APPENDIX A

GENERAL WILDLIFE/PROTECTED SPECIES REPORT

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NFRA
Northeast Florida Regional Airport
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APPENDIX A

ST. AUGUSTINE AIRPORT
TAXIWAY 'C' REPLACEMENT, RSA COMPLIANCE, AND APPROACH LIGHTING SYSTEM PROJECTS

GENERAL WILDLIFE/PROTECTED SPECIES REPORT

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1.0 Background

The National Environmental Policy Act (NEPA) of 1969 requires analysis of impacts for federal actions such as major airport improvements. The St. Augustine airport is proposing to replace Taxiway 'C', repair the eroded Runway Safety Area (RSA), and install an Approach Lighting System (ALS) for Runway 31. It is necessary to replace Taxiway 'C' due to deteriorating pavement of the current taxiway and for the airport to support a larger fleet mix of aircrafts. Taxiway 'C' was originally built in the 1950s, and in 2004, the runway and associated taxiway system was re-categorized accordingly as an "Airplane Design Group IV – Approach Category D" by FAA design standards, which requires a greater runway taxiway centerline separation than what presently exists. FAA Advisory Circular 150-5300-13 requires a runway taxiway centerline separation of 400 feet. The existing Taxiway 'C', which is located on the approach end of Runway 31, has a runway taxiway centerline separation of only 205 feet. Consequently, the existing Taxiway is located too close to the runway for the class and category of aircraft that are presently using the facility.

The RSA has eroded from substantial weather events such as Tropical Storm Fay, Hurricane Floyd, and other recent storms. In effect, the erosion has caused the RSA to become dimensionally non-compliant with regard to FAA airport design standards. Therefore, to meet FAA safety standards, the RSA must be returned to the appropriate design dimensions. In addition, an ALS is needed for Runway 31 to enhance visibility during aircraft approach. The airport currently has two of the three components of the ILS. The last component, the ALS, is needed to complete the ILS.

As a result, an EA which documents the need for the actions, identifies alternatives to the actions, and evaluates potential impacts of the Proposed Projects, is being prepared to comply with NEPA requirements. This Wildlife Report evaluates the potential impacts to federal and state listed species and their habitats.

The policy that governs listed species includes both federal and state regulations. The Endangered Species Act of 1973, Title 16 U.S. Code (USC) Section 1531-1544, must be considered. In order to satisfy the Endangered Species Act, the FAA must determine if a Proposed Project under its purview would affect a federally-listed species or habitat critical to that species (critical habitat). Section 7(a)(2), Title 16 USC Section 1536(a)(2), requires federal agencies to consult with either the Secretary of the Interior or the Secretary of Commerce, as appropriate, through their respective authorized designees.

In the State of Florida, Chapter 68A-27 Florida Administrative Code (F.A.C.) must be addressed. Pursuant to Chapter 68A-27, F.A.C., no project can harm or harass a listed species. Listed species are defined as those plants and animals that are formally listed as Endangered, Threatened, or a Species of Special Concern on the state or federal level or listed as a commercially exploited plant by the United States Department of the Interior, Fish and Wildlife Service (USFWS) (50 CFR 17.11-12), the Florida Fish and Wildlife Conservation Commission (FWC) (68A-27, F.A.C.), or the Florida Department of Agriculture and Consumer Services (Section 581, Florida Statutes [F.S.]).

An endangered species is defined as any species that is in danger of extinction throughout all or a portion of the species' range (16 USC Section 1532(6)). A threatened species is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of the species' range (16 USC Section 1532(20); Ch. 68A-27, Florida Administrative Code (F.A.C.) (FAA, 2007).

The following report provides an analysis of the potential impacts on listed species from the Airport Taxiway 'C' Replacement, RSA Compliance, and ALS Projects.

2.0 Introduction

The Airport is located on the eastern coast of Florida. Specifically, the airport is located immediately east of US Highway 1 in the city of St. Augustine in St. Johns County, Florida. The Airport comprises approximately 718 acres of maintained grasses, saltmarsh, open water, ditches, canals, a boat ramp, a seaplane dock, runways and associated infrastructure. The proposed project comprises 42.5 acres of the 718 acres of airport property.

To assess potential impacts to listed species and their habitat for the EA, a general wildlife survey, a listed species survey, and any relevant species specific surveys were performed. Birkitt Environmental Services, Inc. (Birkitt) was tasked with conducting these three (3) wildlife surveys in the vicinity of all potential impact areas. A scientist from Birkitt and a scientist from The LPA Group, Inc. (LPA) conducted general wildlife surveys and a listed species survey for areas in and adjacent to the proposed for construction activities on April 2009. The methods utilized and the results of these surveys are provided in Section 3.0 and 4.0, respectively.

3.0 Methods

3.1 Desktop Survey

Prior to beginning any field work, a desktop survey of the airport property and surrounding areas was conducted to determine the likely or potential presence of listed species or rare, protected, imperiled, or critical habitat. The desktop survey included obtaining and reviewing the Florida Natural Areas Inventory (FNAI) report. An FNAI report consists of a search of FNAI maps and database for an elemental occurrence of a listed species. "The element occurrence data layer includes occurrences of rare species and natural communities. For animals and plants, elemental occurrences generally refer to more than a casual sighting; they usually indicate a viable population of the species. Note that some elemental occurrences represent historically documented observations, which may no longer be extant" (FNAI, 2008). The FNAI report (**Appendix O**) was received in April 2009, the results of which are detailed below.

In addition, available resource maps which describe the vegetative assemblages, land use, wetland types, and habitat types present in the proposed project area were reviewed prior to field work. Example resource maps included, but were not limited to, FLUCFCS, NWI, FWC manatee mortality and synoptic survey, and FWC seagrass maps (Figures 1 and 2). Various federal and state regulations were also reviewed including 50 Code of Federal Regulations (CFR) 17 (for animals) and 50 CFR 23 (for plants) as administered by the USFWS, Chapter 372, Wildlife – 372.072 Florida Endangered and Threatened Species Act; and Chapter 379, Fish and Wildlife Conservation.

3.2 Field Surveys

Field surveys for the proposed project were conducted from April 6, 2009 to April 10, 2009. Environmental scientists from Birkitt and LPA conducted general wildlife and listed species surveys using pedestrian and vehicular transects in the areas adjacent to proposed construction areas. These areas are not expected to be directly impacted by construction activities. However, there may be listed species present in this area which have the potential to enter construction areas or be affected by construction activities.

General wildlife surveys and listed species surveys were conducted in areas where construction impacts are expected to occur and in adjacent areas. Wading birds, water birds, shorebirds, and wood storks (*Mycteria americana*) were observed during the general wildlife surveys. As a result, species specific surveys for these species were also conducted utilizing field methodologies that conformed to the accepted guidelines developed by the FWC and USFWS.

Species specific surveys were conducted for wading birds, wood storks, shorebirds, brown pelicans and least terns along the shorelines of wetlands located within or adjacent to the proposed project area for five days (April 6th – April 10th, 2009). Accepted FWC methodologies (Beever, 1997) were utilized to conduct these surveys. Per the required FWC protocols, surveys for wading birds, wood storks, and brown pelicans were conducted at dawn and at dusk. The wading bird survey was conducted as follows:

Monday April 6th – Dusk survey
Tuesday April 7th – Dawn survey
Wednesday April 8th – Dawn Survey
Thursday April 9th – Dusk survey
Friday April 10th – Dawn Survey

In addition, surveys for least terns and shorebirds were conducted during the above wading bird surveys, during wetland delineations, and during the general wildlife and listed species surveys for a total of five (5) days of assessments.

During each survey, the species, activity, and general location of the avifauna were noted. In addition, foraging areas that fit the criteria for wood stork Core Foraging Areas (wetlands with 2 to 15 inches of water depth, calm water, and without dense emergent vegetation) were investigated and mapped (**Appendix O, Figure 2**) in accordance with USFWS guidelines.

4.0 Results

4.1 General Vegetation and Habitats Present

Currently, the dominant vegetation at the airport includes maintained grasses. Adjacent areas are comprised of saltmarsh, highways (US 1), commercial areas, residential areas, and open water. An assessment of the habitat and vegetation present at the airport and in adjacent areas was conducted during the wildlife surveys. The results of these surveys are provided below.

The site inspection revealed that the dominant vegetation present at the airport includes maintained grasses (*Cynodon dactylon* and *Paspalum notatum*), spiderwort (*Tradescantia ohiensis*), blackberry (*Rubus* sp.), seashore dropseed (*Sporobolus virginicus*), thistle (*Cirsium* sp.), Indian sweetclover (*Melilotus indicus*), fiddle dock (*Rumex pulcher*), groundcherry (*Physalis arenicola*), and St. John's-wort (*Hypericum* sp.). The vegetation adjacent to the saltmarsh habitats included maintained grasses, saltgrass (*Distichlis spicata*), dollarweed (*Hydrocotyle umbellata*), yaupon holly (*Ilex vomitoria*), gallberry (*Ilex glabra*), and prickly-pear cactus (*Opuntia* sp.). In addition, wrack lines and debris were present in the areas adjacent to the saltmarsh habitats.

Vegetation observed during the surveys in the saltmarsh habitat is included in **Table 1** below.

Table 1
Wetland Vegetation Observed in or Adjacent to the Project Area.

Common Name	Species Name	Common Name	Species Name
Saltgrass	*Distichlis spicata*	Largeleaf marshpennywort	*Hydrocotyle bonariensis*
Black needlerush	*Juncus roemerianus*	Black mangrove	*Avicennia germinans*
Big leaf sumpweed	*Iva frutescens*	Seapurslane	*Sesuvium portulacastrum*
Seashore marshelder	*Iva imbricata*	Crested saltbush	*Atriplex pentandra*
Saltwort	*Batis maritima*	Sea oxeye	*Borrichia frutescens*
Glasswort	*Sarcocornia ambigua*	Seaside goldenrod	*Solidago sempervirens*
Saltmarsh cordgrass	*Spartina alterniflora*	Sea blite	*Suaeda linearis*
Sand cordgrass	*Spartina bakerii*	Saltwater falsewillow	*Baccharis angustifolia*
Marshhay cordgrass	*Spartina patens*	Wax myrtle	*Myrica cerifera*
Black mangrove	*Avicennia germinans*		

**Source: Birkitt Environmental Services, Inc. observations*

4.2 Vegetative Assemblage/Land Use-Land Cover

The FLUCFCS and the NWI were utilized to classify land types and wetland habitats by increasing levels of specificity (**Table 2**). Habitat types, including uplands and wetlands, were characterized on the site and adjacent to the airport using published data and observations recorded during the preliminary and detailed site investigations. Habitat types include the maintained airport field, streams and waterways, reservoirs, saltwater marshes, non-vegetated wetland, and residential areas.

Information regarding species composition of FLUCFCS communities is from the State of Florida Department of Transportation, *Florida Land Use, Cover and Forms Classification System, Handbook*, Third Edition (FDOT, 1999). Information regarding the NWI communities is from the USFWS and Cowardin et al. (1979).

<u>Reservoirs (FLUCFCS-530)</u>
Reservoirs are artificial impoundments of water. Reservoirs are used for irrigation, flood control, municipal and rural water supplies, recreation and hydro-electric power generation. There are three (3) reservoirs located at the airport to the west / southwest of Runway 13-31 and outside of the proposed project area. The reservoirs have overflow control structures that connect hydrologically to the adjacent saltmarsh. Reservoirs are not located in the proposed project area but are adjacent to the northwest of the airport.

Table 2
Land and Wetland Habitat Types

Land Use	FLUCFCS Code†	USFWS Classification (NWI Code)*	In the Proposed Project Area (acres)
Streams and Waterways	510	E1UBLx	3.91
Reservoirs	530	-	0
Airports	811	-	26.7
Saltwater Marshes	642	E2USP	12.2
Residential, Low Density	110	-	0

†FDOT, 1999 *Cowardin et. al, 1979

E = Estuarine, 1 = Subtidal, UB = Unconsolidated bottom, L = Subtidal x = Excavated, 2 = Intertidal US = Unconsolidated shore, P = Irregularly Flooded

Streams and Waterways (FLUCFCS 510; NWI E1UPLx)

This category includes rivers, creeks, canals, and other linear water bodies with a mouth less than one (1) mile in width. The streams and waterways located in the airport vicinity include an embayment, adjacent waterways of the Tolomato River, a tidal creek historically known as "Indian Creek", as well as a previously dredged tidal canal and ditch which maintain navigation for the adjacent residences. This land use comprises approximately 3.91 acres of the proposed project area.

Airports (FLUCFCS 811)

Airports are included under the land use transportation. The transportation facilities are used for the movement of people and goods. The Airport land use code includes all airport facilities including the runways, taxiways, intervening land, terminals, service buildings, navigational aids, fuel storage, parking lots, and a limited buffer zone. Airports account for approximately 26.7 acres of the project area.

Saltwater Marshes (FLUCFCS 642; NWI E2EM1P)

Saltwater marshes or saltmarsh, include a dominance of one or more of the following species:

Saltmarsh cordgrass - *Spartina alterniflora*
Big cordgrass - *Spartina cynosuroides*
Marsh-hay cordgrass - *Spartina patens*
Gulf cordgrass - *Spartina spartinae*
Black needle rush - *Juncus roemerianus*
Seashore saltgrass - *Distichlis spicata*
Saltwort - *Batis maritima*
Glassworts - *Salicornia* sp.
Fringerush - *Fimbristylis castanea*
Salt dropseed - *Sporobolus virginicus*
Seaside daisy - *Borrichia frutescens*
Salt jointgrass - *Paspalum vaginatum*

The saltmarsh located onsite occurs along the eastern, southern, and western boundaries of the airport and the habitat is adjacent to tributaries of the Tolomato River. Dominant vegetation includes cord grasses (*Spartina* spp.) and black needlerush (*Juncus roemerianus)*, and these saltmarsh species are known to provide beneficial foraging habitats for numerous wading birds. This habitat comprises approximately 12.2 acres of the proposed project area.

Non-Vegetated Wetland (FLUCFCS 650; NWI E2USP)
Non-vegetated wetlands are those hydric surfaces on which there is no vegetation due to the erosional effects of wind and water transporting the surface material so rapidly that the establishment of plant communities is hindered or the fluctuation of the water surface level is such that vegetation cannot become established. In the proposed project area, the non-vegetated wetlands include large areas of sand and salt flats that contain no vegetation. Salt flats typically lack vegetation because of hypersaline soil conditions due to the repeated evaporation of saltwater in these areas. These salt flats comprise approximately 1.37 acres of the proposed project area and are located within the saltmarsh habitat.

Even though the salt flats in the proposed project area can be considered a separate habitat, the non-vegetated areas are an important community in a saltmarsh. A salt marsh commonly contains a mosaic of habitats and therefore, the salt flats acreage in the proposed project area is included within the acreage of saltmarsh for a total of 12.2 acres.

Residential, Low Density (FLUCFS 110)
This land use includes those residential areas that have less than two (2) dwellings per acre. This residential type is not located in the proposed project area but adjacent, to the south / southeast of the airport.

4.3 General Wildlife

The wildlife observed at the St. Augustine Airport during the investigations were those species typically found in coastal, saltmarsh habitats. These species included avifauna such as songbirds, wading birds, water birds, and shorebirds, as well as reptiles (snakes), fish, and invertebrates. The non-listed species observed during the general wildlife and listed species surveys as well as during the wetland delineation are provided in the table below (**Table 3**).

4.4 Listed Species

The FNAI map and database query reported a few elemental occurrences near the proposed project area. However, none of the previous occurrences of listed species noted in the FNAI report were recorded on the airport property. In addition, the elemental occurrences that were reported were greater than 1.5 miles from the airport or were separated by large expanses of saltwater. The reported species included the Florida pine snake (*Pituophis melanoleucus mugitus*), eastern indigo snake (*Drymarchon corais couperi*), and coastal vervain (*Glandularia maritima*). Those species with the potential to occur in the proposed project area are included in **Table 4**. The species in **Table 4** were included if they were reported as potentially occurring in the FNAI report or if representative habitat is present within and adjacent to the proposed project area.

Table 3
Non-Listed Wildlife Species Observed in or Adjacent to the Proposed Project Area – April 2009

Common Name	Species Name	Common Name	Species Name
Birds			
Blackbird, red-winged	*Agelaius phoeniceus*	Martin, purple	*Progne subis*
Coot, American	*Fulica americana*	Merganser, hooded	*Lophodytes cucullatus*
Cormorant, double crested	*Phalacrocorax auritus*	Osprey	*Pandion haliaetus*
Duck, mottled	*Anas fulvigula*	Rail, clapper	*Rallus longirostris*
Egret, cattle	*Bubulcus ibis*	Sparrow	*Ammodramus spp.*
Egret, great	*Ardea alba*	Starling, european	*Sturnus vulgaris*
Grackle, boat-tailed	*Quiscalus major*	Swallow, northern rough winged	*Stelgidopteryx serripennis*
Gull, herring	*Larus argentatus*	Teal	*Anas spp.*
Gull, laughing	*Larus atricilla*	Tern, common	*Sterna hirundo*
Gull, ring-billed	*Larus delawarensis*	Turnstone, ruddy	*Arenaria interpres*
Harrier, northern	*Circus cyaneus*	Vulture, turkey	*Cathartes aura*
Heron, great blue	*Ardea herodias*	Whimbrel	*Numenius phaeopus*
Heron, green	*Butorides virescens*	Willet	*Catoptrophorus semipalmatus*
Killdeer	*Charadrius vociferous*	Yellowlegs, lesser	*Tringa flavipes*
Kingfisher, belted	*Ceryle alcyon*		
Mammals			
Deer, white-tailed	*Odocoileus virginianus*	Raccoon, common	*Procyon lotor*
Reptiles			
Alligator, American	*Alligator mississippiensis*	Water snake, brown	*Nerodia taxispilota*
Snake, rat	*Elaphe obsoleta*		
Invertebrates			
Crab, fiddler	*Uca* spp.	Oyster, eastern	*Crassostrea virginica*
Periwinkle	*Littorina* spp.	Whelk, lightning	*Busycon contrarium*
Quahog	*Mercenaria mercenaria*	Crab, blue	*Callinectes sapidus*
Fish			
Killifish	*Fundulus* spp.	Redfish	*Sciaenops ocellatus*
Mosquitofish	*Gambusia holbrooki*		

Table 4
Potentially Occurring Listed Species in the Proposed Project Area*

Common Name	Scientific Name	Federal Status	State Status
Mammals			
Manatee	*Trichechus manatus*	**E**	**E**
Fish			
Atlantic Sturgeon	*Acipenser oxyrinchus oxyrinchus*	**C**	**SSC**
Shortnose Sturgeon	*Acipenser brevirostrum*	**E**	**E**
Reptiles			
American Alligator	*Alligator mississippiensis*	**SAT**	**SSC**
Eastern Indigo Snake	*Drymarchon corais couperi*	**T**	**T**
Florida Pine Snake	*Pituophis melanoleucus mugitus*	**-**	**SSC**
Gopher Tortoise	*Gopherus polyphemus*	**-**	**T**
Birds			
Little Blue Heron	*Egretta caerulea*	**-**	**SSC**
Snowy Egret	*Egretta thula*	**-**	**SSC**
Tricolored Heron	*Egretta tricolor*	**-**	**SSC**
White Ibis	*Eudocimus albus*	**-**	**SSC**
Limpkin	*Aramus guarauna*	**-**	**SSC**
Brown Pelican	*Pelecanus occidentalis*	**-**	**SSC**
Wood Stork	*Mycteria americana*	**E**	**E**
Least Tern	*Sterna antillarum*	**-**	**T**

*Based on habitat present and FNAI report
SAT = Threatened due to similarity of appearance to a listed species; C = Candidate Species; SSC = Species of Special Concern; T = Threatened; E = Endangered

The April 2009 field surveys revealed the presence of several state and federally listed species and their habitat in or adjacent to the airport property (**Table 5**). Listed species, protected species (bald eagle), and their habitat observed during the surveys are discussed in further detail below. Bald eagles (*Haliaeetus leucocephalus*) are included in this report and described as "protected" even though they have been removed from the state and federal list of Threatened and Endangered species because the species remains protected under other state and federal laws. These laws include the federal Bald and Golden Eagle Protection Act of 1940 (50 CFR Part 22), the Migratory Bird Treaty Act, and the state Bald Eagle Management Plan. The state and federally listed and protected species observed at the airport are shown in Table 4 and further discussed below.

Table 5
Listed and Protected Species Observed in the Proposed Project Area – April 2009

Common Name	Scientific Name	Federal Status	State Status
Bald Eagle	*Haliaeetus leucocephalus*	**P**	**P**
Snowy Egret	*Egretta thula*	**-**	**SSC**
Tricolored Heron	*Egretta tricolor*	**-**	**SSC**
White Ibis	*Eudocimus albus*	**-**	**SSC**
Brown Pelican	*Pelecanus occidentalis*	**-**	**SSC**
Wood Stork	*Mycteria americana*	**E**	**E**
Piping Plover	*Charadrius melodus*	**T**	**T**
Least Tern	*Sterna antillarum*	**-**	**T**

SSC = Species of Special Concern; T = Threatened; E = Endangered, P = Protected

4.4.1 Colonial Waterbirds

Colonial waterbirds are avifauna that are often found in or near water and nest in large groups called colonies. Colonial waterbirds are comprised of various families of birds that include but are not limited to the coastal waterbird group and the wading bird group. The coastal waterbird group consists of birds such as terns (*Sterna* spp.), black skimmers (*Rhynchops niger*), gulls (*Larus* spp.), pelicans (*Pelecanus occidentalis*), and cormorants (*Phalacrocorax* spp.). Wading birds include herons and egrets (Family *Ardeidae*) as well as ibis (Family *Threskiornithidae*) and storks (Family *Ciconiidae*). Prey resources for colonial waterbirds include various aquatic and terrestrial fauna comprised of fish, mollusks, insects, reptiles and amphibians, and invertebrates (Rogers et al., 1995).

Legislative History

Federally, colonial waterbirds are protected under the Migratory Bird Treaty Act of 1918. The Migratory Bird Treaty Act prevents the take of any eggs, nests, or feathers. In addition, there are several federal initiatives that have been implemented to research, gather information and identify needs to ensure the sustainability of waterbirds and their habitat. Such initiatives include the North American Colonial Waterbird Conservation Plan and Waterbird Conservation for the Americas (Kushlan et al., 2002).

In the State of Florida, colonial waterbirds are protected by the State Wildlife Code, which also prohibits take of birds, nests, or eggs (FNAI, 2001). Of the wading birds, the tri-colored heron, snowy egret, little blue heron, white ibis, reddish egret, and rosette spoonbill are listed in the state of Florida as Species of Special Concern. The wood stork is listed as Endangered on both the federal and state levels. Of the waterbirds, the brown pelican and black skimmer are listed as Species of Special Concern and the least tern is listed as Threatened in the State of Florida. Due to their higher level of protection, the least tern and wood stork are discussed separately in Section 4.4.2 and 4.4.4, respectively.

Members of the wading bird guild are of conservation concern because their reproductive strategy leaves them vulnerable to habitat degradation. Colonial wading birds nest in large colonies. In fact, hundreds of birds can nest in one tree. Although this strategy provides benefits such as predator avoidance, it also makes the birds especially vulnerable to habitat loss because impacts to a small area (colony) can affect hundreds of breeding pairs of several different species. Habitat loss is one of the main causes for the historic decline in wading bird populations. However, the 2009 State of the Birds Report states that conservation and management measures, such as the protection of wetland habitats, have contributed to increases of many wetland birds (North American Bird Conservation Initiative, U.S. Committee, 2009).

Life Cycle

Colonial waterbirds can be found in both estuarine and freshwater forested and herbaceous wetlands which they utilize for nesting, foraging, and roosting. Breeding habitat includes marshes, ponds, mangroves, lakes, rivers, shallow coastal habitats, and estuaries. As suggested in their name, the group nests colonially, in large groups comprised of multiple species. Nests are typically created in shrubs, flooded woody plants or vegetation on islands (Rogers et al., 1995).

Presence of Species in the Proposed Project Area

The colonial waterbirds observed at St. Augustine Airport included various egrets and herons, gulls, cormorants, terns, ibises and pelicans (See Attachment 1). The listed colonial waterbirds which were observed included the snowy egret, tricolored heron, and white ibis. These three (3) species were primarily observed either foraging in adjacent wetlands or in flight. In total, two (2) snowy egrets, two (2) tricolored herons, and two (2) white ibis were observed during the five (5) days of wading bird surveys. No colonies or nests were observed. The closest reported waterbird nest is located approximately 5 miles to the north northwest of the airport (FWC, 2003). This waterbird colony is currently listed as inactive and was last active in the 1970s. The closest reported active colony is located approximately 16 miles to the south near Crescent Beach.

4.4.2 Least Tern

Legislative History

Least Terns are listed as Threatened by the FWC. The species is federally protected by the Federal Migratory Bird Treaty Act of 1918, which states that it is unlawful to pursue, hunt, capture, kill, possess for sale, purchase, deliver for shipment, or cause to be exported, any migratory birds including their eggs, nests, and body parts.

Life Cycle

The least tern is the smallest American tern and is typically found in coastal areas throughout Florida including beaches, lagoons, bays, and estuaries. Nesting areas are usually well-drained sand or gravel areas with little vegetation. Nesting begins in mid-April and ends in August. The least tern primarily nests at or near the coastline, but some inland breeding is known to occur. The least tern nests colonially, directly on the ground, on light-colored, open areas of sand or gravel, and usually away from any cover, shrubs, or trees that would allow a predator to approach without detection. The species will often utilize artificial nesting sites, including gravel rooftops, dredge spoil islands or other dredged material deposits, construction sites, causeways, and mining lands (FNAI, 2001). The least tern feeds mostly on small, shallow-bodied fresh and saltwater fish, but its diet is varied and includes small crustaceans and insects (Thompson et al., 1997).

Presence of Species in the Proposed Project Area

Least terns observed at the St. Augustine Airport were primarily seen near the seaplane dock. The individuals were observed either roosting on the dock or foraging in the adjacent open water areas. On average, one (1) least tern was observed per day during the bird surveys and at most two (2) birds were observed at one time.

4.4.3 Shorebirds

Shorebirds include those bird species classified in the Order Charadriiformes, suborder Charadrii. Shorebirds are classified as migratory birds that are most often found along shorelines but can also be found inland, upland, on arctic tundra, or at sea. The species most commonly referred to as shorebirds are sandpipers and plovers; however other groups of birds such as oystercatchers, stilts, willets, whimbrels, and yellowlegs are also included as shorebirds. In total, 49 species of birds in North America make up the shorebird group.

Legislative History

Only a few species of shorebirds that are found in Florida are protected. The piping plover, snowy plover, and American oystercatcher are listed either federally and / or on the state level. Of the three (3) listed species, only the piping plover and the American oystercatcher have the likelihood of being present in northeastern Florida (FNAI, 2009). Federally, the piping plover was listed as Threatened by the USFWS in 1985 and is also protected by the US Migratory Bird Treaty Act of 1918. The species is listed as Threatened by the FWC and the state Wildlife Code prohibits take of birds, nests, or eggs. The American oystercatcher is not federally listed and is a Species of Special Concern in the State of Florida.

Along with the colonial waterbirds, shorebirds are of conservation concern due to loss of foraging and nesting habitat. Certain initiatives are being conducted by regulatory agencies. For example, the Migratory Bird Management Program of the USFWS conducts numerous activities to ensure shorebird populations remain healthy.

Life Cycle

Shorebirds are typically characterized as having long bills, legs and toes which are utilized to move through mudflats and wetlands to forage. Species in the group range in size from a few ounces to a pound or more and come in a variety of colors. They are known to migrate over long distances to reach wintering and nesting grounds. Food sources include aquatic insects, crustaceans and other aquatic invertebrates, terrestrial invertebrates, fishes, reptiles, amphibians, and plants.

Although they are typically observed along the coastline in Florida, some shorebirds can also be found inland. Typical habitats include coastal, saline, and freshwater wetlands, flooded agricultural fields, and interior grasslands. Most shorebird species prefer open, sparsely vegetated cover near shallow water for nesting. Nest sites are usually located near foraging habitat and where a source of fresh water for adults and chicks is available. These areas often include wide sloping beaches and wetland edges. Spoil islands formed by disposal of dredged material are also utilized (USDA, 2000).

Presence of Species in the Proposed Project Area

Several species of shorebirds were observed in and adjacent to the proposed project area. Several willets, a whimbrel, several lesser yellowlegs, and a piping plover were observed during the investigations (See Attachment 1). No oystercatchers were observed. Only one (1) whimbrel was observed roosting in the salt flat habitat with a few willets. In total, seven (7) yellowlegs were observed during the wading bird surveys. Six (6) of the seven (7) birds were seen roosting on the seaplane dock during one survey and the other one (1) bird was observed foraging in the tidal ditch during low tide. On average, fifteen (15) willets were recorded in the proposed project area during the wading bird surveys. The majority of the willets were observed roosting in the salt flats as pairs while others were observed roosting on or near the seaplane boat dock. In addition, a few young willets were seen roosting in the salt marsh.

One piping plover was observed during the wading bird and shorebird survey on April 8, 2009. The individual was seen roosting on concrete rocks along the banks of the northern open water area, in proximity to the seaplane dock. The bird was only observed that one time.

4.4.4 Wood Stork

Legislative History

The wood stork was federally listed as Endangered by the USFWS in 1984 and was state listed by the FWC as Endangered in 1988.

Life Cycle

The wood stork is a large wading bird in the family Ciconiidae. The adult bird is large at thirty-three (33) to forty-five (45) in. (83 to 115 cm) tall, with a fifty-eight (58) to seventy-one (71) in. (140 to 180 cm) wingspan. Adults are white with black flight feathers and tail. They have dark legs and beige feet with bald, scaly, dark-gray heads and necks. However, juvenile wood storks have grayish brown feathering on their head and neck with yellowish bills. Wood storks have long, heavy, decurved bills to aid them in foraging (FNAI, 2001). Wood storks feed primarily (often almost exclusively) on small fish between one (1) and eight (8) in. long. Optimal foraging sites for wood storks are wetlands with water levels between two (2) and fifteen (15) inches deep (USFWS, 1990), where they are attracted to falling water levels that concentrate food sources such as fish (FNAI, 2001; Passarella and Associates, 2003).

Wood storks nest in colonies in a variety of inundated forested wetlands, including cypress strands and domes, mixed hardwood swamps, sloughs, and mangroves. Their annual and long-term use of nesting sites is very dependent on feeding conditions, which may be affected dramatically by altered hydrologic patterns. Therefore, this species is very sensitive to the alteration of water regimes and loss of wetland habitat, which affect both nesting sites and feeding areas. Increasingly, nesting pairs have been found nesting in artificial habitats (e.g., impoundments and dredged areas with native or exotic vegetation) in north and central Florida (FNAI, 2001).

Nesting wood storks feed mostly in wetlands that average between five (5) and forty (40) miles from the colony, and occasionally at distances as great as seventy-five (75) miles from the colony (USFWS, 1990). For this reason, as part of the management guidelines for wood stork populations in north Florida, the USFWS has established thirteen (13) mile buffer zones around known nesting colonies called Core Foraging Areas. These buffer zones are designed to offer some protection against loss of potential foraging habitat (i.e. wetlands) located within the range of nesting colonies. (**Appendix O**.)

Presence of Species in the Proposed Project Area
In total, three (3) different occurrences of wood storks were recorded during the five (5) days of wading bird surveys (See Attachment 1). The wood storks during the first two (2) occurrences were observed flying over the proposed project area. Only one (1) wood stork was observed foraging on site, at the corner of the previously dredged tidal ditch and canal. This area satisfies the criteria for suitable foraging areas for wood storks as it is within the (13) mile buffer of one (1) known wood stork nesting colony and satisfies the specific criteria as listed by the USFWS. This wood stork nesting colony is located approximately 6 miles to the south southwest of the airport. Suitable foraging habitat is described as wetland or open water areas that are relatively calm, uncluttered by dense thickets of aquatic vegetation, and have a water depth between two (2) and 15 inches (USFWS, 2007).

The saltmarsh habitats within the proposed project area also contain some areas that may meet the criteria for wood stork Core Foraging Areas (**Appendix O**). However, the majority of the habitat contains thick areas of saltmarsh vegetation and has water depths of less than two (2) inches. Therefore, only a small amount of the proposed project area can be considered wood stork Core Foraging Areas (approximately 2.54 acres). The other habitats that meet the criteria for Core Foraging Areas are open water areas which are tidally influenced, sometimes having depths less than two (2) inches and more than 15 inches of water. (**Appendix O**).

4.4.5 Shortnose Sturgeon

Legislative History
The shortnose sturgeon was originally listed as an endangered species by the USFWS on March 11, 1967 under the Endangered Species Preservation Act (32 FR 4001, **Appendix I**). The NMFS later assumed jurisdiction for shortnose sturgeon under a 1974 government reorganization plan (38 FR 41370) (NMFS, 1998). Critical habitat for the shortnose sturgeon has not been identified.

Life Cycle
Shortnose sturgeon is the smallest of the three sturgeon species that occur in eastern North America, having a maximum known total length of 4.7 feet (1.4 m) and weight of 50.7 pounds (23 kg). The species has a short, blunt snout with a wider mouth than its relative sturgeon, the Atlantic sturgeon. Shortnose sturgeon are found in rivers and estuaries from the St. John River in Canada southward to the St. Johns River in Florida. In Florida, shortnose sturgeon are restricted to the lower St. Johns River basin from the mouth upstream to Lake George and Lake Crescent (FNAI, 2001).

The species is considered estuarine anadromous in the southern part of its range. Anadromous species are those species that swim to rivers and other freshwater systems for breeding. Typically, adult sturgeons in southern rivers forage at the interface of fresh tidal water and saline estuaries and enter the upper reaches of rivers to spawn in early spring (NMFS, 1998). However, the species is mainly a year-round resident and unlike other anadromous fish, shortnose sturgeon do not appear to make long distance offshore migrations. Excursions into full-strength salt water occur seldom, if ever. Most of the life cycle is spent in lower portions of large rivers and in brackish habitats along the Atlantic coast. During spawning, this species may migrate long distances upstream if unimpeded by dams. Spawning occurs in late winter (FNAI, 2001).

Shortnose sturgeon are benthic feeders. Juveniles are believed to feed on benthic invertebrates and crustaceans. Mollusks and large crustaceans are the primary food of adult shortnose sturgeon (NMFS, 1998).

Presence of Species in the Proposed Project Area
No shortnose sturgeon were observed during the wildlife and benthic surveys and it is not anticipated that sturgeon will enter the proposed project area during construction. Research has shown that shortnose sturgeon are found in the St. Johns River in Florida (NOAA, 1984). It is not known whether the sturgeon are found in other rivers in northern Florida, such as the Tolomato River. Five (5) reports of shortnose sturgeon were recorded in the 1970's within the St. John's River and were all located outside of estuarine waters, well upstream in freshwater sections of the river. The latest known recording of shortnose sturgeon in Northeast Florida was in 2002 well upstream of estuarine habitat in the St. John's River (south side of Federal Point outside of Palatka). The FWC states that it is highly unlikely that a sizable population of shortnose sturgeon exists in the St. John's River (FWRI, 2009). As a result, it is very unlikely that shortnose sturgeon will be found within or adjacent to the proposed project area. Suitable habitat does exist in the proposed project area but more suitable habitats including the Tolomato River and large areas of undisturbed saltmarsh habitat are available in areas outside of the proposed project area.

4.4.6 Atlantic Sturgeon

Legislative History
The Atlantic sturgeon is considered a "Candidate Species" by the NMFS and USFWS as the species numbers are nearly at the Threatened level. A status review of the species was initiated by NMFS in 2005 and it was found that the populations of Atlantic sturgeon in the South Atlantic have a moderate risk of becoming endangered in the next twenty (20) years. A full assessment of the species is needed before a recommendation for listing is made. Therefore, the species is listed as a candidate species.

On the state level, the Atlantic sturgeon is classified as a Species of Special Concern by the FWC. Overfishing of the Atlantic sturgeon commercial fishery for the desirable roe (fish eggs that are sold as caviar) has led in part to their protected status.

Life Cycle
Atlantic sturgeon can be identified by bluish black or olive brown skin and five (5) major rows of dermal scutes. The species is a subtropical, anadromous species that migrate upriver in the spring to spawn when temperature are approximately 64°F. Spawning occurs every three (3) to five (5) years in flowing waters of large rivers. After four (4) to six (6) weeks, females migrate out of rivers while the males do not exit the rivers until the fall. Juveniles move to downstream estuarine waters where they can stay up to five (5) years or until they are approximately 30 to 36 inches; at that time, they

move to coastal waters. Once they enter the waters of the Atlantic Ocean, immature Atlantic sturgeon can migrate great distances away from their natal river (NMFS, 2009).

Atlantic sturgeon are currently found in 35 rivers on the Atlantic coast of the United States from Maine to north Florida, including the St. Johns River in northern Florida. The species feed on mollusks, worms, snails, invertebrates, shrimp, small bottom-dwelling fish and insect larvae.

Presence of Species in the Proposed Project Area

No Atlantic sturgeon were observed during the wildlife and benthic surveys. Research has shown that Atlantic sturgeon are found in the St. Johns River in Florida (NMFS, 2009). It is unknown whether the sturgeon are utilizing other rivers in northern Florida, such as the Tolomato River. It is highly unlikely that Atlantic sturgeon will be found near the proposed project area. Suitable habitat does exist in the proposed project area; however, more suitable habitats including the Tolomato River and large areas of undisturbed saltmarsh habitat are available outside of the proposed project area.

4.4.7 Florida Manatee

Legislative History

The manatee has been protected by the State of Florida since 1893. It is currently listed as Endangered by the FWC. Federally, it was listed as Endangered on March 11, 1967 (32 Federa1 Register 4001) and is protected by the Florida Manatee Sanctuary Act (§370.12(2), Florida Statutes), Marine Mammal Protection Act (MMPA) of 1972, and the Endangered Species Act (ESA) of 1973 which state it is unlawful to harm, harass, injure, and/or kill manatees. In 1978, the State of Florida protected critical manatee habitat with the Florida Manatee Sanctuary Act (MSA). The MSA requires permits and empowers the Florida Department of Environmental Protection (DEP) to protect manatee habitats by regulating boat traffic.

St. John's County, Florida has developed a Manatee Protection Plan (MPP). The MPP states that extra protection for shoreline and coastal development projects is not needed in the County. The MPP did identify that there is a lack of information for manatee usage of the County and suggests that further research be conducted. Overall, the MPP states that St. John's County is designated as "medium-risk" to manatees.

Life Cycle

The West Indian manatee is found in fresh, brackish, and marine waters throughout Florida, the Greater Antilles, Central America, and South America. This group is further divided into a separate subspecies commonly called the Florida manatee (*Trichechus manatus latirostris*). The Florida manatee is believed to be comprised of two isolated subpopulations; one along the Atlantic coast and one on the Florida Gulf coast.

Manatees migrate seasonally to adapt to changing water temperatures. They depend on areas with access to natural springs and manmade warm water refugia (USFWS, 1999). There are 17 known warm water aggregation sites in Florida (USFWS, 1999). These aggregation sites occur at or near natural springs and manmade warm water discharges. Once water temperatures drop below 20°C, manatees will migrate to these warmer waters in order to escape the stresses of cold water temperatures.

They are opportunistic herbivores and feed on aquatic plant species, including seagrasses, bank grasses, and overhanging mangroves (USFWS, 1999) at depths of 1 to 3 meters (Hurst and Beck, 1988); due to light attenuation, most Submerged Aquatic Vegetation (SAV) is restricted to shallow near-shore waters. During the winter months (November to March), manatees exhibit diel feeding patterns, resting in warmer waters during the day and feeding in surrounding sometimes cooler areas in the late afternoon (USFWS, 1999).

It is common for female manatees to mate with more than one male during their two to four week estrus period, and gestation will last for approximately 12 to 14 months (USFWS, 1993). Manatees may mate at any time of the year, with a slightly less frequency of births during winter months. Manatees will normally give birth to a single calf, with weaning lasting for 9 to 24 months of age. Calves will reach sexual maturity after 3 to 6 years, and are estimated to live up to 50 years (USFWS, 1993).

Presence of Species in the Proposed Project Area

No manatees were observed during the wildlife and benthic surveys conducted in April 2009. In addition, there are no known warm water aggregation spots (power plants, discharge pipes, large springs with navigable access to the Atlantic Ocean, etc.) located at or in the vicinity of the proposed project area, which would attract large populations of manatees during winter months (USFWS, 2002). No seagrasses were observed in or adjacent to the proposed project area and therefore it is unlikely that manatees would forage within the proposed project area.

A review of the FWC manatee synoptic and mortality surveys showed two manatee mortalities were recorded approximately 0.6 miles to the northeast of the proposed project area, in the Tolomato River (**Figure 4**). The two reported mortalities occurred well in the past, in 1977 and 2001. No manatees were observed during the synoptic surveys, which are conducted in the winter to record manatees in known wintering habitats in Florida and southeast Georgia. The synoptic surveys are conducted by the FWC up to 3 times per winter. The proposed project area is tidally influenced and very shallow (maximum of 1 meter depth). At many times, there is less than two (2) inches of water present in the open water and saltmarsh habitats. Therefore, it is unlikely that manatees will be present within the proposed project area.

4.4.8 Bald Eagle

Legislative History

The bald eagle was recently removed from both the state (April 2008) and federal lists (August 2007) of Threatened and Endangered species. Although it has been de-listed, the bald eagle is still protected federally by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, and at the state level by Section 68A-16.002 F.A.C. (effective May 15, 2008). In accordance with this state rule, bald eagle protections are more thoroughly described in the Florida Bald Eagle Management Plan. The bald eagle also has significant symbolic value as the United States' national animal.

Life Cycle

The bald eagle is the only eagle unique to North America. Its scientific name signifies a sea (*halo*) eagle (*aeetos*) with a white (*leukos*) head (*cephalus*). The adult eagle has a white head, white tail, and large, bright yellow bill; the remaining plumage is dark black and brown. Mature bald eagles are typically between 30 to 37 inches tall, with a wingspan range from 72 to 90 inches, and weigh from ten to fourteen pounds, depending upon sex. Juveniles are dark with variable amounts of light splotching on the body, wings, and tail; the immature head and bill are dark. In flight, the broad, wide wings portray a flat profile when soaring and gliding (FNAI, 2001).

The most common habitat utilized by bald eagles includes locations close to coastal areas, bays, rivers, lakes, or other bodies of water that provide tall sturdy trees for nesting and concentrations of food sources, including fish, waterfowl, and wading birds. The bald eagle is a predatory raptor that eats mostly fish along with small animals and occasionally carrion. Dead or dying fish are an important food source for all bald eagles. Members of this species usually nest in tall trees (typically live pines) that provide clear views of surrounding areas (FNAI, 2001).

Bald eagles mate for life, and after a pair has built a nest it will continue to use and add to that nest year after year. Florida has the third largest breeding population of any state after Alaska and Minnesota. Bald eagles breed throughout Florida, with the greatest numbers of bald eagle nesting territories are concentrated along the Gulf Coast and around larger inland lakes and river systems. The FWC has identified several areas of concentrated bald eagle nesting activity that include a majority of the known nesting territories in Florida. These areas are called "core nesting areas" and include areas located along the Gulf Coast from St Vincent Island to Lee County and inland from the lower St. Johns River to Lake Okeechobee (FWC, 2008).

Presence of Species in the Proposed Project Area

One (1) bald eagle was observed at two (2) different times during the field investigations. On April 6, 2009, a bald eagle was observed foraging in the open water north of the seaplane dock. On April 8, 2009 a bald eagle was observed flying over the stormwater pond to an adjacent tree. No eagle nests were observed during the survey, and no nests have been documented to occur on site or adjacent to the proposed project area according to the FNAI report (**Appendix O**). One inactive eagle nest (SJ013) was previously reported to the north, approximately 0.9 miles from the proposed project area. This nest was last reported as active in 1997.

4.4.9 Eastern Indigo Snake

Legislative History

The eastern indigo snake is state and federally listed as Threatened. The USFWS listed the Eastern indigo snake as Threatened on January 31, 1978 (43 FR 4026-4029). The USFWS cited the reasons for protecting the Eastern indigo snake under the ESA as the threats of habitat modification, collection for the pet trade, and gassing while in gopher tortoise burrows.

Life Cycle

The eastern indigo snake is the largest non-venomous snake in North America and can reach lengths of over ten (10) feet. It has large, smooth, lustrous scales. The eastern indigo snake's coloring is uniformly black, dorsally and ventrally, except for a red or cream-colored suffusion of the chin, throat, and sometimes the cheeks. Historically, this species occurred throughout the far southeastern United States, including Florida and in the coastal plain of Georgia, Alabama, Mississippi, and probably South Carolina. Currently, however, the remaining endemic populations of eastern indigo snakes are established only in Florida and Georgia (USFWS, 1999).

This species thrives in diverse habitats, including longleaf pine forests, scrub, sandhill, wet prairies, and mangrove swamps. Indigo snakes range over large areas and into various habitats throughout the year, with most activity occurring in the summer and fall. This species breeds between November and April, and eggs are laid between May and August. The young hatch approximately 3 months later and hatching activity occurs between August and September. While juveniles feed mainly on invertebrates, the range of habitats occupied by indigo snakes allows adults to enjoy a diverse diet as well. They are predatory snakes that feed on a number of fish, frogs, toads, venomous and non-venomous snakes, lizards, turtles, turtle eggs, juvenile gopher tortoises, small alligators, birds, and small mammals (USFWS, 1999).

Eastern indigo snakes require a variety of habitats such as xeric sandhills that contain gopher tortoises burrows which provide sheltered retreats from winter cold and desiccating conditions (MSRP 1999). As common commensal species, indigo snakes rely heavily on gopher tortoises, regularly utilizing gopher tortoise burrows (active, inactive, and abandoned) without detrimentally affecting the gopher tortoises (Cox, *et al.,* 1987). In wetter habitats that do not support gopher tortoises, eastern indigo snakes commonly find shelter in hollowed root channels, hollow logs, or the burrows of rodents, armadillo (*Dasypus novemcinctus*), or land crabs (*Cardisoma guanhumi*) (USFWS, 1999).

Presence of Species in the Proposed Project Area

No indigo snakes were observed on site during the April field surveys. The species is known to commonly utilize gopher tortoise burrows and no gopher tortoise burrows were observed during investigations at the airport. Additionally, no occurrences of gopher tortoises or indigo snakes were reported by the FNAI in the vicinity of the airport. Habitat and vegetation at the airport is not optimal for indigo snakes.

5.0 Discussion

5.1 Potential Impacts to Wildlife

The majority of wildlife observed within and adjacent to the proposed project area were birds. It is expected that wildlife present within the proposed project area will relocate to suitable habitat that are outside the influences of construction activities. The areas proposed for impact have been previously disturbed and higher quality habitat is available for wildlife in adjacent areas. After construction, saltmarsh habitat that is similar to what is proposed for impact will be replanted along the shoreline of the proposed project area. Approximately 1.66 acres of saltmarsh will be planted along the shoreline interspersed with the erosion control structures. These areas will be available to wildlife after construction and are anticipated to provide the same function as the habitat that is proposed for impact. It is expected that wildlife will return to the remaining areas available after construction is completed or will relocate to the adjacent suitable areas. Therefore, impacts to wildlife are expected to be minimal.

5.2 Potential Impacts to Listed Species

The project proposes to permanently impact approximately 7.46 acres[1] of previously disturbed saltmarsh and 2.57 acres of open, Class II waters. In addition, the project is expected to temporarily impact 4.73 acres of saltmarsh and 1.34 acres of open water (Class II) habitat from construction activities. Impacts to these habitats could also directly impact listed and protected species. The project will also include the planting of 1.66 acres of saltmarsh on top of the erosion control structures across the proposed project area.

Waterbirds, wading birds, shorebirds, and wood storks utilize saltmarsh and open water habitats for foraging, nesting, and roosting and were observed within and adjacent to these areas proposed for impact. Many birds were observed roosting on the seaplane dock and foraging in the open water areas adjacent to the dock. These open water areas are expected to be temporarily disturbed during construction activities. Barges will be utilized to perform the in-water work and will be present in these open water areas adjacent to the dock. The seaplane dock will be available during and after construction and then once the construction is completed, the open water areas will again be available for the birds to forage.

Impacts to colonial water birds, shorebirds, least terns, and wood storks are not expected during the proposed construction activities. Should listed species be found in the proposed project area, it is expected that they will relocate during commencement of construction. Therefore, only minimal impacts, which are temporary in nature, to the various waterbirds are expected during construction. Permanent impacts to waterbird habitat will occur from the direct loss of saltmarsh. Although the proposed project will result in a loss of habitat, significant areas of suitable habitat occur adjacent to and in close proximity to the airport but well outside of the proposed project area. This habitat is of a higher quality than that which is proposed to be impacted as it is a greater distance from the airport. It is expected that any of these species present in the proposed project area will move to these adjacent suitable habitats during construction. After construction, areas of suitable wetland habitat will still remain to support the various bird species.

Permanent impacts from the loss of these species' habitat will be compensated appropriately. Impacts were minimized to the greatest extent possible while still meeting the project's goals. In addition, restoration of the Runway Safety Area will place suitable habitat further away from airport infrastructure with the highest aircraft activity and may reduce the potential for bird strikes. As a result, it is expected that the proposed project will have a determination of "*Not Likely to Adversely Affect*" colonial water birds, shorebirds, least terns, and wood storks. Due to the fact that suitable nesting and foraging habitat does not exist for the piping plover, the Proposed Project is expected to have "*No Effect*" on the piping plover. For further information and impact determination to the wood stork and its foraging habitat, (**Appendix O)** for the Wood Stork Foraging Analysis Report.

Impacts to bald eagles and Eastern indigo snakes are not expected due to the lack of suitable habitat (gopher tortoise burrows/ large nesting trees) in or near the proposed project area. No indigo snakes were observed in or adjacent to the proposed project area. No nests were located in or within 660 feet from the proposed project area. As a result, the proposed project is "*Not Likely to Adversely Affect*" the Eastern indigo snake or the bald eagle.

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[1] The saltmarsh acreage includes approximately 1.37 acres of salt flats.

No manatees have previously been recorded during the FWC synoptic surveys and no manatee deaths have been reported in the areas in or adjacent to the proposed project area. Due to the fact that the open water areas in the proposed project area are predominantly more shallow than the 1 to 3 meter depths that manatee typically utilize and do not contain seagrass, it is unlikely that manatees are regularly present in the open water areas of the proposed project area. However, as a precaution, a Manatee Protection Plan including the "*Standard Manatee Conditions for In-Water Work*" will be developed during the permitting process and enforced during construction activities. Turbidity curtains will also be installed. Therefore, it is expected that the project is "*Not Likely to Adversely Affect*" the Florida manatee.

No sturgeon have been previously observed in the Tolomato River. In fact, the closest reported sighting of shortnose sturgeon to the proposed project area was in 2002 and the location was well upstream, in the St. Johns River, outside of estuarine waters and even outside of St. Johns County. However, suitable sturgeon habitat does exist and therefore, as a precaution, the Sea Turtle and Smalltooth Sawfish Construction Conditions will be utilized during construction. As a result, impacts to shortnose sturgeon and Atlantic sturgeon are not expected. Therefore, the project is anticipated to have a "*Not Likely to Adversely Affect*" determination for the shortnose sturgeon and Atlantic sturgeon.

5.3 Mitigation

The proposed mitigation for this project will also comply with the definition of mitigation that is provided at 40 CFR 1508.20 of the Council on Environmental Quality (CEQ) Recommendations. Those recommendations define mitigation as a sequential process whereby impacts are avoided, minimized, rectified, reduced over time, or are offset through compensation. As a general rule, mitigation that restores previously existing habitats is more desirable and likely to succeed than that which seeks to create new habitat. Substantial opportunities for wetland restoration exist within the Tolomato River. Restoration of adversely impacted emergent vegetation is a feasible and recognized mitigation option.

In addition, Best Management Practices (BMPs) will be utilized throughout the construction of the proposed project and during the mitigation activities. These BMPs include utilizing suitable erosion control and vegetative restoration methods. Construction activities will include techniques (e.g. silt screens and turbidity curtains) that will limit disturbance to the proposed construction areas, control sedimentation and erosion, and avoid or minimize turbidity and dispersal of dredged materials into adjacent wetland areas.

Some of the habitat being impacted can be considered Wood Stork Core Foraging Habitat. However, mitigation for the habitat being impacted will be enough to satisfy the Clean Water Act, Section 404(b)(1) guidelines and will not be contrary to the Habitat Management Guidelines for the wood stork (**Appendix O)**.

As a precaution, measures will be implemented to ensure the protection and safety of manatees and sturgeon that could, although unlikely, be in the vicinity of the proposed project area. These measures will include in water work construction conditions for the duration of the construction activities that will be detailed in a manatee protection plan and in the Sea Turtle and Smalltooth Sawfish Construction Conditions. The manatee protection plan will be developed during the federal and state permitting process.

6.0 Conclusion

Of the 42.8 acres in the proposed project area, this project proposes to permanently impact 7.46 acres of saltmarsh and 2.57 acres of open water. These impacts were minimized to the greatest extent possible while still meeting the purpose and need of the project. It is anticipated that the loss of habitat through implementation of the proposed alternative will be offset by the proposed mitigation within months to a year of completion (**Appendix Q).**

Overall, only nominal impacts to wildlife and protected species are expected. Considering the proposed restoration / mitigation to offset impacts to the previously disturbed quality of habitat to be impacted, the unavoidable nature of the impacts from the proposed project, the adverse impacts to the listed and protected species should be considered insignificant from the proposed project. In addition, the project is not expected to increase the airport operations and aircraft activity as the proposed activities are safety based. No net increase in aircraft landings or take-offs means no impact or increase in disturbance to wildlife and protected species after construction is complete. As a result, the project is expected to have a determination of "*Not Likely to Adversely Affect*" or "*No Effect*" on those wildlife or protected species found within the proposed project area.

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ATTACHMENT 1

Wading Bird Survey Results

Results of the Wading Bird and Shorebird Surveys
April 6 -10, 2009
Observers: Melissa Green and Charles Smith

April 6, 2009 Dusk Survey Results

Species	Number	Activity	Location	Date	Period
Herring Gull	5	Roosting	on seaplane dock	4/6/2009	PM
Ring Billed Gull	10	Roosting	on seaplane dock	4/6/2009	PM
Laughing Gull	8	Roosting	on seaplane dock	4/6/2009	PM
Bald Eagle	1	Feeding	in tributary/open water	4/6/2009	PM
Least Tern	2	Roosting	on seaplane dock	4/6/2009	PM
Willet	1	Roosting	on boat ramp	4/6/2009	PM
Wood Stork	2	Flying	flew over saltmarsh (S of Runway 13/31)	4/6/2009	PM
Willet	6	Roosting/Foraging	in saltflats	4/6/2009	PM
Great Blue Heron	4	Foraging	in saltmarsh	4/6/2009	PM
Juv White Ibis	2	Flying	over saltmarsh	4/6/2009	PM
Great White Egret	3	Foraging	in saltmarsh	4/6/2009	PM
Great White Egret	6	Flying	over saltmarsh	4/6/2009	PM
Belted kingfisher	2	Foraging	in openwater/wetlands east of Runway 20	4/6/2009	PM
Red-winged Blackbird	1	Roosting	in saltmarsh near long white thing	4/6/2009	PM
Brown Pelican	1	Roosting	on seaplane dock	4/6/2009	PM
Common Tern	6	Roosting	on seaplane dock	4/6/2009	PM
Snowy egret	1	Foraging	in saltmarsh	4/6/2009	PM
Cattle egret	9	Flying	over southern saltmarsh	4/6/2009	PM

Results of the Wading Bird and Shorebird Surveys
April 6 -10, 2009
Observers: Melissa Green and Charles Smith

April 7, 2009 Dawn Survey Results

Species	Number	Activity	Location	Date	Period
Cormorant	2	Flying/Roosting	flew over and landed on seaplane dock	4/7/2009	AM
Cormorant	1	Foraging	in southern canal	4/7/2009	AM
Willet	8	Roosting	in eastern saltmarsh	4/7/2009	AM
Willet	23	Roosting	on Runway 13/31	4/7/2009	AM
Cattle Egret	10	Flying	over ditch	4/7/2009	AM
Pelican	1	Flying	over saltmarsh	4/7/2009	AM
Ruddy Turnstone	3	Roosting	on seaplane dock	4/7/2009	AM
Semipalmated Plover	2	Foraging	in eastern saltmarsh	4/7/2009	AM
Teal	1	Flying	over runway from open water	4/7/2009	AM
Great Egret	1	Flying	over runway from open water	4/7/2009	AM
Herring Gull	12	Roosting	on seaplane dock	4/7/2009	AM
Ring Billed Gull	8	Roosting	on seaplane dock	4/7/2009	AM
Common Tern	1	Roosting	on seaplane dock	4/7/2009	AM
Laughing Gull	7	Roosting	on seaplane dock	4/7/2009	AM
Lesser Yellowlegs	6	Roosting	at boat ramp/on seaplane dock	4/7/2009	AM
Northern Harrier (male)	1	Flying	over runway from saltmarsh	4/7/2009	AM
Purple Martins	6	Foraging	over uplands	4/7/2009	AM

Results of the Wading Bird and Shorebird Surveys
April 6 -10, 2009
Observers: Melissa Green and Charles Smith

April 8, 2009 Dawn Survey Results

Species	Number	Activity	Location	Date	Period
Willet	13	Roosting	in saltflats to the north of Runway 13/31	4/8/2009	AM
Willet (juvenile)	1	Roosting	in saltmarsh to the north of Runway 13/31	4/8/2009	AM
Whimbrel	1	Roosting/Foraging	in saltflats to the north of Runway 13/31	4/8/2009	AM
Ring Billed Gulls	5	Roosting	on seaplane dock	4/8/2009	AM
Mottled Duck	2	Roosting	at boat ramp	4/8/2009	AM
Cormorants	2	Roosting	on seaplane dock	4/8/2009	AM
Piping Plover (?)	1	Roosting	along the shoreline north of Runway 13/31	4/8/2009	AM
Snowy Egret	1	Foraging	Near stormwater outfall, north of Runway 13/31	4/8/2009	AM
Great Egret	1	Roosting	on distant island	4/8/2009	AM
Belted Kingfisher	2	Foraging	in open water	4/8/2009	AM
Bald Eagle	1	Flying	Fly over to rest in large tree near stormwater pond	4/8/2009	AM
Northern Harrier (female)	1	Feeding	in saltmarsh to the east of Runway 20	4/8/2009	AM
Teals	4	Roosting	in stormwater pond	4/8/2009	AM
Red-winged blackbird	6	Roosting	in stormwater pond	4/8/2009	AM

Results of the Wading Bird and Shorebird Surveys
April 6 -10, 2009
Observers: Melissa Green and Charles Smith

April 9, 2009 Dusk Survey Results

Species	Number	Activity	Location	Date	Period
Wood stork	1	Flying	over stormwater pond	4/9/2009	PM
Great Egret	3	Flying	over ditch	4/9/2009	PM
Tricolored Heron	1	Foraging	in ditch	4/9/2009	PM
Great Egret	6	Flying	over canal	4/9/2009	PM
Wood stork	1	Foraging	at end of ditch/canal	4/9/2009	PM
Belted Kingfisher	1	Foraging	in canal	4/9/2009	PM
Teal	1	Roosting	in open water by seaplane dock	4/9/2009	PM
Least Tern	2	Roosting	on seaplane dock	4/9/2009	PM
Laughing Gull	3	Roosting	on seaplane dock	4/9/2009	PM
Willet	2	Roosting	on seaplane dock	4/9/2009	PM
Willet	1	Roosting	in saltmarsh	4/9/2009	PM
Great Blue Heron	1	Foraging	in saltmarsh east of Runway 20	4/9/2009	PM
Tricolored Heron	1	Foraging/Flying	in saltmarsh north of Runway 20	4/9/2009	PM
Great Egret	1	Foraging	in ditch	4/9/2009	PM
Great Egret	1	Flying	over ditch	4/9/2009	PM

Results of the Wading Bird and Shorebird Surveys

April 6 -10, 2009

Observers: Melissa Green and Charles Smith

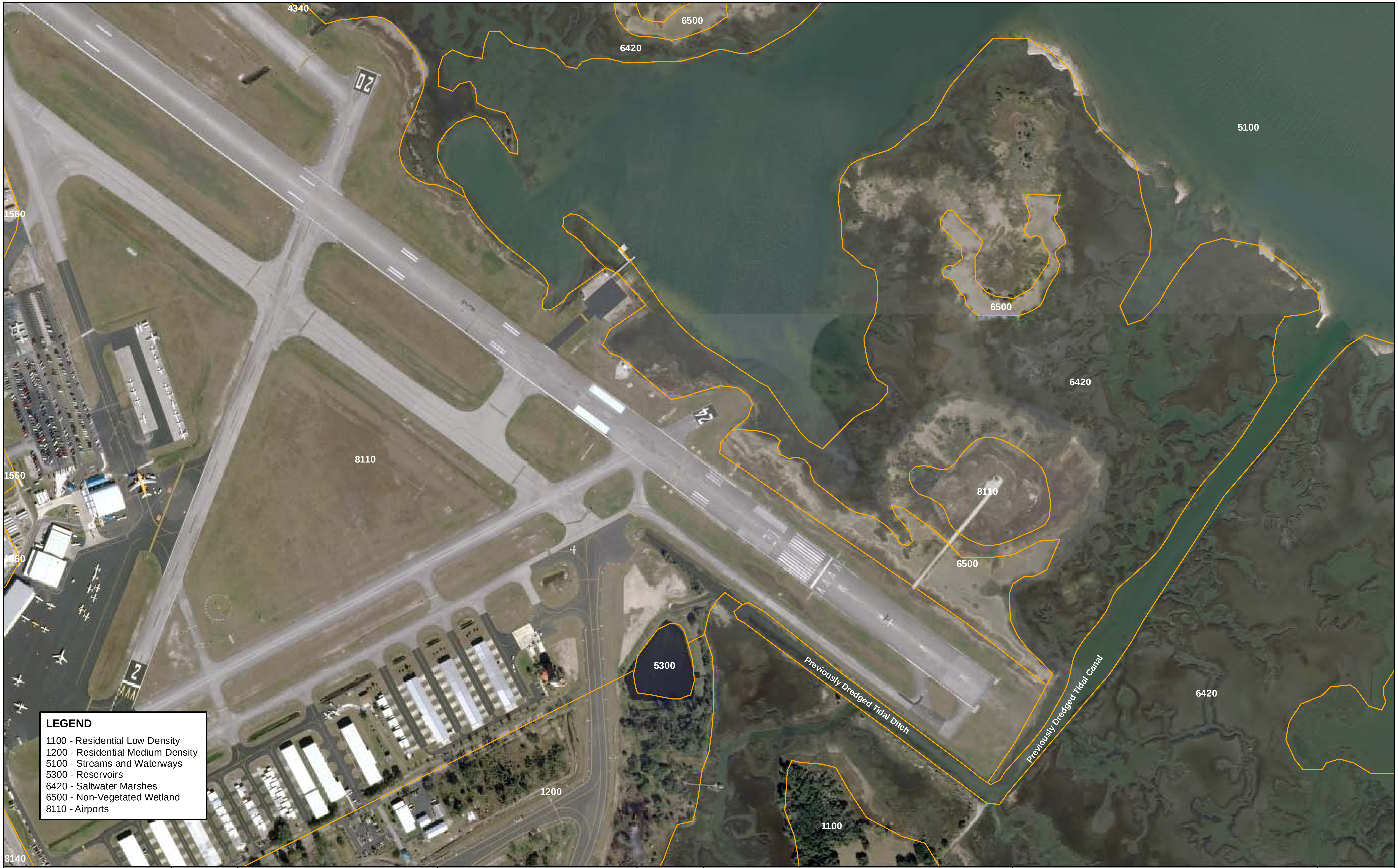
April 10, 2009 Dawn Survey Results

Species	Number	Activity	Location	Date	Period
Clapper Rail	1	Calling	in saltmarsh near ditch	4/10/2009	AM
Cattle Egret	5	Flying	over ditch	4/10/2009	AM
Lesser Yellowlegs	1	Foraging	in ditch	4/10/2009	AM
Willet	6	Roosting	in saltflats	4/10/2009	AM
Willet	3	Roosting	in saltmarsh north of Runway 13/31	4/10/2009	AM
Clapper Rail	1	Calling	in saltmarsh near boat ramp	4/10/2009	AM
Willet (juvenile)	2	Roosting	on stump in saltmarsh near boat ramp	4/10/2009	AM
Ring Billed Gull	5	Roosting	on seaplane dock	4/10/2009	AM
Laughing Gull	4	Roosting	on seaplane dock	4/10/2009	AM
Cormorant	2	Roosting	on seaplane dock	4/10/2009	AM
Hooded Merganser (female)	1	Foraging	in open water adjacent to seaplane dock	4/10/2009	AM
Ruddy Turnstone	1	Roosting	on seaplane dock	4/10/2009	AM
Willet	5	Roosting	near Runway 13/31	4/10/2009	AM
Willet	3	Roosting	on Runway 13/31	4/10/2009	AM
Least Tern	1	Flying	over runway to the east	4/10/2009	AM
Great Egret	1	Foraging	in saltmarsh near residential area	4/10/2009	AM
Willet	2	Roosting	on gravel road to localizer	4/10/2009	AM
Killdeer	1	Roosting	on edge of Runway 13/31	4/10/2009	AM
Great Egret	1	Foraging	in saltmarsh wouth of runway 13/31	4/10/2009	AM
Grackle	8	Roosting/Foraging	in stormwater pond	4/10/2009	AM

FIGURES

FIGURE 1

Existing Conditions – FLUCFCS



LEGEND

- 1100 - Residential Low Density
- 1200 - Residential Medium Density
- 5100 - Streams and Waterways
- 5300 - Reservoirs
- 6420 - Saltwater Marshes
- 6500 - Non-Vegetated Wetland
- 8110 - Airports

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE 1" = 350'
DESIGNED BY David Loy; Melissa Green
DRAWN BY
CHECKED BY

PRIME CONSULTANT:
Passero Associates
Engineering Surveying
Architecture Planning
CERT. OF AUTHORIZATION #3428

SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE 10/22/09
PROJECT NO. 23081.38

Project Taxiway C Replacement, RSA Compliance, and Approach Lighting System
Owner St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

Existing Conditions - FLUCFCS

FIGURE NUMBER
Figure 1

FIGURE 2

National Wetland Inventory (NWI) Habitat

Legend

E2USP - Estuarine, Intertidal, Unconsolidated Shore, Irregularly Flooded
E1UBLx - Estuarine, Subtidal, Unconsolidated Bottom, Subtidal
E2EM1P - Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE 1" = 350'
DESIGNED BY David Loy; Melissa Green
DRAWN BY
CHECKED BY

PRIME CONSULTANT:
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DATE 10/22/09
PROJECT NO. 23081.38

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

National Wetland Inventory (NWI) Habitat

FIGURE NUMBER
Figure 2

FIGURE 3

Proposed Conditions – FLUCFCS

FLUCFCS Table

Class Definition	Code	Number
Streams and Waterways	510	3.2
Saltmarsh (Includes 1.37 ac. of salt flats)	642	12.7
Airports	811	26.8

Legend

- ▭ Project Area
- 🟦 5100 Streams and Waterways
- 🟩 6420 Saltmarsh
- 🟪 8110 Airports

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE 1" = 350'
DESIGNED BY David Loy; Melissa Green
DRAWN BY
CHECKED BY

PRIME CONSULTANT:
Passero Associates
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CERT. OF AUTHORIZATION #3428

SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE 11/05/09
PROJECT NO. 23081.38

Project Taxiway C Replacement, RSA Compliance, and Approach Lighting System
Owner St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

Proposed Impacts - FLUCFCS

FIGURE NUMBER
Figure 3

FIGURE 4

FWC Manatee Mortality Locations

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE	1" = 800'
DESIGNED BY	David Loy; Melissa Green
DRAWN BY	
CHECKED BY	

PRIME CONSULTANT:
Passero Associates
Engineering Surveying
Architecture Planning
CERT. OF AUTHORIZATION #3428

SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE
11/05/09

PROJECT NO.
23081.38

Project
Taxiway C Replacement, RSA Compliance,
and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FWC Manatee Mortality Locations

FIGURE NUMBER
Figure 4

APPENDIX B

WETLANDS

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

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IN COORDINATION WITH:
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TAMPA FL, 33614

NFRA
Northeast Florida Regional Airport
Fly Smart!

WETLANDS

Activities in waters of the U.S., including wetlands, are regulated by federal, state, and local regulations and or laws. Executive Order 11990, Protection of Wetlands, mandates that each federal agency take action to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance their natural values. The U.S. Army Corps of Engineers (USACE) has authority to regulate activities in waters of the U.S. under the *CWA* and the *Marine Protection, Research, and Sanctuaries Act* of 1972, as amended.

The legal framework for the regulation of activities in wetlands by the State of Florida and by the State's Water Management Districts is provided, in part, by Chapter 373 of the Florida Statutes, *the Florida Water Resources Act of 1972*, specifically 373.414, which states that an activity regulated under this part will not be harmful to water resources; water quality standards will not be violated; and such activity in, on, or over surface waters or wetlands, is not contrary to the public interest. Specifics concerning permit requirements are codified in Chapter 40, parts A through E, of the Florida Administrative Code.

The USACE defines wetlands as:

> "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."[1]

Wetlands are specifically protected by laws and orders because of the functions and values they provide with respect to:

- **Hydrology** (e.g., flood control, groundwater recharge and discharge, and dissipation of erosive forces);
- **Water quality** (e.g., removal of sediments, toxins, and nutrients);
- **Food chain support and nutrient cycling** (e.g., primary production and nutrient export/utilization);
- **Wildlife habitat** (e.g., breeding, rearing, and feeding grounds for fish and wildlife species); and
- **Socioeconomics** (e.g., recreational, educational, aesthetic, and consumptive uses).

B.1 METHODOLOGY

A wetland delineation was conducted in April 2009 to assess the potential presence of wetlands and surface waters within the proposed project area. The following resources were reviewed prior to the wetland delineation:

- 2008 Florida Department of Transportation (FDOT) 2008 Aerial Photography;

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[1] 33 C.F.R. 328.3(b).

- The United States Department of Agriculture (USDA)'s Natural Resources Conservation Service (NRCS) 1990 Digital Soils Data for St. Johns County;
- St. Johns River Water Management District (SJRWMD) Florida Land Use, Cover, Forms and Classification System (FLUCFCS) data for St. Johns County; and
- United States Fish and Wildlife Service (USFWS) 2009 National Wetland Inventory (NWI) data for St. Johns County.

The wetland boundaries within the project area were delineated pursuant to methodologies specified in Chapter 62-340 of the Florida Administrative Code, the *1987 U.S. Corps of Engineers Wetlands Delineation Manual*, and the 2008 *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*. Both the state and federal delineations were based on three required parameters: presence of hydric (wetland) soils (based on hand-drilled auger determinations), presence of hydrophytic (wetland adapted) vegetation, and evidence of wetland hydrology. Although state and federal wetland delineation methodologies both evaluate these three parameters, they differ in how this evidence is applied towards making a determination as to whether an area is wetland or upland. In some cases it is necessary to delineate separate state and federal boundaries. In the case of this project, the state wetland jurisdictional boundary and the federal wetland jurisdictional boundary coincided, so only one boundary was delineated. The wetland boundary was marked using sequential, alpha numerically labeled stakes, and the locations of these stakes were surveyed by a registered land surveyor. The surveyor's data file was then incorporated digitally into a Geographic Information Systems (GIS) database for use in spatial analysis and impact assessment.

B.2 WETLAND DESCRIPTIONS

The existing southeast end of Runway 13-31 was historically constructed on fill within an area of salt marsh. Therefore, this end of the runway, its RSA, and its parallel taxiway, Taxiway 'C', are surrounded on three sides (east, south, and west) by an area of contiguous salt marsh, tidal creeks, open waters, and sand flats. The boundary between these contiguous jurisdictional areas and the uplands immediately adjacent to Runway 13-31 was delineated using one continuous line of flags, and therefore these jurisdictional areas are collectively referred to as "Area A." The project area consists of approximately 45.3 acres, and based on the results of the delineation, "Area A" occupies 20.1 acres of the project area. The wetlands and surface waters comprising "Area A" contain various vegetative community and open water cover types (**Figure 3.16.1**). These wetland communities and open water types are detailed below.

For descriptive purposes, the contiguous wetlands and surface waters within "Area A:" were separated into three sections, East, South, and West. **Figure 3.16.1** depicts the location of each of these sections, and the following paragraphs describe the vegetative cover types and open water types found within each section.

Cowardin Classifications

The *Classification of Wetlands and Deepwater Habitats of the United States*[2] is the system developed by the USFWS to categorize wetlands. This system, also known as the Cowardin system, is

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[2] Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe (1979), *Classification of Wetlands and Deepwater Habitats of the United States*, Prepared for the USDI-FWS. FWS/OBS-79/31, Washington, D.C.

commonly used throughout the United States. It categorizes wetlands according to a hierarchical system of wetland types based on hydrologic, geomorphologic, chemical, and biological factors. The USFWS has also developed a shorthand alphanumeric code used to represent the Cowardin classifications. The code varies in length depending on the level of detail or the complexity of the description needed. Wetland types delineated within the study area fell into four Cowardin classifications:

E2EM1P – Estuarine, intertidal (alternately exposed and flooded due to tidal effects) wetlands with persistent emergent vegetation that are irregularly flooded (Estuarine intertidal marsh).

E1UBLx – Estuarine, subtidal (continuously submerged) open waters with unconsolidated bottom sediments, that were created by excavation (Excavated embayments).

E2USP – Estuarine, intertidal shoreline areas with unconsolidated sediments that are irregularly flooded and predominantly unvegetated (Sand and mud flats).

R1UB2/3Nx – Riverine, tidal waters with unconsolidated sediments that are regularly flooded, that were created by excavation (Tidal canal).

Florida Land Use, Cover and Forms Classifications

Another land use and land cover classification system that is widely used within the State of Florida is the system presented in FDOT's *Florida Land Use, Cover and Forms Classification System Handbook* (FLUCFCS).[3] This system classifies areas based on land use, vegetative cover, and surface water types.

Table B.1 lists the Cowardin classification and the FLUCFCS cover class of each of the various surface waters and wetland types found within the East, South, and West Sections and their associated acreages within each section. The locations of these areas are depicted on **Figure 3.16.1**.

Table B.1
Wetlands and Surface Waters Within Area A

Section	Cowardin (USFWS) Classification	FLUCFCS Code and Description	Approximate Area (Acres)
East	E1UBLx – Excavated embayment	5100-Streams and Waterway	0.67
	E2EM1P – Estuarine intertidal saltmarsh	6420-Saltwater Marshes	6.75
	E2USP – Sand and mud flats	6500-Non-vegetated Wetlands	
South	R1UB2/3Nx – Tidal canal	5100-Streams and Waterway	0.76
	E2EM1P - Estuarine intertidal saltmarsh	6420-Saltwater Marshes	0.91
West	R1UB2/3Nx - Tidal canal	5100-Streams and Waterway	2.48
	E2EM1P - Estuarine intertidal saltmarsh	6420-Saltwater Marshes	4.53

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[3] Florida Department of Transportation (1999) *Florida Land Use, Cover and Forms Classification System Handbook*.

"Area A" – East Section

Cowardin Class E1UBLx – Excavated Embayment
FLUCFCS Class 5100 – Streams and Waterways

This area is the area of open water located between the approach end of Runway 20 and the Sea Plane Ramp. This area is a dredged area that was excavated from salt marsh in the 1950s. Substrate consists of mud, sand, and oyster beds. This area is tidally influenced and is navigable by small vessels.

Cowardin Class E2EM1P – Estuarine Intertidal Saltmarsh
FLUCFCS Class 6420 – Salt Marshes

The majority of the East Section of "Area A" is composed of saltmarsh. This cover type extends from the narrow western shoreline of the dredged open water area described above, around the end of the seaplane ramp, and southeast to the creek at the southeastern end of the East Section. This area is tidally influenced, with dominant vegetation that includes smooth cord grass (*Spartina alterniflora*), black rush (*Juncus roemerianus*), and salt grass (*Distichlis spicata*). Other observed vegetation included maritime marsh-elder (*Iva frutescens*), bahia grass (*Paspalum notatum*), St. Augustine grass (*Stenotaphrum secundatum*), cord grass (*Spartina bakeri*), salt bush (*Baccharis angustifolia*), salt meadow cord grass (*Spartina patens*), seashore marshelder (*Iva imbricata*), saltwort (*Batis maritima*), glasswort (*Sarcocornia ambigua*), sea blite (*Suaeda linearis*), seaside goldenrod (*Solidago sempervirens*), soft rush (*Juncus effusus*), and sea ox-eye (*Borrichia frutescens*). The overall condition the saltmarsh in this area is good, and species diversity is typical for this type of mix of high marsh and low marsh vegetative communities. However, past dredging and spoil deposition activities have altered the landform from its natural state, and in some places this has resulted in erosion.

Cowardin Class E2USP – Sand and mud flats
FLUCFCS Class 6500 – Non-vegetated Wetlands

Non-vegetated sand flats are interspersed within areas of high saltmarsh in the portion of the East section that lies adjacent to the runway sideslope southwest and west of the Vortac navigational beacon. Based on a review of historical aerial photography from the 1940's 1950's, and 1960's, it appears that some of these areas are areas where spoil material was deposited historically in association with dredging projects. It is possible that these spoil materials had a low nutrient content or hyper saline chemistry, rendering them less suitable for growth of vegetation. The vegetation bordering these sand flats includes smooth cord grass and salt meadow cord grass, salt grass, sea ox-eye, black mangrove (*Avicennia germinans*), and sea purslane (*Sesuvium portulacastrum*).

"Area A" – South Section

Cowardin Class R1UB2/3Nx – Tidal canal
FLUCFCS Class 5100 – Streams and Waterways

This area is a man made open water canal that is navigable by small vessels at high tide. Vegetation is confined to the edges of the canal. The substrate consists of mud and sand. Scattered clumps of oysters and a few small oyster beds are found along the banks of the canal. Vegetation observed included smooth cord grass and salt meadow cord grass.

Cowardin Class E2EM1P – Estuarine Intertidal Saltmarsh
FLUCFCS Class 6420 – Salt Marshes

The portion of the South Section that lies southeast of the canal consists of saltmarsh. The area is tidally influenced and the dominant vegetation observed was smooth cord grass and salt meadow cord grass. Other observed vegetation included black rush, sea ox-eye, maritime marsh-elder, and soft rush. Because the dominant community type in this area is smooth cordgrass-dominated low marsh, the diversity of vegetative species is low, but typical of this community type. Overall this appears to be a healthy saltmarsh community that has been subjected to relatively little disturbance southeast of the canal.

"Area A" – West Section

Cowardin Class R1UB2/3Nx – Tidal canal
FLUCFCS Class 5100 – Streams and Waterways

The canal described within the South Section turns to the northwest within the West Section and extends along the toe of the runway / taxiway fill slope, approximately 1,800 feet to a stormwater outfall located approximately 80 feet south of Taxiway 'D1.' The canal also connects to a ditch leading from another outfall located east of Taxiway 'F' and connects to a small tidal creek that drains from an area of residential development south of the Airport. For most of this section of the canal, the vegetation is confined to the banks. However, near its northern end, the amount of flow and the extent of tidal flushing decreases, and in this area smooth cordgrass extends into the channel. Substrate within the canal consists of mud and sand, and oyster beds and scattered clumps of oysters are found throughout the canal. Dominant vegetation observed included smooth cord grass and salt meadow cord grass. Other observed vegetation included sea ox-eye, salt grass, and sea purslane.

Cowardin Class E2EM1P – Estuarine Intertidal Saltmarsh
FLUCFCS Class 6420 – Salt Marshes

The portion of the West Section located southwest of the canal is composed of saltmarsh. Dominant vegetation observed included smooth cord grass and salt meadow cord grass. Other observed vegetation included black rush, soft rush, and sea purslane. This saltmarsh area consists of a mix of low and high marsh communities. Overall species diversity is typical for these community types, however this area has been historically subjected to disturbance, including the channelization and re-routing of the tidal creek that formerly passed through the area, the sidecasting of spoil material adjacent to the west side of the canal, and the construction of the runway and taxiway. The area also receives stormwater runoff from the south side of the Airport from multiple outfalls as well as runoff from the residential community south of the Airport.

APPENDIX C

BENTHIC HABITAT SURVEY REPORT

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
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IN COORDINATION WITH:
BIRKITT ENVIRONMENTAL SERVICES, INC
550 N. REO ST, SUITE 105
TAMPA, FL 33609

NFRA
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APPENDIX C

ST. AUGUSTINE AIRPORT
TAXIWAY 'C' REPLACEMENT, RSA COMPLIANCE, AND APPROACH LIGHTING SYSTEM PROJECTS

BENTHIC HABITAT SURVEY REPORT

Table of Contents

EXHIBITS

FIGURES

1.0 Introduction

The Airport is a public-use commercial service airport located in St. Augustine, Florida and is owned and operated by the Authority. The Airport has three paved runways that serve both commercial and general aviation operations. The Airport is located in Sections 25 and 50, Township 6S and Range 29E, situated along the west side of the Tolomato River. The property is bordered by US 1 and a CSX railroad line on the west.

The Authority is proposing the following projects for the Airport:

- The replacement of the existing Taxiway 'C' that serves Runway 31;
- The restoration of the RSA to bring it back into compliance with FAA standards; and
- The installation of an ALS for the existing ILS for Runway 31.

The purpose of these projects is to improve safety and efficiency for arriving and departing aircrafts, and to bring the RSA back into compliance with FAA safety standards.

In accordance with the NEPA of 1969, FAA Order 5050.4B *National Environmental Policy Act Implementing Instructions for Airport Actions*, 40 CFR Parts 1500 – 1508 CEQ, and FAA Order 1050.1E, Change 1 *Environmental Impacts: Policies and Procedures*, the Authority will be preparing an EA to consider and document the potential environmental impacts associated with these proposed projects. As part of the EA, a survey of aquatic benthic habitat was conducted in order to identify the benthic habitat present within the proposed project areas, map the spatial extent of these resources, provide an overall health and or viability assessment, and to specifically determine if any seagrass or Submerged Aquatic Vegetation (SAV) was present within the survey areas. The results of these surveys will be used to determine if benthic resources might be affected by the proposed projects.

2.0 Project and Survey Area Description

The proposed project area consists mainly of Runway end 31 and portions of the saltmarsh and open water habitat directly adjacent to this area. The airport is situated to the west of the Tolomato River, and contains a large expanse of previously disturbed saltmarsh which is composed primarily of black needle rush (*Juncus romerianus*) and saltmarsh cord grass (*Spartina alterniflora*) (**Figure 1**). Large portions of the saltmarsh were previously dredged to provide fill material for the southern end of Runway 13-31. A manmade ditch and canal run alongside the western and southern edge of the RSA of Runway 31 and were dredged to maintain a navigable connection between Indian Creek and the Tolomato River. Areas within the saltmarsh contain rip rap and concrete rubble from previous construction efforts.

The Tolomato River in this area is tidally influenced and is characterized by brackish water. The FDEP has designated the Tolomato River system as Class II Waters, designated for shellfish harvesting and propagation. The waters adjacent to the airport are designated Class II, but are 'conditionally' approved for shellfish harvesting, meaning that they do not always meet Class II water quality standards. The portion of the Tolomato River adjacent to the airport does not currently meet the State water quality standards for a Class II waterbody and is, therefore, considered impaired. Additionally, most of the submerged lands are owned directly by the Airport Authority and are not under state ownership.

The following habitats occur within the proposed project area (**Figure 1**):

Saltmarsh (FLUCCS 642)
The salt marsh habitat occurs in the intertidal areas surrounding the airport property. This community is primarily vegetated with saltmarsh cord grasses (*Spartina alterniflora*) and black needlerush (*Juncus roemerianus*), and likely provides beneficial foraging habitats for numerous wading birds. Other potential vegetation found in this habitat includes saltwort (*Batis maritima*), seashore saltgrass (*Distichlis spicata*), and glassworts (*Salicornia* spp.). This habitat comprises approximately 12.2 acres of the proposed project area.

Oyster Bars (FLUCCS 654)
Oyster bars are mollusk reefs, typically dominated by oysters, and at times, partially exposed during low tide (Madley et al., 2002). Oysters will attach to hard substrate and with the correct conditions, will proliferate and form into an oyster reef. In Florida, these reefs are most common in estuarine areas and are not known to occur in water deeper than 40 feet (Madley et al., 2002). Oysters are present in the proposed project area in sparse numbers and are found within the fringing saltmarsh adjacent to the open water intertidal areas. Oysters are also present within the open water intertidal areas of the proposed project area as individuals, clusters, and beds. Beds may take on one of two primary orientations: 'fringing reefs' that consist of long linear beds, approximately 3-6 feet in width spanning portions of the shoreline parallel to the landward edge and 'patch reefs' that consist of large circular-shaped beds that occur within mudflats. Patch reefs often consist of higher densities of oyster and exhibit areas of high vertical relief within the beds. These areas of higher vertical relief are ecologically important because of its higher composition of live oysters. Both fringing and patch oyster beds as well as clumps of oysters are present within the proposed project area. In total, oyster beds, individuals and clumps comprise approximately 0.51 acres of the proposed project area.

Open Water (FLUCFCS 510)
The open water areas within the vicinity of the proposed project area consist of a tidal ditch and manmade canal which were dredged to maintain a navigable connection between the Tolomato River and Indian Creek as well as an open embayment which was dredged for fill material to create the southern half of Runway 13-31. The open water habitat contains patches of oyster beds and, in some locations, sea lettuce (*Ulva* sp.). Open water areas of the proposed project area comprise approximately 3.91 acres.

3.0 Benthic Habitat Survey Methods

To determine the presence of benthic resources within and adjacent to the proposed project area, a benthic habitat survey was completed. The locations of the survey include those areas potentially impacted by the project alternatives. The primary habitat survey objectives were:

1. To locate benthic resources within and adjacent to the proposed project area;
2. To characterize, map, and evaluate the benthic habitats that may be impacted by the placement of fill to repair the RSA, replace Taxiway 'C' and the placement of pilings to support the ILS;
3. To provide an overall health/viability assessment of the benthic resources present;

4. To identify opportunities to reduce impacts to natural resources in the area;
5. To acquire data to address questions and comments anticipated from the reviewing agencies; and
6. To provide documentation to support the EA, ERP and Section 404/10 permit applications.

The benthic survey was performed on April 21 – 24, 2009 by two (2) Birkitt staff members and one (1) scientist from the LPA Group, Inc. Benthic species surveys were conducted along the entire perimeter of the airport and included any areas that may be impacted during the proposed project (Figure 2). Surveys utilized shoreline mapping, perimeter mapping and transect mapping techniques depending on site conditions and were conducted during low, or even negative low tides, to ensure both ease of access to these areas and enhanced visibility through the water column. Tidal data for these days can be found in **Table 1** below.

During the survey, observations of benthic species such as snails, whelks, clams, mussels, seagrass and algae were recorded in field data sheets and mapped using a Trimble Geo XT sub-meter accuracy GPS unit. Species, health, density, percent cover and substrate type were noted on the data sheets (**Exhibit 1**). Data was collected as either perimeter points, delineating the spatial extent of the feature, or as centroids. Centroid points would represent the center of the feature and would be accompanied with GPS notation as to the dimensions of that feature (square feet). This methodology was utilized in areas of small patch oyster reefs with low percent cover.

Table 1
Tides for St. Augustine City Dock

Day	Tide High/Low	Tide Time	Tide Height (ft.)
April 21, 2009	Low	12:14 AM	1.1
	High	6:17 AM	4.6
	Low	12:35 PM	0.6
	High	6:40 PM	4.9
April 22, 2009	Low	1:06 AM	0.7
	High	7:06 AM	4.7
	Low	1:20 PM	0.4
	High	7:28 PM	5.2
April 23, 2009	Low	1:56 AM	0.5
	High	7:52 AM	4.8
	Low	2:04 PM	0.1
	High	8:13 PM	5.5
April 24, 2009	Low	2:43 AM	0.2
	High	8:37 AM	4.9
	Low	2:48 PM	-0.1
	High	8:58PM	5.7

*Source Tidal data obtained from http://tidesandcurrents.noaa.gov

The survey area included the intertidal and subtidal areas waterward of the wetland and or upland boundary extending out 300 feet (**Figure 2**). Oyster beds are known to be present within the survey area and therefore, oysters were the primary species under investigation. Oyster bars are located primarily within the intertidal zone and along the fringing edge of the saltmarsh and were collected by both perimeter and shoreline mapping methodologies. SAV was not anticipated to be present due to high turbidity and poor water clarity; however, transects were established within the open water areas of the subtidal zone to assess the presence or absence of SAV. Depending on site conditions, snorkeling and or wading was utilized during the investigations.

Observations of benthic macrofauna, substrate type, and any vegetation within these areas were also documented and marked in the GPS and on supplemental data sheets. Each of the methodologies utilized in the benthic survey are described in the following section and the location of these surveys is illustrated in Figure 2.

3.1 Shoreline Survey Methods

Shoreline survey methods were utilized in certain areas in and adjacent to the proposed project area to map the extent of oyster coverage. The shoreline survey method included marking the landward and waterward extents of the oysterbeds from the shoreline. GPS points were taken around the edges of the oyster beds utilizing a GPS to define the area where oysters are present, as well as the spatial extent of each bed. The GPS data of the oysterbeds were later utilized in GIS to determine the acreage of oysters present along the shoreline. While in the field, the perimeter of the habitat supporting the oysters was mapped. An estimation of the density of the oysters present within the area was recorded as a percent coverage in order to provide an accurate estimate of the oyster population. For example, if a one acre mud flat was mapped and oysters covered approximately 10% of the mud flat, the actual acreage of oysters in this area was reported as 0.1 acres.

To access the waterside portions of the shellfish beds, a 17' Carolina skiff was utilized when appropriate. The landward limits were accessed from the airport property. A visual survey was conducted within this area and the following data was collected:

- Presence and or absence of seagrass, species composition, and density estimates
- Oyster beds or scattered oyster habitat
- General macrofauna observed
- Description of benthic sediments

The locations of oyster beds, seagrass, and or other key benthic habitat features were recorded using the GPS. This methodology was utilized in areas along the shoreline from the habitat east of Runway 2-20, southeast to the seaplane boat dock and ramp (**Figure 2**). Shoreline survey methods were also utilized in areas northeast and to the south of Runway 13-31. The shoreline survey method helped to define the landward and seaward extent of the oyster beds. Combined with an estimate of percent coverage, this data was used to provide an estimate of the density of oyster beds present within and adjacent to the proposed project area (**Exhibit 1**). Data and observations were recorded in the field using the field data sheets (**Exhibit 2**).

3.2 Perimeter Survey of Mud Flats

Perimeter surveys were performed in the tidal areas east of Runway 6-24. In this area, large mudflats containing oyster beds were observed. The perimeter of the oyster beds was mapped during low tide by taking GPS points along the outer perimeter of the oyster beds exposed on the mudflats. The shellfish density and species at each of the mud flats were recorded. Any oyster beds, patches and or areas of scattered oysters within this area were also mapped. The outer edge of the oyster bed, patch or individual clump was mapped with the GPS and an estimate of percent coverage was recorded on field data sheets.

3.3 Transect Surveys

Quantitative surveys of benthic habitat in the proposed project area were conducted along transects paralleling the shoreline and within the tidal ditch and canal. This methodology was utilized within the ditches located southwest of Runway 13-31 based on the minimal clumps of oysters present in these areas. Transects were also located in the open water areas in and adjacent to the proposed project area which included the areas potentially affected by the project. This methodology was also utilized in an area east of Runway 13-31, waterward of the seaplane basin, to investigate the area for the presence or absence of benthic resources and SAV (**Figure 2**). At 50 foot intervals along the transect, a 1/4 meter x 1/4 meter quadrat was placed and the percent cover of benthic species, bare ground, and vegetation within the quadrat was recorded on data sheets. The health of the benthic species and the presence of any benthic macrofauna were also documented. A qualitative assessment of the health of oyster beds was evaluated by assessing the ratio of shell to mud existing within the oyster polygon and the percent vertical shell within that shell/mud matrix. Beds that had high ratios (greater than 50%) of shell to mud within the bed and had high percentage of vertical shell were noted as 'Healthy.' Beds that had lower ratios (less than 50%) of shell to mud and less vertical shell were noted as 'Moderate.' Beds that contained greater amounts of mud with only sparse oyster coverage and low amounts of vertical shell or containing washed shell were noted as 'Unhealthy.' The analysis of the results provided an estimated density of benthic species within the investigated areas.

4.0 Benthic Survey Results

The bottom sediments of the proposed project area mainly consisted of unconsolidated sand and mud. The bottom was primarily unvegetated, devoid of any type of attached vegetation or invertebrates. However, areas of sparse attached macroalgae (*Hypnea cervicornis*) were located within roughly 25% of the quadrats surveyed along the previously dredged channel (**Exhibit 2**). In addition, small amounts of drift algae (*Gracillaria* sp.) and sea lettuce were found within the culvert-ditch connect (CDC), south of Runway 13-31. No seagrass was found to exist within or adjacent to the proposed project area. The main benthic resource observed within the proposed project area was oysters (**Exhibit 3**). Please see the attached data sheets within Exhibit 2 for specific descriptions of each survey area and **Exhibit 3** for representative pictures of the benthic habitat. The results of the benthic habitat East / Northeast, West / Northwest, and the South / Southwest of Runway 13-31 are provided below.

<u>East/Northeast of Runway 13-31</u>

East/Northeast of Runway 13-31 oyster beds, patches, and individual clumps were located along the shoreline. Oysters present in this area ranged from moderately healthy to healthy (**Figure 3A**) and were comprised of 0.42 acres within the proposed project area. The oyster beds and patches contained viable populations of juvenile and adult oysters. The living individuals were oriented vertically in most of the beds and patches; an indicator of shellfish health. No submerged aquatic vegetation or seagrasses were observed in this area. Substrate was composed of unconsolidated sand and mud. Macrofauna observed utilizing the habitat includes: killifish (*Fundulus* spp.), blue crab (*Calinectes sapidus*), stone crab (*Menippe mercenaria*), quahog (*Mercenaria mercenaria*), lighting whelk (*Busycon perversum*), periwinkle snails (*Littorina* sp.) and mud snails (*Ilyassoma obsoleta*).

East/Southeast of Runway 13-31

East/Southeast of Runway 13-31, there is a previously dredged tidal canal, which contains sparse oyster patches and individual clumps (**Figure 3B**). The oysters present within the tidal canal range from moderately healthy to unhealthy and measure approximately 0.0003 acres in size. Very few viable juvenile and adult oysters were observed and the individuals were not oriented vertically. Sea lettuce, a common drift alga, was observed interspersed among the oysters. The tidal canal is directly adjacent to the approach end of Runway 13-31 and a contiguous saltmarsh comprised mainly of black needlerush and saltmarsh cord grass. The saltmarsh has many meandering tidal finger creeks, which in most cases contain oyster patches and individual clumps. Macrofauna observed in the tidal canal includes: killifish (*Fundulus* spp.), blue crab (*Callinectes sapidus*), fiddler crabs (*Uca* sp.), and periwinkle snails (*Littorina* spp.).

West / Southwest of Runway 13-31

West / Southwest of Runway 13-31 is a previously dredged tidal canal, which contains sparse oyster patches and individual clumps (**Figure 3B**). The oysters present within the tidal canal were of moderate health and were approximately 0.09 acres in size (**Exhibit 1**). The presence of juvenile oysters was recorded and some of the individual oysters were oriented vertically. Sea lettuce was observed interspersed amongst the oysters. On the other side of the tidal canal is a saltmarsh which contains spoil deposits from the previous dredging of the canal and Indian Creek, a natural tidal creek. The tidal creek contains several large oyster patches. Macrofauna observed utilizing the tidal canal includes killifish, blue crab, and periwinkle snails.

5.0 Discussion

5.1 Impacts

The impacts associated with the Proposed Project will include the placement of fill material which is necessary to restore the RSA and create a new runway. The perimeter of the fill will be stabilized with erosion control material (Armorflex 30) which allow for vegetation to be interplanted with the structures. In addition, a 40 foot construction buffer is proposed along the entire proposed project area that will consist of temporary impacts to 0.34 acres of oysters caused by the use of barges and construction equipment.

It may be possible to relocate the oysters out of the areas proposed for both temporary and permanent impacts to the proposed mitigation site. Additionally, the dredging of approximately 0.60 acres of saltmarsh is proposed for the relocation of the tidal canal to maintain navigability in the southwest area of the airport. This newly dredged canal will be available for new oyster growth. In total, the impacts associated with the proposed project will include approximately 0.51 acres of oysters; however, this figure is inclusive of temporary impacts that would be caused by construction activities (**Figure 4**).

Overall, the oysters within the proposed project area range from unhealthy to healthy and occur in sparse to high concentrations. The oysters located along the southwest boundary of the property exist in sparse concentrations, have lower percent coverage, and possess less vertical shell within each bed and are of lower overall health and productivity. Oyster beds exist along the northeast boundary of the property and are of higher concentrations and better overall health than the others in the proposed project area. These healthy oyster beds provide habitat to numerous species of fish that spend their juvenile stages within these areas prior to moving offshore. Oyster beds also increase water quality by reducing contaminants, as well as nitrogen levels, within the water column. Therefore, impacts to the oyster beds could result in more negative impact to oysters themselves and to surrounding benthic community.

5.2 Mitigation

Mitigation is proposed for the project site that will consist of the relocation of existing oyster clumps and or placing new oyster shells within areas of suitable habitat. Oysters will be placed at the toe of the slope of the RSA on the east side where the interplanting of the ArmorFlex with saltmarsh vegetation and oyster shells will create a "living shoreline" for fish and benthic communities. Additional placement of oyster shell material will also be placed, if needed, to supplement the areas. These areas chosen for placement are within the same watershed as well as within Class II waters. Immature oysters at the free-swimming larvae stage require a solid surface or substrate for attachment, which is called "setting." Planted oyster shell provides this solid substrate and will allow for the attachment oyster larvae called 'spat'. Adult oysters and even shells of dead oysters emit chemicals that attract oyster larvae. By selecting oyster shells as a substrate, the larvae maximize the likelihood of setting near other oysters, which is necessary for reproduction. Providing this hard substrate will not only allow for the potential establishment of oyster bars, but will provide necessary habitat for various commercially important fish and crustaceans. Therefore, shell placement is expected to provide substrate that will lead to the formation of oyster bars and reefs in proximity to the areas of impacts. For additional details on oyster mitigation, see **Appendix R**.

6.0 Conclusion

The application of fill material, dredging, and construction activities will have impacts on the benthic resources occurring within the proposed project area. A total of 0.17 acres of oysters are proposed for permanent impact. Additionally, construction activities and dredging will increase the turbidity levels within the open water habitat, which may reach levels that are detrimental to the filter feeding mechanisms in oysters. Increased turbidity levels in the water column may also have negative effects on the sea lettuce occurring within the proposed project area that serve as a source of food to various fish species.

The oyster impacts will be mitigated appropriately and may include relocating oyster clumps from the proposed project area to the mitigation site. In addition, the tidal canal will be relocated to maintain navigability and 0.60 acres of saltmarsh will be converted to open water habitat, creating an area for additional oyster growth. This would result in a no net loss of oyster habitat. Therefore, impacts to benthic resources are expected to be minimal.

7.0 References

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EXHIBITS

EXHIBIT 1

Total Oyster Coverage in Project Area

Exhibit 1
Total Oyster Coverage in Project Area

Number	Acreage of Polygon	% Cover	Total Acreage of Oysters
Clumps			
1	0.031	75%	0.02325
2	0.021	75%	0.01575
3	0.004	30%	0.0012
4	0.005	5%	0.00025
5	0.022	30%	0.0066
6	0.002	10%	0.0002
7	0.002	5%	0.0001
8	0.0009	70%	0.00063
9	0.0012	40%	0.00048
10	0.0023	30%	0.00069
11	0.056	25%	0.014
12	0.033	70%	0.0231
13	0.0005	50%	0.00025
14	0	50%	0
TOTAL	0.1809		**0.09**
Patches			
1	0.2937	80%	0.23496
2	0.021	80%	0.0168
TOTAL	0.3147		**0.25**
Fringing			
1	0.0016	55%	0.00088
2	0.0378	50%	0.0189
3	0.1186	65%	0.07709
4	0.017	30%	0.0051
5	0.085	70%	0.0595
6	0.0108	80%	0.00864
TOTAL	0.2708		**0.17**
TOTAL ALL	0.7664		**0.51**

EXHIBIT 2

Data Sheets

St Augustine Airport Benthic Habitat Survey

Recorder: J Gable **Date:** 4/22/09

Methodology:

Site # 300 FEET Transect # TR 5

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	100%	

Site #: 350 FEET Transect #: TR 5

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

Site #: 400 FEET Transect #: TR5

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

Site #: 450 FEET Transect #: TR5

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J GABIG **Date:** 4/22/09

Methodology:

Site # 500 FEET	Transect # TR 5	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	**100%**	

Site #: 850 FEET	Transect #: TR 5	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		PATCHES
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	**100%**	

Site #: 600 FEET	Transect #: TR5	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		PATCHES
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	**100%**	

Site #: PM 2	Transect #: TR5	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	65	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	PERI	
PHOTO	779	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE **Date:** 4/22/09

Methodology:

Site # PM 3 Transect # TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	30	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	PERI	
		10 FT DIAMETER
Total	100%	

Site #: PM 4 Transect #: TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	30	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	PERI	
Total	100%	

Site #: 650 FEET Transect #: TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

Site #: PM 5 Transect #: ALONG TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	60	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
PHOTO	776	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J. Garlio
Date: 4/22/09

Methodology:

Site # PM 6 Transect # ALONG TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	70	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	**100%**	

Site #: PM 7 Transect #: TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	65	
Sand	35	
Bare Ground		
Rock		
Shellfish Beds		
	75	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	PERINKLE	
Total	**100%**	

Site #: SW CREEK Transect #: TR6

0 FEET	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	10	
Sand	90	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	**100%**	

Site #: 50 FEET Transect #: TR6

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	10	
Sand	90	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J Gable
Date: 4/22/07

Methodology: ARAQUOY

Site # 0 FEET Transect # TR7

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
ULVA	60	
Substrate		
Mud	~~[illegible]~~ 30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		
	20	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
	BLUE CRAB	
	FIDDLER	
Total	100%	

Site #: 50 FEET Transect #: TR7

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
	B CRAB	
	FIDDLER	
Total	100%	

Site #: 100 FEET Transect #: TR7

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
ULVA	50	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds		
	15	~~[illegible]~~
Health of shellfish bed		
Heathly		
Not Healty		
MODERATE	✓	
Benthic macrofauna		
Total	100%	

Site #: ~~[illegible]~~ 100 FEET Transect #: P. MAP

TO 172 FEET	**Percent Cover**	**Comments**
Seagrass species		
Algal Species		
		FAINT ULVA
		IN DEEPEST
		AREA
Substrate		
Mud	~~[illegible]~~ 70	
Sand	~~40~~ 30	
Bare Ground		
Rock		
Shellfish Beds		
	25	
Health of shellfish bed		
Heathly		
Not Healty		
MODERATE	✓	
Benthic macrofauna		
PHOTO	769	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J GABLE **Date:** 4/22/07

Methodology:

Site # 150 FEET	Transect # TR 7	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	20	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		
	100	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	KILLIFISH	
	B. CRAB	
Total	**100%**	

Site #: 200 FEET	Transect #: TR 7	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	90	
Sand	10	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLIFISH	
	BCRAB	
Total	**100%**	

Site #: 250 FEET	Transect #: TR 7	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
	75	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	<5	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	KILLIFISH	
	PERIWINKLE	
	B. CRAB	
Total	**100%**	

Site #: 300 FEET	Transect #: TR 7	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	0	
Sand		
Bare Ground		
Rock		
SHELL	100	
Shellfish Beds		
	100	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	KILLIFISH	
	B. CRAB	
PHOTO 263		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J GABLE **Date:** 4/22/09

Methodology:

Site # PM 2 Transect # ALONG TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	75	
Health of shellfish bed		
Heathly		
Not Healty		
MODERATE	✓	
Benthic macrofauna		
	KILLIFISH	
	BLUE CRAB	
PHOTO 766 & 767	PERIWINKLE	
Total	**100%**	

Site #: PM 3 Transect #: ALONG TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	30	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	KILLIFISH	
	B. CRAB	
	PERIWINKLE	
Total	**100%**	

Site #: ____________ Transect #:

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: ____________ Transect #:

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J GABLE **Date:** 4/22/09

Methodology: AT CONFLUENCE OF N-S DITCH AND DITCH AT SW CORNER OF RW

Site # 1300 Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	20	" OYSTER PATCH 4th
Sand	80	COLLECTED w/
Bare Ground	100	GPS 40%
Rock		PHOTO 796
		UNHEALTHY
Shellfish Beds		
		N-S DITCH
		PHOTOS
Health of shellfish bed		END AT
Heathly		# 790
Not Healty		
		"OYSTER PATCH 5th
Benthic macrofauna		30% DENSITY
		UNHEALTHY
Total	100%	

Site #: E-W DITCH Transect #: TR 5

0 FEET	Percent Cover	Comments
Seagrass species		
Algal Species		
	10	
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
PHOTOS START AT 789		
Total	100%	

Site #: E-W DITCH Transect #: TR5

S of 13-31 50 FT	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
	ON BANK	
	KILLI	
Total	100%	

Site #: 100 FEET Transect #: TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
	<5	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE
Date: 4/22/07

Methodology:

Site # 150	Transect # TR 5	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	PERIWINKLE	
Total	100%	

Site #: PM1	Transect #: ALONG TR 5	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	80	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	KILLI	PERI
PHOTO	780	
Total	100%	

Site #: 800 FEET	Transect #: TR 5	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	10	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	PERI	
Total	100%	

Site #: 250 FEET	Transect #: TR 5	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		CLUMPS
		ON BANKS
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J. Gable **Date:** 4/21/09

Methodology:

Site # 0 Feet Transect # 1 (Just N. of Seaplane Ramp

	Percent Cover	Comments
Seagrass species	None	
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds	95%	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	Blue crab	
Total	100%	

Site #: 50 Feet Transect #: 1

	Percent Cover	Comments
Seagrass species	None	
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds	20	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	Blue Crab	
Total	100%	

Site #: 100 Feet Transect #: 1

	Percent Cover	Comments
Seagrass species	None	
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds	15	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	Blue Crab	
Total	100%	

Site #: ____________ Transect #: SECTION E

	Percent Cover	Comments
Seagrass species	None	
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds	65	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J. Gable

Date: ____

Methodology:

Site # 150'   Transect # 1

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds	85	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	Blue Crab	
Total	**100%**	

Site #: 200'   Transect #: 1

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds	20	
Health of shellfish bed		
Heathly	–	
Not Healty		
Benthic macrofauna	B Crab	
Total	**100%**	

Site #: ____   Transect #: SECTION F

	Percent Cover	Comments
Seagrass species	NONE	
Algal Species		
Substrate		
Mud	20	
Sand	80	
Bare Ground		
Rock		
Shellfish Beds	50	
	Photo 828 by Seaplane ramp	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	Lightning whelk	
	periwinkle	
	blue crab	
Total	**100%**	

Site #: ____   Transect #: PM SECTION A

	Percent Cover	Comments
Seagrass species	NONE	
Algal Species		
Substrate		
Mud	20	
Sand	80	
Bare Ground		
Rock		
Shellfish Beds	35	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. Galle **Date:** 4/21/08

Methodology:

Site # ____________ Transect # SECTION 6

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds	55	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	NAMFVAR	
	Pariwinkle	
Total	100%	

Site #: 0 feet Transect #: TR2

	Percent Cover	Comments
Seagrass species	NONE	
Algal Species		
Substrate		
Mud	10	
Sand	90	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: ~~100~~ 50 feet Transect #: TR 2

	Percent Cover	Comments
Seagrass species	NONE	
Algal Species		
Substrate		
Mud	10	
Sand	90	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 100 feet Transect #: TR2

	Percent Cover	Comments
Seagrass species	NONE	
Algal Species		
Substrate		
Mud	10	
Sand	90	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: ______________ Date: ______________

Methodology:

Site # 100 FEET Transect # TR 2

	Percent Cover	Comments
Seagrass species	0	
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 150 FEET Transect #: TR 2

	Percent Cover	Comments
Seagrass species	0	
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 0 Transect #: TR 3

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 50 Transect #: TR 3

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE
Date: 4/22/09

ADDITIONAL PATCH OF ULVA AT CONFLUENCE OF CDC & N-S DITC
90
[illegible]

Methodology:

Site # 50 FEET Transect # CDC

	Percent Cover	Comments
Seagrass species		
Algal Species	0	
Substrate		
Mud	20	
Sand	80	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 100 FEET Transect #: CDC

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	5	
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	FIDDLER CRABS	
	BLUE CRAB	
	KILLIFISH	
Total	100%	

Site #: 0 FEET Transect #: N-S DITCH @ TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		
	SCATTERED OYSTERS IN	
	SPARTINA	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	BLUE CRAB	
	KILLIFISH	
Total	100%	

Site #: 50 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		
	SCATTERED OYSTERS	
	IN SPARTINA	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	B. CRAB	
	KILLIFISH	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J Gable
Date: 4/21/09

Methodology: Shoreline Mapping

Site # S of 20 Approach	Transect # SECTION A	
	Percent Cover	**Comments**
Seagrass species	NONE	
Algal Species		
Substrate		
Mud	50-70	60 AVG
Sand	30-50	40 AVG
Bare Ground		
Rock		
		AVG 50%
Shellfish Beds	25-65	Oysters extend
		into Spartina
	photos	838-835
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	blue crab	
	killifish	
	stone crabs	
Total	**100%**	

Site #:	Transect #: SECTION B	
	Percent Cover	**Comments**
Seagrass species	None	
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
PEAT	10 PERCENT	(LOCALIZED)
Shellfish Beds	50-100	AVG 80
	photos	834-830
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	blue crab	
	killifish	
	COHOG CLAM	
Total	**100%**	

Site #:	Transect #: SECTION C	
	Percent Cover	**Comments**
Seagrass species	NONE	
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds	70	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	CoHOG	
	B Crab	
	Killifish	
Total	**100%**	

Site #:	Transect #: SECTION D	
	Percent Cover	**Comments**
Seagrass species	NONE	
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds	30	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	B. crab	
	fiddler crab	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J Gable Date: 4/21/09

NOTE: SCATTERED OYSTERS in spartina near PMC, D & E

Methodology:

Site # ______ Transect # PMC

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	75	
Sand	25	
Bare Ground		
Rock		
Shellfish Beds	80	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: ______ Transect #: PMD

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	85	
Sand	15	
Bare Ground		
Rock		
Shellfish Beds	85	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: ______ Transect #: PME

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	85	
Sand	15	
Bare Ground		
Rock		
Shellfish Beds	85	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	100%	

4/22/09

Site #: 0 FEET Transect #: Culvert Drainage Conn.

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	90	
PATCH OF ULVA	ON RIPRAP AT	OUTFALL
Substrate		
Mud	20	
Sand	80	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

PHOTOS #820-825

St Augustine Airport Benthic Habitat Survey

Recorder: J. Gable Date: 4/21/09

Methodology:

Site # 100 FEET Transect # TR 3

	Percent Cover	Comments
Seagrass species	0	
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 150 FEET Transect #: TR 3

	Percent Cover	Comments
Seagrass species	0	
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed	0	
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 200 FEET Transect #: TR 3

	Percent Cover	Comments
Seagrass species	0	
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed	0	
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: ____________ Transect #: PM B

	Percent Cover	Comments
Seagrass species	0	
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds	80	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna	FIDDLER CRABS	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE

Date: 4/22/09

Methodology:

Site # 100 FEET Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species	0	
ULVA	10	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds	5	
	SCATTERED	OYSTERS
	IN SPARTINA	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 150 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	40	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds		
	SCATTERED	OYSTERS IN
	SPARTINA	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 200 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	25	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds		
	SCATTERED	OYSTERS
	IN SPARTI	NA SEE PHOTOS
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 250 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	50	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	25	SCATTERED IN
		ADJ SPARTINA
Health of shellfish bed		
Heathly		
Not Healty	✓	
~~MODERATE~~	~~✓~~	
Benthic macrofauna		
Total	100%	

1700
1240

TASK 3.5

~~[illegible]~~ 4.2

D
6.50
3.50
4.00
1.00
2.00

T
3.50
3.00
1.00
0.50

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE Date: 4/22/09

Methodology:

Site # 300 FEET Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	15	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	25	SCATTERED OYSTERS
		ALONG CHANNEL 5%
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	B CRAB	
Total	**100%**	

Site #: 350 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	45	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	25	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	B. CRAB	
Total	**100%**	

Site #: 400 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	25	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	30	SCATTERED 5%
		ALONG CHANNEL
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	B CRAB	
Total	**100%**	

Site #: 450 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	15	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

HIGH HAZ. Area
CZM
V zone

St Augustine Airport Benthic Habitat Survey

Recorder: J GABLE **Date:** 4/22/09

Methodology:

Site # 500 FEET Transect # TRY

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		PATCH OF (CLUSTERED
	70	ABUND OYSTERS
		FROM ~460
Health of shellfish bed		to ~ 550
Heathly		~55 %
Not Healty		INGRESS &
		EGRESS
Benthic macrofauna		COLLECTED
	KILLI	
	B CRAB	
Total	**100%**	

Site #: 550 FEET Transect #: TRY

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	15	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	B CRAB	
	PERIWINKLES	
Total	**100%**	

Site #: 600 FEET Transect #: TRY

	Percent Cover	Comments
Seagrass species		
Algal Species		
	15	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		PATCH OF
	30	CLUSTERS 50%
		580 - 650
Health of shellfish bed		INGROSS &
Heathly		EGRESS COLLECTED
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 650 Transect #: TRY

	Percent Cover	Comments
Seagrass species		
Algal Species	0	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	55	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE Date: 4/22/09

Methodology:

Site # 700 FEET Transect # TR4

	Percent Cover	**Comments**
Seagrass species		
Algal Species	0	
Substrate		
Mud	90	
Sand	10	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLES	
	KILLI	
Total	**100%**	

Site #: ~~0~~ 750 FEET Transect #: TR4

	Percent Cover	**Comments**
Seagrass species		
Algal Species	0	
Substrate		
Mud	90	
Sand	10	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 800 FEET Transect #: TR4

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	90	
Sand	10	
Bare Ground		
Rock		
Shellfish Beds		OYSTERS
		DROP EAT AT
		CONFLUENCE OF
Health of shellfish bed		CHANNEL & CREEK
Heathly	(720)	SCATTERED
Not Healty		CLUMPS ALONG
		BANK
Benthic macrofauna		
	PERIWINKLES	
	KILLI	
Total	**100%**	

Site #: 850 FEET Transect #: TR4

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
ULVA	5	
Substrate		
Mud	65	
Sand	35	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
	KILLI	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE

Date: 4/22/09

Methodology:

Site # 900 FEET Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	75	
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		"OYSTER PATCH" COLLECTED GPS UNHEALTHY PHOTO 805
	10	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 950 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	25	
Substrate		
Mud	~~0~~40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds		"OYSTER PATCH" COLLECTED GPS MODERATELY HEALTHY
	55	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 1000 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLES	
Total	**100%**	

Site #: 1050 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLES	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABRIG

Date: 4/22/09

Methodology:

Site # 1100 FEET	Transect # TR4	
	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLE	
Total	100%	

Site #: 1150 FEET	Transect #: TR4	
	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLE	
Total	100%	

Site #: 1200 FEET	Transect #: TR4	
	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLES	
Total	100%	

Site #: 1250	Transect #: TR4	
	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	50	"OYSTER PATCH'S
Sand	50	MAPPED w/ GPS
Bare Ground	100	MODERATE
Rock		70% cover
		photo 795
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: ____________ **Date:** ____________

Methodology:

Site # PM1 Transect # TR6

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		
	70	6x8'
Health of shellfish bed		
Heathly		
Not Healty		
MODERATE	✓	
Benthic macrofauna		
Total	**100%**	

Site #: 100 FT Transect #: TR6

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	**100%**	

Site #: ____________ Transect #:

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: ____________ Transect #:

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: ____________ **Date:** ____________

Methodology:

Site # ____________	Transect # BLACK MANGROVE	
SE CORNER 13-31	**Percent Cover**	**Comments**
Seagrass species		
	Black	Mangroves
Algal Species		
	near upper	fringe of
	marsh.	Approx. maby
Substrate		
Mud	2 dozen	within this
Sand		
Bare Ground	polygon.	Appear
Rock		
	somewhat	stressed/
Shellfish Beds		
	stunted	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: ____________	Transect #:	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: ____________	Transect #:	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: ____________	Transect #:	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: ______________ Date: ______________

Methodology:

Site # ______	Transect # BLACK MANGROVE	
SE CORNER 13-31	**Percent Cover**	**Comments**
Seagrass species		
	Black Mangroves are	
Algal Species		
	near upper fringe of	
	marsh. Approx. maybe	
Substrate		
Mud	2 dozen within this	
Sand		
Bare Ground	polygon. Appear	
Rock		
	somewhat stressed/	
Shellfish Beds		
	stunted	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: ______	Transect #:	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: ______	Transect #:	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: ______	Transect #:	
	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

2004 – 28015; 28048 – 28050

2003 – 28025
28030
28040

St Augustine Airport Benthic Habitat Survey

Recorder: J GABLE　　Date: 4/22/09

Methodology:

Site # PM 2　　Transect # ALONG TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	75	
Health of shellfish bed		
Heathly		
Not Healty		
MODERATO	✓	
Benthic macrofauna		
	KILLFISH	
	BLUE CRAB	
PHOTO 766 & 767	PERIWINKLE	
Total	**100%**	

Site #: PM 3　　Transect #: ALONG TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	30	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	KILLIFISH	
	B. CRAB	
	PERIWINKLE	
Total	**100%**	

Site #: ____________　　Transect #:

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: ____________　　Transect #:

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J GABLE

Date: 4/22/07

Methodology:

Site # 150 FEET Transect # TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	20	
Sand	80	
Bare Ground		
Rock		
Shellfish Beds		
	100	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	KILLIFISH	
	B. CRAB	
Total	100%	

Site #: 200 FEET Transect #: TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	90	
Sand	10	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLIFISH	
	B CRAB	
Total	100%	

Site #: 250 FEET Transect #: TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
	75	
Substrate		
Mud	20	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	<5	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	KILLIFISH	
	PERIWINKLE	
	B. CRAB	
Total	100%	

Site #: 300 FEET Transect #: TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	0	
Sand		
Bare Ground		
Rock		
SHELL	100	
Shellfish Beds		
	100	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	KILLIFISH	
	B. CRAB	
PHOTO 268		
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J Gable   Date: 4/22/09

Methodology: ARAQUOY

Site # 0 FEET Transect # TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	60	
Substrate		
Mud	~~70~~ 30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		
	20	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
	BLUE CRAB	
	FIDDLER	
Total	100%	

Site #: 50 FEET Transect #: TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
	B CRAB	
	FIDDLER	
Total	100%	

Site #: 100 FEET Transect #: TR 7

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	50	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds		
	15	
Health of shellfish bed		
Heathly		
Not Healty		
MODERATE	✓	
Benthic macrofauna		
Total	100%	

Site #: ~~[illegible]~~ 100 FEET Transect #: P. MID

TO 172 FEET	Percent Cover	Comments
Seagrass species		
Algal Species		
		FAINT ULVA
		IN DEEPEST
		AREA
Substrate		
Mud	~~60~~ 70	
Sand	~~40~~ 30	
Bare Ground		
Rock		
Shellfish Beds		
	25	
Health of shellfish bed		
Heathly		
Not Healty		
MODERATE	✓	
Benthic macrofauna		
PHOTO	769	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GRAVES
Date: 4/22/09

Methodology:

Site # PM 6 Transect # ALONG TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	70	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	**100%**	

Site #: PM 7 Transect #: TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	65	
Sand	35	
Bare Ground		
Rock		
Shellfish Beds		
	75	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	PERINKLE	
Total	**100%**	

Site #: SW CREEK 0 FEET Transect #: TR 6

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	10	
Sand	90	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	**100%**	

Site #: 50 FEET Transect #: TR 6

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	10	
Sand	90	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE

Date: 4/22/09

Methodology:

Site # PM 3 Transect # TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	30	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	PERI	
		10 FT DIAMETER
Total	100%	

Site #: PM 4 Transect #: TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	30	
Health of shellfish bed		
Heathly		
Not Healty	✓	
Benthic macrofauna		
	PERI	
Total	100%	

Site #: 650 FEET Transect #: TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

Site #: PM 5 Transect #: ALONG TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	60	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
PHOTO	776	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J GABIG **Date:** 4/22/09

Methodology:

Site # 500 FEET Transect # TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	**100%**	

Site #: 850 FEET Transect #: TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		PATCHES
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	**100%**	

Site #: 600 FEET Transect #: TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	70	
Sand	30	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		PATCHES
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	**100%**	

Site #: PM 2 Transect #: TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	65	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	PERI	
PHOTO	779	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J Gable

Date: 4/22/09

Methodology:

Site # 300 FEET Transect # TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	100%	

Site #: 350 FEET Transect #: TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

Site #: 400 FEET Transect #: TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

Site #: 450 FEET Transect #: TR5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground	100	
Rock		
Shellfish Beds		SCATTERED
		ON BANK
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERI	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE Date: 4/22/07

Methodology:

Site # 150 Transect # TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	60	
Sand	40	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	PERIWINKLE	
Total	**100%**	

Site #: PM1 Transect #: ALONG TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	80	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
	KILLI PERI	
PHOTO	780	
Total	**100%**	

Site #: 000 FEET Transect #: TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	80	
Sand	20	
Bare Ground		
Rock		
Shellfish Beds		
	10	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	PERI	
Total	**100%**	

Site #: 250 FEET Transect #: TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		CLUMPS
		ON BANKS
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PORI	
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J GABLE **Date:** 4/22/09

Methodology: AT CONFLUENCE OF N-S DITCH AND DITCH AT SW CORNER OF RW

Site # 1300 Transect # TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	20	"OYSTER PATCH 4th
Sand	80	COLLECTED w/
Bare Ground	100	GPS 40%
Rock		PHOTO 790
		UNHEALTHY
Shellfish Beds		
		N-S DITCH
		PHOTOS
Health of shellfish bed		END AT
Heathly		# 790
Not Healty		
		"OYSTER PATCH 5th
Benthic macrofauna		30% DENSITY
		UNHEALTHY
Total	100%	

Site #: E-W DITCH Transect #: TR 5

0 FEET	Percent Cover	Comments
Seagrass species		
Algal Species		
	10	
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
PHOTOS STARTS	AT 787	
Total	100%	

Site #: E-W DITCH Transect #: TR 5

S of 13-31 50 FT	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
	ON BANK	
	KILLI	
Total	100%	

Site #: 100 FEET Transect #: TR 5

	Percent Cover	Comments
Seagrass species		
Algal Species		
	<5	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: ____________ **Date:** ____________

Methodology:

Site # PM1 Transect # TRC6

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		
	70	6'x8'
Health of shellfish bed		
Heathly		
Not Healty		
MODERATE	✓	
Benthic macrofauna		
Total	**100%**	

Site #: ~~PM~~ 100 FT Transect #: TRC6

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud	50	
Sand	50	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
Total	**100%**	

Site #: ____________ Transect #:

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: ____________ Transect #:

	Percent Cover	**Comments**
Seagrass species		
Algal Species		
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE   Date: 4/22/09

Methodology:

Site # 1100 FEET   Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLE	
Total	**100%**	

Site #: 1150 FEET   Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLE	
Total	**100%**	

Site #: 1200 FEET   Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLES	
Total	**100%**	

Site #: 1250   Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	50	"OYSTER PATCH'S
Sand	50	MAPPED W/ GPS
Bare Ground	100	MODERATE
Rock		70% cover
		photo 795
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE **Date:** 4/22/09

Methodology:

Site # 900 FEET Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	75	
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		"OYSTER PATCH" COLLECTED GPS UNHEALTHY PHOTO 805
	10	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 950 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	25	
Substrate		
Mud	40	
Sand	60	
Bare Ground		
Rock		
Shellfish Beds		"OYSTER PATCH" COLLECTED GPS MODERATELY HEALTHY
	55	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 1000 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLES	
Total	100%	

Site #: 1050 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	30	
Sand	70	
Bare Ground	100	
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	↑ PERIWINKLES	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE   Date: 4/22/09

Methodology:

Site # 700 FEET   Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species	0	
Substrate		
Mud	90	
Sand	10	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLES	
	KILLI	
Total	100%	

Site #: ~~0~~ 750 FEET   Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species	0	
Substrate		
Mud	90	
Sand	10	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 800 FEET   Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	90	
Sand	10	
Bare Ground		
Rock		
Shellfish Beds		OYSTERS
		~~DROP OFF~~ AT
		CONFLUENCE OF
Health of shellfish bed		CHANNEL & CREEK
Heathly	(720)	SCATTERED
Not Healty		CLUMPS ALONG
		BANK
Benthic macrofauna		
	PERIWINKLES	
	KILLI	
Total	100%	

Site #: 850 FEET   Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	5	
Substrate		
Mud	65	
Sand	35	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	PERIWINKLE	
	KILLI	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J GABLE Date: 4/22/09

Methodology:

Site # 500 FEET Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		PATCH OF (CLUSTED)
	70	ABUND OYSTERS
		FROM ~460
Health of shellfish bed		to ~550
Heathly		~55%
Not Healty		INGRESS &
		EGRESS
Benthic macrofauna		COLLECTED
	KILLI	
	B CRAB	
Total	**100%**	

Site #: 550 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	15	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	B CRAB	
	PERIWINKLES	
Total	**100%**	

Site #: 600 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
	15	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		PATCH OF
	30	CLUSTERS 50%
		580 - 650
Health of shellfish bed		INGRESS &
Heathly		EGRESS COLLECTED
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 650 Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species	0	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	55	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE Date: 4/22/09

Methodology:

Site # 300 FEET Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	15	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	25	SCATTERED OYSTERS
		ALONG CHANNEL ≤5%
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	B CRAB	
Total	100%	

Site #: 350 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	45	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	25	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	B. CRAB	
Total	100%	

Site #: 400 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	25	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	30	SCATTERED 5%
		ALONG CHANNEL
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	KILLI	
	B CRAB	
Total	100%	

Site #: 450 FEET Transect #: TR 4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	15	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE **Date:** 4/22/09

Methodology:

Site # 170 FEET Transect # TR4

	Percent Cover	Comments
Seagrass species		
Algal Species	0	
ULVA	10	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds	5	
	SCATTERED	OYSTERS
	IN SPARTINA	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 150 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	40	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds		
	SCATTERED	OYSTERS IN
	SPARTINA	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 200 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	25	
Substrate		
Mud	60	
Sand	40	
Bare Ground		
Rock		
Shellfish Beds		
	SCATTERED	OYSTERS
	IN SPARTINA	SEE PHOTOS
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	**100%**	

Site #: 250 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	50	
Substrate		
Mud	70	
Sand	30	
Bare Ground		
Rock		
Shellfish Beds		
	25	SCATTERED IN
		ADJ SPARTINA
Health of shellfish bed		
Heathly		
Not Healty	✓	
~~MODERATE~~	~~✓~~	
Benthic macrofauna		
Total	**100%**	

St Augustine Airport Benthic Habitat Survey

Recorder: J. GABLE

Date: 4/22/09

ADDITIONAL
PATCH OF ULVA
AT CONFLUENCE
OF CDC & N-S DITC
90
[illegible]

Methodology:

Site # 50 FEET Transect # CDC

	Percent Cover	Comments
Seagrass species		
Algal Species	0	
Substrate		
Mud	20	
Sand	80	
Bare Ground		
Rock		
Shellfish Beds	0	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: 100 FEET Transect #: CDC

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	5	
Substrate		
Mud		
Sand		
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	FIDDLER CRABS	
	BLUE CRAB	
	KILLIFISH	
Total	100%	

Site #: 0 FEET Transect #: N-S DITCH @ TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		
	SCATTERED OYSTERS	IN
	SPARTINA	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	BLUE CRAB	
	KILLIFISH	
Total	100%	

Site #: 50 FEET Transect #: TR4

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	10	
Substrate		
Mud	50	
Sand	50	
Bare Ground		
Rock		
Shellfish Beds		
	SCATTERED	OYSTERS
	IN SPARTI	NA
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
	B. CRAB	
	KILLIFISH	
Total	100%	

St Augustine Airport Benthic Habitat Survey

Note: SCATTERED OYSTERS in spartina near PMC, D & E

Recorder: J Gable   Date: 4/21/09

Methodology:

Site # ______   Transect # PMC

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	75	
Sand	25	
Bare Ground		
Rock		
Shellfish Beds	80	
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: ______   Transect #: PMD

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	85	
Sand	15	
Bare Ground		
Rock		
Shellfish Beds	85	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	100%	

Site #: ______   Transect #: PME

	Percent Cover	Comments
Seagrass species		
Algal Species		
Substrate		
Mud	85	
Sand	15	
Bare Ground		
Rock		
Shellfish Beds	85	
Health of shellfish bed		
Heathly	✓	
Not Healty		
Benthic macrofauna		
Total	100%	

4/22/09

Site #: O FEET   Transect #: Culvert Drainage Conv.

	Percent Cover	Comments
Seagrass species		
Algal Species		
ULVA	90	
PATCH OF ULVA ON RIPRAP AT OUTFALL		
Substrate		
Mud	20	
Sand	80	
Bare Ground		
Rock		
Shellfish Beds		
Health of shellfish bed		
Heathly		
Not Healty		
Benthic macrofauna		
Total	100%	

PHOTOS 820 -825

EXHIBIT 3

Representative Photos

Photo 1. View of fringing oysters along seaplane basin

Photo 2. View of fringing oysters north of seaplane ramp

Photo 3. Typical view of oyster patches within mud flats at end of Runway 24

Photo 4. Typical view of fringing oysters along northeast boundary of project area

Photo 5. Typical view of oyster clumps along southwest boundary of project area

FIGURES

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE 1" = 350'
DESIGNED BY David Loy; Melissa Green
DRAWN BY
CHECKED BY

PRIME CONSULTANT:
Passero Associates
Engineering Surveying
Architecture Planning
CERT. OF AUTHORIZATION #3428

SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE 11/06/09
PROJECT NO. 23081.38

Project Taxiway C Replacement, RSA Compliance, and Approach Lighting System
Owner St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FLUCFCS and Oyster Locations

FIGURE NUMBER
Figure 1

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE 1" = 350'
DESIGNED BY David Loy; Melissa Green
DRAWN BY
CHECKED BY

PRIME CONSULTANT:
Passero Associates
Engineering Surveying
Architecture Planning
CERT. OF AUTHORIZATION #3428

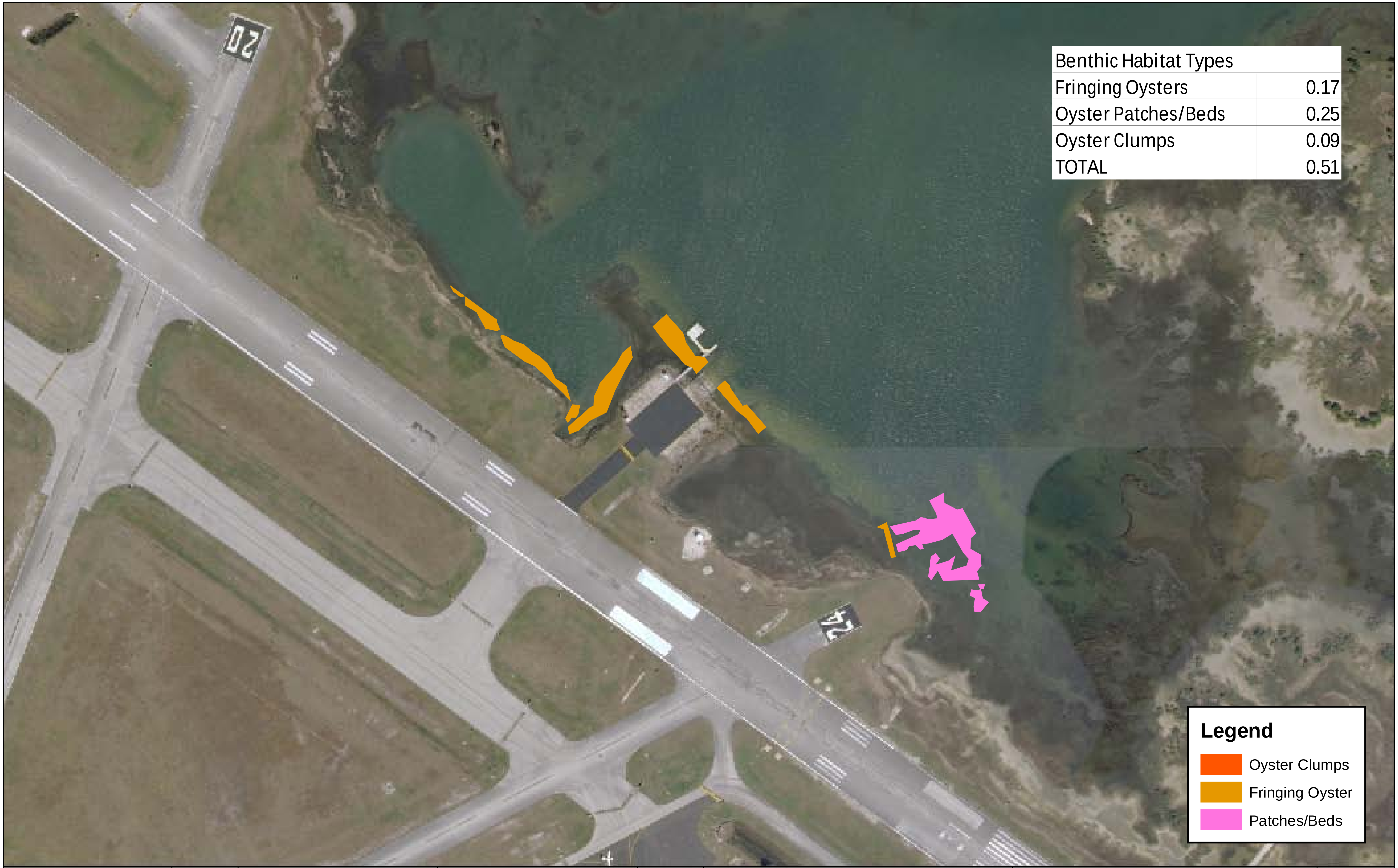
SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE 10/22/09
PROJECT NO. 23081.38

Project Taxiway C Replacement, RSA Compliance, and Approach Lighting System
Owner St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

Benthic Habitat Survey Area with Methodologies

FIGURE NUMBER
Figure 2



Benthic Habitat Types	
Fringing Oysters	0.17
Oyster Patches/Beds	0.25
Oyster Clumps	0.09
TOTAL	0.51

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE 1" = 200'
DESIGNED BY David Loy; Melissa Green
DRAWN BY
CHECKED BY

PRIME CONSULTANT:
Passero Associates
Engineering Surveying
Architecture Planning
CERT. OF AUTHORIZATION #3428

SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE 10/22/09
PROJECT NO. 23081.38

Project Taxiway C Replacement, RSA Compliance, and Approach Lighting System
Owner St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

Benthic Habitat Types - North

FIGURE NUMBER
Figure 3A

Benthic Habitat Types	
Fringing Oysters	0.17
Oyster Patches/Beds	0.25
Oyster Clumps	0.09
TOTAL	0.51

Legend

🟥 Oyster Clumps

🟧 Fringing Oyster

Patches/Beds

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE 1" = 200'
DESIGNED BY David Loy; Melissa Green
DRAWN BY
CHECKED BY

PRIME CONSULTANT:
Passero Associates
Engineering Surveying
Architecture Planning
CERT. OF AUTHORIZATION #3428

SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE 10/22/09
PROJECT NO. 23081.38

Project Taxiway C Replacement, RSA Compliance, and Approach Lighting System
Owner St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

Benthic Habitat Types - South and West

FIGURE NUMBER
Figure 3B

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE 1" = 350'
DESIGNED BY David Loy; Melissa Green
DRAWN BY
CHECKED BY

PRIME CONSULTANT:
Passero Associates
Engineering Surveying
Architecture Planning
CERT. OF AUTHORIZATION #3428

SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE 10/22/09
PROJECT NO. 23081.38

Project Taxiway C Replacement, RSA Compliance, and Approach Lighting System
Owner St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

Oyster Temporary and Permanent Impacts

FIGURE NUMBER
Figure 4

APPENDIX D

ESSENTIAL FISH HABITAT REPORT

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
PASSERO ASSOCIATES, LLC
13453 N. MAIN ST, SUITE 106
JACKSONVILLE, FL 32218

IN COORDINATION WITH:
BIRKITT ENVIRONMENTAL SERVICES, INC
550 N. REO ST, SUITE 105
TAMPA, FL 33609

NFRA
Northeast Florida Regional Airport
Fly Smart!

APPENDIX D

ST. AUGUSTINE AIRPORT

TAXIWAY 'C' REPLACEMENT, RSA REPAIR, AND APPROACH LIGHTING SYSTEM PROJECTS

ESSENTIAL FISH HABITAT REPORT

Table of Contents

Figures

1.0 Introduction

The Airport is located on the eastern coast of Florida, immediately east of US Highway 1 just north of the city of St. Augustine in St. Johns County, Florida. The Airport comprises approximately 718 acres of maintained grasses, saltmarsh, ditches, canals, a boat ramp, a seaplane dock, runways, taxiways and associated infrastructure. The proposed project comprises 42.8 acres and is described below.

The Authority is proposing the following projects for the Airport:

- The replacement of the existing Taxiway 'C' that serves Runway 31;
- The restoration of the RSA to bring the RSA back into compliance with FAA standards; and
- The installation of an ALS for the existing ILS for Runway 31.

The purpose of these projects is to improve safety and efficiency for arriving and departing aircrafts, and to bring the RSA back into compliance with FAA safety standards.

2.0 Essential Fish Habitat Designation

Section 305(b)(1)(A and B) of the Magnuson Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.), as amended, requires identification of adverse impacts on EFH and the actions that should be considered to ensure that EFH is conserved and enhanced. *"The term* ***essential fish habitat*** *means those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." -- Magnuson-Stevens Act §3(10)".*

Eight (8) Fishery Management Councils were developed under the Magnuson Stevens Fishery Conservation and Management Act (MSFCMA) to manage living marine resources within the federal limit water boundary and are required to describe and identify EFH designations in their respective regions. Each of these councils is responsible for developing a Fishery Management Plan (FMP) to achieve specified management goals for fisheries. The FMP includes data, analyses, and management measures (including guidelines for harvest) for a fishery. The Fishery Management Council that manages those federally managed resources and their EFH in the proposed project area is the SAFMC.

Fisheries Management

The SAFMC is responsible for the conservation and management of fish stocks within the federal limits of the Atlantic Ocean along the coasts of North Carolina, South Carolina, Georgia, and along the east coast of Florida south to Key West and is, therefore, charged with managing marine resources within the project limits. The seven (7) Fishery Management Plans (FMP) developed by the Council include: Calico Scallop FMP, Coastal Migratory Pelagic (includes King and Spanish Mackerel) FMP, Coral FMP, Golden Crab FMP, Shrimp (including rock shrimp) FMP, Snapper / Grouper Complex FMP, and Spiny Lobster FMP. According to the MSFCMA, all FMC managed species under Federal FMPs must have EFH identified.

NMFS federally manages the classified "highly migratory species" (HMS) and has developed FMPs for each species. HMS includes Atlantic tunas, billfish, coastal sharks, and swordfish. NMFS geographically defines EFH for each of the HMS along the Atlantic coast.

3.0 EFH Habitat in the Affected Environment

The SAFMC designates a variety of different habitats as EFH. These habitats, shown in **Table 1**, are needed to support fish for spawning, breeding, feeding, or growth to maturity. These habitats can be critically important for an individual species or an assemblage of species. In addition to the SAFMC, NMFS has also defined EFH habitat. The defined NMFS EFH areas are species-specific and include: shallow coastal waters, offshore waters inside the Exclusive Economic Zone (EEZ), offshore waters outside the EEZ, and inshore waters along the Atlantic coast. The EEZ is defined as the maritime zone extending 200 nautical miles from state waters and serves as the area in which a government has special rights for exploration and use of marine resources.

Table 1.
SAFMC Designated EFH within the Federal Waters of the State of Florida

EFH	Area within Project (acres)
Estuarine Habitat	
Estuarine Emergent Wetlands	12.2
Estuarine Shrub/Scrub Mangroves	-
Submerged Aquatic Vegetation	-
Oyster Reefs and Shell Banks	0.51
Tidal Flats	0.76
Estuarine Water Column	3.91
Palustrine Habitat	
Palustrine Emergent Wetlands	-
Palustrine Forested Wetlands	-

The EFH types classified by the SAFMC and NMFS within the proposed project area that are proposed to be impacted by the proposed activities are: estuarine emergent wetlands, estuarine water column, oyster beds, and tidal flats (**Figure 1**). These habitats are utilized by SAFMC and NMFS federally managed fish for spawning, breeding, feeding, or growth during some period of their life cycle.

Estuarine Water Column

Estuaries provide the base of the inshore food chain and habitat for hundreds of species of birds, fish, and other wildlife. They also improve water quality by filtering stormwater runoff originating in upland areas. The estuarine water column consists of open water habitat that many species utilize for spawning, breeding, feeding, schooling, or growth. These open water areas within the vicinity of the proposed project area consist of a previously dredged tidal ditch and canal, which were created to maintain a navigable connection between the Tolomato River and Indian Creek. In addition, an open water embayment which was dredged for fill material to create the southern half of Runway

13-31 is within the vicinity of the proposed project area. The estuarine water column habitat comprises approximately 3.91 acres of the proposed project area.

Estuarine Emergent Wetlands

Estuarine emergent wetlands or saltmarsh constitute a complex ecosystem that serves as EFHbut also is vital to wildlife including endangered and threatened species, mammals, avifauna, reptiles, amphibians, shellfish, and invertebrates (SAFMC, 1998). The existing southeast end of Runway 13-31 was historically constructed on fill material placed within an area of saltmarsh. As a result, the southern end of runway 13-31 and the associated RSA and parallel taxiway (Taxiway 'C'), are surrounded on three sides (east, south, and west) by saltmarsh. The saltmarsh habitat is dominated by high marsh species mixed with unvegetated sand and or salt flats. The saltmarsh community is primarily vegetated with saltmarsh cord grasses (*Spartina alterniflora*) and black needlerush (*Juncus roemerianus*) and comprises approximately 12.2 acres[1] of the proposed project area. On the landward side of the saltmarsh habitat, a few black mangroves (*Avicennia germinans*) are present. These mangroves are dwarfed, and are exhibiting signs of stress. These signs of stress include brown / dead leaves indicative of frost damage as well as reduced plant height (approximately 3 feet) and diameter at breast height (DBH). This appearance is likely due to high soil salinities in the salt flats and the location at the northern extent of distribution for this species.

Tidal Flats

In the area just east and west of the sea plane boat dock, tidal mud flats were observed. Tidal flats are considered EFH as they are critical structural components of coastal systems that serve as benthic nursery areas, refuges, and feeding grounds for a variety of animals (SAFMC, 1998). The tidal flats are predominantly unvegetated and some areas contain a few patches of oysters. The area is highly influenced by the tide and can be completely submerged during high tide and extremely exposed during low tide. The tidal flat habitat comprises approximately 0.76 acres within the proposed project area.

Oyster Reefs and Shell Banks

Oyster beds, designated as EFH by the SAFMC, are considered to be vital marine ecosystems as they improve water quality by filtering pollutants, provide hard bottom, and inshore habitat. The ecological role of the oyster reef as structure, providing food and protection, also contributes to its value as a critical fisheries habitat. Oysters were observed in beds, patches, and individual clumps within the open water areas of the intertidal and or subtidal zone at the waterward edge of the saltmarsh and on the tidal flats. On site investigations revealed that there are approximately 0.51 acres of oysters located within the proposed project area. The oyster beds and patches present in the intertidal zone on the northeast side of the airport were observed to be healthy with a viable population of adult and juvenile individuals. The oyster patches and individual clumps located in the previously dredged tidal ditch and canal on the south southwest side of the airport were observed to be of moderate health and in some cases poor health. The health of oyster beds was evaluated by visually assessing the ratio of shell to mud existing within the oyster polygon and the percent vertical shell within that shell and or mud matrix. Beds that had high ratios of shell to mud within the bed and had high percentage of vertical shell were noted as 'Healthy.' Beds that had lower ratios of shell to mud and less vertical shell were noted as 'Moderate.' Beds that contained greater amounts of

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[1] The saltmarsh acreage includes approximately 1.37 acres of salt flats.

mud with only sparse oyster coverage and low amounts of vertical shell or containing washed shell were noted as 'Unhealthy.' For additional information on the oyster beds located within the proposed project area, see **Appendix C**.

4.0 Managed Species

Species managed by the SAFMC that utilize the EFH located onsite and may be found in the habitats near the airport include shrimp species and members of the Snapper-Grouper complex (FWC, 2009; SAFMC, 1998). Specific shrimp species identified by the SAFMC as having the potential to utilize the estuarine waters within the proposed project area include the white and brown Penaeid shrimp, *Litopenaeus setiferus* and *Farfantepenaeus aztecus*, respectively. For peneaid shrimp, EFH includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies. Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes), tidal palustrine forested areas, mangroves, tidal freshwater, estuarine, and marine submerged aquatic vegetation (e.g., seagrass), and subtidal and intertidal non-vegetated flats (SAFMC, 1998).

EFH for members of the Snapper-Grouper complex may be found within the area of the proposed project. According to the SAFMC EFH Plan, ten (10) families of fishes including 73 species are managed under the Snapper-Grouper complex. Snapper-Grouper species utilize both pelagic and benthic habitats during their life cycle. Planktonic larval stages live in the water column and feed on zooplankton. Juveniles and adults are typically demersal (found living or feeding near the bottom of the ocean) and usually associate with hard structures on the continental shelf that have moderate to high relief; i.e., coral reefs, artificial reefs, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings (SAFMC, 1998). However, some species, such as the gray snapper (*Lutjanus griseus)*, dog snapper (*L. jocu)*, lane snapper (*L. synagris)*, yellowtail snapper (*Ocyurus chrysurus)*, sheepshead (*Archosargus probatocephalus*), crevalle jack (*Caranx hippos*) and Atlantic spadefish (*Chaetodipterus faber)* may occur in estuaries, lagoons, and bay systems. These species have the potential to inhabit the estuarine emergent wetlands, the estuarine water column, or the oyster beds found within the proposed project area at some point in their life-cycle. Many species may also utilize various combinations of these habitats during diurnal feeding migrations or seasonal shifts in cross-shelf distributions (FMNH, 2009; SAFMC, 1998; Fishbase, 2009, Humann and DeLoach, 2002).

In addition, several HMS may inhabit the shallow waters of the proposed project area that are managed by NMFS. These species may include, but are not limited to, the Atlantic bluefin tuna *(Thunnus thynnus)* and yellowfin tuna *(Thunnus albacores*). Several coastal shark species are also managed by NMFS and have the potential to inhabit the waters of the proposed project area. Some of these species may include, but are not limited to, the blacktip shark (*Carcharinus limbatus*), Atlantic sharpnose shark (*Rhizoprionodon terraenovae*), bonnethead shark (*Sphyrna tiburo*), bull shark (*Carcharhinus leucas*)**,** and the scalloped hammerhead shark (*Sphyrna lewini*). These sharks can all be found in coastal waters including estuaries and harbors. Due to the large size of these fish, however, it is likely that the HMS and coastal shark species would inhabit the shallow waters of the proposed project area only during the larval or juvenile stages of their life-cycle (FLMNH, 2009).

5.0 Potential Impacts to EFH

Physical alterations to EFH primarily occur from man's activities and natural environmental events of nature. Potential activities that adversely impact EFH can range from minor (possible recovery of the EFH to 100 percent functionality in months to years) to major (possible recovery of partial EFH functionality in years to decades) to catastrophic (loss of all EFH functionality to the foreseeable future).

The potential impacts to managed species from the proposed project will be minor and primarily due to the loss of habitat. Activities from the proposed project at the Airport are expected to permanently impact less than 7.46 acres of saltmarsh, approximately 2.57 acres of open water habitat (including a man-made previously dredged tidal ditch), 0.17 acres of oyster beds and clumps, and a few low quality black mangroves. Saltmarsh is important to shrimp and members of the Snapper-Grouper complex as it serves as foraging, nursery, refuge, and loafing grounds. However, the saltmarsh habitat adjacent to the proposed project can be considered lower quality due to the discharge of treated runoff from the runway and or taxiway and tarmac as well as untreated runoff from US Highway 1 (via a stormwater ditch) (for more information see **Chapter 3**). Due to the topography of the project site and the elevation of the saltmarsh area, the majority of the habitat can be classified as high marsh. High marsh is characterized by low levels of exposure to tidal waters that evaporate and lead to high salinity levels that tend to prohibit vegetative growth. High marsh areas typically exhibit lower levels of species diversity. In addition, water levels in high marsh are often not deep enough to support managed fish species. Low marsh is present within the proposed project area but in sparse locations predominantly adjacent to the open water habitats. The low marsh, dominated by saltmarsh cord grass, typically contains higher water levels that can support managed fish species and their prey.

Higher quality saltmarsh habitats that provide greater levels of EFH are located adjacent to the proposed project area. Therefore, it is expected that the shrimp, snappers, or groupers in the area will most likely utilize and be found in the higher quality habitat located outside the proposed project area than within the lower quality habitat of the proposed project area.

Estuarine water column impacts will include the fill of approximately 2.32 acres of a previously dredged tidal ditch and canal that contain a few scattered oyster beds and open waters at the end of Runway 24. These areas of the project are of lower quality and are unlikely to provide all the fisheries benefits associated with EFH. According to the FDEP the Airport is located within Water Body (WBID) 23631. WBID 23631 is the Tolomato River segment, which was listed on the 303(d) report as impaired. The Group 5 Basin / Northeast District 303(d) list describes WBID 23631 as having impairments for arsenic, coliform (shellfish harvesting downgrade), copper, iron, mercury (in fish tissue), and nickel (FDEP, 2007). As mentioned previously, these impaired waters also receive treated runoff from the existing runway and or taxiway and tarmac as well as untreated runoff from US Highway 1. The open waters of the project site are manmade dredged waters characterized as having high turbidity and low water clarity.

In addition, ingress and egress of fish to the saltmarsh west of Runway 13-31 through the existing tidal canal will be limited during construction. However, the effects on fish from limiting their ingress and egress to saltmarsh during the relocation of the tidal canal are not expected to be significant. Construction will be completed as quickly as possible and the area will be available to fish upon completion. The relocated tidal canal will mimic the conditions of the tidal canal it is replacing. In addition, the area of construction for the tidal canal relocation is very small. Significant saltmarsh and open water estuarine habitat that is of higher quality than what is proposed for impact will be available in adjacent areas for fish to utilize during construction. Upon completion of construction, the relocated tidal canal will be available for fish to utilize. Therefore, impacts to fish during the relocation of the tidal canal are expected to be temporary and minimal.

Tidal mudflats within the proposed project area were found to contain areas of scattered patches of oysters of relatively good health. However, these mudflats consisted primarily of open areas of unconsolidated mud and sand. The total coverage of oysters within the mudflats area is estimated to be 0.25 acres. Larger concentrations of oysters, oyster beds and patches, were also observed within the proposed project area and were found to contain viable populations of juvenile and adult oysters (**Appendix C**, **Figures 3A and**). Oyster beds occur east to northeast of Runway 13-31 and range from moderately healthy to healthy. The living individuals were oriented vertically (indicating relatively good health) in most of the beds and patches; an indicator of shellfish health. The area east / southeast of Runway 13-31 contain oyster patches and individual clumps, but no oyster beds. The oysters present within the tidal canal range from moderately healthy to poor condition. The poor condition was evident due to the fact that very few viable juvenile and adult oysters were observed and the individuals were not oriented vertically (indicating poorer health). Oyster patches and individual clumps were also observed in the area west / southwest of Runway 13-31. The oysters present within the tidal canal were of moderate health. The presence of juvenile oysters was observed and some of the individual oysters were oriented vertically. Due to the presence of significant populations of oysters in areas surrounding the project that are likely healthier than those within the proposed project area, it is anticipated that the proposed project will have only minimal impacts on oyster habitat in the area. Only 0.17 acres of oysters are proposed to be permanently impacted. The remaining 0.34 acres of oysters are present within the construction areas and may be temporarily impacted by construction activities. It is important to note that oysters take approximately 3 to 5 years to reach maturity and thus, impacts to oysters during construction may not necessarily be considered temporary. Permanent impacts are expected from the filling of the shoreline of the airport in order to construct the RSA to FAA standards. Rip rap will also be placed to help prevent future erosion of the RSA. The impacts to oysters that do occur will be mitigated appropriately. For more details on presence and health of benthic resources, see **Appendix C**. For additional information on the mitigation proposed as compensation for the impacts to oysters, see Section 6.0 of this EFH analysis and **Appendix R**.

In conclusion, impacts to the federally managed fish species are expected to be minimal. In addition, no significant cumulative impacts are expected. The proposed project area is a tidally influenced system and during a significant portion of the day, the habitats in the proposed project area contain less than two (2) inches of water. Therefore, the majority of the habitat in the proposed project area cannot support fish. Higher quality habitats with a more regular hydroperiod can be found in adjacent areas and any fish that may be in the proposed project area are expected to move to these areas that are more suitable during construction. Furthermore, mitigation and BMPs will be utilized throughout the project's construction and mitigation phases to compensate and ensure minimal secondary impacts to the adjacent wetland areas (see **Appendix F**). Please also see Section 6.0 below. An analysis of cumulative effects on EFH is provided in **Section 4.16.5** of this EA.

6.0 Mitigation and BMPs

Airport projects are generally considered to be in the public interest and frequently require wetland impacts which need to be offset by mitigation. The development of suitable mitigation plans should be undertaken early in the planning process. NMFS Branch Office personnel have participated in the planning process since the initial stages of the project. EA kickoff meetings and site visits were held before securing and committing resources to the preferred alternative.

BMPs will be utilized throughout the construction of the proposed replacement of Taxiway 'C' and the mitigation phase of the project. These BMPs include utilizing suitable erosion control and vegetative restoration methods. Construction activities will include techniques (e.g. silt screens and turbidity curtains) that will limit disturbance to the proposed construction areas, control sedimentation and erosion, and avoid and or minimize turbidity and dispersal of dredged materials into adjacent wetland areas.

The proposed mitigation for this project will comply with the definition of mitigation that is provided at 40 CFR 1508.20 of the CEQ recommendations. Those recommendations define mitigation as a sequential process whereby impacts are avoided, minimized, rectified, reduced over time, or are offset through compensation. As a general rule, mitigation that restores previously existing habitats is more desirable and more likely to succeed than that which seeks to create new habitat. Restoration of adversely impacted emergent vegetation is a feasible and recognized option when implemented in association with the services of experienced restoration personnel.

Mitigation for impacts to the oyster beds is proposed, and will include, placement of oyster shell in proximity to where the impacts occur or within the same watershed and Class II waters. In addition, it may be possible to relocate existing oyster clumps to suitable areas outside the influences of the proposed project. The placement of shells within the same watershed and in Class II waters will increase the regional oyster distribution. Free floating oyster larvae, known as oyster spat, need to attach to a solid surface to begin growing into an adult. Shell placed in this area will provide a substrate that will lead to the formation of oyster bars and reefs.

It is anticipated that the loss of habitat through implementation of the proposed alternative will be offset by the proposed mitigation. See **Appendix R** which describes the mitigation options proposed in detail. Considering the unavoidable nature of the impacts with the proposed alternative, the public benefit of the project, the previously disturbed quality of habitat to be impacted and the proposed restoration and or mitigation to offset those impacts, the adverse impacts to EFH should be considered insignificant.

7.0 Summary

Impacts to the managed species that may be present in the area are expected to be minimal. These species utilize a wide variety of habitats and suitable habitats are located in proximity, outside of the influence from the proposed project's activities. Higher quality habitat is available for the managed fish species and their prey to move into during and after construction.

Therefore, with mitigation that is within the same watershed, the use of BMPs, no net loss of wetland and open water habitats, and the presence of more than enough suitable and similar habitat for managed species in adjacent areas, impacts to EFH and managed fish species are expected to be insignificant. Additionally, the saltmarsh habitat proposed for impact can be considered lower quality and the mitigation is expected to meet the necessary regulatory requirements. Impacts to oysters from the proposed project area are expected to be off-set by the placement of the shell within the same watershed and in Class II waters to establish additional oyster habitat and / or the relocation of oysters from the proposed project area. Therefore, impacts to EFH and to the federally managed species from the proposed projects are expected to be minor.

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FIGURE 1

Essential Fish Habitat

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

SCALE	1" = 350'
DESIGNED BY	David Loy; Melissa Green
DRAWN BY	
CHECKED BY	

PRIME CONSULTANT:
Passero Associates
Engineering Surveying
Architecture Planning
CERT. OF AUTHORIZATION #3428

SUBCONSULTANT:
BIRKITT ENVIRONMENTAL SERVICES, INC.

DATE
11/06/09

PROJECT NO.
23081.38

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

Essential Fish Habitat

FIGURE NUMBER
Figure 1

APPENDIX E

FLOODPLAIN ANALYSIS

JUNE 2010

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Fly Smart!

Prepared For:
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Floodplain Analysis for Taxiway C Extension
St. Augustine Airport

St. Augustine, Florida

October 2009

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Contents

Project Background

This report addresses the floodplain considerations for the proposed Taxiway C replacement and lighting, and the proposed erosion control measures for the RSA for runway 13-31. The Taxiway C replacement involves relocating the taxiway westward into a marsh area, relocating a tidal ditch, and placing lighting southward into the marsh. The RSA erosion control involves placement of erosion controls east of runway 13-31 into areas eroded by wave action.

Special Flood Hazard Area Designation

The project is situated in FEMA Special Flood Hazard Area (SFHA) Zone AE (EL 8) on Flood Insurance Rate Map Number 12109C0304H. This corresponds to the floodplain with a 1% annual chance Base Flood Elevation (BFE) of 8.1 feet NGVD29, as shown in the FEMA *Flood Insurance Study* for St. Johns County, dated September 2, 2004. Figure 1 shows the project vicinity located on the FEMA Flood Insurance Rate Map. The Zone AE area has a 1% or greater chance of being flooded during any given year. The primary purpose of the SFHA is to provide guidance for the purchase of flood insurance through the National Flood Insurance Program (NFIP) for insurable structures such as residential and commercial buildings. None of the components of this project are insurable structures under the NFIP, and so none of the standard building elevation requirements, such as first floor elevations, apply to the project. The project is not located within a regulatory floodway.

Additionally, Section 65.12 of the NFIP regulations dictates that a project may not result in more than a one foot increase in Base Flood Elevation. St. Johns County Land Development Code Section 3.03.02 also regulates increases to Base Flood Elevations and limits increases to 0.1 feet without requiring compensating storage. Because the relevant floodplain regulations address increases to flood hazards, the focus of this analysis will be to address concerns regarding increases to flood hazards as a result of the two projects.

Coastal Storm Surge Analysis

The BFE shown on the Flood Insurance Rate Map was derived from the most recent St. Johns County *Flood Insurance Study* published by FEMA. The flooding source is identified in *Table 8 – Summary of Stillwater Elevations* as the Tolomato River, which is a coastal flooding source. The Base Flood Elevation of 8.1 feet NGVD29 is due to storm surge from the Atlantic Ocean which propagate upstream through the Intracoastal Waterway, demonstrated by decreasing Base Flood Elevations further upstream and away from the Atlantic Ocean. The BFE is therefore ultimately due to a static water surface elevation from the Atlantic Ocean, rather than due to extreme rainfall events as in a lake. Therefore, the floodplain volume of the Tolomato River is not a significant factor in determining the Base Flood Elevation, as there is no practical volumetric limit of the Atlantic Ocean. Rather, the Base Flood Elevation is determined by storm surge and meteorological statistics and hydraulics of the St. Augustine Inlet.

An estimate of the volume of fill below the Base Flood Elevation associated with the runway relocation and lighting, and the RSA erosion control projects, indicates that the fill volume of the project is approximately 0.04% of the floodplain volume above mean high water in the Tolomato

River between the Mickler Bridge and the confluence with the Guana River. If this portion of the Tolomato River were suddenly artificially impounded and the project fill added, the estimated increase in water surface elevation would be estimated at 0.002 feet, further indicating that the project impact to the coastal flooding hazard is almost non-measurable. The volumetric estimates are included in Appendix A.

An additional consideration in coastal areas is the wave hazard. The Flood Insurance Study identifies those wave hazard areas with a 1% or greater annual chance of wave height greater than 3 feet from crest to trough as SFHA Zone VE. This particular wave height has been selected as an additional hazard designation because experience and testing has shown that waves of 3 feet or greater height result in significantly increased damage to building structures and coastal erosion. Because the flood zone designation for this area is Zone AE, the maximum wave height experienced at the site is likely to be less than 3 feet. The direction of waves toward the project would be from east to west, so that only the RSA portion of the project would be subjected to any significant wave action. The RSA erosion control measures therefore should take into consideration a moderate wave height.

Hydrologic and Hydraulic Pluvial Flooding Analysis

The Taxiway project also involves relocating a tidal ditch indentified as Indian Creek by the St. Johns River Water Management District. Approximately 343 acres ultimately drain through the ditch. The two main sources of discharge in the basin are from a channelized ditch beginning at US 1 and draining through the St. Augustine Airport, and a natural tidal slough which receives runoff from a residential neighborhood. In order to determine that the project does not results in adverse impacts to local drainage, a hydraulic analysis of the existing and the proposed ditch and pipe system was made in order to ensure that the proposed Taxiway would not cause any adverse flooding impacts.

To estimate the peak runoff rates for the 100-year rainfall event, a rainfall-runoff model was created using the US Army Corps of Engineers HEC-HMS program. Input parameters were calculated from the available St. Johns River Water Management District Land Use, NRCS Soil, and St. Johns County topography GIS data sources. The hydrologic parameter calculations are included in Appendix B. The US Army Corps of Engineers HEC-RAS program was then used to create a hydraulic model of the ditch and pipe system for both the existing and the proposed conditions. The flow hydrographs from the HEC-HMS model were then routed through the HEC-RAS model in order to produce water surface profiles resulting from the 100-year rainfall event. These results verify that within the FEMA SFHA Zone AE, the coastal storm surge elevation is higher than the pluvial flooding elevation. The proposed ditch relocation and proposed stormwater piping were then sized to result in no greater than a 0.1 foot increase in peak flood elevation offsite of the airport property. The HEC-HMS and HEC-RAS model diagrams and results are included in Appendix C, and a CD with electronic versions of the models is included in Appendix D.

Floodplain Impacts

Because the coastal flooding hazard is due to a static water surface elevation from the Atlantic Ocean, the volume of fill associated with the project is minor compared to the volume of a coastal flood and only 0.04% of the floodplain volume in the localized reach of the Tolomato River. Therefore, the runway replacement and lighting and RSA erosion control measures do not increase the coastal flooding hazard.

For the pluvial flooding analysis, a comparison of the existing and proposed conditions at offsite locations in the HEC-RAS model was made as shown in Table 1. The two offsite locations are storage node S15 (which corresponds to the portion of the ditch at US highway 1) and at cross setion 608.17 (which corresponds to the confluence of Indian Creek with the relocated tidal ditch).

Table 1: Comparison of Off-site Pluvial Flooding Elevations

	Peak 100-Year Elevations, feet	
Model Location	Existing	Proposed
Storage Area S15	8.3	8.4
Cross Section 608.17	3.3	3.3

In the tidal area, there is no practical increase in the pluvial flooding elevation. At US 1, which is not identified as a SFHA by FEMA, the increase in pluvial flooding elevation is 0.1 feet, which presents a minor increase. The roadway elevation at US 1 is approximately elevation 9.5 feet, which is over a foot higher than the flooding elevation, which further suggests that the pluvial flooding effects will not result in an increased flooding hazard.

Summary

For the Taxiway C replacement and lighting, and the RSA 13-31 erosion control projects, flooding impacts both from coastal flooding hazards (those identified per the FEMA Flood *Insurance Study* and Flood Insurance Rate Map) and from localized pluvial flooding were evaluated. While both types of flooding have an equal estimated probability of occurring, coastal flooding is the greater of the two hazards and the source of flooding shown on FEMA's Flood Insurance Rate Map. Because the coastal flooding hazard is determined by a static water surface elevation form the Atlantic Ocean and not by floodplain volume, the fill from the projects does not increase the flood hazard and does not require compensating storage per St. Johns County Land Development Code. The pluvial flooding effects of the project were also studied in detail and determined to have minor and insignificant offsite effects.

Figure 1: Flood Insurance Rate Map in Airport Vicinity

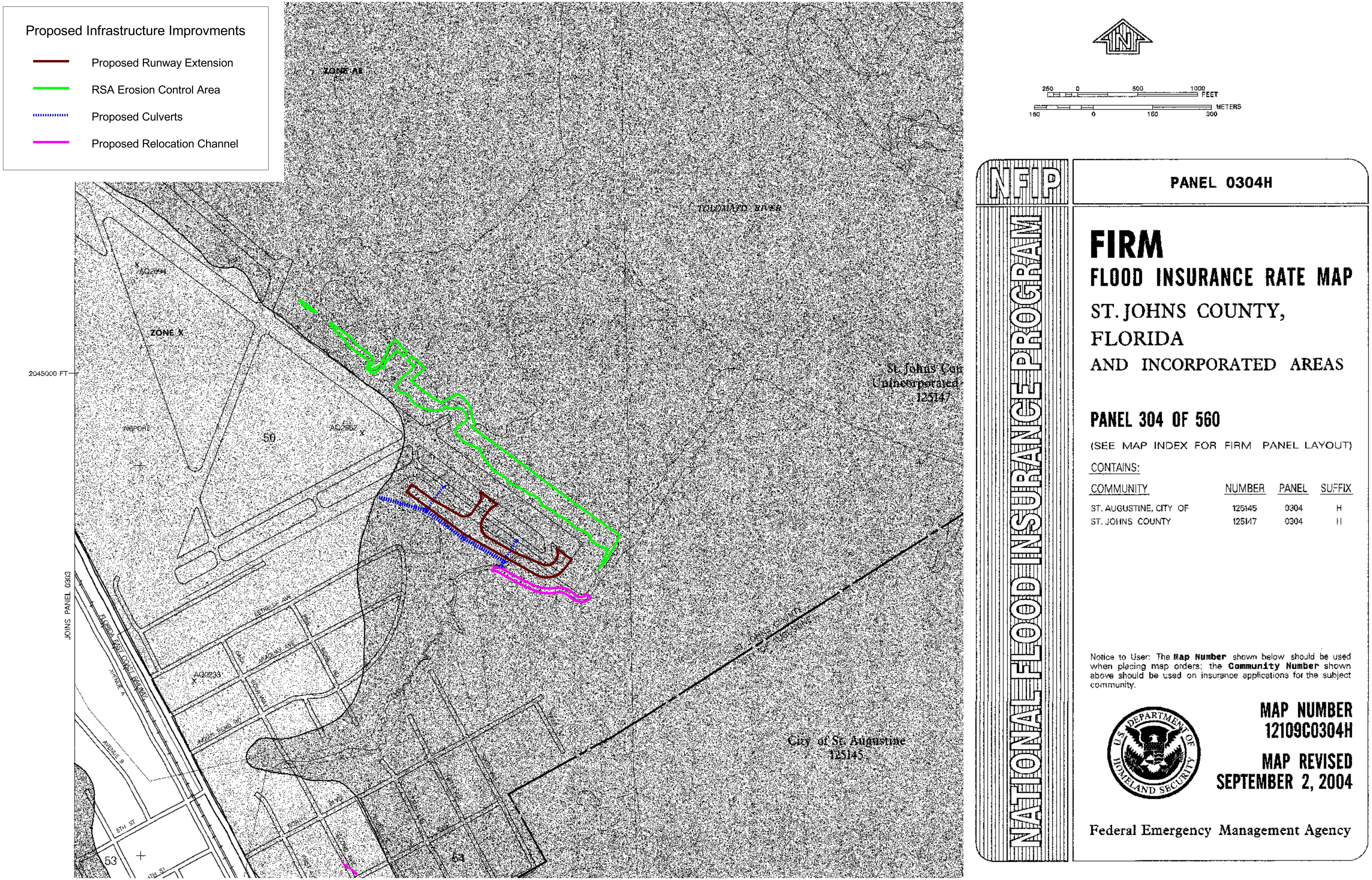


Table 8 from

Flood Insurance Study, St. Johns County, Florida

TABLE 8 – SUMMARY OF STILLWATER ELEVATIONS - continued

FLOODING SOURCE AND LOCATION	ELEVATION (feet NGVD 29)			
	10-YEAR	50-YEAR	100-YEAR	500-YEAR
ATLANTIC OCEAN (continued)				
Between approximately 2.5 miles north of Usinas Beach and St. Augustine Inlet	4.8	7.7	11.11	11.7
Between St. Augustine Inlet and south St. Augustine Beach	4.8	7.6	11.01	11.8
Between south St. Augustine Beach and approximately 1.5 miles south of Crescent Beach	4.7	7.4	10.71	11.2
Between approximately 1.5 miles south of Crescent Beach and the southern county boundary	4.6	7.2	10.51	11.0
MATANZAS RIVER	4.9	7.4	8.6	11.0
MATANZAS RIVER/ INTRACOASTAL WATERWAY	4.7 4.1	7.1 6.2	8.2 7.2	10.5 9.3
MATANZAS RIVER/ SAN SEBASTIAN RIVER	4.8	7.3	8.5	10.9
SALT RUN	4.8	7.6	8.9	11.8
TOLOMATO RIVER				
Between St. Augustine Inlet and Vilano Bridge	4.9	7.5	8.7	11.2
Between Vilano Bridge and Carcaba Road	4.9	7.5	8.6	11.0
Between Carcaba Road and the confluence of the Guano River	4.6	7.0	8.1	10.2
TOLOMATO RIVER/ GUANO RIVER	4.4	6.7	7.6	9.7
TOLOMATO RIVER/ INTRACOASTAL WATERWAY				
Between Tolomato River Tributary No. 1 and Smith Creek	4.1	6.1	7.0	9.0

[1] Includes wave setup of 2.1 feet

References

Flood Insurance Study for St. Johns County, Federal Emergency Management Agency, September 2, 2004

U.S. Code, Title 42 - National Flood Insurance Program

St. Johns County, Florida Land Development Code

Statewide Water Management District Land Use 2004, St. Johns River Water Management District. Florida Geographic Data Library, www.fgdl.org

Soil Survey Geographic (SSURGO) Database for Florida, National Resource Conservation Service. Florida Geographic Data Library, www.fgdl.org

2003 Digital Topographic Contours, St. Johns County, Florida. St. Johns County GIS Division

Appendix A: Volumetric Estimates

Existing Floodplain Volume Estimate of Tolomato River from Mickler Bridge to Guana River

Elevation (feet NAVD)	Area (Acres)	Volume (Acre feet)	
2	6234		<--- Approximate MHW
3	6581.75	6407.875	
4	7061.02	6821.385	
5	7650.61	7355.815	
6	8251.98	7951.295	
7	8893.39	8572.685	<--- 100-Year Flood Elevation

Total	42776.555	Acre-Feet

Source: St. Johns County Topographic Contours

Taxiway C Relocation Fill Estimate

Elevation (feet NAVD)	Fill Footprint (Acres)	Volume (Acre feet)	
2	3.2		<--- Approximate MHW
3	3.44	3.32	
4	4.03	3.735	
5	4.34	4.185	<--- Approximate crest of runway
6		2.17	
7		0	<--- 100-Year Flood Elevation

Total	13.41	Acre-Feet

RSA Erosion Contol Fill Estimate (to approximately elevation 2.5)

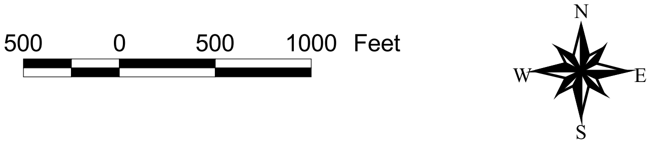
Elevation (feet NAVD)	Fill Footprint (Acres)	Volume (Acre feet)	
2	6.8		<--- Approximate MHW
2.5	7.4	3.55	

Total	3.55	Acre-Feet

Total Estimated Existing Floodplain Volume:	42776.555	Acre-Feet
Total Estimated Fill Volume:	16.96	Acre-Feet
Percent Fill of Existing Volume	0.04%	
Water Surface Elevation Increase Of Artificially Impounded Volume (Fill Volume / Floodplain Area @ Elevation 7)	0.0019	Feet

Appendix B: Hydrology Tabulations

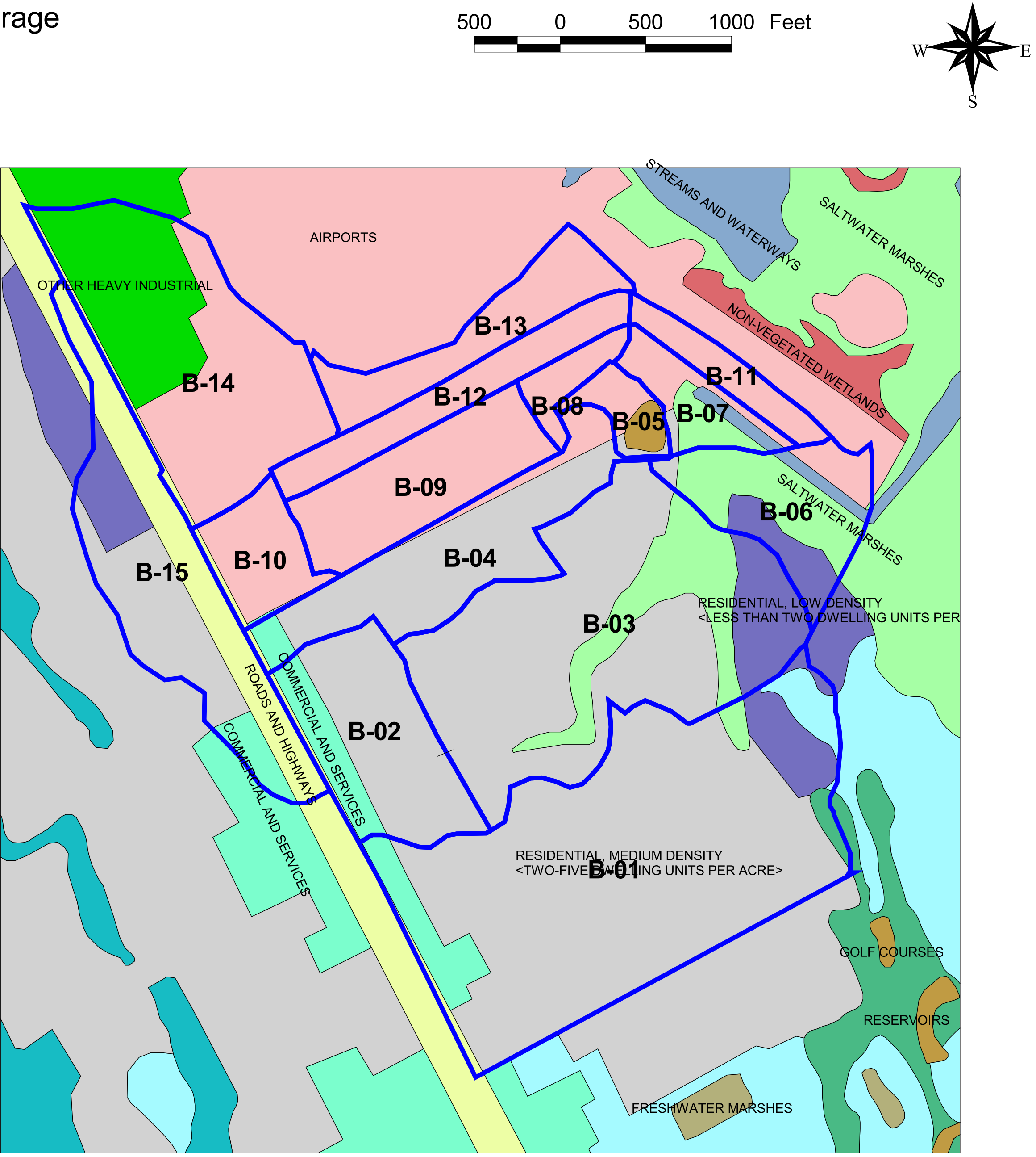
Figure B-1
St. Augustine Airport
Watershed Boundaries Delineation



Legend

Time to Peak Flow Paths
Watershed Boundaries
Contours, feet NAVD88
0 - 1
1 - 3
3 - 5
5 - 7
7 - 8
8 - 9
9 - 11
11 - 15

Figure B-2
St. Augustine Airport
Land Use Coverage



Legend

▭ Watershed Boundaries

SJRWMD 2004 Land Use and Cover

- ■ AIRPORTS
- ■ COMMERCIAL AND SERVICES
- ■ FRESHWATER MARSHES
- ■ GOLF COURSES
- ■ HARDWOOD - CONIFEROUS MIXED
- ■ HERBACEOUS (DRY PRAIRIE)
- ■ INSTITUTIONAL
- ■ MIXED WETLAND HARDWOODS
- ■ NON-VEGETATED WETLANDS
- ■ OTHER HEAVY INDUSTRIAL
- ■ RESERVOIRS
- ■ RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>
- ■ RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>
- ■ ROADS AND HIGHWAYS
- ■ SALTWATER MARSHES
- ■ STREAMS AND WATERWAYS
- ■ TREELESS HYDRIC SAVANNA

Figure B-3:
St. Augustine Airport
Soils Coverage

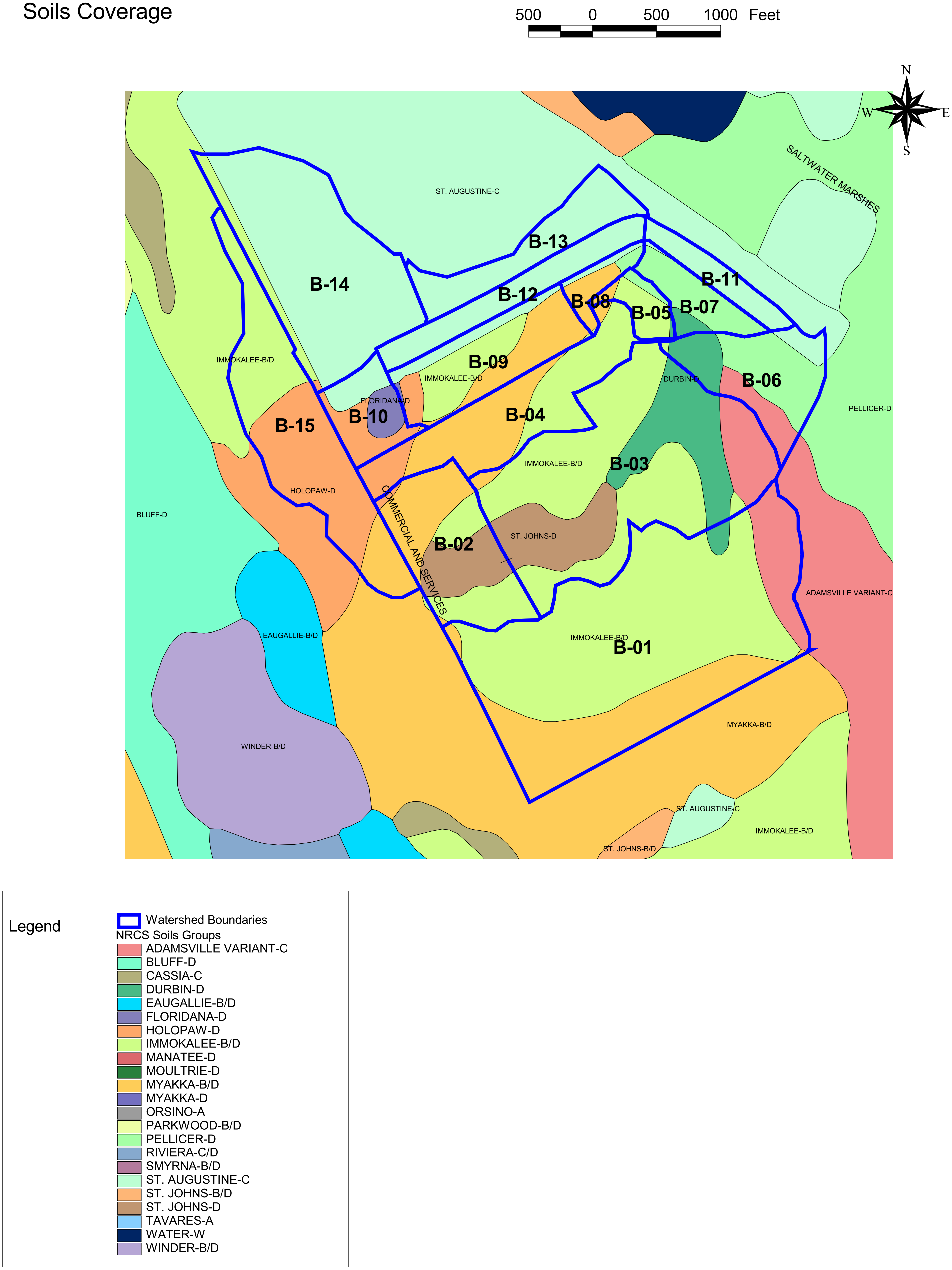


Table B-1: NRCS Curve Number Tabulations

BASIN	Land Use Description	Soils Group	CN	ACRES	CN X ACRES
B-01					
	COMMERCIAL AND SERVICES	B/D	95	4.66	442.985
	GOLF COURSES	C	74	0.96	70.966
	HARDWOOD - CONIFEROUS MIXED	B/D	77	0.04	3.388
	HARDWOOD - CONIFEROUS MIXED	C	70	2.45	171.36
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	B/D	85	1.48	125.715
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	C	80	3.39	271.04
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	D	85	0.00	0.34
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	65.61	5708.07
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	C	83	0.91	75.613
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	0.26	22.446
	ROADS AND HIGHWAYS	B/D	93	1.03	95.976
	SALTWATER MARSHES	B/D	90	0.22	19.53
	SALTWATER MARSHES	D	90	0.58	52.56
	Area (Acres):				81.60
	Weighted Curve Number:				86.5
B-02					
	COMMERCIAL AND SERVICES	B/D	95	3.13	297.635
	COMMERCIAL AND SERVICES	D	95	1.40	133
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	11.15	969.702
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	4.87	423.342
	ROADS AND HIGHWAYS	B/D	93	0.56	51.987
	ROADS AND HIGHWAYS	D	93	0.11	9.858
	Area (Acres):				21.21
	Weighted Curve Number:				88.9
B-03					
	HARDWOOD - CONIFEROUS MIXED	B/D	77	0.00	0.154
	HARDWOOD - CONIFEROUS MIXED	C	70	0.01	0.42
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	B/D	85	0.35	29.41
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	C	80	5.75	459.84
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	D	85	0.60	50.575
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	31.73	2760.162
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	10.53	915.849
	SALTWATER MARSHES	B/D	90	0.69	61.74
	SALTWATER MARSHES	C	90	0.18	16.56
	SALTWATER MARSHES	D	90	10.35	931.77
	Area (Acres):				60.17
	Weighted Curve Number:				86.9

BASIN	Land Use Description	Soils Group	CN	ACRES	CN X ACRES
B-04					
	AIRPORTS	B/D	84	2.74	230.412
	COMMERCIAL AND SERVICES	D	95	1.12	105.925
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	17.89	1556.343
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	1.15	100.137
	ROADS AND HIGHWAYS	D	93	0.24	21.855
	Area (Acres):				23.13
	Weighted Curve Number:				87.1
B-05					
	AIRPORTS	B/D	84	1.80	151.536
	AIRPORTS	D	84	0.64	53.844
	RESERVOIRS	B/D	98	1.18	115.64
	RESERVOIRS	D	98	0.08	7.644
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	0.37	32.451
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	0.12	10.005
	Area (Acres):				4.19
	Weighted Curve Number:				88.6
B-06					
	AIRPORTS	C	79	1.53	120.554
	AIRPORTS	D	84	0.80	67.536
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	C	80	3.39	271.12
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	D	85	0.43	36.805
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	0.12	10.701
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	0.35	30.537
	SALTWATER MARSHES	C	90	0.02	1.89
	SALTWATER MARSHES	D	90	8.52	766.62
	STREAMS AND WATERWAYS	D	98	1.04	102.116
	Area (Acres):				16.21
	Weighted Curve Number:				86.9
B-07					
	AIRPORTS	C	79	0.17	13.588
	AIRPORTS	D	84	3.31	277.872
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	0.00	0.174
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	0.36	31.494
	SALTWATER MARSHES	D	90	2.40	215.91
	STREAMS AND WATERWAYS	D	98	1.05	102.802
	Area (Acres):				7.29
	Weighted Curve Number:				88.0

BASIN	Land Use Description	Soils Group	CN	ACRES	CN X ACRES
B-08					
	AIRPORTS	B/D	84	2.34	196.224
	AIRPORTS	C	79	0.83	65.491
	AIRPORTS	D	84	0.57	48.132
	Area (Acres):				3.74
	Weighted Curve Number:				82.9
B-09					
	AIRPORTS	B/D	84	13.30	1117.032
	AIRPORTS	C	79	2.90	229.021
	AIRPORTS	D	84	1.53	128.688
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	0.00	0.087
	Area (Acres):				17.73
	Weighted Curve Number:				83.2
B-10					
	AIRPORTS	B/D	84	0.05	4.368
	AIRPORTS	C	79	2.66	210.061
	AIRPORTS	D	84	5.12	430.332
	COMMERCIAL AND SERVICES	D	95	0.10	9.405
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	0.01	1.044
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	0.13	10.962
	ROADS AND HIGHWAYS	D	93	0.59	54.405
	Area (Acres):				8.66
	Weighted Curve Number:				83.2
B-11					
	AIRPORTS	C	79	5.71	451.011
	AIRPORTS	D	84	0.00	0
	Area (Acres):				5.71
	Weighted Curve Number:				79.0
B-12					
	AIRPORTS	C	79	11.01	869.711
	Area (Acres):				11.01
	Weighted Curve Number:				79.0
B-13					
	AIRPORTS	C	79	12.49	986.868
	Area (Acres):				12.49
	Weighted Curve Number:				79.0

BASIN	Land Use Description	Soils Group	CN	ACRES	CN X ACRES
B-14					
	AIRPORTS	B/D	84	0.52	43.26
	AIRPORTS	C	79	20.99	1657.894
	AIRPORTS	D	84	0.05	4.284
	OTHER HEAVY INDUSTRIAL	B/D	93	1.54	143.313
	OTHER HEAVY INDUSTRIAL	C	91	14.96	1361.724
	ROADS AND HIGHWAYS	B/D	93	1.26	117.552
	ROADS AND HIGHWAYS	D	93	0.08	7.254
	Area (Acres):				39.40
	Weighted Curve Number:				84.7
B-15					
	COMMERCIAL AND SERVICES	B/D	95	1.16	109.915
	COMMERCIAL AND SERVICES	D	95	1.03	98.23
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	B/D	85	3.95	335.58
	RESIDENTIAL, LOW DENSITY <LESS THAN TWO DWELLING UNITS PER ACRE>	D	85	0.00	0
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	B/D	87	1.31	113.622
	RESIDENTIAL, MEDIUM DENSITY <TWO-FIVE DWELLING UNITS PER ACRE>	D	87	9.73	846.597
	ROADS AND HIGHWAYS	B/D	93	8.22	764.739
	ROADS AND HIGHWAYS	D	93	5.19	482.763
	Area (Acres):				30.59
	Weighted Curve Number:				89.9

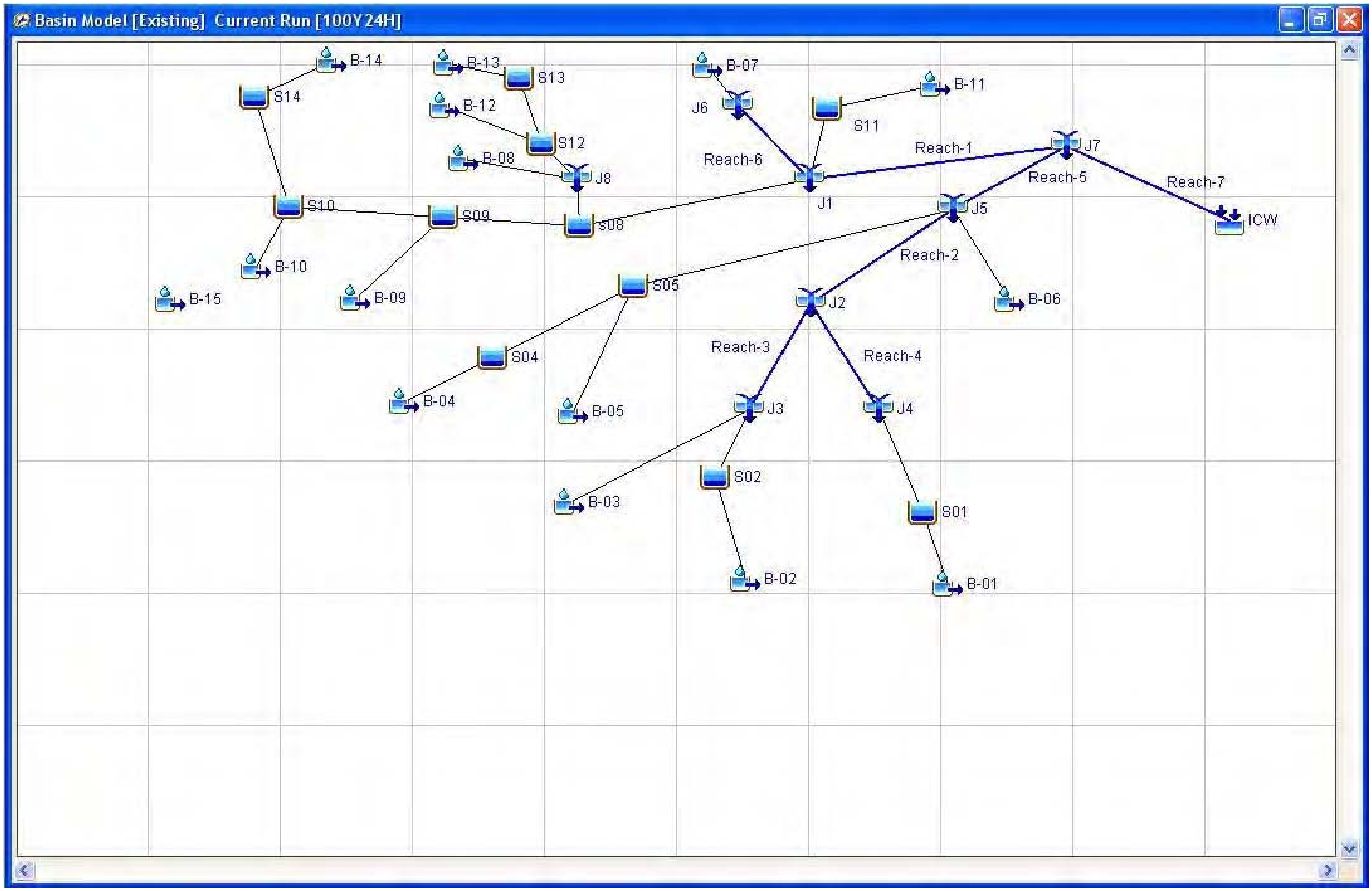
Table B-2: St. Augustine Airport Time to Peak Tabulations

Basin	Area (acres)	Initial Abstraction (in)	Curve Number	Hydraulic Length (ft)	Elevation Drop	Percent Slope	Adjusted % Slope	Time to Peak (min)
B-01	131.389	0.328	85.9	3666.6	8.0	0.218	0.500	62.6
B-02	21.209	0.250	88.9	1251.5	4.0	0.320	0.500	23.7
B-03	60.171	0.301	86.9	3078.4	8.0	0.260	0.500	52.5
B-04	23.134	0.296	87.1	2339.6	5.0	0.214	0.500	41.8
B-05	4.190	0.257	88.6	592.2	4.0	0.675	0.675	11.3
B-06	16.207	0.301	86.9	1388.0	6.0	0.432	0.500	27.8
B-07	7.292	0.273	88.0	1153.4	7.0	0.607	0.607	20.8
B-08	3.738	0.413	82.9	976.0	8.0	0.820	0.820	18.8
B-09	17.731	0.404	83.2	1703.7	8.0	0.470	0.500	37.2
B-10	8.658	0.404	83.2	720.1	9.0	1.250	1.250	11.8
B-11	5.709	0.532	79.0	719.5	2.0	0.278	0.500	21.4
B-12	11.009	0.532	79.0	2198.9	9.0	0.409	0.500	52.2
B-13	39.189	0.532	79.0	2008.3	6.0	0.299	0.500	48.6
B-14	39.399	0.361	84.7	2222.0	4.0	0.180	0.500	43.8
B-15	30.590	0.225	89.9	1835.0	3.000	0.163	0.500	30.9

Appendix C: HEC-HMS and HEC-RAS Model Input and Output

HEC-HMS Model

HEC-HMS Model Diagram



Basin Model [Existing] Current Run [100Y24H]

Project: Airport Simulation Run: 100Y24H

Start of Run: 01Jan2009, 00:00 Basin Model: Existing
End of Run: 04Jan2009, 00:00 Meteorologic Model: 100YR
Compute Time: 10Aug2009, 12:36:12 Control Specifications: Control

Volume Units: IN

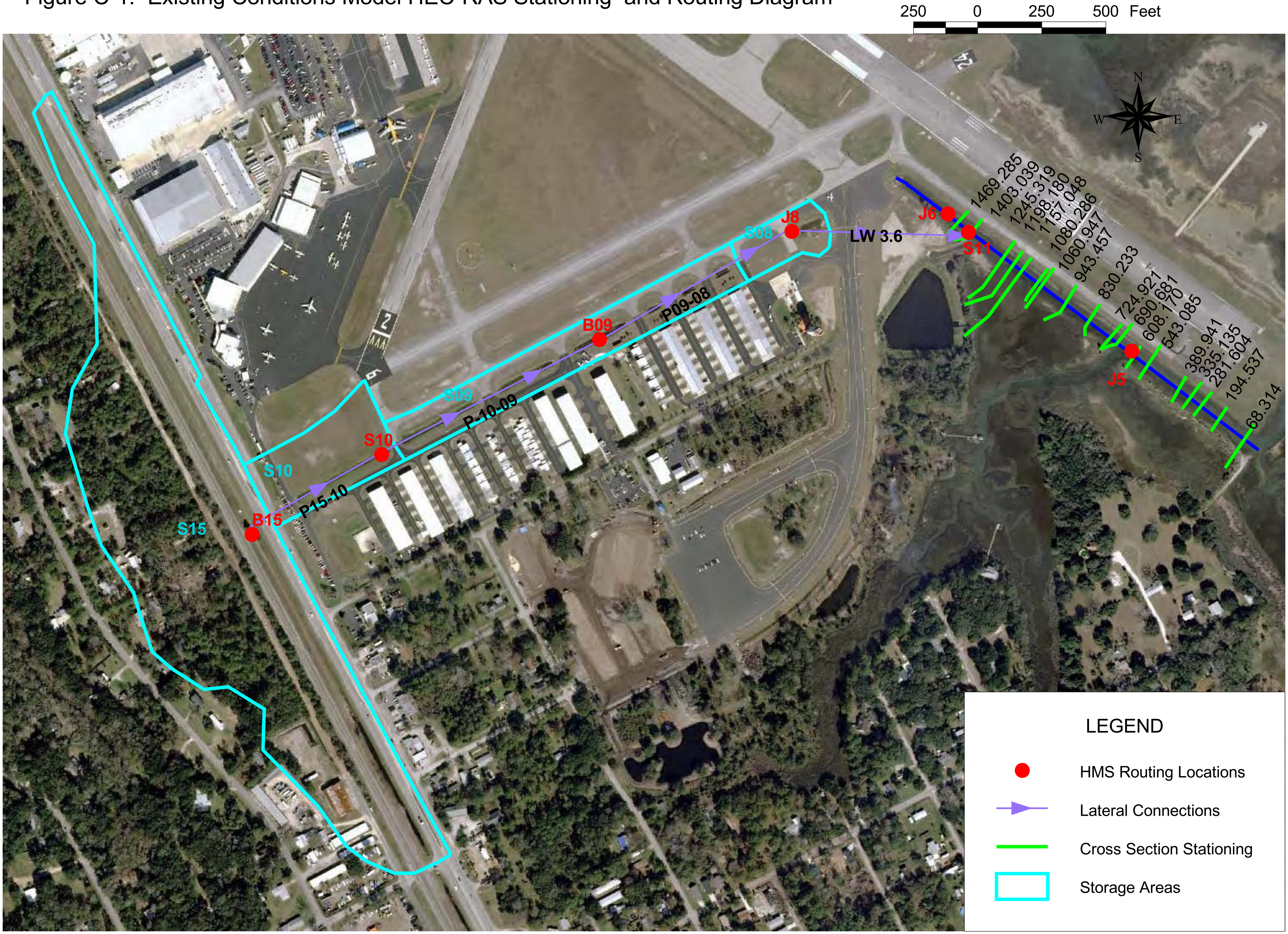
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
B-01	0.12750	291.7	01Jan2009, 13:09	11.22
B-02	0.03314	138.4	01Jan2009, 12:26	11.61
B-03	0.09402	251.3	01Jan2009, 12:55	11.35
B-04	0.03615	111.0	01Jan2009, 12:44	11.38
B-05	0.00655	37.1	01Jan2009, 12:12	11.57
B-06	0.02532	96.7	01Jan2009, 12:30	11.35
B-07	0.01139	50.3	01Jan2009, 12:22	11.50
B-08	0.00584	26.0	01Jan2009, 12:20	10.81
B-09	0.02770	88.2	01Jan2009, 12:40	10.86
B-10	0.01353	72.8	01Jan2009, 12:13	10.86
B-11	0.00892	36.2	01Jan2009, 12:23	10.28
B-12	0.01720	43.0	01Jan2009, 12:56	10.28
B-13	0.06123	160.2	01Jan2009, 12:52	10.28
B-14	0.06156	180.7	01Jan2009, 12:46	11.06
B-15	0.04780	132.1	01Jan2009, 12:54	11.76
ICW	0.53005	624.5	01Jan2009, 12:45	10.08
J1	0.20737	241.6	01Jan2009, 12:28	8.34
J2	0.25466	384.7	01Jan2009, 13:34	11.26
J3	0.12716	332.3	01Jan2009, 12:41	11.42
J4	0.12750	193.8	01Jan2009, 13:53	11.21
J5	0.32268	472.6	01Jan2009, 13:33	11.21
J6	0.01139	50.3	01Jan2009, 12:22	11.50
J7	0.53005	628.8	01Jan2009, 12:42	10.09
J8	0.08427	65.7	01Jan2009, 14:59	10.31
Reach-1	0.20737	237.7	01Jan2009, 12:31	8.34

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Reach-2	0.25466	383.8	01Jan2009, 13:37	11.25
Reach-3	0.12716	287.0	01Jan2009, 13:00	11.31
Reach-4	0.12750	190.1	01Jan2009, 14:01	11.20
Reach-5	0.32268	471.8	01Jan2009, 13:35	11.21
Reach-6	0.01139	49.1	01Jan2009, 12:25	11.48
Reach-7	0.53005	624.5	01Jan2009, 12:45	10.08
S01	0.12750	193.8	01Jan2009, 13:53	11.21
S02	0.03314	138.4	01Jan2009, 12:26	11.61
S04	0.03615	65.2	01Jan2009, 13:19	11.38
S05	0.04270	68.7	01Jan2009, 13:28	10.89
s08	0.18706	167.3	01Jan2009, 12:27	8.06
S09	0.10279	128.1	01Jan2009, 12:27	6.20
S10	0.07509	69.9	01Jan2009, 12:16	4.49
S11	0.00892	28.2	01Jan2009, 12:37	10.28
S12	0.07843	63.7	01Jan2009, 15:02	10.28
S13	0.06123	101.8	01Jan2009, 13:27	10.28
S14	0.06156	22.8	01Jan2009, 15:27	3.09

HEC-RAS Model

Existing Conditions Model

Figure C-1: Existing Conditions Model HEC-RAS Stationing and Routing Diagram



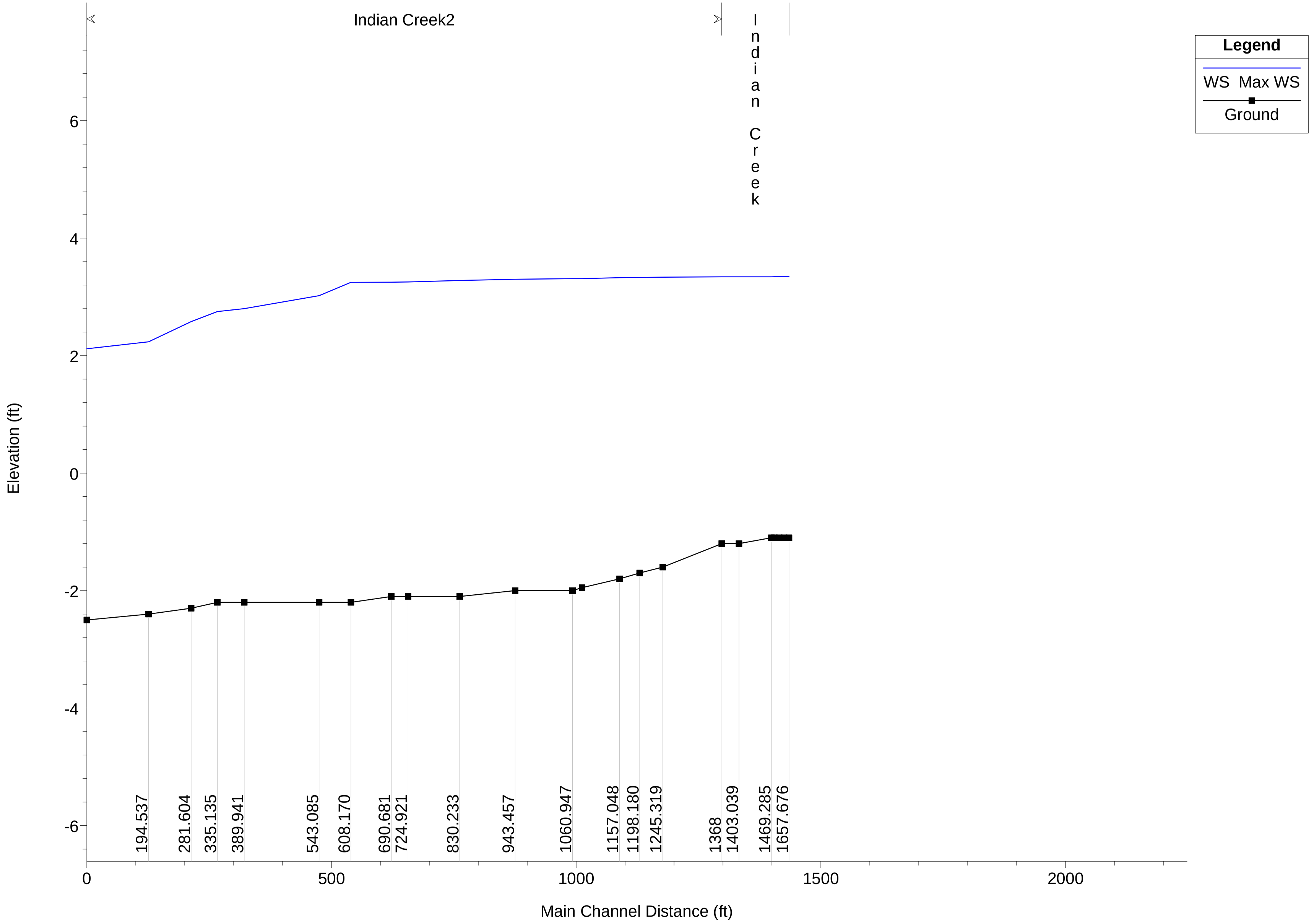
HEC-RAS Plan: EX   Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Creek	1657.676	Max WS	50.00	-1.10	3.35		3.35	0.000016	0.42	161.53	64.61	0.04
Creek	1650	Max WS	50.00	-1.10	3.34		3.35	0.000016	0.42	161.52	64.61	0.04
Creek	1640	Max WS	50.00	-1.10	3.34		3.35	0.000016	0.42	161.51	64.61	0.04
Creek	1475	Max WS	50.00	-1.10	3.34		3.35	0.000016	0.42	161.50	64.60	0.04
Creek	1469.285	Max WS	56.74	-1.10	3.34		3.35	0.000045	0.76	161.43	64.58	0.06
Creek	1403.039	Max WS	56.74	-1.20	3.34		3.34	0.000032	0.65	186.59	72.68	0.05
Creek	1369	Max WS	56.73	-1.20	3.34		3.34	0.000008	0.32	275.13	129.37	0.03
Creek2	1368	Max WS	250.18	-1.20	3.34		3.37	0.000155	1.40	275.13	129.37	0.12
Creek2	1245.319	Max WS	250.18	-1.60	3.34		3.34	0.000119	1.28	491.08	234.39	0.11
Creek2	1198.180	Max WS	250.17	-1.70	3.33		3.34	0.000117	1.28	542.12	293.31	0.10
Creek2	1157.048	Max WS	250.15	-1.80	3.33		3.33	0.000095	1.16	627.91	377.34	0.09
Creek2	1080.286	Max WS	250.08	-1.95	3.31		3.33	0.000128	1.36	327.10	131.76	0.11
Creek2	1060.947	Max WS	250.09	-2.00	3.31		3.33	0.000119	1.32	356.01	153.72	0.11
Creek2	943.457	Max WS	250.02	-2.00	3.30		3.31	0.000075	1.05	399.28	153.56	0.08
Creek2	830.233	Max WS	249.81	-2.10	3.28		3.31	0.000166	1.57	280.72	112.07	0.13
Creek2	724.921	Max WS	249.56	-2.10	3.26		3.29	0.000191	1.69	239.09	90.84	0.13
Creek2	690.681	Max WS	249.50	-2.10	3.25		3.28	0.000194	1.70	247.06	96.96	0.14
Creek2	608.170	Max WS	249.47	-2.20	3.25		3.26	0.000092	1.17	337.85	106.06	0.09
Creek2	543.085	Max WS	719.94	-2.20	3.02		3.19	0.001199	4.12	308.19	113.70	0.33
Creek2	389.941	Max WS	719.91	-2.20	2.80		3.00	0.001253	4.07	256.99	89.66	0.34
Creek2	335.135	Max WS	719.91	-2.20	2.75		2.93	0.001159	3.87	268.97	94.02	0.32
Creek2	281.604	Max WS	719.90	-2.30	2.58		2.87	0.003112	6.18	227.27	94.48	0.52
Creek2	194.537	Max WS	719.89	-2.40	2.24		2.62	0.002988	5.92	197.13	82.24	0.51
Creek2	68.314	Max WS	719.89	-2.50	2.12	0.30	2.28	0.001130	3.65	280.32	157.23	0.32

HEC-RAS Plan: EX Profile: Max WS

Storage Area	Profile	W.S. Elev	SA Min El	Net Flux	SA Area	SA Volume
		(ft)	(ft)	(cfs)	(acres)	(acre-ft)
S08	Max WS	5.11	-2.00	-32.83	0.81	1.81
S09	Max WS	6.37	-2.00	-56.76	1.86	2.65
S10	Max WS	6.75	0.00	-6.26	0.58	1.06
S15	Max WS	8.27	3.00	-88.44	6.13	3.67

St. Augustine Airport Floodplain Analysi Plan: Existing Conditions 100-year Routing 10/29/2009



1 in Horiz. = 300 ft 1 in Vert. = 2.5 ft

HEC-RAS Report

```
                         HEC-RAS Version 3.1.3 May 2005
                          U.S. Army Corp of Engineers
                         Hydrologic Engineering Center
                               609 Second Street
                               Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX




PROJECT DATA
Project Title: St. Augustine Airport Floodplain Analysi
Project File : SA_Airport.prj
Run Date and Time: 10/29/2009 10:00:15 PM

Project in English units



PLAN DATA

Plan Title: Existing Conditions 100-year Routing
Plan File : C:\StJohns\Airport\HEC\RAS\SA_Airport.p01

           Geometry Title: Existing Conditions Channel
           Geometry File : C:\StJohns\Airport\HEC\RAS\SA_Airport.g01

           Flow Title    :
           Flow File     :

Plan Summary Information:
Number of:  Cross Sections =   29    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    1

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow




GEOMETRY DATA

Geometry Title: Existing Conditions Channel
Geometry File : C:\StJohns\Airport\HEC\RAS\SA_Airport.g01

Reach Connection Table

  River            Reach               Upstream Boundary    Downstream Boundary

  Indian           Creek                                      J1
  Indian           Trib                                       J1
  Indian           Creek2               J1


JUNCTION INFORMATION

Name: J1
Description:
Energy computation Method

    Length across Junction             Tributary
     River           Reach               River           Reach        Length   Angle
Indian          Creek            to Indian          Creek2                0
Indian          Trib             to Indian          Creek2                0

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1657.676

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      36       5   36.69       5   43.14    4.71   46.35    4.54   46.82    4.52
   56.72       4   57.13    3.95   58.18    3.81   64.53       3   70.95       2
   80.22       1   81.31     .86   87.04     .12      88       0   96.99    -.93
   97.65      -1   99.96    -1.1  102.27      -1  113.35       0  113.63     .11
  115.82       1  115.89    1.03  118.66       2  120.94    2.55   121.1    2.59
   122.8       3  133.34       4  156.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      36     .06      88    .035  113.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            88  113.35               10      10      10             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1650

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
      36       5   36.69       5   43.14    4.71   46.35    4.54   46.82    4.52
   56.72       4   57.13    3.95   58.18    3.81   64.53       3   70.95       2
   80.22       1   81.31     .86   87.04     .12      88       0   96.99    -.93
   97.65      -1   99.96    -1.1  102.27      -1  113.35       0  113.63     .11
  115.82       1  115.89    1.03  118.66       2  120.94    2.55   121.1    2.59
   122.8       3  133.34       4  156.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      36     .06      88    .035  113.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            88  113.35               10      10      10            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1640

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      36       5   36.69       5   43.14    4.71   46.35    4.54   46.82    4.52
   56.72       4   57.13    3.95   58.18    3.81   64.53       3   70.95       2
   80.22       1   81.31     .86   87.04     .12      88       0   96.99    -.93
   97.65      -1   99.96    -1.1  102.27      -1  113.35       0  113.63     .11
  115.82       1  115.89    1.03  118.66       2  120.94    2.55   121.1    2.59
   122.8       3  133.34       4  156.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      36     .06      88    .035  113.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            88  113.35               10      10      10            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1475

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      36       5   36.69       5   43.14    4.71   46.35    4.54   46.82    4.52
   56.72       4   57.13    3.95   58.18    3.81   64.53       3   70.95       2
   80.22       1   81.31     .86   87.04     .12      88       0   96.99    -.93
   97.65      -1   99.96    -1.1  102.27      -1  113.35       0  113.63     .11
  115.82       1  115.89    1.03  118.66       2  120.94    2.55   121.1    2.59
   122.8       3  133.34       4  156.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      36     .06      88    .035  113.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            88  113.35                6       6       6            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1469.285

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       5     .69       5    7.14    4.71   10.35    4.54   10.82    4.52
   20.72       4   21.13    3.95   22.18    3.81   28.53       3   34.95       2
   44.22       1   45.31     .86   51.04     .12      52       0   60.99    -.93
   61.65      -1   63.96    -1.1   66.27      -1   77.35       0   77.63     .11
   79.82       1   79.89    1.03   82.66       2   84.94    2.55    85.1    2.59
    86.8       3   97.34       4  120.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   61.65    .035   66.27     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         61.65   66.27            65.18   66.25   67.41            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1403.039

INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    4.69   21.05    4.08   22.15    4.05   22.64    4.03   23.71       4
   25.96    3.78   33.66       3   37.99    2.22   39.29       2   41.84     1.7
   47.68       1   54.45     .09   55.15       0   55.75    -.06   60.65    -.52
    65.1    -.95   65.66      -1    68.6    -1.2   71.54      -1   86.82       0
   87.39     .31   88.62       1   92.57    1.95   92.77       2   93.17    2.06
   94.79    2.31   95.86    2.45   97.96    2.71  100.13       3  100.57       3
  100.72    3.02  102.31    3.26  105.74    3.68  106.21    3.75  106.45    3.78
  108.17       4  134.03       4   148.8    4.49     150    4.54  151.43    4.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   65.66    .035   71.54     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         65.66   71.54               35      35      35            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1369

INPUT
```

```
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     3.9      26      .5      32     -.7      46    -1.2      65     -.7
      76     1.6     172     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      32    .035      65     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            32      65                2       2       2             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 5

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.6      21     -.3      29     -.4      56     6.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      21    .035      29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            21      29               10      10      10             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 4

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.6      21     -.3      29     -.4      56     6.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      21    .035      29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            21      29               60      60      60             .1       .3

LATERAL STRUCTURE


RIVER: Indian
REACH: Trib               RS: 3.6

INPUT
Description:
Lateral structure position     = Right overbank
Distance from Upstream XS =       2
Deck/Roadway Width        =      30
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =        2
     Sta    Elev     Sta    Elev
       0       8      20       8

Weir crest shape                            = Broad Crested


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       4
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                        424     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation = -1.28
Centerline Stations
    Sta.    Sta.    Sta.
       5      10      15
Downstream Elevation = -1.45
Centerline Stations
    Sta.    Sta.    Sta.
       5      10      15

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 3

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.6      21     -.3      29     -.4      56     6.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      21    .035      29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            21      29               60      60      60             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 2

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
       0     5.2      20       0      26     -.3      45     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      20    .035      26     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            20      26               60      60      60             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 1

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.2      20     -.4      26     -.7      45     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      20    .035      26     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
            20      26             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 1368

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     3.9      26      .5      32     -.7      46    -1.2      65     -.7
      76     1.6     172     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      32    .035      65     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            32      65           119.17  120.72  122.42             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 1245.319

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4    18.9       4   33.87    3.12   34.86    3.07   35.92       3
   37.96    2.85   49.74       2   54.61    1.42   58.19       1   62.95     .01
   63.01       0   63.13    -.01   77.44      -1   82.61    -1.6   87.78      -1
   97.75    -.27  101.75     .03   101.8     .03  103.81     .14   104.1     .14
   105.7     .22  129.48       1  143.41       1  221.64     1.9  223.09    1.91
  223.93    1.92  229.19    1.99  229.28    1.99  230.01       2  231.15    2.05
  247.24    2.62  249.39    2.73  250.38    2.75  252.79    2.89  253.23     2.9
  254.92       3  255.47       3  269.31    3.51  271.28    3.56  272.83    3.64
  274.47    3.68  276.12    3.78  278.21     3.9  278.73    3.91  280.09       4
  281.64       4  292.01    4.39  293.75    4.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   77.44    .035   87.78     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         77.44   87.78             46.9   47.14   47.41             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 1198.180

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    3.44   10.97    3.14   11.34    3.14   11.72    3.13   12.53    3.11
   12.85    3.11   16.99       3   19.19       3    20.1    2.95   21.79    2.84
   25.18    2.56   26.69    2.44   27.59    2.36   31.78       2   36.16    1.57
   37.41    1.45   41.91       1   44.35      .4   45.95       0   59.77      -1
  64.495    -1.7   69.22      -1   71.94    -.79   82.46       0   95.49     .54
   98.26     .66  106.83       1  203.17       2  267.93       2  271.57    2.21
  287.24    2.84  289.75    2.95  290.29    2.97  291.29       3  301.44    3.56
  304.43    3.73  309.42       4   309.9    4.03     310    4.03  310.19    4.04
     316    4.36  318.04    4.48  322.39    4.72

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   59.77    .035   69.22     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         59.77   69.22             41.9   41.13   40.29             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 1157.048

INPUT
Description:
Station Elevation Data    num=      70
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    3.96    3.26    3.83   12.12    3.46   22.13       3   34.66       2
   39.05    1.56   44.53       1   45.16     .74   46.46      .2   46.96       0
   59.32      -1    65.1    -1.8   70.88      -1   90.08     .35    95.9     .77
   99.37       1  101.39       1  114.12    1.16  114.27    1.16  127.19    1.29
  130.64    1.33  130.87    1.33  195.97       2  293.72       2  327.75    2.33
  334.75    2.33  344.13     2.4  344.78    2.41  347.27    2.41  347.87    2.42
```

```
  348.38    2.42  350.25    2.44  350.68    2.45  351.31    2.46  353.59    2.46
  356.01    2.49   358.1    2.49  358.88     2.5  359.55    2.51   361.5    2.51
  361.95    2.52  362.13    2.52  366.95    2.59  368.48    2.59  369.66    2.62
  370.91    2.64  372.17    2.64  374.44    2.68  375.45    2.68  376.33     2.7
  376.98    2.71  377.51    2.73  378.27    2.73   380.6    2.78  381.12    2.78
  382.92    2.83  384.14    2.82  386.12    2.88  386.53    2.88  388.81    2.95
   388.9    2.95  390.11       3  392.43    3.34  397.11       4  398.01    4.14
  399.23    4.34  403.32       5  405.24    5.19  407.38    5.39  407.73    5.42

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   59.32    .035   70.88     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         59.32   70.88            76.39   76.76   77.17             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 1080.286

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   12.11       4   12.78    3.96   14.87    3.82   20.88    3.44
   27.72       3   39.32       2   40.05     1.9   44.17    1.36   46.85       1
   47.51     .71   49.09       0    61.9      -1   74.13   -1.95   86.36      -1
   86.52    -.93   88.55       0   90.93     .73   91.82       1  154.29       2
  154.64       2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    61.9    .035   86.36     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          61.9   86.36            19.14   19.34   19.56             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 1060.947

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   32.49       4   35.76    3.75   45.32       3   54.21    2.26
   55.84    2.12    57.3       2   57.72    1.95   58.62    1.85   65.93       1
   68.08     .24   68.77       0   81.42      -1  93.505      -2  105.59      -1
  106.85    -.41  107.73       0  108.83      .4  110.53       1  172.27       2
  195.09       2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   81.42    .035  105.59     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         81.42  105.59            115.9  117.49  119.25             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 943.457

INPUT
Description:
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       5   16.12       5   18.15    4.91   37.49       4   41.03    3.59
   45.87       3   46.01    2.98   53.58       2   62.76       1   63.87     .76
   67.28       0   68.43    -.26   69.59     -.5   71.82    -.92   72.01    -.95
   72.27      -1      87      -2      91      -2  105.92      -1  107.03    -.39
  107.75       0  108.66     .42  110.04       1  143.22       1  173.67    1.69
  175.42    1.75  177.39    1.83  179.52    1.91  181.67    1.98  182.18       2
  196.96       2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   72.27    .035  105.92     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         72.27  105.92           113.83  113.22  112.56             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 830.233

INPUT
Description:
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       5   13.08       5   16.06    4.67   22.34       4   24.17    3.84
   29.54    3.39   45.88       2      51    1.54   53.07    1.36   57.11       1
   64.38     .29    67.4       0   70.61    -.62   72.56      -1   74.82   -1.28
   77.09   -1.55   80.98      -2   83.25    -2.1   85.52      -2   88.73    -1.6
   93.64      -1   93.97    -.92   98.01       0  105.22     .98  105.34       1
   108.2     1.1  113.28    1.25  114.24    1.28  116.08    1.35  133.33    1.97
  134.08       2  142.91       2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   72.56    .035   93.64     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         72.56   93.64           108.78  105.31  101.46             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 724.921

INPUT
```

```
Description:
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       5    3.22       5   15.19       4   21.07    3.22   22.79       3
   27.67    2.14   28.49       2   47.18       1    48.8     .31   49.05     .21
   49.56       0   50.76    -.29   53.81      -1    65.3      -2  68.335    -2.1
   71.37      -2   75.47   -1.09   75.92      -1   76.48    -.92   82.49       0
   86.29     .54   90.05       1   97.33    1.74  110.24       3  111.08    3.15
  113.44    3.59  115.89       4  121.63       5  126.84    5.88  127.53       6
  133.23       6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   53.81    .035   75.47     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         53.81   75.47            33.39   34.24   17.97              .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 690.681

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       8    4.78   22.61       5   38.08       5   49.88       4   57.38       3
   63.42       2    81.1       1   83.03     .44   83.56     .28   84.54       0
   84.86     -.1   87.61      -1   97.42      -2  100.35    -2.1  103.27      -2
  106.15   -1.46  108.34      -1  110.09    -.32  110.86       0  117.43       0
  123.69     .86  124.12     .98  124.26       1   130.6       1  131.23    1.09
  131.35     1.1   131.5    1.11  131.64    1.12  138.02    1.81  138.12    1.82
   139.7    1.92  140.56       2  140.61    2.01  143.24    2.28  143.86    2.35
  146.62    2.65  148.25    2.83  149.98       3   150.8       3  153.79    3.45
  155.27    3.63  156.04    3.72  156.76    3.85  157.03    3.88  157.78       4
  159.15       4  165.46    4.94  165.94       5  168.06       5  170.06     5.3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       8     .06   87.61    .035  108.34     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         87.61  108.34            80.49   82.51  101.98              .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 608.170

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2.69     2.8    2.23    4.18       2   15.03       1   18.52      .4
   20.93       0   23.15    -.24   23.96    -.32    30.2      -1   34.29   -1.33
   41.46      -2    45.1    -2.2   48.74      -2    52.8   -1.62    58.9      -1
   63.36    -.48   67.93       0   72.33     .54   73.62      .7   75.98       1
  106.06       1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    30.2    .035    58.9     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          30.2    58.9            64.29   65.08   65.97              .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 543.085

INPUT
Description:
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   37.05       4   43.98    3.32   44.76    3.24   47.27       3
   53.69       2   57.13    1.57   59.86    1.22   61.62       1    65.8     .08
   66.17       0   69.09    -.15   73.66     -.4   84.82      -1   91.15   -1.72
   93.85      -2   97.46    -2.2  101.07      -2  101.98   -1.85  102.27   -1.79
  102.91   -1.67  106.28      -1  116.45    -.04  116.89       0  131.52     .99
   131.7       1  137.39    1.34   139.3    1.41  142.62     1.6  146.32    1.72
  147.92     1.8  149.43    1.85   153.2    1.96  153.45    1.97  154.64       2
  160.75       2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   84.82    .035  106.28     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         84.82  106.28           151.68  153.14   154.8              .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 389.941

INPUT
Description:
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   13.72       4   14.05    3.79   14.39    3.59   15.33       3
   17.28    2.18   17.71       2   22.79    1.23   24.26       1   30.13     .25
   32.04       0   32.99    -.05   36.25    -.24   44.23    -.69   49.02      -1
   62.46   -1.87    64.4      -2  68.775    -2.2   73.15      -2   74.59   -1.74
   76.31   -1.42   78.53      -1   78.99    -.88   79.09    -.85   79.29     -.8
   81.88    -.07   82.13       0   85.14     .48   88.54       1   89.03    1.05
   89.23    1.07   92.36    1.41   98.17    2.03   98.35    2.05   99.12    2.13
  105.45     2.8  107.37       3  117.65       3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   49.02    .035   78.53     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
```

```
         49.02   78.53            57.63   54.81   51.65            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 335.135

INPUT
Description:
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    4.03       5       4   28.37       4   29.87    3.33   30.24    3.17
   30.39     3.1   30.62       3   30.79    2.92   32.87       2   34.07    1.77
   38.14       1   40.49     .44   42.36       0   59.58    -.84   59.79    -.85
   60.39    -.88   60.69    -.89   60.96    -.91   63.22      -1   65.53   -1.08
   81.83      -2   86.15    -2.2   90.47      -2   90.66   -1.95   90.82   -1.91
   91.48   -1.75   94.51      -1   97.45     -.3   98.68       0   99.67     .18
  104.25       1  118.44    1.99  118.57       2  118.71    2.02  119.23    2.07
  123.75    2.59  127.45       3  130.23       3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   63.22    .035   94.51     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         63.22   94.51            53.98   53.53   53.03            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 281.604

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   21.76       4   22.97    3.46   23.69    3.14   24.01       3
   24.28    2.88   26.18       2   29.88    1.34   31.82       1   35.77     .26
   37.17       0   49.61    -.31   77.35      -1   77.48   -1.07   79.47      -2
   81.81    -2.3   84.15      -2   86.47   -1.32   87.59      -1   88.53    -.78
   91.91       0   95.33     .74   96.52       1  100.23    1.29  108.96    1.99
  109.16       2  111.13    2.14  119.41    2.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   77.35    .035   87.59     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         77.35   87.59            85.69   87.07   88.61            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 194.537

INPUT
Description:
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   13.65       4   13.79    3.91   15.12       3   17.09    2.29
   17.87       2   20.78    1.64   21.78    1.52   25.99       1   31.37       0
   36.07    -.18   57.53      -1   58.52   -1.27   61.24      -2  66.675    -2.4
   72.11      -2   76.83   -1.04   77.02      -1   81.45       0   87.27       1
   90.87    1.36     107       3  115.53       3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   57.53    .035   77.02     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         57.53   77.02           126.27  126.22  126.17            .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 68.314

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   19.16       4    21.5     3.2   22.09       3   22.48     2.9
   26.24       2   26.73     1.9   30.83       1   34.23     .12    34.7       0
   42.26    -.23   58.26    -.69   62.35    -.82   68.95      -1   74.54   -1.65
   76.21   -1.85   76.72   -1.91   76.95   -1.94   77.08   -1.95   77.82      -2
   89.95    -2.5  102.08      -2  103.64   -1.64  104.17    -1.5  106.17      -1
  107.68    -.35   108.5       0  109.01     .22  109.39     .38  110.82       1
  114.21       1  122.63    1.61  123.83    1.69  125.58    1.82  128.09       2
   130.4    2.24  130.93    2.31  132.13    2.44   135.3    2.81  136.36    2.93
  136.91       3  137.09    2.99  140.95    2.72  143.15    2.57  144.58    2.46
  151.11       2  203.22       2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   68.95    .035  106.17     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         68.95  106.17            63.17   68.31   50.74            .1       .3


STORAGE AREA: S08
Volume Method : Rating Curve

  Elevation     Volume
        -2          0
         2       .432
         3       .699
         4       1.16
         5      1.722
         6     2.5305
         7     4.6545
         8    15.0795
         9     33.494
        10     52.724
```

```
STORAGE AREA: S09
Volume Method : Rating Curve

  Elevation     Volume
         -2          0
          2       .252
          3       .461
          4       .849
          5       1.31
          6      1.957
          7     3.8155
          8    13.3445
          9    30.2785


STORAGE AREA: S10
Volume Method : Rating Curve

  Elevation     Volume
          0          0
          3      .1755
          4      .2735
          5      .4225
          6      .6335
          7      1.212
          8     4.8985
          9     12.232
         10      20.66


STORAGE AREA: S15
Volume Method : Rating Curve

  Elevation     Volume
          3          0
          6     .43305
          7     .88025
          8     2.0313
          9    8.15935
         10    27.5641


CONNECTION: P09-08


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       4
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                        150     .013     .013        0                   .5                1
Number of Barrels =  2
Upstream   Elevation = -1.4
Centerline Stations
    Sta.    Sta.
       7      13
Downstream Elevation = -1.9
Centerline Stations
    Sta.    Sta.
       7      13


CONNECTION: P-10-09


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       4
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                         35     .013     .013        0                   .5                1
Number of Barrels =  2
Upstream   Elevation =  2
Centerline Stations
    Sta.    Sta.
       7      13
Downstream Elevation =  1.7
Centerline Stations
    Sta.    Sta.
       7      13


CONNECTION: P15-10


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       3
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                        180     .013     .013        0                   .2                1
Number of Barrels =  2
Upstream   Elevation =  3
Centerline Stations
    Sta.    Sta.
       8      12
Downstream Elevation =  2.5
Centerline Stations
    Sta.    Sta.
       8      12



SUMMARY OF MANNING'S N VALUES

River:Indian

      Reach          River Sta.       n1        n2        n3
```

```
 Creek                1657.676           .06      .035       .06
 Creek                1650               .06      .035       .06
 Creek                1640               .06      .035       .06
 Creek                1475               .06      .035       .06
 Creek                1469.285           .06      .035       .06
 Creek                1403.039           .06      .035       .06
 Creek                1369               .06      .035       .06
 Trib                 5                  .06      .035       .06
 Trib                 4                  .06      .035       .06
 Trib                 3.6          Lat Struct
 Trib                 3                  .06      .035       .06
 Trib                 2                  .06      .035       .06
 Trib                 1                  .06      .035       .06
 Creek2               1368               .06      .035       .06
 Creek2               1245.319           .06      .035       .06
 Creek2               1198.180           .06      .035       .06
 Creek2               1157.048           .06      .035       .06
 Creek2               1080.286           .06      .035       .06
 Creek2               1060.947           .06      .035       .06
 Creek2               943.457            .06      .035       .06
 Creek2               830.233            .06      .035       .06
 Creek2               724.921            .06      .035       .06
 Creek2               690.681            .06      .035       .06
 Creek2               608.170            .06      .035       .06
 Creek2               543.085            .06      .035       .06
 Creek2               389.941            .06      .035       .06
 Creek2               335.135            .06      .035       .06
 Creek2               281.604            .06      .035       .06
 Creek2               194.537            .06      .035       .06
 Creek2               68.314             .06      .035       .06
```

```
SUMMARY OF REACH LENGTHS

River: Indian

      Reach          River Sta.      Left     Channel    Right

 Creek                1657.676            10        10        10
 Creek                1650                10        10        10
 Creek                1640                10        10        10
 Creek                1475                 6         6         6
 Creek                1469.285         65.18     66.25     67.41
 Creek                1403.039            35        35        35
 Creek                1369                 2         2         2
 Trib                 5                   10        10        10
 Trib                 4                   60        60        60
 Trib                 3.6          Lat Struct
 Trib                 3                   60        60        60
 Trib                 2                   60        60        60
 Trib                 1
 Creek2               1368            119.17    120.72    122.42
 Creek2               1245.319          46.9     47.14     47.41
 Creek2               1198.180          41.9     41.13     40.29
 Creek2               1157.048         76.39     76.76     77.17
 Creek2               1080.286         19.14     19.34     19.56
 Creek2               1060.947         115.9    117.49    119.25
 Creek2               943.457         113.83    113.22    112.56
 Creek2               830.233         108.78    105.31    101.46
 Creek2               724.921          33.39     34.24     17.97
 Creek2               690.681          80.49     82.51    101.98
 Creek2               608.170          64.29     65.08     65.97
 Creek2               543.085         151.68    153.14     154.8
 Creek2               389.941          57.63     54.81     51.65
 Creek2               335.135          53.98     53.53     53.03
 Creek2               281.604          85.69     87.07     88.61
 Creek2               194.537         126.27    126.22    126.17
 Creek2               68.314           63.17     68.31     50.74
```

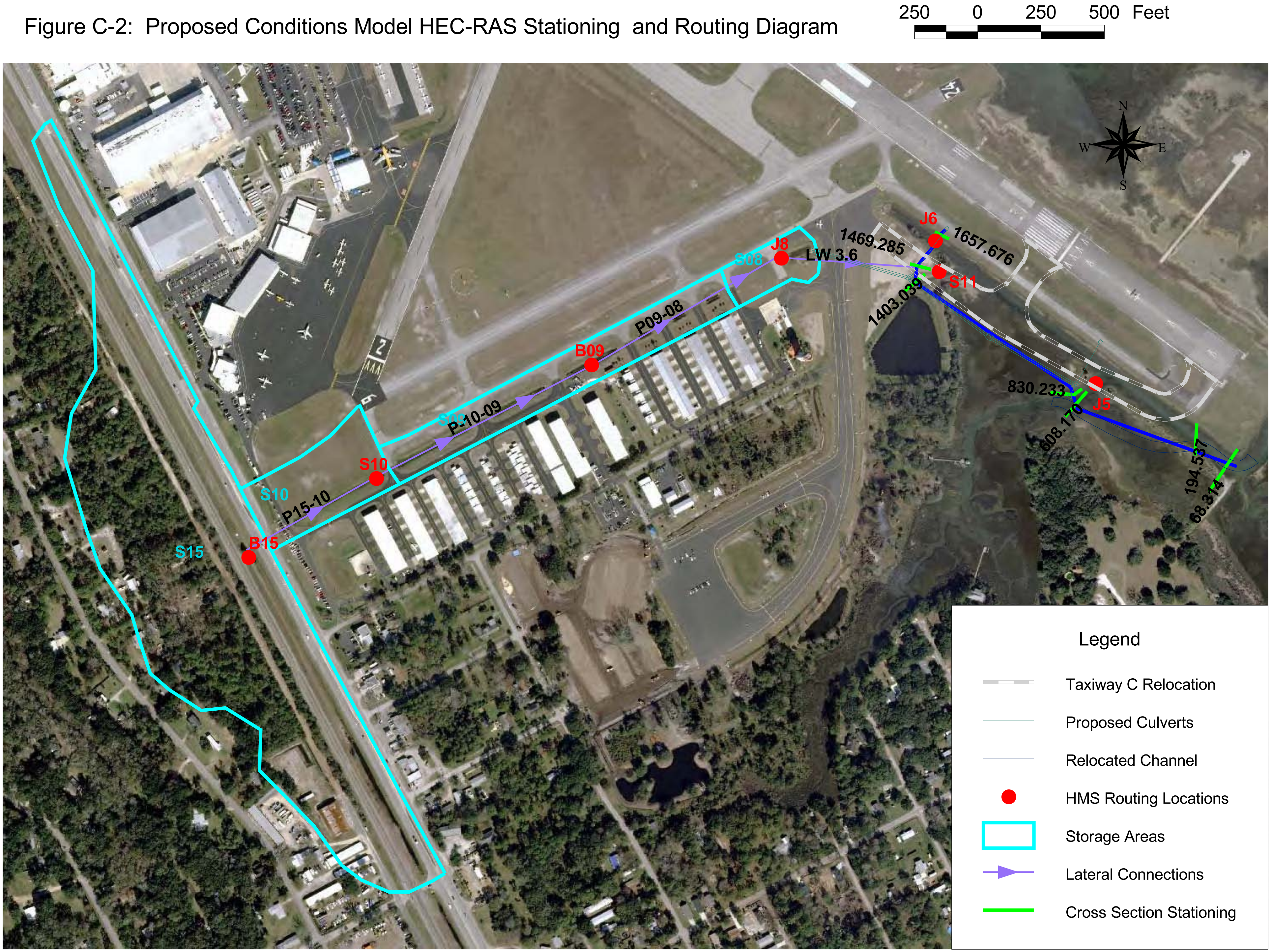
```
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Indian


      Reach          River Sta.     Contr.    Expan.

 Creek                1657.676        .1        .3
 Creek                1650            .1        .3
 Creek                1640            .1        .3
 Creek                1475            .1        .3
 Creek                1469.285        .1        .3
 Creek                1403.039        .1        .3
 Creek                1369            .1        .3
 Trib                 5               .1        .3
 Trib                 4               .1        .3
 Trib                 3.6      Lat Struct
 Trib                 3               .1        .3
 Trib                 2               .1        .3
 Trib                 1               .1        .3
 Creek2               1368            .1        .3
 Creek2               1245.319        .1        .3
 Creek2               1198.180        .1        .3
 Creek2               1157.048        .1        .3
 Creek2               1080.286        .1        .3
 Creek2               1060.947        .1        .3
 Creek2               943.457         .1        .3
 Creek2               830.233         .1        .3
 Creek2               724.921         .1        .3
 Creek2               690.681         .1        .3
 Creek2               608.170         .1        .3
 Creek2               543.085         .1        .3
 Creek2               389.941         .1        .3
 Creek2               335.135         .1        .3
 Creek2               281.604         .1        .3
 Creek2               194.537         .1        .3
 Creek2               68.314          .1        .3
```

Proposed Conditions Model

Figure C-2: Proposed Conditions Model HEC-RAS Stationing and Routing Diagram



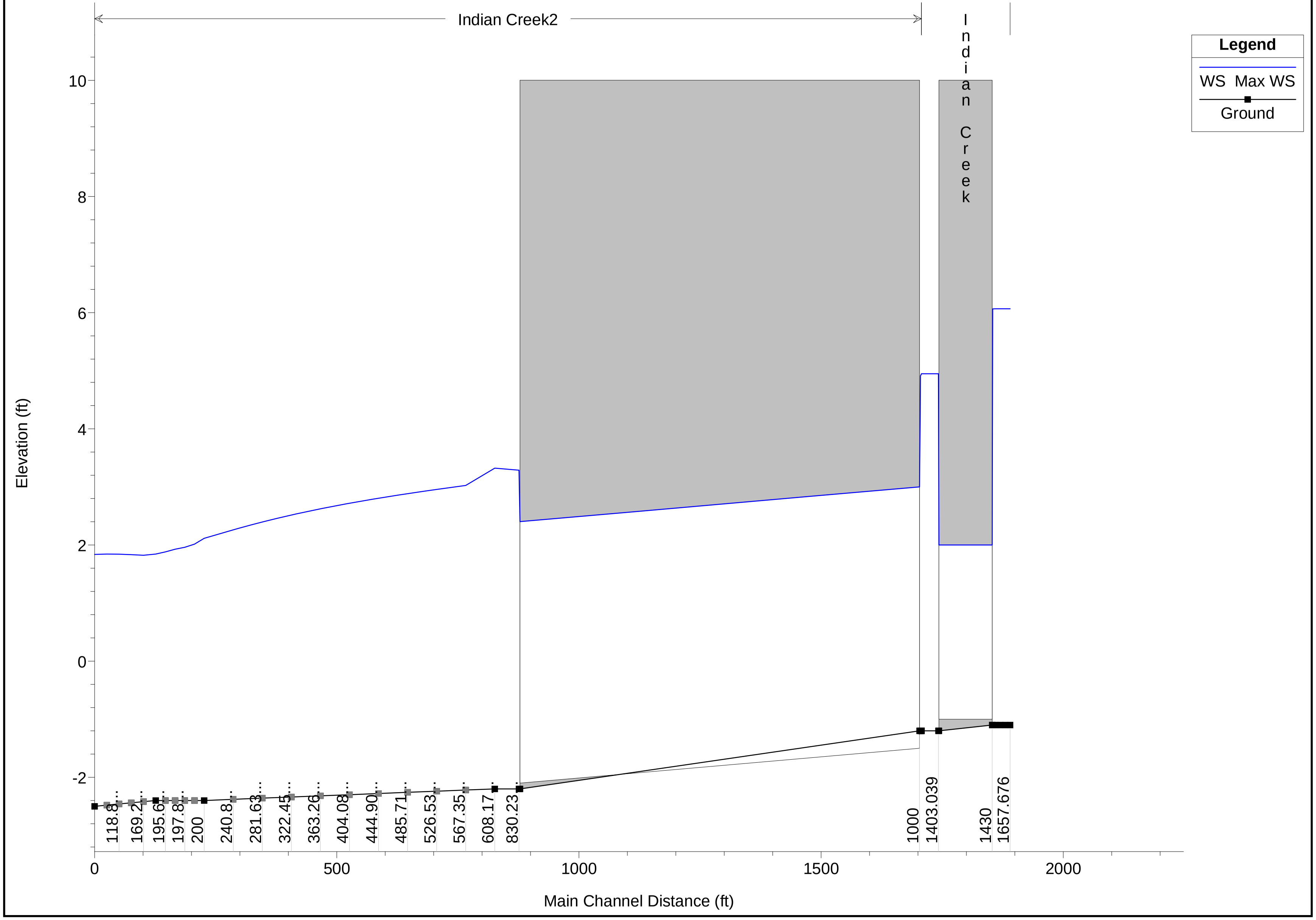
HEC-RAS Plan: PROP Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Creek	1657.676	Max WS	50.00	-1.10	6.07		6.07	0.000001	0.21	436.22	120.99	0.01
Creek	1650	Max WS	49.28	-1.10	6.07		6.07	0.000001	0.20	436.22	120.99	0.01
Creek	1640	Max WS	48.62	-1.10	6.07		6.07	0.000001	0.20	436.20	120.99	0.01
Creek	1475	Max WS	48.09	-1.10	6.06		6.07	0.000001	0.20	436.17	120.99	0.01
Creek	1469.285	Max WS	96.01	-1.10	6.06		6.06	0.000011	0.62	435.97	120.99	0.04
Creek	1430		Culvert									
Creek	1403.039	Max WS	56.41	-1.20	4.95		4.95	0.000008	0.46	368.38	151.43	0.03
Creek	1369	Max WS	56.41	-1.20	4.95		4.95	0.000001	0.20	527.73	172.00	0.01
Creek2	1368	Max WS	230.08	-1.20	4.95		4.95	0.000025	0.80	527.73	172.00	0.06
Creek2	1367	Max WS	229.98	-1.20	4.91		4.98	0.000172	2.14	107.50	172.00	0.15
Creek2	1000		Culvert									
Creek2	830.233	Max WS	228.88	-2.20	3.29		3.38	0.000255	2.39	95.57	80.00	0.18
Creek2	608.170	Max WS	228.88	-2.20	3.32		3.34	0.000076	1.28	319.95	219.02	0.10
Creek2	567.353*	Max WS	700.08	-2.22	3.02		3.29	0.000946	4.34	262.43	199.01	0.35
Creek2	526.536*	Max WS	700.03	-2.24	2.96		3.23	0.001001	4.43	252.62	199.05	0.36
Creek2	485.719*	Max WS	699.98	-2.26	2.88		3.18	0.001063	4.53	241.63	194.95	0.37
Creek2	444.902*	Max WS	699.94	-2.28	2.80		3.11	0.001139	4.64	228.89	189.67	0.38
Creek2	404.085*	Max WS	699.92	-2.30	2.72		3.05	0.001227	4.77	215.13	180.72	0.39
Creek2	363.268*	Max WS	699.91	-2.32	2.62		2.98	0.001334	4.91	199.96	168.55	0.41
Creek2	322.451*	Max WS	699.91	-2.34	2.51		2.90	0.001466	5.08	183.33	152.32	0.43
Creek2	281.634*	Max WS	699.90	-2.36	2.39		2.81	0.001624	5.26	167.02	130.73	0.45
Creek2	240.817*	Max WS	699.90	-2.38	2.26		2.71	0.001816	5.45	151.27	101.92	0.47
Creek2	200	Max WS	699.89	-2.40	2.11		2.60	0.002036	5.65	139.05	67.10	0.49
Creek2	198.907*	Max WS	699.88	-2.40	2.01		2.57	0.002474	6.12	145.43	104.10	0.54
Creek2	197.814*	Max WS	699.88	-2.40	1.96		2.54	0.002750	6.38	160.07	115.50	0.57
Creek2	196.722*	Max WS	699.88	-2.40	1.93		2.49	0.002923	6.53	171.95	110.82	0.59
Creek2	195.629*	Max WS	699.88	-2.40	1.88		2.44	0.003170	6.72	173.48	96.29	0.61
Creek2	194.537	Max WS	699.88	-2.40	1.84		2.35	0.004340	6.67	165.85	76.47	0.61
Creek2	169.292*	Max WS	699.88	-2.42	1.82		2.20	0.002911	5.37	178.65	84.63	0.50
Creek2	144.047*	Max WS	699.88	-2.44	1.83		2.11	0.002052	4.42	193.93	83.57	0.42
Creek2	118.803*	Max WS	699.88	-2.46	1.84		2.05	0.001574	3.78	211.84	86.88	0.36
Creek2	93.5586*	Max WS	699.88	-2.48	1.84		2.01	0.001294	3.33	229.73	92.71	0.33
Creek2	68.314	Max WS	699.88	-2.50	1.84	0.15	1.98	0.001128	3.02	245.82	98.80	0.30

HEC-RAS Plan: PROP   Profile: Max WS

Storage Area	Profile	W.S. Elev	SA Min El	Net Flux	SA Area	SA Volume
		(ft)	(ft)	(cfs)	(acres)	(acre-ft)
S08	Max WS	6.06	-2.00	-45.56	2.12	2.65
S09	Max WS	6.85	-2.00	-36.71	1.86	3.55
S10	Max WS	7.15	0.00	-3.65	3.69	1.76
S15	Max WS	8.40	3.00	-80.08	6.13	4.46

St. Augustine Airport Floodplain Analysi Plan: Proposed Conditions 100-year Routing 10/29/2009



1 in Horiz. = 300 ft 1 in Vert. = 2.5 ft

HEC-RAS Report

```
                         HEC-RAS Version 3.1.3 May 2005
                          U.S. Army Corp of Engineers
                         Hydrologic Engineering Center
                               609 Second Street
                               Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X      XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX




PROJECT DATA
Project Title: St. Augustine Airport Floodplain Analysi
Project File : SA_Airport.prj
Run Date and Time: 10/29/2009 9:58:25 PM

Project in English units



PLAN DATA

Plan Title: Proposed Conditions 100-year Routing
Plan File : C:\StJohns\Airport\HEC\RAS\SA_Airport.p02

           Geometry Title: Proposed Runway Ext. Culvert/Channel
           Geometry File : C:\StJohns\Airport\HEC\RAS\SA_Airport.g02

           Flow Title    :
           Flow File     :

Plan Summary Information:
Number of:  Cross Sections =   36    Multiple Openings  =    0
            Culverts       =    2    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    1

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow




GEOMETRY DATA

Geometry Title: Proposed Runway Ext. Culvert/Channel
Geometry File : C:\StJohns\Airport\HEC\RAS\SA_Airport.g02

Reach Connection Table

  River            Reach               Upstream Boundary    Downstream Boundary

  Indian           Creek                                      J1
  Indian           Trib                                       J1
  Indian           Creek2               J1


JUNCTION INFORMATION

Name: J1
Description:
Energy computation Method

    Length across Junction             Tributary
     River           Reach               River           Reach        Length   Angle
Indian          Creek            to Indian          Creek2                 0
Indian          Trib             to Indian          Creek2                 0

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1657.676

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      36       5   36.69       5   43.14    4.71   46.35    4.54   46.82    4.52
   56.72       4   57.13    3.95   58.18    3.81   64.53       3   70.95       2
   80.22       1   81.31     .86   87.04     .12      88       0   96.99    -.93
   97.65      -1   99.96    -1.1  102.27      -1  113.35       0  113.63     .11
  115.82       1  115.89    1.03  118.66       2  120.94    2.55   121.1    2.59
   122.8       3  133.34       4  156.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      36     .06      88     .03  113.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            88  113.35               10      10      10             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1650

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
      36       5   36.69       5   43.14    4.71   46.35    4.54   46.82    4.52
   56.72       4   57.13    3.95   58.18    3.81   64.53       3   70.95       2
   80.22       1   81.31     .86   87.04     .12      88       0   96.99    -.93
   97.65      -1   99.96    -1.1  102.27      -1  113.35       0  113.63     .11
  115.82       1  115.89    1.03  118.66       2  120.94    2.55   121.1    2.59
   122.8       3  133.34       4  156.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      36     .06      88     .03  113.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            88  113.35               10      10      10            .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1640

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      36       5   36.69       5   43.14    4.71   46.35    4.54   46.82    4.52
   56.72       4   57.13    3.95   58.18    3.81   64.53       3   70.95       2
   80.22       1   81.31     .86   87.04     .12      88       0   96.99    -.93
   97.65      -1   99.96    -1.1  102.27      -1  113.35       0  113.63     .11
  115.82       1  115.89    1.03  118.66       2  120.94    2.55   121.1    2.59
   122.8       3  133.34       4  156.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      36     .06      88     .03  113.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            88  113.35               10      10      10            .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1475

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      36       5   36.69       5   43.14    4.71   46.35    4.54   46.82    4.52
   56.72       4   57.13    3.95   58.18    3.81   64.53       3   70.95       2
   80.22       1   81.31     .86   87.04     .12      88       0   96.99    -.93
   97.65      -1   99.96    -1.1  102.27      -1  113.35       0  113.63     .11
  115.82       1  115.89    1.03  118.66       2  120.94    2.55   121.1    2.59
   122.8       3  133.34       4  156.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      36     .06      88     .03  113.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            88  113.35                6       6       6            .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1469.285

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       5     .69       5    7.14    4.71   10.35    4.54   10.82    4.52
   20.72       4   21.13    3.95   22.18    3.81   28.53       3   34.95       2
   44.22       1   45.31     .86   51.04     .12      52       0   60.99    -.93
   61.65      -1   63.96    -1.1   66.27      -1   77.35       0   77.63     .11
   79.82       1   79.89    1.03   82.66       2   84.94    2.55    85.1    2.59
    86.8       3   97.34       4  120.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   61.65     .03   66.27     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         61.65   66.27              112     112     112            .1      .3

CULVERT


RIVER: Indian
REACH: Creek              RS: 1430

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =     110
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0      10             200      10

Upstream Bridge Cross Section Data
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       5     .69       5    7.14    4.71   10.35    4.54   10.82    4.52
   20.72       4   21.13    3.95   22.18    3.81   28.53       3   34.95       2
   44.22       1   45.31     .86   51.04     .12      52       0   60.99    -.93
   61.65      -1   63.96    -1.1   66.27      -1   77.35       0   77.63     .11
   79.82       1   79.89    1.03   82.66       2   84.94    2.55    85.1    2.59
    86.8       3   97.34       4  120.99    4.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   61.65     .03   66.27     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
         61.65   66.27             .1      .3
```

```
Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0      10             200      10

Downstream Bridge Cross Section Data
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    4.69   21.05    4.08   22.15    4.05   22.64    4.03   23.71       4
   25.96    3.78   33.66       3   37.99    2.22   39.29       2   41.84     1.7
   47.68       1   54.45     .09   55.15       0   55.75    -.06   60.65    -.52
    65.1    -.95   65.66      -1    68.6    -1.2   71.54      -1   86.82       0
   87.39     .31   88.62       1   92.57    1.95   92.77       2   93.17    2.06
   94.79    2.31   95.86    2.45   97.96    2.71  100.13       3  100.57       3
  100.72    3.02  102.31    3.26  105.74    3.68  106.21    3.75  106.45    3.78
  108.17       4  134.03       4   148.8    4.49     150    4.54  151.43    4.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   65.66     .03   71.54     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
         65.66   71.54             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       3
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  1     110     .013     .013        0                   .5                1
Number of Barrels =  2
Upstream   Elevation = -1
Centerline Stations
    Sta.    Sta.
      62      67
Downstream Elevation = -1
Centerline Stations
    Sta.    Sta.
      66      71

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1403.039

INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    4.69   21.05    4.08   22.15    4.05   22.64    4.03   23.71       4
   25.96    3.78   33.66       3   37.99    2.22   39.29       2   41.84     1.7
   47.68       1   54.45     .09   55.15       0   55.75    -.06   60.65    -.52
    65.1    -.95   65.66      -1    68.6    -1.2   71.54      -1   86.82       0
   87.39     .31   88.62       1   92.57    1.95   92.77       2   93.17    2.06
   94.79    2.31   95.86    2.45   97.96    2.71  100.13       3  100.57       3
  100.72    3.02  102.31    3.26  105.74    3.68  106.21    3.75  106.45    3.78
  108.17       4  134.03       4   148.8    4.49     150    4.54  151.43    4.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   65.66     .03   71.54     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         65.66   71.54               35      35      35             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek              RS: 1369

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     3.9      26      .5      32     -.7      46    -1.2      65     -.7
      76     1.6     172     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      32     .03      65     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            32      65                2       2       2             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 5

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.6      21     -.3      29     -.4      56     6.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      21     .03      29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            21      29               10      10      10             .1       .3

CROSS SECTION
```

```
RIVER: Indian
REACH: Trib               RS: 4

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.6      21     -.3      29     -.4      56     6.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      21     .03      29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            21      29               30      30      30             .1       .3

LATERAL STRUCTURE


RIVER: Indian
REACH: Trib               RS: 3.6

INPUT
Description:
Lateral structure position     = Right overbank
Distance from Upstream XS =       2
Deck/Roadway Width        =      30
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =        2
     Sta    Elev     Sta    Elev
       0       8      20       8

Weir crest shape                            = Broad Crested


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       4
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                        410     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation = -1.28
Centerline Stations
    Sta.    Sta.    Sta.
       5      10      15
Downstream Elevation = -1.45
Centerline Stations
    Sta.    Sta.    Sta.
       5      10      15

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 3

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.6      21     -.3      29     -.4      56     6.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      21     .03      29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            21      29               10      10      10             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 2

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.2      20       0      26     -.3      45     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      20     .03      26     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            20      26               10      10      10             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Trib               RS: 1

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     5.2      20     -.4      26     -.7      45     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      20     .03      26     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
            20      26             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 1368

INPUT
```

```
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     3.9      26      .5      32     -.7      46    -1.2      65     -.7
      76     1.6     172     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      32     .03      65     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            32      65                2       2       2             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 1367

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     3.9      26      .5      32     -.7      46    -1.2      65     -.7
      76     1.6     172     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      32     .03      65     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            32      65              829     829     829             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      37      10       F
      55     172      10       F

CULVERT


RIVER: Indian
REACH: Creek2             RS: 1000

INPUT
Description:
Distance from Upstream XS =       2
Deck/Roadway Width        =     825
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0      10             200      10

Upstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     3.9      26      .5      32     -.7      46    -1.2      65     -.7
      76     1.6     172     4.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      32     .03      65     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
            32      65             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      37      10       F
      55     172      10       F

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0      10             200      10

Downstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      43       3      63       2      72      -1      78    -2.2      88    -2.2
      94      -1     103       2     123       3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      43     .06      72     .03      94     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
            72      94             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      43      74      10       F
      92     123      10       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular     4.5
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               2     825     .013     .013        0                   .2                 1
Number of Barrels =  3
Upstream   Elevation = -1.5
Centerline Stations
    Sta.    Sta.    Sta.
      40      46      52
Downstream Elevation = -2.1
Centerline Stations
    Sta.    Sta.    Sta.
      77      83      89
```

```
CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 830.233

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      43       3      63       2      72      -1      78    -2.2      88    -2.2
      94      -1     103       2     123       3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      43     .06      72     .03      94     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            72      94               50      50      50             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      43      74      10       F
      92     123      10       F

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 608.170

INPUT
Description:
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135    -2.2
     145    -2.2     155      -1     160       2     180       2     290       3
     360       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 567.353*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135   -2.22
     145   -2.22     155      -1  158.63    1.18  160.22       2   181.1    2.01
  295.93    2.99  318.22    3.27     369       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 526.536*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135   -2.24
     145   -2.24     155      -1  158.78    1.27  160.44       2   182.2    2.03
  301.85    2.97  325.08    3.24     378       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 485.719*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135   -2.26
     145   -2.26     155      -1  158.93    1.36  160.66       2  183.29    2.04
  307.78    2.96  331.95    3.21     387       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 444.902*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135   -2.28
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     145   -2.28     155      -1  159.08    1.45  160.88       2  184.39    2.06
  313.71    2.94  338.81    3.18     396       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 404.085*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135    -2.3
     145    -2.3     155      -1  159.24    1.54   161.1       2  185.49    2.07
  319.63    2.93  345.68    3.15     405       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 363.268*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135   -2.32
     145   -2.32     155      -1  159.39    1.63  161.32    2.01  186.59    2.08
  325.56    2.92  352.54    3.12     414       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 322.451*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135   -2.34
     145   -2.34     155      -1  159.54    1.73  161.54    2.01  187.68     2.1
  331.49     2.9  359.41    3.09     423       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 281.634*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135   -2.36
     145   -2.36     155      -1  159.69    1.82  161.76    2.01  188.78    2.11
  337.41    2.89  366.27    3.06     432       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 240.817*

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135   -2.38
     145   -2.38     155      -1  159.85    1.91  161.98    2.01  189.88    2.13
  343.34    2.87  373.14    3.03     441       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           125     155               60      60      60             .1      .3

CROSS SECTION


RIVER: Indian
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REACH: Creek2            RS: 200

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      80       4     100       3     120       2     125      -1     135    -2.4
     145    -2.4     155      -1     160       2     380       3     450       4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      80     .06     125     .03     155     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          125     155               20      20      20             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 198.907*

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      64       4   75.27    3.57   75.39    3.55   76.49    3.33   78.11    3.12
   78.76    3.04   81.16    2.88   81.99    2.82   85.11    2.61   85.46    2.59
    89.9    2.22   93.79    2.04  106.23    1.45  111.51      -1  112.57   -1.18
  115.49   -1.65  121.33    -2.4  129.34    -2.4  134.62   -1.73  139.22   -1.03
   139.4      -1  143.53    1.43  167.44    1.71  204.27    2.07  227.05    2.24
  325.28    2.99  329.13    3.05  383.11     3.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      64     .06  111.51     .03   139.4     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        111.51   139.4              20      20      20             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 197.814*

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      48       4   59.87    3.68   59.99    3.64   61.14    3.25   62.86    2.91
   63.53    2.78   66.06    2.57   66.93     2.5   70.23    2.22   70.59    2.19
   75.27    1.66   79.36    1.48   92.46      .9   98.01      -1   99.06    -1.2
  101.93   -1.74  107.67    -2.4  113.67    -2.4     119    -1.8  123.62   -1.03
  123.81      -1  127.07     .86  145.94    1.28  175.02     1.8  193.01    2.02
  270.56    2.98  273.59    3.04  316.21     3.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      48     .06   98.01     .03  123.81     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         98.01  123.81              20      20      20             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 196.722*

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      32       4   44.46    3.79   44.59    3.73    45.8    3.16    47.6    2.71
   48.31    2.52   50.97    2.26   51.88    2.17   55.34    1.83   55.73    1.79
   60.64    1.11   64.93     .93   78.68     .35   84.52      -1   85.55   -1.22
   88.37   -1.83   94.01    -2.4   98.01    -2.4  103.37   -1.87  108.02   -1.03
  108.21      -1   110.6     .29  124.44     .85  145.77    1.53  158.96     1.8
  215.84    2.96  218.06    3.03  249.32     3.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      32     .06   84.52     .03  108.21     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         84.52  108.21              20      20      20             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 195.629*

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      16       4   29.06    3.89   29.19    3.82   30.46    3.08   32.35     2.5
   33.09    2.26   35.87    1.95   36.83    1.85   40.46    1.44   40.86     1.4
      46     .55    50.5     .37   64.91     -.2   71.02      -1   72.03   -1.25
    74.8   -1.91   80.34    -2.4   82.34    -2.4   87.74   -1.93   92.43   -1.04
   92.62      -1   94.14    -.28  102.95     .43  116.52    1.27  124.92    1.58
  161.11    2.95  162.53    3.01  182.42     3.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      16     .06   71.02     .03   92.62     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         71.02   92.62              20      20      20             .1       .3

CROSS SECTION


RIVER: Indian
REACH: Creek2            RS: 194.537

INPUT
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```
Description:
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   13.65       4   13.79    3.91   15.12       3   17.09    2.29
   17.87       2   20.78    1.64   21.78    1.52   25.99       1   31.37       0
   36.07    -.18   57.53      -1   58.52   -1.27   61.24      -2  66.675    -2.4
   72.11      -2   76.83   -1.04   77.02      -1   81.45       0   87.27       1
   90.87    1.36     107       3  115.53       3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   57.53    .035   77.02     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         57.53   77.02            25.25   25.24   25.23             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 169.292*

INPUT
Description:
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   12.57       4    12.7    3.93   13.92     3.2   15.73    2.63
   16.45     2.4   19.13    2.11   20.05    2.02   23.93     1.6   28.88      .8
   29.24     .79   32.82     .51   33.21     .48   33.72     .44   34.31      .4
   40.05     .03    40.8    -.02   47.06     -.4   52.25    -.75   52.96     -.8
   54.95   -1.05   55.48   -1.12   60.41   -1.73    60.8   -1.75   62.16   -1.82
   64.35   -1.92   66.21    -2.1   66.76   -2.16   66.93   -2.17   67.01   -2.18
   67.05   -2.18    67.3    -2.2   71.33   -2.42   77.63   -2.02   79.17   -1.78
   80.18   -1.57   80.52   -1.49   81.81   -1.21   82.79    -.95    83.1    -.86
   83.32     -.8   83.58    -.72   83.78    -.66   84.53    -.43   86.32    -.18
   89.04     .28   90.74      .5   91.37     .59   92.29     .71   93.61     .89
   94.82    1.06    95.1    1.11   95.73     1.2   96.56    1.32   97.39    1.41
   97.95    1.47   98.24     1.5   98.33    1.51  100.36    1.58  101.21    1.61
  101.52    1.62  102.27    1.65   105.7    1.77  122.05     2.8  133.07     2.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   52.96    .035   83.32     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         52.96   83.32            25.25   25.24   25.23             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 144.047*

INPUT
Description:
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   11.48       4    11.6    3.95   12.72     3.4   14.38    2.97
   15.03     2.8   17.48    2.58   18.32    2.51   21.86     2.2   26.39     1.6
   26.72    1.59   29.99    1.18   30.34    1.14   30.81    1.08   31.35    1.02
    36.6     .52   37.28     .46      43    -.05   47.74    -.53    48.4     -.6
   51.38    -.83   52.17     -.9   59.59   -1.46   60.16   -1.48    62.2   -1.57
    65.5   -1.69   68.29   -1.99   69.12   -2.08   69.38   -2.11   69.49   -2.12
   69.56   -2.13   69.93   -2.15   75.99   -2.44   83.14   -2.04    84.9   -1.84
   86.04   -1.59   86.43    -1.5    87.9   -1.16   89.01     -.8   89.36    -.68
   89.61     -.6   89.94    -.48   90.19     -.4   91.11    -.07   93.29     .11
   96.63     .55   98.71     .78   99.48     .86  100.61     .99  102.23    1.16
  103.71    1.36  104.06    1.41  104.83    1.51  105.85    1.65  106.87    1.76
  107.55    1.84  107.91    1.88  108.02    1.88  110.51    1.86  111.55    1.86
  111.92    1.86  112.85    1.85  117.05    1.83   137.1     2.6  150.61     2.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    48.4    .035   89.61     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          48.4   89.61            25.25   25.24   25.23             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 118.803*

INPUT
Description:
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4    10.4       4   10.51    3.96   11.52     3.6   13.02    3.32
   13.62     3.2   15.83    3.06   16.59    3.01    19.8     2.8    23.9     2.4
    24.2    2.39   27.16    1.85   27.48     1.8    27.9    1.72    28.4    1.65
   33.15    1.01   33.76     .94   38.94      .3   43.24    -.32   43.83     -.4
   47.82    -.62   48.87    -.67   58.76   -1.19   59.53   -1.22   62.25   -1.32
   66.65   -1.46   70.37   -1.87   71.49      -2   71.83   -2.04   71.98   -2.06
   72.07   -2.07   72.56    -2.1   80.64   -2.46   88.66   -2.06   90.62   -1.89
   91.91   -1.61   92.34    -1.5   93.99   -1.11   95.23    -.65   95.63     -.5
   95.91     -.4    96.3    -.25   96.59    -.14   97.68     .29  100.26     .41
  104.22     .83  106.68    1.06   107.6    1.14  108.93    1.26  110.85    1.44
  112.61    1.65  113.01    1.71  113.93    1.82  115.13    1.97  116.35    2.11
  117.15     2.2  117.57    2.25  117.71    2.25  120.66    2.15  121.89    2.11
  122.33     2.1  123.42    2.05   128.4    1.89  152.14     2.4  168.14     2.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   43.83    .035   95.91     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         43.83   95.91            25.25   25.24   25.23             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 93.5586*

INPUT
Description:
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
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```
       0       4    9.32       4    9.41    3.98   10.32     3.8   11.66    3.66
    12.2     3.6   14.18    3.53   14.87     3.5   17.74     3.4   21.41     3.2
   21.68     3.2   24.33    2.53   24.62    2.45      25    2.36   25.44    2.27
   29.69    1.51   30.25    1.42   34.89     .65   38.73     -.1   39.27     -.2
   44.25     -.4   45.56    -.45   57.94    -.93   58.89    -.95    62.3   -1.07
    67.8   -1.23   72.46   -1.76   73.85   -1.93   74.27   -1.98   74.46      -2
   74.57   -2.01   75.19   -2.05   85.29   -2.48   94.18   -2.08   96.35   -1.95
   97.77   -1.62   98.26    -1.5  100.08   -1.05  101.46     -.5  101.89    -.32
   102.2     -.2  102.65    -.01  102.99     .12  104.25     .64  107.24      .7
  111.81     1.1  114.66    1.33  115.71    1.41  117.26    1.54  119.47    1.72
   121.5    1.95  121.97    2.01  123.03    2.13  124.42     2.3  125.82    2.46
  126.76    2.57  127.24    2.63   127.4    2.62   130.8    2.43  132.23    2.36
  132.74    2.33     134    2.26  139.76    1.94  167.19     2.2  185.68     2.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   39.27    .035   102.2     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         39.27   102.2            25.25   25.24   25.23             .1      .3

CROSS SECTION


RIVER: Indian
REACH: Creek2             RS: 68.314

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0       4   19.16       4    21.5     3.2   22.09       3   22.48     2.9
   26.24       2   26.73     1.9   30.83       1   34.23     .12    34.7       0
   42.26    -.23   58.26    -.69   62.35    -.82   68.95      -1   74.54   -1.65
   76.21   -1.85   76.72   -1.91   76.95   -1.94   77.08   -1.95   77.82      -2
   89.95    -2.5  102.08      -2  103.64   -1.64  104.17    -1.5  106.17      -1
  107.68    -.35   108.5       0  109.01     .22  109.39     .38  110.82       1
  114.21       1  122.63    1.61  123.83    1.69  125.58    1.82  128.09       2
   130.4    2.24  130.93    2.31  132.13    2.44   135.3    2.81  136.36    2.93
  136.91       3  137.09    2.99  140.95    2.72  143.15    2.57  144.58    2.46
  151.11       2  203.22       2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    34.7    .035   108.5     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          34.7   108.5            63.17   68.31   50.74             .1      .3


STORAGE AREA: S08
Volume Method : Rating Curve

  Elevation     Volume
         -2          0
          2       .432
          3       .699
          4       1.16
          5      1.722
          6     2.5305
          7     4.6545
          8    15.0795
          9     33.494
         10     52.724


STORAGE AREA: S09
Volume Method : Rating Curve

  Elevation     Volume
         -2          0
          2       .252
          3       .461
          4       .849
          5       1.31
          6      1.957
          7     3.8155
          8    13.3445
          9    30.2785


STORAGE AREA: S10
Volume Method : Rating Curve

  Elevation     Volume
          0          0
          3      .1755
          4      .2735
          5      .4225
          6      .6335
          7      1.212
          8     4.8985
          9     12.232
         10      20.66


STORAGE AREA: S15
Volume Method : Rating Curve

  Elevation     Volume
          3          0
          6     .43305
          7     .88025
          8     2.0313
          9    8.15935
         10    27.5641


CONNECTION: P09-08


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       4
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
```

```
                        150     .013     .013        0                   .5                1
Number of Barrels =  2
Upstream   Elevation = -1.4
Centerline Stations
    Sta.    Sta.
       7      13
Downstream Elevation = -1.9
Centerline Stations
    Sta.    Sta.
       7      13


CONNECTION: P-10-09


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       4
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                         35     .013     .013        0                   .5                1
Number of Barrels =  2
Upstream   Elevation =  2
Centerline Stations
    Sta.    Sta.
       7      13
Downstream Elevation =  1.7
Centerline Stations
    Sta.    Sta.
       7      13


CONNECTION: P15-10


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       3
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                        180     .013     .013        0                   .2                1
Number of Barrels =  2
Upstream   Elevation =  3
Centerline Stations
    Sta.    Sta.
       8      12
Downstream Elevation =  2.5
Centerline Stations
    Sta.    Sta.
       8      12



SUMMARY OF MANNING'S N VALUES

River:Indian

      Reach          River Sta.       n1        n2        n3

 Creek                1657.676           .06       .03       .06
 Creek                1650               .06       .03       .06
 Creek                1640               .06       .03       .06
 Creek                1475               .06       .03       .06
 Creek                1469.285           .06       .03       .06
 Creek                1430         Culvert
 Creek                1403.039           .06       .03       .06
 Creek                1369               .06       .03       .06
 Trib                 5                  .06       .03       .06
 Trib                 4                  .06       .03       .06
 Trib                 3.6          Lat Struct
 Trib                 3                  .06       .03       .06
 Trib                 2                  .06       .03       .06
 Trib                 1                  .06       .03       .06
 Creek2               1368               .06       .03       .06
 Creek2               1367               .06       .03       .06
 Creek2               1000         Culvert
 Creek2               830.233            .06       .03       .06
 Creek2               608.170            .06       .03       .06
 Creek2               567.353*           .06       .03       .06
 Creek2               526.536*           .06       .03       .06
 Creek2               485.719*           .06       .03       .06
 Creek2               444.902*           .06       .03       .06
 Creek2               404.085*           .06       .03       .06
 Creek2               363.268*           .06       .03       .06
 Creek2               322.451*           .06       .03       .06
 Creek2               281.634*           .06       .03       .06
 Creek2               240.817*           .06       .03       .06
 Creek2               200                .06       .03       .06
 Creek2               198.907*           .06       .03       .06
 Creek2               197.814*           .06       .03       .06
 Creek2               196.722*           .06       .03       .06
 Creek2               195.629*           .06       .03       .06
 Creek2               194.537            .06      .035       .06
 Creek2               169.292*           .06      .035       .06
 Creek2               144.047*           .06      .035       .06
 Creek2               118.803*           .06      .035       .06
 Creek2               93.5586*           .06      .035       .06
 Creek2               68.314             .06      .035       .06



SUMMARY OF REACH LENGTHS

River: Indian

      Reach          River Sta.      Left     Channel    Right

 Creek                1657.676            10        10        10
 Creek                1650                10        10        10
 Creek                1640                10        10        10
 Creek                1475                 6         6         6
 Creek                1469.285           112       112       112
```

```
 Creek                1430         Culvert
 Creek                1403.039            35        35        35
 Creek                1369                 2         2         2
 Trib                 5                   10        10        10
 Trib                 4                   30        30        30
 Trib                 3.6          Lat Struct
 Trib                 3                   10        10        10
 Trib                 2                   10        10        10
 Trib                 1
 Creek2               1368                 2         2         2
 Creek2               1367               829       829       829
 Creek2               1000         Culvert
 Creek2               830.233             50        50        50
 Creek2               608.170             60        60        60
 Creek2               567.353*            60        60        60
 Creek2               526.536*            60        60        60
 Creek2               485.719*            60        60        60
 Creek2               444.902*            60        60        60
 Creek2               404.085*            60        60        60
 Creek2               363.268*            60        60        60
 Creek2               322.451*            60        60        60
 Creek2               281.634*            60        60        60
 Creek2               240.817*            60        60        60
 Creek2               200                 20        20        20
 Creek2               198.907*            20        20        20
 Creek2               197.814*            20        20        20
 Creek2               196.722*            20        20        20
 Creek2               195.629*            20        20        20
 Creek2               194.537          25.25     25.24     25.23
 Creek2               169.292*         25.25     25.24     25.23
 Creek2               144.047*         25.25     25.24     25.23
 Creek2               118.803*         25.25     25.24     25.23
 Creek2               93.5586*         25.25     25.24     25.23
 Creek2               68.314           63.17     68.31     50.74



SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Indian


      Reach          River Sta.     Contr.    Expan.

 Creek                1657.676        .1        .3
 Creek                1650            .1        .3
 Creek                1640            .1        .3
 Creek                1475            .1        .3
 Creek                1469.285        .1        .3
 Creek                1430     Culvert
 Creek                1403.039        .1        .3
 Creek                1369            .1        .3
 Trib                 5               .1        .3
 Trib                 4               .1        .3
 Trib                 3.6      Lat Struct
 Trib                 3               .1        .3
 Trib                 2               .1        .3
 Trib                 1               .1        .3
 Creek2               1368            .1        .3
 Creek2               1367            .1        .3
 Creek2               1000     Culvert
 Creek2               830.233         .1        .3
 Creek2               608.170         .1        .3
 Creek2               567.353*        .1        .3
 Creek2               526.536*        .1        .3
 Creek2               485.719*        .1        .3
 Creek2               444.902*        .1        .3
 Creek2               404.085*        .1        .3
 Creek2               363.268*        .1        .3
 Creek2               322.451*        .1        .3
 Creek2               281.634*        .1        .3
 Creek2               240.817*        .1        .3
 Creek2               200             .1        .3
 Creek2               198.907*        .1        .3
 Creek2               197.814*        .1        .3
 Creek2               196.722*        .1        .3
 Creek2               195.629*        .1        .3
 Creek2               194.537         .1        .3
 Creek2               169.292*        .1        .3
 Creek2               144.047*        .1        .3
 Creek2               118.803*        .1        .3
 Creek2               93.5586*        .1        .3
 Creek2               68.314          .1        .3
```

Appendix D: CD with Electronic Copies of Models

APPENDIX F

SOLID WASTE, HAZARDOUS MATERIALS, SWPPP AND SPCCP

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
PASSERO ASSOCIATES, LLC
13453 N. MAIN ST, SUITE 106
JACKSONVILLE, FL 32218

IN COORDINATION WITH:
THE LPA GROUP
4503 WOODLAND CORPORATE BLV, SUITE 400
TAMPA, FL 33614

NFRA
Northeast Florida Regional Airport
Fly Smart!

SOLID WASTE, HAZARDOUS MATERIALS, SWPPP AND SPCCP

F.1 Solid Waste Collection Disposal

St. Johns County Solid Waste Management Department is responsible for the disposal of residential and commercial waste, sludge generated by wastewater treatment plants, household hazardous waste, appliances, and tires. The St. Johns County Solid Waste Management Department also operates and maintains the Leachate Collection System, monitors groundwater quality and gas migration, and the enforcement of Solid Waste Disposal Ordinances in conformance with the EPA and FDEP permits and regulations.[1]

Implemented in 1995, the Solid Waste Management Department supervises the certified waste haulers for St. Johns County[2]. The certified waste hauler for the Airport is Waste Services Incorporated (WSI). There are two transfer stations that accept municipal solid waste in St. Johns County, the Tillman Ridge Solid Waste Transfer Station and 250 North Stratton Road Transfer Station. Materials received at these two transfer stations, are then sent to landfills in the State of Georgia. Commercial and Demolition (C&D) debris is accepted and disposed within St. Johns County at the Nine Mile C&D Landfill.

F.2 Hazardous Materials

F.2.1 State and Federal Regulations

Federal

Hazardous materials are regulated by a number of Federal laws and regulations. The *Resource Conservation and Recovery Act* (RCRA) provides a general guideline for the generation, transportation, treatment, storage, and disposal of hazardous waste[3]. RCRAs focus is on active and future sites and does not the address abandoned or historical sites. The CERCLA created a tax on the chemical and petroleum industries and provided Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment[4]. Hazardous materials are those substances defined by CERCLA, as amended by the Superfund Amendments and Reauthorization Act, and the Toxic Substances Control Act.[5] In general, hazardous materials include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare, or to the environment, when released or otherwise improperly managed.

State

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[1] Information obtained through the St. Johns County Website: http://www.co.st-johns.fl.us/BCC/Solid_Waste/index.aspx.

[2] Information obtained through the St. Johns County Website: http://www.co.st-johns.fl.us/BCC/Solid_Waste/index.aspx.

[3] *Resource Conservation and Recovery Act,* United States Environmental Protection Agency, November 1980.

[4] *Comprehensive Environmental Response, Compensation, and Liability Act,* United States Environmental Protection Agency, December 11, 1980.

[5] *Superfund Amendments and Reauthorization Act*, United States Environmental Protection Agency, October 17, 1986.

The FDEP is also involved in the administration and enforcement of the Federal hazardous materials regulations. On February 12, 1985, Florida received authorization from the USEPA to administer its own hazardous waste management and regulatory program under RCRA and received final authorization on November 17, 2000 to implement the Hazardous and Solid Water Amendments of 1984.[6] The Hazardous Waste Regulation Section (HWRS) is responsible for implementing the hazardous waste regulatory portion of RCRA. It reviews and issues permits and coordinates compliance monitoring and enforcement activities at hazardous waste generators, transporters and Treatment, Storage and Disposal (TSD) facilities with the regulatory District offices.

On June 1, 2009, a Phase I Environmental Site Assessment (ESA) was conducted by Access Environmental Incorporated (AEI) for the proposed project area. According to Phase I ESA, there are no hazardous materials located within the proposed project area. However, there were hazardous materials sites located in the vicinity of the proposed project area. The following list the locations of the hazardous materials sites in the vicinity of the proposed project area:

- The southwest adjoining property, identified as St. Augustine Airport Auth-AvGas Self, is a listed AST Site. Two 10,000-gallon aviation gas Above Ground Storage Tanks (AST) were reportedly installed in 2002 - 2007 and remain active. No violations or discharges were reported for the site.
- A property south of the proposed project area, identified as Plane Crash Site, is a listed Leaking Underground Storage Tanks (LUST) Site. A plane crash on a residential property that occurred in December of 1988 triggered an emergency response (excavation of impacted soils). The assessment appears to have confirmed the successful remediation of the site during the emergency response and the status is listed as completed.
- A property west of the proposed project area, the Airport is a listed LUST Site. A discharge date of 2/2/1989 was reported. The documentation revealed plume maps that confirm the extents of the plumes (not a threat to the project).
- A property west of the proposed project area, the Airport is a listed Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) Site. Review of the database report revealed that assessment in 1996 - 1997 did not result in a Nation Priorities List (NPL) listing and No Further Remedial Action Planned (NFRAP).
- Numerous aviation businesses were identified at 4900 U.S. Highway 1. These businesses are located approximately ½-mile from the proposed project site.
- Northrop Grumman Integrated is listed at 5000 U.S. Highway 1. This business is located at > ½-mile from the proposed project site (deed restricted site – impacts do not extend beyond the property boundaries).

For more information regarding Hazardous Materials and methods used obtaining information used in this section of the EA see **Appendix G**.

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[6] FDEP Hazardous Waste Regulation Section Website: http://www.dep.state.fl.us/waste/categories/hwRegulation/default.htm.

F.2.2 Stormwater Pollution Prevention and Spill Prevention Control Countermeasures Plans

Stormwater Pollution Prevention Regulations

Federal

In 1972, Congress passed the Federal Water Pollution Control Act (FWPCA), also known as the Clean Water Act (CWA), to restore and maintain the quality of the nation's waterways.[7] The ultimate goal was to make sure that rivers and streams were fishable, swimmable, and drinkable. In 1987, the Water Quality Act (WQA) added provisions to the CWA that allowed the EPA to govern stormwater discharges from industrial activities. The EPA developed the federal NPDES stormwater permitting program in two phases. Phase I was promulgated in 1990 and it addressed the large and medium municipal separate storm sewer systems (MS4s) and eleven industrial categories. Phase II was promulgated in 1999 and it addressed MS4s not regulated under Phase I and small construction activities. The EPA published the final notice for Phase I of the Multi-Sector General Stormwater Permit program (MSGP) (Federal Register Volume 60 No. 189, September 20, 1995, page 50804) which included provisions for the development of a SWPPP by each industrial facility discharging stormwater, including airports.

In 1973, the FAA published AC 150/5320-10, *Environmental Enhancement at Airports - Industrial Waste Treatment*, to address industrial waste management at airports.[8] In 1991 and 1997, the AC was updated and 150/5320-15, *Management of Airport Industrial Waste*, was issued. On September 9, 2008, the FAA updated to AC 150-5320-15 and released AC 150/5320-15A, the goal of AC 150/5320-15A was to provide additional guidance for waste management at airports and to develop a SWPPP that focused on BMPs to eliminate, prevent, or reduce pollutants in storm water runoff associated with airport activities.

State

In October 2000, EPA authorized FDEP to implement the NPDES stormwater permitting program in the State of Florida, except on Native American County Lands. The FDEPs authority to administer the NPDES program is set forth in Section 403.0885 of the Florida statutes. Leased areas of the Airport property that engage in industrial activities are required to be permitted under the industrial NPDES program. NPDES stormwater program requires a SWPPP plan be in place, the Airport has an active SWPPP.

Spill Prevention Control and Countermeasures Regulations

EPA regulation 40 CFR Part 112, Oil Pollution Prevention implements the SPCC Rule. The SPCC rules include requirements for spill prevention, preparedness, and response to prevent oil discharges to navigable water and adjoining shorelines specifically for facilities that stores more than 1,320 gallons of oil or petroleum products. The Airport has a two fuel farms that stores over 20,000 gallons at each. Therefore, the Airport has an active SPCC Plan in place for the fuel farms.

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[7] *The Clean Water Act,* United States Environment Protection Service, 1972

[8] AC 150/5320

APPENDIX G

PHASE I ENVIRONMENTAL SITE ASSESSMENT

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
PASSERO ASSOCIATES, LLC
13453 N. MAIN ST, SUITE 106
JACKSONVILLE, FL 32218

IN COORDINATION WITH:
ACCESS ENVIRONMENTAL, INC
1039 GREEN PINE CIRCLE
ORANGE PARK, FL 32065

NFRA
Northeast Florida Regional Airport
Fly Smart!

Passero Associates, LLC
13453 North Main Street
Suite 106
Jacksonville, FL 32218

By

Access Environmental, Inc.
1039 Green Pine Circle
Orange Park, Florida 32065

Phase I Environmental Site Assessment
St. Augustine Airport Taxiway "C" Relocation Site

St. Augustine, St. Johns County, Florida
Project Nº 09-1020-00
June 4, 2009

Access Environmental, Inc.
1039 Green Pine Circle
Orange Park, Florida 32065

June 4, 2009

Passero Associates, LLC
Attn: Mr. Andrew M. Holesko
13453 North Main Street
Suite 106
Jacksonville, FL 32218

Subject: Phase I Environmental Site Assessment
St. Augustine Airport Taxiway “C” Relocation Site
St. Augustine, St. Johns County, Florida
Project N^{o} 09-1020-00

Dear Mr. Holesko:

Access Environmental, Inc. (AEI) has performed a Phase I Environmental Site Assessment (ESA) of the subject property, pursuant to your request. The Phase I ESA was performed in general accordance with ASTM Standard E 1527-05. The attached Phase I ESA report represents: (1) an outline of the scope of work performed, (2) the environmental findings, and (3) our summary and conclusions regarding potential environmental concerns.

We urge you to read the entire report, and to contact the individuals involved in the completion of this project should any questions arise after your review.

Sincerely,

Access Environmental, Inc.

Earl R. Faust, P.G.
President-Principal Consultant

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

1.1 Purpose

The Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment (ESA) Process, ASTM Designation: E 1527-05, is to define good commercial and customary practice in the United States for conducting an environmental site assessment of a parcel of residential real estate with respect to the range of contaminants within the scope of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and petroleum products. As such, this Phase I ESA is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner defense to CERCLA liability. Namely, this Phase I ESA constitutes “all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice” as defined in 42 USC § 9601(35)(B).

EPA discussed the new requirements for Phase I ESAs as follows: On January 11, 2002, President Bush signed into law the Small Business Liability Relief and Brownfields Revitalization Act (the Brownfields Amendments), which amended the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq. The Brownfields Amendments require the Environmental Protection Agency (EPA) to develop regulations establishing federal standards and practices for conducting all appropriate inquiries. Congress included in the Brownfields Amendments a list of criteria that the Agency must address in the regulations (section 101(3 5)(B)(iii) of CERCLA).

Subtitle B of Title II of the Brownfields Amendments revised the liability provisions of CERCLA Section 101(35) by clarifying the requirements necessary to establish the innocent landowner defense under CERCLA. In addition, the Brownfields Amendments amended CERCLA by providing additional liability protections for contiguous property owners and bona fide prospective purchasers. For the first time since the enactment of CERCLA in 1980, a person may purchase property with the knowledge that the property is contaminated without being held potentially liable for the cleanup of the contamination. To claim protection from liability, a prospective property owner must comply with the statutory requirements for obtaining the contiguous property owner or bona fide prospective purchaser liability defenses. Among these is the requirement to, prior to the date of acquisition of the property, undertake “all appropriate inquiries” into prior ownership and uses of a property.

The all appropriate inquiries requirements are applicable to any public or private party who may potentially claim protection from CERCLA liability as an innocent landowner, a bona fide prospective purchaser, or a contiguous property owner. In addition, parties receiving grants to conduct characterizations or assessments of brownfields properties under EPA’s Brownfields Grant program must conduct the property characterization and assessment in compliance with the all appropriate inquiries requirements.

The purpose of this document is to present an ASTM E1527-05 Phase I ESA that meets, to the extent feasible using local standard of care, the requirements of EPA and ASTM.

1.2 Special Terms and Conditions

Recognized Environmental Conditions - In defining a standard of good commercial and customary practice for conducting an ESA of a parcel of property, the goal of the process established by this practice is to identify recognized environmental conditions. The term recognized environmental conditions means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products, even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to the public health or the environment, and that generally would not be the subject of an enforcement action, if brought to the attention of appropriate governmental agencies.

Hazardous Substances - A substance defined as a hazardous substance pursuant to CERCLA 42 USC §9601(14), as interpreted by Federal Environmental Protection Agency (EPA) regulations and the courts, which includes: (i) any substances designated pursuant to section 1321(b)(2)(A) of Title 33, (ii) any element, compound, mixture, solution, or substance designated pursuant to 42 USC §9602, (iii) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (42 USC §6921) (but not including any waste the regulation of which, under the Solid Waste Disposal Act (42 USC §6901 *et seq*) has been suspended by Act of Congress), (iv) any toxic pollutant listed under section 112 of the Clean Air Act (42 USC §7412), (v) any imminently hazardous chemical substance or mixture with respect to which the Administrator (of EPA) has taken action pursuant to section 2606 of Title 15, and (vi) any other substance regulated by the state.

Petroleum Products - those substances included within the meaning of the petroleum exclusion to CERCLA, 42 USC §9601(14), as interpreted by the courts and EPA, which includes: petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance under Subparagraphs (A) through (F) of 42 USC §9601(14), natural gas, natural gas liquids, liquefied natural gas, and synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). The word fraction refers to certain distillates of crude oil, including gasoline, kerosene, diesel oil, jet fuels, and fuel oil, pursuant to Standard Definitions of Petroleum Statistics.

Property - the real property that is the subject of the environmental site assessment described in this practice. Real property includes buildings, other fixtures, and improvements located on the property and affixed to the land.

Adjoining Properties - any real property or properties, the border of which is contiguous or partially contiguous with that of the subject property, or that which would be contiguous or partially contiguous with that of the subject property but for a street, road, or other public thoroughfare separating them.

Vicinity - For the purposes of this report, the "vicinity" of the site is defined as properties located within an approximate 1/8-mile radius of the subject site, unless otherwise noted.

No additional special terms and conditions, apart from the contractual agreements that are delineated within our Proposal were executed in the performance of this project.

1.3 Limitations and Exceptions of Assessment

This Phase I ESA has been conducted to permit formulation of an opinion as to the presence or likely presence of recognized environmental conditions in connection with the subject property. Opinions relative to the recognized environmental conditions potential given in this report are based upon information derived from the most recent subject property reconnaissance and from other activities described herein. The Client is herewith advised that the conditions observed by AEI are subject to change. The findings and opinions conveyed via this Phase I ESA report are based on information obtained from a variety of sources that AEI believes are reliable. Nonetheless, AEI cannot, and does not, guarantee the authenticity or reliability of the information it has relied upon.

In addition, the Phase I ESA report does not include any information regarding inquiry into the propensity for radon and/or methane gas, wetlands, the presence of asbestos-containing materials, or lead-based paint. These items, called Non-Scope Considerations, are beyond the scope of ASTM Standard E 1527-05.

AEI has endeavored to meet what it believes is the applicable standard of care observed by consultants performing environmental site assessments contemporaneously in the geographical area of the project and, in so doing, is obliged to advise the Client of Phase I ESA limitations. AEI believes that providing information about limitations is essential to help the Client identify and thereby manage its risks. Because standards of care can be identified only through retrospective inquiry, AEI has assumed that the standard of care is articulated by ASTM Standard E 1527-05 as interpreted herein.

As stated within ASTM Standard E 1527-05 no environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a property*.* Performance of practice ASTM Standard E 1527-05 is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with a property*,* and recognizes reasonable limits of time and cost.

In addition, per ASTM Standard E 1527-05 discretionary physical setting sources shall be sought and reviewed only when conditions have been identified in which hazardous substances or petroleum products are likely to migrate to the property or from or within the property into the groundwater or soil.

Also, it should be noted that the Client is the only intended beneficiary of this report. This report and its findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other third party, nor used by any other party in whole or in part, without the prior written consent of AEI and the Client.

Finally, the geographic database search utilized for this project meets the ASTM Standard E 1527-05 requirements for a government records review (according to the provider). The minimum search distance is defined in ASTM Standard E 1527-05. Accordingly, it is possible that the referenced information research, while fully appropriate for a Phase I ESA, may not indicate the existence of important information sources. Assuming such sources actually exist, their information could not have been considered in the formulation of our findings and opinions.

1.4 Limiting Conditions

ASTM Standard E 1527-05 requires consulting historical sources to develop a history of all obvious uses of the subject property from the present, back to the subject property's obvious first developed use, or back to 1940, whichever is earlier. To accomplish this task, ASTM Standard E 1527-05 requires reviewing only as many of the standard historical sources listed in the ASTM Standard E 1527-05 that are necessary, reasonably ascertainable, and likely to be useful (defined as data failure if not possible).

In our experience, aerial photographs, fire insurance maps, interviews with parties knowledgeable about the subject property history, building and zoning records, property assessor record cards and to a lesser extent recorded land titles, are typically the standard historical sources likely to yield information which fulfills ASTM Standard E 1527-05, as related to identifying the first developed subject property use, and adjoining property uses which are considered environmentally sensitive. Past experience in utilizing the remaining standard historical sources, as delineated in the standard have not been in the opinion of the undersigned author sufficiently useful, accurate, or complete in terms of satisfying the standard, hence, our selection of historical resources. AEI was able to review printed historical sources as far back as 1942 (Historic aerial photograph) during this Phase I ESA investigation.

1.5 Methodology

The scope of service conducted was completed in general accordance with ASTM Standard E 1527-05, and tasks outlined within our proposal.

2.0 SUBJECT PROPERTY & VICINITY DESCRIPTION

The subject property consists of a portion of one parcel of approximately 4.25+/- acres, with the following Real Estate Nº 074840 0000, in St. Augustine, St. Johns County, Florida. According to the St. Johns County Property

Appraiser, the current owner of the subject property is St. Augustine-St. Johns County Airport Authority. The property use is listed as County (8600). Information obtained during our subject property inspection on June 1, 2009, confirmed that the subject property is currently undeveloped with the exception of portions of the existing runway/taxiway structures. Copies of the Clay County Property Appraiser’s Cards are included in the Appendices. Figure 1 is a Site Location Map.

Airport facilities and undeveloped salt marsh primarily surround the subject property. The adjoining properties are as follows:

1) North: St. Augustine-St. Johns County Airport Authority (Runway 13-31, medians and taxiway)
2) South: St. Augustine-St. Johns County Airport Authority (taxiway, undeveloped and retention pond) and undeveloped salt marsh (residential beyond)
3) East: St. Augustine-St. Johns County Airport Authority (undeveloped) and undeveloped salt marsh
4) West: St. Augustine-St. Johns County Airport Authority (Runways, taxiways and airport facilities)

3.0 ENVIRONMENTAL RECORDS REVIEW

Environmental Database Search

AEI utilized the services of Environmental Data Management, Inc. (EDM) for the requisite regulatory database review portion of the Phase I ESA. EDM relies upon data from the Federal, State and local government sources, which occasionally have been found to be either incorrect or incomplete. Data processing of federal and state database files is primarily done utilizing point-geocoding (latitude and longitude) methodology of environmental sites that fall within the commensurate ASTM Standard E 1527-05 minimum search distance (MSD) parameter. Neither EDM nor AEI can warranty the accuracy or reliability of the information included within the EDM database report, which AEI relied upon in developing opinions regarding environmental risk. In addition to the requisite federal and state regulatory database files, which are detailed below. EDM also provides information from the review of additional federal and state non-ASTM databases. This information is detailed in the EDM Site Assessment Report found in the Appendices section of this report. A summary as taken from the EDM Report is Attached in Table 1.

Data processing of federal and state database files is primarily done utilizing point-geocoding (latitude and longitude) methodology of environmental sites that fall within the commensurate ASTM Standard E 1527-05 MSD search parameter. Some data processing of federal and state database files is also done utilizing unique geographic criteria (zip codes, county, etc.). This methodology is less precise than the point-geocoding methodology. As a result, due to poor or inadequate address information, several environmental sites that fall within the subject site zip code or county are listed as “Unmapped Sites” if the point-geocoding data processing method could not be utilized. Review of the Unmapped Sites List within the EDM Site Assessment Report revealed 2 “Unmapped Sites”. Please note, ASTM Standard E 1527-05 states the “user” or “environmental professional” are not obligated to identify mistakes or insufficiencies in information provided to them. AEI does attempt to identify environmentally sensitive property uses, which may have a significant potential to impair the subject property. The subject property was not located as one of the “Unmapped Sites”.

3.1 Environmental Lien Search

AEI reviewed the FDEP Institutional Controls Registry for the requisite environmental lien search portion of the Phase I ESA. AEI relies upon data from the Federal, State and local government sources, which occasionally have been found to be either incorrect or incomplete. The FDEP Institutional Controls Registry includes results from a search of available land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

Neither EDM nor AEI can warranty the accuracy or reliability of the information included within the EDM database report, which AEI relied upon in developing opinions regarding environmental risk**.** A review of the FDEP Institutional Controls Registry revealed no deed restrictions and/or institutional/engineering controls were found on the subject property.

3.2 File Review

To facilitate compliance with ASTM E1527-05, file review was conducted of information supplied by the Client, found on the FDEP website (Oculus) and or gleaned from the attached database report.

Review of the database report revealed that numerous documented contaminated sites were identified within the search radii. Those that require further review are summarized below:

- The southwest adjoining property, identified as St. Augustine Airport Auth-AvGas Self, is a listed AST Site. Two 10,000-gallon aviation gas ASTs were reportedly installed in 2002/2007 and remain active. No violations or discharges were reported for the site. No additional information was available in the database report or the FDEP OCULUS database system.
- A south vicinity property, identified as Plane Crash Site, is a listed LUST Site. A plane crash on a residential property that occurred in December of 1988 triggered an emergency response (excavation of impacted soils). Additional assessment documentation (PCAP) found in OCULUS addressed remaining impacts. The assessment appears to have confirmed the successful remediation of the site during the emergency response as the status is listed as completed.
- A west vicinity property, St. Augustine-St. Johns County Airport is a listed LUST Site (Map ID #3 and #4). A discharge date of 2/2/1989 was reported. Review of the OCULUS documentation revealed plume maps that confirm the extents of the plumes (not a threat to the subject property). The discharge appears to have received a NFA/SRCR in January of 2006.
- A west vicinity property, St. Augustine Airport is a listed CERCLIS Site (Map ID #4 and located near the above documented UST discharge site). Review of the database report revealed that assessment in 1996/1997 did not result in a NPL listing and No Further Remedial Action Planned (NFRAP).

Review of the additional listed sites revealed all were of sufficient distance, remedial status and/or topographic direction to not require further review. Significant review items for each site listed are attached in Appendix H.

3.3 Standard Physical Setting Sources

The standard physical setting sources reviewed for which the subject property is located, are outlined as follows:

Review of Current USGS 7.5 Minute Topographic Map

A current USGS 7.5 Minute Topographic Map is the only Standard Physical Setting source required for ASTM Standard E 1527-05. Review of the St. Augustine, Fl Quadrangle-USGS Digital Raster Graphic provided by EDM depicts the subject property as being situated northeast of the eastern extent of Estrella Avenue and south of the current southernmost extent of the existing runway, within a primarily commercial/residential area of St. Augustine, St. Johns County, Florida. No specific environmentally sensitive businesses or conditions were noted within the immediate vicinity of the subject property.

The subject property appears to be located at an elevation of +/-5 feet National Geodetic Vertical Datum (NGVD) 1929. A copy of the Current USGS Topographic Map is attached as Figure 2.

Review of Current NRCS Soil Survey Maps

Review of the current NRCS Soil Survey Map of St. Johns County (USDA Soil Survey), Florida, depicts the subject property as lying within an area comprised primarily of St. Augustine-Urban land complex (51) and Pellicer silty clay loam, frequently flooded (24).

St. Augustine-Urban land complex (51) has a drainage characteristic described as somewhat poorly drained. This soil type is located in nearly level urban developed areas near the ICW and tidal marshes from which the materials were dredged. These areas have slopes ranging from 0 to 2 percent.

Pellicer silty clay loam, frequently flooded (24) has a drainage characteristic described as very poorly drained. This soil type is located in nearly level low tidal marshes along stream estuaries. These areas have slopes of less than 1 percent.

A copy of the current NRCS Soil Survey Map is attached as Figure 3.

3.4 Standard Historical Use Information Sources

Information obtained from the subject property inspection and vicinity reconnaissance conducted during our Phase I ESA historical information search indicated that the subject property was historically utilized as follows:

The site primarily appears to have been historically undeveloped from at least 1942 to the present with the exception of portions of a taxiway visible from at least 1971 to the present.

The standard historical use information sources reviewed for the subject property are outlined in the following sections.

Aerial Photographs

The aerial photographs obtained from Environmental Data Management, Inc. were reviewed to gain information concerning past or present development on and in the vicinity of the subject property. The 2008 (tax map), 2005, 1993, 1980, 1971, 1960, 1952 and 1942 historic aerial photographs were available for this area of St. Johns County, Florida. The subject property appears to have been undeveloped from at least 1942 to at least 1960. The current runway/taxiway structures that are partially contained within the proposed subject property boundaries are visible in 1971 to the present. A review of the attached aerial photographs for the area identified no specific environmentally sensitive businesses located on or near the subject property.

Fire Insurance Maps

Fire Insurance Maps are normally reviewed to critique historical property usage of the subject property and adjoining properties. Inquiry revealed that fire insurance maps were not available for this portion of St. Johns County, Florida. The fire insurance map inquiry is attached as Appendix D.

Polk’s City Directories

AEI representatives reviewed the available Polk’s City Directories or other available directories obtained from the St. Johns County Public Libraries (St. Augustine/Southeast Regional branches) to obtain information about previous occupants of the subject property and adjoining properties. These directories are normally reviewed at five (5) year intervals to attempt to identify past occupants of the subject property and adjoining properties whose names could suggest activities typically associated with the use, generation, storage, treatment, or disposal of hazardous materials. The historical city directory data listed in the research source is reported for the subject property and vicinity properties within ⅛ mile of the subject property. A copy of the City Directories Inquiry is included in the appendices. U.S. Highway 1 was researched surrounding the parent parcel address of 4796. The subject property is not specifically identified in the city directories as it has no corresponding physical address. The parent parcel and nearby property listings identified the following environmentally sensitive businesses:

- Numerous aviation businesses were identified at 4900 U.S. Highway 1. These businesses are located approximately ½-mile from the subject site.

- Northrop Grumman Integrated (aircraft modifications) is listed at 5000 U.S. Highway 1. This business is located at > ½-mile from the site (deed restricted site – impacts do not extend beyond the property boundaries).

Property Assessor's Office Records
AEI reviewed the property information for the subject property at the St. Johns County Property Appraiser's Office for information on past uses of the subject property. The results of the inquiry were as follows: St. Augustine-St. Johns County Airport Authority owns the subject property. The subject property covers an area of approximately 4.25+/- acres. The subject property is currently undeveloped with the exception of portions of the existing runway/taxiway structures.

4.0 INFORMATION DERIVED FROM SITE/VICINITY RECONNAISSANCE & INTERVIEWS

The methodology used by AEI's representative during the subject property and vicinity reconnaissance consisted of a walkover of the subject property and adjoining properties. In addition, a vehicular reconnaissance of the surrounding vicinity and interviews of parties with knowledge information were performed. Details of the subject property and vicinity reconnaissance are summarized in the following sections. Photographs of the subject property and vicinity reconnaissance are included in the Appendices.

4.1 Subject Property & Vicinity Reconnaissance

The purpose of a subject property and vicinity reconnaissance is to visually or physically observe the existing subject property and vicinity conditions with respect to indicators of materials, which may have the potential to adversely affect the subject property. These indicators typically include the presence of 55-gallon drums, chemical containers, waste disposal areas, electrical transformers that may contain Polychlorinated Biphenyls (PCBs), and discolored surficial soils. Information obtained and observations noted during the subject property and vicinity reconnaissance with respect for the aforementioned items are summarized below. A physical description of the subject property was previously discussed.

✓ The inspector conducted a survey for the presence of PCBs or PCB containing equipment limited to a visual inspection for the presence of transformers, capacitors, and hydraulic equipment. PCBs were widely used in such equipment until 1979 when EPA banned such use. Many utilities have since acted to replace PCB containing transformers and capacitors with other substances. No PCB containing transformers were noted on the subject property.

✓ Reconnaissance of the subject property did not reveal visually and physically observed indications of storage, non-natural solid waste disposal (land filling activity), pits, ponds, lagoons, stressed vegetation, stained soil or pavement, unidentified substance containers, USTs and/or ASTs on the property.

✓ Reconnaissance of the adjoining properties did not reveal visually and physically observed indications of storage, use or disposal of hazardous substances or petroleum products, stained soil or pavement, unidentified substance containers, ASTs, non-natural solid waste disposal (land filling activity), pits, ponds, lagoons, stressed vegetation, septic systems, or USTs except for the following:

- The southwest adjoining airport property is an active aviation gasoline fueling station. Two 10,000-gallon ASTs were noted.

✓ Reconnaissance of the immediate vicinity properties did not reveal visually and/or physically observed indications of storage, use or disposal of significant quantities of hazardous substances or petroleum products.

4.2 Interviews with Knowledgeable Parties

AEI interviewed a representative of the current owner of the subject property (Mr. J. Bryan Cooper, Assistant Airport Manager). Mr. Cooper stated that the site was historically salt marsh that was filled to create land for the previous airport runway extensions. Mr. Cooper was not aware of any spills, emergency responses or other events ever existing on the property nor was he aware of any environmental concerns in relation to the subject property (specifically from neither the off-site airport cleanup sites nor the Northrup Grumman site).

5.0 DATA GAPS DISCUSSION

AEI has performed a Phase I ESA historic data collection in conformance within the scope and limitations of ASTM Standard E 1527-05 of the subject property. The all appropriate inquiries rule requires that the environmental professional: (1) identify data gaps that remain after the conduct of all required activities; (2) identify the sources of information consulted to address such data gaps; and (3) comment upon the significance of such data gaps with regard to his or her ability to identify conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to the property. During completion of the data gathering, gaps in the historic data can occur which can lead to increased environmental liability and risk. As such, AEI has provided a summary table to represent the data gaps (Table 2 – attached) and a discussion on environmental risk associated with these gaps (below):

Our assessment has revealed no excessive data gaps that would result in elevated risk. It is our opinion that the data collected adequately covers the historical usage of the subject property as follows:

The site primarily appears to have been historically undeveloped from at least 1942 to the present with the exception of portions of a taxiway visible from at least 1971 to the present.

6.0 FINDINGS AND CONCLUSIONS

AEI has performed a Phase I ESA in conformance within the scope and limitations of ASTM Standard E 1527-05 of the subject property. This assessment has revealed the following:

1. **On-Site Current Recognized Environmental Conditions** – No on-site recognized environmental conditions were found to exist on the subject property.

2. **Off-Site Current Recognized Environmental Conditions** – The following off-site recognized environmental conditions were found to exist in the vicinity of the subject property:

- The southwest adjoining property, identified as St. Augustine Airport Auth-AvGas Self, is a listed AST Site. Two 10,000-gallon aviation gas ASTs were reportedly installed in 2002/2007 and remain active. No violations or discharges were reported for the site. No additional information was available in the database report or the FDEP OCULUS database system.
- A south vicinity property, identified as Plane Crash Site, is a listed LUST Site. A plane crash on a residential property that occurred in December of 1988 triggered an emergency response (excavation of impacted soils). Additional assessment documentation (PCAP) found in OCULUS addressed remaining impacts. The assessment appears to have confirmed the successful remediation of the site during the emergency response as the status is listed as completed.
- A west vicinity property, St. Augustine-St. Johns County Airport is a listed LUST Site (Map ID #3 and #4). A discharge date of 2/2/1989 was reported. Review of the OCULUS documentation revealed plume maps that confirm the extents of the plumes (not a threat to the subject property). The discharge appears to have received a NFA/SRCR in January of 2006.

- A west vicinity property, St. Augustine Airport is a listed CERCLIS Site (Map ID #4 and located near the above documented UST discharge site). Review of the database report revealed that assessment in 1996/1997 did not result in a NPL listing and No Further Remedial Action Planned (NFRAP).
- Numerous aviation businesses were identified at 4900 U.S. Highway 1. These businesses are located approximately ½-mile from the subject site.
- Northrop Grumman Integrated (aircraft modifications) is listed at 5000 U.S. Highway 1. This business is located at > ½-mile from the site (deed restricted site – impacts do not extend beyond the property boundaries).

7.0 RECOMMENDATIONS

The all appropriate inquiries regulation requires that the prospective property owner and environmental professional take into account information collected during the inquiries in considering the degree of obviousness of the presence or likely presence of hazardous substances on, at, in, or to the subject property. They should also take into account the information collected during the inquiries in considering the ability to detect contamination by appropriate investigation. The all appropriate inquiries rule, however, requires that the environmental professional also provide in the written report an opinion regarding additional appropriate investigation that may be necessary, if any. The opinion could include activities or considerations outside the scope of the all appropriate inquiries investigation that might help the prospective property owner to more fully characterize environmental conditions on the property.

Based on our findings and the off-site recognized environmental concerns identified (due to type, distance, direction to, remedial status and file review) these concerns pose a low threat to the subject property. Therefore, additional assessment does not appear warranted for the off-site concerns.

8.0 SIGNATURES & QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

Personnel involved in conducting the Phase I ESA for the subject property qualify as Environmental Professionals through educational backgrounds, specialized training, certifications, registrations, or affiliations and previous or current work experiences. The following individuals and their qualifications are listed below.

Respectfully submitted,
Access Environmental, Inc.

Eric Lane

Eric G. Lane
Environmental Manager

Earl R. Faust, P.G.
President-Principal Consultant

ATTACHMENTS

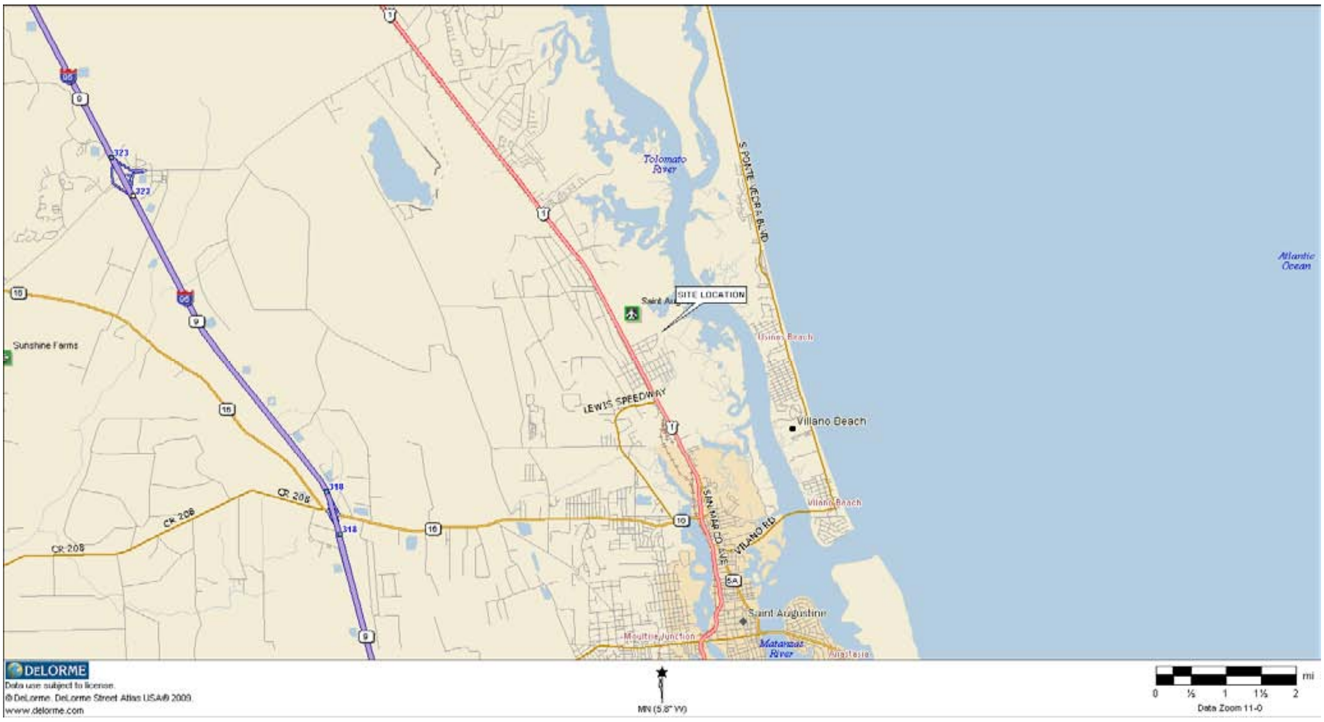
Figures

Tables

Appendices

FIGURES

AREA VICINITY MAP



LOCAL VICINITY MAP

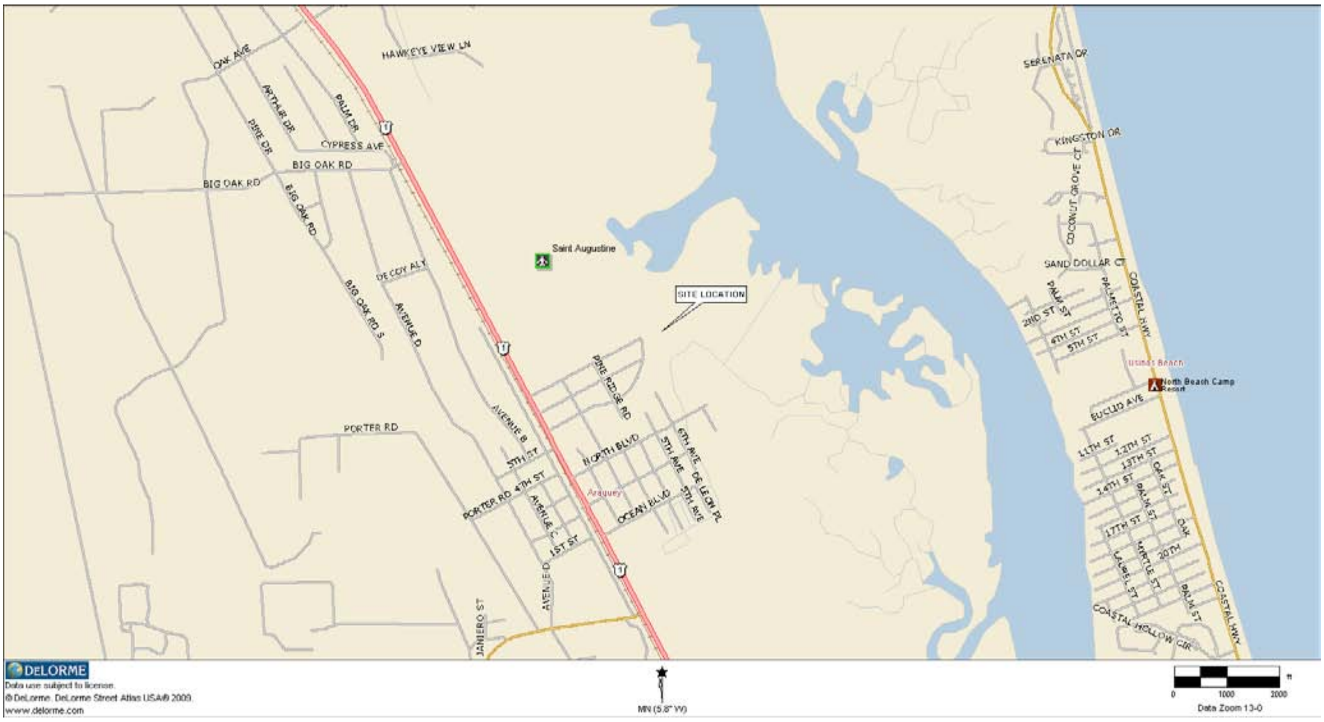


Figure 1
Site Location Map

St. Augustine Airport Taxiway C Relocation Site
St. Augustine, St. Johns County, Florida
AEI Project No. 09-1020-00
Source: DeLorrme Street AtlasUSA Version 2009

Access Environmental Incorporated

1039 Green Pine Circle
Orange Park, FL 32065

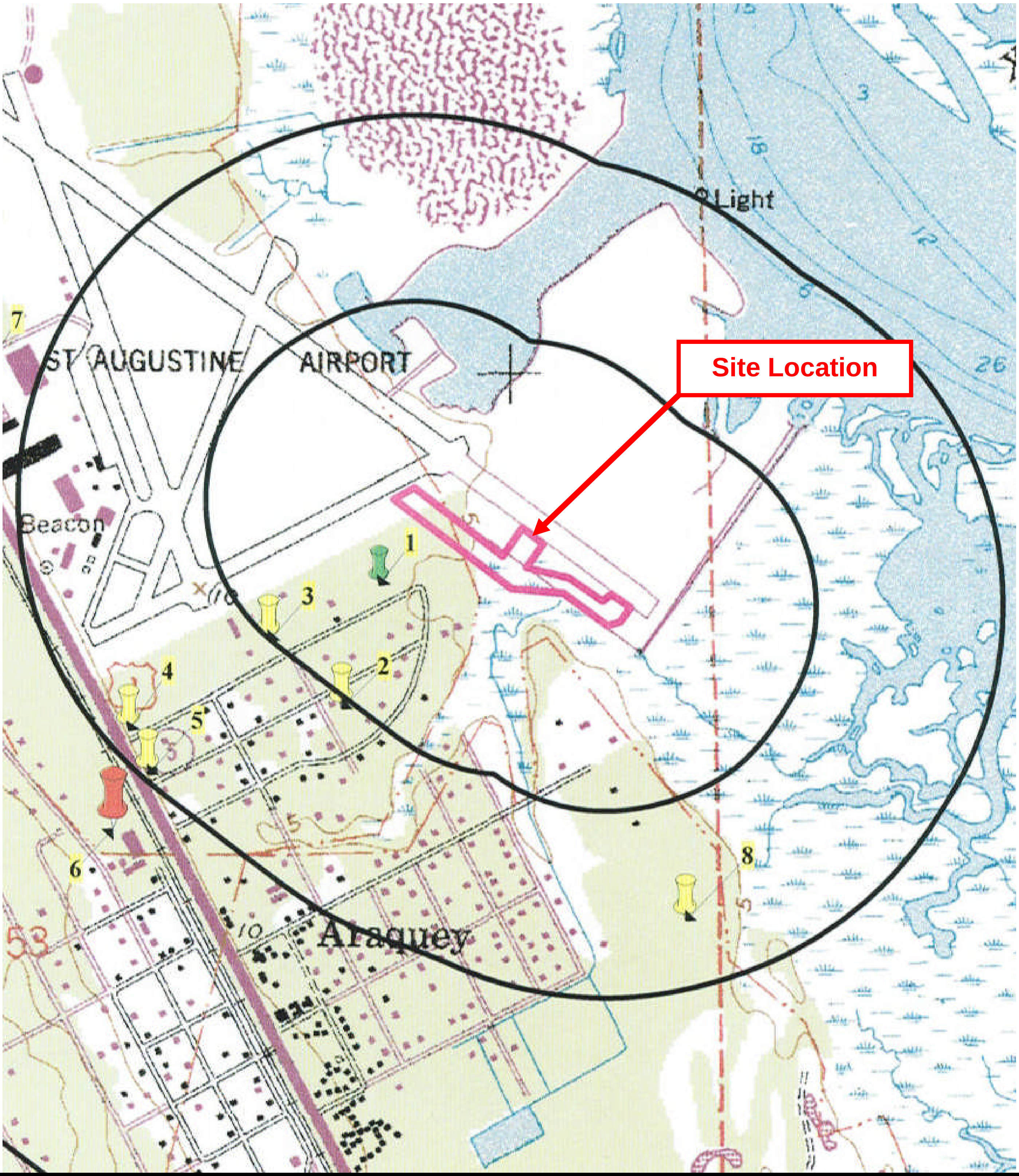


Figure 2
USGS Topographic Map

St. Augustine Airport Taxiway C Relocation Site
St. Augustine, St. Johns County, Florida
AEI Project No. 09-1020-00
Source USGS Digital Raster Graphic - EDM

Access
Environmental
Incorporated

1039 Green Pine Circle
Orange Park, FL 32065

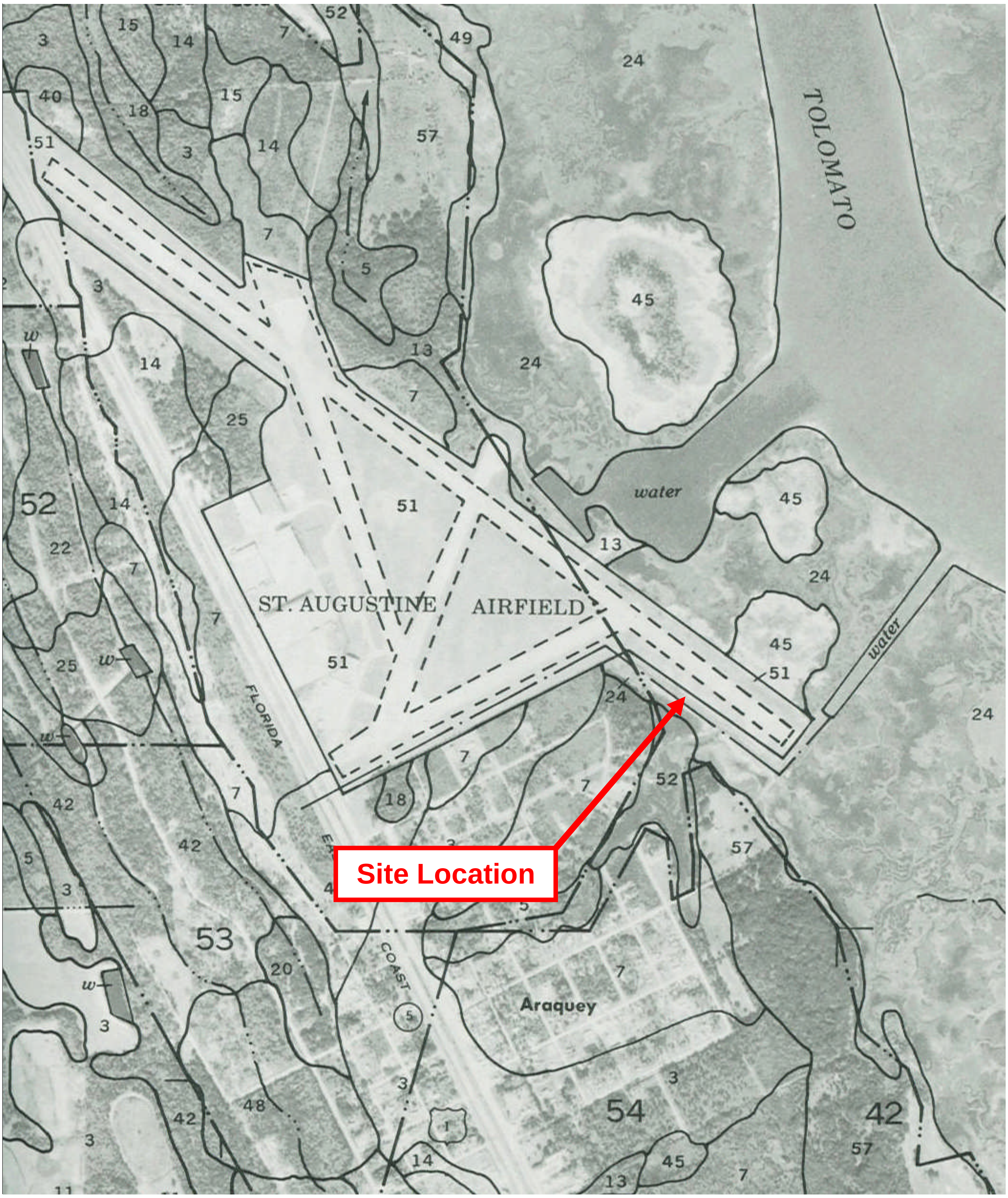


Figure 3
USDA Soil Survey

St. Augustine Airport Taxiway C Relocation Site
St. Augustine, St. Johns County, Florida
AEI Project No. 09-1020-00
Source: NRCS, St. Johns County

Access Environmental Incorporated

1039 Green Pine Circle
Orange Park, FL 32065

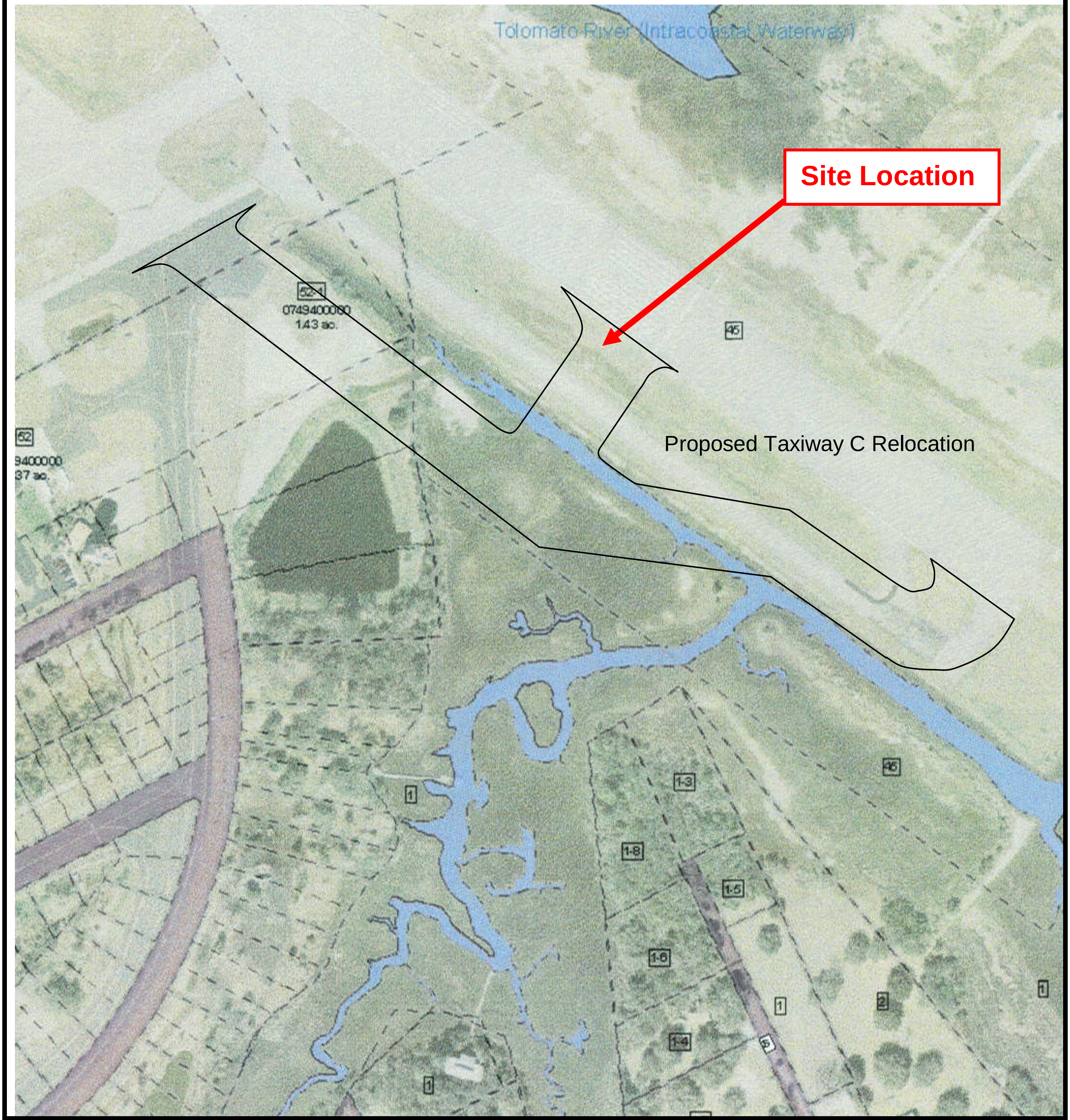


Figure 4
Tax Assessor's Map

St. Augustine Airport Taxiway C Relocation Site
St. Augustine, St. Johns County, Florida
AEI Project No. 09-1020-00
Source: St. Johns County Property Appraiser's Office - 2008

Access Environmental Incorporated

1039 Green Pine Circle
Orange Park, FL 32065

TABLES

Table 1 – EDR Database Search Summary

Table 2 – Data Gaps Summary

ENVIRONMENTAL DATA MANAGEMENT

Standard ASTM Research

Report Date: 5/28/2009

SUMMARY TABLE

MAPID#	FAC ID, NAME AND LOCATION	REGULATORY LISTS																		
		NPL	CERCLIS	NFRAP	ERNS	CORRACTS	TSD	NONTSD	TRIBLTANKS	TRIBLLUST	USBRWNFLDS	STNPL	STCERC	SLDWST	LUST	TANKS	BRWNFLDS	VOLCLNUP	INSTENG	DRY
1)	9804849 Dist/Dir: 0.2 W SAINT AUGUSTINE AIRPORT AUTH-AVGAS SE 374 ESTRELLA AVE SAINT AUGUSTINE, FL. 32095															X				
2)	9200496 Dist/Dir: 0.3 S PLANE CRASH SITE 313 ARAQUAY RD SAINT AUGUSTINE, FL.														X					
3)	8515846. Dist/Dir: 0.3 W ST AUGUSTINE ST JOHNS CNTY AIRPORT 270 ESTRELLA AVE SAINT AUGUSTINE, FL. 320956115														X					
4)	8515846 Dist/Dir: 0.6 W ST AUGUSTINE ST JOHNS CNTY AIRPORT 4900 US HWY N SAINT AUGUSTINE, FL. 320956115														X					
4)	FLD984177485 Dist/Dir: 0.6 W ST. AUGUSTINE AIRPORT US HWY 1/ N OF ESTRELLA AVE ST. AUGUSTINE, FL. 32084		X																	
5)	9400435 Dist/Dir: 0.6 S MCQUAIG PROPERTY 4778 HWY 1 N SAINT AUGUSTINE, FL. 32095														X					
6)	120 Dist/Dir: 0.6 S Washac Industries 4735 Ave. A St. Augustine, FL.											X								
7)	FLD046771952 Dist/Dir: 0.8 W NORTHROP GRUMMAN CORPORATION 5000 U.S. 1 NORTH ST. AUGUSTINE, FL. 32095					X	X													
8)	BF550601000 Dist/Dir: 0.5 SE St. Augustine Ponce de Leon ST AUGUSTINE, FL.																X			
8)	BF550601001 Dist/Dir: 0.5 SE Former Ponce de Leon Golf Course ST AUGUSTINE, FL.																	X		

For further information please contact us at 800-368-7376

TABLE 2
Data Gaps Summary

Research Source	1887 - 1904	1905 - 1909	1910 - 1914	1915 - 1919	1920 - 1924	1925 - 1929	1930 - 1934	1935 - 1939	1940 - 1944	1945 - 1949	1950 - 1954	1955 - 1959	1960 - 1964	1965 - 1969	1970 - 1974	1975 - 1979	1980 - 1984	1985 - 1989	1990 - 1994	1995 - 1999	2000 - 2004	2005 - 2009
Tax Map																						√
Tax Assessors Card																						√
EDM Database Search																						
Aerial Photographs									√		√		√		√		√		√			√
Fire Insurance Maps																						
City Directories															√	√	√	√	√	√	√	√
Topographic Maps																			√			
File Review																						
Owner/ Occupant Interviews															√	√	√	√	√	√	√	√
Lien Search																						√

Notes:

The site primarily appears to have been historically undeveloped from at least 1942 to the present with the exception of portions of a taxiway visible from at least 1971 to the present.

APPENDICES

Appendix A

Tax Assessor’s Card

Property Information

PIN:	074840 0000	**Tax District:**	450
Mailing Address:		**Neighborhood Code:**	2203.00
4796 US HIGHWAY 1 N SAINT AUGUSTINE, FL 32095-5706		**Use Code/Description:**	8600/COUNTY
		Sec-Town-Range:	50 - 6 - 29
Site Address:	4900 N US 1		
Total Land Value	$7,616,800.00	**Total Building Value**	$0.00
Total Extra Features	$0.00	**Total Market(Just) Value**	$7,616,800.00
Assessed Value	$7,616,800.00	**Taxable Value**	$0.00
Homestead Exempt	$0.00	**Property Map**	click here

Owner Name(s)
ST AUG-ST JOHNS CO AIRPORT AUTHORITY

Exemption(s)
03 County

Legal Description
45 SECS 24 25 50 & 51-6S-29E &
30-6S-30E PART OF SABATE GRANT
& MARSH LAND (EX 19.45AC IN
DB215/212, 14.16 AC IN
OR56/392, 0.013 AC OR207/702 &
& R/W OF US 1 IN DB210/324)
(EX PT TO AERO SPORT INC BY
LEASE DATED 7-24-78 & AMENDED
1-16-79 4-17-79 & 4-20-84) (EX
PT LEASED TO GRUMMAN AS ENGINE
RUNUP FACILITY)(EX PTS LEASED
TO GRUMMAN AS FENCED AIRCRAFT
PARKING & STORAGE PARCELS 1 A
B & C)
OR75/20 103/141 & 145 & 19/90

Property Information

PIN:	074940 0000	**Tax District:**	450
Mailing Address:		**Neighborhood Code:**	2203.50
4796 US HIGHWAY 1 N SAINT AUGUSTINE, FL 32095-5706		**Use Code/Description:**	9000/LEASEHOLD INTEREST
		Sec-Town-Range:	50 - 6 - 29
Site Address:	270 ESTRELLA AVE		
Total Land Value	$2,456,948.00	**Total Building Value**	$5,026,637.00
Total Extra Features	$600,598.00	**Total Market(Just) Value**	$8,084,183.00
Assessed Value	$8,084,183.00	**Taxable Value**	$0.00
Homestead Exempt	$0.00	**Property Map**	click here

Owner Name(s)

ST AUG-ST JOHNS CO AIRPORT AUTHORITY

Exemption(s)

03 County

Legal Description

48 49 50 51 52 52-1 52-2 & 52-3 PTS
OF SABATE GRANT BOUNDED ON N
BY AIRPORT ON W BY US#1 ON S
PT'LY BY ESTRELLA AVE & ON E
BY MARSH INCL PTS OF ARAQUAY
PK UT 2 LOTS 28 29 & 30 BLK C
& ALL BLKS J K L M N O & P IN
MB3/145 & PTS OF VACATED STS
LOUISIANA PL IN DB165/445 CASA
COLA WAY IN OR548/473 ESPANOLA
AVE IN OR596/898 & OTONO AVE &
INDIAN BEND IN OR432/762 & INCL
PTS OF ARAQUAY PARK UTS 1 & 2
LOTS & STS LYING N OF CASA COLA WAY
VACATED BY SJC RES 2005-377 IN
OR2603/547
OR172/147 172/155 225/908 232/267
236/835 237/316 238/125 253/109
266/106 288/49 378/239 431/233
525/447 568/501 697/1092 900/356 &
1030/1222 (ORDER OF TAKING) &
2378/1636 (ORDER OF TAKING)
2139/1796 1300/1 1629/374 & 377
1650/949 1351/671 1392/358 2140/1481
1569/1242 1400/1499 2126/711
2405/1496 1300/871 1304/1574
2378/1572(ORDER OF TAKING) &
1471/533 2423/329(ORDER OF TAKING)
1933/1441 906/1258 1378/1951
1377/636 1480/128 811/824 1464/5
916/654 1224/1163 DB204/439(SJC DITCH)
1629/302 2126/709 1658/689 1378/998
2143/647 1338/43 844/1812 801/799
1620/881 1525/1800 2140/1479
1192/1352 1503/476 1471/542
1530/639 1589/349 2139/1794
1472/241 1373/970 697/1092
1472/239 1547/1008 687/1162
1504/214 716/1991 761/1993
949/1133 837/978 1380/929
1054/461 1054/462 809/413
779/1596 1155/1260 1320/913

Appendix B

EDR Site Assessment Report

ENVIRONMENTAL DATA REPORT

Standard ASTM Research

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

Prepared For:

Access Environmental, Inc.
1039 Green Pines Circle
Orange Park, FL 32065

Prepared By:

ENVIRONMENTAL DATA MANAGEMENT, INC.
2840 West Bay Drive, Suite 208
Largo, Florida 33770

May 28, 2009

EDM

Environmental Data Management, Inc.
2840 West Bay Drive, Suite 208
Largo, Florida 33770
Tel. (727) 586-1700 Fax (727) 585-1701
http://www.edm-net.com

May 28, 2009

Eric Lane
Access Environmental, Inc.
1039 Green Pines Circle
Orange Park, FL 32065

Subject: **Standard ASTM Research - EDM Project #20195**

Dear Mr. Lane

Thank you for using Environmental Data Management, Inc. The following report provides the results of our environmental data research that you requested for the following location:

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

The following is a summary of the components contained within this report:

- **Executive Summary** –lists the databases that were searched for this report, the search distance criteria and the number of sites identified for each database.
- **Map of Study Area**– street map showing the location of the Subject Property and any regulatory listed sites identified within the search criteria (*a non-mapped option is available).*
- **Site Summary Table** –displays corresponding sites' Map ID numbers, Permit or Registration numbers, Name/Address and the Government Database(s) on which the site was listed.
- **Detail Reports** – data detail for each record identified.
- **Proximal Records Table** – a listing of potentially relevant sites identified just beyond the search criteria.
- **Non-Mapped Records Table -** lists those government records that do not contain sufficient address information to plot within our GIS system, but may still exist within your study area.
- **Agency List Descriptions –** defines the regulatory databases included in this report along with the dates that each database was last updated by the respective agency and EDM.
- **Physical Setting** – includes USGS Contour or Topographic map and a map of statewide American Indian Lands. Recent Aerial Photo, FEMA Flood Map and NWI Wetland Map included with Comprehensive Report. Water Well locations and detail well reports are included where this information is available.

At EDM we take great pride in our work, and continually strive to provide you with the most accurate and thorough research service available. We accomplish this by manually screening and researching your study area to identify and accurately locate any sites of environmental concern. This manual effort may add more time and effort to your report preparation, but we think a more thorough and accurate result is worth it.

Thank you again for selecting EDM as your data research provider. Should you have any questions regarding this report or our service, please feel free to contact us. We appreciate the opportunity to be of service to you and look forward to working with you in the future.

ENVIRONMENTAL DATA MANAGEMENT, INC.

Report Date: 5/28/2009

Executive Summary

Client Information	Project Information
Access Environmental, Inc. 1039 Green Pines Circle Orange Park FL 32065 Client Job No: 09-1020-00 Client P.O. No:	Standard ASTM Research Runway Relocation Extents Portions of Parcel IDs: 074840 0000 & 074940 0000 St Augustine, Florida 32095 EDM Job No# 20195

The following table displays the databases that were included in the research provided, the respective search distance for each database, and the number of records identified for each database. The absence of records in this table and the Site Summary Table indicates that no sites were found within the specified research area.

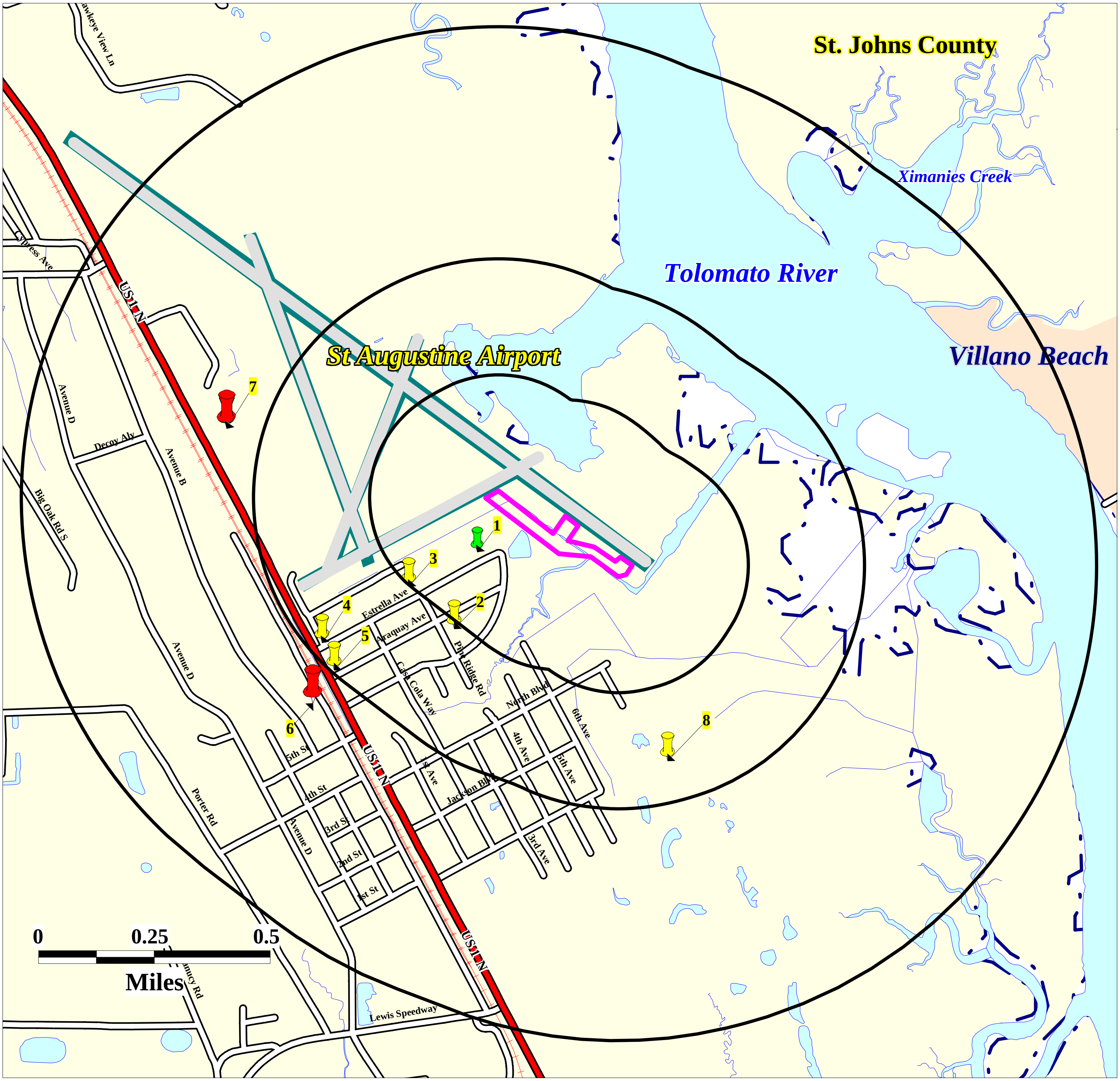
	Search Radius (Miles)	From 0 - .13 mi	From .13 - .25 mi	From .26 - .5 mi	From .51 - 1.0 mi	Greater than 1 Mile	Totals
EPA DATABASES							
National Priorities List(NPL)	1.00	0	0	0	0	N/A	**0**
Comprehensive Env Response, Compensation & Liability Information System List(CERCLIS)	0.50	0	0	0	1	N/A	**1**
Archived Cerclis Sites(NFRAP)	0.50	0	0	0	N/A	N/A	**0**
Emergency Response Notification System List(ERNS)	0.25	0	0	N/A	N/A	N/A	**0**
RCRIS Handlers with Corrective Action(CORRACTS)	1.00	0	0	0	1	N/A	**1**
RCRA-Treatment, Storage and/or Disposal Sites(TSD)	1.00	0	0	0	1	N/A	**1**
RCRA-LQG,SQG,CESQG and Transporters(NONTSD)	0.25	0	0	N/A	N/A	N/A	**0**
Tribal Tanks List(TRIBLTANKS)	0.25	0	0	N/A	N/A	N/A	**0**
Tribal Lust List(TRIBLLUST)	0.50	0	0	0	N/A	N/A	**0**
Brownfields Management System(USBRWNFLDS)	0.50	0	0	0	N/A	N/A	**0**
FDEP DATABASES							
State NPL Equivalent(STNPL)	1.00	0	0	0	1	N/A	**1**
State CERCLIS Equivalent(STCERC)	0.50	0	0	0	N/A	N/A	**0**
Solid Waste Facilities List(SLDWST)	0.50	0	0	0	N/A	N/A	**0**
Leaking Underground Storage Tanks List(LUST)	0.50	0	0	2	2	N/A	**4**
Underground/Aboveground Storage Tanks(TANKS)	0.25	0	1	N/A	N/A	N/A	**1**
State Designated Brownfields(BRWNFLDS)	0.50	0	0	0	1	N/A	**1**
State Voluntary Cleanup List(VOLCLNUP)	0.50	0	0	0	1	N/A	**1**
State Institutional and/or Engineering Controls(INSTENG)	0.25	0	0	N/A	N/A	N/A	**0**
State Dry Cleaners List(DRY)	0.50	0	0	0	N/A	N/A	**0**

***** Disclaimer *****

Please understand that the regulatory databases we utilize were not originally intended for our use, but rather for the source agency's internal tracking of sites for which they have jurisdiction or other interest. As a result of this difference in intended use, their data is frequently found to be incomplete or inaccurate, and is less than ideal for our use. Additionally, limitations exist in mapping data detail and accuracy. Our report is not to be relied upon for any purpose other than to "point" at approximate locations where further evaluation may be warranted. No conclusion can be based solely upon our report. Rather, our report should be used in conjunction with other relevant information to direct your attention at potential problem areas; which should be followed up by site inspections, interviews with relevant personnel and regulatory file review. Readers proceed at their own risk in relying upon this data, in whole or in part, for use within any evaluation. The EDM Service Request Form contains more detailed language with regard to such limitations, the terms of which the reader must accept in their entirety before utilizing this report. If the signed contract is not available to the reader, EDM will gladly furnish a copy upon request. Requests via email authorization are construed to be in accordance with these terms.

EDM

Standard ASTM Research
Street Map



Source: 2006 US Census Bureau TIGER Files

Map Scale and Site Locations are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

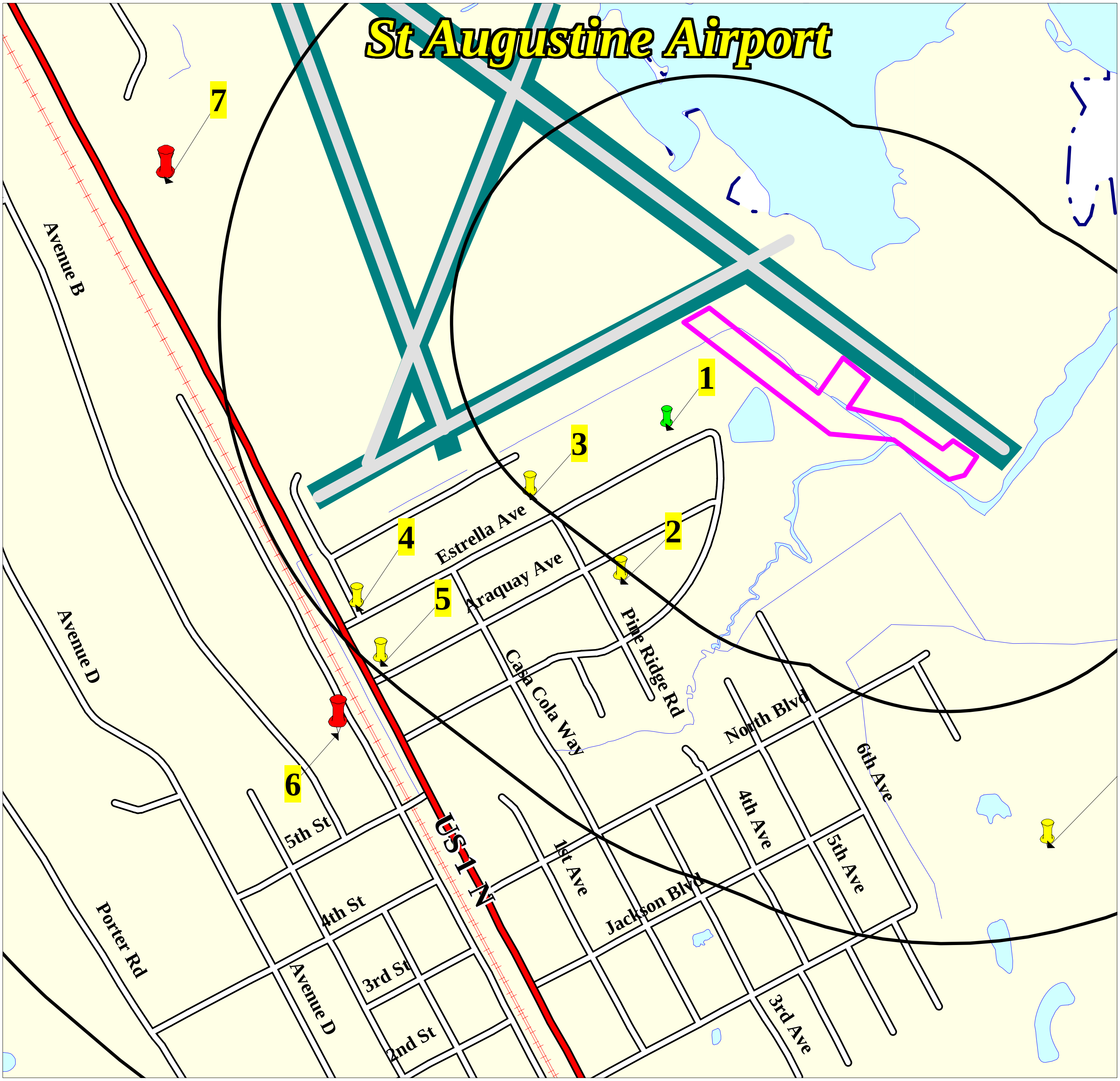
Approximate Site Boundary

NPL, CORRACTS, TSD & STNPL sites - 1 Mile Radius

CERCLIS, STCERC, NFRAP, SLDWST, LUST, BRWNFLDS, VOLCLNUP & DRY sites - 1/2 Mile Radius

ERNS, NONTSD,TANKS & INSTENG sites - 1/4 Mile Radius

Standard ASTM Research Street Map



Source: 2006 US Census Bureau TIGER Files

Map Scale and Site Locations are Approximate

Subject Property

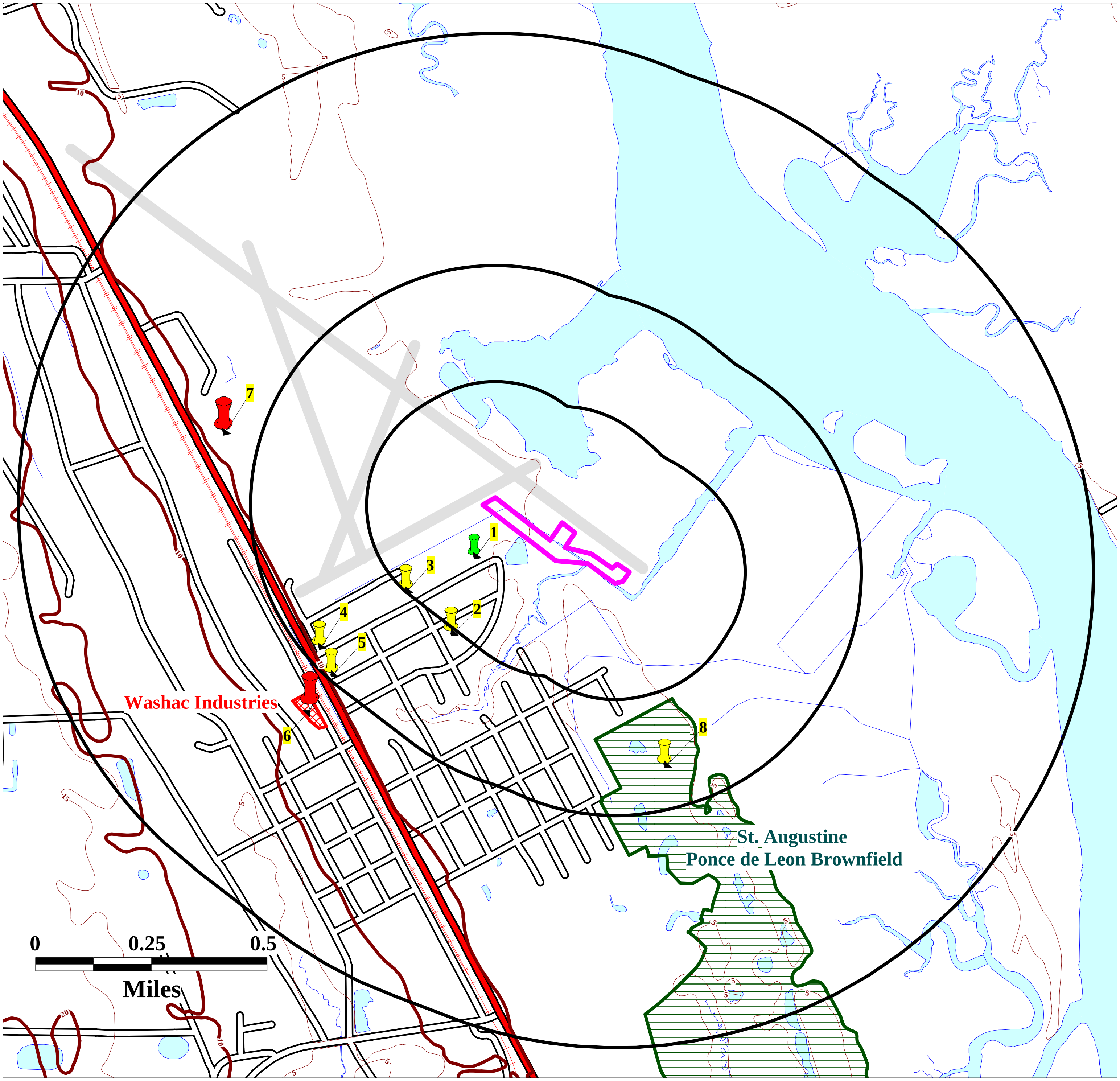
Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

▬	**Approximate Site Boundary**
🟥	**NPL, CORRACTS, TSD & STNPL sites - 1 Mile Radius**
🟨	**CERCLIS, STCERC, NFRAP, SLDWST, LUST, BRWNFLDS, VOLCLNUP & DRY sites - 1/2 Mile Radius**
🟩	**ERNS, NONTSD,TANKS & INSTENG sites - 1/4 Mile Radius**

EDM

Standard ASTM Research
Brownfields & Contaminated Areas Map



Source: 2006 US Census Bureau TIGER Files, 1997 USGS/Water Mgt District Elevation Contours, 2008 FDEP Brownfield Areas, 2008 FDEP State Cleanup Sites, 2007 USEPA NPL Sites, 1994 FDEP GW Delination Program

Map Scale and Site Locations are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

🟩	**State Brownfield Areas**
🟥	**NPL & STNPL Sites**
▨	**FDEP Delineated GW Contamination**
—	**Approximate Site Boundary**
📍	**NPL, STNPL, CORRACTS & TSD sites - 1 Mile Radius**
📍	**CERCLIS, STCERC, NFRAP, SLDWST, LUST, BRWNFLDS, VOLCLNUP & DRYsites - 1/2 Mile Radius**
📍	**ERNS, NONTSD, TANKS & INSTENG sites - 1/4 Mile Radius**

ENVIRONMENTAL DATA MANAGEMENT

Standard ASTM Research

Report Date: 5/28/2009

SUMMARY TABLE

		REGULATORY LISTS																		
MAPID#	**FAC ID, NAME AND LOCATION**	NPL	CERCLIS	NFRAP	ERNS	CORRACTS	TSD	NONTSD	TRIBLTANKS	TRIBLLUST	USBRWNFLDS	STNPL	STCERC	SLDWST	LUST	TANKS	BRWNFLDS	VOLCLNUP	INSTENG	DRY
1)	9804849 Dist/Dir: 0.2 W SAINT AUGUSTINE AIRPORT AUTH-AVGAS SE 374 ESTRELLA AVE SAINT AUGUSTINE, FL. 32095															X				
2)	9200496 Dist/Dir: 0.3 S PLANE CRASH SITE 313 ARAQUAY RD SAINT AUGUSTINE, FL.														X					
3)	8515846. Dist/Dir: 0.3 W ST AUGUSTINE ST JOHNS CNTY AIRPORT 270 ESTRELLA AVE SAINT AUGUSTINE, FL. 320956115														X					
4)	8515846 Dist/Dir: 0.6 W ST AUGUSTINE ST JOHNS CNTY AIRPORT 4900 US HWY N SAINT AUGUSTINE, FL. 320956115														X					
4)	FLD984177485 Dist/Dir: 0.6 W ST. AUGUSTINE AIRPORT US HWY 1/ N OF ESTRELLA AVE ST. AUGUSTINE, FL. 32084		X																	
5)	9400435 Dist/Dir: 0.6 S MCQUAIG PROPERTY 4778 HWY 1 N SAINT AUGUSTINE, FL. 32095														X					
6)	120 Dist/Dir: 0.6 S Washac Industries 4735 Ave. A St. Augustine, FL.											X								
7)	FLD046771952 Dist/Dir: 0.8 W NORTHROP GRUMMAN CORPORATION 5000 U.S. 1 NORTH ST. AUGUSTINE, FL. 32095					X	X													
8)	BF550601000 Dist/Dir: 0.5 SE St. Augustine Ponce de Leon ST AUGUSTINE, FL.																X			
8)	BF550601001 Dist/Dir: 0.5 SE Former Ponce de Leon Golf Course ST AUGUSTINE, FL.																	X		

EDM

FDEP STORAGE TANKS REPORT

(TANKS)

Report Date: 5/28/2009

FACILITY ID NUMBER, NAME AND LOCATION:

9804849
SAINT AUGUSTINE AIRPORT AUTH-AVGAS SELF FUEL FAC
374 ESTRELLA AVE

SAINT AUGUSTINE, FL 32095

OWNERSHIP INFORMATION:

ST JOHNS CNTY AIRPORT AUTH
4796 US HWY 1 N ATT: EDWARD R W
SAINT AUGUSTINE, FL 32095
CONTACT TEL #: (904) 209-0090

CONTACT: EDWARD R WUELLNER
FACILTY TEL #: (904) 209-0090

MAP ID NUMBER: 1
Dist (Miles): 0.18
Direction: W

TANKS

COUNTY ID: 55 **FAC TYPE:** County Government **FAC STATUS:** OPEN

TANK #:	**TANK VOL(GALS):**	**INST.DATE:**	**TANK CONTENTS:**	**TANK POSITION:**	**TANK STATUS (as of...):**
1	10000	01-May-2002	Aviation Gas	ABOVEGROUND	IN SERVICE 01-May-2002

** **CONSTR TYPE:** BCIMNP **PIPING TYPE:** **LEAK MONIT TYPE:** HQR

TANK #:	**TANK VOL(GALS):**	**INST.DATE:**	**TANK CONTENTS:**	**TANK POSITION:**	**TANK STATUS (as of...):**
2	10000	01-Jan-2007	Aviation Gas	ABOVEGROUND	IN SERVICE 01-Jan-2007

** **CONSTR TYPE:** I **PIPING TYPE:** ABDF **LEAK MONIT TYPE:** DFQ

See "Agency List Descriptions" Ssection for Code Definitions

EDM

FDEP LEAKING UNDERGROUND STORAGE TANKS

Report Date: 5/28/2009

(LUST)

FACILITY ID NUMBER, NAME AND LOCATION:

9200496
PLANE CRASH SITE
313 ARAQUAY RD
SAINT AUGUSTINE, FL -

OWNERSHIP INFORMATION:

PROPERTY OWNER
PHOENIX AVIATION MANAGERS INC
PO BOX 723897
ATLANTA, GA 30339-
(000) 000-0000

MAP ID NUMBER: 2

Dist (Miles): 0.30
Direction: SW

L U S T

COUNTY CODE: 55
FACILITY STATUS: CLOSED
FACILITY TYPE: X - Contamination Site -

FAC OPERATOR: TIM BAHR
FAC TEL #:

SCORE **SCORE EFF DATE:** **RANK:** **SCORE WHEN RANKED:**

DISCHARGE INFORMATION

Mapid: 2

DISCHARGE DATE: 12/18/1988

INSPECTION DATE:
LEAD AGENCY:
TANK OFF: -
CLEANUP REQUIRED: N - NO CLEANUP REQUIRED
CLEANUP WORK STATUS: COMPLETED
INFO SOURCE: R - EMERGENCY RESPONSE REPORT
DISCH CLNUP STATUS: 5/29/2001 NREQ - CLEANUP NOT REQUIRED

CONTAMINATED MEDIA?: **SOIL:** Y **SUR WATER:** N **GR WATER:** N **MON WELL:** N **# DW WELLS CONTAMINATED:** 0

POLLUTANT TYPE/ESTIMATED GALLONS (IF REPORTED):

POLLUTANT	GALLONS	OTHER
E - AVIATION GAS		

CLEANUP INFORMATION

(for specific discharge noted above)

Mapid: 2

CLNUP PROG:

APPL RCVD:
ELIG STATUS: INELIGIBLE
ELIG STATUS DATE:
ELIG REDETERMINED?:

SITE ASSESSMENT

CLNP RESP: RP - RESPONSIBLE PARTY
FUND ELLIG: -
ACTUAL COMPLETION DATE:
PAYMENT DATE:
ACTUAL COST:

REMEDIAL ACTION PLAN

CLEANUP RESP: -
FUND ELLIG: -
ORDER COMPL DATE:
ACTUAL COMPL DATE:
PAYMENT DATE:
ACTUAL COST:

REMEDIAL ACTION

CLEANUP RESP: -
FUND ELLIG: -
ACTUAL COST:
YEARS TO COMPL:

SITE REHABILITATION COMPLETION REPORT

ACTION TYPE: -
SUBMIT DATE:
REVIEW DATE:
ISSUE DATE:
COMPL STATUS: -
COMPL STATUS DT:
COMMENTS:

SOURCE REMOVAL

CLEANUP RESP: RP - RESPONSIBLE PARTY
FUND ELLIG: -
ACTUAL COMPLETION DATE:
FREE PRODUCT REMOVAL?(Y/N):
SOIL REMOVAL? (Y/N): Y
SOIL TONNAGE REMOVED:
SOIL TREATMENT?(Y/N):
OTHER TREATMENT?:
ALT PROC STATUS:
ALT PROC STATUS DT:

FDEP LEAKING UNDERGROUND STORAGE TANKS

Report Date: 5/28/2009

(LUST)

LUST Page 1 of 1

FACILITY ID NUMBER, NAME AND LOCATION:

8515846. **--HISTORICAL ENTRY--**
ST AUGUSTINE ST JOHNS CNTY AIRPORT
270 ESTRELLA AVE
SAINT AUGUSTINE, FL 320956115

OWNERSHIP INFORMATION:

ST AUGUSTINE AIRPORT AUTHO
270 ESTRELLA ST
SAINT AUGUSTINE, FL 320950000
(904) 824-9355
GUS CRAIG

MAP ID NUMBER: 3

Dist (Miles): 0.34
Direction: W

L U S T

COUNTY CODE: 55
FACILITY STATUS:
FACILITY TYPE: LOCAL, CITY GOVERNMENT

FAC OPERATOR:
FAC TEL #: (904) 824-1995

SCORE **SCORE EFF DATE:** **RANK:** **SCORE WHEN RANKED:**

DISCHARGE INFORMATION

Mapid: 3

DISCHARGE DATE: 2/2/1989

INSPECTION DATE:
CLEANUP REQUIRED: NEW C/U REQUIRED
INFO SOURCE: DISCHARGE NOTIFICATION
DISCH CLNUP STATUS:

LEAD AGENCY: DISTRICT

TANK OFF:
CLEANUP WORK STATUS:

CONTAMINATED MEDIA?: **SOIL:** N **SUR WATER:** N **GR WATER:** Y **MON WELL:** **# DW WELLS CONTAMINATED:**

POLLUTANT TYPE/ESTIMATED GALLONS (IF REPORTED):

POLLUTANT	GALLONS	OTHER
UNKNOWN/NOT REPOR		

CLEANUP INFORMATION

(for specific discharge noted above)

Mapid: 3

CLNUP PROG:
APPL RCVD: **ELIG STATUS:** **ELIG STATUS DATE:** **ELIG REDETERMINED?:**

SITE ASSESSMENT

CLNP RESP:
FUND ELLIG:
ACTUAL COMPLETION DATE:
PAYMENT DATE:
ACTUAL COST:

REMEDIAL ACTION PLAN

CLEANUP RESP:
FUND ELLIG:
ORDER COMPL DATE:
ACTUAL COMPL DATE:
PAYMENT DATE:
ACTUAL COST:

REMEDIAL ACTION

CLEANUP RESP:
FUND ELLIG:
ACTUAL COST:
YEARS TO COMPL:

SITE REHABILITATION COMPLETION REPORT

ACTION TYPE:
SUBMIT DATE:
REVIEW DATE:
ISSUE DATE:
COMPL STATUS:
COMPL STATUS DT:
COMMENTS:

SOURCE REMOVAL

CLEANUP RESP:
FUND ELLIG:
ACTUAL COMPLETION DATE:
FREE PRODUCT REMOVAL?(Y/N):
SOIL REMOVAL? (Y/N):
SOIL TONNAGE REMOVED:
SOIL TREATMENT?(Y/N):
OTHER TREATMENT?:
ALT PROC STATUS:
ALT PROC STATUS DT:

USEPA COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY INFORMATION SYSTEM LIST (CERCLIS)

Report Date:5/28/2009

FACILITY ID NUMBER, NAME AND LOCATION:

FLD984177485
ST. AUGUSTINE AIRPORT
US HWY 1/ N OF ESTRELLA AVE
ST. AUGUSTINE, FL 32084

MAP ID NUMBER: 4

Dist (Miles): 0.56
Direction: W

CERCLIS

NPL DESCRIPTION: NOT ON THE NPL
OWNERSHIP TYPE:
FEDERAL FACILITY STATUS: NOT A FEDERAL FACILITY
NON NPL STATUS: NFRAP
SITE INCIDENT CATEGORY:

CERCLIS EVENT DETAIL FOR EACH OPERABLE UNIT

OPERABLE UNIT ID #: 00 **OPERABLE UNIT NAME:** SITEWIDE
CONTAMINANT: **MEDIA:**

EVENT NAME: SITE INSPECTION
START DATE: 19960729
COMPLETION DATE: 19970314
EVENT LEAD: EPA Fund-Financed
EVENT QUALIFIER: NFRAP: No further Remedial Action planned

EVENT NAME: PRELIMINARY ASSESSMENT
START DATE:
COMPLETION DATE: 19950330
EVENT LEAD: State, Fund Financed
EVENT QUALIFIER: Higher priority for further assessment

EVENT NAME: DISCOVERY
START DATE:
COMPLETION DATE: 19900803
EVENT LEAD: State, Fund Financed
EVENT QUALIFIER:

ADDITIONAL EPA COMMENTS FOR THIS FACILITY:

DRUM DISPOSAL AND COPPER WIRE/BATTERY/ENGINE PARTS DISPOSAL AREAS WERE REPORTED ON-SITE. AN AIRPLANE PAINT STRIPPING AREA HAS ALSO BEEN IDED. GW CONTAMINATION BY PETROLEUM PRODUCTS, SOLVENTS AND HEAVY METALS POSSIBLE. (DLR 8-3-90)

FDEP LEAKING UNDERGROUND STORAGE TANKS

(LUST)

Report Date: 5/28/2009

LUST Page 1 of 1

FACILITY ID NUMBER, NAME AND LOCATION:

8515846
ST AUGUSTINE ST JOHNS CNTY AIRPORT
4900 US HWY N
SAINT AUGUSTINE, FL 32095-6115

OWNERSHIP INFORMATION:

ACCOUNT OWNER
ST AUGUSTINE AIRPORT AUTHORITY
4796 US HWY 1 N
SAINT AUGUSTINE, FL 32095-
(904) 824-9355
ELENA KNIGHT

MAP ID NUMBER: 4

Dist (Miles): 0.56
Direction: W

L
U
S
T

COUNTY CODE: 55
FACILITY STATUS: OPEN
FACILITY TYPE: H - Local Government -

FAC OPERATOR: AERO SPORT INC
FAC TEL #: (904) 824-1995

SCORE **SCORE EFF DATE:** **RANK:** **SCORE WHEN RANKED:**

DISCHARGE INFORMATION

Mapid: 4

DISCHARGE DATE: 2/2/1989

INSPECTION DATE:
LEAD AGENCY:
TANK OFF: PCTM1 - Team 1
CLEANUP REQUIRED: R - CLEANUP REQUIRED
CLEANUP WORK STATUS: COMPLETED
INFO SOURCE: D - DISCHARGE NOTIFICATION
DISCH CLNUP STATUS: 1/12/2006 SRCR - SRCR COMPLETE

CONTAMINATED MEDIA?: **SOIL:** N **SUR WATER:** N **GR WATER:** Y **MON WELL:** N **# DW WELLS CONTAMINATED:** 0

POLLUTANT TYPE/ESTIMATED GALLONS (IF REPORTED):

POLLUTANT	GALLONS	OTHER
Y - UNKNOWN/NOT REPORTED		

CLEANUP INFORMATION

(for specific discharge noted above)

Mapid: 4

CLNUP PROG:
APPL RCVD:
ELIG STATUS: INELIGIBLE
ELIG STATUS DATE:
ELIG REDETERMINED?:

SITE ASSESSMENT

CLNP RESP: RP - RESPONSIBLE PARTY
FUND ELLIG: -
ACTUAL COMPLETION DATE: 10/25/1991
PAYMENT DATE:
ACTUAL COST:

REMEDIAL ACTION PLAN

CLEANUP RESP: RP - RESPONSIBLE PARTY
FUND ELLIG: -
ORDER COMPL DATE: 9/3/1992
ACTUAL COMPL DATE: 9/3/1992
PAYMENT DATE:
ACTUAL COST:

REMEDIAL ACTION

CLEANUP RESP: RP - RESPONSIBLE PARTY
FUND ELLIG: -
ACTUAL COST:
YEARS TO COMPL: 0

SITE REHABILITATION COMPLETION REPORT

ACTION TYPE: SRCR - SITE REHABILITATION COMPLETION REPORT
SUBMIT DATE: 2/4/2000
REVIEW DATE: 2/15/2000
ISSUE DATE: 2/17/2000
COMPL STATUS: A - APPROVED
COMPL STATUS DT: 2/15/2000
COMMENTS: SRCO ISSUED.

SOURCE REMOVAL

CLEANUP RESP: -
FUND ELLIG: -
ACTUAL COMPLETION DATE: 9/20/1990
FREE PRODUCT REMOVAL?(Y/N):
SOIL REMOVAL? (Y/N):
SOIL TONNAGE REMOVED: 2004
SOIL TREATMENT?(Y/N):
OTHER TREATMENT?:
ALT PROC STATUS:
ALT PROC STATUS DT:

FDEP LEAKING UNDERGROUND STORAGE TANKS

Report Date: 5/28/2009

(LUST)

LUST Page 1 of 1

FACILITY ID NUMBER, NAME AND LOCATION:

9400435
MCQUAIG PROPERTY
4778 HWY 1 N
SAINT AUGUSTINE, FL 32095-

OWNERSHIP INFORMATION:

ACCOUNT OWNER
FL AVIATION CAREER TRAINING INC
4900 US 1 N ATTN: BJORN OTTESEN
ST AUGUSTINE, FL 32095-
(904) 824-9401
BJORN OTTESEN

MAP ID NUMBER: 5

Dist (Miles): 0.57
Direction: SW

LUST

COUNTY CODE: 55
FACILITY STATUS: CLOSED
FACILITY TYPE: A - Retail Station -

FAC OPERATOR: BJORN OTTESEN
FAC TEL #: (904) 824-9401

SCORE 41 **SCORE EFF DATE:** 8/11/2008 **RANK:** 8533 **SCORE WHEN RANKED:** 10

DISCHARGE INFORMATION

Mapid: 5

DISCHARGE DATE: 6/4/1996

INSPECTION DATE: 10/18/1993
LEAD AGENCY:
TANK OFF: -
CLEANUP REQUIRED: R - CLEANUP REQUIRED
CLEANUP WORK STATUS: ACTIVE
INFO SOURCE: D - DISCHARGE NOTIFICATION
DISCH CLNUP STATUS: 3/30/2001 ENTD - ELIGIBLE - NO TASK LEVEL DATA

CONTAMINATED MEDIA?: **SOIL:** N **SUR WATER:** N **GR WATER:** Y **MON WELL:** N **# DW WELLS CONTAMINATED:** 0

POLLUTANT TYPE/ESTIMATED GALLONS (IF REPORTED):

POLLUTANT	GALLONS	OTHER
B - UNLEADED GAS		

CLEANUP INFORMATION

(for specific discharge noted above)

Mapid: 5

CLNUP PROG: C - PETROLEUM CLEANUP PARTICIPATION PROGRAM
APPL RCVD:
ELIG STATUS: ELIGIBLE
ELIG STATUS DATE: 1/27/1997
ELIG REDETERMINED?: N

SITE ASSESSMENT

CLNP RESP: -
FUND ELLIG: -
ACTUAL COMPLETION DATE:
PAYMENT DATE:
ACTUAL COST:

REMEDIAL ACTION PLAN

CLEANUP RESP: -
FUND ELLIG: -
ORDER COMPL DATE:
ACTUAL COMPL DATE:
PAYMENT DATE:
ACTUAL COST:

REMEDIAL ACTION

CLEANUP RESP: -
FUND ELLIG: -
ACTUAL COST:
YEARS TO COMPL:

SITE REHABILITATION COMPLETION REPORT

ACTION TYPE: -
SUBMIT DATE:
REVIEW DATE:
ISSUE DATE:
COMPL STATUS: -
COMPL STATUS DT:
COMMENTS:

SOURCE REMOVAL

CLEANUP RESP: -
FUND ELLIG: -
ACTUAL COMPLETION DATE:
FREE PRODUCT REMOVAL?(Y/N):
SOIL REMOVAL? (Y/N):
SOIL TONNAGE REMOVED:
SOIL TREATMENT?(Y/N):
OTHER TREATMENT?:
ALT PROC STATUS:
ALT PROC STATUS DT:

FDEP STATE FUNDED ACTION SITES

(STNPL)

Report Date: 5/28/2009

FACILITY ID NUMBER, NAME AND LOCATION:

120
Washac Industries
4735 Ave. A
St. Augustine, FL

MAP ID NUMBER: 6

Dist (Miles): 0.64

Direction: SW

STNPL

FDEP DISTRICT: Northeast

PROJECT MGR: Aaron Cohen

STATUS: Active

STATUS DATE: 8/29/2008

PROCESS TYPE: Steel/Metal/Electrical Processor

The former Washac Industries site is located at 4735 Avenue A in St. Augustine, St. John's County in Section 50, Township 06S, Range 29E at 29° 56 58.2305 N, 81° 20 29.6117 W in a mixed commercial and residential area. The site consists of an approximately 10,000 square foot metal warehouse/building situated on an unpaved lot. The facility is a closed business that formerly manufactured aluminum components for military aircraft. The manufacturing process included the cutting, punching, alodining, and painting of aluminum sheets. Alodining consists of a six part process in which parts are alternately dipped into six tanks containing alkaline aluminum cleaner, acidic oxidizer, and chromic coating. The paint guns, tools, and small parts used throughout the process were regularly cleaned with toluene and acetone.

In 1990, the DEP determined that Washac Industries personnel had improperly disposed of hazardous waste onto the ground and into drains that led to the facility's septic tank and drain field. Records indicated that several 55 gallon drums of hazardous materials were received every year for use within their processes, but there was no documentation to show how spent solvents and wastes were disposed. It was reported that most of the waste streams were discharged directly onto the ground or into the septic system. As a result of these findings, the corporation and four employees pleaded no contest to several felony counts of unlawful disposal and treatment of hazardous waste, willful pollution, and felony littering. Washac Industries subsequently filed for bankruptcy.

Threat

Previous groundwater and soil investigations have revealed contamination of on-site soils as well as the shallow aquifer both on- and off-site. The shallow aquifer is contaminated with a variety of volatile organic compounds, primarily trichloroethene (TCE), above State groundwater cleanup target levels (GCTLs). Contaminated groundwater is a potential health threat to local residents through direct contact and use of private surficial aquifer wells.

Response Strategy and Status (June 2008)

In July 1994, the DEP Northeast District Office requested the DEP Site Investigation Section (SIS) conduct a site investigation. SIS found that Washac had detrimentally impacted the ground and surficial aquifer through their discharge of industrial waste. SIS found toluene, TRPH with a
kerosene odor, aluminum, arsenic, cadmium, chromium, copper, lead, nickel, zinc, and mercury in the soil. The groundwater was found to be contaminated primarily with trichloroethene (TCE) and cis 1,2-DCE. The groundwater contaminant plume extended approximately 200 to 300-feet north/northeast of the property and was approximately 40 feet deep.

The Washac Industries site was adopted for cleanup under the State funded Hazardous Waste Cleanup Program in June 2005. In August 2005 E&E began soil and groundwater assessment activities at the site in order to complete delineation of both the onsite and offsite soil and groundwater contamination. Assessment activities were completed in February 2006 and a Site Assessment Report (SAR) was generated and submitted to DEP in April 2006. Chromium was the most common contaminant found in concentrations exceeding the leaching Soil Cleanup Target Level (SCTL) of 38 mg/kg. TCE and cis 1,2-DCE were the primary contaminants found in groundwater. The major portion of the contaminant mass resides at depths between 25 and 35-feet below ground surface immediately north-northeast of the building. The chlorinated solvent contaminant plume trends east-northeast and extends under the Florida East Coast Railroad and the U.S. Highway 1 right-of-way. Groundwater contaminants were not detected in monitoring wells located along the east side of U.S. Highway 1.

In July 2006, DEP met with E&E engineers and determined that a pilot study be conducted to determine the efficacy of bio-stimulation as a potential remedy for the site. The pilot study workplan was approved by DEP in September 2007. Baseline groundwater sampling was conducted in December 2007, and the pilot study began in January 2008. The pilot study ended in April 2008, and the report concluded that biostimulation was a viable remedial alternative at the site, and should be expanded to a full-scale remedy.

This site was reassigned to GeoSyntec Consultants in June 2008.

Schedule

GeoSyntec is currently reviewing the site files and relevant site data to develop a plan of action which it will present tot DEP in July 2008. DEP anticipates implementation of a full scale remedy in late 2008.

USEPA RCRA HANDLERS WITH CORRECTIVE ACTION (CORRACTS)

FACILITY ID NUMBER, NAME AND LOCATION:

FLD046771952
NORTHROP GRUMMAN CORPORATION
5000 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

CONTACT INFORMATION:

,

Contact: JACK ANDERSON
Contact Tel: (904) 825-3557

MAP ID NUMBER: 7

Dist (Miles): 0.75
Direction: W

CORRACTS

AREA NAME: ENTIRE FACILITY

AIR RELEASE ?: **GW RELEASE ?:** Y **SOIL RELEASE ?:** Y **SUR WATER RELEASE ?:** Y

CORRECTIVE ACTION DATE:	CORRECTIVE ACTION EVENT:	
12/6/2000	CA770NG	ENGINEERING CONTROLS ESTABLISHED-NON-GROUNDWATER CONTROL
9/20/2000	CA550	REMEDY CONSTRUCTION
8/19/1999	CA400	REMEDY DECISION
8/18/1999	CA750YE	RELEASE TO GW CONTROLLED DETERMINATION-YES, APPLICABLE AS OF THIS DATE
8/18/1999	CA725YE	HUMAN EXPOSURES CONTROLLED DETERMINATION-YES, APPLICABLE AS OF THIS DATE
6/24/1999	CA380	DATE FOR PUBLIC NOTICE ON PROPOSED REMEDY
6/23/1999	CA350	CMS APPROVED
6/18/1999	CA340	CMS REPORT RECEIVED
4/13/1999	CA340	CMS REPORT RECEIVED
1/29/1999	CA340	CMS REPORT RECEIVED
9/8/1998	CA200	INVESTIGATION COMPLETE
9/8/1998	CA250	CMS IMPOSITION
9/8/1998	CA300	CMS WORKPLAN APPROVED
6/30/1998	CA340	CMS REPORT RECEIVED
1/8/1998	CA190	INVESTIGATION REPORT RECEIVED
7/24/1997	CA184	DRAFT RFI REPORT RECEIVED
5/12/1997	CA150	INVESTIGATION WORKPLAN APPROVED
4/8/1997	CA200	INVESTIGATION COMPLETE
4/7/1997	CA110	INVESTIGATION WORKPLAN RECEIVED
2/20/1997	CA200	INVESTIGATION COMPLETE
12/12/1996	CA190	INVESTIGATION REPORT RECEIVED
11/22/1996	CA184	DRAFT RFI REPORT RECEIVED
11/13/1996	CA186	DRAFT RFI REPORT REVIEWED - NOTI ISSUED
9/9/1996	CA186	DRAFT RFI REPORT REVIEWED - NOTI ISSUED
7/31/1996	CA184	DRAFT RFI REPORT RECEIVED
6/28/1996	CA184	DRAFT RFI REPORT RECEIVED
2/14/1996	CA725NO	HUMAN EXPOSURES CONTROLLED DETERMINATION-FACILITY DOES NOT MEET DEFINITION
2/14/1996	CA750YE	RELEASE TO GW CONTROLLED DETERMINATION-YES, APPLICABLE AS OF THIS DATE
5/11/1995	CA184	DRAFT RFI REPORT RECEIVED
1/20/1995	CA186	DRAFT RFI REPORT REVIEWED - NOTI ISSUED
9/29/1994	CA184	DRAFT RFI REPORT RECEIVED
6/7/1994	CA152	RFI OVERSIGHT INVESTIGATION
4/25/1994	CA150	INVESTIGATION WORKPLAN APPROVED
1/24/1994	CA650	STABILIZATION CONSTRUCTION COMPLETED
11/30/1993	CA140	INVESTIGATION WORKPLAN NOTICE OF DEFICIENCY ISSUED
11/30/1993	CA105	CONFIRM. SAMPLING WORKPLAN - NOTI ISSUED
9/10/1993	CA650	STABILIZATION CONSTRUCTION COMPLETED
7/20/1993	CA600OT	STABILIZATION/INTERIM MEASURES DECISION-OTHER
5/7/1993	CA600	STABILIZATION/INTERIM MEASURES DECISION
5/3/1993	CA110	INVESTIGATION WORKPLAN RECEIVED
3/31/1992	CA075HI	CA PRIORITIZATION-HIGH CA PRIORITY
1/2/1991	CA104	CONFIRMATORY SAMPLING WORKPLAN RECEIVED
11/1/1990	CA100	INVESTIGATION IMPOSITION
9/28/1990	CA100	INVESTIGATION IMPOSITION
9/28/1990	CA102	ADMINISTRATIVE APPEAL
	CA260	CMS WORKPLAN RECEIVED

AREA NAME: IM AT SWMU 5

AIR RELEASE ?: **GW RELEASE ?:** **SOIL RELEASE ?:** Y **SUR WATER RELEASE ?:**

CORRECTIVE ACTION DATE:	CORRECTIVE ACTION EVENT:	
9/26/1996	CA650	STABILIZATION CONSTRUCTION COMPLETED
9/26/1996	CA640	INTERIM MEASURES REPORT RECEIVED
4/29/1996	CA630	INTERIM MEASURES PLAN APPROVED
4/17/1996	CA600EC	STABILIZATION/INTERIM MEASURES DECISION-PRIMARY MEAS IS EXPOSURE CONTROL
1/24/1996	CA640	INTERIM MEASURES REPORT RECEIVED
9/26/1995	CA600SR	STABILIZATION/INTERIM MEASURES DECISION-PRIMARY MEAS IS SOURCE REMOVL &/OR TRT

AREA NAME: MNA EVALUATION

AIR RELEASE ?: **GW RELEASE ?:** Y **SOIL RELEASE ?:** **SUR WATER RELEASE ?:**

CORRECTIVE ACTION DATE:	CORRECTIVE ACTION EVENT:	
12/29/1997	CA640	INTERIM MEASURES REPORT RECEIVED
12/19/1997	CA650	STABILIZATION CONSTRUCTION COMPLETED

10/21/1997	CA640	INTERIM MEASURES REPORT RECEIVED
2/20/1997	CA630	INTERIM MEASURES PLAN APPROVED
12/12/1996	CA610	INTERIM MEASURES PLAN APPROVED
11/13/1996	CA600GW	STABILIZATION/INTERIM MEASURES DECISION-GROUNDWATER EXTRACTION & TREATMENT

USEPA RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM (RCRIS)

(TSD)

Report Date: 5/28/2009

FACILITY ID NUMBER, NAME AND LOCATION:

FLD046771952
NORTHROP GRUMMAN CORPORATION
5000 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

CONTACT INFORMATION:

,
Contact: JACK ANDERSON
Contact Telephone: 9048253557
Contact Email:

MAP ID NUMBER: 7
Dist (Miles): 0.75
Direction: W

T
S
D

RCRIS INFORMATION

NOTIFICATION DATE: **9/9/2008** **SOURCE:** INSPECTION

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: **2/27/2008** **SOURCE:** NOTIFICATION

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: **2/22/2006** **SOURCE:** BIENNIAL RPT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: NOT A TSD,VERIFIED
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: **9/28/2005** **SOURCE:** INSPECTION

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: **3/29/2004** **SOURCE:** ANNUAL/BIENNIAL REPORT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: NOT A TSD,VERIFIED
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: **3/28/2002** **SOURCE:** ANNUAL/BIENNIAL REPORT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: UNKNOWN
TSD?: NOT A TSD,VERIFIED
NON-NOTIFIER?:
RECYCLER?: UNKNOWN

ON SITE BURNER?: UNKNOWN
FURNACE?: UNKNOWN
UNDGRND INJ?: UNKNOWN
XFER FAC?:
UO BURNER?: UNKNOWN
UO PROC?: UNKNOWN
UO RECY?: UNKNOWN
UO TRANS?: UNKNOWN
UO XFER?: UNKNOWN

USEPA RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM (RCRIS)

(TSD)

NOTIFICATION DATE: 2/29/2000 **SOURCE:** ANNUAL/BIENNIAL REPORT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State):
TRANSPORTER?: UNKNOWN
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: UNKNOWN

ON SITE BURNER?: UNKNOWN
FURNACE?: UNKNOWN
UNDGRND INJ?: UNKNOWN
XFER FAC?:
UO BURNER?: UNKNOWN
UO PROC?: UNKNOWN
UO RECY?: UNKNOWN
UO TRANS?: UNKNOWN
UO XFER?: UNKNOWN

NOTIFICATION DATE: 1/12/2000 **SOURCE:** INSPECTION

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?: NO
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: 2/25/1998 **SOURCE:** ANNUAL/BIENNIAL REPORT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State):
TRANSPORTER?: UNKNOWN
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: UNKNOWN

ON SITE BURNER?: UNKNOWN
FURNACE?: UNKNOWN
UNDGRND INJ?: UNKNOWN
XFER FAC?:
UO BURNER?: UNKNOWN
UO PROC?: UNKNOWN
UO RECY?: UNKNOWN
UO TRANS?: UNKNOWN
UO XFER?: UNKNOWN

NOTIFICATION DATE: 2/15/1996 **SOURCE:** ANNUAL/BIENNIAL REPORT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State):
TRANSPORTER?: UNKNOWN
TSD?: NOT A TSD,VERIFIED
NON-NOTIFIER?:
RECYCLER?: UNKNOWN

ON SITE BURNER?: UNKNOWN
FURNACE?: UNKNOWN
UNDGRND INJ?: UNKNOWN
XFER FAC?:
UO BURNER?: UNKNOWN
UO PROC?: UNKNOWN
UO RECY?: UNKNOWN
UO TRANS?: UNKNOWN
UO XFER?: UNKNOWN

NOTIFICATION DATE: 8/18/1994 **SOURCE:** NOTIFICATION

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: 2/28/1994 **SOURCE:** ANNUAL/BIENNIAL REPORT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State):
TRANSPORTER?: UNKNOWN
TSD?: NOT A TSD,VERIFIED
NON-NOTIFIER?:
RECYCLER?: UNKNOWN

ON SITE BURNER?: UNKNOWN
FURNACE?: UNKNOWN
UNDGRND INJ?: UNKNOWN
XFER FAC?:
UO BURNER?: UNKNOWN
UO PROC?: UNKNOWN
UO RECY?: UNKNOWN
UO TRANS?: UNKNOWN
UO XFER?: UNKNOWN

NOTIFICATION DATE: 2/19/1992 **SOURCE:** ANNUAL/BIENNIAL REPORT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State):
TRANSPORTER?: UNKNOWN
TSD?: NOT A TSD,VERIFIED
NON-NOTIFIER?:
RECYCLER?: UNKNOWN

ON SITE BURNER?: UNKNOWN
FURNACE?: UNKNOWN
UNDGRND INJ?: UNKNOWN
XFER FAC?:
UO BURNER?: UNKNOWN
UO PROC?: UNKNOWN
UO RECY?: UNKNOWN
UO TRANS?: UNKNOWN
UO XFER?: UNKNOWN

NOTIFICATION DATE: 3/1/1990 **SOURCE:** ANNUAL/BIENNIAL REPORT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State):
TRANSPORTER?: UNKNOWN
TSD?: NOT A TSD,VERIFIED
NON-NOTIFIER?:
RECYCLER?: UNKNOWN

ON SITE BURNER?: UNKNOWN
FURNACE?: UNKNOWN
UNDGRND INJ?: UNKNOWN
XFER FAC?:
UO BURNER?: UNKNOWN
UO PROC?: UNKNOWN
UO RECY?: UNKNOWN
UO TRANS?: UNKNOWN
UO XFER?: UNKNOWN

NOTIFICATION DATE: 3/1/1990 **SOURCE:** NOTIFICATION

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: 3/1/1990 **SOURCE:** INSPECTION

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: TREAT,STORE &/OR DISPOSE OF HAZ WASTE
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

NOTIFICATION DATE: 3/1/1990 **SOURCE:** BIENNIAL RPT

GEN STATUS(Fed): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
GEN STATUS(State): LARGE QUANTITY GENERATOR(>1000 KG PER MONTH)
TRANSPORTER?: NOT A TRANSPORTER,VERIFIED
TSD?: NOT A TSD,VERIFIED
NON-NOTIFIER?:
RECYCLER?: NO

ON SITE BURNER?: NO
FURNACE?: NO
UNDGRND INJ?: NO UNDER
XFER FAC?:
UO BURNER?: NO
UO PROC?: NO
UO RECY?: NO
UO TRANS?: NO
UO XFER?: NO

VIOLATION INFO

Eval Date: 12/28/1990 **Eval Agcy:** EPA **Eval Type Descr:** NON-FINANCIAL RECORD REVIEW
Viol Date: 12/28/1990 **Viol Agcy:** EPA **Enf Type Descr:** FINAL CIVIL JUDICIAL ACTION FOR COMPLIANCE AND/OR MONE
Enf Date: 05/12/1993 **Enf Agcy:** EPA **Lead Agcy:**

Viol Type:	262.A	Generators - General	**Citation:**		**Compl Date:**	05/12/1993
Viol Type:	263.A	Transporters - General	**Citation:**		**Compl Date:**	05/12/1993
Viol Type:	265.Q	TSD IS-Chemical, Physical, AND Treatment	**Citation:**		**Compl Date:**	05/12/1993
Viol Type:	264.H	TSD - Financial Requirements	**Citation:**		**Compl Date:**	05/12/1993
Viol Type:	264.B	TSD - General Facility Standards	**Citation:**		**Compl Date:**	05/12/1993
Viol Type:	268.A	LDR - General	**Citation:**		**Compl Date:**	05/12/1993
Viol Type:	264.I	TSD - Container Use and Management	**Citation:**		**Compl Date:**	05/12/1993
Viol Type:	268.A	LDR - General	**Citation:**		**Compl Date:**	05/12/1993

Eval Date: 10/29/1997 **Eval Agcy:** STATE **Eval Type Descr:** COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date: 10/29/1997 **Viol Agcy:** STATE **Enf Type Descr:**
Enf Date: 10/29/1997 **Enf Agcy:** STATE **Lead Agcy:**

Viol Type:	265.N	TSD IS-Landfill Standards	**Citation:**	GOR:265.31 :PREVIOUS CITATION: 26	**Compl Date:**	10/29/1997

Eval Date: 8/29/1990 **Eval Agcy:** STATE **Eval Type Descr:** NON-FINANCIAL RECORD REVIEW
Viol Date: 08/29/1990 **Viol Agcy:** STATE **Enf Type Descr:**
Enf Date: **Enf Agcy:** **Lead Agcy:**

Viol Type:	264.F	TSD - Releases from SWMUs	**Citation:**	DGW:	**Compl Date:**	09/02/1990
Viol Type:	264.F	TSD - Releases from SWMUs	**Citation:**	DGW:	**Compl Date:**	09/02/1990
Viol Type:	264.F	TSD - Releases from SWMUs	**Citation:**	DGW:	**Compl Date:**	01/29/1991

Eval Date:	8/27/1990	**Eval Agcy:**	STATE	**Eval Type Descr:**	NON-FINANCIAL RECORD REVIEW
Viol Date:	08/27/1990	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	264.F	TSD - Releases from SWMUs	**Citation:**	DGW:	**Compl Date:**	01/29/1991

Eval Date:	7/19/1989	**Eval Agcy:**	STATE	**Eval Type Descr:**	FOLLOW-UP INSPECTION
Viol Date:	07/19/1989	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	264.B	TSD - General Facility Standards	**Citation:**	DOR:	**Compl Date:**	06/07/1990
Viol Type:	264.B	TSD - General Facility Standards	**Citation:**	DOR:	**Compl Date:**	06/07/1990
Viol Type:	264.B	TSD - General Facility Standards	**Citation:**	DOR:	**Compl Date:**	06/07/1990
Viol Type:	264.B	TSD - General Facility Standards	**Citation:**	DOR:	**Compl Date:**	06/07/1990

Eval Date:	7/17/1991	**Eval Agcy:**	STATE	**Eval Type Descr:**	NON-FINANCIAL RECORD REVIEW
Viol Date:	07/17/1991	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	264.B	TSD - General Facility Standards	**Citation:**	DPB:	**Compl Date:**	08/19/1991

Eval Date:	6/29/1990	**Eval Agcy:**	STATE	**Eval Type Descr:**	NON-FINANCIAL RECORD REVIEW
Viol Date:	06/29/1990	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	264.F	TSD - Releases from SWMUs	**Citation:**	DGW:	**Compl Date:**	08/03/1990
Viol Type:	264.F	TSD - Releases from SWMUs	**Citation:**	DGW:	**Compl Date:**	09/09/1991

Eval Date:	4/20/1994	**Eval Agcy:**	STATE	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	06/03/1994	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	XXS	State Statute or Regulation	**Citation:**	GMR:17-730.160	**Compl Date:**	08/29/1994
Viol Type:	268.A	LDR - General	**Citation:**	GLB:268.7	**Compl Date:**	08/29/1994
Viol Type:	262.A	Generators - General	**Citation:**	GGR:262.11	**Compl Date:**	08/29/1994

Eval Date:	5/4/1987	**Eval Agcy:**	EPA	**Eval Type Descr:**	GROUNDWATER MONITORING EVALUATION
Viol Date:	05/04/1987	**Viol Agcy:**	EPA	**Enf Type Descr:**	FINAL 3008(A) COMPLIANCE ORDER
Enf Date:	12/31/1987	**Enf Agcy:**	EPA	**Lead Agcy:**	

Viol Type:	265.F	TSD IS-Ground-Water Monitoring	**Citation:**		**Compl Date:**	03/10/1989
Viol Type:	264.G	TSD - Closure/Post-Closure	**Citation:**		**Compl Date:**	03/10/1989

Eval Date:	2/26/1992	**Eval Agcy:**	STATE	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	04/09/1992	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	262.A	Generators - General	**Citation:**	GGR:	**Compl Date:**	07/01/1992
Viol Type:	261.A	Listing - General	**Citation:**	GOR:	**Compl Date:**	07/01/1992
Viol Type:	262.C	Generators - Pre-transport	**Citation:**	GPT:	**Compl Date:**	07/01/1992

Eval Date:	2/26/1992	**Eval Agcy:**	STATE	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	04/08/1992	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	268.A	LDR - General	**Citation:**	DLB:268.7	**Compl Date:**	07/02/1993
Viol Type:	262.A	Generators - General	**Citation:**	DGS:262.11	**Compl Date:**	07/02/1993

Eval Date:	3/29/1989	**Eval Agcy:**	STATE	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	03/29/1989	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	268.A	LDR - General	**Citation:**	DLB:	**Compl Date:**	03/29/1989
Viol Type:	268.A	LDR - General	**Citation:**	DLB:	**Compl Date:**	03/29/1989
Viol Type:	268.A	LDR - General	**Citation:**	GLB:	**Compl Date:**	03/29/1989
Viol Type:	268.A	LDR - General	**Citation:**	GLB:	**Compl Date:**	03/29/1989

Eval Date:	3/23/1990	**Eval Agcy:**	STATE	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	03/23/1990	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	268.A	LDR - General	**Citation:**	GLB:	**Compl Date:**	04/10/1990

USEPA RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM (RCRIS)

(TSD)

Viol Type:	268.A	LDR - General	**Citation:**	DLB:	**Compl Date:**	04/10/1990
Viol Type:	268.A	LDR - General	**Citation:**	GLB:	**Compl Date:**	04/10/1990
Viol Type:	264.B	TSD - General Facility Standards	**Citation:**	DOR:	**Compl Date:**	06/29/1990
Viol Type:	268.A	LDR - General	**Citation:**	DLB:	**Compl Date:**	04/10/1990

Eval Date:	3/20/1990	**Eval Agcy:**	STATE	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	03/20/1990	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	264.G	TSD - Closure/Post-Closure	**Citation:**	DCL:	**Compl Date:**	06/07/1990
Viol Type:	264.G	TSD - Closure/Post-Closure	**Citation:**	DCL:	**Compl Date:**	06/07/1990

Eval Date:	3/19/1990	**Eval Agcy:**	STATE	**Eval Type Descr:**	NON-FINANCIAL RECORD REVIEW
Viol Date:	03/19/1990	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	264.F	TSD - Releases from SWMUs	**Citation:**	DGW:	**Compl Date:**	10/10/1991

Eval Date:	3/16/1989	**Eval Agcy:**	STATE	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	03/16/1989	**Viol Agcy:**	STATE	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	264.B	TSD - General Facility Standards	**Citation:**	DOR:	**Compl Date:**	06/07/1990

Eval Date:	2/19/1986	**Eval Agcy:**	EPA	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	02/19/1986	**Viol Agcy:**	EPA	**Enf Type Descr:**	FINAL 3008(A) COMPLIANCE ORDER
Enf Date:	11/12/1986	**Enf Agcy:**	EPA	**Lead Agcy:**	

Viol Type:	264.H	TSD - Financial Requirements	**Citation:**		**Compl Date:**	01/12/1987
Viol Type:	264.G	TSD - Closure/Post-Closure	**Citation:**		**Compl Date:**	01/12/1987
Viol Type:	264.A	TSD - General	**Citation:**		**Compl Date:**	01/12/1987
Viol Type:	265.F	TSD IS-Ground-Water Monitoring	**Citation:**		**Compl Date:**	01/12/1987

Eval Date:	1/23/1987	**Eval Agcy:**	EPA-Initiated Oversight/Obsv/Training Actions	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	01/23/1987	**Viol Agcy:**	EPA	**Enf Type Descr:**	
Enf Date:		**Enf Agcy:**		**Lead Agcy:**	

Viol Type:	264.A	TSD - General	**Citation:**		**Compl Date:**	05/05/1987
Viol Type:	264.A	TSD - General	**Citation:**		**Compl Date:**	05/05/1987

Eval Date:	12/6/1994	**Eval Agcy:**	STATE	**Eval Type Descr:**	COMPLIANCE EVALUATION INSPECTION ON-SITE
Viol Date:	01/20/1995	**Viol Agcy:**	STATE	**Enf Type Descr:**	DEP WARNING LETTER
Enf Date:	01/20/1995	**Enf Agcy:**	STATE	**Lead Agcy:**	

Viol Type:	265.I	TSD IS-Container Use and Management	**Citation:**	GOR:265.173	**Compl Date:**	03/02/1995
Viol Type:	262.C	Generators - Pre-transport	**Citation:**	GPT:262.34(A)(2)	**Compl Date:**	03/02/1995
Viol Type:	262.C	Generators - Pre-transport	**Citation:**	GPT:262.34(A)(3)	**Compl Date:**	03/02/1995

FDEP DESIGNATED BROWNFIELD AREAS

(BRWNFLDS)

Report Date: 5/28/2009

AREA ID NUMBER, NAME AND LOCATION:

BF550601000
St. Augustine Ponce de Leon

ST AUGUSTINE, FL

MAP ID NUMBER: 8

Dist (Miles): 0.52

Direction: SE

BRWNFLDS

ACREAGE: 283.53729

RESOLUTION DATE: 11/12/2006 7:00:00 PM

FDEP DISTRICT: Northeast

FDEP BROWNFIELDS WITH SITE REHABILITAION AGREEMENT

(VOLCLNUP)

FACILITY ID NUMBER, NAME AND LOCATION:

BF550601001
Former Ponce de Leon Golf Course

ST AUGUSTINE, FL

MAP ID NUMBER: 8

Dist (Miles): 0.52
Direction: SE

VOLCLNUP

ACREAGE: 283.537287
REMEDIATION: ACTIVE
CHEMICAL_1: Arsenic
CHEMICAL_2:
CHEMICAL_3:

AREA ID: BF550601000
AREA NAME: St. Augustine Ponce de Leon
FDEP DISTRICT: Northeast

EDM

LUST ADDENDUM REPORT -- TANK DATA DETAIL FROM THE FDEP STORAGE TANKS REPORT (TANKS)

The following reports are the TANKS data associated with LUST sites, identified **outside** of the ¼ mile TANKS query criteria. Please see the “Florida Tanks Codes” page of this report for an explanation of the tank construction, monitoring and piping codes used in reporting this data.

LUST Addendum

FACILITY ID NUMBER, NAME AND LOCATION:

9200496
PLANE CRASH SITE
313 ARAQUAY RD
SAINT AUGUSTINE, FL

OWNERSHIP INFORMATION:

,

CONTACT TEL #:
CONTACT:
FACILTY TEL #:

MAP ID NUMBER: 2

Dist (Miles): 0.30
Direction: SW

T A N K S

COUNTY ID: 55 **FAC TYPE:** Contamination Site **FAC STATUS:** CLOSED

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):

** **CONSTR TYPE:** **PIPING TYPE:** **LEAK MONIT TYPE:**

LUST Addendum

FACILITY ID NUMBER, NAME AND LOCATION:

8515846. **--HISTORICAL ENTRY--**
ST AUGUSTINE ST JOHNS CNTY AIRPORT
270 ESTRELLA AVE
SAINT AUGUSTINE, FL 32095

OWNERSHIP INFORMATION:

,
CONTACT TEL #:
CONTACT:
FACILTY TEL #: 9048241995

MAP ID NUMBER: 3
Dist (Miles): 0.34
Direction: W

TANKS

COUNTY ID: 55 **FAC TYPE:** H / Local Government **FAC STATUS:** OPEN

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
1	00015000		AVIATION GAS	UNDERGROUND	Removed

** **CONSTR TYPE:** E **PIPING TYPE:** Y **LEAK MONIT TYPE:** I

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
10	00000500	01-May-1990	WASTE OIL	ABOVEGROUND	In Service

** **CONSTR TYPE:** CK **PIPING TYPE:** A **LEAK MONIT TYPE:** I

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
2	00015000		AVIATION GAS	UNDERGROUND	Removed

** **CONSTR TYPE:** E **PIPING TYPE:** Y **LEAK MONIT TYPE:** I

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
3	00000600		UNLEADED GAS	UNDERGROUND	Removed

** **CONSTR TYPE:** D **PIPING TYPE:** Y **LEAK MONIT TYPE:** I

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
4	00029000	01-May-1990	JET FUEL	ABOVEGROUND	In Service

** **CONSTR TYPE:** CKN **PIPING TYPE:** A **LEAK MONIT TYPE:** I

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
6	00025000	01-May-1990	JET FUEL	ABOVEGROUND	In Service

** **CONSTR TYPE:** CKLN **PIPING TYPE:** A **LEAK MONIT TYPE:** I

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
8	00022000	01-May-1990	AVIATION GAS	ABOVEGROUND	In Service

** **CONSTR TYPE:** CKLN **PIPING TYPE:** A **LEAK MONIT TYPE:** I

LUST Addendum

FACILITY ID NUMBER, NAME AND LOCATION:

8515846
ST AUGUSTINE ST JOHNS CNTY AIRPORT
4900 US HWY N
SAINT AUGUSTINE, FL 32095

OWNERSHIP INFORMATION:

ST AUGUSTINE AIRPORT AUTHO
4796 US HWY 1 N
SAINT AUGUSTINE, FL 32095
CONTACT TEL #: (904) 824-9355
CONTACT: ELENA KNIGHT
FACILTY TEL #: (904) 824-1995

MAP ID NUMBER: 4
Dist (Miles): 0.56
Direction: W

T A N K S

COUNTY ID: 55 **FAC TYPE:** Local Government **FAC STATUS:** OPEN

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
1	15000	01-Jul-1980	Aviation Gas	UNDERGROUND	REMOVED 28-Feb-1990
** CONSTR TYPE: E		PIPING TYPE:	LEAK MONIT TYPE: I		
10	500	01-May-1990	Waste Oil	ABOVEGROUND	IN SERVICE
** CONSTR TYPE: CK		PIPING TYPE:	LEAK MONIT TYPE: I		
2	15000	01-Jul-1980	Aviation Gas	UNDERGROUND	REMOVED 28-Feb-1992
** CONSTR TYPE: E		PIPING TYPE:	LEAK MONIT TYPE: I		
3	600		Unleaded Gas	UNDERGROUND	REMOVED 30-Jun-1988
** CONSTR TYPE: D		PIPING TYPE:	LEAK MONIT TYPE: I		
4	25000	01-May-1990	Jet Fuel	ABOVEGROUND	IN SERVICE
** CONSTR TYPE: CKN		PIPING TYPE: A	LEAK MONIT TYPE: I		
6	25000	01-May-1990	Jet Fuel	ABOVEGROUND	IN SERVICE
** CONSTR TYPE: CKLN		PIPING TYPE: A	LEAK MONIT TYPE: I		
8	20000	01-May-1990	Aviation Gas	ABOVEGROUND	IN SERVICE
** CONSTR TYPE: CKLN		PIPING TYPE: A	LEAK MONIT TYPE: I		

LUST Addendum

FACILITY ID NUMBER, NAME AND LOCATION:

9400435
MCQUAIG PROPERTY
4778 HWY 1 N
SAINT AUGUSTINE, FL 32095

OWNERSHIP INFORMATION:

FL AVIATION CAREER TRAININ
4900 US 1 N ATTN: BJORN OTTESEN
ST AUGUSTINE, FL 32095
CONTACT TEL #: (904) 824-9401
CONTACT: BJORN OTTESEN
FACILTY TEL #: (904) 824-9401

MAP ID NUMBER: 5
Dist (Miles): 0.57
Direction: SW

T A N K S

COUNTY ID: 55 **FAC TYPE:** Retail Station **FAC STATUS:** CLOSED

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
1	1000		Unknown/Not Reported	UNDERGROUND	REMOVED 01-Feb-2004

** **CONSTR TYPE:** C **PIPING TYPE:** **LEAK MONIT TYPE:** Y

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
2	1000		Unknown/Not Reported	UNDERGROUND	REMOVED 01-Feb-2004

** **CONSTR TYPE:** C **PIPING TYPE:** **LEAK MONIT TYPE:** Y

TANK #:	TANK VOL(GALS):	INST.DATE:	TANK CONTENTS:	TANK POSITION:	TANK STATUS (as of...):
3	500		Unknown/Not Reported	UNDERGROUND	CLOSED IN PLACE 01-Oct-1993

** **CONSTR TYPE:** C **PIPING TYPE:** **LEAK MONIT TYPE:** Y

PROXIMAL RECORDS TABLE

Report Date: 5/28/2009

The Proximal Records Table includes mapped facilities that appear outside of the study area, but in the proximity of the research boundary. They are provided in a summary fashion to allow one to determine potential interest.

Generally, these sites may be of potential interest for three reasons:

1.) The location occurs so close to the research boundary that it merits inclusion in the evaluation.

2.) The site may be expansive with regard to the property boundary. The physical address of a landfill for example may occur outside of the research boundary, but the landfill boundary may extend into the research area. Large industrial complexes may also fall into this category.

3.) The U.S. Census Bureau data, from which our maps are created, is not always precise with regard to address information. A facility may therefore appear on the map outside of the research area, but actually fall within the research area. These inaccuracies are typically less than 500 feet. If you observe any such inaccuracies, we ask that you please notify us of the more precise location and we will use this information to improve our product.

If more specific information relative to one or more locations included in the Proximal Records Table is desired, please feel free to contact us and we will send you this information as an addendum to this report.

ENVIRONMENTAL DATA MANAGEMENT

Standard ASTM Research

Report Date: 5/28/2009

PROXIMAL RECORDS TABLE

			REGULATORY LISTS																		
MAPID#	**FAC ID, NAME AND LOCATION**		NPL	CERCLIS	NFRAP	ERNS	CORRACTS	TSD	NONTSD	TRIBLTANKS	TRIBLLUST	USBRWNFLDS	STNPL	STCERC	SLDWST	LUST	TANKS	BRWNFLDS	VOLCLNUP	INSTENG	DRY
1A)	71383 Unknown 313 ARAQUAY AVENUE ACCIDENT OCCURED IN A TRAILER PARK SAINT AUGUSTINE, FL.	Dist/Dir: 0.3 S				X															
1A)	9200496 PLANE CRASH SITE 313 ARAQUAY RD SAINT AUGUSTINE, FL.	Dist/Dir: 0.3 S															X				
2A)	8515846. ST AUGUSTINE ST JOHNS CNTY AIRPORT 270 ESTRELLA AVE SAINT AUGUSTINE, FL. 32095	Dist/Dir: 0.3 W															X				
2A)	FLD982141558 ST AUGUSTINE AIRPORT AUTHORITY 270 ESTRELLA AVE ST AUGUSTINE, FL. 320956115	Dist/Dir: 0.3 W							X												
3A)	348858 Unknown 268 JACKSON BLVD ST AGUSTINE, FL.	Dist/Dir: 0.4 S				X															
4A)	8518443 THE PANTRY #1069 4760 US 1 N & ARAQUAY ST #A SAINT AUGUSTINE, FL. 32095	Dist/Dir: 0.6 S														X					
5A)	FLD984216630 WASHAC INDUSTRIES 4735 AVENUE A (US HWY 1 N) ST. AUGUSTINE, FL. 32084	Dist/Dir: 0.6 S		X																	
6A)	8515900 NORTHROP GRUMMAN CORP ST AUGUSTINE SI 5000 US HWY 1 N SAINT AUGUSTINE, FL. 320956201	Dist/Dir: 0.8 W														X					
6A)	NONE 551 GRUMMAN ST AUGUSTINE CORP HWY 1 ST AUGUSTINE, FL.	Dist/Dir: 0.8 W												X							

EDM

For further information please contact us at 800-368-7376

NONMAPPED RECORDS TABLE

Report Date: 5/28/2009

The Non-Mapped Records Table is a listing of database records that lack sufficient address information to be placed within our mapping system, but may exist within your study area. These records have been manually screened to determine whether they could likely fall within the study area or can be conclusively identified as existing outside of the study area. Those records that could be located within the study area, but cannot be plotted within our GIS, are displayed in the Non-Mapped Records Table within this report.

If more specific information relative to one or more locations included in the Non-Mapped Records Table is desired, please feel free to contact us and we will send you this information as an addendum to this report.

ENVIRONMENTAL DATA MANAGEMENT

Standard ASTM Research

Report Date: 5/28/2009

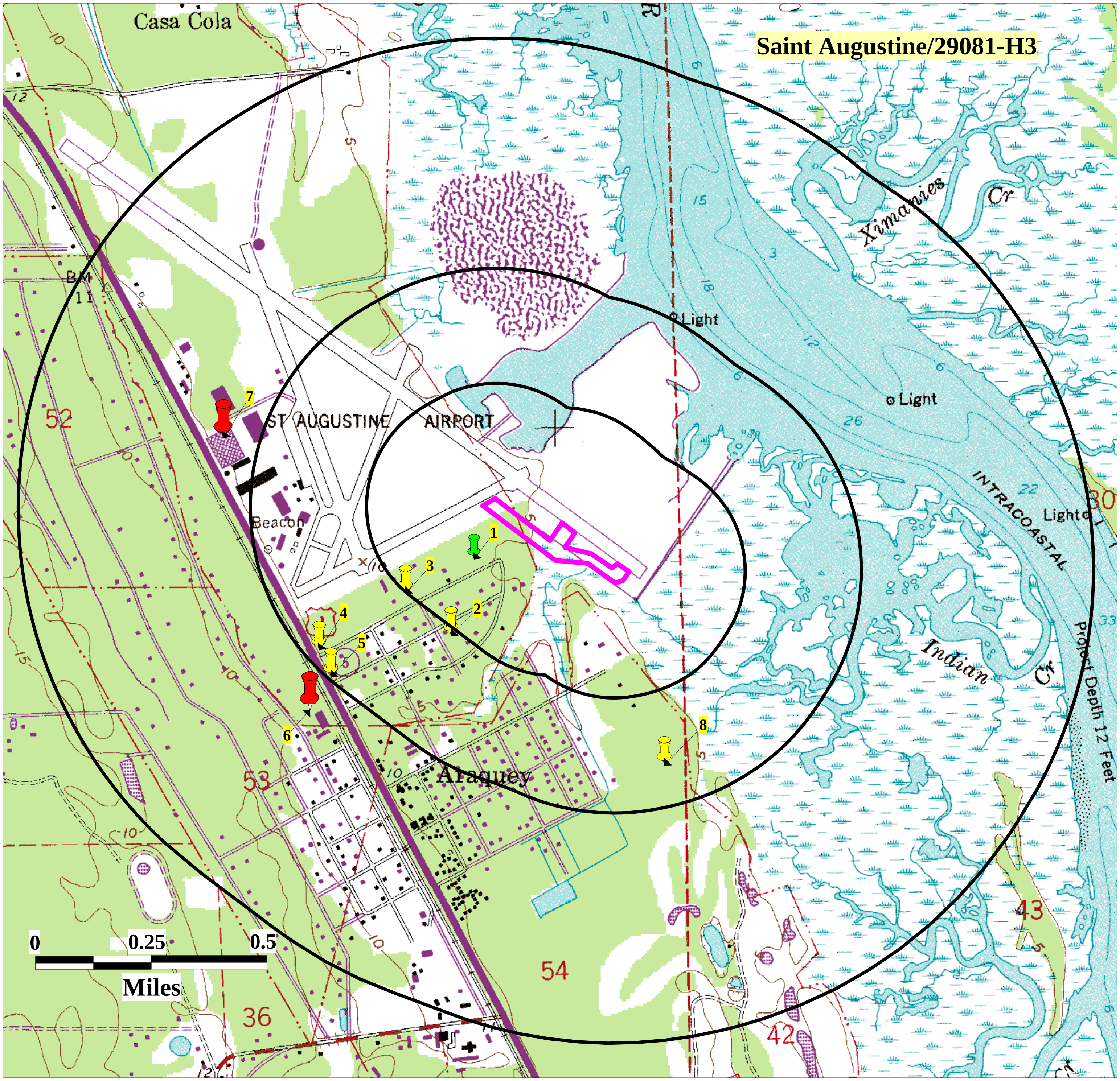
NON-MAPPED RECORDS TABLE

	REGULATORY LISTS																		
MAPID# FAC ID, NAME AND LOCATION	NPL	CERCLIS	NFRAP	ERNS	CORRACTS	TSD	NONTSD	TRIBLTANKS	TRIBLLUST	USBRWNFLDS	STNPL	STCERC	SLDWST	LUST	TANKS	BRWNFLDS	VOLCLNUP	INSTENG	DRY
FLD982109985 ST AUGUSTINE AIRCRAFT SERVICE INC ROUTE 3 BOX 38A ST AUGUSTINE, FL. 32000							X												
FLD982152035 AERO AIRCRAFT REFINISHING US 1 N ST AUGUSTINE, FL. 32000							X												

EDM

EDM

Standard ASTM Research
USGS Topographic Map



Source: USGS Digital Raster Graphic

Map Scale and Site Locations are Approximate

Subject Property

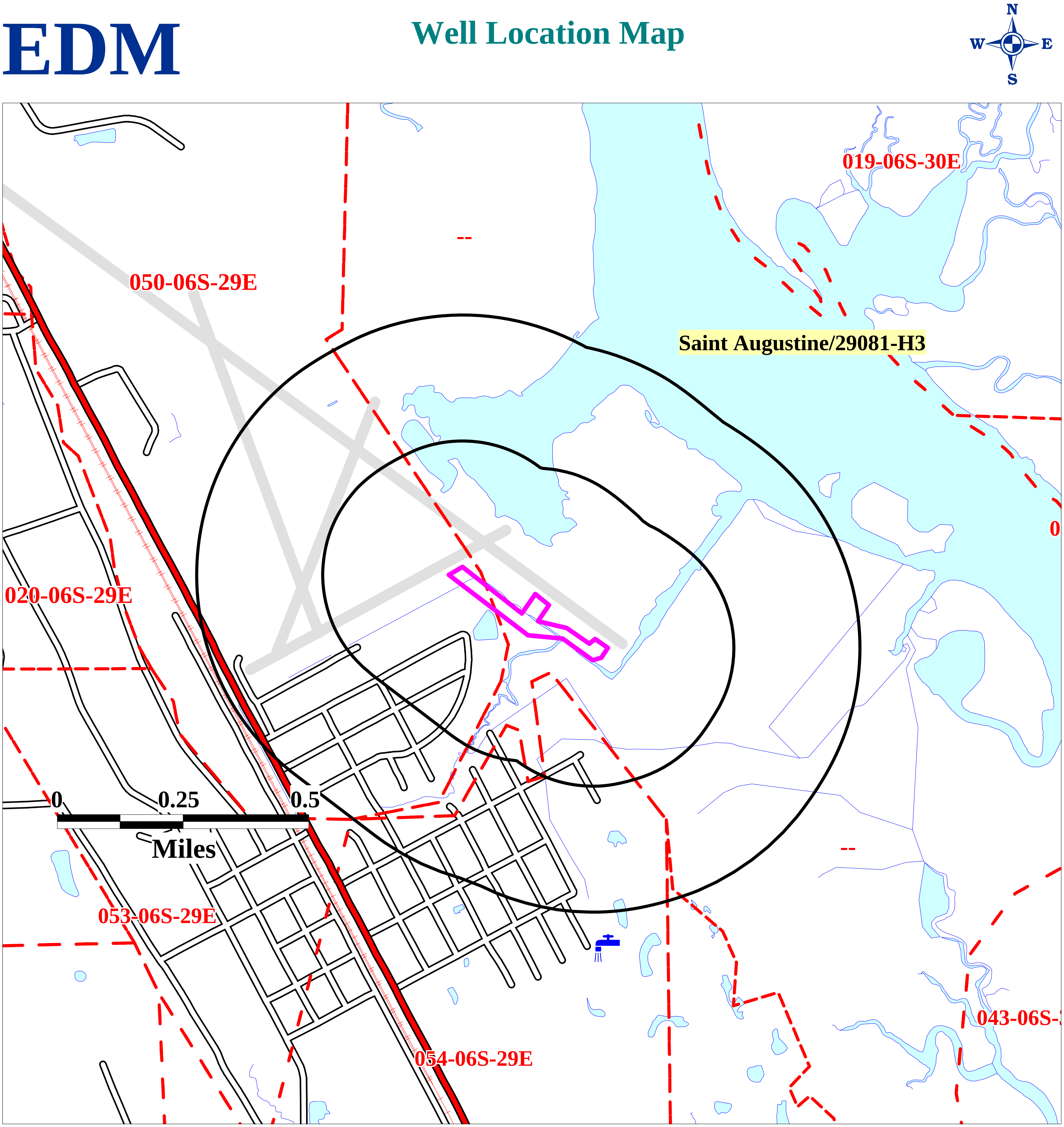
Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

▬	**Approximate Site Boundary**
🟥	**NPL, STNPL, CORRACTS & TSD sites - 1 Mile Radius**
🟨	**CERCLIS, NFRAP, STCERC, SLDWST, LUST, BRWNFLDS, VOLCLNUP & DRYsites - 1/2 Mile Radius**
🟩	**ERNS, NONTSD, TANKS & INSTENG sites - 1/4 Mile Radius**

EDM

Well Location Map



Source: 2006 US Census Bureau TIGER Files, 1995 USGS PLSS, 1997 USGS Contour Data
2005-2007 Florida Water Management District Data, 2007 FDEP Drinking Water Section Public Water System Data

Map Scale and Site Locations are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

Name/12345-A1	USGS Quad Boundary
1234S56E	Section Township Range
🚰	Well Location
🚰	Public Water System Location
—	Approximate Site Boundary

Centroid Latitude: 29° 57' 18.3132"
Centroid Longitude: -81° 19' 58.8468"

USGS Quad: Saint Augustine/29081-H3

WATER MANAGEMENT DISTRICT WELL DATA

Report Date: 5/28/2009

NO DATA FOUND FOR STUDY AREA

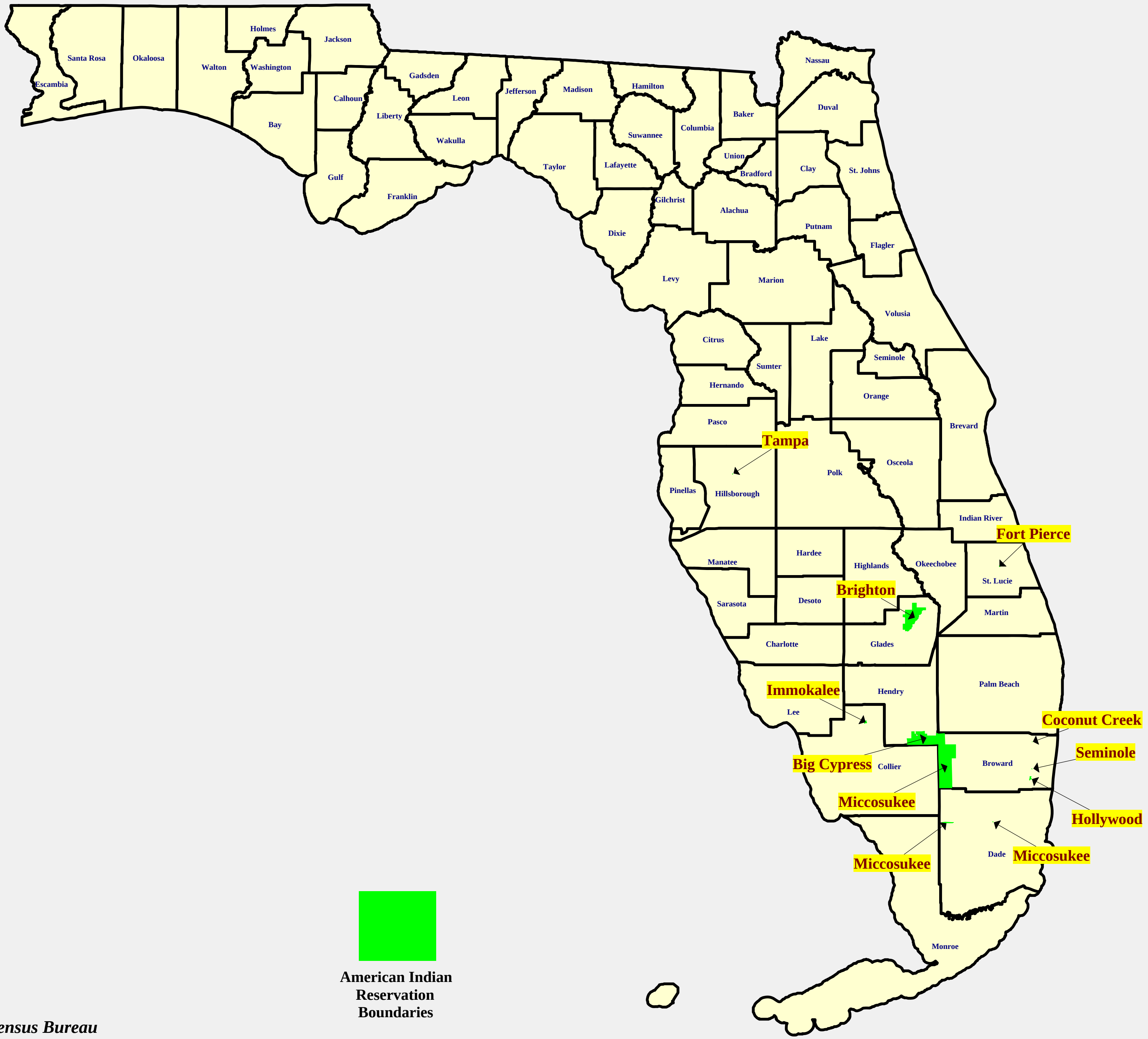
FDEP DRINKING WATER PROGRAM

PUBLIC WATER SUPPLY BASIC FACILITY REPORT (FLPWS)

NO DATA FOUND FOR STUDY AREA

EDM

American Indian Reservations
State of Florida



Source: 2000 US Census Bureau

American Indian Lands in Florida

Name	Entity	County	General Location Information	Approx. Area (Acres)
Tampa Reservation	Seminole Tribe of Florida	Hillsborough	I-4 & Hillsborough Avenue	42
Fort Pierce Reservation	Seminole Tribe of Florida	Saint Lucie	Okeechobee Rd & Eleven Mile Rd	54
Brighton Reservation	Seminole Tribe of Florida	Glades	N of CR 721 & SR 78	36,630
Immokalee Reservation	Seminole Tribe of Florida	Collier	N of CR 846 & Stockade Rd	660
Big Cypress Reservation	Seminole Tribe of Florida	Hendry/Broward	CR 833 & BIA Hwy 182	52,750
Miccosukee Reservation	Miccosukee Tribe of Florida	Broward	I-75 & Government Rd	81,440
Miccosukee Reservation	Miccosukee Tribe of Florida	Dade	SW 8th St & Loop Rd	750
Miccosukee Reservation	Miccosukee Tribe of Florida	Dade	SW 177th Ave & SW 8th St	56
Holly (Dania) Reservation	Seminole Tribe of Florida	Broward	Stirling Rd & Florida's turnpike	560
Coconut Creek Reservation	Seminole Tribe of Florida	Broward	US 441 & NW 40th St	6
Seminole Trust Land	Seminole Tribe of Florida	Broward	US 441 & Davie Blvd	1

Florida Tribal Contacts

Entity	Contact	Tel/Fac	Source
Miccosukee Tribe of Florida	**Billy Cypress** Tribal Chairman Miccosukee Tribe of Indians of Florida iPost Office Box 440021 Miami, Florida 33144 County: Dade	Phone: (305) 223-8380 Facsimile: (305) 223-1011	EPA Reg IV Tribal Contacts
Miccosukee Tribe of Florida	**Steve Terry** Land Resources Manager Miccosukee Tribe of Indians of Florida Post Office Box 440021 Miami, Florida 33144 E-Mail:esoterry@shadow.net	Phone:(305) 223-8380 Facsimile: (305) 223-1011	EPA Reg IV Tribal Contacts
Miccosukee Tribe of Florida	**Billy Cypress** Chairman Miccosukee Indian Tribe Tamiami Station PO Box 440021 Miami, Florida 33144	Phone: (305) 223-8380 Facsimile: (305) 223-1011	US DOI - BIA Tribal Leaders Directory
Seminole Tribe of Florida	**Mitchell Cypress** Tribal Chairman Seminole Tribe of Florida 6300 Stirling Road Hollywood, Florida 33024 County: Broward	Phone: (954) 967-3900 Facsimile: (954) 967-3486	EPA Reg IV Tribal Contacts
Seminole Tribe of Florida	**Craig T. Tepper**, Director Water Resource Management Department Seminole Tribe of Florida 6300 Stirling Road Hollywood, Florida 33024 County: Broward E-Mail:water@gate.net	Phone: (954) 966-6300, extension 1120 Facsimile: (954) 967-3489	EPA Reg IV Tribal Contacts
Seminole Tribe of Florida	**Susie Kippenberger**, Director Utilities Department Seminole Tribe of Florida 6300 Stirling Road Hollywood, Florida 33024 County: Broward E-Mail:susiek@semtribe.com	Phone: (954) 966-3475 Facsimile: (954) 967-3475	EPA Reg IV Tribal Contacts
Seminole Tribe of Florida	**Mitchell Cypress** Chairman Seminole Indian Tribe 6300 Stirling Road Hollywood, Florida 33024 http://www.seminoletribe.com/	Phone: (954) 966-6300 Facsimile: (954) 967-3463	US DOI - BIA Tribal Leaders Directory
Seminole Tribe of Florida	**Joe Frank, Acting Superintendent** Seminole Agency Bureau of Indian Affairs 6100 Hollywood Blvd, Suite 206 Hollywood, FL 33024	Phone: (954) 983-1537 Facsimile: (954) 983-5018	US DOI - BIA Tribal Leaders Directory

Agency List Descriptions

US Environmental Protection Agency (USEPA)

Comprehensive Env Response, Compensation & Liability Information System List(CERCLIS)

The US EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) is the Superfund database used to track facilities and/or locations that the USEPA is investigating to determine if an existing or threatened release of hazardous substances is present.

Agency File Date: 1/9/2009 **Received by EDM:** 5/25/2009 **EDM Database Updated:** 5/25/2009

RCRIS Handlers with Corrective Action(CORRACTS)

The US EPA Corrective Action Sites (CORRACTS) database is a listing of hazardous waste handlers that have undergone RCRA corrective action activity. This information is compiled by the EPA Regional and State RCRA program personnel, as well as the RCRA facilities themselves.

Agency File Date: 5/13/2009 **Received by EDM:** 5/20/2009 **EDM Database Updated:** 5/22/2009

Emergency Response Notification System List(ERNS)

The Emergency Response Notification System (ERNS) database stores information on oil discharges and hazardous substance releases. The ERNS program is a cooperative data sharing effort among the EPA, DOT and the National Response Center (NRC), which currently provides access to this data.

Agency File Date: 1/26/2009 **Received by EDM:** 5/20/2009 **EDM Database Updated:** 5/20/2009

Archived Cerclis Sites(NFRAP)

The US EPA NFRAP list contains archived data of CERCLIS records where the EPA has completed assessment activities and determined that no further steps to list the site on the NPL will be taken. NFRAP sites may be reviewed in the future to determine if they should be returned to CERCLIS based upon newly identified contamination problems at the site. Note: Archived CERCLIS records are now stored in the EPA List 8T database.

Agency File Date: 3/10/2009 **Received by EDM:** 3/10/2009 **EDM Database Updated:** 3/10/2009

RCRA-LQG,SQG,CESQG and Transporters(NONTSD)

The EDM NONTSD list is a subset of the US EPA RCRAInfo System and identifies facilities that generate and transport hazardous wastes. These facilities may be Large Quantity Generators (LQG), Small Quantity Generators (SQG), Conditionally Exempt SQG's (CESQG) as well as" Non-Notifiers" and "Non-Handlers".

Agency File Date: 4/19/2009 **Received by EDM:** 4/28/2009 **EDM Database Updated:** 4/28/2009

National Priorities List(NPL)

The US EPA National Priorities List (NPL) contains facilities and/or locations where environmental contamination has been confirmed and prioritized for cleanup activities. In addition to sites that are currently on the EPA NPL, the EDM database contatains sites that have been Proposed for and Deleted from the list.

Agency File Date: 5/9/2009 **Received by EDM:** 5/21/2009 **EDM Database Updated:** 5/21/2009

Tribal Lust List(TRIBLLUST)

The USEPA Region IV Tribal Tanks database lists Active and Closed storage tank facilities on Native American lands. The EDM Tribal Lust report is created by extracting those records from the storage tank database that have indicated current or past releases.

Agency File Date: 6/6/2008 **Received by EDM:** 10/14/2008 **EDM Database Updated:** 10/27/2008

Tribal Tanks List(TRIBLTANKS)

The USEPA Region IV Tribal Tanks database lists Active and Closed storage tank facilities on Native American lands.

Agency File Date: 6/6/2008 **Received by EDM:** 10/14/2008 **EDM Database Updated:** 10/27/2008

RCRA-Treatment, Storage and/or Disposal Sites(TSD)

The EDM TSD list is a subset of the US EPA RCRAInfo system and identifies facilities that Treat, Store and/or Dispose of hazardous waste.

Agency File Date: 4/19/2009 **Received by EDM:** 4/28/2009 **EDM Database Updated:** 4/28/2009

Brownfields Management System(USBRWNFLDS)

The US EPA Brownfields program contains information on Brownfields properties reported to be addressed by Brownfields Grantees or by EPA with Targeted Brownfields Assessment funding. EDM has included Tribal Brownfield sites in it's USBRWNFLDS database.

Agency File Date: 5/13/2009 **Received by EDM:** 5/23/2009 **EDM Database Updated:** 5/23/2009

Florida Department of Environmental Protection (FDEP)

State Designated Brownfields(BRWNFLDS)

The FDEP Brownfields database contains a listing of State Designated Brownfield Areas. Brownfields areas are typically abandoned, idled or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.

Agency File Date: 5/24/2009 **Received by EDM:** 5/24/2009 **EDM Database Updated:** 5/24/2009

State Dry Cleaners List(DRY)

The Florida Dry Cleaners List is comprised of data from the FDEP Storage Tank and Contamination Monitoring (STCM) database and the Drycleaning Solvent Cleanup Program- Priority Ranking List. It contains a listing of those Dry Cleaner sites (and suspected historical Dry Cleaning sites) who have registered with the FDEP for the Dry Cleaning Solvent Cleanup Program.

Agency File Date: 3/10/2009 **Received by EDM:** 3/26/2009 **EDM Database Updated:** 3/27/2009

State Institutional and/or Engineering Controls(INSTENG)

The FDEP INSTENG list contains sites that have had Institutional and/or Engineering Controls implemented to regulate exposure to environmental hazards

Agency File Date: 4/28/2009 **Received by EDM:** 4/28/2009 **EDM Database Updated:** 5/5/2009

Leaking Underground Storage Tanks List(LUST)

The FDEP LUST list identifies facilities and/or locations that have notified the FDEP of a possible release of contaminants from petroleum storage systems. This Report is generated from the FDEP Storage Tank and Contamination Monitoring Database (STCM).

Agency File Date: 5/4/2009 **Received by EDM:** 5/25/2009 **EDM Database Updated:** 5/25/2009

Solid Waste Facilities List(SLDWST)

The FDEP SLDWST identifies locations that have been permitted to conduct solid waste handling activities including Landfills, Transfer Stations and sites handling Bio-Hazardous wastes. Sites listed with "##" after the Facility ID Number are historical locations, obtained from documents on record at local agencies.

Agency File Date: 3/26/2009 **Received by EDM:** 3/26/2009 **EDM Database Updated:** 3/26/2009

State CERCLIS Equivalent(STCERC)

The STCERC is a historical listing of sites that the Florida Department of Environmental Regulation (FDER) compiled to track suspect contamination sites. This list was known as the Florida SITES list and was last updated by the FDER in 1989.

Agency File Date: 12/1/1989 **Received by EDM:** 4/1/1995 **EDM Database Updated:** 4/25/1995

State NPL Equivalent(STNPL)

The FDEP State Funded Action Sites (SFAS) list contains facilities and/or locations that have been identified by the FDEP as having known environmental contamination and are currently being addressed through State funded cleanup action.

Agency File Date: 9/5/2008 **Received by EDM:** 3/26/2009 **EDM Database Updated:** 3/26/2009

Underground/Aboveground Storage Tanks(TANKS)

The FDEP TANKS list contains sites with registered aboveground and/or underground storage tanks containing regulated petroleum products. Please refer to the "Explanation of Florida Tank Codes" insert to interpret tank construction, monitoring and piping codes.

Agency File Date: 4/3/2009 **Received by EDM:** 4/21/2009 **EDM Database Updated:** 4/22/2009

State Voluntary Cleanup List(VOLCLNUP)

The FDEP VOLCLNUP List is derived from the FDEP Brownfields Site Rehabilitation Agreement (BSRA) database. This database identifies those sites that have signed an agreement to Voluntarily cleanup a Brownfields site in accordance with FDEP requirements.

Agency File Date: 5/24/2009 **Received by EDM:** 5/24/2009 **EDM Database Updated:** 5/25/2009

EXPLANATION OF FLORIDA TANK CODES

CONSTRUCTION TYPE CODES

A = BALL CHECK VALVE
B = INTERNAL LINING
C = STEEL
D = UNKNOWN
E = FIBERGLASS
F = FIBERGLASS-CLAD STEEL
G = CATHODIC PROTECTION-SACRIFICIAL ANODE
H = CATHODIC PROTECTION -IMPRESSED CURRENT
I = DBL WALL/SINGLE MATERIAL
J = SYNTHETIC LINER IN TANK EXCAVATION
K = AST CONTAINMENT: CONCRETE /SYNTHETIC MATERIAL AREA
L = COMPARTMENTED
M = SPILL CONTAINMENT BUCKET
N = FLOW SHUT OFF
O = TIGHT FILL
P = LEVEL GAUGES, HI LEVEL ALARMS
Q = OTHER DER APPROVED PROTECTION METHOD
R = DBL WALL/DUAL MATERIAL/ (TANK “JACKET”)
S = OTHER DEP APPROVED SECONDARY CONTAINTMENT SYSTEM
T = SMALL USE TANK
U = FIELD ERECTED TANK
V = PIPELESS UST W/SECONDARY CONTAINMENT
W = BUILT ON SUPPORTS
X = CONCRETE
Y = POLYETHYLENE
Z = OTHER DEP APPROVED TANK MATERIAL

PIPING TYPE CODES

A = ABOVE GROUND-NO CONTACT W/SOIL
B = STEEL OR GALVANIZED METAL
C = FIBERGLASS
D = EXTERNAL PROTECTIVE COATING
E = CATHODIC PROTECTION (SACRIFICIAL ANODE/IMPRESSED CURRENT)
F = DBLWALL/SINGLE MATERIAL
G = SYNTHETIC OR BOX/TRENCH LINER
H = AIRPORT/SEAPORT HYDRANT SYSTEM
I = SUCTION PIPING SYSTEM
J = PRESSURIZED PIPING SYSTEM
K = DISPENSER LINERS
L = BULK PRODUCT SYSTEM
M = DOUBLE WALL / DUAL MATERIAL (PIPE “JACKET”)
N = APPROVED SYNTHETIC MATERIAL
O = SEVERE VIOLATION
P = INTERNAL PIPING WITHIN INTERNAL SUMP RISER
V = VIOLATION
X = NO PIPING ASOCIATED WITH TANK
Y = UNKNOWN
Z = OTHER DEP APPROVED PIPING MATERIAL

LEAK MONITORING CODES

1 = CONTINUOUS ELECTRONIC SENSING EQUIPMENT
2 = VISUAL INSPECTIONS OF PIPING SUMPS
3 = ELECTRONIC MONITORING OF PIPING SUMPS
4 = VISUAL INSPECTIONS OF DISPENSING LINERS
5 = ELECTRONIC MONITORING OF DISPENSER LINERS
6 = EXTERNAL PIPING MONITORING
7 = AUTOMATICALLY SAMPLED WELLS
8 = MANUALLY SAMPLED WELLS
A = SITE SUITABILITY PLAN
B = SITE SUITABILITY PLAN EXEMPTION
C = GROUNDWATER MONITOR PLAN
D = SPCC PLAN
E = INTERSTITIAL MONITORING UST LINERS
F = INTERSTITIAL SPACE-DOUBLE WALL TANK
G = ELECTRONIC LINE LEAK DETECTOR W/FLOW SHUTOFF
H = MECHANICAL LINE LEAK DETECTOR
I = NOT REQUIRED-SEE RULE FOR EXEMPTIONS
J = INTERSTITIAL MONITORING-PIPING LINER
K = INTERSTITIAL MONITORING- DOUBLE WALL PIPING
L = AUTOMATIC TANK GAUGING SYSTEM (USTS)
M = MANUAL TANK GAUGING SYSTEM (USTS)
N = GROUNDWATER MONITORING SYSTEM
O = VAPOR MONITORING SYSTEM
P = VAPOR MONITORING W/DILUTION PROCEDURES
Q = VISUAL INSPECTION OF AST SYSTEMS
R = INTERSTITIAL MONITORING OF TANK BOTTOM
S = STATISTICAL INVENTORY RECONCILIATION (SIR/USTS)
T = ANNUAL TIGHTNESS TEST WITH INVENTORY (UST)
U = BULK PIPING PRESSURE TEST
V = SUCTION PUMP CHECK VALVE
W = FIBER-OPTIC TECHNOLOGIES
X = NONE
Y = UNKNOWN
Z = OTHER DEP APPROVED MONITORING METHOD

Map Descriptions

Brownfields and Contaminated Areas Map

EDM’s Brownfields and Contaminated Areas map displays the areial extent and location of State Designated Brownfields, USEPA National Priorities List (Superfund) sites, State Funded Action Sites (State NPL equivalent) and FDEP Contaminated Groundwater Delineation areas.

The FDEP Groundwater Delineation Program was developed after studies conducted in 1983, showed the presence of ethylene dibromide (EDB) in drinking water wells at various locations throughout the state. From 1962 to mid 1983 the Florida Department of Agriculture and Consumer Services conducted widespread field application of this soil fumigant (EDB) to control nematodes in citrus groves. EDB was also used by private citizens on golf courses and on crops such as peanuts and soybeans. Because of the EDB in drinking water wells, the 1988 Legislature directed the Department of Environmental Protection to implement water well construction and water testing standards within areas of known ground water contamination.

Well Location Map

EDM’s Well Location Map displays the location of Public Water Supply and consumptive use water wells in the area surrounding the subject property. Data details regarding these water wells is provided for those wells that fall within a 1/2 Mile radius of the subject property.

This information is derived from integrating map data from the US Census Bureau and the USGS along with well location data from the FEDP and various water management districts throughout the State of Florida. In addition to the well location information displayed, this map also includes Section, Township and Range info, USGS Quad Names and the Latitude and Longitude of the subject property (Deg-Min-Sec).

American Indian Lands

EDM has obtained American Indian Reservation boundary files from the US Census Bureau and has presented them in a statewide reference map. General location and contact information is also presented in the Table accompanying this map.

Topographic Map

EDM’s Topographic Map is derived from Digital Raster Graphic (DRG) data obtained from the US Geological Survey (USGS). A DRG is a raster image created by scanning published paper maps on high-resolution scanners. To display these DRGs within our Geographic Information System (GIS), EDM strips the collar information from each image and assigns control points for matching the image to ground control coordinate values associated with our vector based Street Map data.

FEMA Flood Map

EDM’s FEMA Flood Map is a representation of 100-Year and 500-Year floodplain areas as derived from Digital Q3 Flood Data obtained from the Federal Emergency Management Agency (FEMA). The Q3 Flood Data are developed by scanning and vectorizing existing hardcopy Flood Insurance Rate Maps (FIRMs) to create 1) a raster product suitable for viewing or printing and 2) a thematic vector overlay of flood risk areas. The Q3 Flood Data are intended to capture all FIRM data in the raster file, but only certain features in the vector file. EDM uses the vector file to provide a graphic display of the 100-year and 500-year floodplain areas.

Definitions: SFHA-Special Flood Hazard Area COBRA-Coastal Barrier Resources Act

NWI Wetlands Map

EDM’s NWI Wetlands Map is a representation of wetland areas as derived from Digital Line Graph (DLG) data obtained from the US Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI) program. The FWS/NWI has the primary responsibility for the mapping and inventory of wetlands within the United States. The NWI produces wetland maps by initially employing photo-interpretation of color-infrared photographs. These photographs often provide distinctive color, texture and pattern features that are characteristic of wetland vegetation and background soils. The mapping process may be further checked and validated through analysis of US Geological Survey (USGS) Topographic maps and Natural Resources Conservation Service (NRCS) Soil Survey maps. In some instances, field reconnaissance may also be an option during the validation process.

Appendix C

Historic Aerial Photo Inquiry

ENVIRONMENTAL DATA REPORT

Historical Aerial Photograph Report

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

Prepared For:

Access Environmental, Inc.
1039 Green Pines Circle
Orange Park, FL 32065

Prepared By:

ENVIRONMENTAL DATA MANAGEMENT, INC.
2840 West Bay Drive, Suite 208
Largo, Florida 33770

May 28, 2009

EDM

Environmental Data Management, Inc.
2840 West Bay Drive, Suite 208
Largo, Florida 33770
Tel. (727) 586-1700 Fax (727) 585-1701
http://www.edm-net.com

May 28, 2009

Eric Lane
Access Environmental, Inc.
1039 Green Pines Circle
Orange Park, FL 32065

Subject: **Historic Aerial Photos-- EDM Project #: 20195**

Dear Mr. Lane:

Thank you for using Environmental Data Management, Inc. The following report contains a series of Historical Aerial Photographic images for the following location:

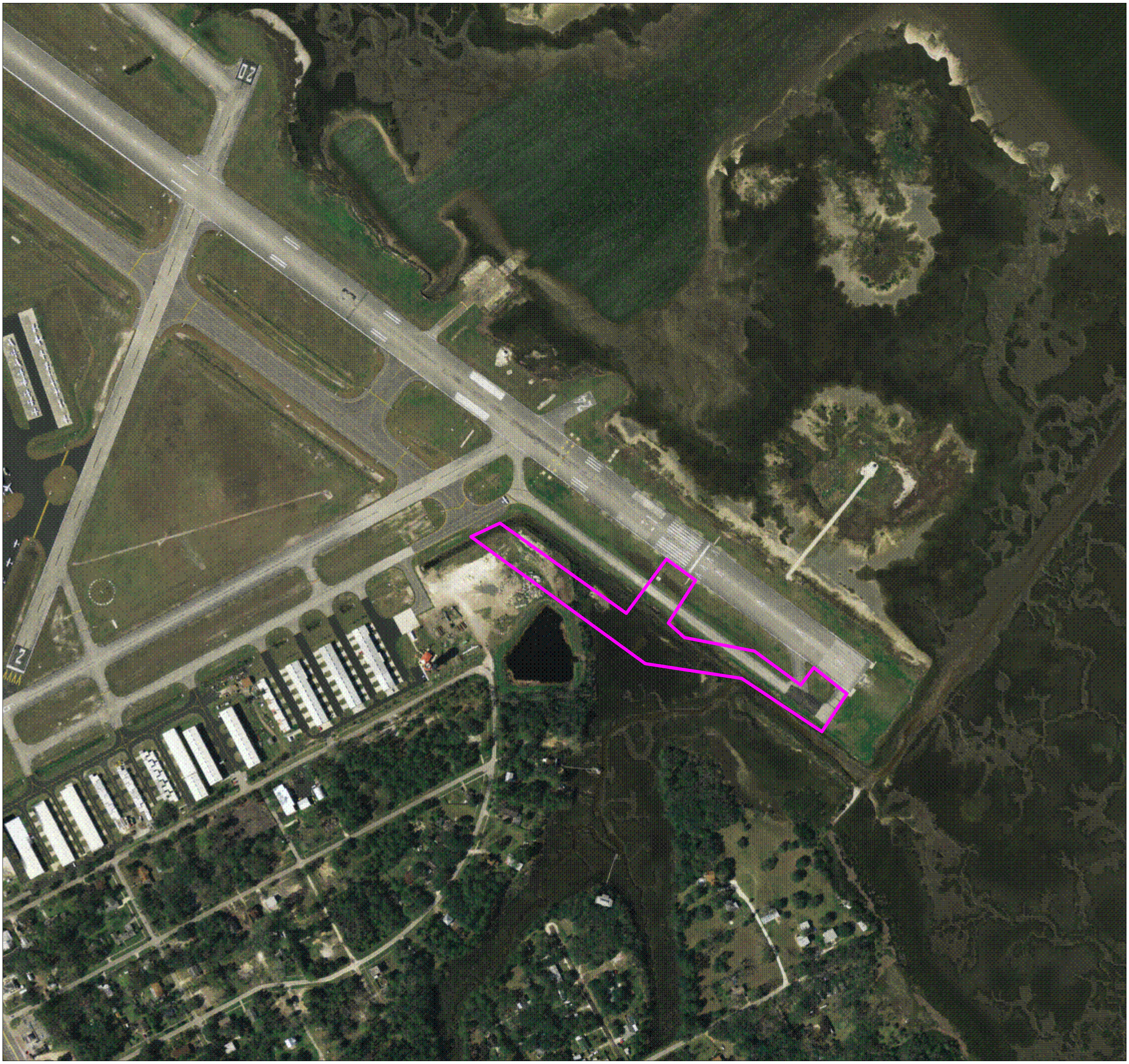
Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

These images were selected to provide you with an aerial photographic record of this location **at intervals of one photograph per decade**, where available. Should you have any questions regarding this report or our service, please feel free to contact us. We appreciate the opportunity to be of service to you and look forward to working with you in the future.

ENVIRONMENTAL DATA MANAGEMENT, INC.

EDM

Aerial Photo Image
2005



Source: Florida Dept of Transportation

Map Scale and Property Boundaries are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

━ Approximate Site Boundary

Aerial Photo Image
1993

Source: Florida Dept of Transportation

Map Scale and Property Boundaries are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

▬	Approximate Site Boundary

EDM

Aerial Photo Image
1980

Source: Florida Dept of Transportation

Map Scale and Property Boundaries are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

▬	Approximate Site Boundary

EDM

Aerial Photo Image
1971

Source: Florida Department of Transportation

Map Scale and Property Boundaries are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

▬	Approximate Site Boundary

EDM

Aerial Photo Image
1960

Source: *University of Florida*

Map Scale and Property Boundaries are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

▬	Approximate Site Boundary

EDM

Aerial Photo Image
1952

Source: University of Florida

Map Scale and Property Boundaries are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

━ Approximate Site Boundary

EDM

Aerial Photo Image
1942

Source: University of Florida

Map Scale and Property Boundaries are Approximate

Subject Property

Runway Relocation Extents
Portions of Parcel IDs: 074840 0000 & 074940 0000
St Augustine, Florida 32095

EDM Job No: 20195
May 28, 2009

▬ Approximate Site Boundary

Appendix D

Historic Fire Insurance Map Inquiry

Access Environmental, Inc.

Fire Insurance Map Inquiry

Project Name: St. Augustine Airport Taxiway C Relocation Site
Location: St. Augustine, St. Johns County, FL.

Recorded by: EGL
Of: AEI

At (time): 1330 PM
On (date): June 1, 2009

Summary of Inquiry: A review of all publicly held fire insurance maps at the St. Johns County Public Libraries (St. Augustine/Southeast Regional branches) as well as review of the University of Florida digital collections revealed that fire insurance maps were not available for this portion of St. Johns County.

Conclusions, actions taken, required or recommended: NA

Follow up required; when, with and by whom: NA

Population [illegible] in Winter and [illegible] in Summer

[illegible]

WATER FACILITIES

[illegible]

FIRE DEPARTMENT

[illegible]

INSURANCE MAPS OF St. Augustine

FLORIDA

SANBORN MAP COMPANY

March 1910

INDEX.

[illegible]

Appendix E

Historic City Directory Inquiry

2006

US HIGHWAY 1 N Cont'd

11430 No Current Listing

BUSINESSES 9 **HOUSEHOLDS 7**

US HIGHWAY 1 N (SAINT AUGUSTINE)-FROM 101 SUMMERLIN LN NORTHWEST

• ZIP CODE 32095 CAR-RT R033

4000 Ⓝ Abramajtis Teodora
GEORGETOWN HOSPITALITY INC nonclassified establishments 904-826-3555
4225 BETTER BUILT HOMES mobile homes-dlrs 904-824-2835
Ⓝ McCallister Joseph A
4275 PRESTIGE HOME CTR mobile homes-dlrs 904-825-4650
4460 MIKE MORELLO INC ventilating sys- cleaning 904-797-5026
4508 STEPHANIE'S restaurants 904-829-0086
4516 Ⓝ Murphy Colleen
4524 AMERICA U STORE IT storage- household & commercial 904-824-9050
RYDER MOVING SVC movers 904-829-2626
4540 ACME WIRELESS CO cellular telephones 904-810-2275
Ⓝ Catalli Rice Suzie 904-826-3999
GLOBAL BAIL BONDS bonds-bail 904-826-3999
GLOBAL SURETIES INC bonds-bail 904-825-1511
KANGAROO EXPRESS convenience stores 904-829-0074
4560 ROBINSON CLEANING SVC INC janitor serv 904-824-5035
Ⓝ Shoar Estelle
Ⓝ Silseth D S
YACHT SPECIALISTS-ST AUGUSTINE boat rpr ..904-824-6541
4600 DAVID DOBBS ENTERPRISES INC leather goods 904-824-6171
DESIGNS INC nonclassified establishments 904-584-1233
4644 PARTS DIRECT truck equip & parts-whol 904-808-1222
4660 GIGI'S GRILL & DELI restaurants 904-829-5880
4700 PROBATION PLUS legal serv plans 904-824-8383
PSYCHOLOGICAL SVC alcoholism info/treatment ctrs 904-829-8382
4742 Hayes Joseph W [17] ▲ 904-829-8815
4760 CAR STEREO SVC auto radio & stereo sys 904-826-4000
4778 MOLLY MAID house cleaning 904-825-1717
4900 ALLISION'S FLY BY CAFE restaurants 904-827-0172
ENTERPRISE RENT A CAR auto renting 904-823-1767
FLY BY CAFE & CATERING restaurants 904-824-3494
PGA TOUR AIRCRAFT HANGER aircraft-dlrs 904-825-4981
100 GALAXY AVIATION airports 904-824-1995
100 HERTZ RENT A CAR auto renting 904-826-1374
200 FLORIDA AVIATION CAREER TRNNG schools 904-824-9401
400 HELICOPTERS OF ST AUGUSTINE helicopter 904-824-5506
800 LIGHTHOUSE LIMOUSINE limousine serv 904-827-1003
4900 B/2 GWANDA computer rooms 904-808-1386
5000 NORTHROP GRUMMAN INTEGRATED aircraft modifications 904-825-3300

• ZIP CODE 32095 CAR-RT R020

5720 INTERNATIONAL CANINE NARCOTICS dog training 904-829-5654
Kunz James M & Bambie L [15] ▲
5750 OLD CITY IRON & CANVAS welding 904-827-0000
TIERRA FINA ceramic prod- decorative-whol 904-808-0507
5760 Ⓝ Horovsky Robert L 904-824-6279
WILSON MACHINE & WELDING WORKS mach shops 904-829-3737
5774 Agan Joe [3] 904-829-8606
Ⓝ Blackwell Michael
Bowse Holly [2]
Ⓝ Cheshire Thomas 904-819-0393
Ⓝ Clinton Lewis & Robin 904-825-4045
Dekle Daniel [8]
Dekle Courtney
FROG HOLLOW mobile homes 904-829-6665
Jordan Joann [7]
Massie Wm C [14]
Massie Mary
Payne Kenneth B [4]
Payne Brad
Ⓝ Rhodes Wendy 904-829-5176
Ⓝ Ronn M E 904-819-9158
Schriver Charles E [5]
Ⓝ Simpson Samantha

US HIGHWAY 1 N Cont'd

6310 FAIRING SCREEN GUSTAFSSON screens- door & window 904-824-2119
NORTH CITY AUTOMOTIVE INC auto body- rpr & painting 904-824-3030
PEARSON WELDING welding 904-824-5755
6312 Ⓝ Benhardus Chris G
MVP PAINTING painters 904-824-4636
STRANGE LATHING & PLASTERING plastering contractors 904-824-6286
6370 ALL NATURAL INTERIORS tile-ceramic 904-824-8503
BELARO DESIGN GROUP INC costumes- masquerade/theatrical 904-829-5242
COMPOSITE TECHNOLOGIES LLC fiber glass fabricators 904-827-9000
CURB SYSTEM OF NE FLORIDA concrete contractors 904-829-3455
SET IN STONE MARBLE & GRANITE granite products- mfrs 904-823-9779
ST AUGUSTINE MILLWORKS millwork 904-827-0882
1 MURPHY BED DEPOT CO beds-retail 904-823-9255
5 ANTIQUE WAREHOUSE furniture-dlrs- retail 904-826-1524
6460 BRITISH PUB KINGS HEAD restaurants 904-823-9558
KINGS HEAD BRITISH PUB pubs 904-823-9787
6470 ENGLISH VILLAGE MOTEL hotels & motels 904-823-1466
6480 AMERDEN INC material handling equip 904-826-4490
SCHOENHUT PIANO toys-retail 904-810-1945

+ N ONE DR BEGINS

6520 CHECKER CAB OF ST AUGUSTINE taxicabs & transportation serv 904-829-1111
6550 No Current Listing
6580 Rudolph Jeromi A [4] ▲ 904-823-8703
Rudolph Rocki 904-823-8703
6590 Mull Richard [5] ▲ 904-824-6861
Mull Margaret 904-824-6861

+ RONALD RD BEGINS

• ZIP CODE 32095 CAR-RT R046

6810 Cornwell Russell L [8] ▲ 904-826-0172
CORNWELL'S MARKET grocers-retail 904-829-8159
6980 AQUATECHNIQUE MANUFACTURING mfrs 904-824-0580
LEEBERN DISTRIBUTORS tile-ceramic 904-829-6161
PAVERS BY FISHER CONCRETE INC concrete contractors 904-808-9970
104 MARINER AMERICA INC plumbing fixtures & supl-whol 904-826-1055
108 G B CUSTOM CABINETS cabinets 904-824-4229
7000 ARTISTIC TILE CO tile-ceramic 904-810-7065
BYO PRODUCTS INC playground equip 904-808-8509
NATURAL ANIMAL pet supl-whol 904-824-5884
7040 WHITECASTLE BAPTIST CHILDCARE child care serv 904-824-0098
7060 Hickey Gary D & Jacquelyn S [15] ▲ 904-824-7985
7280 Frantz John E [15] ▲
MOTHER NATURE'S NURSERY plants-retail 904-829-2528
8990 Burnette Douglas G [10] ▲
9050 No Current Listing
9080 Ⓝ Gillen Shannon
9990 H S MACHINE mach shops 904-810-2300
10090 AUSTIN OUTDOOR INC nonclassified establishments 904-819-1895
10450 MARDALE SPECIALTIES DIRECT building materials 904-810-9713
RJR LESKO INC construction mgmt 904-824-5552

BUSINESSES 82 **HOUSEHOLDS 44**

US HIGHWAY 1 S (SAINT AUGUSTINE)-FROM 337 STATE ROAD 206 E

• ZIP CODE 32084 CAR-RT C021

1360 ST JOHNS PET SHOP pet boarding & sitting 904-824-2233
ST JOHNS VETERINARY CLINIC veterinarians ..904-824-2233
1375 GOODYEAR TIRE tire-dlrs-retail 904-824-2891
RAY'S TIRE & SVC auto rpr & serv 904-829-6418
1395 ABS GROUP INC & ASSOC financial planning consultants 904-827-1820
JOHN VALDES & ASSOC INC real estate inspection 904-824-6150
Starling Vanessa J [14]
VIVIAN'S JEWELRY & REPAIR jewelry-rpr 904-824-5155
B SUNCOAST SHOES & REPAIRS shoe & boot rpr 904-810-5577

US HIGHWAY 1 S Cont'd

Knox James [2] ▲
1586 PPG PORTER PAINTS paint-retail ....
1590 ADAM & EVE lingerie ....
ST AUGUSTINE FLORIST florists-retail ....

+ ARAPAHO AVE INTERSECTS

+ OLD DIXIE HWY INTERSECTS

1600 JIM MARTIN DISC TIRES & SVC tire-dlrs-retail ....
TIRES PLUS TOTAL CAR CARE auto rpr & serv ..
1635 SAN LORENZO CEMETERY cemeteries ....
1650 PERFORMANCE PHYSICAL THERAPY phys thera ....
WORLD GYM FITNESS CTR health clubs studios/g ....
1681 HOLY CROSS LITTLE BLESSINGS child care serv ....
1685 NAPA AUTO PARTS auto rpr & serv ....
1690 NORTHEAST FLORIDA OCCUPATIONAL physician surgeons ....
A HEALTHSOUTH SPORTS MEDICINE phys therap ....
C DERMATOLOGY ASSOCIATES-NE FL physicians ....
D ANDERSON LUIS MD physicians & surgeons ..
D NG RAPHAEL MD physicians & surgeons ....
E MORTGAGE MARKET INC real estate loans ....
G RE/MAX 100 REALTY INC real estate ....
I COLONIAL BANK banks ....
1695 COMPASS BANK banks ....

+ NIX BOAT YARD RD INTERSECTS

1699 CLASSIC CUTS beauty salons ....
K K'S TIRE tire-dlrs-retail ....
PRE OWN SELECT AUTO SALES auto dlrs-used car 9
PROFESSIONAL REAL ESTATE INC real estate ..9
A A PERFECT FIT ALTERATIONS alterations- clothin 9
B HOME FASHIONS BY SALLY int decrtrs design/cor 9
C MEL'S NAILS manicuring 9
1700 FLORIDA CAPITAL BANK banks 9
1720 SONNY'S REAL PIT BAR-B-Q restaurants 9
1725 BURGER KING restaurants 9
1750 HOME DEPOT home centers 9
1752 Chick Fila [4] ▲ 9
Chick A 9
1760 STEAK N SHAKE restaurants 9
1777 KMART department stores 9
KMART PHARMACY pharmacies 9
1783 RENT WAY rental serv- stores & yards 9
1787 TURTLES MUSIC records tapes & compact discs ..9
1790 VP LLC 1 convenience stores 90
1795 DANA B KENYON CO nonclassified establishments 90
MARSHALLS department stores 90
1799 TUESDAY MORNING gift shops 90
1803 RADIO SHACK electronic equip/supl-retail 90
1805 KFC restaurants 90
1811 FIRESIDE HEARTHS & GRILLS fireplaces 90
1815 NETTLES FINE JEWELRY jewelers-retail 90
1820 TACO BELL restaurants 90
1830 WENDY'S restaurants 90
1835 A/C DESIGN OF ST AUGUSTINE air conditioning contr 90
AMERICAN SHAMROCK MOBILE DTLNG auto detail & up serv 90
FIRST WOK restaurants 904
Horning James A [7] 904
INVESTIGATIVE & SECURITY SPEC detectives-private 904
KAREN MICHELLE TILES antiques-dlrs 904
Ⓝ Kromberg Kenneth
MATTRESS FIRM mattresses 904
113 SMOOTHIE KING health & diet foods-retail 904
119 ANDERLE MARINE docks 904
119 Ⓝ Burnett Mary
119 Ⓝ Doss Joan M
119 Doss Hazel C

2001

UNIVERSITY BLVD

BUSINESSES 3

US HIGHWAY 1 N (SAINT AUGUSTINE)-FROM 3991 N PONCE DE LEON BLVD NORTHWEST

+PONCE ISLAND DR ENDS

· ZIP CODE 32095 CAR-RT R020

4000 FAIRWAYS GRILL eating places 824-2821
GEORGETOWN HOSPITALITY 826-3555
PONCE DE LEON GOLF & CNFRNC eating places 824-2821
PONCE DE LEON RESORT 824-4327
RADISSON PONCE DE LEN GLF AND CNFRNCE RSRT PR SHP public golf courses ... 829-5314
RADISSON PONCE DE LEON GOLF public golf courses 824-2821

+N PONCE DE LEON BLVD CONTINUES

4225 A & W MOBILE HOMES mobile home dlr...... 824-2835
Harrison Danny R [3]
Harrison Janet R
SANCTUARY THE.. 824-2106
4255 18 WILLIAM P HENDRICKS CABINETS furn stores 806-0587
4275 PRESTIGE HOME CENTER real estate agt 825-4650

+LEWIS SPEEDWAY ENDS

4490 ISS GOLF SERVICES 829-2551
4524 AMERICA U STORE IT whse self stg...................... 824-9050
U HAUL COMPANY INDEPENDENT DEALERS truck rntl 808-0610
4540 REYNOLDS SMITH & HILLS CS...................... 825-0220
4560 Annaruma Elizabeth M 829-6131
Annaruma Joseph A [6] 829-6131
2 Silseth Darlis S [5]
4-9 Not Verified (2 Apts)

+2ND ST BEGINS

4600 DAVID DOBBS ENTERPRISES coml prtg lithographic 824-6171
GEOTEC SERVICES surveying serv 826-4410
MENU DESIGNS 824-6171
4660 JEFF'S PLACE eating places 829-6726
4688 TRUCK IMPROVEMENTS recreational veh dlr 808-1222
4700 Chalmers John J [7]
LAND MANAGEMENT SERVICE logging 824-4708
B LG2 ENVIRONMENTAL SOLUTIONS coml physical research 824-8633
4704 CARE-A-LOT DAY CARE & PRESCHL child day care 829-9563
4760 CAR STEREO SERVICE radio tv repr 826-4000
LIL' CHAMP FOOD STORE grocery stores 829-8460
4776 Not Verified
4778 Kadlec George W [5] ⌂
4900 AVIS RENT A CAR auto rntl 829-3700
FLY-BY CAFETERIA eating places 829-1838
PGA TOUR AIRCRAFT HANGER 825-4981
SOUTHEAST AERO SERVICE airports 824-1899
100 AERO SPORT auto dlrs 824-1995
100 ST AUGUSTINE AIRPORT airports 824-1995
200 FLORIDA AVIATION CAREER TRNNG schs/educ serv 824-9401
5000 NORTHROP GRUMMAN aircraft parts............ 825-3300
NORTHROP GRUMMAN FEDERAL CREDIT UNION 824-7440
SERVICE AMERICA food vending machs 825-0387

· ZIP CODE 32095 CAR-RT R010

5720 INTERNATIONAL CANINE NARCOTICS pet serv 829-5654
5750 OLD CITY IRON & CANVAS welding repr 827-0000
TIERRA FINA homefurnishings 808-0507
5760 WILSON MACHINE &

US HIGHWAY 1 N

3 Not Verified
4ⓃWatts Richelle L
7 Harrison Lori D [2] 827-1427
8 Delaughter Joseph W [5]
8 Delaughter Valenia C
9 Not Verified
14 Wexler Terry L [2]
15 McMath Mary A [2]
19 Morgan Kathleen A [4] 829-1648
27 Williams Roberta L [4] ⌂ 827-0527
35 Taylor Brenda S
35 Taylor Lloyd [3]
5900 Finiello John
Finiello Nicholas F [8] ⌂
5940 Chapman Brenda M
Chapman Charles W [9]+ ⌂
CHARLES CHAPMAN AUTO SALES new used car dlrs 824-9206
Peters Ben W [9]+
5960 LEVEL FLOW 823-3606
5980 DEVANE REALTY GROUP real estate agt 823-1400
EAGLE CREEK OF ST AUGUSTINE real estate agt 823-1400
6050 Vansandt Richard L Jr [9]+ ⌂
3 Scott Stacey M
3 Scott William T [4]
6100 GLOBAL MARINE SYSTEMS 827-9885
SOUTHERN LATCH MFG indl machry 824-5466
U S CUSTOMS SERVICE 823-8500
H CREATIVE IMAGES mfg industries 825-6700
6110 Cox Mike [2]............ 829-5598
6120 PRIESTER'S CABINETS furn stores...................... 826-4417
6130 CANDLE CREATIONS candle shops 826-0144
A Friello Michael A 824-3257
A Friello Ronald A [6] ⌂
6210 Anderson George L [7]
6236 Not Verified
6310 FAIRING SCREEN GUSTAFSSON........ 824-2119
GUSTAFSSON PLASTICS plastics prodts 824-3443
NORTH CITY AUTOMOTIVE top/body repr/paint sh 824-3030
PEARSON WELDING welding repr 824-5755
Weiss R E [5].......... 824-3030
6370 1 AMERICAN WALL BED COMPANY furn 823-9255
3 VALDON INDUSTRIES mattresses bedsprings 829-3000
4 ANTIQUE WAREHOUSE used merch stores 826-1524
6410 OLD CITY PLUMBING SUPPLIES lumber/other bldg matl...................... 824-5242
6460 KINGS HEAD BRITISH PUBLIC bar............ 823-9787
6470 ENGLISH VILLAGE MOTEL THE motel.............. 823-1466
6480 AMBIANCE.............. 824-9039
AMERDEN busn conslt 826-4490
OCEANIC SOUTHEAST 824-6528
SCHOENHUT PIANO COMPANY games toys children's 325-6850
6550 Hayes James E & Robin [8] ⌂
6580 Not Verified

· ZIP CODE 32095 CAR-RT R003

6810 CORNWELL'S MARKET grocery stores......... 829-8159
Solana Steven L [9]+
B Not Verified
G Cornwell Rita E [9]+ ⌂ 826-0172
7000 NATURAL ANIMAL nondurable gds.......................... 824-5884
7040 WHITECASTLE BAPTIST CHURCH baptist ch 808-8558
7060 Hickey Gary D Sr & Jacquelyn [9]+ ⌂..... 824-1533

+WHITE CASTLE RD BEGINS

7250 Williams Larry S [5]
7280 Frantz John E [9]+ ⌂
MOTHER NATURE'S NURSERY florists 829-2528

+INTERNATIONAL GOLF PKWY BEGINS

+PINE ISLAND RD INTERSECTS

9050 Gobler John D [4]... 825-0090

+HILDEN RD ENDS

9990 H S MACHINE........ 810-2300

+NE 5TH ST ENDS

10230 DAVID JOHNSON'S GIFTS gift novelty/souvenir 829-9129
10450 FORCE ONE WALLS concrete wk............ 824-6677
PREMIER PLASTERING concrete wk............ 823-3660

US HIGHWAY 1 N

10830 Bright Francis M & Ina [5] 829-8359
10850 PLUMB MASTERS 819-0024
11280 Not Verified
11300 Provin Bruce L [9]+
Provin Richard E
Savoy Margaret C
Savoy Oliver S [5]
11370 Martin Cynthia F... 825-4084
Martin Van B [6] ⌂ 825-4084
11390 Hooker Brian K 827-0749
Hooker Shane R [8] 827-0749
ⓃKitchin John D ⌂
2 Not Verified
11410 PHYSICIANS LEASING COMPANY auto rntl 827-0400
11420 MC GOVERN'S MAINTENANCE lawn garden serv.......................... 824-6651
11430 Gilbert James W & Karen [7] ⌂.............................. 823-1379

BUSINESSES 77 HOUSEHOLDS 52

US HIGHWAY 1 S (SAINT AUGUSTINE)-

+S PONCE DE LEON BLVD INTERSECTS

+STATE ROAD 207 CONTINUES

+ARAPAHO AVE INTERSECTS

+S PONCE DE LEON BLVD INTERSECTS

· ZIP CODE 32084 CAR-RT C021

1360 DECKARD KATHLEEN DVM veterinary serv........ 824-8123
INGALLINERA CHRISTIN L DVM veterinary serv 824-8123
METZGER-SMIT KATHY DVM veterinary serv 824-8123
QUELCH VIRGINIA DVM veterinary serv 824-8123
ST JOHNS PET CENTER pet serv 824-2233
ST JOHNS VETERINARY CLINIC animal hosps 824-8123
1375 GOODYEAR TIRES auto home sup store 824-2891
RAY'S TIRE & SERVICE auto home sup store 829-6418
1395 A-1 TROPHY CENTER trophies/plaques 808-1991
BTS BUILDERS new home constn 829-3466
A1 BETTER HOMES INSPECTION SERVICE ins agts brokers/serv 824-6150
A1 JOHN VALDES & ASSOCIATES MAINTENANCE COMPANY nonres constn 824-6150
B SUNCOAST PEDORTHICS shoe repr shoeshine 810-5577
C STITCHERY repair serv 824-7839
D STATE FARM INSURANCE ins agts brokers/serv 824-8111
F AAA STICHERY.. 824-8223
G ALL BOOKS & COMICS used merch stores 829-0944
I HISTORICAL RESEARCH personal serv 810-2434
1400 OPTICAL SHOP opt gds stores...................... 829-2287
1405 ST GERARD HOUSE social serv.......................... 829-5516
1420 ELK'S BINGO amusement recreactn 471-3557
ELKS LODGE civic/social assns 471-2829

+OLD DIXIE HWY ENDS

1485 TRINITY CHAPEL MINISTRIES religious orgn 824-6176
WAYL radio broadcasting sta 829-9200
1550 ALLSTATE INSURANCE ins agts brokers/serv.... 824-6555
1572 WOOD YOU FURNITURE STORE furn stores. 824-0133
1574 LITTLE HARBOR RESTAURANT restr 825-0021
YAHALA CAFETERIA eating places
1576 ARC TRANSPORTATION frt trans arrangement.. 797-7900
BARNES BARNES & COHEN legal serv 824-4141
1580 ACCURATE INSURANCE OF ST JOHNS ins agts brokers/serv............ 825-1233
EXPRESS TAX SERVICE tax return preparation 825-1233
1586 PARAGON COMMUNICATIONS radiotel comnctn 808-8500

US HIGHWAY 1 S

PERFORMANCE PHYSICAL THERAPY physical therapist 824-7787
WORLD GYM FITNESS & NUTRITION personal serv 829-3443
1681 JAZZERCISE FITNESS CENTER aerobic dance 824-3320
LIMELIGHT THEATRE theatrical producers 825-1164
1685 K CS TIRES SOUTH STORE 829-8253
K K'S TIRES auto home sup store 829-6347
1690 A HEALTH SOUTH SPORTS MEDICAL REHABILITATION health practitioner ... 810-2101
C BARROS FAMILY HEALTH CARE ofcs/clinics med docto 824-7076
C BARROS MELCHOR ofcs/clinics med docto 824-7076
D NG RAPHAEL ofcs/clinics med docto 810-2333
E LABORATORY CORPORATION OF AMERICA med laby 824-4477
F COMMUNITY PODIATRY & WOUND ofcs/clinics med docto 823-3301
F RODRIGUEZ ROSANNA DPM podiatrists 823-3301
I COLONIAL BANK bank 825-4977
1695 COMPASS BANK bank 824-0101
1699 C FIRST COAST METRO COMM CHURCH religious orgn 824-2802
E VILLAGE INSURANCE ins agts brokers/serv 940-1999
1700 LONG JOHN SILVER'S eating places 829-9007
1720 SONNY'S B B Q.... 824-3206
SONNY'S REAL PIT BAR-B-Q eating places . 824-3220
1725 BURGER KING eating places 824-8544
1760 STEAK N SHAKE eating places 824-7229
1777 K MART dept store 824-8361
K MART PHARMACY drug stores 824-8171
1783 RENT WAY equip rntl/leasing 824-0481
1790 TEXACO FOOD MART gas serv sta 826-0387
1791 PAYLESS SHOE SOURCE shoe store.............. 824-5675
1795 PUBLIX SUPERMARKETS grocery stores......... 824-8338
TAN PAGES misc publg 471-4840
1799 ECKERD DRUG drug stores 824-6167
1803 RADIO SHACK radio tv/electronic st......... 824-2475
1805 KFC eating places.. 829-6019
1811 ONE PRICE CLOTHING STORE women's clothg stores 829-2023
1815 JEWELRY LOAN COMPANY used merch stores . 824-5145
NETTLES JEWELRY & COIN jwlry stores 824-5145
1820 TACO BELL eating places 825-4785
1830 WENDY'S eating places 824-0155
1835 AMERICAN SHAMROCK MOBILE DTLNG carwashes 827-0610
BANK OF SAINT AUGUSTINE bank 829-5983
McMaster William M [2]
SELIG ENTERPRISES 829-6219
SUBWAY 1920 sandwiches/sub shop 829-6230
17 WHEREHOUSE MUSIC record/prerecorded tap 825-0777
113 SMOOTHIE KING misc food store 825-6770
115 PAMPERED PET & FINS misc retail stores 823-9222
119 MAIL BOXES ETC direct mail adv 825-2300
121 JOHNSTON STEPHEN A opt gds stores 824-0212
121 ROWE FAMILY EYECARE optometrist 824-0212
121 SMITH FARRIS M optometrist 824-3001
125 METABOLIC RESEARCH CENTER personal serv 825-0202

1996

WIN FOX TRAIL *cont'd*

278 Shook Larry [2] ⌂
USINESSES 1 HOUSEHOLDS 22

WINE ST -FROM 113 LOVETT ST SOUTH
2B

ZIP CODE 32095
16ⓃWard J L
17 Richard Juanita [9]+ ⌂ 824-6021
18 Batie Robert B [9]+ ⌂
19ⓃDavis Beulah
20 Vacant
21 Brown Mary C [4] ⌂ 824-2552
22 Warthaw Walter [6] ⌂
23 Young Virgil F Sr [6] ⌂ 825-0960
24ⓃWright Marie
26 Britton Barbara J [9]+ ⌂ 808-7304
27 Rickerson Jesse & Margaret [9]+ ⌂
29ⓃDouglas Denise 825-1926
32 Nimmons David L [2]
34 Brown Edwin [2]
39ⓃBailey Donald Jr 824-3959
39½-142 Vacant (3 Hses)
146 Staley James E & Minnie [2] ⌂. 824-2560
145ⓃThreet Thelton L
148 Whitfield Robert J Jr [2]
150 Not Verified
152 Spaulding G [2]
+ *SOUTH ST INTERSECTS*
153 Levins Doretha [9]+ ⌂ 824-2919
Levins Mark G 824-2919
154 Wilcox Shantle D [2] ⌂
Anderson Stacy
155 Williams Rebecca T [2]
157 Molden R [2]
158 Long Lisha R [2]
158b Vacant
159 Wilson Lucy J [5] ⌂ 823-8652
Wilson Betty 823-8652
Maypray Joe Ann 823-8652
161 Williams Bertha [2]
163 Twine Henry L & Katherine [7] ⌂
.... 824-4037
164ⓃEubanks Joe ⌂ 825-0436
165 Kirksey Joann [2] 829-9910
166ⓃTirado Rafael 824-5716
Lazala Franklin 824-5716
167 CHURCH OF GOD
170ⓃOdom Belinda R
172 Heggs Tiny R [7] ⌂ 824-2529
+ *DUERO ST INTERSECTS*
177 Brooks H Jill [9]+ ⌂ 824-4722
179 Earley Regina T [2] 826-3599
+ *CERRO ST INTERSECTS*
BUSINESSES 1 HOUSEHOLDS 34

UCITA AV (SANTA ROSA)-FROM JARDINE AV WEST
11A

· ZIP CODE 32095
+ *JARDINE AV INTERSECTS*
239 Bettes Helen L [9]+ ⌂ 829-5044
244 Tanner Wayne K [9]+ ⌂
246 Vandergrift Gerald E & Doris [9]+ ⌂
.... 824-3128
252 Masters Barry J & Phyllis [9]+ ⌂
.... 824-6463
Masters Kevin F 824-6463
+ *EL REY AV INTERSECTS*
HOUSEHOLDS 4

UNICORN RD (ST AUGUSTINE SOUTH)-FROM SHORE DR SOUTHWEST
14B

· ZIP CODE 32086
+ *SHORE DR INTERSECTS*
102 Wishart Abraham & Rosemarie [7] ⌂
.... 797-3530
107 Doll
Doll Robert S
111 Jones Marshal A & Kathy [8] 797-4580
Jones Kathy 797-4580
114 Oakley Jeffrey B & Donna [9]+ ⌂
.... 797-2727
117 Burns Paul R & Paulette [9]+ ⌂ 797-4140

UNICORN RD (SAS) *cont'd*

124 Not Verified
127 Perkins Robert C [9]+ ⌂ 797-4328
+ *SHORE DR INTERSECTS*
HOUSEHOLDS 8

US HWY 1 N RT 10 -
16

· ZIP CODE 32095
4000 PONCE DE LEON GOLF & CONFERENCE RESORT 824-2821
4225 A & W MOBILE HOME sls 824-2835
4275 PRESTIGE HOME CENTER INC
.... 825-4650
4490 ENVIRONMENTAL CARE golf mtce
.... 829-8979
4508 EL TARASCO restr 825-4259
4540a LIL' CHAMP gro store 829-0074
+ *OCEAN BLVD INTERSECTS*
4540b-4540c Vacant (2 Hses)
4540d MADDOX MARTIN & STAPP attys
.... 829-9707
4560 AUDUBON COURT apts 829-2593
1 Chambers Marvin A [7] 829-2593
1 Chambers Helen K 829-2593
2 Silsith Darlis [7]
4 Reed Lola Mae [2]
5 Not Verified
6ⓃKerwin Lavergne
7 Lisborg John [2]
8ⓃJones Brenda 826-1513
9ⓃColaianni Heather
4600 MENU DESIGN 824-6171
+ *JACKSON BLVD INTESECTS*
DOBBS DAVID ENTERPRISES INC mfrs rep 824-6171
4630 Vacant
+ *NORTH BLVD INTERSECTS*
4660 DINO'S RESTAURANT 823-9193
4688 Vacant
4700 ST JOHNS REALTY GROUP real estate 824-0345
4704 CARE A LOT DAY CARE & PRESCHOOL 829-9563
+ *INDIAN BEND INTERSECTS*
4742 DADDLE PEPPERS 829-8815
4760a LIL CHAMP FOOD STORE NO 1069
.... 829-8460
4760b-4778 Vacant (2 Hses)
+ *ARAQUAY AV INTERSECTS*
4796 ST AUGUSTINE ST JOHN'S COUNTY AIRPORT 825-6860
+ *ESTRELLA AV INTERSECTS*
4900 FLORIDA AVIATION CAREER TRAINING INC charter serv 824-9401
AERO SPORT INC 824-1995
AVIS CAR RENTAL 829-3700
SOUTHEAST AERO SERVICES INC avionics 824-6695
SOUTHEAST AERO SERVICE INC mtce
.... 824-1899
5000 NORTHROP GRUMMAN CORP aircraft mfrs 825-3300
+ *BIG OAK RD INTERSECTS*
BUSINESSES 22 HOUSEHOLDS 8

US HWY 1 S -A CONTINUATION OF S PONCE DE LEON BLVD SOUTH OF CITY LIMITS
19A

· ZIP CODE 32086
1360 ST JOHNS VETERINARY CLINIC animal hosp 824-8123
1375 GOODYEAR tires-muffler repr .. 829-6418
RAY'S TIRE & SERVICE INC ... 824-2891
1385 GOODYEAR (overflow)
1395 K K'S PLAZA shopping center
1395b SUNCOAST PEDORTHICS orthopedic phys 810-5577
BUSINESSES 6

US HWY 1 S RT 4 -A CONTINUATION OF S PONCE DE LEON BLVD
19A

· ZIP CODE 32084
+ *SHORE DR INTERSECTS*

US HWY 1 S RT 4 *cont'd*

1395a MANCINO DAVID A archt 824-3099
1395c CREATIVE PROMOTIONAL SERVICES med equip 823-1234
1395 D STATE FARM INSURANCE ins
.... 824-8111
E STATE FARM overflow
F STITCHERY THE alteration shop
.... 824-8223
G ALL BOOKS AND COMICS retail
.... 829-0944
H ALL BOOKS & COMICS overflow
I ALL BOOKS & COMICS overflow
1405 ST GERARD MATERNITY HOME & CHRISTIAN SCHOOL 829-5516
1485 TRINITY CHAPEL MINISTRIES
.... 824-6176
TRINITY CHAPEL SCHOOL private sch
.... 824-6176
TRINITY CHAPEL DAY CARE day care cntr 824-6176
1550 ALLSTATE INSURANCE CO 824-6555
1568 1 Vacant
1572 Vacant
1574 RAGIN CAJUN RESTAURANT 829-1005
1576 BARNES BARNES AND COHEN PA
.... 824-4141
1578 FIRST FEDERAL SAVINGS MORTGAGE OFFICE banks 808-8572
1580 ACCURATE INSURANCE 825-1233
1582 MC ELHINNEY CHIROPRACTIC
.... 823-1971
1586 FIRST COAST COMMUNICATION
.... 824-2770
1590 FLOWERS BY SHIRLEY INC florists
.... 824-8163
1600 JIM MARTIN TIRE tire co 824-0449
1650 BADCOCK HOME FURNISHINGS CENTER 824-4314
1685 K K'S INC tire-sls & repr 829-6347
1690 PROFESSIONAL HEALTH CENTER plaza
INSTITUTE OF PHYSICAL THERAPY INC 826-0084
1690-a CONNOR JAMES F phys 824-8088
PALEY BRUCE phys 824-8088
1690b Vacant
1690-c KRUEGER LOTHAR phys 824-8333
1690-d KHALID MOHAMMAD phys ... 824-8666
1690d KISHWAR HUSAIN physician. 824-8666
1690-e LABORATORIES CORP 824-4477
1690-f SADOWSKI GEORGE E phys
.... 823-8799
1690-g INSTITUTE OF PHYSICAL THERAPY overflow
1690-h INSTITUTE OF PHYSICAL THERAPY overflow 826-0084
1690-i INSTITUTE OF PHYSICAL THERAPY overflow
1695 COMPASS BANK 824-0101
+ *NIX BOATYARD RD INTERSECTS*
1700 LONG JOHN SILVER'S NO 3431 restr
.... 829-9007
1720 SONNY'S B-B-Q restr 824-3206
1725 BURGER KING restr 824-8544
1750 DIXIE CUSTOM AUTOMOTIVE trks sls
.... 824-2894
1790 TEXACO STATION gasoline sta
.... 826-0387
1820 TACO BELL NO 2855 restr 825-4785
1830 WENDY'S restr 824-0155
1850 SUN BANK 824-8709
+ *STATE RD 312 INTERSECTS*
1900 PIZZA HUT financial institution 829-5659
1910 BUBBLES FULL SERVICE CAR WASH
.... 829-5075
1919 FIRST UNION NATIONAL BANK OF FLORIDA 824-7550
1940 SCOTTY'S HOME BUILDERS SUPPLY INC 829-2939
1944 DOLLAR TREE genl merchandise
.... 824-0505
1948 SHOE WORLD 824-5553
1952 FASHION BUG PLUS clo 824-9059

1991

19-A

US HWY 1 N RT 10–Contd
4540b-4554 Vacant (4 Hses)
4560 Audubon Court apts 829-2593
  1 Chambers Marvin 829-2593
  2 Silsith Doris
  4 Vacant
  5 Booth
  6★Walker
  7-Rear Vacant (3 Apts)
4600 Menu Design 824-6171
  Dobbs David Enterprises Inc mfrs rep 824-6171
4630-4660 Vacant (2 Hses)
INDIAN BEND RD BEGINS
4700 Vacant
4742 Linda's restr & bar 829-8815
4760a Lil Champ Food Store No 69 829-8460
4760b T V Engineers sls & serv 829-2761
ARAQUAY AV BEGINS
ESTRELLA AV BEGINS
4900 St Augustine Aircraft Service Inc aircraft mtce 824-1899
  Florida Aviation Career Training Inc charter serv 824-9401
  Aero Sport Inc charter serv 824-1995
  Avis Car Rental 829-3700
  Southeast Avionics Inc 824-6695
5000 Grumman St Augustine Corp aircraft mfrs 825-3300
5100 U S Coast Guard (Air Station) 823-1743
5000 Grumman St Augustine (Flight Tower)

17-A

US HWY 1 S –FROM 1101 S PONCE DE LEON BLVD SOUTH (ALSO KNOWN AS S PONCE DE LEON BLVD)

ZIP CODE 32086
1360 St Johns Veterinary Clinic animal hosp 824-8123
1375 Goodyear tires-muffler-repr 829-6418
1385 Archer's Big A Auto Parts auto parts 824-0865
1395 K K's Plaza shopping center

US HWY 1 S RT 4 –A CONTINUATION OF S PONCE DE LEON BLVD

ZIP CODE 32084
NIX BOATYD RD INTERSECTS
SHORE DR BEGINS
FL HWY 312 INTERSECTS
1375 Ray's Tire & Service Inc 824-2891
  A1 Mancino David A architect 824-3099
  A Coleman Construction genl contr 824-4636
  B Seahunt (Overflow)
  C Sea Hunt ret-scuba diving equip 824-0831
  D State Farm Insurance ins 824-8111
  E State Farm (Overflow)
  F Stitchery the alteration shop 824-8223
  G All Books & Comics retail
  H Claudines Sewing alterations shops
1395 Hunter Clark Associates busn brokers
1405 St Gerard House crisis pregncy cntr 829-5516
1485 Trinity Chapel Ministries 824-6176
  Trinity Chapel School private sch 824-7260
  Trinity Chapel Day Care day care cntr 824-2199
1550 Allstate Insurance ins 824-6555
1570 Rowe Family Eye Care optometrists & eyewear 824-0212
  Smith Farris M optom 824-3001
1572 Rowe Family Eye Care (overflow)
1574 Subway restr 825-0310
1576 Pam's Hair-N-Moore hair stylists 824-0196
  Juanita's Boutique women's apparel 824-7734
1578 Kight's Bill Copy Center (Overflow)
1580 Kight's Bill Copy Center prntg co 824-8400
1582 Kight's Bill Copy Cntr (Overflow)

US HWY 1 S RT 4–Contd
1584 Vacant
1586 Flowers By Shirley (Overflow)
1588 Flowers By Shirley (overflow)
1590 Flowers By Shirley Inc florists 824-8163
1600 Stephens Charles Enterprises tire co 824-0449
1650 Vacant
1681 Jazzercise exercise classes 824-3320
1685 K K's Inc tire-sls & repr 829-6347
1690 Country Square the shopping cntrs
1690-1-1690-11 Vacant (11 Hses)
1695 First Performance Bank bks 824-0101
1700 Long John Silver's No 3431 restr 829-9007
1720 Sonny's B-B-Q restr 824-3206
1725 Burger King restr 824-8544
1750 Dixie Custom Automotive trks sls 824-4318
1790 Texaco Station gasoline sta 826-0387
1820 Taco Bell No 2855 restr 825-4785
1830 Wendy's restr 824-0155
1850 Security First Bank bk 824-3364

11

STATE RD 312 BEGINS
1910 Bubbles Full Service Car Wash 829-5075
1919 First Union National Bank of Florida 824-6152
1930 Scotty's Home Builders Supply Inc 824-9146
1940 Wal-Mart 824-6157
1944 Cato's clo 824-9842
1948 Shoe World 824-5553
1952 Fashion Bug Plus clo 824-9059
1955 Medical Office Services billing serv 824-0298
  Saint Augustine General Hospital 824-8431
1956 Vacant
1957 No Return
1958 Solutions Beauty Salon 824-3473

1986

RILLO ST (ST AUGUSTINE SHORES)—FROM VISCAYA BLVD EAST 1 SOUTH OF ROSARIO ST 28

ZIP CODE 32086
0 Kendzor Julian ◎ 797-3383
1 Anderson Bernice E ◎ 797-3208
6 Vacant
1 Morin Leo ◎ 797-5218
VALNERA CT INTERSECTS
2 Vacant
3★Peterson Lester ◎
1 Giglio Marion Mrs ◎ 797-3198
3 Moch John M ◎
Vacant
Giglio Anthony J ◎ 797-4317
No Return
LMANSA ST INTERSECTS

LIP RD —FROM QUEEN D EAST 1 SOUTH OF IRANDA RD 14

P CODE 32086

TA AV (SANTA ROSA) ROM 368 JARDINE AV EST 1 NORTH OF ENECAL AV 11

CODE 32084
Bettes Helen L Mrs ◎ 829-5044
Skinner Theresa M Mrs ◎ 824-3830
anner Wayne K ◎
andergrift Doris M 824-3128
acant
asters Barry J ◎ 824-6463
REY AV INTERSECTS

RIET AV (DAVIS ORES)—FROM ASTASIA BLVD SOUTH 1 T OF COMARES ST 7

CODE 32084
ARES ST INTERSECTS

ORN RD (ST AUGUSTINE TH)—FROM SHORE DR THWEST 1 SOUTH OF URN RD 14

CODE 32086

UNICORN RD—Contd
111★Martyn John A
117 Burns Paul R ◎ 797-4140
122★Sanderson Lynn ◎
123★Candler Sam ◎ 797-3120
127 Perkins Robt C ◎ 797-4328

US HWY 1 —SEE PONCE DE LEON BLVD 6

U S HWY 1 N RT 10 —CONTINUATION OF SAN MARCO AV NORTH FROM CITY LIMIT 16

ZIP CODE 32084
BOX NUMBERS
bx14 Vacant
JACKSON BLVD BEGINS
bx27b Vacant
Dobbs David Enterprises Inc 824-6171
bx11 D & S Mobile Home Sale 824-2835
bx13 Global Homes Inc 824-8118
bx13a Vacant
bx15 Vacant
bx18 Audubon Court apts
1 Vacant
2 Vacant
4 Godby Alan
6 Chambers Marvin
7 Vacant
8 Vacant
9 No Return
bx22b East Coast Bindery 824-6273
bx28 Araquay Apartments 829-8642
Jacalone Jos O ◎ 829-8642
INDIAN BEND RD INTERSECTS
Vacant
Lil Champ Food Store 829-9473
ARAQUAY AV INTERSECTS
ESTRELLA AV INTERSECTS
Saint Augustine Airport 824-1995
Old City TV 824-6306
Aero Sport Inc charter serv 824-1995
Avis Car Rental 829-3700
Vacant
Gruman St Augustine aircraft mfrs 829-2501
St Augustine Avionics Inc 824-6695
Vacant

U S HWY 1 S RT 4 —A CONTINUATION OF S PONCE DE LEON BLVD 19

ZIP CODE 32086
BOX NUMBERS
Twin Oaks Alcohol Treatment Center 824-6142
Boston Shoe Repair
Trinity Chapel Ministries 824-6176
Danny Tire & Auto 829-6347
NIX BOATYD RD INTERSECTS
Sonny's Real Pit Bar-B-Que 824-3220
County Fire Dept (St Aug South Sta No 5) 797-2977
Long John Silver's Seafood Shoppes 829-9007
K-Mart Shopping Plaza 824-8361
FOR OCCUPANTS SEE K-MART PLAZA
Dixie Custom Automotive used cars & trucks 824-2894
Atlantic National Bank Of Florida 824-8451
Burger King 824-8544
Andy's Lounge liquor 824-3777
Wendy's Old Fashioned Hamburgers 824-0155
Pizza Hut 829-5659
STATE RD 312 BEGINS
Scotty's Home Builders Supply Inc 824-9146
800 Florida National Bank 824-6152
Saint Augustine General Hospital 824-8431
Rozas J R internal medicine 824-8431
Simmons Robert D phys 824-0412
Bevill's Community Pharmacy 824-4496
O'Connell Wayne W phys 829-6533
Anello Joseph P Jr phys 829-8388

1979-80

10 Gonzalez Leopoldo B phys 824-4277
10 Kluger Warren S phys 824-4277
11 Rosenthal Saml G phys 824-5352
11 Whitelock Warren Jr phys 824-6880
13 American Red Cross The st johns cnty chapt 829-8812
130 Vacant
131 Saint Johns County Home For Senior Citizens 824-1755

TRILLO ST (ST—AUGUSTINE SHORES)-FROM VISCAYA BLVD EAST 1 SOUTH OF ROSARIO ST 20

ZIP CODE 32084
260 Smith Norman C 797-4749
261★Anderson Ernest O ◎ 797-3208
266 Fitch Lawrence ◎ 797-4453
271 Vacant
272 Nelson Wm T
278 Peterson Lester W ◎
281 No Return
283 Moch John M ◎ 797-4703
284 Conrad Grace ◎ 797-4285
285 Giglio Anthony J ◎ 797-4317
287 Owen Eloise ◎ 797-3799
316 Under Constn

TULIP RD —FROM QUEEN RD EAST 1 SOUTH OF MIRANDA RD 14

ZIP CODE 32084

UCITA AV (SANTA ROSA) FROM 368 JARDINE AV WEST 1 NORTH OF MENECAL AV 11

ZIP CODE 32084

UCITA AV—Contd
239 Bettes Helen L Mrs ◎ 829-5044
240 Skinner Thereasa ◎ 824-3830
244 Tanner Wayne K ◎
246 Vandergrift Gerald E ◎ 824-3128
252 Masters Barry J ◎ 824-4643
EL REY AV INTERSECTS

UMBRIET AV (DAVIS SHORES)—FROM ANASTASIA BLVD SOUTH 1 EAST OF COMARES ST 7

ZIP CODE 32084
COMARES ST INTERSECTS

UNICORN RD (ST AUGUSTINE SOUTH)—FROM SHORE DR SOUTHWEST 1 SOUTH OF SATURN RD 14

ZIP CODE 32084
102 Wishart Abr ◎ 797-3530
117 Burns Paul R ◎ 797-4140
121 Vacant
122★Burney J F ◎
127 Perkins Robt C ◎ 797-4328

US HWY 1 —SEE PONCE DE LEON BLVD 6

U S HWY 1 N RT 3 —CONTINUATION OF SAN MARCO AV NORTH FROM CITY LIMIT 16

ZIP CODE 32084
BOX NUMBERS
bx14 Ye Old Flea Market 824-0933
Showcase Homes mobile
bx15★Shepard Anna K Mrs
22b Book Shop The 824-1515
Majestic Pest Control 824-1228
Touchton Wm J 824-0933
JACKSON BLVD BEGINS
Kennedy's Game Room billards-pin ball 829-8078
Gator Land Alligator Farm 824-1700
bx918 Number One Hero Sandwich Shop 824-6663
Lambert Carl ◎ 824-3639
bx18 Audibon Court Apts 824-2568
bx28★Martin Ross
★Tabor John
★Walrath Larry
Araquay Apartments 829-8642
Jacalone Joseph ◎ 829-8642
Knapp Wm
INDIAN BEND RD INTERSECTS
Linda's Sandwich Shop 829-8815
Lil-Champ Food Store 829-9473
ARAQUAY AV INTERSECTS
Araquay Service Station 829-9548
ESTRELLA AV INTERSECTS
Saint Augustine Airport 824-1995
Aero Sport Inc charter serv 824-1995
Aero Sport Avionic's (div of aero sport) 829-5707
Avis Car Rental 829-3700
Atlantic Yacht Corp 824-4383
bx3144 Saint Augustine Industrial Pk 829-5611
bx3085 C P Lumber Inc 824-6118
bx3317 Cultured Marble Products 824-9612
Desco Marine 824-9548
bx3205 Intermodal Equipment Mfg Inc 824-4366
bx3143 S A P I 824-3308

U S HWY 1 S RT 4 —A CONTINUATION OF S PONCE DE LEON BLVD 19

ZIP CODE 32084
bx 20 Ancient City Ornamental Iron
Twin Oaks Alcohol & Mental Health Treatment Center 824-6142
Trinity Chapel 824-2418
NIX BOATYD RD INTERSECTS
Sonny's Bar-B-Que restr 824-3206

1975

[redacted]

7 34½ State Fa
824-811
35 Cathedral
Rectory
Heslin J 6
36 Baker 7
ST GEO S
SPANIS
CORD

5 2

T TREM
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ZI
1 A 4-3103
1 1½
2 829-8427
2½
3 829-2912
4 ◎

5 29-5974
◎ 829-2858
824-1261
rgan
ndation Inc
Center
outh Services

12 14

ROM QUEEN
SOUTH OF
D

32084

11

(SANTA ROSA)
68 JARDINE AV
NORTH OF
CAL AV

ODE 32084
ttes Earl S ◎ 829-5044
inner Theresa Mrs ◎
824-3830

UCITA AV—Contd
244 Tanner Wayne K ◎
246 Vandergrift Gerald E ◎ 824-3128
252 Masters Barry J ◎ 829-8255
EL REY AV INTERSECTS

7

UMBRIET AV (DAVIS SHORES)—FROM ANASTASIA BLVD SOUTH 1 EAST OF CABEZA ST

ZIP CODE 32084
(NO HOUSES–
CARVER ST INTERESTS

14

UNICORN RD (ST AUGUSTINE SOUTH)—FROM SHORE DR SOUTHWEST 1 SOUTH OF SATURN RD

ZIP CODE 32084
102 Wishart Abr ◎ 829-8611
127 Wood Lewis ◎ 829-6073
122 Peterson R L ◎ 824-6865

6

US HWY 1 —SEE PONCE DE LEON BLVD

16

U S HWY 1 N —CONTINUATION OF SAN MARCO AV NORTH FROM CITY LIMIT

ZIP CODE 32084
Century Mobile Home Service 824-9642
Blue & White Motor Court 824-0933
★Touchton Wm J
★Smith Gordon
Majestic Pest Control 824-1228
★Shepard Anna ◎
Ancient City Animal Clinic 824-5454
JACKSON BLVD BEGINS
Kennedy's Nursery
Kravitz Joe Aircraft Salvage 829-6381
Gatorland Alligator Farm 824-1700
★Lambert Carl ◎ 824-1700
Araquay Apartments 829-8642
★Jacalone Joseph 829-8642
★Knapp Wm
★Vickers Fredk
Linda's Sandwich Shop 829-8815
★Hayes Joseph ◎ 829-8815
Lil-Champ Food Store 829-9473
Araquay Service Station 829-9548
★Mc Quaig J Howard 829-9548
Saint Augustine Airport 824-1995
Aero Sport Inc charter serv 824-1995
Avis Car Rental 829-3700
Fairchild Industries Inc 829-5611
Usaf-Aircraft Contract Ofc 829-5611
Civil Air Patrol (Santa Rosa Cadet Squadron) usaf aux

19

U S HWY 1 S RT 5 —A CONTINUATION OF S PONCE DE LEON BLVD

ZIP CODE 32084
Twin Oaks Motel 824-2130
★Stevenson Edw M ◎ 824-2130
Trinity Church 824-2418
Dixie Custom Automotive used cars 824-2894
Southgate Bowling Lanes 824-2112
★Wells Glenn 829-3263
White Spot Package & Lounge 824-3777
★Thomas Burton J 824-2662
Shelley Joseph A phys
St Augustine Family Practice Program 824-2928
Zaffke Karl H phys 824-6227

1970

US HWY 1 N—Contd
Wise Foods Co 824-1682
M & B Auto Parts used 824-2868
Blue & White Restaurant 824-4146
Merry Harley
Blue & White Motor Court 829-2594
Carol Larry
Ohio Tourist Court 829-3027
Thomas Andrew L ◎
Shepherd Ann
Audubon Motor Court 824-3884
Meyer Vincent C ◎ 824-3884
Kravitz Joe-Aircraft Salvage 829-6381
Johnson Leo 829-2936
Vacant
Gatorland alligator farm 824-1700
State Iron & Metal Co 829-6200
Araquay Apartments
Henderson J A
Vickers Fred ◎
Knapp William
J B C Food Specialties Inc jelly mfrs 829-2860
Linda's confr
Thornton Harold T 829-9780
Araquay Service Station
Mc Quaig J Howard 829-9548
Saint Augustine Airport 824-3001
Aero Sport Inc 824-1995
Fairchild Hiller Corp (Aircraft Service Division) 829-5611
Usaf aircraft contract ofc 829-3202
Ye Old Sausage & Cheese Shop

4

US HWY 1 S —A CONTINUATION OF S PONCE DE LEON BLVD FROM CITY LIMIT SOUTH

ZIP CODE 32084
Twin Oaks Motel 824-2130
Stevenson Edw M ◎
Dixie Custom Automotive auto reprs 824-2894
Spot Liquor Store 829-9288
Haake Paul ◎ 829-2728
Southgate Bowling Lanes 824-2112
Southgate Trailer Park 824-2049
Southgate-General Store 829-3535
Herndon John F ◎ 829-3569
Saint Augustine South Midget Store 829-6065
Miller Ralph ◎

8

US HWY A1A N (VILANO BEACH)—SEE OCEAN BLVD

ZIP CODE 32084
NO HOUSES

10

US HWY A1A S (ST AUGUSTINE BEACH)—A CONTINUATION OF ANASTASIA BLVD SOUTH

ZIP CODE 32084
Anastasia State Park 829-2668
Henry Champ C
Porter Boyce J 824-2770
SAN JUAN ST BEGINS
POPE ST BEGINS
Anastasia Island Lodge 829-9045
Eley Clifford H ◎ 829-9045
Anastasia Island Cottages 824-1918
Anastasia Island Golf Club 824-1918
Briny Deep Restaurant 829-3567
Anastasia Service Center 824-3569
Plaza The shopping center
Funland Park
Keeler John ◎
Surfburger restr
Saint Augustine Beach Hotel
Sun-N-Surf Shop 824-3065
US Po (St Aug Bch Contract Sta)
Saint Augustine Beach Ocean Pier
Ocean Pier Lunch
Sportland Arcade
Redmon's Gift Shop

US HWY A1A S (SAB) —Contd
Saint Augustine Beach To
Hall 824-2217
Saint Aug Bch Town Clk 824-2217
Saint Aug Bch Town Com
Saint Aug Bch Town Mars
Saint Aug Bch Town May
St Aug Volunteer Fire De
829-3390
16TH ST INTERSECTS
Ebb Tides Restaurant & Cocktail Lounge 829-9192
28 Surf Village Motel 829-3
Hawkins Bertha M Mrs 829-3201
15TH ST INTERSECTS
700 Village Store The gifts
14TH ST BEGINS
740 Meckstrouth Wm E ◎ 829-3754
12TH ST ENDS
750 Seaway Motel 829-2762
Solana Herman A ◎ 829-2762
751 Gianni's Italian-Americ
Restaurant 824-3969
Sea Shore Motel 829-28
11TH ST ENDS
10TH ST ENDS
9TH ST ENDS
801 Holiday Court 829-8726
Nakon Nicholas ◎
811 Tropics Restaurant 829-
8TH ST ENDS
7TH ST ENDS
6TH ST ENDS
840 Sputo Dominic ◎ 824-2
5TH ST ENDS
4TH ST ENDS
910 Tides Lounge cocktail l
& pkg store 829-9303
916 Beach Laundry coin lau
930 Vacant
3D ST ENDS
2D ST ENDS
1ST ST ENDS
A ST INTERSECTS
951 Peal's Grocery & State
Store 824-2543
B ST INTERSECTS
C ST INTERSECTS

Appendix F

Photographic Survey of Existing Site Conditions

View southeast of subject property.

View northwest of subject property.

View northeast of subject property – typical north adjoining beyond.

View southeast of subject property – typical east adjoining beyond.

Typical view of north/east adjoining properties.

View of south adjoining properties.

View of south/west adjoining properties.

View south/west adjoining property.

View of west adjoining property - ASTs.

View of northwest adjoining properties.

Appendix G

Environmental Liens Search

Institutional Controls Registry

Map center: 657052, 663683

Legend

- ● ICR Sites
- Cities (census places)
- ☐ Counties (generalized)

Scale: 1:21,340

[Florida Department of Environmental Protection] Disclaimer: This map is intended for display purposes only. It was created using data from different sources collected at different scales, with different levels of accuracy, and/or covering different periods of time.

Notes: Map produced on Wed May 27 17:01:49 EDT 2009

Drill Down Identify Results Snapshot

Coordinates of Report

Coordinate Position in FDEP_Albers_HARN:
655979, 663921

Selection Results

1 feature(s) found from: ICR Sites

Rec#	Links	Site Id	Site Name	Address	City	Zip	County	State	Section	Township	Range	Lat DMS	Long DMS	Lat Long Acquisition
1		FLD 046771952	NORTHROP GRUMMAN CORP.	5000 US 1 NORTH	ST. AUGUSTINE	32085	ST JOHNS	FL	50	6S	29E	29 57 27	81 20 39	DPHO-DIGITAL ARIAL PHOTOGRAPHY WIT

Selection Results

1 feature(s) found from: Counties (generalized)

Rec#	County Name	FDEP County Id	FIPS County Id	Area(sq.m)	Length(m)
1	St. Johns	55	109	2127542620	226901

Institutional Controls Registry Report

Controls found for NORTHROP GRUMMAN CORP. (Id: FLD 046771952)
5000 US 1 NORTH, ST. AUGUSTINE, 32085, ST JOHNS County

IC TYPE	EC TYPE	MEDIA	CONTAMINATION	MECHANISM	DATE IC RECORDED	PROGRAM AREA	DATE ORDER ISSUED	DATE IC AMENDED	DATE IC REMOVED	INSPECTION DATE
LAND USE RESTRICTION	FENCES	SOIL	PAH - POLYNUCLEAR AROMATIC HYDOCARBONS	DEED NOTICE	APRIL 16, 2001	RCRA	AUGUST 19, 1999			
EC MAINTENANCE	IMPERVIOUS CAP	GROUND WATER	PAH - POLYNUCLEAR AROMATIC HYDOCARBONS	DEED NOTICE	APRIL 16, 2001	RCRA	AUGUST 19, 1999			
LAND USE RESTRICTION	SOIL CAP	SOIL	PAH - POLYNUCLEAR AROMATIC HYDOCARBONS	DEED NOTICE	APRIL 16, 2001	RCRA	AUGUST 19, 1999			
LAND USE RESTRICTION	SOIL CAP	GROUND WATER	PAH - POLYNUCLEAR AROMATIC HYDOCARBONS	DEED NOTICE	APRIL 16, 2001	RCRA	AUGUST 19, 1999			
WATER USE RESTRICTION	NONE	GROUND WATER	VOH - VOLATILE ORGANIC HYDROCARBONS	DEED NOTICE	APRIL 16, 2001	RCRA	AUGUST 19, 1999			
ACCESS RESTRICTION	FENCES	SOIL	PAH - POLYNUCLEAR AROMATIC HYDOCARBONS	DEED NOTICE	APRIL 16, 2001	RCRA	AUGUST 19, 1999			
ACCESS RESTRICTION	FENCES	GROUND WATER	PAH - POLYNUCLEAR AROMATIC HYDOCARBONS	DEED NOTICE	APRIL 16, 2001	RCRA	AUGUST 19, 1999			

Print Close

Appendix H

File Review

Sort By: Document Date
Type: Any
Creator:
Created: (MM-DD-YYYY) To (MM-DD-YYYY)

Search Clear

County = ST. JOHNS
Facility-Site ID = 9804849 ... SAINT AUGUSTINE AIRPORT AUTH-AVGAS SELF FUEL FAC
Document Date = (MM-DD-YYYY) To (MM-DD-YYYY)
Received Date = (MM-DD-YYYY) To (MM-DD-YYYY)
Document Type =
Contractor ID =
Facility Type *
Document Subject =

Search Clear

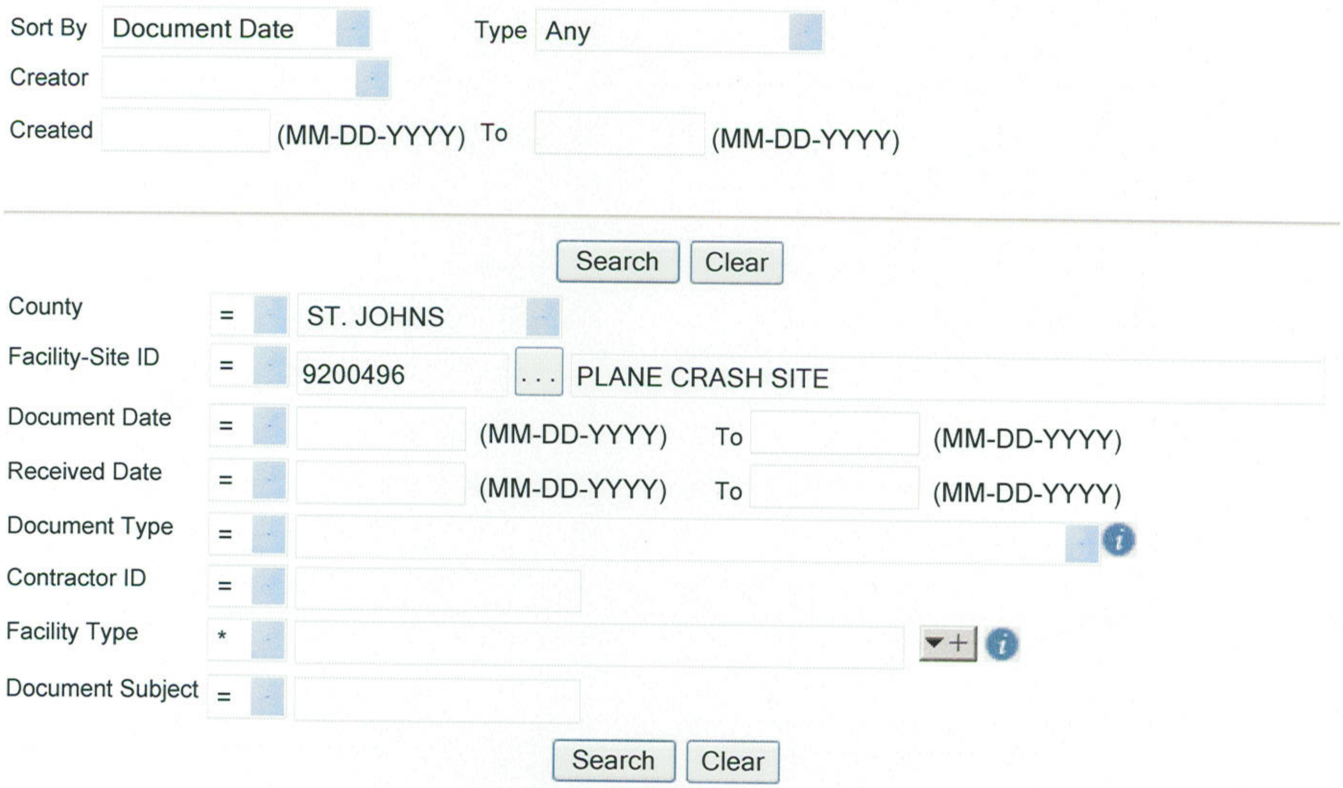
Search Results

Storage Tanks
0 total

Result/Page 5 Sort Document Date Refresh Add to Favorites

Operations View Select Turn Previewer on

No documents found



Sort By: Document Date

Type: Any

Creator:

Created: (MM-DD-YYYY) To (MM-DD-YYYY)

County = ST. JOHNS

Facility-Site ID = 9200496 PLANE CRASH SITE

Document Date = (MM-DD-YYYY) To (MM-DD-YYYY)

Received Date = (MM-DD-YYYY) To (MM-DD-YYYY)

Document Type =

Contractor ID =

Facility Type *

Document Subject =

For Routing To Other Than The Addressee
To ______________________ Location ______________
To ______________________ Location ______________
To ______________________ Location ______________
From ____________________ Date ______________

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

TO: Michael Reutter, Northeast District

THROUGH: James J. Crane, Bureau of Waste Cleanup TB for JC

FROM: Tim Bahr, Bureau of Waste Cleanup TB

DATE: July 31, 1990

SUBJECT: Review of PCAP
Plane Crash Site
313 Araquay Road, St. Augustine
Non-EDI Site

559200496

The following comments and recommendations are based on my review of the PCAP prepared by Hazards Environmental Services:

1) Documentation (field observations and measurements, shipping manifest, sampling/analysis results, etc.) regarding the soil IRA that was performed should be provided. Depending on the available documentation, supplemental soil assessment in accordance with Section 17-770.200(2), F.A.C., and the Department's January 1989 "Guidelines for Assessment and Remediation of Petroleum Contaminated Soils" may be required to demonstrate that all contaminated soils have been remediated.

2) A monitoring well should be located at the "Crash Site" (see Figure 3), so that worst case contaminant concentrations can be established. If obvious groundwater contamination is present at the site, permenant monitoring wells should be installed in lieu of the preposed temporary wells so that the permanent wells can be used in supplemental investigations. Also note, the top of the screen for shallow monitoring wells should be located approximately 2 foot above the mean annual high water table.

3) The groundwater samples should be analyzed for the Gasoline Analytical Group, see Section 17-770.600(8a).

If you have any questions, please contact me Suncom 278-0190.

TB/sr

NORTHEAST DISTRICT
RECEIVED
JUN 27 1990
DER-JACKSONVILLE

PRELIMINARY CONTAMINATION ASSESSMENT PLAN

for

PLANE CRASH SITE
313 ARAQUAY ROAD
ST. AUGUSTINE, FLORIDA

HES J.N. 2439

Prepared by:

HAZARDS ENVIRONMENTAL SERVICES, INC.
2811 NW 41st STREET, SUITE A-2
GAINESVILLE, FLORIDA 32606

Prepared for:

PHOENIX AVIATION MANAGERS, INC.
P.O. BOX 723897
ATLANTA, GEORGIA 30339

PAM F.N. H88103409

INTRODUCTION

The subject site is a parcel of residential property whose street address is 313 Araquay Road in St. Augustine, Florida (Figure 1). The permanent structure on this property is a mobile home with an attached front porch. On December 18, 1988, a small plane made an emergency landing on the property. The plane broke into several pieces with the major portions of the plane coming to rest under or near the front porch of the mobile home. A fuel spill of 100 octane low lead aviation gasoline occurred as a result of the rupture of the plane's fuel system.

Hazards Environmental Services (HES) was contacted to remove gasoline-contaminated soil from the site of the plane crash. HES personnel arrived onsite to begin recovery operations, and removed soils found to exhibit total organic vapor readings of greater than 10 parts per million (ppm) as analyzed with a Century 128/GC Flame Ionization Detector (FID). An approximate delineation of the excavation and site map is presented as Figure 2. A total of 16.68 tons of contaminated soil was transported to MFM, Inc., for incineration at MFM's Lowell, Florida facility.

As a result of this spill, the Florida Department of Environmental Regulation required the owners of the property or their designated representatives to initiate a Preliminary Contamination Assessment Plan/Report (PCAP/PCAR). Phoenix Aviation Managers contracted with HES, Inc., to provide this scope of work.

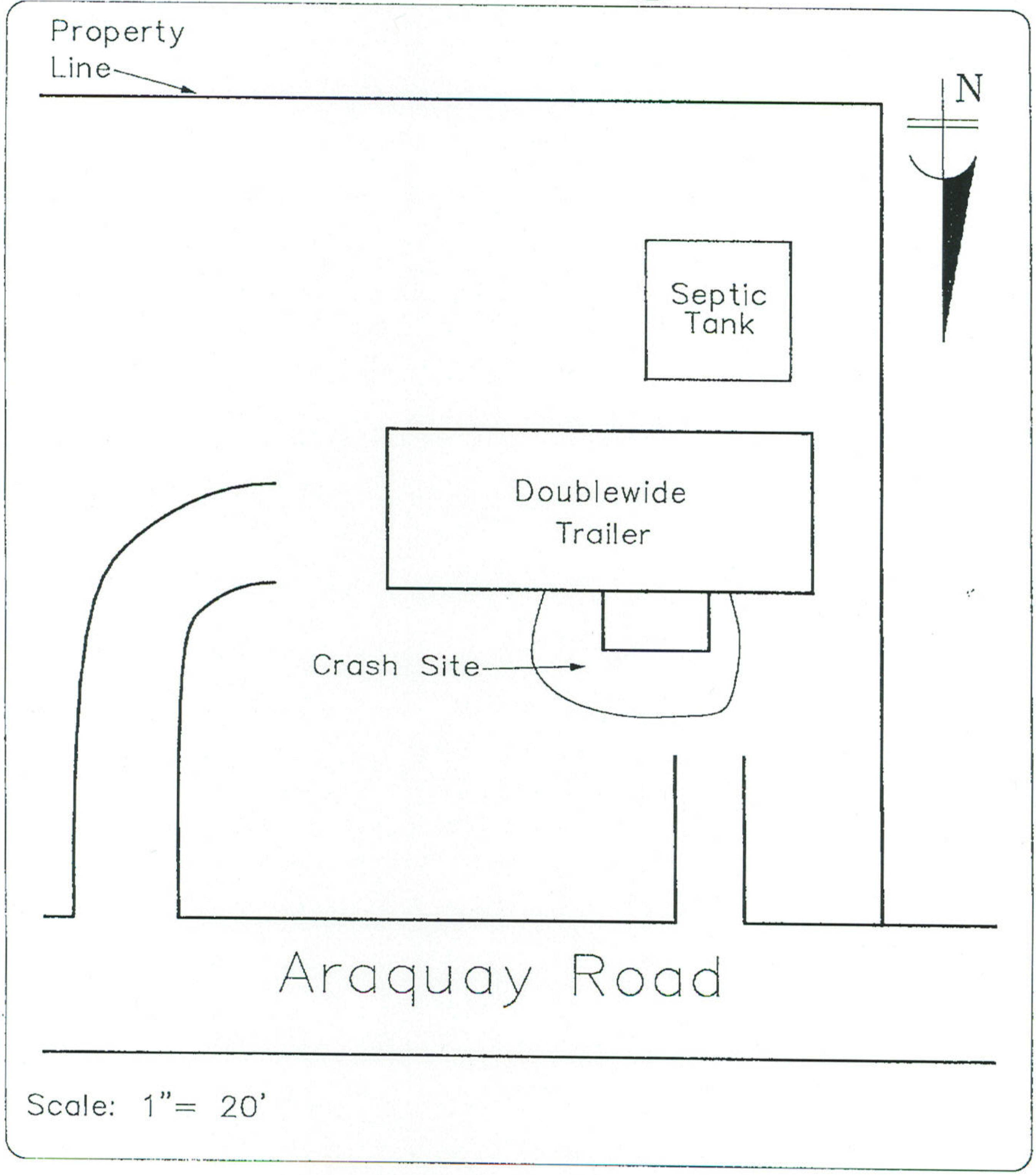


Figure 2: Site Map
313 Araquay Road

HAZARDS
Environmental Services, Inc.

Map ID #3 & #4

Sort By Document Date Type Any

Creator

Created (MM-DD-YYYY) To (MM-DD-YYYY)

Search Clear

County = ST. JOHNS

Facility-Site ID = 8515846 ... ST AUGUSTINE ST JOHNS CNTY AIRPORT

Document Date = (MM-DD-YYYY) To (MM-DD-YYYY)

Received Date = (MM-DD-YYYY) To (MM-DD-YYYY)

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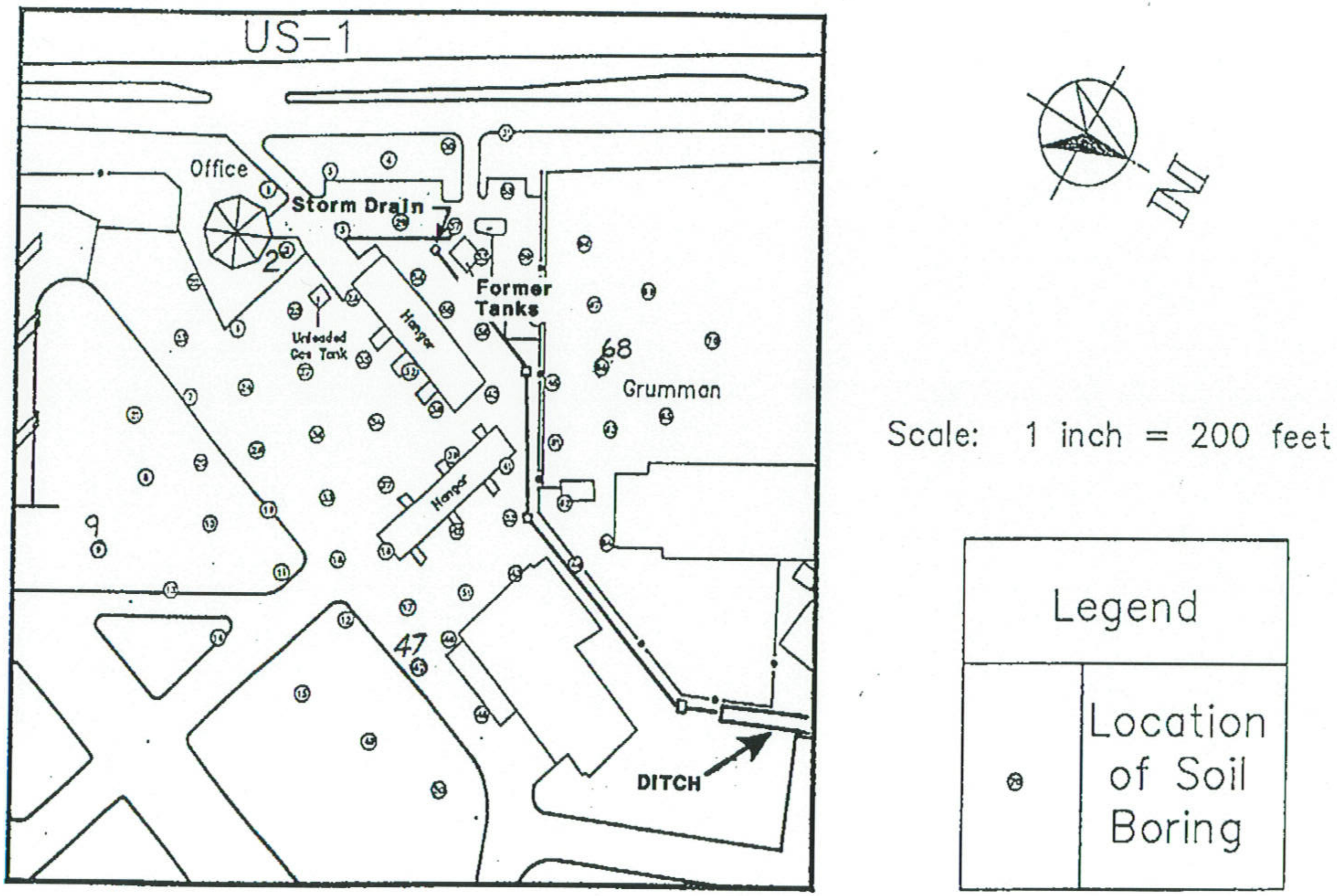
Contractor ID =

Facility Type *

Document Subject =

Search Clear



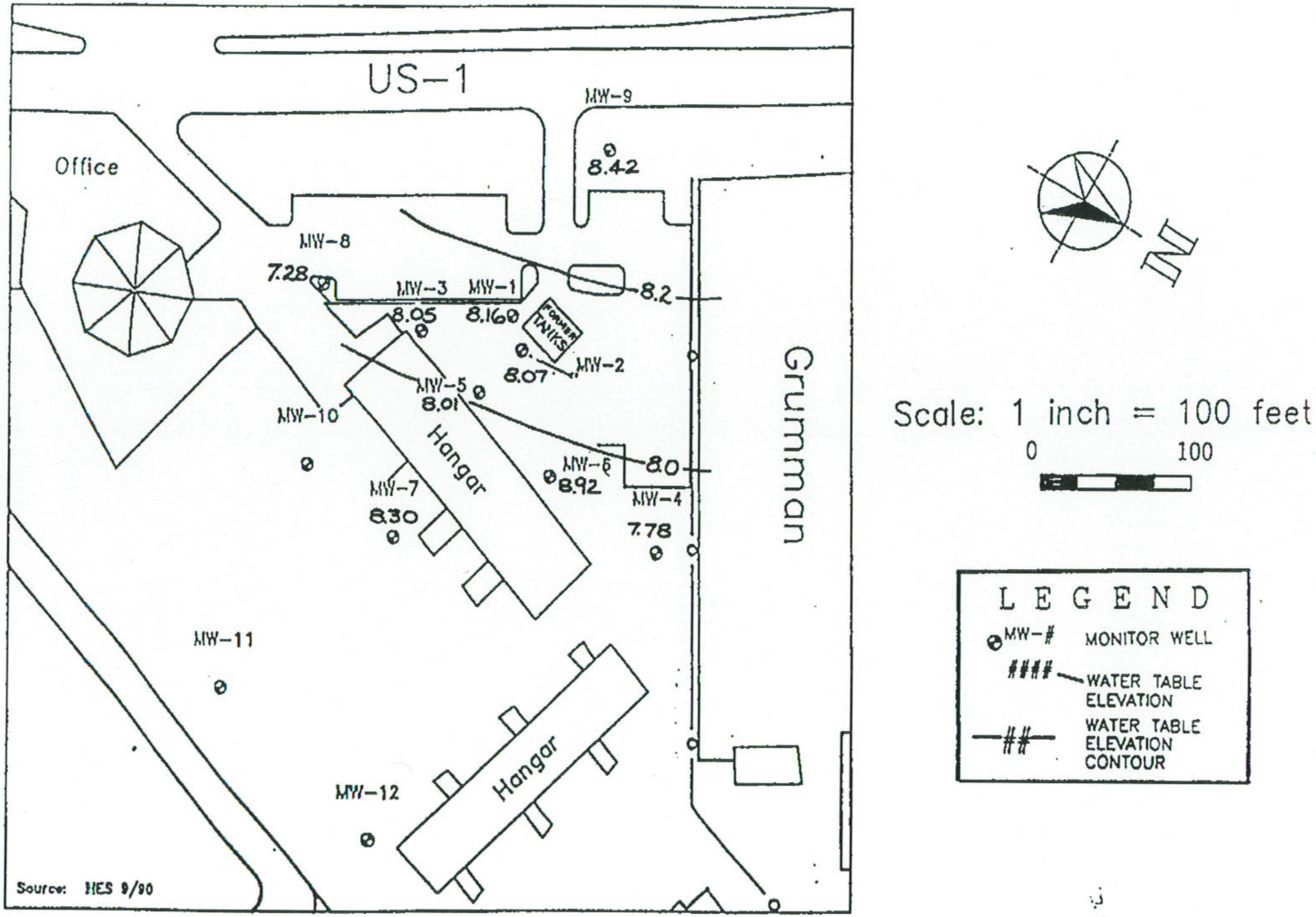
Source: HES 9/90

FIGURE 1

SITE MAP

Source: ECT, 1991.

ECT
Environmental Consulting & Technology, Inc.



Source: HES 9/90

FIGURE 2

WATER TABLE ELEVATION CONTOURS--3/28/90

Source: ECT, 1991.

ECT
Environmental Consulting & Technology, Inc.

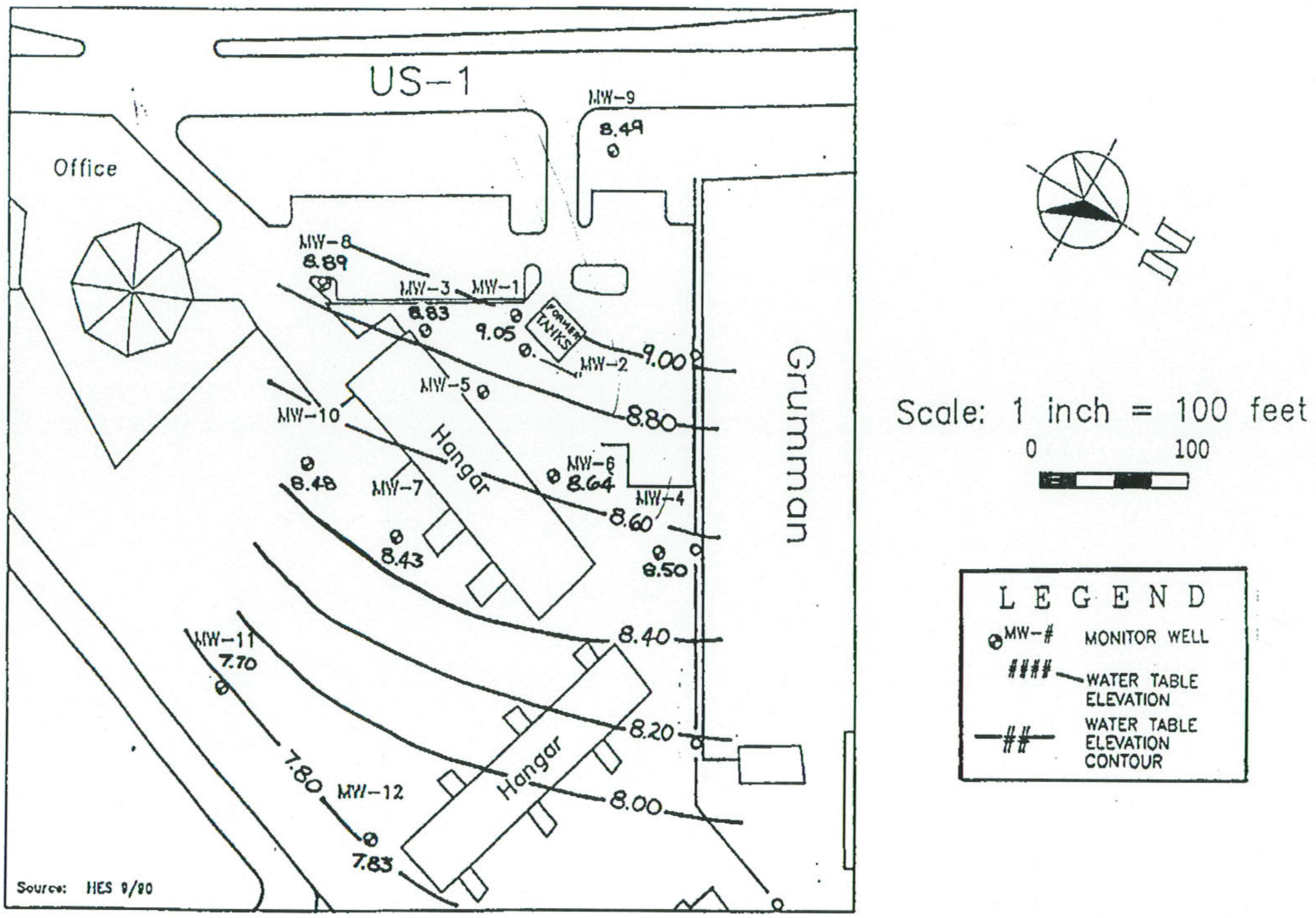


FIGURE 3

WATER TABLE ELEVATION CONTOURS--7/1/91

Source: ECT, 1991.

ECT

Environmental Consulting & Technology, Inc.

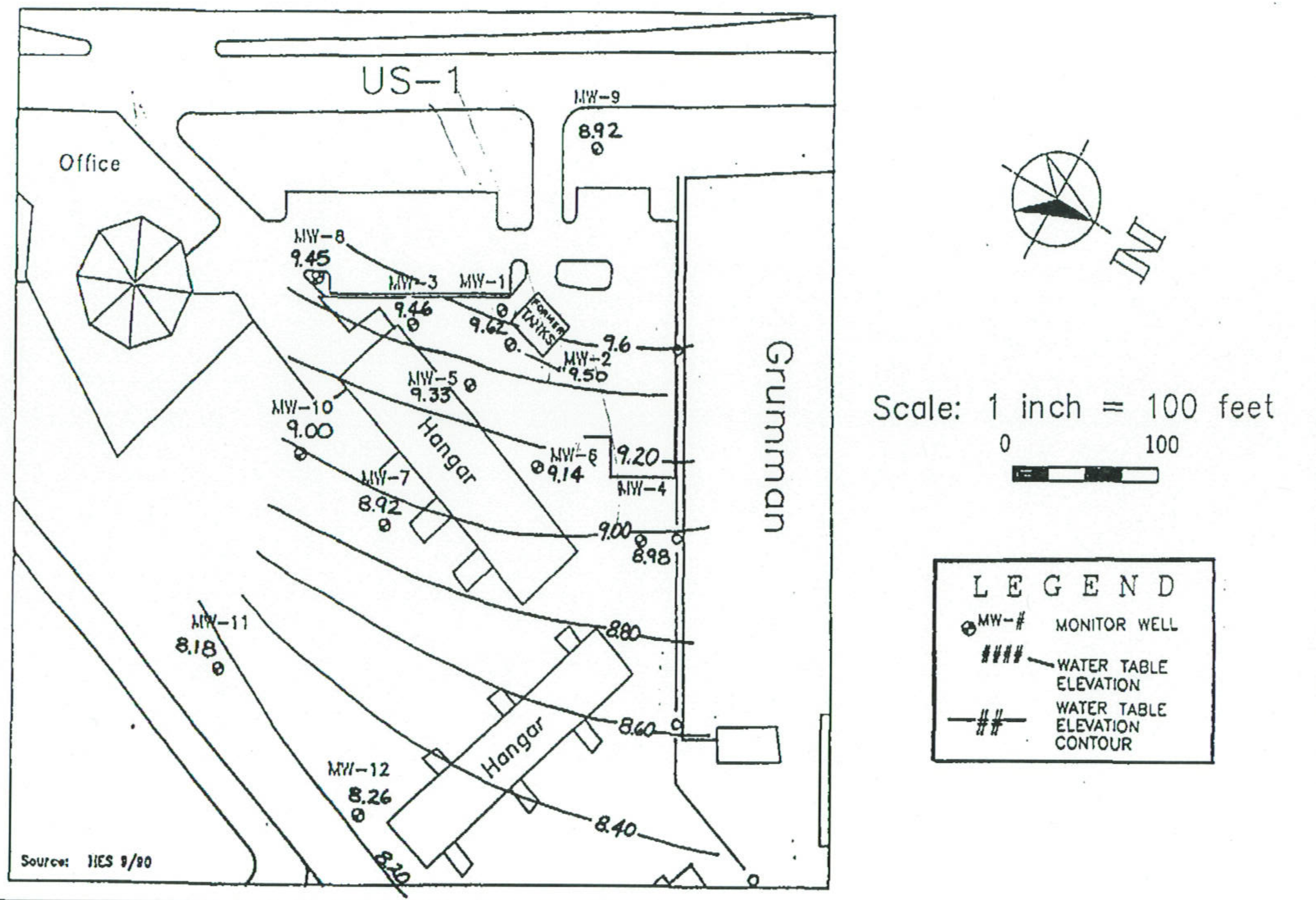


FIGURE 4

WATER TABLE ELEVATION CONTOURS--7/9/91

Source: ECT, 1991.

ECT
Environmental Consulting & Technology, Inc.

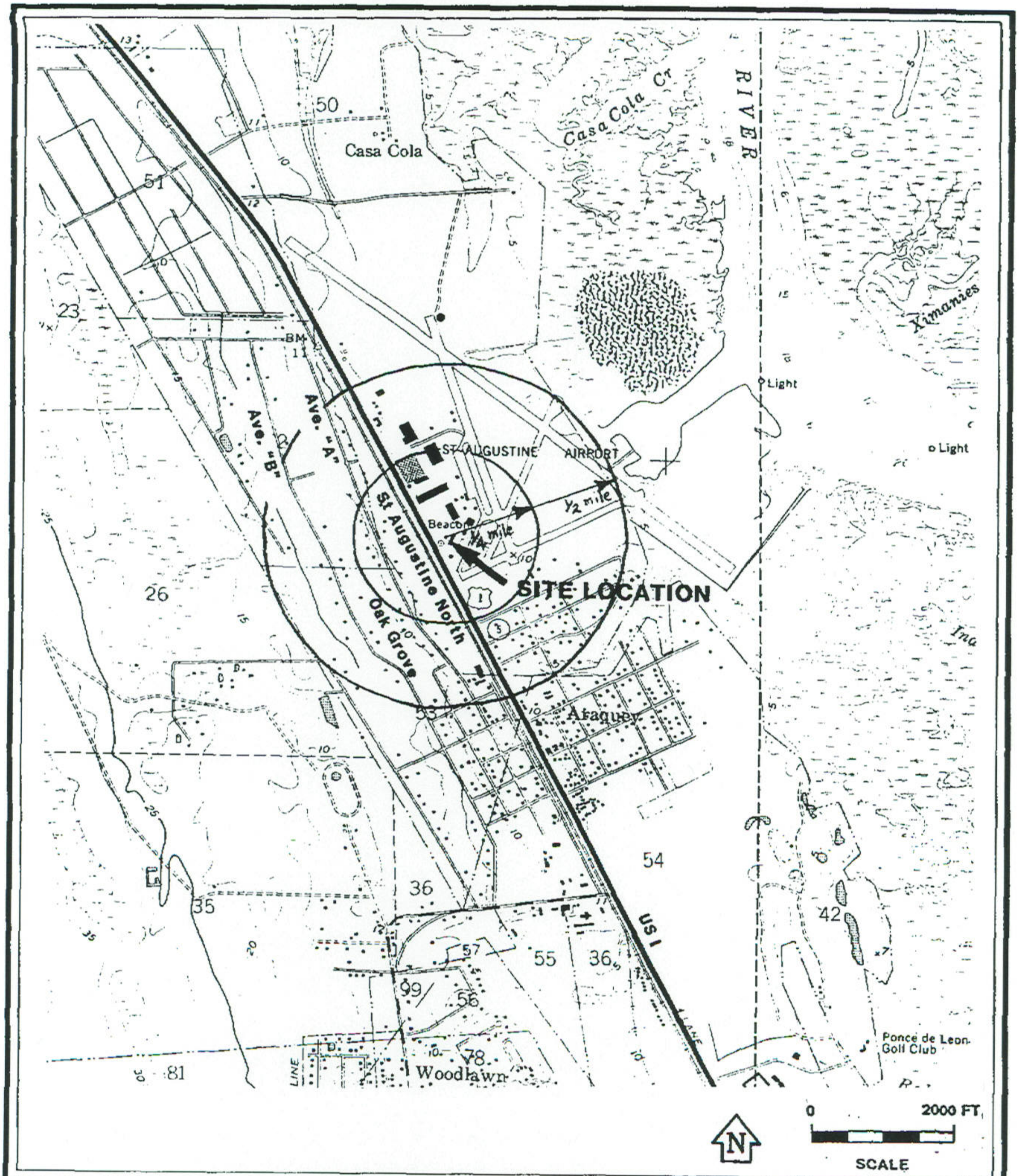


FIGURE 5

AREA MAP

Source: ECT, 1991.

ECT
Environmental Consulting & Technology, Inc.

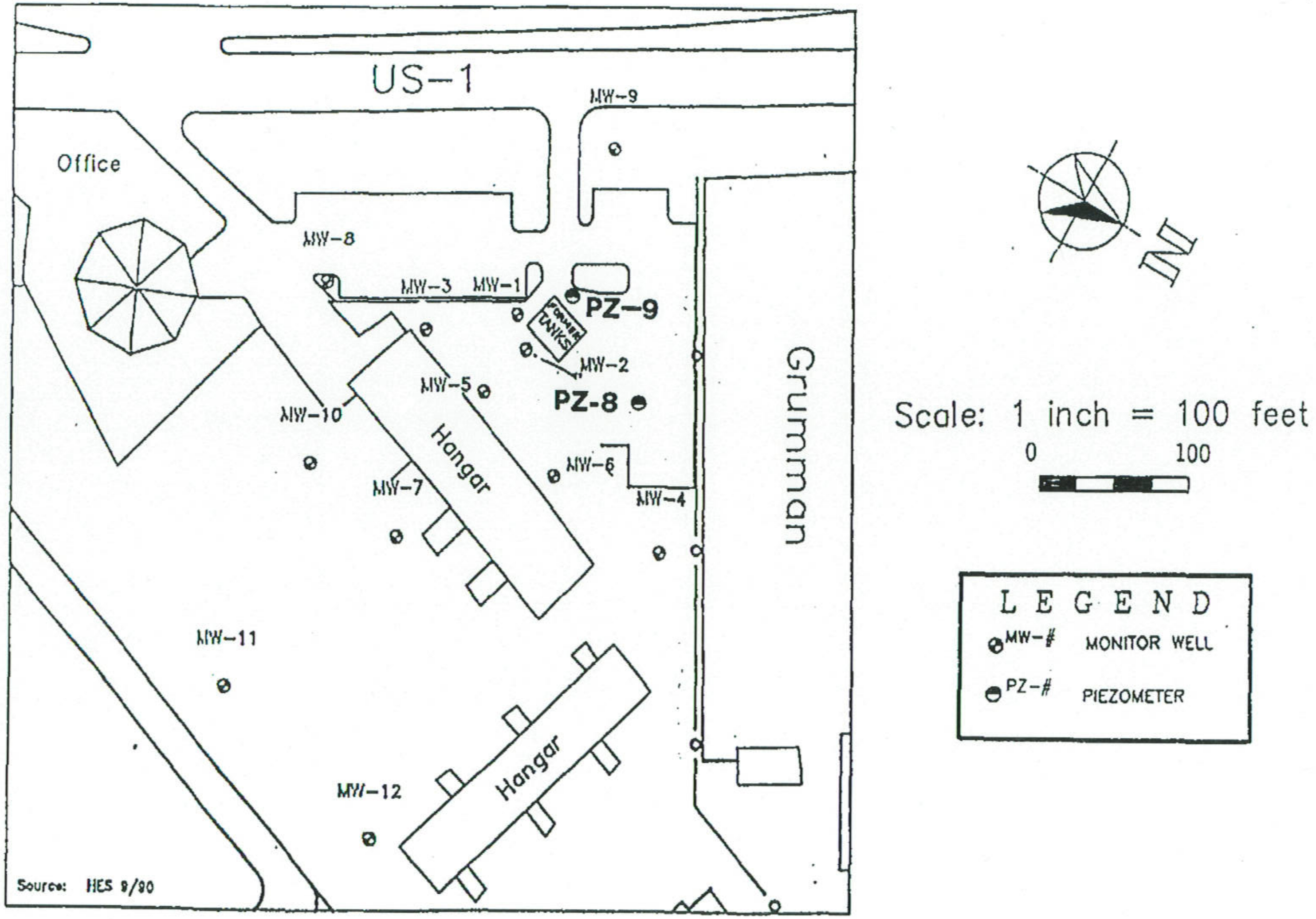


FIGURE 6

LOCATION OF PIEZOMETERS

Source: ECT, 1991.

ECT
Environmental Consulting & Technology, Inc.

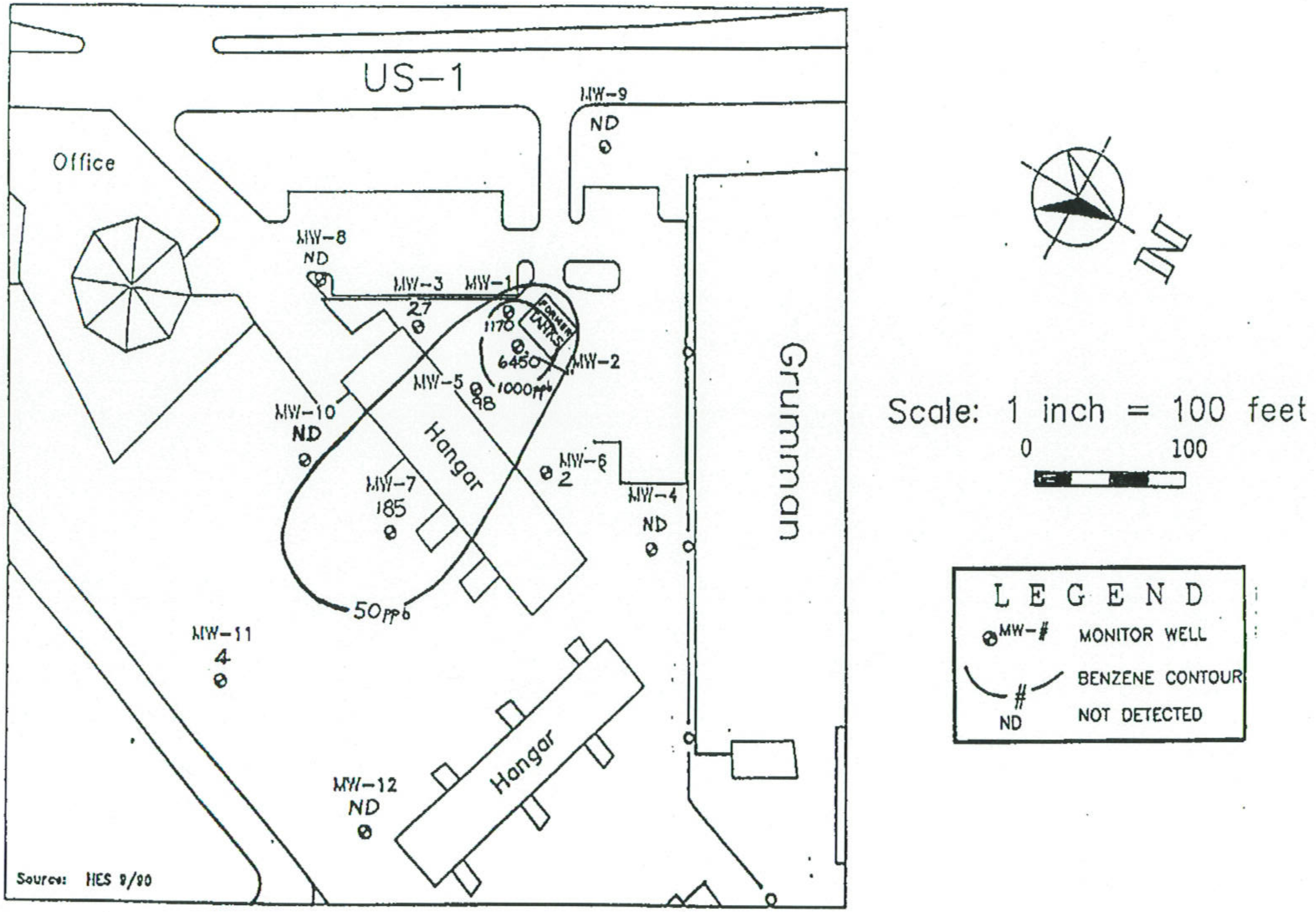


FIGURE 7

TOTAL VOA CONTOURS

Source: ECT, 1991.

ECT
Environmental Consulting & Technology, Inc.

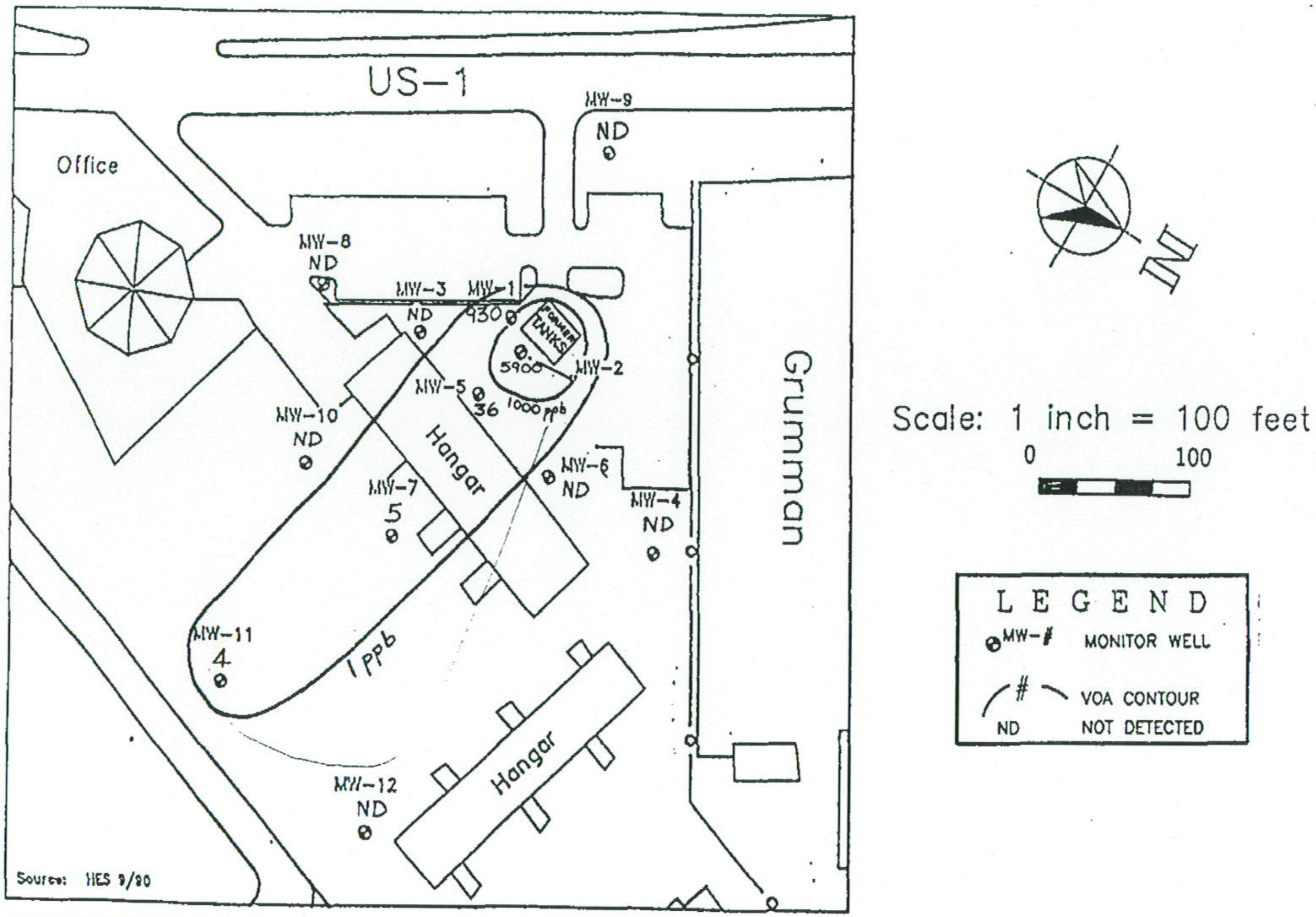


FIGURE 8

BENZENE CONTOURS

Source: ECT, 1991.

ECT
Environmental Consulting & Technology, Inc.

Sort By Document Date Type Any

Creator

Created (MM-DD-YYYY) To (MM-DD-YYYY)

Search Clear

County = ST. JOHNS

Facility-Site ID = 9400435 ... MCQUAIG PROPERTY

Document Date = (MM-DD-YYYY) To (MM-DD-YYYY)

Received Date = (MM-DD-YYYY) To (MM-DD-YYYY)

Document Type =

Contractor ID =

Facility Type *

Document Subject =

Search Clear

Search Results

Storage Tanks
0 total

Result/Page 5 Sort Document Date Refresh Add to Favorites

Operations View Select Turn Previewer on

No documents found

Washac Industries

4735 Avenue A
St. Augustine, Florida
County: St. John's
District: Northeast
Site Lead: Bureau of Waste Cleanup
Approved for Cleanup: 4/25/05
HWC # 120

Site Description and History

The former Washac Industries site is located at 4735 Avenue A in St. Augustine, St. John's County in Section 50, Township 06S, Range 29E at 29° 56′ 58.2305″ N, 81° 20′ 29.6117″ W in a mixed commercial and residential area. The site consists of an approximately 10,000 square foot metal warehouse/building situated on an unpaved lot. The facility is a closed business that formerly manufactured aluminum components for military aircraft. The manufacturing process included the cutting, punching, alodining, and painting of aluminum sheets. Alodining consists of a six part process in which parts are alternately dipped into six tanks containing alkaline aluminum cleaner, acidic oxidizer, and chromic coating. The paint guns, tools, and small parts used throughout the process were regularly cleaned with toluene and acetone.

In 1990, the Florida Department of Environmental Regulation (FDER, now DEP) determined that Washac Industries personnel had improperly disposed of hazardous waste onto the ground and into drains that led to the facility's septic tank and drain field. Records indicated that several 55 gallon drums of hazardous materials were received every year for use within their processes, but there was no documentation to show how spent solvents and wastes were disposed. It was reported that most of the waste streams were discharged directly onto the ground or into the septic system. As a result of these findings, the corporation and four employees pleaded no contest to several felony counts of unlawful disposal and treatment of hazardous waste, willful pollution, and felony littering. Washac Industries subsequently filed for bankruptcy.

Threat

Previous groundwater and soil investigations have revealed contamination of onsite soils as well as the shallow aquifer both on- and offsite. The shallow aquifer is contaminated with a variety of volatile organic compounds, primarily trichloroethene (TCE), above State groundwater cleanup target levels (GCTLs). Contaminated groundwater is a potential health threat to local residents through direct contact and use of private surficial aquifer wells.

Response Strategy and Status (December 2008)

In July 1994, the DEP Northeast District Office requested the DEP Site Investigation Section (SIS) conduct a site investigation. SIS found that Washac had detrimentally impacted the ground and surficial aquifer through their discharge of industrial waste. SIS found toluene, TRPH with a kerosene odor, aluminum, arsenic, cadmium, chromium, copper, lead, nickel, zinc, and mercury in the soil. The groundwater was found to be contaminated primarily with trichloroethene (TCE) and cis-1, 2-dichloroethene (cis-1, 2-DCE). The groundwater contaminant plume extended approximately 200 to 300 feet north/northeast of the property and was approximately 40 feet deep.

The Washac Industries site was adopted for cleanup under the State-funded Hazardous Waste Cleanup Program in June 2005. In August 2005 E&E began soil and groundwater assessment activities at the site in order to complete delineation of both the onsite and offsite soil and groundwater contamination. Assessment activities were completed in February 2006 and a Site Assessment Report (SAR) was generated and submitted to DEP in April 2006. Chromium was the most common contaminant found in concentrations exceeding the leaching Soil Cleanup Target Level (SCTL) of 38 mg/kg. TCE and cis-1, 2-DCE were the primary contaminants found in groundwater. The major portion of the contaminant mass resides at depths between 25 and 35 feet below ground surface immediately north-northeast of the building. The chlorinated solvent contaminant plume trends east-northeast and extends under the Florida East Coast Railroad and the US Highway 1 right-of-way. Groundwater contaminants were not detected in monitoring wells located along the east side of US Highway 1.

In July 2006, DEP met with E&E engineers and determined that a pilot study be conducted to determine the efficacy of bio-stimulation as a potential remedy for the site. The pilot study workplan was approved by DEP in September 2007. Baseline groundwater sampling was conducted in December 2007, and the pilot study began in January 2008. The pilot study ended in April 2008, and the report concluded that biostimulation was a viable remedial alternative at the site, and should be expanded to a full-scale remedy.

This site was reassigned to GeoSyntec Consultants in June 2008. Geosyntec reviewed the site data and proposed to conduct membrane interface probe (MIP) profiling, direct push technology (DPT) groundwater sampling, monitor well sampling, and oxidant demand testing. These field activities were conducted in September 2008. Based upon the collected data, Geosyntec concluded that both in situ chemical oxidation (ISCO) and biostimulation are viable remedial options for the site. Geosyntec recommends conducting both an ISCO treatability study and a biostimulation treatability study to determine which remedy is more suitable to achieving successful site remediation.

Schedule

DEP anticipates tasking both treatability studies in mid 2009. Based upon the treatability study results, Geosyntec will write a revised remedial action plan (RAP) describing full-scale implementation of the selected remedy.

APPENDIX H

LIGHT EMISSIONS AND VISUAL IMPACTS

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
PASSERO ASSOCIATES, LLC
13453 N. MAIN ST, SUITE 106
JACKSONVILLE, FL 32218

IN COORDINATION WITH:
THE LPA GROUP
4503 WOODLAND CORPORATE BLVD, SUITE 400
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NFRA
Northeast Florida Regional Airport
Fly Smart!

Light Emissions and Visual Impacts

There are no federal statutory or regulatory guidelines that dictate requirements concerning airport related light emissions or visual impacts. However, it is the FAA's policy to consider potential light emissions and effects and visual effects to properties and people's use of properties covered by Section 4(f) of the *U.S. Department of Transportation Act*, Section 6(f) of the *Land and Water Conservation Fund Act* and Section 106 of the *National Historic Preservation Act* in association with new airport development.

H.1 Existing Conditions

Several light systems and or sources are associated with existing Taxiway 'C' and the approach ends of Runway 31, Runway 24, and Runway 20 in the project study area. These light sources are described in the following paragraphs.

High Intensity Runway Light System

The first of these sources is the existing HIRL system associated with Runway 13-31. HIRLs allow pilots to identify the edges of the runway and assist them in determining the runway length remaining when conducting takeoff and landing operations during periods of darkness and restricted visibility. HIRLs emit white light, except in the caution zone, which corresponds to the last 2,000 feet of the runway. In the caution zone, HIRLs emit yellow light in the direction facing the instrument approach threshold and white light in the opposite direction (directed toward the runway end). The yellow lights warn pilots that they are approaching the last 2,000 feet of the runway on rollout after they have landed. Wattage of the lamps typically ranges from 120 to 200 watts. The HIRLs cast light in a full 360 degree arc. The lights are installed as pairs with one on each side of the runway and a maximum spacing between pairs of 200 feet.[1]

Medium Intensity Runway Light System

The Airport has MIRL systems that identify the edges of Runway 2-20 and Runway 6-24. MIRLs on these runways emit white light in a full 360 degree arc. Wattage of the lamps typically ranges from 30 to 45 watts. The lights are installed as pairs with one on each side of the runway and a maximum spacing between pairs of 200 feet.[2]

Threshold Lighting System

Another type of lighting source associated with the proposed project area is the existing threshold lighting. Threshold lights identify the runway end, or threshold, for pilots during landing and takeoff. Two sets of threshold lights have been installed on the approach end of Runway 31, due to the displaced threshold. At the pavement edge at the end of the runway, these lights have red on both sides. The lights at the displaced threshold have red and green lenses. Therefore, at night when pilots are approaching Runway 31, the first set of threshold lights are red, indicating an unsafe area to land, then 800 feet down the runway, the green lights mark the displaced threshold, indicating the beginning of the usable landing area. On takeoff, the red half of the lens at the displaced threshold faces the aircraft, indicating the end of the usable runway. These light systems employ a set of four lights on each side of the runway at the displaced threshold and four lights on each side of the runway at the runway end. Threshold lighting is also installed at the ends of Runways 20 and 24,

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[1] Federal Aviation Administration. (2008) Advisory Circular 150/5340-30D Design and Installation Details for Airport Visual Aids

[2] Federal Aviation Administration. (2008) Advisory Circular 150/5340-30D Design and Installation Details for Airport Visual Aids

with four standard inboard threshold lights on each side of the runway centerline. These threshold lights have the two-color (red and or green) lens, placed across the edge of the runway pavement. Wattage of threshold lamps typically ranges from 120 to 200 watts. Threshold lighting casts light in a full 360 degree arc.[3]

Precision Approach Path Indicator System

The next light source in the project study area is the PAPI that is located just southeast of the intersection of Taxiway ‘D1’ and Runway 13-31. The PAPI provides approach slope guidance to assist the pilot of an aircraft in flying a stabilized approach. The system has a visual range of approximately 5 miles during the day and up to 20 miles at night. The PAPI allows the pilot to determine an optimal altitude to avoid obstructions on approach, and provides a visual aiming point that helps the pilot to avoid overshoots or undershoots. The Airport's PAPI system is a four box system with two lights per box. The PAPI emits both white and red light; the perceived color depends on the angle from which it is viewed. The lighting colors that are observed by the pilot provide information about the pilot’s approach relative to the ideal approach (all or three white - glide slope too high; all or three red - glide slope too low; two red and two white - on the correct glide slope).[4] Lamp wattages vary for PAPI systems, but 150 to 200 watt lamps are typical. PAPIs are uni-directional because the light is emitted parallel to the runway along the runway approach.

Medium Intensity Taxiway Lighting System

A MITL system is installed along Taxiway ‘C’. The MITLs define the taxiway edge, and emit blue light in a full 360 degree arc. The lamps are typically 30 to 45 watt lamps. The lights are installed as pairs with one on each side of the taxiway and a maximum spacing between pairs of 100 feet.[5]

Aircraft Lights

The final source of light emissions within the project study area is the light that is emitted from aircraft approaching Runway 31 and aircraft departing from Runway 13. The lighting mounted on aircraft includes various navigational lights, landing lights, and strobe lights, some of which are omni-directional and others of which are uni-directional. The light emitted from aircraft is minor in comparison to other light sources around the Airport. Aircraft on approach to Runways 31, 24, and 20 within the project study area do not fly at low enough altitudes on approach that landing lights or other aircraft lights are a nuisance to surrounding property owners. In addition, much of the length of the approaches for each of these runways is over open water or saltmarsh.

H.2 Comments Received

Based on communication with Airport personnel,[6] the most recent complaints by the general public concerning annoyance from light emissions came in 2002. These comments were related to the former location of the Airport’s beacon near U.S. Route 1. Airport personnel are not aware of any other airport lighting - related complaints from the general public since the beacon was moved to its current location atop the ATC.

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[3] Ibid.

[4] Ibid.

[5] Ibid.

[6] Bryan Cooper, Assistant Airport Manager, St. Augustine-St. John’s County Airport. Personal communication, June 1, 2009.

APPENDIX I

NOISE

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
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NOISE

Regulations concerning noise impacts that occur as a result of Airport development include 49 USC Sections 47101 (a)(2), (c) and (h), "Airport Improvement Policies." These sections establish a policy to minimize current and projected noise impacts related to the construction and operation of aviation facilities where the noise impacts affect communities that are located near airports. In addition, 49 USC Sections 47501-47510, "Noise Abatement," requires the Secretary of Transportation to issue regulations that establish a system for measuring and assessing noise impacts on individuals near airports and to identify land uses compatible with various noise exposure levels. These regulations were issued as 14 CFR Part 150, "Airport Noise Compatibility Planning."

Previous studies have been completed to describe average airport noise exposure in the environs of the Airport. Noise contours were prepared for the *St. Augustine-St. John's County Airport Master Plan Update* [1] using standard FAA methodologies and procedures. The analysis contained within the master plan used the FAA Integrated Noise Modeling (INM) software, a computer program developed by the FAA, Office of Environment and Energy. This program is an industry accepted tool to analyze noise levels generated by aircraft operations at airports.

Among several noise descriptors developed by INM is the Day-Night Noise Level (DNL) metric. DNL is a 24-hour logarithmic average of noise levels in A-weighted decibels and is the accepted metric for evaluating aircraft noise compatibility. Since sound occurring during nighttime hours is usually found to be more annoying due to sleep disruption, the DNL metric requires the addition of a 10-decibel (dB) penalty (twice as loud) to nighttime operations between the hours of 10:00 p.m. and 7:00 a.m. DNL noise metric was originally developed by the EPA and is used by the FAA, the Department of Housing and Urban Development, and other federal agencies concerned with airport noise compatibility.

Airport noise contours are developed in INM by identifying equivalent values of DNL, typically in the range of 65 dB and higher. The DNL contours generated do not depict a strict demarcation of where the noise levels end or begin; however, their purpose is to describe the generally expected noise exposure over an average 24-hour period. As a result, noise exposure on any one day may be greater or less than the average day. It must be recognized that although the INM is the current state-of-the-art aircraft noise modeling software, input variables to the INM require several simplifying assumptions to be made, including, types of aircraft, time of operations, level of activity, runway utilization and flight paths. The noise model is useful for comparison of noise impacts between airfield development alternatives and can provide a reasonable basis for performing airport noise compatibility planning within the vicinity of the airport.

As part of the AMP update, DNL contours were generated for DNL 65 and higher in 5 dB increments to describe existing noise exposure estimates. The existing noise contours reflect conditions at the airport in 2002, which is the base year of the master plan. **Table I-1**

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[1] THE LPA GROUP INCORPORATED. (2005) *St. Augustine-St. John's County Airport Master Plan Update.*

summarizes the annual INM inputs by aircraft type that were used in the master plan to develop noise contours for 2002 baseline conditions.

Table I-1

Annual INM Inputs by Aircraft Type

Year	Single-Engine		Multi-Engine		Jet		Rotorcraft		Total
	Ops	%	Ops	%	Ops	%	Ops	%	
2002 BASELINE	78,292	74.00 %	11,638	11.00 %	12,696	12.00 %	3,174	3.00 %	105,800

Source: 2005 Master Plan Update, Table 3-16.

In reference to 2002 baseline conditions, the INM input variables for runway utilization, approach and departure profiles, and flight tracks included the following:

- Runway Utilization – The runway utilization depends primarily on prevailing wind conditions. Secondarily, runway use is influenced by available runway length and aircraft departure or arrival into terminal airspace. Runway 31 is the primary runway end for all aircraft, as it is equipped with ILS approach, and Runway 13 is the second-most utilized, and Runways 2 -20 and 6- 24 are used infrequently.

- Approach and Departure Profiles – Approach and departure profiles illustrate an aircraft's changing altitude along its flight path. The INM aircraft database contains standard profiles for all aircraft included in this analysis.

- Flight Tracks – A flight track is a projection of an aircraft's in-flight path, as if shown on the ground. Due to meteorological conditions, aircraft type, stage length, air traffic separation, and pilot judgment, flight tracks can be unique to each operation. Flight tracks for the airports runways consist of straight-in approaches and departures for all runways.

According to the FAA Terminal Area Forecast (TAF), SGJ recorded a total of 100,733 annual operations in 2008, approximately 5% less than those of 2002. The Airport has had no major reconfiguration and all other conditions are the same or similar to those in 2002, therefore the 2002 noise contours prepared in the AMP reflect a conservative estimate of existing noise conditions.

Figure I.1 (**Figure 3.12.1**) depicts the 2002 baseline noise contours generated for Airport overlaid onto the 2015 Comprehensive Plan for St. John's County (2004). These are the same noise contours depicted on the Land Use Plan (Sheet 18) of the 2005 ALP drawing set for the airport (developed in conjunction with the 2005 master plan). The comprehensive plan reflects planned land use with the vicinity of Airport. Within the DNL noise contours, certain land uses may be incompatible with airport operations according to FAA guidelines. The FAA offers general guidelines for land use compatibility in Appendix 1 of FAA AC No/150/5020-1, *Noise Control and Compatibility Planning for Airports*. Per the FAA's guidelines, residential land uses, hospitals, schools, nursing homes, churches, and auditoriums are discouraged within the 65 DNL and greater; however, in some cases, these uses may be compatible if proper noise level reduction measures are incorporated into the design of the structure. Generally, commercial and manufacturing uses are compatible with sound levels below 80 DNL if certain sound level reduction practices are employed. For reference, **Table I-2** presents a complete description of FAA guidelines for land uses normally compatible with various airport noise levels.

For 2002 baseline conditions, total acreage of land exposed to 65 DNL or greater is 1,310 acres. As noted on **Figure I.1**, 1.0 acre of residential land use located approximately 1,400 feet south of existing Taxiway 'C' is found within the 65 DNL and may be incompatible with airport noise depending on construction standards applied to the structures. No other incompatible land uses were noted in the existing condition. Based on a review of aerial photography, this area of residential land use contains one single family residence.

At this time, the most relevant noise analysis for the EA evaluation is the 2002 baseline scenario. No runway developments have occurred since the 2002 baseline analysis was conducted, and the airport experienced fewer operations in 2008 than in 2002. The proposed actions of the EA primarily serve to correct FAA design standard deficiencies, and do not include runway extension projects that might change the airport's existing fleet characteristics and or induce activity growth. As such, the undertaking of the proposed actions would result in a safer airfield environment, and only natural activity growth / decline would be expected after their implementation. Consequently, any existing and future incompatible noise exposure within the vicinity of SGJ would be unrelated to the proposed action of the EA. It is further anticipated that as Stage 2 jets continue to be phased-out of service throughout the United States, the airport's future noise footprint may be smaller than shown in the 2002 baseline analysis, even with increases in overall activity levels.

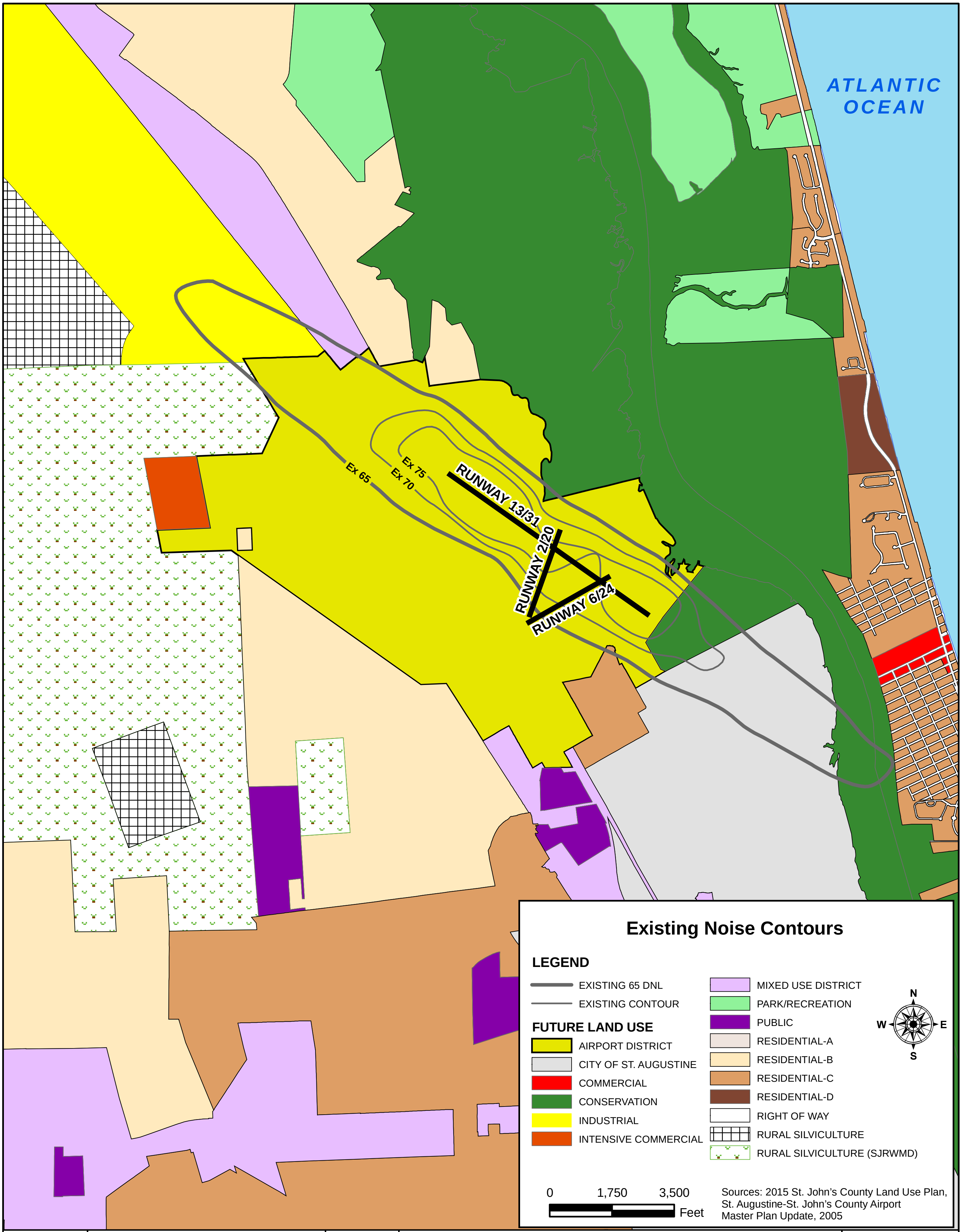
Table I−2

Land Uses Normally Compatible With Various Noise Levels

Land Use	Yearly day−night average sound level, DNL in decibels					
	Below 65	65−69	70−74	75−79	80−85	Over 85
Residential Use						
Residential, other than mobile and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30 N(3)	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)		Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale & retail − building materials, hardware, & farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade − general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing (general)	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

SLUCM - Standard Land Use Coding Manual
Y - (Yes) Land Use and related structures compatible without restrictions.
N - (No) Land Use and related structures are not compatible and should be prohibited.
NLR - Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30 or 35 - Land use and related structures generally compatible; measures to achieve NLR or 25, 30, or 35 must be incorporated into design and construction of structure.
(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal construction can be expected to provide an NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
(2) Measures to achieve NLR to 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
(3) Measures to achieve NLR to 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR to 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
(5) Land uses compatible, provided special sound reinforcement systems are installed.
(6) Residential buildings require an NLR of 25.
(7) Residential buildings require an NLR of 30.
(8) Residential buildings not permitted.
Source: 14 CFR Part 150.



Existing Noise Contours

Sources: 2015 St. John's County Land Use Plan,
St. Augustine-St. John's County Airport
Master Plan Update, 2005

SCALE
1 in = 3,500 ft
DESIGNED BY
DG
DRAWN BY
DG
CHECKED BY
JG

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

DATE
10/21/2009
PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance,
and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
I.1

APPENDIX J

WATER QUALITY

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
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NFRA
Northeast Florida Regional Airport
Fly Smart!

WATER QUALITY

J.1 REGULATORY REQUIREMENTS

The *Federal Water Pollution Control Act*, as amended by the *Clean Water Act* (CWA, 33 United States Code 1251), provides the authority to establish water control standards, control discharges into surface waters and subsurface waters, develop waste treatment management plans and practices, and issue permits for discharges and for dredging and or filling in surface waters.

Water Quality Standards

Section 303 of the CWA requires states to establish water quality standards for waters within their boundaries that are subject to CWA jurisdiction. Florida is authorized to administer its CWA program and has EPA-approved water quality standards, which are contained in Florida Administrative Code (FAC) Chapter 62-302.

Section 303(d) of the CWA requires states to develop a list of waters not meeting water quality standards or not supporting their designated use classifications. Section 303(d) of the CWA and Florida Statutes Section 403.067 define impaired waters as those not meeting applicable water quality standards, which include:

1. Designated uses;
2. Water quality criteria;
3. The Florida antidegradation policy; and
4. Moderating provisions.

Waters that do not meet water quality standards due to natural conditions, or that do not meet water quality standards due to other factors that are not related to pollutants, are noted as such in the state's water quality assessment report (Subsection 305b Report).

In 2001, the FDEP adopted the "Impaired Waters Rule" for the purpose of interpreting existing water quality criteria and evaluating attainment of established designated uses. FAC Chapter 62-303 establishes the methodology used to identify state surface waters that will be included in the state's planning list of waters that will be assessed. Chapter 62-303 also identifies impaired waters based on representative data that are included on the state's verified list of impaired waters. The FDEP calculates the Total Maximum Daily Loads (TMDLs) for identified state impaired waters, pursuant to Florida Statutes subsection 403.067(4). Additionally, the list of impaired waters is submitted to the U.S. Environmental Protection Agency (EPA) as mandated by Section 303(d)(1) of the CWA. The proposed project is located in the Upper East Coast Watershed, which is labeled by the FDEP as a Group 5 Basin for TMDLs.[1]

Regulation of Discharges

Discharges to surface waters are regulated by the FDEP through the NPDES Program. The NPDES Program is a program administered by the EPA under the Authorization of the CWA that is designed to regulate the discharge of point source pollution into Waters of the United States. Requirements of the program are stipulated in the Title 40 of the Code of Federal Regulations, Parts 122 through 124. In October of 2000, the State of Florida obtained the approval to operate its own

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[1] Florida Department of Environmental Protection. (2008, April 2). Surface Water Quality Standards. Chapters 62-302 , p. 19, http://www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf

NPDES program, which is administered by FDEP in lieu of a Federal program. The NPDES program issues permits for various types of activities that result in discharges to state waters including permits for municipal storm sewer systems, permits for large (greater than five acres) and small (one to five acres) construction activities, and several other categories of industrial activities that result in discharges to surface waters. Two types of permits would apply to the proposed project. First, the proposed project would require an NPDES permit for a large construction activity. Second, once constructed, the proposed project would be covered by the Airport's existing Sector S Multi Sector Generic Permit (MSGP). As a transportation facility that discharges stormwater to surface waters of the State, the Airport is required to operate under the conditions of a MSGP. As a condition of the MSGP, the Airport is also required to have a SWPPP. Should the project be approved and constructed, the SWPPP would then be updated to include the drainage changes resulting from the proposed project.

Environmental Resource Permitting

On behalf of the State of Florida, the SJRWMD administers the ERP program in St. Johns County. This permitting program regulates the design of stormwater management systems and construction activities that result in dredging or filling activities within waters of the State of Florida, as set forth in Chapter 40C-4, FAC. Airport projects resulting in changes to its stormwater management system or dredging or filling activities within existing wetlands or surface waters require an ERP from the SJRWMD.

J.2 SURFACE WATERS

As stated previously, the Airport is located within the Upper East Coast Watershed [Hydrological Unit Code (HUC) 03080201][2] **(Figure J.1)**. This basin covers approximately 692 square miles (excluding estuarine areas), and it includes the watersheds along the Atlantic Intracoastal Waterway (AICW) from Ponce de Leon Inlet in Volusia County, north through Flagler and St. Johns Counties, to southern Duval County.[3] HUC 03080201 is described below:[4]

> The basin encompasses coastal lowlands and extensive marshes interspersed with numerous creeks and small rivers draining east toward the Atlantic Ocean to form a series of shallow bays and coastal lagoons. These are separated from the Atlantic Ocean by a barrier island system with three inlets where tidal exchange occurs: St. Augustine, Matanzas, and Ponce de Leon.

The Upper East Coast Watershed is divided into four planning units: Tolomato River, Matanzas River, Pellicer River, and Halifax River **(Figure J.2)**. The primary named waterbody closest to the project study area is the Tolomato River. This river is located east of the Airport property, with a small segment of the river abutting Airport property. Surface water runoff from the project study area drains to ditches, salt marsh, and / or tidal creeks that are connected to the Tolomato River. The SJRWMDs 2000 District Water Management Plan identified the estuaries associated with the Tolomato River as containing regionally significant habitat.

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[2] Collins, Jerilyn J., & Katz, Brian G. (1998). *Evaluation of Chemical Data from Selected Sites in the Surface-Water Ambient Monitoring Program (SWAMP) in Florida*, p. 3. http://fl.water.usgs.gov/PDF_files/ofr98_559_katz.pdf

[3] Florida Department of Environmental Protection. (2009). *Upper East Coast Watershed – Florida's Water: Ours to Protect.* http://www.protectingourwater.org/watersheds/map/upper_east_coast/

[4] *Ibid.*

The State of Florida categorizes the Tolomato River as a *Class II water,* which classifies the river as supporting the propagation and harvesting of shellfish.[5] In addition, the segment of the Tolomato River located adjacent to the project study area is just south of a portion of the river listed as an *aquatic preserve*[6] **(Figure J.3)**. An aquatic preserve is defined in Florida Statute 258.37 as "an exceptional area of submerged lands and its associated waters set aside for being maintained essentially in its natural or existing condition"[7] (**Appendix K**).

J.3 SURFACE WATER QUALITY

In 1998, EPA approved the Florida 1998 303(d) List, which was based on the state's 1996 305(b) Water Quality Assessment Report; that report used a watershed approach to evaluate the state's surface waters, ground waters, and wetlands. The Airport is located within Water Body (WBID) 23631 and is adjacent to WBID 2468. WBID 23631 is the Tolomato River segment, which was listed on the 303(d) report as impaired **(Figure J.4)**. The Group 5 Basin / Northeast District 303(d) list describes WBID 23631 as having impairments for arsenic, coliform (shellfish harvesting downgrade), copper, iron, mercury (in fish tissue), and nickel.[8] WBID 2468 is the Casa Cola Creek segment which includes the drainage from the north end of the Airport. Casa Cola Creek was listed as a 3b water, which signifies that insufficient data has been collected to determine whether any designated use is attained. Future monitoring will be recommended to gather sufficient information.[9] **Table J.1** provides the priority level for TMDL development for each impairment factor and the year in which the FDEP plans on having TMDLs developed for WBID 23631:

Table J.1
Priority level for TMDL Development

Pollutant	Priority Level	Implementation Year
Arsenic	Medium	2012
Coliform	Low	2017
Copper	Medium	2012
Iron	Medium	2012
Mercury	Low	2011
Nickel	Medium	2012

FDEP's delist document, which was updated on December 7, 2007, recommended that WBID 23631 be delisted for coliforms.[10]

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[5] Florida Department of Environmental Protection. (2008, April 2). Surface Water Quality Standards. Chapters 62-302 , p. 9. http://www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf

[6] Florida Department of Environmental Protection – Division of Water Resource Management. (2005). *Water Quality Status Report Upper East Coast*, pp. 26, 29. ftp://ftp.dep.state.fl.us/pub/water/basin411/uppereast/status/UEC.pdf

[7] *The 2008 Florida Statutes*. (2008). Retrieved April 29, 2009, from Online Sunshine http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0258/SEC37.HTM&Title=->2008->Ch0258->Section%2037#0258.37

[8] Florida Department of Environmental Protection – Division of Water Resource Management. (2007, December 7). *Upper East Coast Group 5 Basin/Northeast District – Verified List,* p. 5. http://www.dep.state.fl.us/WATER/TMDL/docs/303d/group5/adopted/ueastcoastverifiedlist.pdf

[9] Florida Department of Environmental Protection – Division of Water Resource Management. (2005). *Water Quality Status Report Upper East Coast*, p 47. ftp://ftp.dep.state.fl.us/pub/water/basin411/uppereast/status/UEC.pdf

[10] Florida Department of Environmental Protection – Division of Water Resource Management. (2007, December 7). *Upper East Coast Group 5 Basin/Northeast District – Delist List*, p. 1.

J.4 GROUNDWATER AND WATER SUPPLY

The water supply source for almost all water used in St. Johns County is groundwater. Groundwater in the County comes from three aquifer systems; the surficial aquifer, the intermediate aquifer, and the Floridan aquifer.

The uppermost of these aquifer systems, the surficial aquifer, is composed primarily of sand, shell, and to a lesser extent clay. It is an unconfined aquifer whose surface is essentially defined by the water table. It is directly replenished by rainfall and percolation from surface water bodies. As a water supply source, this aquifer is limited by seasonal fluctuations in the water table, but it is still used as a water source for shallow wells for livestock or domestic uses that do not require large quantities, particularly in areas where the quality of the water in the Floridan aquifer is not suitable for such use.[11] The surficial aquifer is used for water supply for the Harmony Village Water Treatment System in northwestern St. Johns County and for part of the supply for the St. Augustine Water Treatment System, which also provides water to the County's Eagle Creek water system.[12]

The intermediate aquifer is below the surficial aquifer. It is made up of clays and thin zones of sand, shell, and limestone containing relatively small amounts of confined groundwater. Intermediate aquifers are not a major source of water supply in St. Johns County.[13]

The Floridan aquifer is the main water supply source in St. Johns County. This aquifer is a confined aquifer that is composed primarily of limestone and dolomite.[14] With the exception of the two treatment systems listed above (Harmony Village and St. Augustine), public utility water supplies within St. Johns County originate primarily from wells that tap into the Floridan aquifer.[15] Based on a review of the 2005 Floridan aquifer recharge area map obtained from the SJRWMD, the project study area is not located within a recharge area for the Floridan aquifer. It is instead located in an aquifer discharge area.[16] In coastal areas, such as the project study area, the Floridan aquifer is characterized by a layer of fresh groundwater that is above a wedge shaped body of intruding seawater. The interface of the two layers is the freshwater / saltwater transition zone. Chemical constituents of waters within the Floridan aquifer where it underlies coastal areas tend to include higher concentrations of calcium, magnesium, chloride, and sulfate, with typically high concentrations of total dissolved solids, hardness, and pH.[17] Such areas are not ideal for water withdrawal.

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http://www.dep.state.fl.us/water/tmdl/docs/303d/group5/adopted/ueastcoastdelistlist.pdf

[11] St. Johns River Water Management District (1990) *Technical Publication SJ90-8: Lower St. Johns and St. Marys Ground Water Basins Resource Availability Inventory.*

[12] St. Johns County Utility Department Water Quality Reports (2009) http://www.co.st-johns.fl.us/BCC/Utility_Department/Water_Quality_Reports/index.aspx

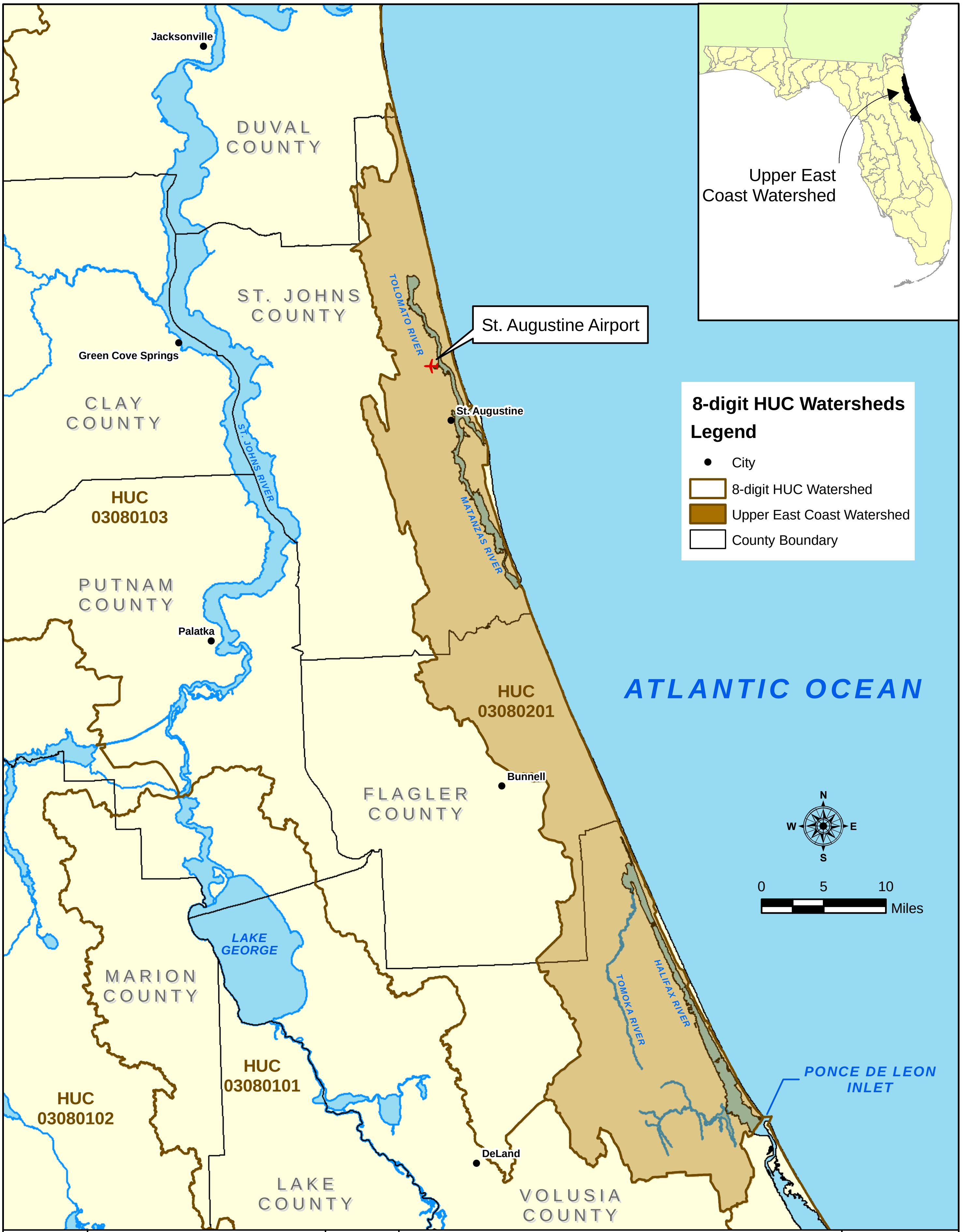
[13] St. Johns River Water Management District (1990) *Technical Publication SJ90-8: Lower St. Johns and St. Marys Ground Water Basins Resource Availability Inventory.*

[14] St. Johns River Water Management District (1990) *Technical Publication SJ90-8: Lower St. Johns and St. Marys Ground Water Basins Resource Availability Inventory.*

[15] St. Johns County Utility Department Water Quality Reports (2009) http://www.co.st-johns.fl.us/BCC/Utility_Department/Water_Quality_Reports/index.aspx

[16] St. Johns River Water Management District (2005) *Recharge Areas of the Floridan Aquifer in the St Johns River Water Management District.* Available via download from http://sjr.state.fl.us/groundwaterassessment/recharge.html

[17] St. Johns River Water Management District (2002) *Technical Publication SJ2002-1: Evaluation of Upper Floridan Aquifer Water Quality to Design a Monitoring Network in the St. Johns River Water Management District.*



SCALE
1 in = 10 mi

DESIGNED BY
DG

DRAWN BY
DG

CHECKED BY
JG

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

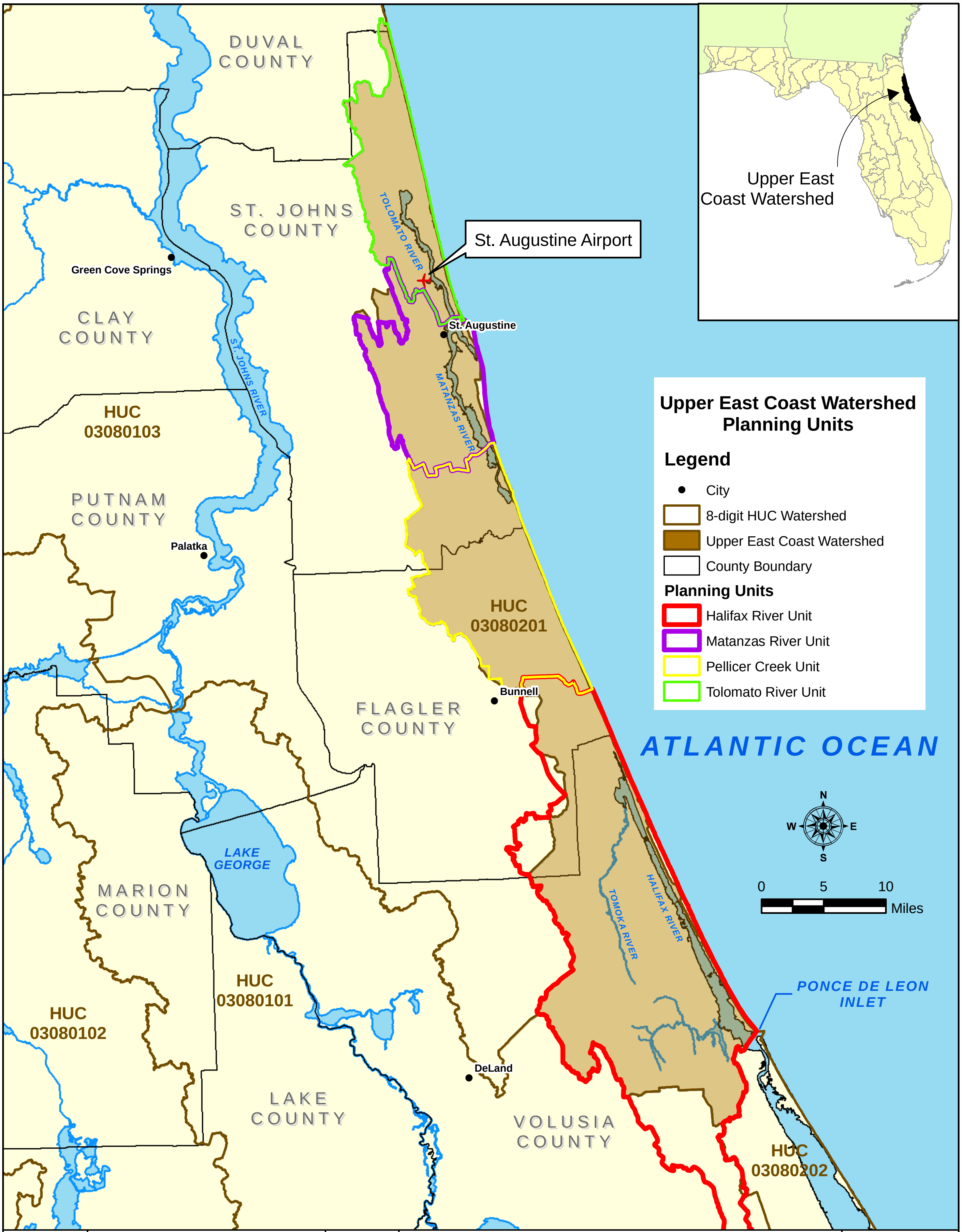
DATE
10/21/2009

PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
J.1



SCALE
1 in = 10 mi

DESIGNED BY
DG

DRAWN BY
DG

CHECKED BY
JG

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

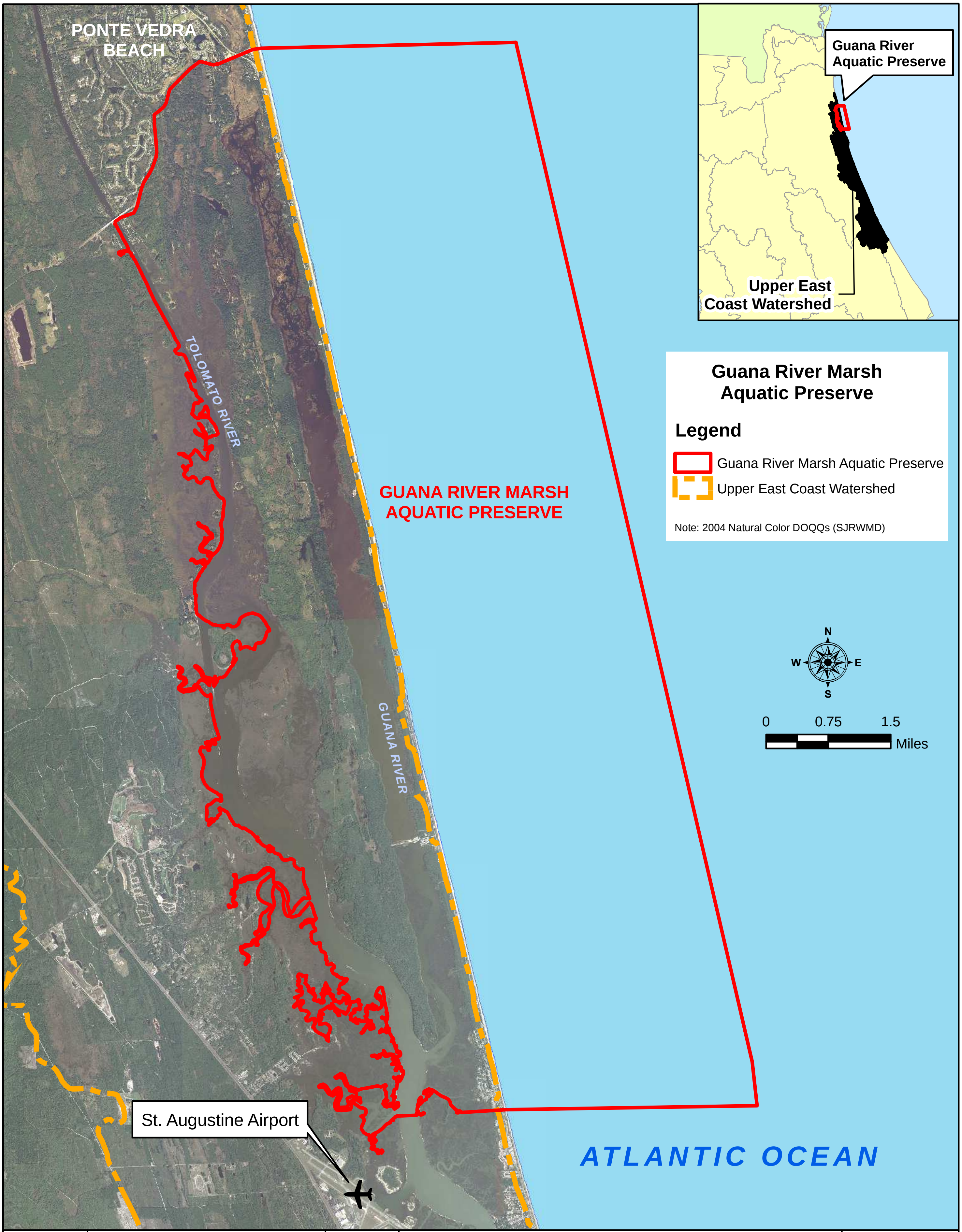
DATE
10/21/2009

PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance,
and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
J.2



SCALE
1 in = 1.5 mi

DESIGNED BY
DG

DRAWN BY
DG

CHECKED BY
JG

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

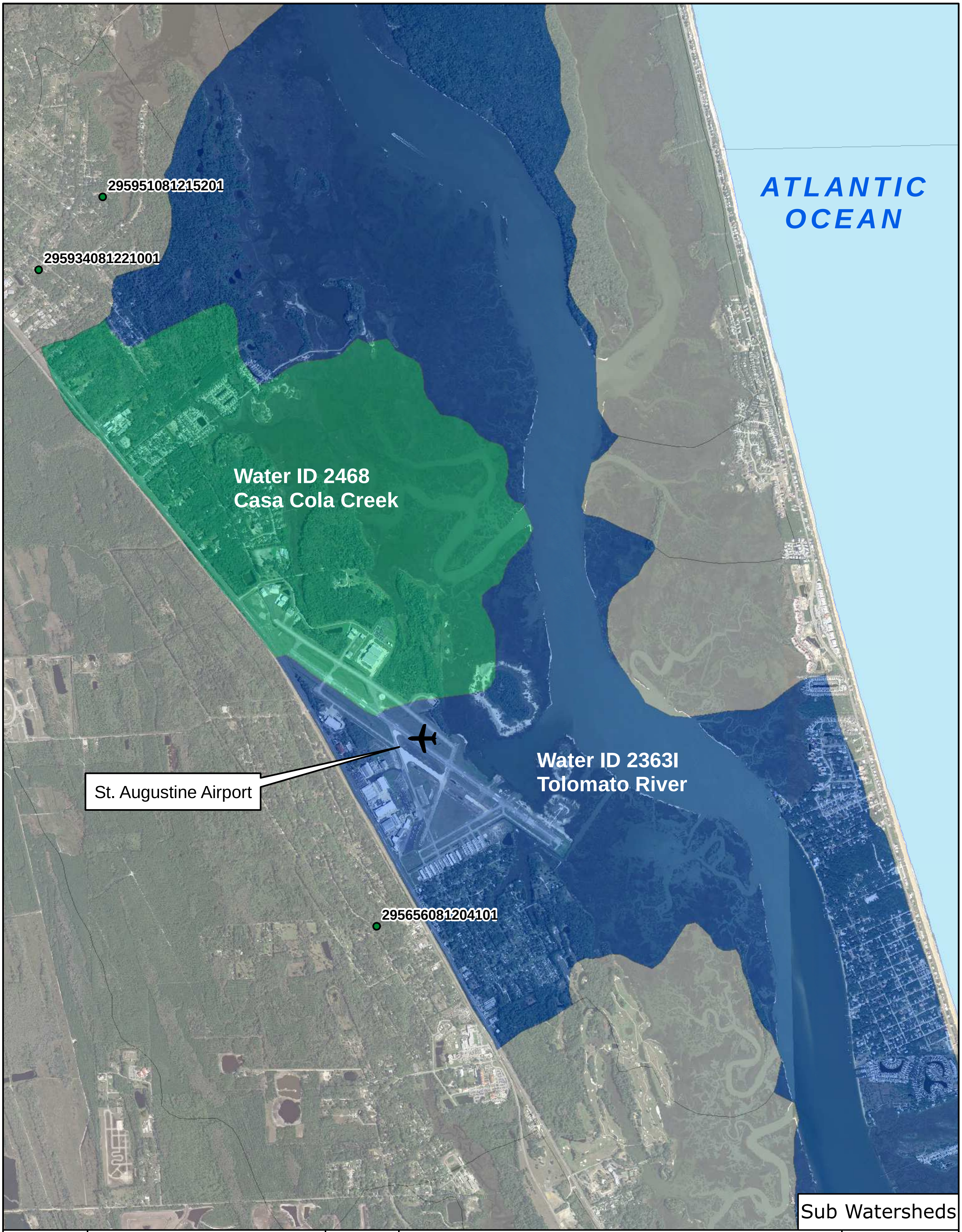
DATE
10/21/2009

PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
J.3



Sub Watersheds

SCALE
1 in = 3,000 ft
DESIGNED BY
DG
DRAWN BY
DG
CHECKED BY
JG

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

DATE
10/21/2009
PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
J.4

APPENDIX K

CLASS II WATERS PROTECTION PLAN

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
PASSERO ASSOCIATES, LLC
13453 N. MAIN ST, SUITE 106
JACKSONVILLE, FL 32218

IN COORDINATION WITH:
BIRKITT ENVIRONMENTAL SERVICES, INC
550 N. REO ST, SUITE 105
TAMPA, FL 33609

NFRA
Northeast Florida Regional Airport
Fly Smart!

I. Introduction

This document details the measures that will be taken to protect Class II waters during and after construction of the Proposed Project which include:

- The replacement of the existing Taxiway 'C' that serves Runway 31;
- The restoration of the Runway Safety Area (RSA) to bring the RSA back into compliance with FAA standards; and
- The installation of an Approach Lighting System (ALS) for the existing Instrument Landing System (ILS) for Runway 31.

II. Class II Waters of the Project Area

The waters adjacent to the airport are designated Class II, but are conditionally approved for shellfish harvesting, meaning they do not always meet Class II water quality standards. Additionally, most of the submerged lands are owned directly by the Authority and are not under state ownership. Thus, shellfish harvesting cannot be authorized by the state in these areas.

The Class II waters adjacent to airport are characterized by scattered oyster beds and emergent salt marsh habitat. A benthic habitat survey of the Class II waters was conducted from April 21 through 24, 2009, by Birkitt Environmental Services, Inc. and LPA Group scientists. Oyster (*Crassostrea virginica*) clumps, patches, and individuals were observed in the open water surrounding the Airport (**Appendix C, Figures 3A and 3B**). Oysters are present in the project area in sparse numbers.

In total, the Airport proposes to fill approximately 2.32 acres of Class II waters. These impacts were minimized to the greatest extent possible while still meeting the purpose and need of the project. Additional Class II open water impacts will occur from deepening existing tidal canals and temporary impacts from construction activities. These impacts are not expected to cause degradation of Class II waters. A Class II waters protection plan which includes BMPs will be implemented to protect Class II waters during project construction. Furthermore, the previously dredged ditch will be relocated to maintain navigability to the adjacent residential areas by dredging 0.60 acres of saltmarsh and deepening 0.25 acres of already established open water habitat. The dredging will create new Class II open waters and reduce the total impacts to Class II waters to approximately 1.72 acres. Additionally, the shoreline of the project area will be re-planted with saltmarsh vegetation. The vegetated shoreline is expected to create a higher quality habitat than open waters as saltmarsh habitats have greater diversity and support for fish and wildlife than open water habitats.

III. Avoidance, Minimization and Protection of Class II Waters

A. Avoidance and Minimization of Impacts to Class II Waters

Multiple alternatives for the design of the Taxiway 'C' were considered for this project. Avoidance and minimization measures are detailed in Chapter 2, Alternatives analysis, and in the wetlands environmental consequences section, Section 4.16 of the EA.

The Proposed Project addresses the stated purpose and need for the project, while at the same time minimizing impacts to Class II waters. Specific design elements which minimized impacts will be implemented with the proposed project that includes use of Armorflex 30 for erosion stabilization.

The use of the Armorflex material created a smaller impact footprint than the originally discussed rip rap material resulting in a reduction of 0.76 acres to Class II waters. In addition, the Armorflex 30 material allows for vegetation to be interplanted among it, allowing for restoration of the shoreline. The interplanting of saltmarsh vegetation with the erosion control material even further reduces impacts to Class II waters. Approximately 3.1 acres of saltmarsh impacts were reduced from the change in erosion control measures.

An additional design element that was included to minimize impacts was the use of four to one side slopes in the area of the new Taxiway 'C' replacement. Typically, side slopes of a Taxiway Safety Area would be six to one slope or greater. The steeper side slopes were used to decrease the impact on the west side of the project area.

Furthermore, no impacts to Class II waters to the south of Runway 31 are proposed. The shoreline stabilization will be constructed in uplands, avoiding permanent impacts to wetlands or open water in the area. The only impacts proposed in this area are very small (0.01 acres of saltmarsh) and will result from the placement of the ALS support poles.

B. Protection of Class II Waters During Construction

BMPs are described in FAA Advisory Circular 150/5370-10 *Standards for Specifying Construction of Airports* (change 10). Item P-156 Temporary Air and Water Pollution, Soil Erosion and Siltation Control will be followed during construction to minimize potential impacts. Erosion and turbidity will be controlled via construction sequencing, silt screens, turbidity curtains and quick sodding. The first construction activity will be the deployment of turbidity curtains, in the open waters and silt screens along the future toe of fill. Next, perimeter berms will be constructed which will consist of erecting a silt screen fence along the berms inner edge, excavation of unsuitable materials and, if necessary, berm material deposition. These measures and their sequencing will minimize erosion and the effects of turbidity on the adjacent marsh and open water habitat.

Stormwater runoff treatment for the proposed action will be compliant with SJRWMD regulations which require development of a SWPPP during construction. In addition, the Airport currently has an operational SWPPP in place which provides BMPs to prevent pollution from entering Class II waters. The measures in the construction SWPPP would be consistent with the Airport's operational SWPPP, which is associated with the BMPs recommended in the Airport's NPDES Multi Sector Generic Permit. By implementing the control measures in the construction SWPPP, it is anticipated that increases in turbidity, sedimentation of areas beyond the project's limits, and erosion of soil from disturbed areas would be minimized and disturbance would be contained within the project limits to the maximum extent practicable.

C. Protection Measures After Construction

In-kind mitigation will offset the proposed impacts to Class II waters by the restoration of salt marsh habitat within Class II waters. Currently, the proposed mitigation is to restore the shoreline of the project area and restore a spoil island which is in proximity to the proposed impacts. The conceptual design of the mitigation proposed at the spoil island includes the construction of a tidal creek that will traverse the restored saltmarsh habitat. Refer to **Figure 5.02.1** in Chapter 5 of the EA for the proposed conceptual mitigation design at the spoil island. The proposed mitigation is expected to provide no net loss of Class II waters.

As stated above, Armorflex 30 will be installed for shoreline stabilization. The proposed shoreline stabilization is expected to prevent future erosion of the shoreline. Therefore, the erosion control structures will help prevent future impacts to Class II waters from the turbidity and soils that could erode into the waters if the structures were not in place. In addition, the shoreline around the project area will be replanted, helping create a higher quality habitat than open water, as saltmarsh is known to provide natural water quality treatment via nutrient uptake and attenuation.

IV. Conclusion

Considering the unavoidable nature of the impacts, the public benefit of the project, the previously disturbed quality of the habitat to be impacted, and the proposed restoration/mitigation to offset those impacts, it is expected that impacts to Class II waters will be temporary and result in no net loss. The proposed BMPs will help prevent impacts to Class II waters in and outside of the project area during construction. The project also proposes measures to prevent future impacts to Class II waters from the placement of erosion control structures around the perimeter of the project area. These areas will be re-planted with saltmarsh vegetation which further provides additional benefit to Class II waters.

APPENDIX L

UMAM ANALYSIS

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
PASSERO ASSOCIATES, LLC
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IN COORDINATION WITH:
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TAMPA, FL 33609

NFRA
Northeast Florida Regional Airport
Fly Smart!

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

DRAFT

Site/Project Name St Augustine Airport EA	Application Number	Assessment Area Name or Number Wetland A - East Area

FLUCCs code 642, 510, and 650	Further classification (optional)	Impact or Mitigation Site? Impact	Assessment Area Size Saltmarsh - 9.00 acres Open Water - 1.57 acres

Basin/Watershed Name/Number Matanzas River/ Upper East Coast	Affected Waterbody (Class) Class II	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Directly adjacent and hydrologically connected to navigable waterways and the Tolomato River; Connects to continuous saltmarsh and estuarine creeks.

Assessment area description

Wetland is a saltmarsh dominated by *Spartina alterniflora* , *Juncus roemerianus* , *Distichlis spicata,* and other typical saltmarsh vegetation. Wetland is directly adjacent to the Saint Augustine Airport and connects to tributaries of the Tolomato River. Open water areas are present and are designated as Class II waters. The open water areas contain oyster beds. No seagrass is present.

Significant nearby features Airport runways and taxiway; tributaries of the Tolomato River; Guano River Marsh Aquatic Preserve and Guano-Tolomato Matanzas National Estuarine Research Reserve (OFW) to the north (~1 mile)	Uniqueness (considering the relative rarity in relation to the regional landscape.) Not Unique; saltmarsh and open water habitat is similar to adjacent areas
Functions Provides habitat for estuarine fish, shellfish, and wildlife. Foraging and roosting habitat for wading birds, shorebirds, and alligators. Water quality filtration, water storage	Mitigation for previous permit/other historic use Historically, area was a contiguous saltmarsh, dredged in 1967 for fill to construct the runways at the airport. No mitigation needed at that time. Historically (1960s), the open water areas were filled create Runway 13/31 and runway safety area.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found) Osprey, bald eagle, wading birds, shorebirds, waterbirds (gulls and terns), alligators, raccoons, crabs and other crustaceans, snakes, shellfish, mollusks, fish	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) Snowy egret (SSC) occasional feeding usage; tricolored heron (SSC) occasional feeding usage; Least Tern (T) occasional feeding usage; Alligator (SSC) occasional feeding and nesting usage; Piping plover (T) rare roosting usage.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Osprey, bald eagle, snowy egret, great egret, great blue heron, tricolored heron, ring billed gull, laughing gull, herring gull, least tern, common tern, cormorant, fish crow, purple martin, three lined rat snake, willet, crab (*Uca* sp.), whimbrel, mottled duck, belted kingfisher, northern harrier, teals, red-winged blackbird, killdeer, lesser yellowlegs, ruddy turnstone, clapper rail, hooded merganser, alligator, oyster, blue crab, killifish, lightning whelk, periwinkle snail (*Littorina* sp.)

Additional relevant factors:

Areas of no vegetation in sand/salt flats (FLUCFCS 650); Concrete pieces and rip-rap present in some areas. Heavy erosion present, creating a large escarpment along the shoreline.

Assessment conducted by: Birkitt Environmental Services	Assessment date(s): April 6 - 10, 2009

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

DRAFT

Site/Project Name Saint Augustine EA	Application Number	Assessment Area Name or Number Wetland A - East
Impact or Mitigation **Impact (Open Water)**	Assessment conducted by: Birkitt Environmental Services, Inc.	Assessment date: April 6 - 10, 2009

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 7 with: 0	**Current:** Adjacent to the saltmarsh, Wetland A (East) also includes open water that is brackish in nature. The open water habitat is adjacent to tributaries of the Tolomato River. Runways, taxiways, and other facilities of the St. Augustine Airport are adjacent as they are present on the other side of the salt marsh. A culvert is present that outfalls into the open water areas. A large spoil island exists to the north and contains a few exotic species. The open water habitat contains a seaplane dock and a boat ramp. Historically (1960s), the open water areas were formed from salt marsh habitat which was dredged for fill to create Runway 13/31. Oysters clumps and patches are present in and adjacent to the project area. **With:** The proposed project will fill 0.16 acres of open water habitat of Wetland A (East) to address the significant erosion occurring in Runway Safety Area (RSA) of the airport. The fill is necessary to bring the RSA to the appropriate design standard advised by the FAA. Currently, the erosion in the area has caused the RSA to be short of the proper design standard of 250 feet from the runway centerline.	
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 with: 0	**Current:** The open water areas of Wetland A (East) are tidally influenced and shallow. During low tide, shellfish beds are exposed. The water quality and clarity of the open water is fairly good with 2 to 3 foot visibility. The hydrology and water quality are normal for this type of habitat and the open water provides habitat to fish and wildlife. However, a culvert is present bringing stormwater into the system and the historic flow of water has been altered (rerouted) by way of a tidal ditch. This ditch is located to the west and south of Runway 13-31. Several species of birds and fish were observed utilizing the open water areas for foraging and habitat. **With:** The proposed project will fill 0.16 acres of open water habitat of Wetland A (East) to address the significant erosion occurring in Runway Safety Area (RSA) of the airport. The fill is necessary to bring the RSA to the appropriate design standard advised by the FAA. Currently, the erosion in the area has caused the RSA to be short of the proper design standard of 250 feet from the runway centerline.	
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 5 with: 0	**Current:** The open water areas of Wetland A (East) is tidally influenced and shallow. The habitat has minimal vegetative cover but does contain areas of shellfish patches (~0.61 acres). Some algae is present including *Ulva* species. Oysters are present in clumps, individuals, and patches and a small presence of quahogs were noted. No seagrass was observed during the surveys of the wetland and open water. The bottoms consist of sandy mud or muck with limited macro invertebrates present besides the oysters. **With:** The proposed project will fill 0.16 acres of open water habitat of Wetland A (East) to address the significant erosion occurring in Runway Safety Area (RSA) of the airport. The fill is necessary to bring the RSA to the appropriate design standard advised by the FAA. Currently, the erosion in the area has caused the RSA to be short of the proper design standard of 250 feet from the runway centerline.	

Score = sum of above scores/30 (if uplands, divide by 20) current or w/o pres: 0.633 with: 0.000	If preservation as mitigation: Preservation adjustment factor = Adjusted mitigation delta =	For impact assessment areas FL = delta x acres = 0.1013 Acres: 0.160
Delta = [with-current] 0.633	If mitigation: Time lag (t-factor) = Risk factor =	For mitigation assessment areas RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

DRAFT

Revised 10-22-09

Site/Project Name Saint Augustine EA	Application Number	Assessment Area Name or Number Wetland A - East
Impact or Mitigation **Impact (Saltmarsh)**	Assessment conducted by: Birkitt Environmental Services, Inc.	Assessment date: April 6 - 10, 2009

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 7 with: 0	**Current:** Wetland A (East) includes a tidally influenced saltmarsh habitat located adjacent to runways, taxiways, and other facilities of the St Augustine Airport. The wetland is also adjacent to tributaries and other saltmarsh of the Tolomato River. The saltmarsh can be considered a mosaic of habitats with low and high marsh species mixed with unvegetated sand flats. Concrete pieces and rip-rap are present where erosion is evident. A large scarp has formed in the area from the significant erosion in the area. A culvert is also present. A large spoil island exists to the north and contains a few exotic species. Historically (1960s), the open water areas were filled to create Runway 13/31 and runway safety area. The area has eroded significantly. **With**: Approximately 3.92 acres of saltmarsh of Wetland A (East) will be filled to address the significant erosion occurring in the Runway Safety Area (RSA) of the airport.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 with: 0	**Current:** The saltmarsh habitat of Wetland A (East) is a mosaic of habitats dominated by high marsh species and mixed with unvegetated sand flats. A large scarp is also present and was formed from the significant erosion in the area. The saltmarsh is tidally influenced and adjacent to runways, taxiways, and other facilities of the St Augustine Airport. The wetland is also adjacent to tributaries and other saltmarsh of the Tolomato River. Concrete pieces and rip-rap are present where erosion is evident. The hydrology and water quality are normal for this type of habitat and the assessment area provides habitat to fish and wildlife. However, a culvert is present bringing stormwater into the system and the historic flow of water has been altered by the original construction of the runway. This ditch is located to the east and south of Runway 13-31. Additionally, some vegetative stress is evident due to hypersaline conditions in and adjacent to the salt flats. Historically (1960s), the open water areas were filled to create Runway 13/31 and runway safety area. The area has eroded significantly. **With:** Approximately 3.92 acres of saltmarsh of Wetland A (East) will be filled to address the significant erosion occurring in the Runway Safety Area (RSA) of the airport.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 7 with: 0	**Current:** The saltmarsh habitat of Wetland A (East) is a mosaic of habitats dominated by high marsh species and mixed with unvegetated sand flats. The wetland has high species diversity and species number in some places. Wetland A (east) is primarily dominated by an estuarine ground cover but a shrub layer was present. Black mangroves (*Avicennia germinans*) are present in small numbers and are included in the shrub stratum. Oysters are sparse along the edges but mainly are found adjacent to the saltmarsh in the open water habitat. Normal age and size distribution is present for most of the vegetation with the exception of the mangroves which are dwarfed. Large areas of unvegetated salt/sand flats are interspersed within the wetland. Large areas of concrete rip rap and disturbed vegetation are also present near the seaplane basin and a large scarp is present from the significant erosion in the area. Historically (1960s), the open water areas were filled to create Runway 13/31 and runway safety area. The area has eroded significantly. **With**: Approximately 3.92 acres of saltmarsh of Wetland A (East) will be filled to address the significant erosion occurring in the Runway Safety Area (RSA) of the airport.

Score = sum of above scores/30 (if uplands, divide by 20)

current or w/o pres: 0.700

with: 0.000

Delta = [with-current]

0.700

If preservation as mitigation:

Preservation adjustment factor =

Adjusted mitigation delta =

If mitigation:

Time lag (t-factor) =

Risk factor =

For impact assessment areas

FL = delta x acres = 2.7440

Acres: 3.920

For mitigation assessment areas

RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

DRAFT

Site/Project Name St Augustine Airport EA	Application Number	Assessment Area Name or Number Wetland A - South Area

FLUCCs code 642, 510	Further classification (optional)	Impact or Mitigation Site? Impact	Assessment Area Size Saltmarsh - 0.91 acres Open Water - 0.97 acres

Basin/Watershed Name/Number Matanzas River/ Upper East Coast	Affected Waterbody (Class) Class III	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Hydrologically connected to navigable waterways of tributaries to the Tolomato River; Connects to continuous saltmarsh and estuarine creeks that travel into residential areas. Directly adjacent to the airport and includes a man-made, shallow navigation canal.

Assessment area description

The wetland is primarily an estuarine ditch system and saltmarsh area dominated by *Spartina alterniflora* , *Juncus roemerianus* , and other typical saltmarsh vegetation. The wetland is directly adjacent to the St. Augustine Airport and travels inland toward residential areas. Open water areas consist of a previously dredged canal containing very scattered oyster clumps. No seagrass is present.

Significant nearby features Airport runways and taxiway; Residential areas; Tributaries of the Tolomato River	Uniqueness (considering the relative rarity in relation to the regional landscape.) Not Unique; saltmarsh and open water habitats are similar to adjacent areas
Functions Stormwater conveyance for the airport; Provides habitat for estuarine fish, shellfish, and wildlife. Foraging habitat for wading birds, shorebirds, wood storks, and alligators; Water storage	Mitigation for previous permit/other historic use Historically, area was a contiguous saltmarsh, dredged in 1967 to maintain navigability to adjacent residence and replace previous existing tidal creek as approved by the USACE. No mitigation needed at that time.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found) Osprey, bald eagle, wading birds, shorebirds, waterbirds (gulls and terns), alligators, crabs, snakes, shellfish, fish	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) Snowy egret (SSC) occasional feeding usage; Tricolored heron (SSC) occasional feeding usage; Wood Stork (T) occasional feeding usage; Alligator (SSC) occasional feeding and nesting usage

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Osprey, bald eagle, snowy egret, great egret, great blue heron, tricolored heron, fish crow, purple martin, willet, crab (*Uca* sp.), red-winged blackbird, lesser yellowlegs, clapper rail, wood stork, oysters, blue crab, killifish

Additional relevant factors:

This impact area primarily consists of creeks and ditches and minimum diversity in saltmarsh mainly dominated by *Juncus roemerianus* ; Concrete and other types of rip-rap pieces present; Obvious erosion in areas; Culverts and stormwater outfalls present.

Assessment conducted by: Birkitt Environmental Services	Assessment date(s): April 6 - 10, 2009

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

DRAFT

Site/Project Name	Application Number	Assessment Area Name or Number
Saint Augustine EA		Wetland A - South
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact - Dredge (Open Water)	Birkitt Environmental Services, Inc.	April 6 - 10, 2009

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 7 with: 7	**Current:** Part of Wetland A (South) is a man-made canal system. The canals are directly adjacent to runways, taxiways, and other facilities of the St Augustine Airport to the west. Residential areas are in close proximity to the south and the residential areas and the airport create a barrier for fish and wildlife. The canals are, however, hydrologically connected to tributaries and other saltmarsh of the Tolomato River to the east and north. **With:** The proposed project will dredge 0.11 acres of open water habitat of Wetland A (South) into a deeper canal. The dredging is necessary to replace and relocate the canal located to the southwest of Runway 13-31 while maintaining navigability for the area. The habitat is expected to be similar to the habitat impacted.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 with: 7	**Current:** Wetland A (South) includes a tidally influenced man-made canal system. The habitat is adjacent to runways, taxiways, and other facilities of the St Augustine Airport to the west. The wetland is also adjacent to residential areas (low density) to the south and hydrologically connected to tributaries and other saltmarsh of the Tolomato River. The water quality and clarity of the open water ranges from somewhat turbid to turbid. Some oysters are present in small clumps or individuals but the aquatic species number of diversity of fish was low in the canals. The area can be considered wood stork critical foraging habitat and wood storks were observed foraging in the area. **With:** The proposed project will dredge 0.11 acres of open water habitat of Wetland A (South) into a deeper canal. The dredging is necessary to replace and relocate the canal located to the southwest of Runway 13-31 while maintaining navigability for the area. The habitat is expected to be similar to the habitat impacted.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 6 with: 6	**Current:** The open water areas of Wetland A (South) are tidally influenced and shallow. The habitat has minimal vegetative cover but does contain a few areas of small oyster clumps (~0.007 acres). Some algae is present including *Ulva* sp. No seagrass was observed in or near the project area during the surveys of the canals. **With:** The proposed project will dredge 0.11 acres of open water habitat of Wetland A (South) into a deeper canal. The dredging is necessary to replace and relocate the canal located to the southwest of Runway 13-31 while maintaining navigability for the area. The habitat is expected to be similar to the habitat impacted. It expected that any oysters present prior to dredging will return after the project is complete.

Score = sum of above scores/30 (if uplands, divide by 20)

current or w/o pres	with
0.667	0.667

If preservation as mitigation:

Preservation adjustment factor =

Adjusted mitigation delta =

For impact assessment areas

FL = delta x acres = 0.0000

Acres 0.110

Delta = [with-current]

0.000

If mitigation:

Time lag (t-factor) =

Risk factor =

For mitigation assessment areas

RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

DRAFT

Site/Project Name	Application Number	Assessment Area Name or Number
Saint Augustine EA		Wetland A - South
Impact or Mitigation	Assessment conducted by:	Assessment date:
Impact (Saltmarsh)	Birkitt Environmental Services, Inc.	April 6 - 10, 2009

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support

w/o pres or current: 8 with: 0

Current: Wetland A (South) includes a tidally influenced saltmarsh that is adjacent to a navigable man-made canal dredged historically from saltmarsh. The saltmarsh in this area is predominantly low marsh, dominated by *Juncus roemerianus* and *Spartina alterniflora* with several tidal creeks intermixed. On the other side of the canal, Runway 13/31 of the St Augustine Airport is in proximity. Residential areas are present to the southwest. The wetland is also adjacent to tributaries and other saltmarsh of the Tolomato River. The wetland provides foraging, nesting, and roosting habitat for wildlife. No exotic species were observed within or adjacent to the wetland.

With: Approximately 0.01 acres of saltmarsh habitat of Wetland A (South) will be filled due to the placement of an Approach Lighting System (ALS). Fill will only include the placement of support pilings. Any construction related impacts are expected to be temporary in nature.

.500(6)(b)Water Environment (n/a for uplands)

w/o pres or current: 8 with: 0

Current: Wetland A (South) is comprised of both a tidally influenced saltmarsh and a tidal creek system. The saltmarsh is adjacent to the dredged canal to the east and is also adjacent to residential areas (low density) to the south. Airport runways and taxiways are present to the east on the other side of the canal. The saltmarsh is also adjacent to tributaries and other saltmarsh of the Tolomato River to the west and north. The wetland, as a low marsh environment, provides habitat for wetland dependent species such as wading birds and juvenile fish. Shellfish were observed along the edges of the saltmarsh and in the tidal creeks in sparse numbers.

With: Approximately 0.01 acres of saltmarsh habitat of Wetland A (South) will be filled due to the placement of an Approach Lighting System (ALS). Fill will only include the placement of support pilings. Any construction related impacts are expected to be temporary in nature.

.500(6)(c)Community structure

1. Vegetation and/or
2. Benthic Community

w/o pres or current: 7 with: 0

Current: The saltmarsh habitat of Wetland A (South) can be classified as low marsh as it is dominated by *Juncus roemerianus and Spartina alterniflora.* An open water natural tidal creek system flows through the saltmarsh in this area which contains areas of shellfish. Normal age and size distribution of the vegetation are present. The wetland has lower species diversity as it predominantly contains *Juncus roemerianus and Spartina alterniflora*. Oysters are present in small numbers along the edges but mainly are found adjacent to the saltmarsh in the open water habitat.

With: Approximately 0.01 acres of saltmarsh habitat of Wetland A (South) will be filled due to the placement of an Approach Lighting System (ALS). Fill will only include the placement of support pilings. Any construction related impacts are expected to be temporary in nature.

Score = sum of above scores/30 (if uplands, divide by 20)

current or w/o pres: 0.767 with: 0.000

Delta = [with-current]

0.767

If preservation as mitigation:

Preservation adjustment factor =

Adjusted mitigation delta =

If mitigation:

Time lag (t-factor) =

Risk factor =

For impact assessment areas

FL = delta x acres = 0.0077

Acres 0.010

For mitigation assessment areas

RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

DRAFT

Site/Project Name
St Augustine Airport EA

Application Number

Assessment Area Name or Number
Wetland A - West Area

FLUCCs code
642, 510

Further classification (optional)

Impact or Mitigation Site?
Impact

Assessment Area Size
Saltmarsh - 5.11 acres Open Water - 2.54 acres

Basin/Watershed Name/Number
Matanzas River/ Upper East Coast

Affected Waterbody (Class)
Class II

Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Hydrologically connected to navigable waterways of tributaries to the Tolomato River; Connects to continuous saltmarsh and estuarine creeks that travel into residential areas.

Assessment area description

The wetland is primarily an estuarine ditch system and saltmarsh area dominated by *Spartina alterniflora* , *Juncus roemerianus* , and other typical saltmarsh vegetation. The wetland is directly adjacent to the St. Augustine Airport and travels inland toward residential areas. Open water areas consist of a previously dredged canal containing very scattered oyster clumps. No seagrass is present. Habitat receives direct influx of treated and untreated stormwater from the airport, a stormwater pond, and Highway US1.

Significant nearby features

Airport runways and taxiway; Residential areas; Tributaries of the Tolomato River

Uniqueness (considering the relative rarity in relation to the regional landscape.)

Not Unique; saltmarsh and open water habitats are similar to adjacent areas

Functions

Stormwater conveyance for the airport; Provides habitat for estuarine fish, shellfish, and wildlife; Foraging habitat for wading birds, shorebirds, wood storks, and alligators; Water storage

Mitigation for previous permit/other historic use

Historically, area was a contiguous saltmarsh, dredged in 1967 to maintain navigability to adjacent residence and replace a previously existing tidal creek as approved by the USACE. No mitigation needed at that time.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)

Osprey, wading birds, waterbirds (gulls and terns), alligators, crabs, shellfish, fish

Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

Snowy egret (SSC) occasional feeding usage; Tricolored heron (SSC) occasional feeding usage; Wood Stork (T) occasional feeding usage; Alligator (SSC) occasional feeding and nesting usage

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Osprey, bald eagle, snowy egret, great egret, great blue heron, tricolored heron, fish crow, purple martin, crab (*Uca* sp.), red-winged blackbird, northern harrier, wood stork, oysters, blue crab, killifish, periwinkle snail (*Littorina* sp.)

Additional relevant factors:

This impact area primarily consists of a man-made canal. The adjacent saltmarsh is mainly dominated by *Juncus roemerianus* and *Spartina alterniflora* . Obvious erosion in areas adjacent to airport. Large concrete pieces and gravel present in one area.

Assessment conducted by:
Birkitt Environmental Services

Assessment date(s):
April 6 - 10, 2009

Form 62-345.900(1), F.A.C. [effective date 02-04-2004]

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

DRAFT

Site/Project Name Saint Augustine EA	Application Number	Assessment Area Name or Number Wetland A - West
Impact or Mitigation **Impact - Dredge (Open Water)**	Assessment conducted by: Birkitt Environmental Services, Inc.	Assessment date: April 6 - 10, 2009

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 6 with: 6	**Current:** Part of Wetland A (West) is a man-made canal system. The canals are directly adjacent to runways, taxiways, and other facilities of the St. Augustine Airport to the north. Residential areas are in close proximity to the south and the residential areas and the airport create a barrier for fish and wildlife. The canals are, however, hydrologically connected to tributaries and other saltmarsh of the Tolomato River to the east. In addition, stormwater flows into the canals directly from a stormwater pond and several culverts. **With:** The proposed project will dredge 0.14 acres of open water habitat of Wetland A (West) into a deeper canal. The dredging is necessary to replace and relocate the canal located to the southwest of Runway 13/31 while maintaining navigability for the area. The habitat is expected to be similar to the habitat impacted.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 with: 7	**Current:** Wetland A (West) includes a tidally influenced man-made canal system. The habitat is adjacent to runways, taxiways, and other facilities of the St. Augustine Airport to the north. The wetland is also adjacent to residential areas (low density) to the south and hydrologically connected to tributaries and other saltmarsh of the Tolomato River. The water quality and clarity of the open water ranges from somewhat turbid to turbid and is most likely degraded due to the stormwater inflow from an adjacent stormwater pond and several culverts. Some oysters are present in small clumps or individuals but the diversity of fish was low in the canals. The area can be considered wood stork critical foraging habitat and wood storks were observed foraging in the area. **With:** The proposed project will dredge 0.14 acres of open water habitat of Wetland A (West) into a deeper canal. The dredging is necessary to replace and relocate the canal located to the southwest of Runway 13/31 while maintaining navigability for the area. The habitat is expected to be similar to the habitat impacted.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 4 with: 4	**Current:** The open water areas of Wetland A (West) are tidally influenced and shallow. The habitat has minimal vegetative cover but does contain a few areas of small shellfish clumps (~0.001 acres). Some algae is present including *Ulva* sp. No seagrass was observed in or near the project area during the surveys of the canals. In addition, a few upland spoil areas are present to the south. **With:** The proposed project will dredge 0.14 acres of open water habitat of Wetland A (West) into a deeper canal. The dredging is necessary to replace and relocate the canal located to the southwest of Runway 13/31 while maintaining navigability for the area. The habitat is expected to be similar to the habitat impacted.

Score = sum of above scores/30 (if uplands, divide by 20)

current or w/o pres	with
0.567	0.567

Delta = [with-current]

0.000

If preservation as mitigation:	
Preservation adjustment factor =	
Adjusted mitigation delta =	

If mitigation:	
Time lag (t-factor) =	
Risk factor =	

For impact assessment areas

FL = delta x acres = 0.0000

Acres: 0.140

For mitigation assessment areas

RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

DRAFT

Site/Project Name Saint Augustine EA	Application Number	Assessment Area Name or Number Wetland A - West
Impact or Mitigation **Impact - Dredge (Saltmarsh)**	Assessment conducted by: Birkitt Environmental Services, Inc.	Assessment date: April 6 - 10, 2009

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 6 with: 6	**Current:** Part of Wetland A (West) is a saltmarsh system with natural tidally influenced creeks. The saltmarsh system is within close proximity to runways, taxiways, and other facilities of the St. Augustine Airport to the north. The wetland is also adjacent to residential areas (low density) to the south and hydrologically connected to tributaries and other saltmarsh of the Tolomato River. In addition, stormwater flows into the creek and saltmarsh system from a stormwater pond and culverts to the west. A man-made sand boat ramp is located to east and serves the adjacent residential area. **With:** The proposed project will dredge 0.6 acres of saltmarsh habitat of Wetland A (West) into open water habitat to replace and relocate the canal located to the southwest of Runway 13-31. The open water habitat can be considered wood stork critical foraging habitat.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 with: 7	**Current:** Wetland A (West) is a tidally influenced estuarine wetland comprising of saltmarsh and a natural creek system. The habitat is adjacent to runways, taxiways, and other facilities of the St. Augustine Airport to the north. The wetland is also adjacent to residential areas (low density) to the south and hydrologically connected to tributaries and other saltmarsh of the Tolomato River. The wetland provides habitat for wetland dependent species such as wading birds and shellfish. The water quality and clarity of the open water ranges from somewhat turbid to turbid. **With:** The proposed project will dredge 0.6 acres of saltmarsh habitat of Wetland A (West) into open water habitat to replace and relocate the canal located to the southwest of Runway 13-31. The open water habitat can be considered wood stork critical foraging habitat.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 7 with: 5	**Current:** Wetland A (West) includes a tidally influenced estuarine wetland comprising of saltmarsh and a natural creek system. The wetland in this area has lower species diversity than the east side. Wetland A (West) is primarily dominated by an estuarine ground cover dominated by *Juncus roemerianus* (low marsh). Along the southern edge of the wetland, upland species (oaks, saw palmetto, palms) are encroaching. Oysters are present in small clumps or individuals along the edges of the marsh. Normal age and size distribution of the vegetation are present. Areas of unvegetated salt/sand flats and open water are interspersed within the wetland. In addition, a few upland spoil areas are present creating a separation in the saltmarsh. **With:** The proposed project will dredge 0.6 acres of saltmarsh habitat of Wetland A (West) into open water habitat to replace and relocate the canal located to the southwest of Runway 13-31. The open water habitat can be considered wood stork critical foraging habitat.

Score = sum of above scores/30 (if uplands, divide by 20)

current or w/o pres	with
0.667	0.600

Delta = [with-current]

0.067

If preservation as mitigation:

Preservation adjustment factor =

Adjusted mitigation delta =

If mitigation:

Time lag (t-factor) =

Risk factor =

For impact assessment areas

FL = delta x acres = 0.0400

Acres: 0.600

For mitigation assessment areas

RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

DRAFT

Site/Project Name Saint Augustine EA	Application Number	Assessment Area Name or Number Wetland A - West
Impact or Mitigation **Impact - Fill (Open Water)**	Assessment conducted by: Birkitt Environmental Services, Inc.	Assessment date: April 6 - 10, 2009

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support

w/o pres or current	with
6	0

Current: Part of Wetland A (West) is a man-made canal system. The canals are directly adjacent to runways, taxiways, and other facilities of the St. Augustine Airport to the north and east. Residential areas are in close proximity to the south and the residential areas and the airport create a barrier for fish and wildlife. The canals are, however, hydrologically connected to tributaries and other saltmarsh of the Tolomato River to the east. In addition, untreated and treated stormwater flows into the canals directly from a stormwater pond and several culverts (directly from Highway US 1). Minimal amounts of tropical soda apple (*Solanum viarum*) are present adjacent to the wetland. Approximately 0.7 acres of the assessment area is an upland cut ditch.

With: The proposed project will fill 2.16 acres of open water habitat of Wetland A (West) to replace and relocate Taxiway C. Relocating Taxiway C is necessary to meet the FAA standards for the proper design standard of 400-feet from the runway centerline.

.500(6)(b)Water Environment (n/a for uplands)

w/o pres or current	with
7	0

Current: Wetland A (West) includes a tidally influenced, shallow, man-made canal system. The habitat is adjacent to runways, taxiways, and other facilities of the St. Augustine Airport to the north and east. The wetland is also adjacent to residential areas (low density) to the south and hydrologically connected to tributaries and other saltmarsh of the Tolomato River. The wetland provides habitat for wetland dependent species such as wading birds and shellfish. The habitat can be considered wood stork critical foraging habitat, however, no wood storks were observed foraging in this area. The water quality and clarity of the open water ranges from somewhat turbid to turbid and is most likely degraded due to the stormwater inflow from an adjacent stormwater pond and several culverts. Only a few small clumps or individuals of oysters were observed and the species number and diversity of fish were low in the canal. Approximately 0.7 acres of the assessment area is an upland cut ditch.

With: The proposed project will fill 2.16 acres of open water habitat of Wetland A (West) to replace and relocate Taxiway C. Relocating Taxiway C is necessary to meet the FAA standards for the proper design standard of 400-feet from the runway centerline.

.500(6)(c)Community structure

1. Vegetation and/or
2. Benthic Community

w/o pres or current	with
4	0

Current: The open water areas of Wetland A (West) are man-made, tidally influenced and shallow. The bottom is very mucky with minimal vegetative cover. However, areas do contain some *Spartina alterniflora* on the eastern end, but this area is an upland cut ditch. A few small clumps of shellfish (0.06 acres) and some algae (*Ulva* sp.) are present. No seagrass was observed during the surveys of the canals. In addition, a few upland spoil areas are present to the south. The open waters include a man-made stormwater ditch in which approximately 0.7 acres is an upland cut ditch.

With: The proposed project will fill 2.16 acres of open water habitat of Wetland A (West) to replace and relocate Taxiway C. Relocating Taxiway C is necessary to meet the FAA standards for the proper design standard of 400-feet from the runway centerline.

Score = sum of above scores/30 (if uplands, divide by 20)

current or w/o pres	with
0.567	0.000

If preservation as mitigation:

Preservation adjustment factor =

Adjusted mitigation delta =

For impact assessment areas

FL = delta x acres = 1.2240

Acres 2.160

Delta = [with-current]

0.567

If mitigation:

Time lag (t-factor) =

Risk factor =

For mitigation assessment areas

RFG = delta/(t-factor x risk) =

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

DRAFT

Site/Project Name Saint Augustine EA	Application Number	Assessment Area Name or Number Wetland A - West
Impact or Mitigation **Impact - Fill (Saltmarsh)**	Assessment conducted by: Birkitt Environmental Services, Inc.	Assessment date: April 6 - 10, 2009

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 6 with: 0	**Current:** Part of Wetland A (West) is a saltmarsh system with a natural tidal creek. The creek included in this area is historically named Indian Creek. The saltmarsh system is within close proximity to runways, taxiways, and other facilities of the St. Augustine Airport to the north, east and west. The wetland is also adjacent to residential areas (low density) to the south and hydrologically connected to tributaries and other saltmarsh of the Tolomato River. In addition, treated stormwater outflows into the creek and saltmarsh directly from a stormwater pond to the west. A minimal amount of tropical soda apple (*Solanum viarum*) is present adjacent to the wetland. **With:** Approximately 2.93 acres of saltmarsh habitat of Wetland A (West) will be filled to replace and relocate Taxiway C.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 with: 0	**Current:** Wetland A (West) is a tidally influenced estuarine wetland comprised of saltmarsh and a tidal creek. The habitat is adjacent to runways, taxiways, and other facilities of the St. Augustine Airport to the north, east and west. The wetland is also adjacent to residential areas (low density) to the south, a stormwater pond to the west, and hydrologically connected to tributaries and other saltmarsh of the Tolomato River. The wetland provides habitat for wetland dependent species such as wading birds and shellfish. The water quality and clarity of the open water ranges from somewhat turbid to turbid. Upstream, Indian Creek has been culverted to create a crossing for US 1 and a CSX railroad line. Direct stormwater flows into the saltmarsh from adjacent areas via the culverts. Along the edges of the wetland which are not mowed airport property, upland species (oaks, saw palmetto, palms) occur in some areas. **With:** Approximately 2.93 acres of saltmarsh habitat of Wetland A (West) will be filled to replace and relocate Taxiway C.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 7 with: 0	**Current:** Wetland A (West) includes a tidally influenced estuarine wetland comprising of saltmarsh and a natural tidal creek. The wetland in this area has lower species diversity than the east side. Wetland A (West) is primarily dominated by an estuarine ground cover dominated by Juncus roemerianus (low marsh). Along the edge of the wetland, upland species (oaks, saw palmetto, palms) occur in some areas. Normal age and size distribution of the vegetation are present. Areas of unvegetated salt/sand flats and open water are interspersed within the wetland. In addition, a few upland spoil areas are present creating a barrier in the saltmarsh. **With:** Approximately 2.93 acres of saltmarsh habitat of Wetland A (West) will be filled to replace and relocate Taxiway C.

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres: 0.667
with: 0.000

If preservation as mitigation:
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 1.9533
Acres: 2.930

Delta = [with-current]
0.667

If mitigation:
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

APPENDIX M

CUMULATIVE IMPACTS

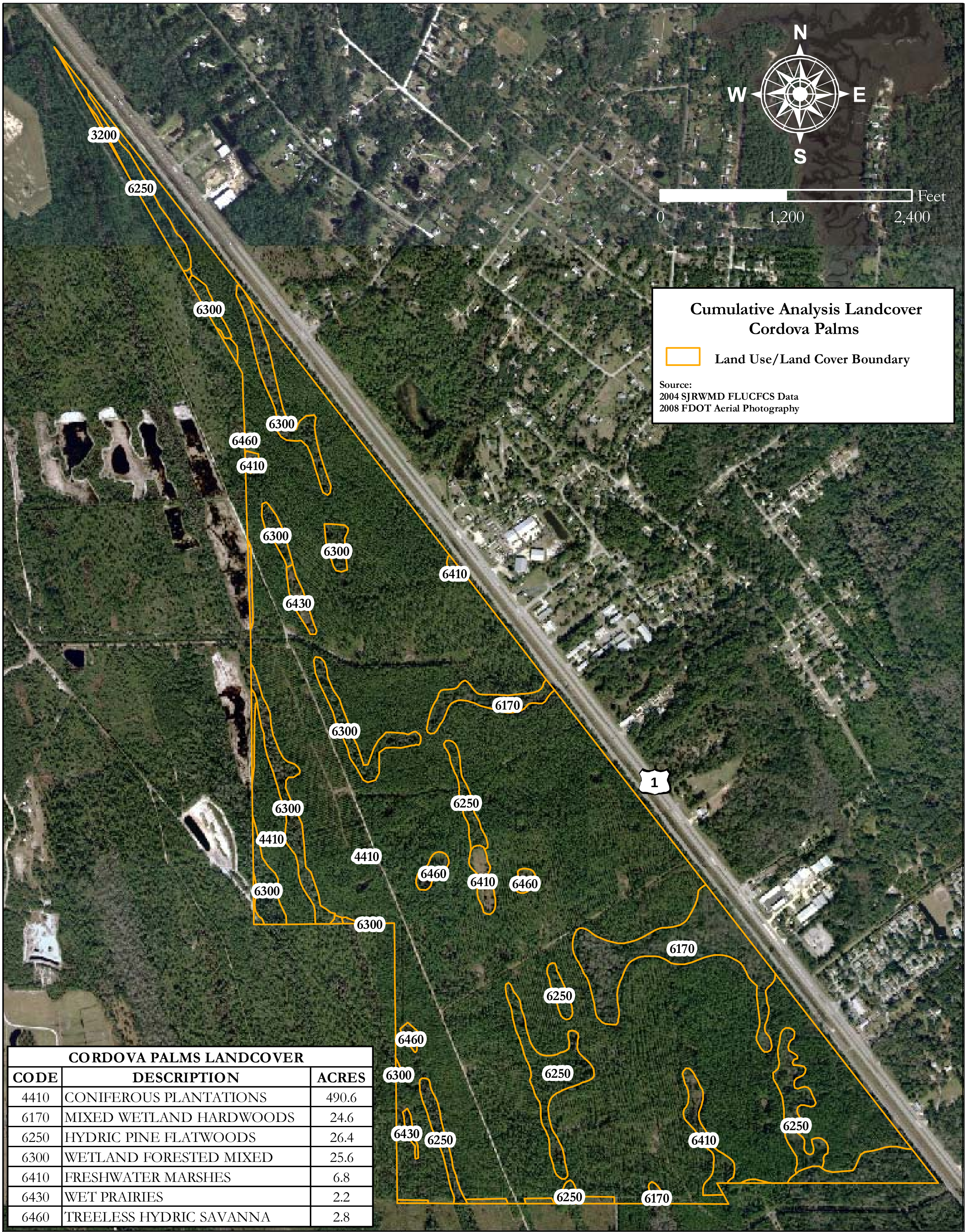
JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
PASSERO ASSOCIATES, LLC
13453 N. MAIN ST, SUITE 106
JACKSONVILLE, FL 32218

IN COORDINATION WITH:
THE LPA GROUP
4503 WOODLAND CORPORATE BLVD, SUITE 400
TAMPA, FL 33614

NFRA
Northeast Florida Regional Airport
Fly Smart!



Cumulative Analysis Landcover
Cordova Palms

▭ Land Use/Land Cover Boundary

Source:
2004 SJRWMD FLUCFCS Data
2008 FDOT Aerial Photography

CORDOVA PALMS LANDCOVER

CODE	DESCRIPTION	ACRES
4410	CONIFEROUS PLANTATIONS	490.6
6170	MIXED WETLAND HARDWOODS	24.6
6250	HYDRIC PINE FLATWOODS	26.4
6300	WETLAND FORESTED MIXED	25.6
6410	FRESHWATER MARSHES	6.8
6430	WET PRAIRIES	2.2
6460	TREELESS HYDRIC SAVANNA	2.8

SCALE
SCALE
DESIGNED BY
NAME
DRAWN BY
NAME
CHECKED BY
NAME

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

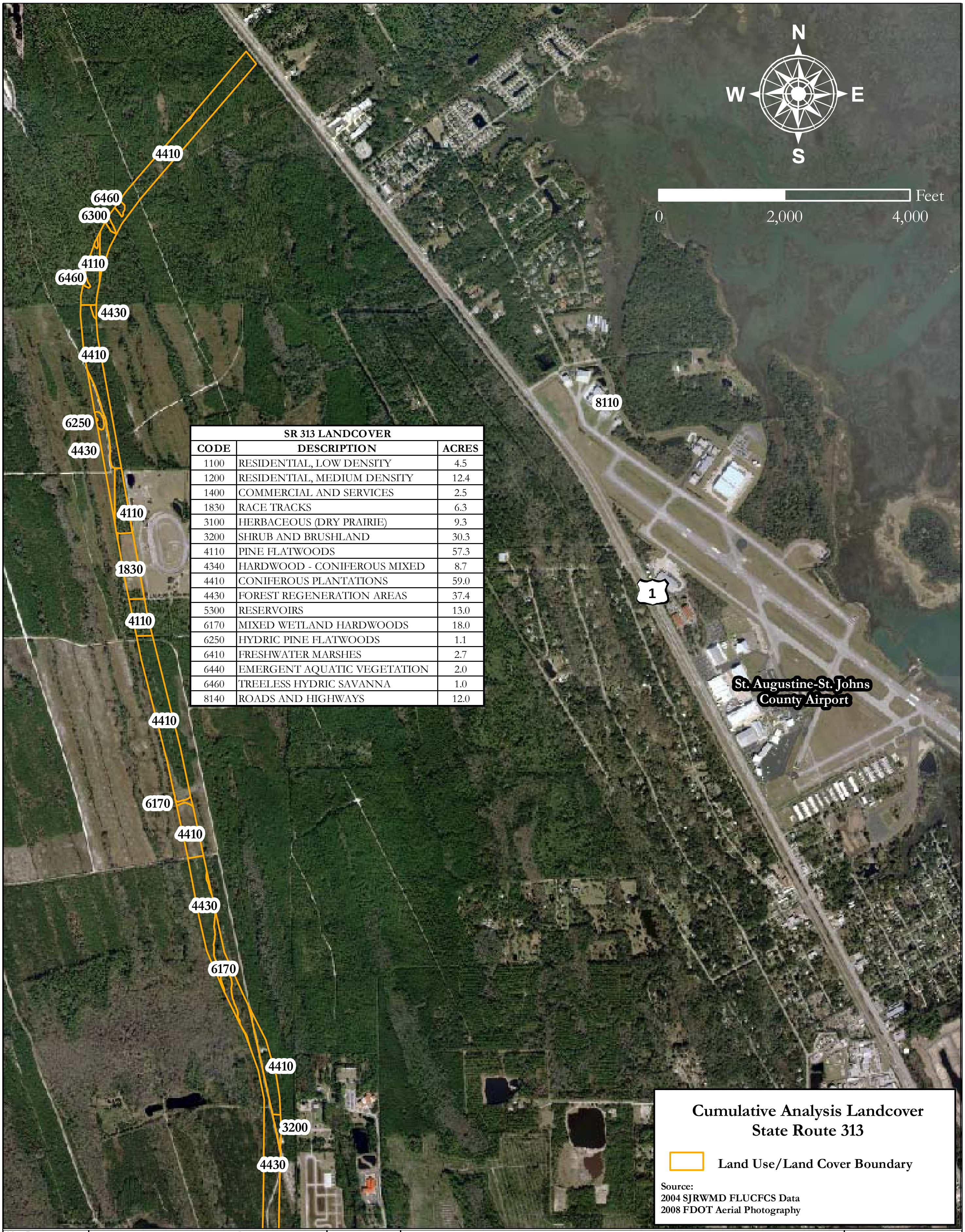
DATE
10/29/2009

PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
M.1



SR 313 LANDCOVER		
CODE	DESCRIPTION	ACRES
1100	RESIDENTIAL, LOW DENSITY	4.5
1200	RESIDENTIAL, MEDIUM DENSITY	12.4
1400	COMMERCIAL AND SERVICES	2.5
1830	RACE TRACKS	6.3
3100	HERBACEOUS (DRY PRAIRIE)	9.3
3200	SHRUB AND BRUSHLAND	30.3
4110	PINE FLATWOODS	57.3
4340	HARDWOOD - CONIFEROUS MIXED	8.7
4410	CONIFEROUS PLANTATIONS	59.0
4430	FOREST REGENERATION AREAS	37.4
5300	RESERVOIRS	13.0
6170	MIXED WETLAND HARDWOODS	18.0
6250	HYDRIC PINE FLATWOODS	1.1
6410	FRESHWATER MARSHES	2.7
6440	EMERGENT AQUATIC VEGETATION	2.0
6460	TREELESS HYDRIC SAVANNA	1.0
8140	ROADS AND HIGHWAYS	12.0

Cumulative Analysis Landcover
State Route 313

🟧 Land Use/Land Cover Boundary

Source:
2004 SJRWMD FLUCFCS Data
2008 FDOT Aerial Photography

SCALE SCALE
DESIGNED BY NAME
DRAWN BY NAME
CHECKED BY NAME

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

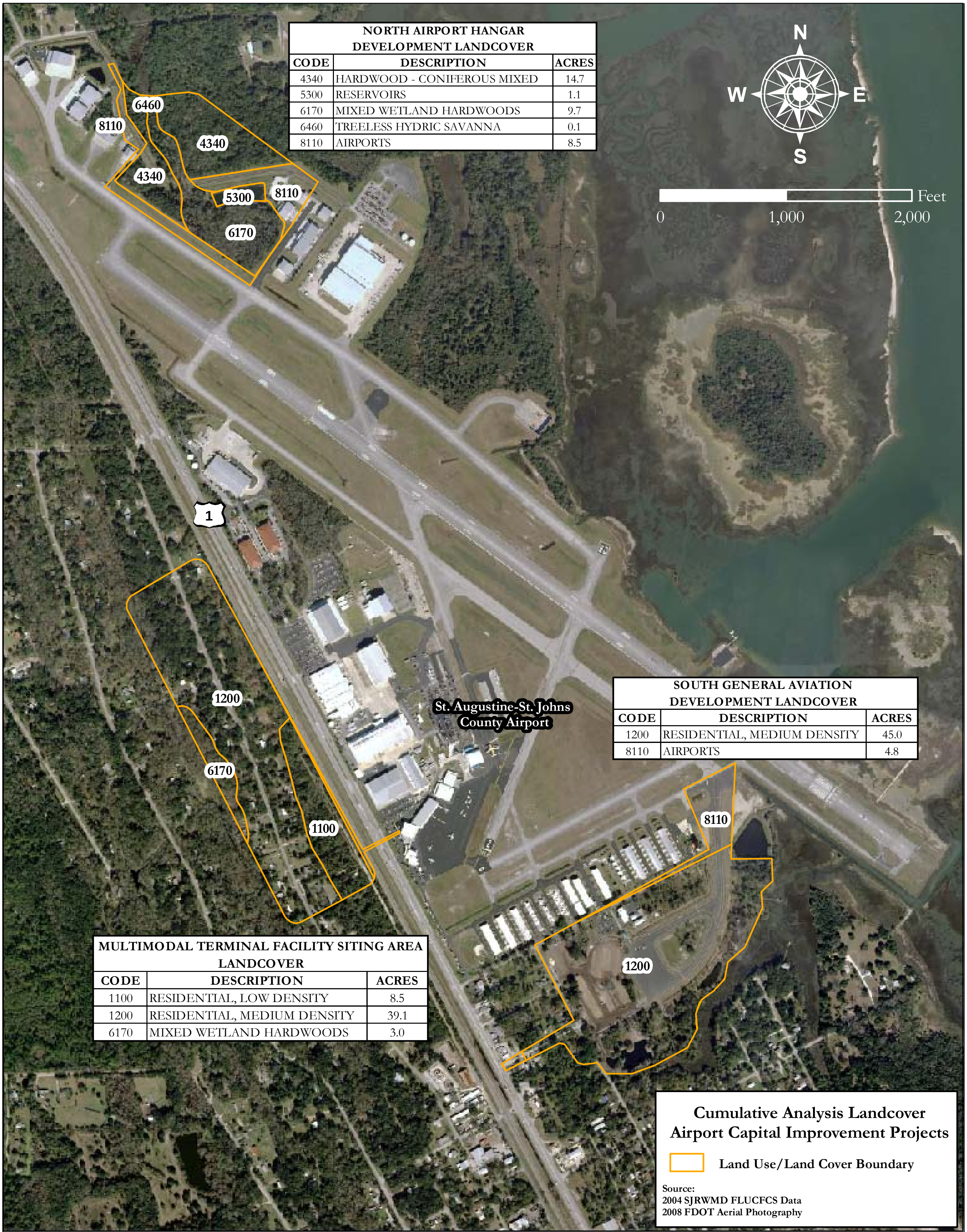
DATE
10/29/2009

PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
M.2



NORTH AIRPORT HANGAR DEVELOPMENT LANDCOVER

CODE	DESCRIPTION	ACRES
4340	HARDWOOD - CONIFEROUS MIXED	14.7
5300	RESERVOIRS	1.1
6170	MIXED WETLAND HARDWOODS	9.7
6460	TREELESS HYDRIC SAVANNA	0.1
8110	AIRPORTS	8.5

SOUTH GENERAL AVIATION DEVELOPMENT LANDCOVER

CODE	DESCRIPTION	ACRES
1200	RESIDENTIAL, MEDIUM DENSITY	45.0
8110	AIRPORTS	4.8

MULTIMODAL TERMINAL FACILITY SITING AREA LANDCOVER

CODE	DESCRIPTION	ACRES
1100	RESIDENTIAL, LOW DENSITY	8.5
1200	RESIDENTIAL, MEDIUM DENSITY	39.1
6170	MIXED WETLAND HARDWOODS	3.0

Cumulative Analysis Landcover Airport Capital Improvement Projects

▭ Land Use/Land Cover Boundary

Source:
2004 SJRWMD FLUCFCS Data
2008 FDOT Aerial Photography

SCALE
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DESIGNED BY
NAME
DRAWN BY
NAME
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NAME

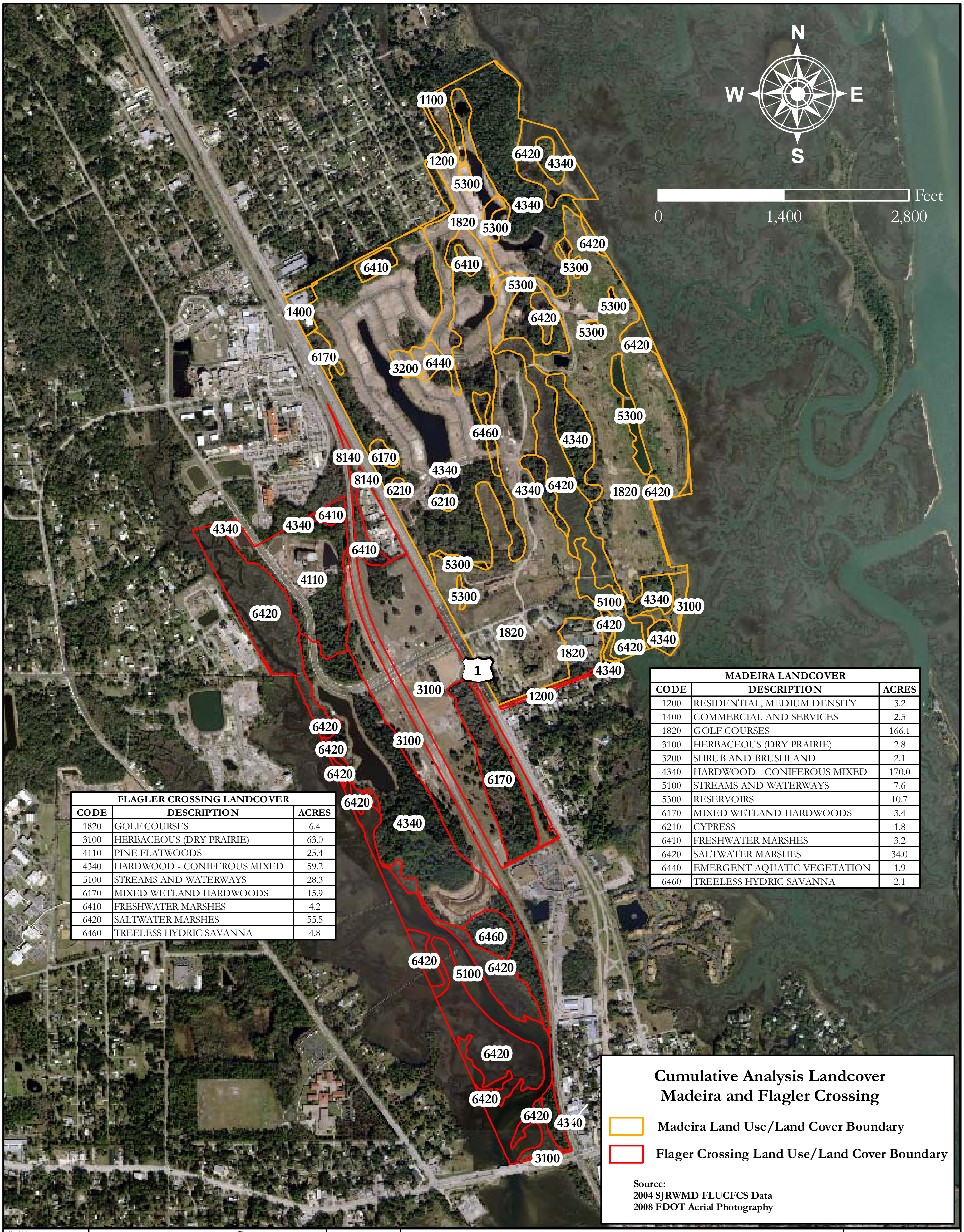
ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

DATE
10/29/2009
PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
M.3



FLAGLER CROSSING LANDCOVER

CODE	DESCRIPTION	ACRES
1820	GOLF COURSES	6.4
3100	HERBACEOUS (DRY PRAIRIE)	63.0
4110	PINE FLATWOODS	25.4
4340	HARDWOOD - CONIFEROUS MIXED	59.2
5100	STREAMS AND WATERWAYS	28.3
6170	MIXED WETLAND HARDWOODS	15.9
6410	FRESHWATER MARSHES	4.2
6420	SALTWATER MARSHES	55.5
6460	TREELESS HYDRIC SAVANNA	4.8

MADEIRA LANDCOVER

CODE	DESCRIPTION	ACRES
1200	RESIDENTIAL, MEDIUM DENSITY	3.2
1400	COMMERCIAL AND SERVICES	2.5
1820	GOLF COURSES	166.1
3100	HERBACEOUS (DRY PRAIRIE)	2.8
3200	SHRUB AND BRUSHLAND	2.1
4340	HARDWOOD - CONIFEROUS MIXED	170.0
5100	STREAMS AND WATERWAYS	7.6
5300	RESERVOIRS	10.7
6170	MIXED WETLAND HARDWOODS	3.4
6210	CYPRESS	1.8
6410	FRESHWATER MARSHES	3.2
6420	SALTWATER MARSHES	34.0
6440	EMERGENT AQUATIC VEGETATION	1.9
6460	TREELESS HYDRIC SAVANNA	2.1

Cumulative Analysis Landcover
Madeira and Flagler Crossing

🟧 Madeira Land Use/Land Cover Boundary

🟥 Flager Crossing Land Use/Land Cover Boundary

Source:
2004 SJRWMD FLUCFCS Data
2008 FDOT Aerial Photography

SCALE SCALE
DESIGNED BY NAME
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ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

DATE 10/29/2009

PROJECT NO. #

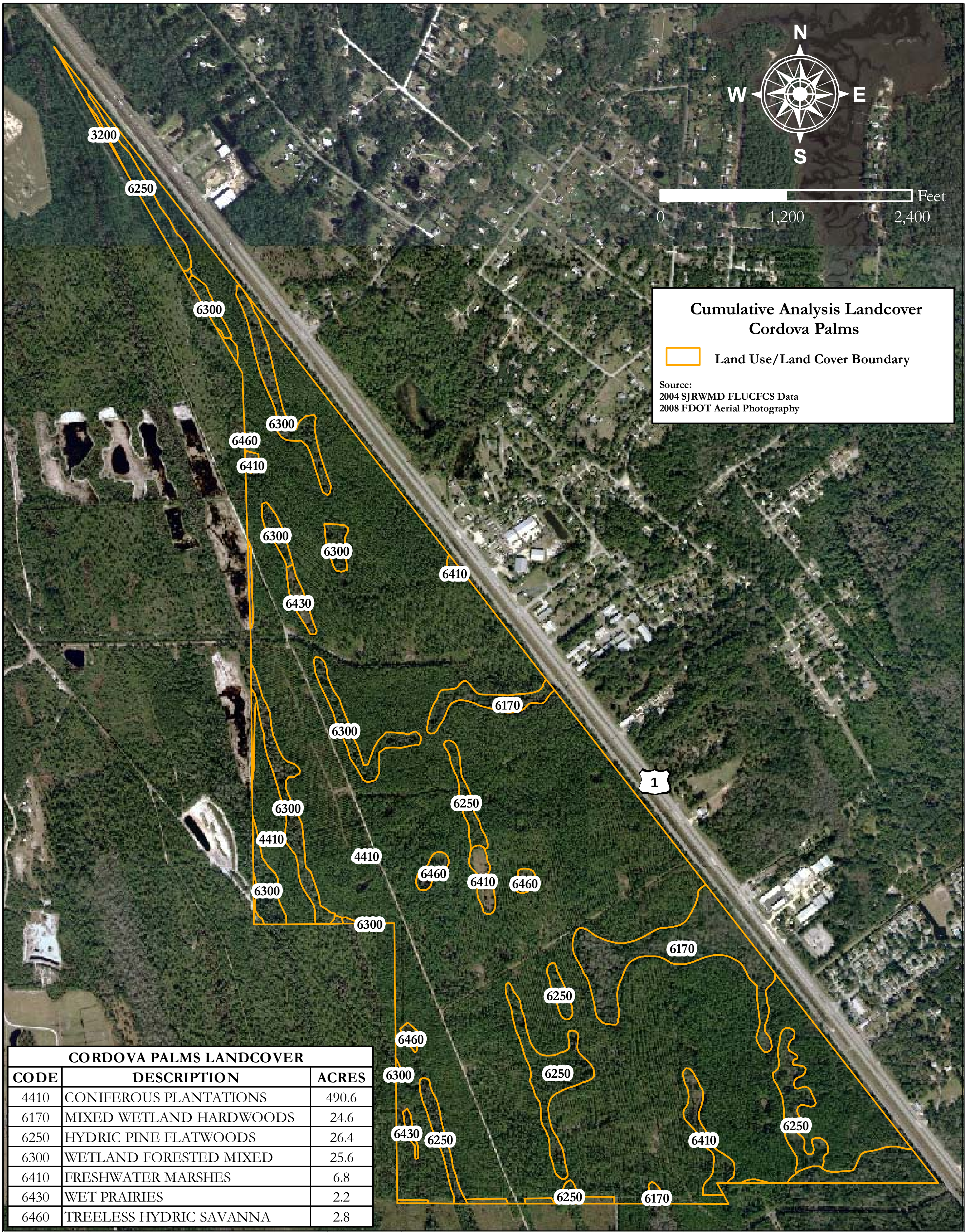
Project Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER M.4

Table M-1
Joint Automated Capital Improvement Program Listed Projects
June 17, 2009

Description	Requested Year(s)	Allocated Year(s)
Land Acquisition	2005-2010	2006
Southside Commercial/ Corporate Hangars	2006	2006
Construct Corporate Hangars	2006	2006
200 Block-Infrastructure Improvements	2006	2006
Construct Three 12 unit T-Hangar Buildings	2006-2007	2006-2007
200 Block – Infrastructure Improvements	2007	2007
Construct Commercial, Corporate Hangar	2007	2007-2008
Construct Three 12 unit T-Hangar Buildings	2007-2008	2007-2008
Upgrade RW 13-31 Signage at RW 6-24 and TW B/D	2008	N/A
Construct New Fuel Farm	2008	2008
Southside Commercial/ Corporate Hangars	2008	2008
Industrial Park Infrastructure	2008	2008
Construct Heliport	2008	2002
Environmental Permitting for Runway 31	2009	N/A
EA and Permitting for RW 13-31 RSA Improvements	2009	N/A
Taxiway B (North) Pavement Rehabilitation	2009	N/A
Southside Corporate/Commercial Hangars	2009	2011
New ARFF Facility (Design – Phase 1)	2009	N/A
Construct Hangars	2010	2008
Construct RSA Improvements to South end of RW 13-31	2010	N/A
Extend Taxiway B to end of Runway 31	2010	N/A
Construct ARFF Facility (Phase 2)	2010	N/A
Initial Airport Industrial Park Infrastructure	2010	N/A
Acquire ARFF Vehicle to Meet Index B	2010	N/A
Relocate Glideslope	2010	2004
Overlay Runway 6/24	2010	2009
Main Runway 13/31 Pavement Rehabilitation	2010	2010
Construct North Airside Service Road	2011	2011
Install Aircraft Washrack	2011	N/A
Construct Multimodal Terminal Facility	2011	N/A
Install Approach Lighting Runway 31	2011	2011
Construct Corporate/Commercial Hangars	2011-2019	N/A
Acquire Land for Development	2011-2020	2011-2014
Industrial Park Infrastructure	2012	2012
Overlay Taxiway D	2012	2012
Extend Runway 31	2012-2013	2005
Construct (3) 12 Unit T-Hangars	2012-2018	N/A
Southside Infrastructure	2012-2020	N/A
Construct Taxiway B Bridge	2013	2013
Rehab South Half Taxiway B	2013	2013
Install ILS	2014	N/A
Install Approaching Lighting to Runway 13	2014	N/A
Land Acquisition (Immediate Airport Area)	2014	N/A
Construct Hangars	2014	N/A
Site Development	2014	N/A
Rehab Taxiway A	2019	N/A
Source: http://florida-aviation-database.com/facility/Jacip/, accessed and copy provided by Airport Staff on June 17, 2009.		



Cumulative Analysis Landcover
Cordova Palms

▭ Land Use/Land Cover Boundary

Source:
2004 SJRWMD FLUCFCS Data
2008 FDOT Aerial Photography

CORDOVA PALMS LANDCOVER

CODE	DESCRIPTION	ACRES
4410	CONIFEROUS PLANTATIONS	490.6
6170	MIXED WETLAND HARDWOODS	24.6
6250	HYDRIC PINE FLATWOODS	26.4
6300	WETLAND FORESTED MIXED	25.6
6410	FRESHWATER MARSHES	6.8
6430	WET PRAIRIES	2.2
6460	TREELESS HYDRIC SAVANNA	2.8

SCALE
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DESIGNED BY
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DRAWN BY
NAME
CHECKED BY
NAME

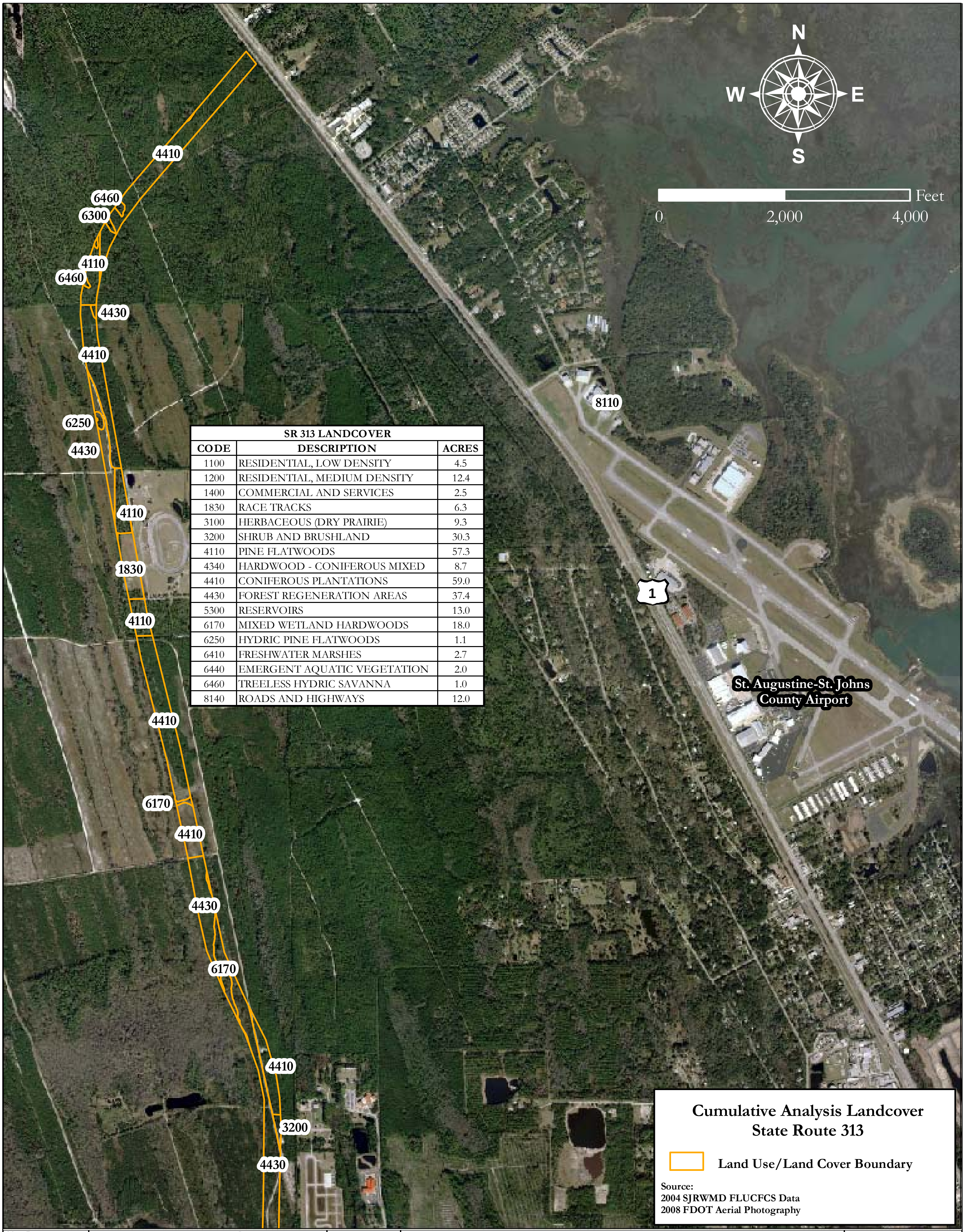
ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

DATE
10/29/2009
PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
M.1



SR 313 LANDCOVER		
CODE	DESCRIPTION	ACRES
1100	RESIDENTIAL, LOW DENSITY	4.5
1200	RESIDENTIAL, MEDIUM DENSITY	12.4
1400	COMMERCIAL AND SERVICES	2.5
1830	RACE TRACKS	6.3
3100	HERBACEOUS (DRY PRAIRIE)	9.3
3200	SHRUB AND BRUSHLAND	30.3
4110	PINE FLATWOODS	57.3
4340	HARDWOOD - CONIFEROUS MIXED	8.7
4410	CONIFEROUS PLANTATIONS	59.0
4430	FOREST REGENERATION AREAS	37.4
5300	RESERVOIRS	13.0
6170	MIXED WETLAND HARDWOODS	18.0
6250	HYDRIC PINE FLATWOODS	1.1
6410	FRESHWATER MARSHES	2.7
6440	EMERGENT AQUATIC VEGETATION	2.0
6460	TREELESS HYDRIC SAVANNA	1.0
8140	ROADS AND HIGHWAYS	12.0

Cumulative Analysis Landcover
State Route 313

🟧 Land Use/Land Cover Boundary

Source:
2004 SJRWMD FLUCFCS Data
2008 FDOT Aerial Photography

SCALE
SCALE
DESIGNED BY
NAME
DRAWN BY
NAME
CHECKED BY
NAME

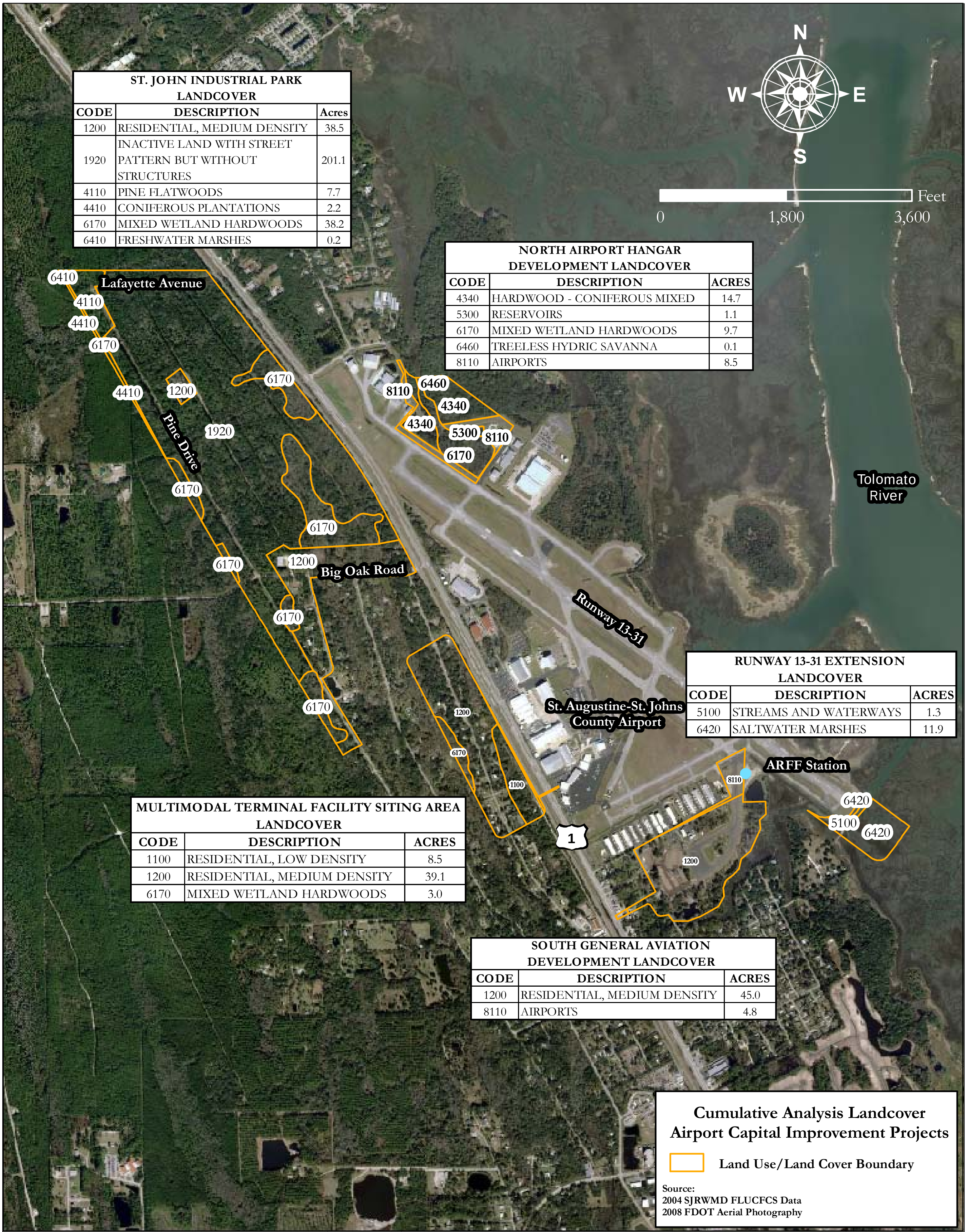
ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

DATE
10/29/2009
PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
M.2



ST. JOHN INDUSTRIAL PARK LANDCOVER

CODE	DESCRIPTION	Acres
1200	RESIDENTIAL, MEDIUM DENSITY	38.5
1920	INACTIVE LAND WITH STREET PATTERN BUT WITHOUT STRUCTURES	201.1
4110	PINE FLATWOODS	7.7
4410	CONIFEROUS PLANTATIONS	2.2
6170	MIXED WETLAND HARDWOODS	38.2
6410	FRESHWATER MARSHES	0.2

NORTH AIRPORT HANGAR DEVELOPMENT LANDCOVER

CODE	DESCRIPTION	ACRES
4340	HARDWOOD - CONIFEROUS MIXED	14.7
5300	RESERVOIRS	1.1
6170	MIXED WETLAND HARDWOODS	9.7
6460	TREELESS HYDRIC SAVANNA	0.1
8110	AIRPORTS	8.5

RUNWAY 13-31 EXTENSION LANDCOVER

CODE	DESCRIPTION	ACRES
5100	STREAMS AND WATERWAYS	1.3
6420	SALTWATER MARSHES	11.9

MULTIMODAL TERMINAL FACILITY SITING AREA LANDCOVER

CODE	DESCRIPTION	ACRES
1100	RESIDENTIAL, LOW DENSITY	8.5
1200	RESIDENTIAL, MEDIUM DENSITY	39.1
6170	MIXED WETLAND HARDWOODS	3.0

SOUTH GENERAL AVIATION DEVELOPMENT LANDCOVER

CODE	DESCRIPTION	ACRES
1200	RESIDENTIAL, MEDIUM DENSITY	45.0
8110	AIRPORTS	4.8

Cumulative Analysis Landcover Airport Capital Improvement Projects

▭ Land Use/Land Cover Boundary

Source:
2004 SJRWMD FLUCFCS Data
2008 FDOT Aerial Photography

SCALE	SCALE
DESIGNED BY	NAME
DRAWN BY	NAME
CHECKED BY	NAME

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

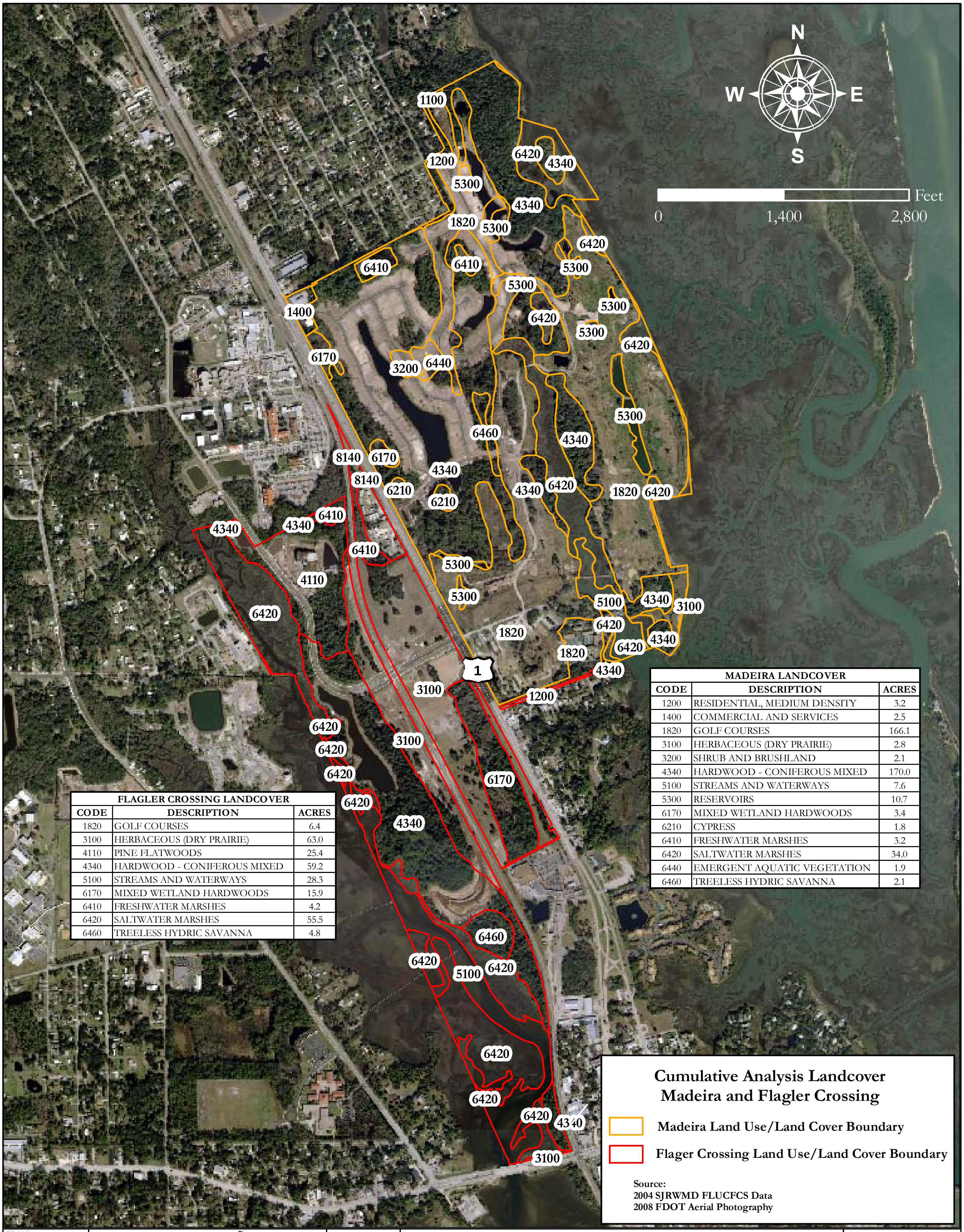
DATE
10/29/2009

PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
M.3



Cumulative Analysis Landcover
Madeira and Flagler Crossing

🟧	Madeira Land Use/Land Cover Boundary
🟥	Flager Crossing Land Use/Land Cover Boundary

Source:
2004 SJRWMD FLUCFCS Data
2008 FDOT Aerial Photography

MADEIRA LANDCOVER

CODE	DESCRIPTION	ACRES
1200	RESIDENTIAL, MEDIUM DENSITY	3.2
1400	COMMERCIAL AND SERVICES	2.5
1820	GOLF COURSES	166.1
3100	HERBACEOUS (DRY PRAIRIE)	2.8
3200	SHRUB AND BRUSHLAND	2.1
4340	HARDWOOD - CONIFEROUS MIXED	170.0
5100	STREAMS AND WATERWAYS	7.6
5300	RESERVOIRS	10.7
6170	MIXED WETLAND HARDWOODS	3.4
6210	CYPRESS	1.8
6410	FRESHWATER MARSHES	3.2
6420	SALTWATER MARSHES	34.0
6440	EMERGENT AQUATIC VEGETATION	1.9
6460	TREELESS HYDRIC SAVANNA	2.1

FLAGLER CROSSING LANDCOVER

CODE	DESCRIPTION	ACRES
1820	GOLF COURSES	6.4
3100	HERBACEOUS (DRY PRAIRIE)	63.0
4110	PINE FLATWOODS	25.4
4340	HARDWOOD - CONIFEROUS MIXED	59.2
5100	STREAMS AND WATERWAYS	28.3
6170	MIXED WETLAND HARDWOODS	15.9
6410	FRESHWATER MARSHES	4.2
6420	SALTWATER MARSHES	55.5
6460	TREELESS HYDRIC SAVANNA	4.8

SCALE	SCALE
DESIGNED BY	NAME
DRAWN BY	NAME
CHECKED BY	NAME

ST. AUGUSTINE • ST. JOHNS COUNTY
AIRPORT AUTHORITY

DATE
10/29/2009

PROJECT NO.
#

Project
Taxiway C Replacement, RSA Compliance, and Approach Lighting System

Owner
St. Augustine-St. Johns County Airport Authority
4796 US 1 North, St. Augustine, Florida 32095

FIGURE NUMBER
M.4

APPENDIX N

CULTURAL RESOURCE STUDY

JUNE 2010

PREPARED FOR:
ST. AUGUSTINE – ST. JOHNS COUNTY
AIRPORT AUTHORITY
4796 U.S. 1 NORTH
ST. AUGUSTINE, FL 32095

PREPARED BY:
PASSERO ASSOCIATES, LLC
13453 N. MAIN ST, SUITE 106
JACKSONVILLE, FL 32218

IN COORDINATION WITH:
BLAND & ASSOCIATES, INC
4104 ST. AUGUSTINE RD
JACKSONVILLE, FL 32207

NFRA
Northeast Florida Regional Airport
Fly Smart!

AN INTENSIVE CULTURAL RESOURCE ASSESSMENT SURVEY OF THE ST. AUGUSTINE AIRPORT EXPANSION PARCEL, ST. JOHNS COUNTY, FLORIDA

Prepared for:
Passero Associates, LLC

By:
Myles Bland
Registered Professional Archaeologist No. 10650

BAIJ08010184.01
BAI Report of Investigations No. 417
March 2009

4104 St. Augustine Road
Jacksonville, Florida 32207-6609

Bland & Associates, Inc.
Archaeological and Historic Preservation Consultants
Atlanta, Georgia Charleston, South Carolina Jacksonville, Florida

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I. INTRODUCTION

During March of 2009, Bland and Associates, Inc. (BAI) conducted a cultural resource assessment of a 26.08-acre parcel in St. Johns County, Florida (See Figure 1). This investigation was undertaken as part of the permitting for a proposed development in order to comply with county and federal regulations regarding the identification and management of cultural resources that might occur within the project tract; this survey was conducted on behalf of Passero Associates, LLC. The purpose of the proposed project is to add a runway to the currently existing, St. Augustine Airport; this project has been assigned Federal Aviation Administration (FAA) AIP Project Number 3-12-0073-023-2008. The goal of this assessment survey was to determine whether the tract contained evidence of past human occupation or site probability variables that would warrant a more intensive level of cultural resource assessment testing.

This work was required by section 3.01.05.B.1 of the St. Johns County rezoning regulations. All work was performed in accordance with these regulations (Article III, Special Districts, Sections 3.01.00-3.01.08) as established by St. Johns County (Ordinance Book 23, Pages 72-81). Specifically, the St. Johns County regulations locally implement Florida Statutes Chapter 267, as set forth by the State of Florida, Florida Department of State. Chapter 267 mandates the identification and management of cultural resources that might occur within the lands of Florida in order to satisfy Section 106 requirements. Section 106 of the *National Historic Preservation Act* of 1966 (PL 89-665, as amended) requires agencies to take into account the effects upon historic properties of projects ("undertakings") involving federal funding and/or permitting. The guidelines for fulfilling the provisions of Section 106 and determinations of effect are contained in the implementing regulations of the Code of Federal Regulations (CFR), Title 36, Chapter VIII, Part 800 (36 CFR 800, as amended, 1999).

Fieldwork was conducted in order to locate cultural resources and to isolate areas where additional subsurface testing might encounter archaeological sites. The term "cultural resources" as used herein is meant to refer to sites or objects that are archaeological, architectural, and/or historical in nature. This investigation included preliminary background research that focused upon the history of the tract, as well as a review of archaeological investigations to determine whether the tract contained previously recorded archaeological sites. Seventeen shovel tests were then excavated, all of which were negative. These negative shovel tests indicated that the soils present within the 26.08-acre project tract consisted of very disturbed and very poorly drained soils. In addition a walkover survey of the tract was conducted along access roads and open areas, this pedestrian survey failed to locate artifacts and/or historic structural remains in areas of exposed ground surface. In summary, no artifacts were found within the project area during fieldwork. Based upon the completed negative testing, the results of this survey suggest that the project area represents a very low potential for containing cultural resources.

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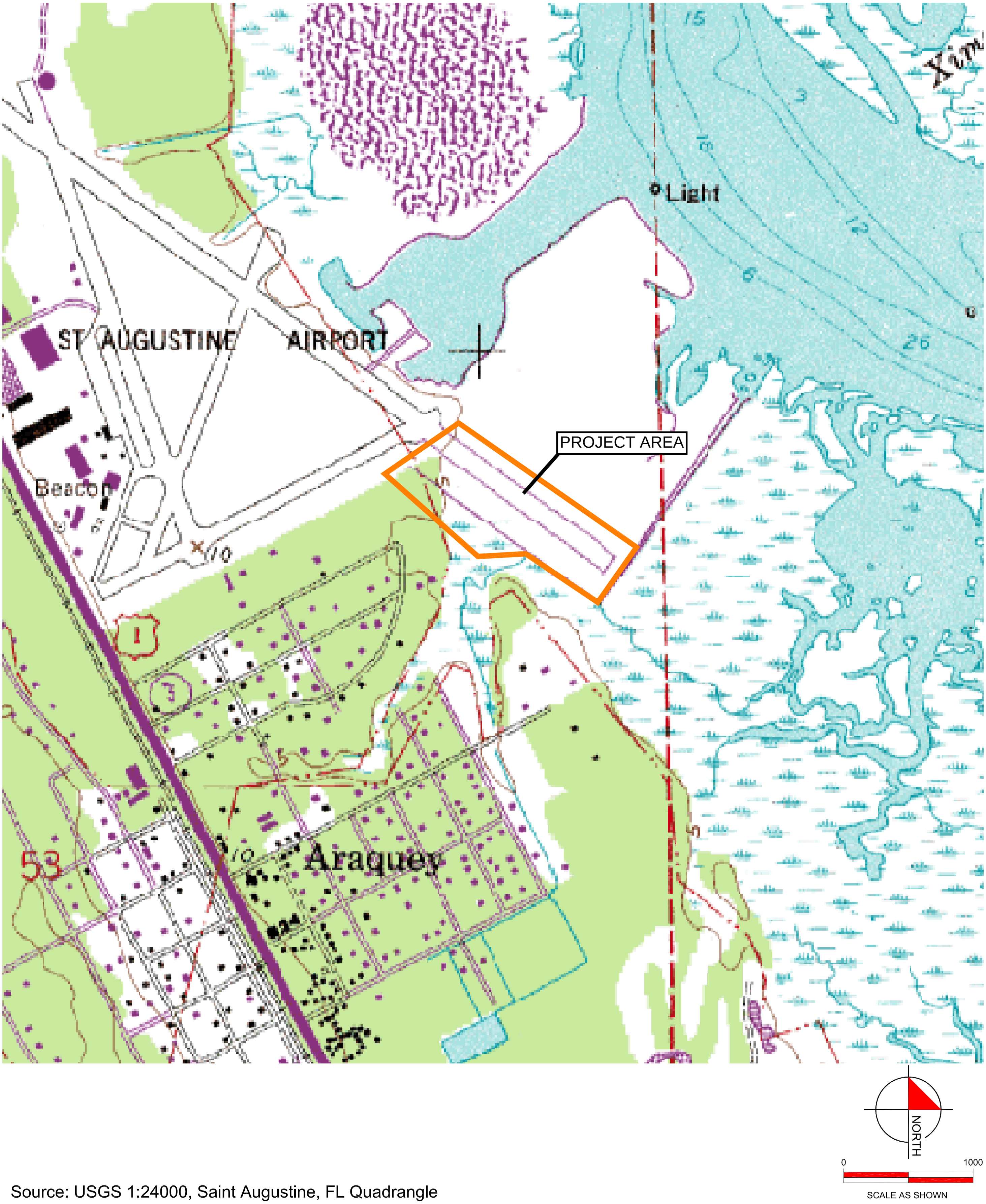


Source: USGS 1:24000, Saint Augustine, FL Quadrangle

Bland & Associates, Inc.
Archaeological and Historic Preservation Consultants

An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion Parcel
St. Johns County, Florida
Project Location

Figure: 1
Project No.: BAIJ08010184.01
Scale: 1" = 1000'-0"
Date: March 2009

II. ENVIRONMENTAL SETTING

Environmental variables have always had an important influence on the selection of habitation and special use sites by human groups. Local soil type is an important variable in site location because edaphic conditions generally guide, or are guided by, environmental factors such as drainage, relief, and flora/fauna. These factors are reviewed below.

Project Location

The project tract is located in St. Johns County. The project tract is bordered by wetlands to the northeast and southeast, partial wetlands and Indian Bend Road to the southwest and runways from the St. Augustine Airport to the northwest. The project tract may be found in Section 50, Township 6 South, Range 29 East of the St. Augustine, Florida United States Geological Service (USGS), topographic quadrangle map (1992). More specifically, the Taxpayer Identification Number (TPIN) for the parcel under investigation is 074840 0000. The project tract lies at an elevation of 0 to 5 feet above mean sea level (AMSL).

Soils

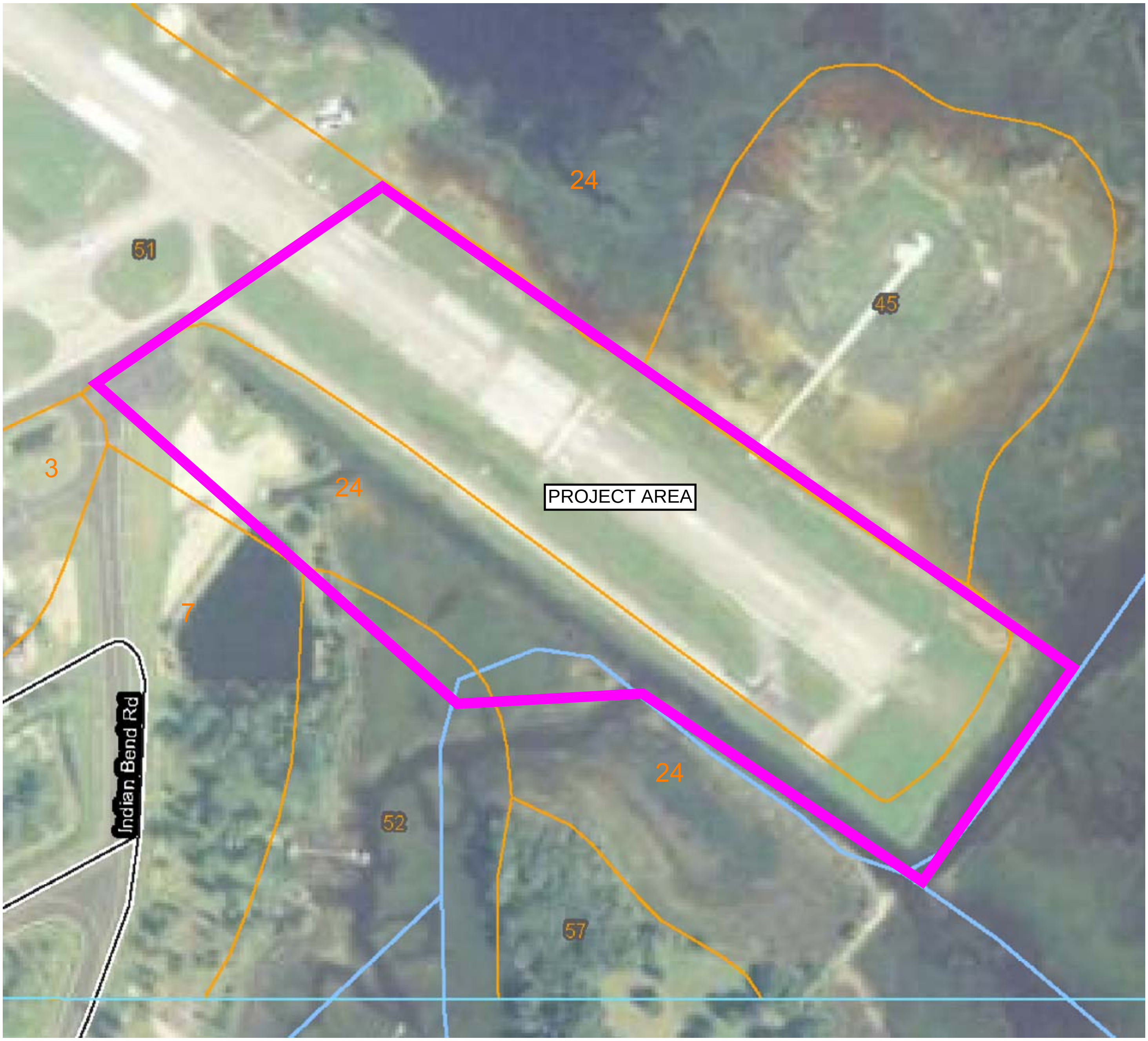
The soils of St. Johns County are primarily composed of granular quartz sands that are relatively young and very acidic (USDA 1983). The dominant soil group associated with the tract is the Myakka-Immokalee-St. Johns soil association (No.5), which consists of nearly level, poorly drained and very poorly drained sandy soils that have a dark subsoil stained by organic matter. In taxonomic sequence, the specific soil types (See Figure 2) mapped within the tract (USDA 1983) consist of:

3 = Myakka fine sand
7 = Immokalee fine sand
24 = Pellicer silty clay loam, frequently flooded
45 = St. Augustine fine sand, clayey substratum
51 = St. Augustine-Urban land complex
52 = Durbin muck, frequently flooded
57 = Adamsville variant fine sand
99 = Water

The dominant soil for this project tract is St. Augustine-Urban land complex. This soil series consists of very deep, somewhat poorly drained, moderately rapid to very slowly permeable soils which are found upon broad to narrow flats, and slight ridges and knolls, bordering tidal marshes and estuaries of Peninsular Florida. They formed of fill material. The fill is the result of dredging and filling operations along peninsular Florida. They are composed of sandy materials containing loamy or clayey fragments and fragments of shell. Shovel testing indicated that the soils present were fully indicative of the mapped soil types.

Hydrology

The St. Johns River is the major hydrologic feature in St. Johns County (USDA 1983:3-5). Both artesian (Floridan Aquifer) and non-artesian source of water are also common sources of water in St. Johns County. The creeks and marshes associated with the Intracoastal Waterway (ICW) are another significant hydrological feature; these creeks and rivers are hydrologically very important to the local environment, and they transport nutrients and detritus that re-nourish the extensive estuarine systems that compose a large part of eastern St. Johns County. Specifically, the project tract falls within the drainage basin of the Tolomato River (Intracoastal Waterway), which empties into the Atlantic Ocean.



Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

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

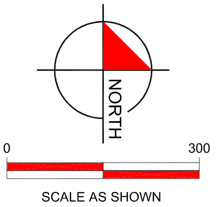
Soil Survey Area: St. Johns County, Florida
Survey Area Data: Version 8, Feb 27, 2009

Date(s) aerial images were photographed: 10/13/2007

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

Map Symbol:

3 = Myakka fine sand
7 = Immokalee fine sand
24 = Pellicer silty clay loam, frequently flooded
45 = St. Augustine fine sand, clayey substratum
51 = St. Augustine-Urban land complex
52 = Durbin muck, frequently flooded
57 = Adamsville variant fine sand
99 = Water



Bland & Associates, Inc.
Archaeological and Historic Preservation Consultants

An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion Parcel
St. Johns County, Florida
Soils Map

Figure: 2
Project No.: BAIJ08010184.01
Scale: 1" = 300'-0"
Date: March 2009

Physiography

Physiography refers to the study and description of landforms or the physical geography of an area. Following Brooks' (1981) *Guide to the Physiographic Divisions of Florida*, the Florida is divided into two physiographic sections, each of which is subdivided into districts and sub-districts. These subdivisions are based on four principles: (1) type of rock and soil (2) geological structure of underlying rocks, (3) geomorphic processes that shape or modify the landscape, and (4) relief (Brooks 1981). Marine forces have largely shaped the land surface of the state of Florida over the past several million years. The depositional and erosional activities of marine currents associated with sea level fluctuations—which at times covered the Florida land mass—combined with more recent erosion and windblown sand deposition have created the Florida landforms of today. The project area lies in the Eastern Flatwoods physiographic district (Brooks 1981). More specifically, the project area occurs within the St. Augustine Edgewater Ridge (1e1), a barrier island area composed of perched clastic deposits and with an underlying ridge of coquina; these deposits are Late Pleistocene in age (Brooks 1981:2). In geologic terms, this area consists of undifferentiated sand, shell, clay, marl, peat, that is mostly less than 4,500 years B.P. in age (Qh).

Climate

The humid, subtropical climate of Florida is greatly influenced by the seasonal conditions of the Caribbean, Atlantic Ocean, and Gulf of Mexico (USDA 1983:1-3; Chen and Gerber 1990:11-34). The climate of St. Johns County is characterized by long, warm, humid summers and mild winters. During late spring and summer months, late afternoon and evening thunderstorms are a common occurrence. Fifty-six percent of the annual rainfall is concentrated in the months of June through October; the annual average rainfall is 55 inches. During these same months, temperatures in St. Johns County vary little from day to night, with the mean monthly temperature about 80^{o} F.

Although the peak season for hurricanes and tropical storms is June through November, direct landfall of these storms is uncommon. However, rains, tidal surges, and wind gusts associated with passing hurricanes and tropical storms still generate property damage and severe flooding. The chance of a hurricane-making landfall in a given year within St. Johns County is approximately 1 in 40 (USDA 1983:2). Greater daily temperature ranges, less humidity, higher temperatures, and far fewer rainy days characterize late fall to early spring seasons. Prevailing winds are easterly, and the wind-speed is usually 10 to 12 miles an hour. Freezing temperatures in St. Johns County are rarely achieved, and they are confined to a timeframe of December 8 to February 20.

III. REGIONAL CULTURE HISTORY

Archaeological research in Florida has established a general prehistoric chronology dating back some 12,000 years (Milanich 1994). Archaeologists have divided this long span of time into four general periods based on distinct cultural, technological, and environmental changes over time. From oldest to most recent, these include: Paleoindian, Archaic, Woodland, and Mississippian. It should be noted that for each period, artifact complexes, cultural trends, and archaeological manifestations vary by region. Geographically, Northeast Florida lies within the St. Marys archaeological area, which extends along the Atlantic coast from the St. Johns River, Florida to the Satilla River, Georgia (Russo 1992). A summary of each local prehistoric period is presented below.

Prehistoric and Historic Cultural Chronology of Northeastern Florida.

PALEOINDIAN	12,000 – 8,000 BC
ARCHAIC	
Early	8,000 - 5,000 BC
Middle	5,000 - 3,000 BC
Late[1]	3,000 – 500 BC
WOODLAND	
Deptford	500 BC - A.D 500
Swift Creek	AD 400 - 850
Colorinda	AD 850 - 900
MISSISSIPPIAN	
St. Johns II	AD 900 – 1250
St. Marys II	AD 1250-1500
San Pedro	AD 1500 - Contact
SPANISH MISSION	
San Pedro	AD 1587 – 1600+
San Marcos[2]	AD 1600+ - 1702
HISTORIC	AD 1565 – Present

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1. production of Orange pottery began around 2800-2500 BC
2. also referred to as Altamaha

3.*1* *Paleoindian Period (10,000 - 8,000 BC)*

The earliest period of human occupation of the Americas is known as the Paleoindian period. Traditionally, the initial human colonization of North America has been attributed to "Clovis" people who crossed Beringia, a frozen land mass linking present-day Alaska to Siberia, and eventually dispersed themselves throughout North, Central, and South America some 11,500 or so years ago (Meltzer 1995). Several archaeological sites in South and North America, including the eastern United States (e.g., Meadowcroft Rockshelter, Topper site, Cactus Hill) suggest that pre-Clovis (pre 11,500 years ago) occupation of the Americas was possible (Fiedel 2000; Meltzer et al. 1997). Nevertheless, the earliest undisputed evidence of human occupation within the southeastern United States dates to approximately 10,000 BC.

The Paleoindian period is typically segregated into three sub periods (Early, Middle, and Late) based on diagnostic stone projectile point types (Anderson et al. 1996). The Early Paleoindian period is characterized by Clovis points, a distinctive fluted, lanceolate-shaped projectile point. In Florida, the Middle Paleoindian period is marked by the presence of Suwannee and Simpson points, whereas the Late Paleoindian period witnessed the production of Dalton-like projectile points. The emergence of smaller Dalton projectile points may indicate a transition from hunting large Pleistocene megafauna to smaller Holocene game, such as deer (Goodyear 1982). Archaeological evidence shows that lithic blades and unifacial scrapers, ivory foreshafts, bone pins, and atlatls (i.e., spear-throwers) were also used by paleoindians in Florida (Milanich 1994:48-52).

The first humans to occupy Florida were small hunting and gathering bands of paleoindians, who arrived around 10,000 BC. These highly mobile foragers encountered an environment warmer than the recently-ended Ice Age (Pleistocene), but cooler by today's standards (Delcourt and Delcourt 1985; Watts and Hansen 1988). Because sea levels were lower at this time, peninsular Florida was more than twice its present width. The inland water table was also much lower, meaning that many of today's wetlands and other hydric features were either nonexistent or retained little water. While paleoindians hunted mastadon, giant sloth, bison, and other megafauna that still wandered the Florida peninsula, they also hunted smaller game and gathered various edible plants (Milanich 1994; Webb et al. 1984).

Today, the distribution of paleoindian sites across the Florida landscape suggests that sinkholes and high quality chert outcroppings were primary considerations that affected paleoindian movement and settlement patterns. According to the "oasis model," paleoindian bands frequented cenotes and springs to collect water and exploit the abundant flora growing there and the animals also attracted to these wetland loci (Dunbar 1991; Dunbar and Waller 1983; Milanich 1994; Webb et al. 1984). As an added bonus, many of these freshwater sources were located in areas of exposed Tertiary age limestone that provided paleoindians with raw material for tool manufacture.

The archaeological record indicates that most paleoindian sites in Florida are located in the tertiary karst region located beneath Gulf waters, along the central Gulf Coast and in the north-central panhandle part of the state (Dunbar 1991:193-194; Faught and Carter 1998). Unfortunately, very few paleoindian sites in Florida have been subjected to intensive excavation, and those that have been tested date to the waning years of the Paleoindian period (e.g., Daniel and Wisenbaker 1987; Dunbar et al. 1988; Horvath 2000). To date, no evidence of paleoindian activity has been discovered in Duval County. In fact, extreme northeastern Florida is deemed an "outlying region" with regard to the distribution of paleoindian sites in Florida. The nearest indication of the presence of these early natives in northeastern Florida consists of a paleoindian projectile point purportedly collected by a local resident along the seashore at Jacksonville Beach (Dunbar 1991:208).

3.2 Archaic Period (8,000-500 BC)

The Archaic period environment was marked by warmer climatic conditions and higher ocean and interior water levels compared to paleoindian times, circumstances that resulted in the widespread emergence of hardwood forest communities in some upland locations and wetland habitants in low-lying areas (Smith 1986:21-24; Milanich 1994:62-63). With the extinction of Pleistocene megafauna, Archaic foragers focused their attention on the procurement of smaller game (comparable in size to those found today), fish, shellfish (Claassen 1986), and various edible wild plants, nuts, and fruits. Throughout Florida, populations increased and groups became more sedentary, as reflected archeologically in the proliferation of regional material assemblages (Milanich 1994:85-104). Over time, Archaic populations utilized wider variety of archaeological site types arose, including villages or base camps, cave sites, procurement camps, cemeteries, and short-term resource extraction sites. The Archaic period would precipitate great changes in the regional cultures of Northeast Florida. The post-Archaic way of life in Northeast Florida would come to be characterized by population growth, the increased exploitation of coastal resources, the construction of burial mounds, the appearance of new ceramic styles, incipient plant cultivation, and the importation of exotic products from outside the region.

3.2a Early Archaic (8,000-6,000 BC)

The Early archaic populations of Florida exhibited subsistence practices that were quite similar to those of their paleoindian predecessors. Some researchers in Florida have suggested that terminal paleoindian and Early Archaic occupations should be treated as a single cultural entity because both populations roamed the same landmass unreduced by a rise in sea-level, experienced a diverse hardwood biotic regime, and shared similar subsistence-settlement strategies (Thomas et al. 1993:510). However, by the latter portions of the Early Archaic period, people were adapting from Pleistocene environmental conditions to the changing, wetter and warmer conditions of the Holocene period. With the emergence of more numerous and diversified natural communities such as riverine oxbows during the Early Archaic, regional specialization increased and led to greater interregional variation.

Projectile points utilized during the Early Archaic period consisted of side notched varieties, rather than fluted, lanceolate forms of the paleoindian period. Projectile points diagnostic of Early Archaic period in Florida include the Bolen and Kirk side-notched, projectile points, as well as Santa Fe and Tallahassee projectile points. Other lithic tool types characteristic of the

Early Archaic period include bifacial Edgefield scrapers and a variety of unifacial end, side, and tear drop-shaped end scrapers that were presumably hafted (Coe 1964).

The earliest Early Archaic populations exhibited settlement patterns similar to their paleoindian predecessors. Pleistocene megafauna were extinct by the Early Archaic period, and it appears that Early Archaic populations were composed of small nomadic bands that sought biotic resources (small game, plants) that were seasonally available during wide-ranging forays. Although proof of extensive Early Archaic plant use is lacking in Southeastern North America, “the relatively limited evidence of plant processing implements and plant remains in comparison to later time periods does not constitute a strong argument in support of the minimal use of plant resources” (Smith 1986:10). Wooden mortar and pestles were used by people in the Early Holocene, if but they do not preserve well in the archaeological record. Examples such as the small oak mortar uncovered at Little Spring Florida are rarely found (Clausen et al. 1979).

Within Northeast Florida, evidence of the earliest Archaic occupations usually consists of lithic scatters containing chert debitage and rarely Early (8,000-6,000 BC) or Middle (6,000-3,000 BC) Archaic projectile points. These deposits evince short-term and intermittent occupation of the region during the Early and Middle Archaic periods.

3.2.b Middle Archaic (6,000-3,000 BC)

During the Middle Archaic period, the post-glacial environment of the Southeast began to stabilize, eventually reaching nearly modern conditions (Schuldenrein 1996). The major climatic event of the Middle Archaic is the Altithermal, a warming trend that occurred from circa 8,000 to 5,000 B.P. and affected the Southeast and the continent as a whole. As water availability increased in the Middle Archaic, “new food gathering fishing and hunting economies were increasingly possible as wetlands expanded” (Watts, Grimm, and Hussey 1994:38). In regard to subsistence shifts in the Southeast during the Middle Holocene, Smith writes: “they do not reflect a uniform pan-southeastern convergence on a single ultimate adaptive solution. Rather they suggest a variety of local adjustments some major, some minor, to alterations in the habitat and changes in the potential resources of the catchment areas of different populations, with the availability of lithic raw materials rather than localized food resources perhaps dictating settlement location” (Smith 1986:21, 25). One exception to this statement is the broad scale intensification of floodplain occupation that occurred 6,500 to 6,000 years ago at or about latitude 34° and west of the Appalachians (Smith 1986:22).

This intensification trend correlates with a shift from the Early Holocene pattern in rivers of pulses of sediment removal and river incision to the Middle Holocene phase of river aggradations and stability (Smith 1986:22); this shift is believed to cause the formation of backwaters walks and resource abundant shallow water habitats. During the Middle Archaic period, the Native Americans of Northeast Florida collected large quantities of mystery snails (*Vivaparus* spp.) from the freshwater areas of the upper St. John's River. These mystery snail middens contained artifacts indicative of a Middle Archaic culture referred to as Mount Taylor (Goggin 1952: 40- 43).

Artifacts diagnostic of the Middle Archaic period in Florida consist of stemmed, broad- blade projectile points which are identified as variants of the Florida Archaic Stemmed point; these point types include the Newnan, Levy, Hillsborough, and Marion projectile points (Bullen 1975:30-32). Expedient, flake tools also become more common. Some Middle Archaic shell middens in Florida have also demonstrated that animal bone was an important source of raw material for tool and ornament production (Milanich 1994:82).

3.2.c Late Archaic (3,000-500 BC)

Shell middens excavated near the mouth of the St. Johns River indicate increased utilization of extreme northeastern Florida during the Late Archaic period (3,000-500 BC). In fact, by 3,700 BC preceramic Archaic groups were living along the Atlantic coast of northern Florida on a year-round basis and subsisting largely on estuarine fish and shellfish (Russo 1992:111). The earliest good evidence of plant cultivation also occurs during the Late Archaic period (Yarnell 1993:13). Other types of plants flourished in the disturbed areas around habitation sites and these “camp followers” were also utilized by Late Archaic populations in North America. These “camp followers” included maygrass (*Phalaris caroliniana*), giant ragweed (*Ambrosia trifida*), and carpetweed (*Mollugo verticillata*) (Yarnell 1993: 13-16). There is good evidence that plant use by Late Archaic societies in the eastern woodlands was sophisticated and complex (Chapman and Watson 1993:34). In general, Late Archaic components are also much more prevalent throughout the Southeast than are earlier Archaic and Paleoindian components. Late Archaic sites also exhibit increased sedentism; recent archaeological investigations have demonstrated that Late Archaic populations were building structures. A structure dated to 3,895 ± 102 B.P. and 3,867 ± 79 B.P. has recently been discovered at 9WR4, the Mill Branch site (Ledbetter 1995:178).

By 2,000 BC, natives in northeastern Florida began to manufacture for the first time, fired-clay pottery, known to archaeologists today as *Orange* pottery. This early ware was tempered with vegetal fibers, either thin strands of palmetto or Spanish moss (Griffin 1945:219; Bullen 1972:9). Over a span of approximately 1,500 years, plain, incised, and punctated types of fiber-tempered pottery were manufactured, with decorated variants undergoing phases of stylistic popularity. With regard to vessel form, early pots were hand molded and tended to be flat-based rectangular containers, whereas some of the later vessels showed more variety in form and were produced by coiling (Sassaman 2003). The Late Archaic period was witness to other innovations in cooking technology as well. Perforated soapstone (steatite) slabs were commonly used after 5,000 BP as indirect heat sources for stone boiling (Sassaman 1993). Late Archaic populations also used steatite for the manufacture of bowls, and steatite bowls from quarry sources in Georgia and South Carolina have been found in Georgia. Grooved axes and cruciform drills are also found in the Late Archaic artifact assemblage.

The Late Archaic period is also marked by a proliferation of linear and ring shaped shell middens on the coastline of the South Atlantic slope (Stoltman 1974). Along the coast of South Carolina, Florida and Georgia, Late Archaic populations occupied marine estuaries that appear to have been less intensively inhabited by earlier Middle Archaic populations. The Late Archaic inhabitants began to collect shellfish (oysters) from the Atlantic during the late fall to the early spring, and accumulating the debris from these activities in shell rings. Zooarchaeological evidence from Georgia coastal shell middens and rings (linear and circular) indicate a strong subsistence dependence on vertebrate and invertebrate tidewater fauna (Reitz 1988).

To date, most Late Archaic sites in Northeast Florida are manifested as low to moderate density scatters of fiber-tempered pottery on the mainland, as well as on Amelia, Martins' and Crane islands (Bullen and Griffin 1952; Dickinson and Wayne 1999; Griffin and Steinbach 1991; Hemmings and Deagan 1973; Hendryx et al. 2000; Johnson 1988; Smith 1998). Numerous Late Archaic shell middens are known for Fort George Island and various small, tidally inundated marsh islands, immediately north of the St. Johns River (Russo et al. 1993). Russo (1992:111) has suggested that some of the larger shell middens, such as Rollins Shell Ring on Fort George Island, represent base camps. Coquina middens dated to the Orange period occur to the south near the Atlantic shoreline.

3.3 Woodland Period (500 BC - AD 900)

The first Woodland period occupations of the region occurred around 500 BC and are represented by *Deptford* pottery assemblages containing plain, check stamped, and simple stamped types (Bullen and Griffin 1952; Dickinson and Wayne 1987, Hendryx et al. 2000; Russo 1992:115 Sears 1957; Vernon 1984:108;). Deptford and "chalky" St. Johns pottery are also known to co-occur on some northeastern Florida middens (Kirkland and Johnson 2000). The Deptford archaeological culture represents a continuation of a coastal way of life that was well established in the region by Late Archaic times, possibly earlier.

Along the Atlantic coastal strand, Deptford communities were situated in maritime hammocks near tidal marshes, with subsistence centered essentially on the exploitation of estuarine and maritime forest resources. Deptford groups (or possibly subgroups) may have moved inland seasonally to the river valleys to gather plant foods, hunt game, and trade with non-coastal peoples (Milanich 1971, 1973, 1980). Deptford community organization is thought to have been composed of bands of 30 to 50 kin-related individuals (Milanich 1971:199). Furthermore, it is speculated that these bands occupied small settlements containing 15 to 25 houses, each comprised of a single nuclear family. Both ceramic scatters and shell midden site types are associated with Deptford pottery in Northeast Florida.

Swift Creek is another Woodland culture, easily identified by its distinctive sand-tempered complicated stamped pottery (Ashley 1992, 1995, 1998). The occurrence of Swift Creek ceramics in northeastern Florida was first recognized by John Goggin (1952), who observed that such complicated stamped wares were found in local Woodland period mounds along with non-local mortuary items, such as copper, galena, and mica. Interaction networks appear to have allowed Early Swift Creek design concepts to spread from northwestern to northeastern Florida, where the ware was locally produced as a sand-tempered and charcoal-tempered variety between AD 400 and 500 (Ashley 1998).The recovery of Late Swift Creek pottery in northeastern Florida, similar to that found along the Atlantic coast to the north in Georgia, suggests that interaction networks emanating out of northeastern Florida had shifted to the north between AD 500 and 850 (Ashley 2003b).

Swift Creek pottery on sites in Northeast Florida tends to be grit-tempered (like that from southeastern Georgia), whereas Swift Creek pottery to the south along the St. Johns River is mostly sand-tempered. Individual (household) shell middens dated to local Swift Creek times are dotted across several sites on or near Amelia Island, including Crane Island Shell Midden B (8NA709), Ocean Reach Site (8NA782), and Honey Dripper (8NA910) site to name a few (Dickinson and Wayne 1999; Hendryx and Smith 2001; Johnson et al. 1997). Presently, at least 15 Swift Creek burial mounds are known for Duval County (Ashley 1998).

Colorinda represents the terminal Late Woodland period in northeastern Florida. This little known archaeological culture is represented by a sandy ware tempered with crushed St. Johns pottery (Sears 1957). Colorinda pottery is part of a ceramic complex that also includes sand-tempered plain, St. Johns Plain, and small amounts of St. Johns Check Stamped (Ashley 2003a). This distinctive pottery type appears to be sparsely scattered across northeastern Florida, although a few sites contain high-density concentrations (Ashley 2003a; Russo et al. 1993; Sears 1957). Although initially interpreted as a St. Johns II mound, the Walker Point Mound (8NA28) on Amelia Island may actually date to the Colorinda period (Ashley 2003b). Recent calibration of a corrected radiocarbon date on oyster shell from Coffee Mound and two new calibrated radiometric dates from the Cedar Point site (on Black Hammock Island) date the Colorinda period to ca. AD 850-900 (Ashley 2003a).

3.4 Mississippian Period (AD 900 - 1565)

The Mississippian period in northeastern Florida is marked by the introduction of St. Johns Check Stamped pottery. St. Johns is a unique pottery type that contains microscopic sponge spicules, which give the ware its hallmark “chalky” tactual quality (Borremans and Shaak 1986). Controversy surrounds the nature of these bio-silicate inclusions, with some researchers suggesting that sponge spicules are natural constituents of certain clays (Borremans and Shaak 1986; Cordell and Koski 2003), while others argue that the material represents the byproduct of added sponge temper (Rolland and Bond 2003). In addition to plain, check stamped, and punctated St. Johns types, Ocmulgee Cordmarked (mostly grit-tempered) is also found on St. Johns II sites in northeastern Florida (Ashley 2002).

For the broader St. Johns region, the *St. Johns II period* begins around AD 750 and extends into the early contact period (post-AD 1565). In northeastern Florida, however, the St. Johns II period is restricted to ca. AD 900-1250 and followed by the St. Marys II period. St. Johns II coastal sites are often manifested as diffuse shell middens composed mostly of oyster. Small sand burial mounds similar to those of the preceding Woodland period are often found on St. Johns II village sites; at least two massive sand mounds are also known for the period (Ashley 2002; Thunen and Ashley 1995:5-8). The emergence of St. Johns II sites in northeastern Florida around AD 900 appears to herald a settlement shift within the river valley, with some St. Johns II people from the south relocating to the extreme northeastern part of the state (Ashley 2003b).

St. Johns II subsistence emphasized the capture of estuarine fish and shellfish along the coast and freshwater species along the river (Ashley 2002:165; Russo 1992:118; Milanich 1994:262-267).

Zooarchaeological evidence indicates that fish species such as Atlantic croaker, mullet, silver perch, catfish, seatrout, flounder, and drums were taken from the marshes and shallow tidal sloughs. Presently, there is no evidence suggestive of an ocean or deep-water fishing economy. Oyster was by far the most intensively collected shellfish species, but quahog clam, Atlantic ribbed mussel, stout tagelus, and whelk were also collected and eaten. Deer, raccoon, opossum, and other mammals were also hunted or trapped, but were exploited to a far lesser degree than aquatic animals.

The St. Johns II period appears to represent the zenith of prehistoric sociopolitical organization in northeastern Florida. The Shields (8DU12) and Grant (8DU14) mounds, located less than a kilometer apart along the south bank of the St. Johns River in Duval County, together comprise the Mill Cove Complex (Thunen and Ashley 1995:5-8; Ashley 2003b). Both were large St. Johns II mounds that contained human burials, copper plates, copper beads, galena, ground stone implements, and other pieces of exotica (Moore 1894; 1895). Current evidence indicates that the Mill Cove Complex was the ceremonial and population center of the local St. Johns II culture (Ashley 2003b). There may have been as many as 10 other St. Johns II village-and-mound sites in northeastern Florida, including three on Amelia Island; these include Mitchell Mound (8NA48), Fernandina Lighthouse (8NA2), and Old Town (8NA248) (Ashley 2003b).

In northeastern Florida, the St. Johns II period is supplanted by the *St Marys II period* (AD 1250 - 1500). St. Marys Cordmarked, sand tempered plain, and fabric and net impressed, make up the ceramic series; lesser amounts of St. Johns series pottery may also occur on St. Marys II sites (Ashley 2003b; Ashley and Rolland 2002; Bullen and Griffin 1952; Larson 1958; Russo 1992; Saunders 1989; Sears). Some time after AD 1500, St. Mary's pottery is replaced by the San Pedro series, which continues in production until the early 17th century. San Pedro pottery is a grog-tempered ware that has been recovered at numerous coastal sites, including Spanish missions in northeastern Florida and southeastern Georgia (Ashley and Rolland 1997a).

St. Marys II habitation sites typically occur as groupings of discrete shell midden heaps that range from 2 to 15 meters in diameter. Sites containing these household middens (as they are frequently interpreted) are known for all barrier islands in the St. Marys region, including Black Hammock Island (Russo et al. 1993; Ellis and Ellis 1992), Fort George Island (Jones 1967; Dickinson and Wayne 1987; Russo et al. 1993), Amelia Island (Ashley and Rolland 1997b; Bullen and Griffin 1952; Hemmings and Deagan 1973; Saunders 1992), and Cumberland Island (Ehrenhard 1976, 1981). St. Marys II sites have also been recorded on Crane and Martin's islands (Dickinson and Wayne 1999; Hendryx and Smith 2000). Their occurrence on mainland northeastern Florida (Ashley 2002; Lee et al. 1984) and southeastern Georgia (Adams 1985; Crook 1984, 1986; Smith et al. 1981) has also been noted. St. Marys II sites are more numerous and dispersed compared to the nature of St. Johns II sites.

Zooarchaeological and seasonality data suggest that St. Marys II groups lived along the coast throughout the year, with a subsistence economy focused on the capture of small estuarine fish, shellfish, and other aquatic resources; terrestrial mammals were exploited but to a far lesser extent (Russo 1992:118-119; Russo et al. 1993:172). Species exploited by St. Marys II groups were very similar to those utilized during St. Johns II times and included menhaden, catfish, spot, Atlantic croaker, seatrout, flounder, drum, and mullet (Lee et al. 1984). While the specifics of the yearly cycle are still not fully understood at this time, there seems to be little doubt that the St. Marys II people of northeastern Florida were sedentary coastal fishers and shellfish collectors, who at times employed foraging mobility.

3.5 Contact Period (1562-1587)

The contact period in northeastern Florida began with Jean Ribault's (1964) brief exploration of the lower (northern) St. Johns River and Florida Atlantic coast in 1562. Two years later René Laudonniére, who had earlier accompanied Ribault, returned and established Fort Caroline (*La Caroline*) along the south bank of the St. Johns River, about 10 miles from its mouth (Bennett 1964, 1968, 1975; Lawson 1992). The French were told that Paracousi Saturiwa was the dominant native ruler near the fort and that he "had under his authority thirty other paracousis and whom ten were all his brothers, and for this reason he was greatly feared in these regions" (Lawson 1992:64). According to Laudonierre, the title Paracousi Saturiwa was "equivalent to King Saturiwa," and that his sons "bore the same title of paracousi" (Lawson 1992:50). However, the title was used by Laudonierre to refer to several other village leaders near the fort, and elsewhere along the St. Johns River.

The natives inhabiting Northeast Florida at the time of European contact were Timucua-speakers, who were possibly allied with the Saturiwa (Swanton 1922; Deagan 1978; Hann 1996; Milanich 1996). Before encountering the French, however, Timucua on the north end of Amelia Island may have briefly met a scouting party associated with the Spanish expedition of Lucas Vásquez de Ayllón centered on the northern Georgia coast (Milanich 1996:70-71).

With the building of Fort Caroline in 1564, the St. Johns River estuary became the hub of sixteenth century French-Indian relations in southeastern North America. From the French fort, correspondence was established with local native villages, and patrols were made up (south) the St. Johns River and north along the Atlantic coast to South Carolina (Bennett 1964, 1968, 1975; Lawson 1992). As a result of these forays into the interior of Florida, valuable information was recorded about other native polities in northern Florida and southeastern Georgia. Through these expeditions, the French experienced first-hand Timucuan warfare and diplomacy as well as native social and political intrigue.

Information gleaned from French documents and maps suggest that the Timucuan village of Sarabay was on Big Talbot Island and the village of Tacatacuru was on Cumberland Island. The French colony at Fort Caroline was brief, and by late 1565 it had fallen to Spanish forces under the command of Pedro Menéndez de Avilés. The Spaniards assumed control of the French stronghold, renaming it Fort San Mateo. Mutinous revolts by Spanish soldiers, combined with Timucua hostility toward the interlopers, made Fort San Mateo a source of grief for Menéndez (Lyon 1976:153). The French Catholic Dominique DeGourges, along with a large contingent of local natives, attacked and burned the fort in April 1568 (Bennett 1965). DeGourges was more intent on revenge than re-colonization, so he and his men returned to France upon destruction of the fort.

A weak attempt was made by the Spanish to re-outfit the fort, but it was soon abandoned for Fort San Pedro on Cumberland Island (Barrientos 1965; Hann 1996:66-67; Lyon 1982:57; Solís de Merás 1964). Placed near the native settlement of Tacatacuru, the Spanish soldiers stationed at the fort were also repeatedly harassed by local Timucua, resulting in its eventual abandonment in 1573. Written accounts present strong support for the existence of a native alliance between Saturiwa, Tacatacuru, and the other Timucua groups in the St. Marys region at contact. The documents indicate that at the same time the relations between Saturiwa and inland Timucua groups, such as the Outina along the middle reaches of the St. Johns River were volatile and at times violent (Bennett 1975; Lawson 1992).

With the removal of the French, it was the Spanish, based primarily in settlements at St. Augustine and Santa Elena, who interacted almost exclusively with the Timucua of northeastern Florida and southeastern Georgia after 1568. Between AD 1565 and 1587, relations between the Spaniards and the coastal Timucua were uneasy, with the natives repeatedly attacking soldiers who happened to stray from their fortified outposts (Hann 1996; Lyon 1976). European presence clearly challenged the political might of the indigenous societies. While documentation is rather mute with regard to native activities during the 1570s, it appears that the Spaniard's retaliatory tactics were intensive, as they burned or destroyed native villages, fishweirs, plantings, and other holdings (Hann 1996:68; Solís de Merás 1964).Hann (1996:70) suggests that the "fire and blood" strategy on the part of the Spaniards "convinced enough of the Indians of the desirability of peace to force the hands of leaders who had chosen war."

From an archaeological perspective, the contact era Timucua of northeastern Florida are represented by San Pedro pottery, a distinctive grog-tempered ware (Ashley and Rolland 1997b). In terms of surface treatments, the series consists mostly of plain, check stamped, and cob marked wares, and to a lesser extent, cord marked, textile impressed and complicated stamped types (Ashley and Rolland 1997b; Deagan 1978; Herron 1986; McMurray 1973; Milanich 1971b, 1972). Recent analysis suggests that while the overwhelming number f vessels in assemblages are grog tempered, the range includes some sand and sand/sparse grog tempered wares (Ashley and Rolland 1997a; Ashley and Thunen 2000). Details concerning some technological aspects of San Pedro pottery can be found elsewhere (see Ashley 2001; Ashley and Rolland 1997b).

Another archaeological occurrence in northeastern Florida coincident with the emergence of San Pedro pottery is the recovery of preserved corn. Thus the cultivation of corn by coastal Timucua appears to be a very late development (post AD 1500).

3.6 Mission Period (A.D. 1587-1702)

Spain established a garrison community at present-day St. Augustine in 1565, and soon afterwards Jesuit friars set out to convert native populations to Christianity through missionization (Gannon 1965; McEwen 1993; Milanich 1999). Beginning in the late-sixteenth century, the coastal Timucua along with Guale Indians to the north were the first to be congregated at mission villages, taught the Catholic doctrine, and introduced to the Hispanic way of life, as part of Spain's colonization process. Sustained Spanish interaction with the native peoples of the St. Marys region began in earnest with the arrival of Franciscan friars and the establishment in 1587 of the missions San Juan del Puerto on Fort George Island and San Pedro de Mocama on Cumberland Island (Gannon 1965:38). San Juan and San Pedro were each a *doctrina* since they maintained a resident priest. Such villages included a church, *convento* (friar's residence), and possibly a detached kitchen (Saunders 1990; Worth 1998:42). Satellite villages located near a *doctrina* and within a priest's evangelical jurisdiction were referred to as *visitas*, which themselves may also have had a small church or open chapel for a priest's use. The Mocama visita of Santa Maria de la Sena was located on Amelia Island (possibly at Harrison Homestead site) during the first half of the seventeenth century (Worth 1997).

The imposition of missions at Timucuan villages without incident intimates that the once antagonistic coastal Indians had become more tolerant of Spanish presence in the St. Marys region. There is no mention at this time or in documents of the 1570s and 1580s of any of the early high-profile Timucans, like Saturiwa or Tacatacuru. The demise of these two prominent individuals, relentless enemies of the Spanish, very well may have factored into the coastal Timucua's apparent reversal of attitude toward Spanish presence in the region (Hann 1996:70). Ironically, Don Juan, the reported cacique at the mission San Pedro (Tacatacuru) in 1587, was a fervent supporter of the Spanish (Deagan 1978:102; Hann 1996:146), and one would suspect that if traditional rules of inheritance were in practice, he was a blood relative (nephew?) of Tacatacuru.

The early mission period in the St. Marys region is also represented by San Pedro series pottery, which has been recovered at several mission-related sites in Camden County, Georgia and Nassau, Duval, and northern St. Johns counties, Florida (Ashley and Rolland 1997b). The archaeological location of the missions of San Juan and San Pedro are known and have been subjected to varying degrees of archaeological investigation. San Juan del Puerto (8DU53) has received the most attention, but detailed broad-scale excavations are lacking (Dickinson 1989; Dickinson and Wayne 1985; Griffin 1960; Hart 1982; Hart and Fairbanks 1981; Jones 1967; Russo et al. 1993). Work at San Pedro (Dungeness Wharf, 9CAM14) has consisted mostly of surface collections (Milanich 1971b), and the limited testing that has taken place has been poorly reported (Ehrenhard 1976, 1981).

At least four suspected early seventeenth century *visitas* have been sampled to some extent as well, and all have yielded San Pedro pottery (Ashley and Thunen 2000; Johnson 1998; Johnson and Ste. Claire 1988; FAS 1994; Russo et al. 1993; Smith et al. 2001). Admittedly, however, these are all large multi-component sites that have also produced both St. Marys and later mission-period San Marcos wares. Strangely, European artifacts (e.g., beads, axes, hoes, etc), save for small amounts of olive jar, have been infrequently recovered at these suspected satellite villages

By the mid-seventeenth century, non-local Guale Indians from coastal Georgia were relocated to missions in northeastern Florida, including ones on Amelia Island (Saunders 2000; Worth 1995). Native sites of the seventeenth and early eighteenth century in northeastern Florida are marked by the presence of San Marcos (Altamaha) series pottery, a grit-tempered ware often stamped with complicated or simple designs (Larson 1978; Otto and Lewis 1974; Saunders 1992, 2000; Smith 1948). Although the appearance of San Marcos pottery on sites in Florida has traditionally been interpreted as evidence of Guale occupation, it now appears that San Marcos pottery was dominant mid-seventeenth century mission ware manufactured by coastal Guale, Yamassee and Mocama Indians (Hann 1996; Saunders 2000; Worth 1995, 1997).

During the latter half of the seventeenth century, a series of Yamassee and Guale settlements were relocated to Amelia Island. According to the a 1675 Pedro de Arcos list, Worth (1995:28) states

> The northernmost [pagan town], inhabited by 60 Yamassee, was located on the tip of the [Amelia] island, followed by the town of Ocotoque a league to the south, with 40 residents. Two leagues southward was the town of La Tama, containing 50 pagan Indians, and half a league away was the town of Santa Maria, recently resettled by Yamassee immigrants after the disappearance of the original Mocama mission during the 1660s…In total, the immigrant Yamassee population of Amelia Island reached 190 individuals, making it the second most populous island of Guale and Mocama [Provinces] in 1675…"

The mission or visita of Santa Maria de Yamassee was established along Harrison Creek between 1665 and 1773 and abandoned in 1683 (Saunders 1992; Worth 1995:28). The church, located at the Harrison Homestead site, was excavated by Rebecca Saunders during the late 1980s (Saunders 1992, 2000). In 1684, Guale Indians from the missions along the northern Georgia coast were relocated to Amelia Island, where they constructed a church and mission complex (Santa Catalina de Guale) immediately north of the Santa Maria church. The Santa Catalina mission at Harrison Homestead site was the scene of extensive excavation by Saunders (1992, 2000) as well. In 1685, two more Guale missions (Santa Clara de Tupiqui and San Phelipe) were moved to the north end of Amelia Island (Worth 1995). At this time, Amelia Island represented the northernmost extent of the coastal Spanish Mission system.

The Atlantic coastal mission system same to an end in 1702, when Carolina militia and allied Yamassee Indians attacked and burned Mocama and Guale missions north of St. Augustine (Arnade 1960). Those Guale Indians inhabiting Amelia Island at the time of attack dispersed themselves, with many heading to St. Augustine. The missions on Amelia Island were never rebuilt, and by the first decade of the eighteenth century, Northeast Florida was void of Native American populations.

3.7 Historic Period

The first recorded encounter between northeastern Florida natives and Europeans in the Jacksonville area began with Jean Ribault's (1964) brief exploration of the St. Johns River estuary in 1562. In the ensuing years, French, Spanish, and British colonists would all claim and occupy northeastern Florida at various times. The French colony at Fort Caroline was short lived, and by late 1565 it had fallen to Spanish forces under the command of Pedro de Menéndez (Bennett 1964, 1968, 1975; Lawson 1992). With the removal of the French from *La Florida*, it was the Spanish, based primarily in settlements at St. Augustine and Santa Elena, who interacted almost exclusively with the natives of the St. Marys region after 1568. Spain controlled Florida from 1565 to 1763 and again from 1783 to 1821. During the intervening twenty years (1763-1783), Great Britain controlled what is today present-day Florida.

Florida was acquired from Spain in 1819 and officially became a U.S Territory in 1821, with Duval County being established the next year. In 1832, the community of Cowford, renamed Jacksonville in honor of Andrew Jackson, became the ninth Florida town to incorporate (Tebeau 1971:146). During the Territorial Period (1821-1845), Jacksonville became a major shipping point, from which agricultural produce grown within the interior of the peninsula was dispersed to other areas (Davis 1964; Ward 1985). Lumber processing and shipping also became important economic enterprises. As the general economic prosperity of the Territory grew so did interest in statehood, with Florida officially accepted into Statehood in 1845 (Tebeau 1971).

St. Augustine first attracted the attention of American travelers such as Ralph Waldo Emerson in the 1820’s, and citrus production flourished in the area until a severe freeze occurred in 1835. During the Seminole Wars, it served as a major military headquarters. During the Civil War (1861-1865), St. Augustine was one of the first (1862) important ports in the South to be captured by Union troops, but it was spared hostile bombardment and widespread destruction (Davis 1964). After a brief period of economic decline, the city rebounded and grew into a major railhead, while steamboat traffic along the St. Johns River opened the entire central portion of the county to exploitation and settlement via settlements such as Switzerland, Orangedale, and Picolata.

St. Augustine expanded quickly, with the population center spreading out from the downtown business district into outlying areas, largely due to the construction of magnificent hotels by Henry Flagler. In the 1890’s, Thomas Hastings began growing vegetables for these hotels, which soon sparked widespread potato production; today, potatoes remain the major agricultural crop of St. Johns County. The early 1900 were also marked by several decades of intense naval stores activity within the pine flatwoods of St. Johns County. With the advent of the automobile, additional bridges and roads were built, and St. Augustine continued to grow in population and size. Today, the Castillo de San Marcos of St. Augustine is a major tourist attraction, and the city itself is a flourishing business center.

IV. PREVIOUS RESEARCH

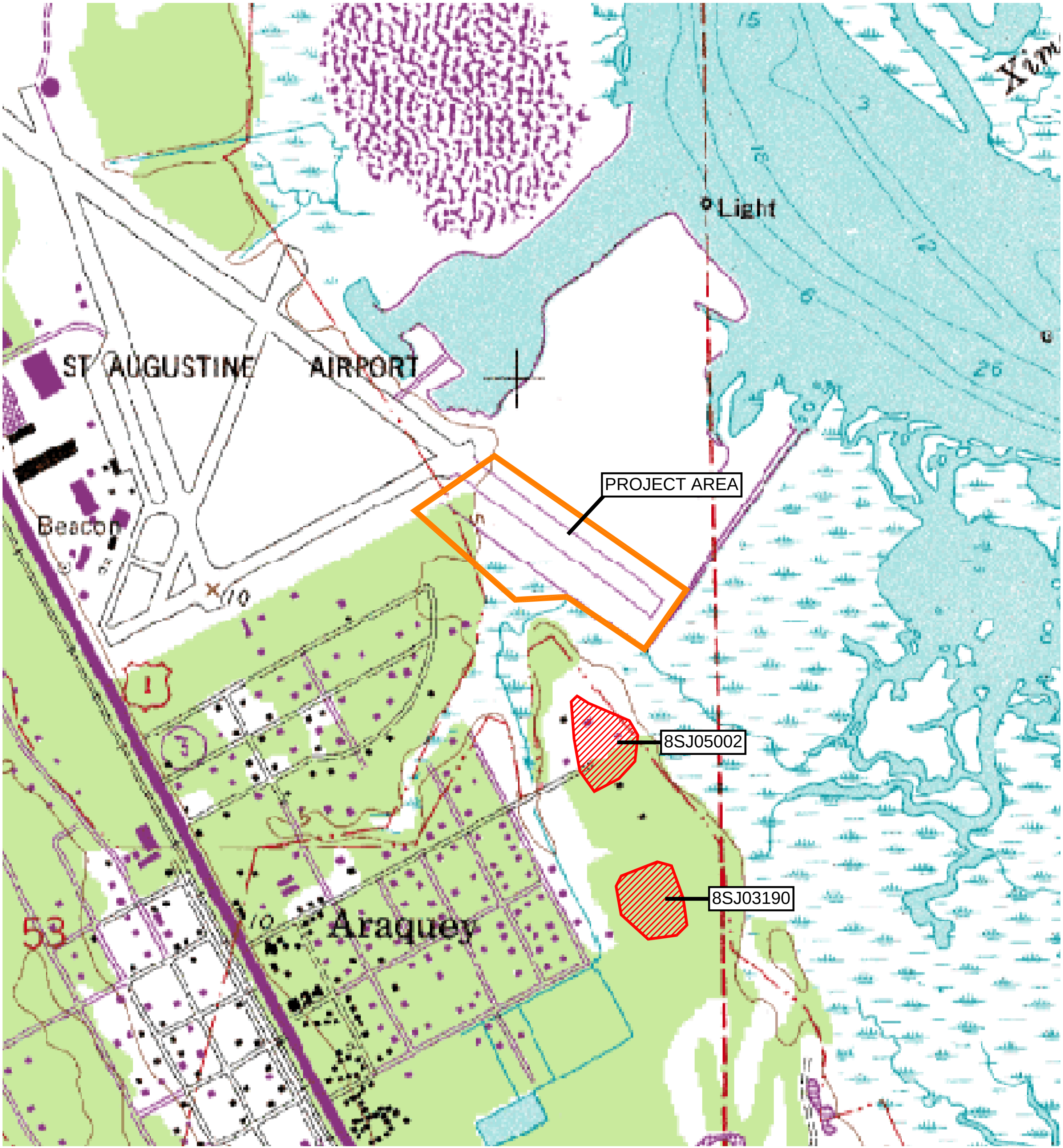
William Bartram (1958:42-43, 349-350) was among the first to mention the presence of prehistoric archaeological sites in Florida, when, in the 1770s, he noted earthen Indian mounds outside Old Town Fernandina in Northeast Florida. Later nineteenth century investigators of Florida antiquities included Brinton (1859, 1872), Wyman (1868, 1875), Mitchell (1875), Stearns (1869), and LeBaron (1884). Among the most well known individuals in early Florida archaeology was a wealthy Philadelphia socialite named Clarence B. Moore (1896), who excavated sand burial mounds in Florida and throughout the southeastern United States in the1890s. Although some sites were investigated in the middle 20th century by researchers such as Goggin (1951) and Wiley (1949), prior to the 1970s relatively few archaeological investigations had been conducted within St. Johns County. However, this situation changed with the emergence of legally mandated archaeological investigations. Cultural resource management (CRM), as it is now called, has changed the pace and scope of archaeology within the Southeast. Most CRM projects are funded by governmental agencies or private organizations responsible for certain kinds of construction or development projects. Under specific conditions, these entities must fulfill legal requirements concerning the proper recording and evaluation of archaeological sites and cultural resources before their undertakings can commence. Since 1970, several hundred archaeological, architectural, and historic resource investigations have been conducted within St. Johns County. These investigations have preceded municipal, commercial, and residential development; road and bridge construction or modification; pipeline construction; and cell tower and utilities installation. Today, there are over 12,000 cultural resources recorded in the county.

In regard to the specific project tract, a 1987 survey of the general vicinity by Stanley Bond located historic period resources from the British and Second Spanish periods. In addition, the presence of 19th century sites associated with the turpentine industry was noted throughout the area; Bond (and others) have observed that Herty cup fragments indicative of 20th century turpentine activities are commonly observed in the pine forests (Smith and Bond 1984; Blount 1993; Butler 1998). A review of the archaeological site file records maintained by the FMSF-DHR indicated that two archaeological sites had been previously recorded near the project tract. In addition, other such resources or archaeological sites might occur within the current project tract, thus necessitating this regulatory survey. These previously recorded sites are reviewed below (See Figure 3).

<u>8SJ05002</u>: Site 8SJ05002 was recorded in 2006. The site is located in St. Johns County, Florida and can be found on the USGS St. Augustine, FL (1992) map in Section 13 of Township 6 South, Range 27 East. This site is called the “Sesona Midden” site. It is a late prehistoric shell midden from the Late Archaic period. The site appears to be the northern extension of Araquey Midden. This site has not been evaluated by the SHPO.

<u>8SJ03190</u>: Site 8SJ03190 was recorded in 1987. The site is located in St. Johns County, Florida and can be found on the USGS St. Augustine, FL (1992) map in Section 54 of Township 6 South, Range 29 East. This site is called the “Araquey Midden” site. This midden was the location of the 18th century Guale/Mocama Indian village Capuaca. Eight loci were investigated at 8SJ3190, revealing over 300 postholes and 105 features, including a square structure, a well, a

hearth, and several trash pits. Two clusters of agricultural furrows in the center of the site appear to be related to the operation of the plantation associated with the nearby Sanchez residence (8SJ3228). This site is potentially eligible for NRHP (April 16, 2004).



Source: USGS 1:24000, Saint Augustine, FL Quadrangle

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion Parcel
St. Johns County, Florida
Previously Recorded Sites

Figure: 3
Project No.: BAIJ08010184.01
Scale: 1" = 1000'-0"
Date: March 2009

V. RESEARCH DESIGN AND METHODOLOGY

The fieldwork for this project was preceded by: a review of the Florida Master Site File (FMSF) to determine the presence of previously recorded archaeological sites within the study area; an examination of soil maps for the area; perusal of aerial photographs to identify anomalies, waterways, vegetation patterns, and greatly disturbed areas; the attainment of familiarity with topographic maps of the project area so that elevation data could be utilized; and an investigation of previous archaeological research pertaining to the region. In addition, data regarding past aboriginal settlement and subsistence patterns within Florida were considered.

The goal of this survey was to assess the potential for cultural resources to occur within the tract, including prehistoric and historic archaeological sites and historic structures. The tract was inspected in order to locate surface artifacts and to isolate areas that might necessitate further subsurface testing. Historic and prehistoric archaeological sites can often be detected initially during a walkover inspection by looking for artifacts in disturbed or cleared areas such as dirt roads, roadside ditches, uprooted treefalls, plowed fields, or recently timbered tracts.

Fieldwork consisted of extensive pedestrian survey transects that were walked throughout the wooded parcel and along the perimeter of the project tract. In order to assess the soil types and the potential for artifacts, shovel tests were dug. The placement of shovel tests was influenced largely by the soil characteristics of the property; these tests were concentrated in areas that represented the best probability for containing evidence of human occupation. All shovel tests measured 50 x 50 cm, and were dug to a depth of one meter below ground surface whenever possible. Deep auger tests were also installed in the base of several shovel tests; these auger tests extended to a depth of 200 cmbs. All excavated material was sifted through 6.35 mm (1/4") mesh mounted upon portable shaker screen. Locational accuracy in the field was maintained through the use of USGS topographic maps, aerial photographs, Suunto KB-77 compasses, and Uniden GMRS 680 walkie-talkies. Informant interviews were conducted with the client, as well as any, available, project tract neighbors, and a copy of this report was provided to the pertinent, CLG (Certified Local Government) planning professional; any data generated via these sources is included in the Results section of this report.

Procedures to Deal with Unexpected Results

Archaeologists frequently encounter unanticipated features that require efforts that exceed the scope of project expectations. In such cases it is sometimes necessary to reevaluate the research design and/or seek additional funding to address unexpected discoveries. It is our policy to amend a project research design as needed to ensure that proper treatment and evaluation are afforded to unexpected findings. Coordination with the county and the office of the SHPO is a necessary step in such an approach. Unexpected findings might include the discovery of human remains, which would require additional coordination with the state archaeologist in compliance with Chapter 872.05, Florida Statutes, or a medical examiner if the remains appear less than 75 years old. The recovery of unexploded ordnance or hazardous materials (HAZMAT) would also constitute an unexpected discovery.

Informant Interviews

Local residents can often provide a wealth of information about a project tract. Informant interviews are always conducted with the client. The client is specifically asked about numerous historic topics such as battlefields, cemeteries (marked and unmarked), structures (residential and commercial), previously recorded cultural resources, historic markers, previous property owners, historic land use and improvements (industrial and agricultural), roads, waterways, docks, and any other relevant factors. We also speak with the project tract neighbors, as well as the current inhabitants of the project tract during the fieldwork phase of each project, if such people exist. Also, a copy of each report is provided to any pertinent, CLG (Certified Local Government) historic preservation professional. Informant interviews and historic property usage patterns as reviewed in the environmental audits are also reviewed, as are property appraiser records. We also check local county history data (local historic society books, websites, local librarians, etc.) as well as our in house collection of historic aerials and historic maps (USDA, USGS, DOT) and atlases. More specifically, BAI spoke with Sara Massey of Passero and Associates, and Kevin Harvey and Brian Copper of the St. Augustine Airport.

VI. RESULTS

Records maintained at the FMSF indicate that the project tract does not contain any historic structures or archaeological sites. A review of the American Battlefield Protection Program (ABPP) database to check whether the project tract encompassed any historical battlefields indicated no military sites were near the project vicinity. A review of the Scenic America Organization (SAO) and the Alliance of National Heritage Areas (ANHA) holdings to determine the presence of historic corridors indicated the project tract does not border any scenic byways governed by a corridor management plan. The 1917 St. Augustine USGS (1:62500) quadrangle map (USGS 1917), the 1924 USDA soil map (USDA 1924), the 1983 USDA soil map (USDA 1983), and the current USGS (1956, photo-revised 1992) quadrangle map all indicate the absence of structures within the project tract at those times.

The project tract currently contains wetlands and a portion of a runway from the St. Augustine Airport. The project tract does not contain any previously recorded cultural resources. Several pedestrian surveys were conducted in clear areas, and along road-cuts and ditches, and within other areas of subsurface disturbance. BAI personnel were accompanied by St. Augustine Airport escorts at all times while in the field. No historic artifacts, historic land improvements, historic docks, or prehistoric artifacts were noted on the exposed ground surface during these pedestrian surveys; no historic structures were encountered. Since the 26.08-acre project tract lies in a setting which could have conceivably witnessed historic development, the entire project tract was extensively tested with (See Figure 4) seventeen negative shovel tests (n=17); shovel tests were placed in the grassy medians and accessible areas around the currently existing, paved runways.

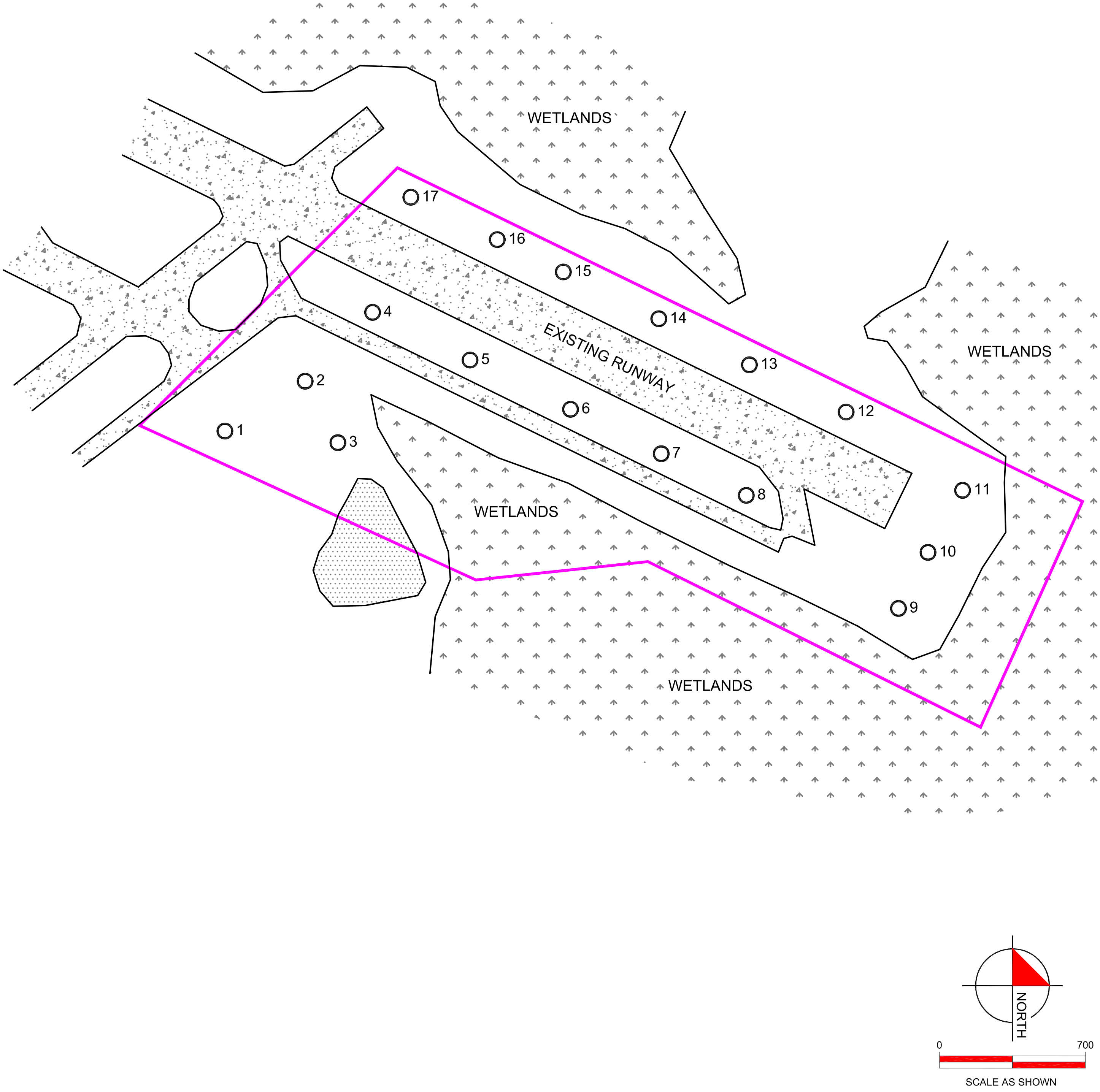
All shovel tests were negative for cultural material, and each test encountered fill materials consistent with the mapped soil type (51 – Urban Land Complex). At a depth of 100 centimeters below surface (cmbs), several of these tests were deep augered to depths below 200 cmbs in order to test for deeply buried deposits; these auger tests encountered water-logged, dark grey muck. Each shovel test was carefully back-filled, packed, and re-covered; extra care was taken to ensure that each test was returned to a completely flat surface. It should be noted that tests were not marked with flagging tape, pin flags, or anything else due to the relative proximity of aircraft operating along the flight line; nearly all shovel tests were photographed while in progress.

In summary, all subsurface tests and pedestrian surveys were negative, and no artifacts, isolated finds, historic standing structures, or historic structural remnants were encountered. Although no cultural resources were recorded during the present investigation, this work will add to our current knowledge of aboriginal and historic settlement of St. Johns County. The negative results can be integrated into a broad-scale and comprehensive regional settlement model aimed at the prediction of prehistoric and historic site locations within St. Johns County.

LEGEND

○	NEGATIVE SHOVEL TEST
●	POSITIVE SHOVEL TEST
—	PROPERTY AREA
J	JUDGMENTAL TEST
TR	TRANSECT
ST	SHOVEL TEST

TESTS = 17
NEGATIVE = 17
POSITIVE = 0



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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion Parcel
St. Johns County, Florida
Shovel Testing Results

Figure: 4
Project No.: BAIJ08010184.01
Scale: 1" = 700'-0"
Date: March 2009

Figure 4-1a: Shovel Test 13 View North, St. Augustine Airport

Figure 4-1b: Shovel Test 17 View West, St. Augustine Airport

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion Parcel
St. Johns County, Florida
Photos

Figure: 4-1
Project No.: BAIJ08010184.01
Scale: Not to Scale
Date: March 2009

VII. CONCLUSIONS AND RECOMMENDATIONS

In March of 2009, Bland and Associates, Inc. (BAI) conducted a cultural resource assessment survey of an approximately 26.08-acre parcel in St. Johns County, Florida. The investigation was undertaken as part of the permitting for a proposed development at the request of Passero Associates, LLC. The goals of this project were to locate, identify, delineate, and evaluate cultural resources within the tract. The term "cultural resources" as used herein is meant to refer to those districts, structures, sites and objects that would qualify as “historic properties” as the latter term is defined in 36 CFR 800.16(1), as those such entities meeting the criteria for eligibility for inclusion in *the National Register of Historic Places* given at 36 CFR 60.4. No previously recorded cultural resources occur within the project tract. No artifacts, historic structures, or historic structural remnants were noted during fieldwork. Based upon the absence of cultural material and the lack of evidence for occupation, no further archaeological investigation is warranted, and it is recommended that this project be allowed to proceed without further concern for impacts to cultural resources.

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APPENDIX A:
FMSF SURVEY LOGSHEET

Ent D (FMSF only)__/__/__

Survey # (FMSF only)________

Survey Log Sheet

Florida Site Master File
Version 2.0 9/97

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (Name and project phase) An Intensive Cultural Resource Assessment Survey / The St. Augustine Airport Expansion Parcel

Report Title (exactly as on title page) An Intensive Cultural Resource Assessment Survey of the St. Augustine Airport Expansion Parcel, St. Johns County, Florida

Report Author(s) (as on title page— individual or corporate; last names first) Bland, Myles

Publication Date (year) 2009 **T**otal Number of Pages in Report (Count text, figures, tables, not site forms) 40+

Publication Information (If relevant, series and no. in series, publisher, and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*: see *Guide to the Survey Log Sheet*.) Bland & Associates, Inc. Report of Investigations No. 417. Report on file, DHR-FMSF, Tallahassee.

Supervisor(s) of Fieldwork (whether or not the same as author[s]; last name first) Bland RPA No. 10650, Myles

Affiliation of Fieldworkers (organization, city) Bland & Associates, Inc. (BAI)

Key Words/Phrases (Don't use the county, or common words like *archaeology*, *structure*, *survey*, *architecture*. Put the most important first. Limit each word or phrase to 25 characters.) The St. Augustine Airport Expansion Parcel

Survey Sponsors (corporation, government unit, or person who is directly paying for fieldwork)
Name Passero Associates, LLC
Address/Phone 13453 North Main Street, Suite 106, Jacksonville, Florida 32218 / (904) 757-6016

Recorder of *Log Sheet* Myles Bland RPA No. 10650 Date *Log Sheet* Completed 3 / 22 / 09

Is this survey or project a continuation of a previous project? X No ☐ Yes: Previous survey #(s) [FMSF only] _____

Mapping

Counties (List each one in which field survey was done - do not abbreviate; use supplement sheet if necessary) St. Johns County

USGS 1:24,000 Map(s): Map Name/Date of Latest Revision (use supplement sheet if necessary): St. Augustine (1992), Florida

Description of Survey Area

Dates for Fieldwork: Start 3 / 09 End 3 / 09 **T**otal Area Surveyed (fill in one) __ hectares 26.08 acres

Number of Distinct Tracts or Areas Surveyed 1

If Corridor (fill in one for each): **W**idth _____ meters _____ feet **L**ength _______ kilometers ________miles

Survey Log Sheet of the Florida Master Site File

Research and Field Methods

Types of Survey (check all that apply): ☒ archaeological ☐ architectural ☐ historical/archival ☐ underwater ☐ other: __

Preliminary Methods (Check as many as apply to the project as a whole. If needed write others at bottom).

☐ Florida Archives (Gray Building)
☐ Florida Photo Archives (Gray Building)
☒ FMSF site property search
☒ FMSF survey search
☐ library research- *local public*
☐ library-special collection – *nonlocal*
☐ Public Lands Survey (maps at DEP)
☐ local informant(s)
☐ local property or tax records
☐ newspaper files
☒ literature search
☐ Sanborn Insurance maps
☒ windshield
☒ aerial photography

☒ other (describe) historic maps

Archaeological Methods (Describe the proportion of properties at which method was used by **writing in** the corresponding letter. Blanks are interpreted as "None.")

F(-ew: 0-20%), **S**(-ome: 20-50%); **M**(-ost: 50-90%); or **A**(-ll, Nearly all: 90-100%). If needed write others at bottom.

☐ Check here if **NO** archaeological methods were used.

_A_ surface collection, controlled
___ surface collection, **un**controlled
_A_ shovel test-1/4"screen
___ shovel test-1/8" screen
___ shovel test 1/16"screen
___ shovel test-unscreened
___ other screen shovel test (size: ____)
___ water screen (finest size: ____)
___ posthole tests
___ auger (size:____)
___ coring
___ test excavation (at least 1x2 M)
___ block excavation (at least 2x2 M)
___ soil resistivity
___ magnetometer
___ side scan sonar
___ unknown

__ other (describe):

Historical/Architectural Methods (Describe the proportion of properties at which method was used by **writing in** the corresponding letter. Blanks are interpreted as "None.")

F(-ew: 0-20%), **S**(-ome: 20-50%); **M**(-ost: 50-90%); or **A**(-ll, Nearly all: 90-100%). If needed write others at bottom.

☐ Check here if **NO** historical/architectural methods were used.

___ building permits
___ commercial permits
___ interior documentation
___ demolition permits
_A_ exposed ground inspected
__ local property records
__ neighbor interview
__ occupant interview
___ occupation permits
___ subdivision maps
___ tax records
___ unknown

___ other (describe):

Scope/Intensity/Procedures Assessment Survey of the approximately 26.08-acre, St. Augustine Airport Expansion Parcel / 17 total 50 x 50 x 100 cm shovel tests installed in the parcel / no positive tests or historic structures encountered / no further work recommended

Survey Results (cultural resources recorded)

Site Significance Evaluated? ☐ Yes ☒ No If *Yes*, circle NR-eligible/significant site numbers below.

Site Counts: Previously Recorded Sites 0 Newly Recorded Sites 0

Previously Recorded Site #'s (List site #'s without "8." Attach supplementary pages if necessary)
None

Newly Recorded Site #'s (Are you sure all are originals and not updates? Identify methods used to check for updates, ie, researched the FMSF records. List site #'s without "8." Attach supplementary pages if necessary.) None

Site Form Used: ☐ SmartForm ☒ FMSF Paper Form ☐ Approved Custom Form: Attach copies of written approval from FMSF Supervisor.

DO NOT USE ▪▪▪▪▪▪SITE FILE USE ONLY▪▪▪▪▪▪DO NOT USE

BAR Related
☐ 872 ☐ 1A32
☐ CARL ☐ UW
#_________

BHP Related
☐ State Historic Preservation Grant
☐ Compliance Review: CRAT

ATTACH PLOT OF SURVEY AREA ON PHOTOCOPIES OF USGS 1:24,000 MAP(S)

ADDENDUM REPORT TO THE 2009 INTENSIVE CULTURAL RESOUCE ASSESSMENT SURVEY REPORT FOR THE PROPOSED ST. AUGUSTINE AIRPORT RUNWAY MODIFICATIONS, ST. JOHNS COUNTY, FL

AN ADDENDUM REPORT TO THE 2009 INTENSIVE CULTURAL RESOURCE ASSESSMENT SURVEY REPORT FOR THE PROPOSED ST. AUGUSTINE AIRPORT RUNWAY MODIFICATIONS, ST. JOHNS COUNTY, FLORIDA

(DHR No. 2010-00007)

Prepared for:
Passero Associates, LLC

By:
Myles Bland
Registered Professional Archaeologist No. 10650

BAIJ08010184.02
BAI Report of Investigations No. 413
May 2010

4104 St. Augustine Road
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Bland & Associates, Inc.
Archaeological and Historic Preservation Consultants
Atlanta, Georgia Charleston, South Carolina Jacksonville, Florida

MANAGEMENT SUMMARY

During April 2010, an intensive cultural resource assessment survey was conducted by Bland & Associates, Inc. (BAI) of an approximately 36+/- acre parcel at the St. Augustine-St. Johns County Airport located at 4796 U.S. 1 North in St. Johns County, Florida. The project tract can be found in Section 50, Township 6 South, Range 29 East of the St. Augustine, Florida USGS topographic quadrangle map. The taxpayer identification number (TPIN) for this parcel is 074840 0000. The proposed project is "Taxiway C Replacement, RSA Compliance, and Approach Lighting System." The purpose of the project is to modify portions of the St. Augustine Airport runway system. This project was assigned Federal Aviation Administration (FAA) AIP Project Number 3-12-0073-023-2008 and DHR Number 2010-00007.

This survey was performed at the request Passero Associates, LLC in order to comply with state, county and federal regulations regarding the management of cultural resources that might occur within the project area. This survey builds upon a previous 2009 survey of the airport which was also conducted as part of this same project. During this 2010 phase of testing, extensive fieldwork was conducted in order to locate cultural resources. The current investigation also included extensive background research that focused upon the history of the tract, with a particular emphasis upon World War II activities at the airport. An additional thirty-eight tests were then excavated within the project tract, all of which were negative. These deep subsurface shovel tests indicated that the soils present within the 38 +/-acre project tract consisted of very disturbed and very poorly drained soils composed entirely of fill. It should be noted that in all cases these shovel tests were deep cored with an AMSL steel auger to a depth in excess of 2.62 meters below surface (mbs). These deep tests all encountered fill materials overlying muck and water. Historic background research, and time-sequenced aerial photographs, as reviewed within Chapter IV of this report, also indicated that the project tract is composed of fill. In summary, no artifacts were found within the project tract during fieldwork.

In addition, no historic structures were encountered within the project tract. Specifically, no World War II era structures exist at the St. Augustine Airport, although some portions of the underlying runway lay-out may or may not conform to the original pattern of the historic runways from that era. Based upon these results, and in consultation with DHR, the St. Augustine Airport and its runways was generally recorded with Florida Master Site File (FMSF) Resource Group (RG) Form Number 8SJ05465 in order to note its World War II era history. Although no significant cultural resources were recorded during the present investigation, this work will add to our current knowledge of World War II aeronautic activities within St. Johns County. This historic research data can be integrated into a broad-scale and comprehensive regional history of St. Johns County. Based upon the results of this survey, it is recommended that the proposed project be authorized to proceed as planned without further concern for impacts to significant cultural resources.

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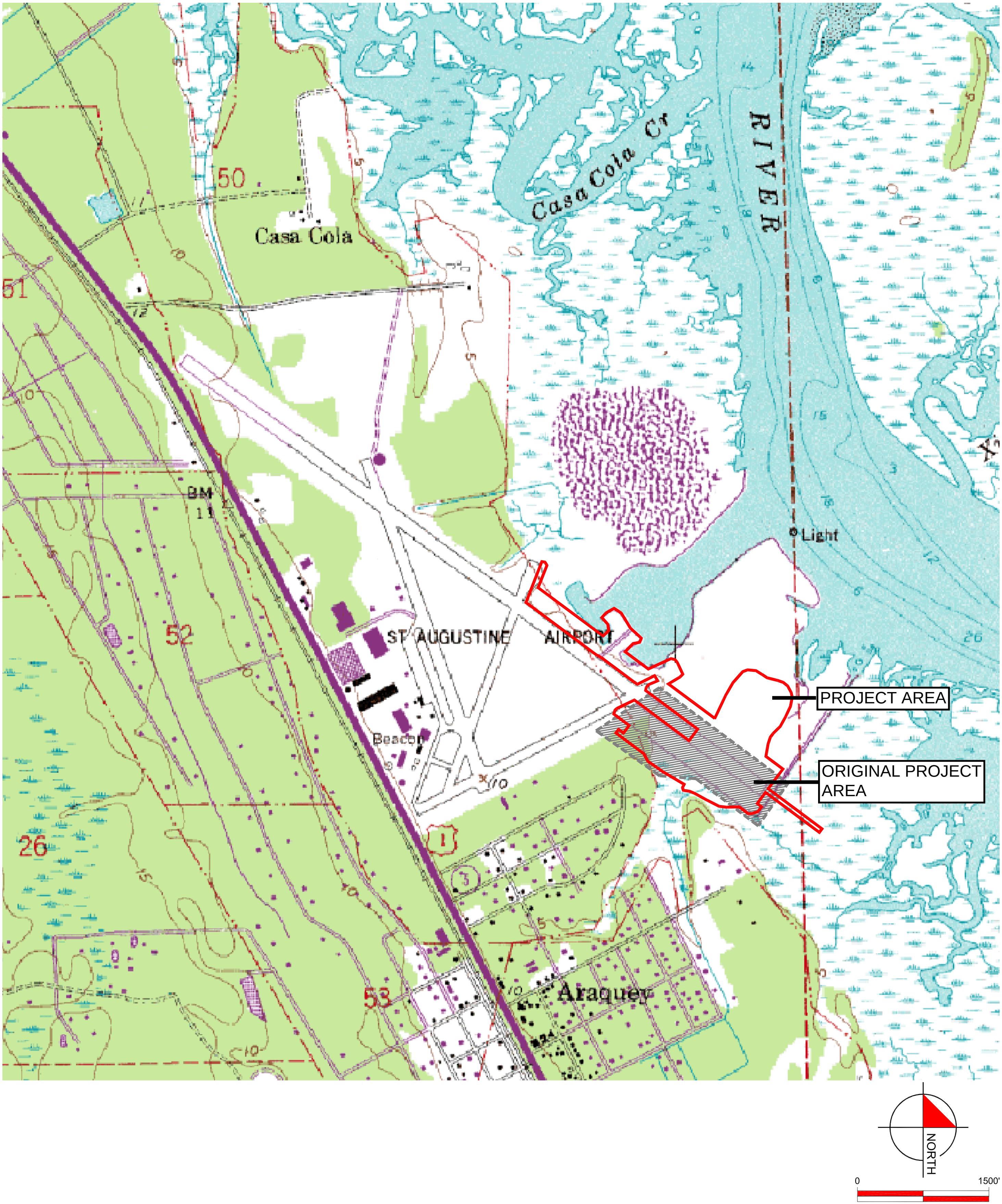
I. INTRODUCTION

March 2009 Survey: During March of 2009, Bland and Associates, Inc. (BAI) conducted a cultural resource assessment of a 26.08-acre parcel in St. Johns County, Florida. This investigation was undertaken as part of the permitting for a proposed development in order to comply with county and federal regulations regarding the identification and management of cultural resources that might occur within the project tract; this survey was conducted on behalf of Passero Associates, LLC. The purpose of the proposed project was to modify existing runways at the St. Augustine Airport. This project was assigned Federal Aviation Administration (FAA) AIP Project Number 3-12-0073-023-2008. The goal of this March, 2009, cultural resource assessment survey was to determine whether the tract contained evidence of past human occupation or site probability variables that would warrant additional cultural resource assessment testing.

More specifically, this work was required by section 3.01.05.B.1 of the St. Johns County rezoning regulations. All work was performed in accordance with these regulations (Article III, Special Districts, Sections 3.01.00-3.01.08) as established by St. Johns County (Ordinance Book 23, Pages 72-81). Specifically, the St. Johns County regulations locally implement Florida Statutes Chapter 267, as set forth by the State of Florida, Florida Department of State. Chapter 267 mandates the identification and management of cultural resources that might occur within the lands of Florida in order to satisfy Section 106 requirements. Section 106 of the *National Historic Preservation Act* of 1966 (PL 89-665, as amended) requires agencies to take into account the effects upon historic properties of projects ("undertakings") involving federal funding and/or permitting. The guidelines for fulfilling the provisions of Section 106 and determinations of effect are contained in the implementing regulations of the Code of Federal Regulations (CFR), Title 36, Chapter VIII, Part 800 (36 CFR 800, as amended, 1999). No cultural resources were encountered during the 2009 survey. The survey report was subsequently submitted to the Division of Historical Resources (DHR), and was assigned DHR Project Number 2010-00007.

April 2010 Survey: Following the submittal of the 2009 report, the runway modification plan was slightly altered. These alterations necessitated the archaeological testing of some additional areas. This addendum report details the testing of these additional areas, which was conducted in April of 2010. During this 2010 phase of testing, extensive fieldwork was conducted in order to locate cultural resources and to isolate areas where additional subsurface testing might encounter archaeological sites. The term "cultural resources" as used herein is meant to refer to sites or objects that are archaeological, architectural, and/or historical in nature. The 2010 investigation also included extensive background research that focused upon the history of the tract, with a particular emphasis upon World War II activities at the airport. An additional thirty-eight tests were then excavated within the project tract, all of which were negative.



Source: USGS 1:24000, Saint Augustine, FL Quadrangle

Bland & Associates, Inc.
Archaeological and Historic Preservation Consultants

Addendum Report to the Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Project Location

Figure: 1
Project No.: BAIJ08010184.02
Scale: 1" = 1500'-0"
Date: May 2010

These deep subsurface shovel tests indicated that the soils present within the 38 +/-acre project tract consisted of very disturbed and very poorly drained soils composed entirely of fill. It should be noted that in all cases these shovel tests were deep cored with an AMSL steel auger to a depth in excess of 2.62 meters below surface (mbs). These deep tests all encountered fill materials overlying muck and water. Historic background research, and time-sequenced aerial photographs, as reviewed within Chapter IV of this report, also indicated that the project tract is composed of fill. In addition a walkover survey of the tract was conducted along access roads and open areas, this pedestrian survey failed to locate artifacts in areas of exposed ground surface. In summary, no artifacts were found within the project tract during fieldwork. Based upon the completed negative testing, the results of this survey suggest that the project area represents a very low potential for containing subsurface cultural resources.

In addition, no historic structures were encountered within the project tract. Specifically, no World War II era structures exist at the St. Augustine Airport, although some portions of the underlying runway lay-out may or may not conform to the original pattern of the historic runways from that era. Based upon these results, and in consultation with DHR, the St. Augustine Airport and its runways was generally recorded with Florida Master Site File (FMSF) Resource Group (RG) Form Number 8SJ05465 in order to note its World War II era history.

Although no significant cultural resources were recorded during the present investigation, this work will add to our current knowledge of World War II aeronautic activities within St. Johns County. This historic research data can be integrated into a broad-scale and comprehensive regional history of St. Johns County. Based upon the results of this survey, it is recommended that the proposed project be authorized to proceed as planned without further concern for impacts to significant cultural resources.

II. NATURAL ENVIRONMENT

2.1 Project Location

The project tract is located in St. Johns County. The Atlantic Ocean lies to the east of St. Johns County, while Duval County lies to the north, Clay County lies to the east, and Flagler County lies to the south. The current project tract is bordered by wetlands to the northeast and southeast, partial wetlands and Indian Bend Road to the southwest and runways from the St. Augustine Airport to the northwest. The project tract may be found in Section 50, Township 6 South, Range 29 East of the St. Augustine, Florida United States Geological Service (USGS), topographic quadrangle map (1992). More specifically, the Taxpayer Identification Number (TPIN) for the parcel under investigation is 074840 0000, and it lies wholly within the St. Augustine County Airport located at 4796 U.S. 1 North. The project tract lies at an elevation of 1 to 5 feet above mean sea level (AMSL).

2.2 Environmental and Social Considerations

A number of social and environmental factors have a direct effect on locations selected for human occupation and activity (e.g., resource procurement). These include location of other human settlements, geology/physiography, topography, hydrology and water sources, vegetation, soil characteristics, and availability of subsistence (food) and other resources. Therefore, it was not only subsistence-related resources that influenced prehistoric movement patterns, but raw material such as stone was also a factor. We must also bear in mind that the modern vegetational regime covering a given area may not reflect the environment of the past. Knowledge of past and present environmental conditions, combined with the results of previous archaeological investigation and historic research, are vital in the interpretation of previous land use and site locations. To understand the ecology and potential for human use of the project area, relevant environmental characteristics of the vicinity are discussed below.

2.3 Environmental History

During the 12,000 years that Florida has been inhabited by human populations, the region has undergone significant episodes of climatic and environmental change. When the first humans entered Florida they encountered much different flora, fauna, and climate from those of today. During the early Holocene (10,000-8,000 BC), the prevailing environment was drier and surface water was less prevalent than today; sinkholes located in karstic areas of Florida provided access to potable water (Delcourt and Delcourt 1985; Watts and Hansen 1988). Oak scrub and dry oak forest communities covered the dunes of central Florida, and large areas of open savannahs also existed; pines were absent (Watts and Hansen 1988). Because much of the earth's seawater was still trapped in large icecaps, sea levels were much lower, meaning the Atlantic shoreline of Florida was situated as far as 200 kilometers (km) seaward of its present location (Milanich

1994). Florida's earliest inhabitants were attracted to permanent, potable water at solution lakes, springs, and sinkholes that were linked to the (Dunbar 1991; Dunbar and Waller 1983; Milanich 1994; Webb et al. 1984).

Climatic changes after about 8,000 BC, led to the demise of the cool mesic temperate forest north of present-day Florida and the development of oak-dominated forests (with a minimum of pine) over much of the Southeast (Watts and Hansen 1988). During the middle Holocene (8,000-3,000 BC), climatic temperatures increased, seawater levels rose, and the perched water system began to contain more water. The number of exploitable natural environments gradually increased. However, climatic fluctuations continued during the early and middle Holocene, causing water availability to vary; settlement loci probably adjusted accordingly.

By about 3,000 BC climatic fluctuations began to stabilize and essentially modern vegetation regimes emerged (Watts and Hansen 1988). The oak-hickory forests of the Coastal Plain gave way to woodlands dominated by southern pine. Some researchers suggest that increased summer thunderstorms allowed the more fire-tolerant southern pines to thrive at the expense of oak (Watts and Hansen 1988). Rising water tables led to the formation of cypress swamps, bayheads, and mesic hammocks by around 3,000 BC. Moreover, sea levels reached modern conditions by this time.

2.4 Physiography and Topography

Physiography refers to the study and description of landforms or the physical geography of an area. Following Brooks' (1981) *Guide to the Physiographic Divisions of Florida*, the Florida is divided into two physiographic sections, each of which is subdivided into districts and sub-districts. These subdivisions are based on four principles: (1) type of rock and soil (2) geological structure of underlying rocks, (3) geomorphic processes that shape or modify the landscape, and (4) relief (Brooks 1981). Marine forces have largely shaped the land surface of the state of Florida over the past several million years. The depositional and erosional activities of marine currents associated with sea level fluctuations—which at times covered the Florida land mass—combined with more recent erosion and windblown sand deposition have created the Florida landforms of today (Miller 1997; Schmidt 1997; Scott 1997). The project area lies in the Atlantic Coastal Plain physiographic section and the Eastern Flatwoods physiographic district (Brooks 1981). In geologic terms, this area consists of clastic and shell deposits (Qftg) of the Fort Thompson Group, which date to the Middle to Early Pleistocene.

This area of Florida is constructed largely of recent and Pleistocene (2 million – 10,000 years ago) formations resulting from erosional and depositional processes associated with sea level fluctuations (Brooks 1981). The upper geological layers consist of undifferentiated sediments comprised of marine-deposited quartz sands and scattered clay lenses containing shells and soft clay marl; all of which are of recent to Pleistocene age. Below these deposits lie earlier Pleistocene and Late Miocene age consolidated sand, shell, clay, and limestone. The Ocala Limestone layer is located at the base of these deposits, and it contains the Floridan aquifer system (Miller 1997). The aquifer is approximately 50-100 ft thick in this area of Florida (Puri and Vernon 1964).

2.5 Soil Types and Characteristics

The soils within the project tract (Figure 2) fall within the Myakka-Immokalee-St. Johns soil association, and they consist of several nearly level, poorly drained, soil types (USDA 1983). These soils are classified as spodosols, which are soils characterized by a well-defined spodic horizon consisting of compact, fine-textured, dark organic matter mixed with aluminum and/or iron minerals (Brown et al. 1990:42-48). Soils lying above the spodic lens are primarily composed of granular quartz sands that are relatively young and very acidic. The specific soil types found within the property consist of:

3 = Myakka fine sand
7 = Immokalee fine sand
13 = St. Johns fine sand
24 = Pellicer silty clay loam, frequently flooded
45 = St. Augustine fine sand, clayey substratum
51 = St. Augustine-Urban land complex
52 = Durbin muck, frequently flooded
57 = Adamsville variant fine sand

Testing indicated that the soils present within the project tract were fully indicative of the mapped soil types, and completely disturbed. The dominant soil for this project tract is St. Augustine-Urban land complex. This soil series consists of very deep, somewhat poorly drained, moderately rapid to very slowly permeable soils which are found upon broad to narrow flats, and slight ridges and knolls, bordering tidal marshes and estuaries of Peninsular Florida. This soil complex is formed of fill material. This fill material is the result of dredging and filling operations along peninsular Florida. It is composed of sandy materials containing loamy or clayey fragments and fragments of shell. Shovel testing indicated that the soils present composed of fill.

2.6 Hydrology

The St. John River is the major hydrologic feature in St. Johns County (USDA 1983:3-5). Both artesian (Floridan Aquifer) and non-artesian source of water are common sources of water in St. Johns County. The creeks and marshes associated with the St. Johns River are a significant hydrological feature; these creeks and rivers are hydrologically very important to the local environment, and they transport nutrients and detritus that re-nourish the extensive riverine systems that compose a large part of eastern St. Johns County. Specifically, the project tract falls within the drainage basin of the Tolomato River (Intracoastal Waterway), which empties into the Atlantic Ocean.

Source of Map: Natural Resources Conservation Service Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov Coordinate System: UTM Zone 17N NAD83

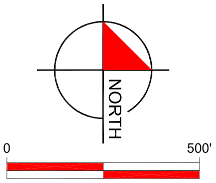
This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: St. Johns County, Florida
Survey Area Data: Version 9, Jan 28, 2010

Date(s) aerial images were photographed: 10/13/2007

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

Map Symbol:
3 = Myakka fine sand
7 = Immokalee fine sand
13 = St. Johns fine sand
24 = Pellicer silty clay loam, frequently flooded
45 = St. Augustine fine sand, clayey substratum
51 = St. Augustine-Urban land complex
52 = Durbin muck, frequently flooded
57 = Adamsville variant fine sand
99 = Water



SCALE AS SHOWN

Bland & Associates, Inc.
Archaeological and Historic Preservation Consultants

Addendum Report to the Cultural Resource Assessment Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Soils Map

Figure: 2
Project No.: BAIJ08010184.02
Scale: 1" = 500'-0"
Date: May 2010

2.7 Climate

The humid, subtropical climate of Florida is greatly influenced by the seasonal conditions of the Caribbean, Atlantic Ocean, and Gulf of Mexico (USDA 1983:1-3; Chen and Gerber 1990:11-34). The climate of St. Johns County is characterized by long, warm, humid summers and mild winters. During late spring and summer months, late afternoon and evening thunderstorms are a common occurrence. Fifty-six percent of the annual rainfall is concentrated in the months of June through October; the annual average rainfall is 55 inches. During these same months, temperatures in St. Johns County vary little from day to night, with the mean monthly temperature about 80° F.

Although the peak season for hurricanes and tropical storms is June through November, direct landfall of these storms is uncommon. However, rains, tidal surges, and wind gusts associated with passing hurricanes and tropical storms still generate property damage and severe flooding. The chance of a hurricane making landfall in a given year within St. Johns County is approximately 1 in 40 (USDA 1983:2). Greater daily temperature ranges, less humidity, higher temperatures, and far fewer rainy days characterize late fall to early spring seasons. Prevailing winds are easterly, and the windspeed is usually 10 to 12 miles an hour. Freezing temperatures in St. Johns County are rarely achieved, and they are confined to a timeframe of December 8 to February 20.

2.8 Vegetation and Wildlife

The biotic community within the project tract consisted of mixed mesic grass species, with no trees whatsoever. There is no understory because the project tract consists of well maintained, mowed grassy areas which are interspersed with active runways. The project tract formerly supported marsh grasses prior to filling. Evidence or observation of wild fauna within the parcel was rare. Birds were sometimes seen circling overhead. During prehistoric times, this area would have been inhabited by a variety of terrestrial fauna such as white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), bobcat (*Lynx rufus*), gray squirrel (*Sciurus carolinensis*), cottontail rabbit (*Sylvilagus floridanus*), cotton mouse (*Peromyscus gossypinus*), and other small rodents. Reptiles including various snakes, turtles, and lizards, as well as waterfowl, raptorial avifauna, and migratory songbirds would have been notable depending on the season of the year.

III. REGIONAL CULTURE HISTORY

3.1 Introduction

Archaeological research in Florida has established a general prehistoric chronology dating back some 12,000 years (Milanich 1994). Archaeologists have divided this long span of time into four general periods based on distinct cultural, technological, and environmental changes over time. From oldest to most recent, these include: Paleoindian, Archaic, Woodland, and Mississippian (Table 3-1). It should be noted that for each period, artifact complexes, cultural trends, and archaeological manifestations vary by region. A summary of each local prehistoric period is presented below.

Prehistoric and Historic Cultural Chronology of Northeastern Florida.

PALEOINDIAN	12,000 – 8,000 BC
ARCHAIC	
Early	8,000 - 5,000 BC
Middle	5,000 - 3,000 BC
Late[1]	3,000 – 500 BC
WOODLAND	
Deptford	500 BC - A.D 500
Swift Creek	AD 400 - 850
Colorinda	AD 850 - 900
MISSISSIPPIAN	
St. Johns II	AD 900 – 1250
St. Marys II	AD 1250-1500
San Pedro	AD 1500 - Contact
SPANISH MISSION	
San Pedro	AD 1587 – 1600+
San Marcos[2]	AD 1600+ - 1702
HISTORIC	AD 1565 – Present

1. production of Orange pottery began around 2800-2500 BC
2. also referred to as Altamaha

3.2 Paleoindian Period (10,000 - 8,000 BC)

The earliest period of human occupation of the Americas is known as the Paleoindian period. Traditionally, the initial human colonization of North America has been attributed to "Clovis" people who crossed Beringia, a frozen land mass linking present-day Alaska to Siberia, and eventually dispersed themselves throughout North, Central, and South America some 11,500 or so years ago (Meltzer 1995). Several archaeological sites in South and North America, including the eastern United States (e.g., Meadowcroft Rockshelter, Topper site, Cactus Hill) suggest that pre-Clovis (pre 11,500 years ago) occupation of the Americas was possible (Fiedel 2000; Meltzer et al. 1997). Nevertheless, the earliest undisputed evidence of human occupation within the southeastern United States dates to approximately 10,000 BC.

The Paleoindian period is typically segregated into three sub-periods (Early, Middle, and Late) based on diagnostic stone projectile point types (Anderson et al. 1996). The Early Paleoindian period is characterized by Clovis points, a distinctive fluted, lanceolate-shaped projectile point. In Florida, the Middle Paleoindian period is marked by the presence of Suwannee and Simpson points, whereas the Late Paleoindian period witnessed the production of Dalton-like projectile points. The emergence of smaller Dalton projectile points may indicate a transition from hunting large Pleistocene megafauna to smaller Holocene game, such as deer (Goodyear 1982). Archaeological evidence shows that lithic blades and unifacial scrapers, ivory foreshafts, bone pins, and atlatls (i.e., spear-throwers) were also used by paleoindians in Florida (Milanich 1994:48-52).

The first humans to occupy Florida were small hunting and gathering bands of paleoindians, who arrived around 10,000 BC. These highly mobile foragers encountered an environment warmer than the recently-ended Ice Age (Pleistocene), but cooler by today's standards (Delcourt and Delcourt 1985; Watts and Hansen 1988). Because sea levels were lower at this time, peninsular Florida was more than twice its present width. The inland water table was also much lower, meaning that many of today's wetlands and other hydric features were either nonexistent or retained little water. While paleoindians hunted mastadon, giant sloth, bison, and other megafauna that still wandered the Florida peninsula, they also hunted smaller game and gathered various edible plants (Milanich 1994; Webb et al. 1984).

Today, the distribution of paleoindian sites across the Florida landscape suggests that sinkholes and high quality chert outcroppings were primary considerations that affected paleoindian movement and settlement patterns. According to the "oasis model," paleoindian bands frequented cenotes and springs to collect water and exploit the abundant flora growing there and the animals also attracted to these wetland loci (Dunbar 1991; Dunbar and Waller 1983; Milanich 1994; Webb et al. 1984). As an added bonus, many of these freshwater sources were located in areas of exposed Tertiary age limestone that provided paleoindians with raw material for tool manufacture.

The archaeological record indicates that most paleoindian sites in Florida are located in the tertiary karst region located beneath Gulf waters, along the central Gulf Coast and in the north-central panhandle part of the state (Dunbar 1991:193-194; Faught and Carter 1998). Unfortunately, very few paleoindian sites in Florida have been subjected to intensive excavation, and those that have been tested date to the waning years of the Paleoindian period (e.g., Daniel and Wisenbaker 1987; Dunbar et al. 1988; Horvath 2000). To date, no evidence of paleoindian activity has been discovered in St. Johns County. In fact, extreme northeastern Florida is deemed an "outlying region" with regard to the distribution of paleoindian sites in Florida. The nearest indication of the presence of these early natives in northeastern Florida consists of a paleoindian projectile point purportedly collected by a local resident along the seashore at Jacksonville Beach (Dunbar 1991:208).

3.3 Archaic Period (8,000-500 BC)

The Archaic period environment was marked by warmer climatic conditions and higher ocean and interior water levels compared to paleoindian times, circumstances that resulted in the widespread emergence of hardwood forest communities in some upland locations and wetland habitants in low-lying areas (Smith 1986:21-24; Milanich 1994:62-63). With the extinction of Pleistocene megafauna, Archaic foragers focused their attention on the procurement of smaller game (comparable in size to those found today), fish, shellfish (Claassen 1986), and various edible wild plants, nuts, and fruits. Throughout Florida, populations increased and groups became more sedentary, as reflected archeologically in the proliferation of regional material assemblages (Milanich 1994:85-104). Over time, Archaic populations utilized wider variety of archaeological site types arose, including villages or base camps, cave sites, procurement camps, cemeteries, and short-term resource extraction sites. The Archaic period would precipitate great changes in the regional cultures of Northeast Florida. The post-Archaic way of life in Northeast Florida would come to be characterized by population growth, the increased exploitation of coastal resources, the construction of burial mounds, the appearance of new ceramic styles, incipient plant cultivation, and the importation of exotic products from outside the region.

3.3.a Early Archaic (8,000-6,000 BC)

The Early archaic populations of Florida exhibited subsistence practices that were quite similar to those of their paleoindian predecessors. Some researchers in Florida have suggested that terminal paleoindian and Early Archaic occupations should be treated as a single cultural entity because both populations roamed the same landmass unreduced by a rise in sea-level, experienced a diverse hardwood biotic regime, and shared similar subsistence-settlement strategies (Thomas et al. 1993:510). However, by the latter portions of the Early Archaic period, people were adapting from Pleistocene environmental conditions to the changing, wetter and warmer conditions of the Holocene period. With the emergence of more numerous and diversified natural communities such as riverine oxbows during the Early Archaic, regional specialization increased and led to greater interregional variation.

Projectile points utilized during the Early Archaic period consisted of side notched varieties, rather than fluted, lanceolate forms of the paleoindian period. Projectile points diagnostic of Early Archaic period in Florida include the Bolen and Kirk side-notched, projectile points, as well as Santa Fe and Tallahassee projectile points. Other lithic tool types characteristic of the Early Archaic period include bifacial Edgefield scrapers and a variety of unifacial end, side, and tear drop-shaped end scrapers that were presumably hafted (Coe 1964).

The earliest Early Archaic populations exhibited settlement patterns similar to their paleoindian predecessors. Pleistocene megafauna were extinct by the Early Archaic period, and it appears that Early Archaic populations were composed of small nomadic bands that sought biotic resources (small game, plants) that were seasonally available during wide-ranging forays. Although proof of extensive Early Archaic plant use is lacking in Southeastern North America, “the relatively limited evidence of plant processing implements and plant remains in comparison to later time periods does not constitute a strong argument in support of the minimal use of plant resources” (Smith 1986:10). Wooden mortar and pestles were used by people in the Early Holocene, if but they do not preserve well in the archaeological record. Examples such as the small oak mortar uncovered at Little Spring Florida are rarely found (Clausen et al. 1979).

Within St. Johns County, evidence of the earliest Archaic occupations usually consists of lithic scatters containing chert debitage and rarely Early (8,000-6,000 BC) or Middle (6,000-3,000 BC) Archaic projectile points. These deposits evince short-term and intermittent occupation of the region during the Early and Middle Archaic periods.

3.3.b Middle Archaic (6,000-3,000 BC)

During the Middle Archaic period, the post-glacial environment of the Southeast began to stabilize, eventually reaching nearly modern conditions (Schuldenrein 1996). The major climatic event of the Middle Archaic is the Altithermal, a warming trend that occurred from circa 8,000 to 5,000 B.P. and affected the Southeast and the continent as a whole. As water availability increased in the Middle Archaic, “new food gathering fishing and hunting economies were increasingly possible as wetlands expanded” (Watts, Grimm, and Hussey 1994:38). In regard to subsistence shifts in the Southeast during the Middle Holocene, Smith writes: “they do not reflect a uniform pan-southeastern convergence on a single ultimate adaptive solution. Rather they suggest a variety of local adjustments some major, some minor, to alterations in the habitat and changes in the potential resources of the catchment areas of different populations, with the availability of lithic raw materials rather than localized food resources perhaps dictating settlement location” (Smith 1986:21, 25). One exception to this statement is the broad scale intensification of floodplain occupation that occurred 6,500 to 6,000 years ago at or about latitude 34° and west of the Appalachians (Smith 1986:22).

This intensification trend correlates with a shift from the Early Holocene pattern in rivers of pulses of sediment removal and river incision to the Middle Holocene phase of river aggradation and stability (Smith 1986:22); this shift is believed to cause the formation of backwaters walks and resource abundant shallow water habitats. During the Middle Archaic period, the Native Americans of Northeast Florida collected large quantities of mystery smells (*Vivaparus* spp.) from the freshwater areas of the upper St. John's River. These mystery snail middens contained artifacts indicative of a Middle Archaic culture referred to as Mount Taylor (Goggin 1952: 40-43).

Artifacts diagnostic of the Middle Archaic period in Florida consist of stemmed, broad- blade projectile points which are identified as variants of the Florida Archaic Stemmed point; these point types include the Newnan, Levy, Hillsborough, and Marion projectile points (Bullen 1975:30-32). Expedient, flake tools also become more common. Some Middle Archaic shell middens in Florida have also demonstrated that animal bone was an important source of raw material for tool and ornament production (Milanich 1994:82).

3.3.c Late Archaic (3,000-500 BC)

Shell middens excavated near the mouth of the St. Johns River indicate increased utilization of extreme northeastern Florida during the Late Archaic period (3,000-500 BC). In fact, by 3,700 BC pre-ceramic Archaic groups were living along the Atlantic coast of northern Florida on a year-round basis and subsisting largely on estuarine fish and shellfish (Russo 1992:111). The earliest good evidence of plant cultivation also occurs during the Late Archaic period (Yarnell 1993:13). Other types of plants flourished in the disturbed areas around habitation sites and these “camp followers” were also utilized by Late Archaic populations in North America. These “camp followers” included maygrass (*Phalaris caroliniana*), giant ragweed (*Ambrosia trifida*), and carpetweed (*Mollugo verticillata*) (Yarnell 1993: 13-16). There is good evidence that plant use by Late Archaic societies in the eastern woodlands was sophisticated and complex (Chapman and Watson 1993:34). In general, Late Archaic components are also much more prevalent throughout the Southeast than are earlier Archaic and Paleoindian components. Late Archaic sites also exhibit increased sedentism; recent archaeological investigations have demonstrated that Late Archaic populations were building structures. A structure dated to 3,895 ± 102 B.P. and 3,867 ± 79 B.P. has recently been discovered at 9WR4, the Mill Branch site (Ledbetter 1995:178).

By 2,000 BC, natives in northeastern Florida (including St. Johns County) began to manufacture for the first time, fired-clay pottery, known to archaeologists today as *Orange* pottery. This early ware was tempered with vegetal fibers, either thin strands of palmetto or Spanish moss (Griffin 1945:219; Bullen 1972:9). Over a span of approximately 1,500 years, plain, incised, and punctated types of fiber-tempered pottery were manufactured, with decorated variants undergoing phases of stylistic popularity. With regard to vessel form, early pots were hand molded and tended to be flat-based rectangular containers, whereas some of the later vessels showed more variety in form and were produced by coiling (Sassaman 2003). The Late Archaic period was witness to other innovations in cooking technology as well. Perforated soapstone (steatite) slabs were commonly used after 5,000 BP as indirect heat sources for stone boiling (Sassaman 1993). Late Archaic populations also used steatite for the manufacture of bowls, and steatite bowls from quarry sources in Georgia and South Carolina have been found in Georgia. Grooved axes and cruciform drills are also found in the Late Archaic artifact assemblage.

The Late Archaic period is also marked by a proliferation of linear and ring shaped shell middens on the coastline of the South Atlantic slope (Stoltman 1974). Along the coast of South Carolina, Florida and Georgia, Late Archaic populations occupied marine estuaries that appear to have been less intensively inhabited by earlier Middle Archaic populations. The Late Archaic inhabitants began to collect shellfish (oysters) from the Atlantic during the late fall to the early spring, and accumulating the debris from these activities in shell rings. Zooarchaeological evidence from Georgia coastal shell middens and rings (linear and circular) indicate a strong subsistence dependence on vertebrate and invertebrate tidewater fauna (Reitz 1988).

To date, most Late Archaic sites in St. Johns County are manifested as low to moderate density scatters of fiber-tempered pottery on the mainland. However, numerous Late Archaic shell middens are known for Fort George Island and various small, tidally inundated marsh islands, immediately north of the St. Johns River in Duval County (Russo et al. 1993). Russo (1992:111) has suggested that some of the larger shell middens, such as Rollins Shell Ring on Fort George Island, represent base camps. Coquina middens dated to the Orange period occur to the south near the Atlantic shoreline.

3.4 Woodland Period (500 BC - AD 900)

The first Woodland period occupations of the region occurred around 500 BC and are represented by *Deptford* pottery assemblages containing plain, check stamped, and simple stamped types (Bullen and Griffin 1952; Dickinson and Wayne 1987; Russo 1992:115 Sears 1957; Vernon 1984:108;). Deptford and "chalky" St. Johns pottery are also known to co-occur on some northeastern Florida middens (Kirkland and Johnson 2000). The Deptford archaeological culture represents a continuation of a coastal way of life that was well established in the region by Late Archaic times, possibly earlier.

Along the Atlantic coastal strand, Deptford communities were situated in maritime hammocks near tidal marshes, with subsistence centered essentially on the exploitation of estuarine and maritime forest resources. Deptford groups (or possibly subgroups) may have moved inland seasonally to the river valleys to gather plant foods, hunt game, and trade with non-coastal peoples (Milanich 1971, 1973, 1980). Deptford community organization is thought to have been composed of bands of 30 to 50 kin-related individuals (Milanich 1971:199). Furthermore, it is speculated that these bands occupied small settlements containing 15 to 25 houses, each comprised of a single nuclear family. Both ceramic scatters and shell midden site types are associated with Deptford pottery in St. Johns County.

Swift Creek is another Woodland culture, easily identified by its distinctive sand-tempered complicated stamped pottery (Ashley 1992, 1995, 1998). The occurrence of Swift Creek ceramics in northeastern Florida was first recognized by John Goggin (1952), who observed that such complicated stamped wares were found in local Woodland period mounds along with non-local mortuary items, such as copper, galena, and mica. Interaction networks appear to have allowed Early Swift Creek design concepts to spread from northwestern to northeastern Florida, where the ware was locally produced as a sand-tempered and charcoal-tempered variety between AD 400 and 500 (Ashley 1998).The recovery of Late Swift Creek pottery in northeastern Florida, similar to that found along the Atlantic coast to the north in Georgia, suggests that interaction networks emanating out of northeastern Florida had shifted to the north between AD 500 and 850 (Ashley 2003b). Swift Creek pottery on sites in Northeast Florida tends to be grit-tempered (like that from southeastern Georgia), whereas Swift Creek pottery to the south along the St. Johns River is mostly sand-tempered.

Colorinda represents the terminal Late Woodland period in northeastern Florida. This little known archaeological culture is represented by a sandy ware tempered with crushed St. Johns pottery (Sears 1957). Colorinda pottery is part of a ceramic complex that also includes sand-tempered plain, St. Johns Plain, and small amounts of St. Johns Check Stamped (Ashley 2003a). This distinctive pottery type appears to be sparsely scattered across northeastern Florida, although a few sites contain high-density concentrations (Ashley 2003a; Russo et al. 1993; Sears 1957). Recent calibration of a corrected radiocarbon date on oyster shell from Coffee Mound and two new calibrated radiometric dates from the Cedar Point site (on Black Hammock Island) date the Colorinda period to ca. AD 850-900 (Ashley 2003a).

3.5 Mississippian Period (AD 900 - 1565)

The Mississippian period in northeastern Florida is marked by the introduction of St. Johns Check Stamped pottery. St. Johns is a unique pottery type that contains microscopic sponge spicules, which give the ware its hallmark “chalky” tactual quality (Borremans and Shaak 1986). Controversy surrounds the nature of these bio-silicate inclusions, with some researchers suggesting that sponge spicules are natural constituents of certain clays (Borremans and Shaak 1986; Cordell and Koski 2003), while others argue that the material represents the byproduct of added sponge temper (Rolland and Bond 2003). In addition to plain, check stamped, and punctated St. Johns types, Ocmulgee Cordmarked (mostly grit-tempered) is also found on St. Johns II sites in northeastern Florida (Ashley 2002).

For the broader St. Johns region, the *St. Johns II period* begins around AD 750 and extends into the early contact period (post-AD 1565). In northeastern Florida, however, the St. Johns II period is restricted to ca. AD 900-1250 and followed by the St. Marys II period. St. Johns II coastal sites are often manifested as diffuse shell middens composed mostly of oyster. Small sand burial mounds similar to those of the preceding Woodland period are often found on St. Johns II village sites; at least two massive sand mounds are also known for the period (Ashley 2002; Thunen and Ashley 1995:5-8). The emergence of St. Johns II sites in northeastern Florida around AD 900 appears to herald a settlement shift within the river valley, with some St. Johns II people from the south relocating to the extreme northeastern part of the state (Ashley 2003b).

St. Johns II subsistence emphasized the capture of estuarine fish and shellfish along the coast and freshwater species along the river (Ashley 2002:165; Russo 1992:118; Milanich 1994:262-267). Zooarchaeological evidence indicates that fish species such as Atlantic croaker, mullet, silver perch, catfish, seatrout, flounder, and drums were taken from the marshes and shallow tidal sloughs. Presently, there is no evidence suggestive of a ocean or deep-water fishing economy. Oyster was by far the most intensively collected shellfish species, but quahog clam, Atlantic ribbed mussel, stout tagelus, and whelk were also collected and eaten. Deer, raccoon, opossum, and other mammals were also hunted or trapped, but were exploited to a far lesser degree than aquatic animals.

The St. Johns II period appears to represent the zenith of prehistoric sociopolitical organization in northeastern Florida. The Shields (8DU12) and Grant (8DU14) mounds, located less than a kilometer apart along the south bank of the St. Johns River in Duval County, together comprise the Mill Cove Complex (Thunen and Ashley 1995:5-8; Ashley 2003b). Both were large St. Johns II mounds that contained human burials, copper plates, copper beads, galena, ground stone implements, and other pieces of exotica (Moore 1894; 1895). Current evidence indicates that the Mill Cove Complex was the ceremonial and population center of the local St. Johns II culture (Ashley 2003b). There may have been as many as 10 other St. Johns II village-and-mound sites in northeastern Florida.

In northeastern Florida, the St. Johns II period is supplanted by the *St Marys II period* (AD 1250 - 1500). St. Marys Cordmarked, sand tempered plain, and fabric and net impressed, make up the ceramic series; lesser amounts of St. Johns series pottery may also occur on St. Marys II sites (Ashley 2003b; Ashley and Rolland 2002; Bullen and Griffin 1952; Larson 1958; Russo 1992; Saunders 1989; Sears). Some time after AD 1500, St. Marys pottery is replaced by the San Pedro series, which continues in production until the early 17th century. San Pedro pottery is a grog-tempered ware that has been recovered at numerous coastal sites, including Spanish missions in northeastern Florida and southeastern Georgia (Ashley and Rolland 1997a).

St. Marys II habitation sites typically occur as groupings of discrete shell midden heaps that range from 2 to 15 meters in diameter. Sites containing these household middens (as they are frequently interpreted) are known for all barrier islands in the St. Marys region, including Black Hammock Island (Russo et al. 1993; Ellis and Ellis 1992), Fort George Island (Jones 1967; Dickinson and Wayne 1987; Russo et al. 1993), Amelia Island (Ashley and Rolland 1997b; Bullen and Griffin 1952; Hemmings and Deagan 1973; Saunders 1992), and Cumberland Island (Ehrenhard 1976, 1981). Their occurrence on mainland northeastern Florida (Ashley 2002; Lee et al. 1984) and southeastern Georgia (Adams 1985; Crook 1984, 1986; Smith et al. 1981) has also been noted. St. Marys II sites are more numerous and dispersed compared to the nature of St. Johns II sites.

Zooarchaeological and seasonality data suggest that St. Marys II groups lived along the coast throughout the year, with a subsistence economy focused on the capture of small estuarine fish, shellfish, and other aquatic resources; terrestrial mammals were exploited but to a far lesser extent (Russo 1992:118-119; Russo et al. 1993:172). Species exploited by St. Marys II groups were very similar to those utilized during St. Johns II times and included menhaden, catfish, spot, Atlantic croaker, seatrout, flounder, drum, and mullet (Lee et al. 1984). While the specifics of the yearly cycle are still not fully understood at this time, there seems to be little doubt that the St. Marys II people of northeastern Florida were sedentary coastal fishers and shellfish collectors, who at times employed foraging mobility.

3.6 Contact Period (1562-1587)

The contact period in northeastern Florida began with Jean Ribault's (1964) brief exploration of the lower (northern) St. Johns River and Florida Atlantic coast in 1562. Two years later René Laudonniére, who had earlier accompanied Ribault, returned and established Fort Caroline (*La Caroline*) along the south bank of the St. Johns River, about 10 miles from its mouth (Bennett 1964, 1968, 1975; Lawson 1992). The French were told that Paracousi Saturiwa was the dominant native ruler near the fort and that he "had under his authority thirty other paracousis and whom ten were all his brothers, and for this reason he was greatly feared in these regions" (Lawson 1992:64). According to Laudonierre, the title Paracousi Saturiwa was "equivalent to King Saturiwa," and that his sons "bore the same title of paracousi" (Lawson 1992:50). However, the title was used by Laudonierre to refer to several other village leaders near the fort, and elsewhere along the St. Johns River.

The natives inhabiting Northeast Florida at the time of European contact were Timucua-speakers, who were possibly allied with the Saturiwa (Swanton 1922; Deagan 1978; Hann 1996; Milanich 1996). Before encountering the French, however, Timucua on the north end of Amelia Island may have briefly met a scouting party associated with the Spanish expedition of Lucas Vásquez de Ayllón centered on the northern Georgia coast (Milanich 1996:70-71).

With the building of Fort Caroline in 1564, the St. Johns River estuary became the hub of sixteenth century French-Indian relations in southeastern North America. From the French fort, correspondence was established with local native villages, and patrols were made up (south) the St. Johns River and north along the Atlantic coast to South Carolina (Bennett 1964, 1968, 1975; Lawson 1992). As a result of these forays into the interior of Florida, valuable information was recorded about other native polities in northern Florida and southeastern Georgia. Through these expeditions, the French experienced first-hand Timucuan warfare and diplomacy as well as native social and political intrigue.

The French colony at Fort Caroline was brief, and by late 1565 it had fallen to Spanish forces under the command of Pedro Menéndez de Avilés. The Spaniards assumed control of the French stronghold, renaming it Fort San Mateo. Mutinous revolts by Spanish soldiers, combined with Timucua hostility toward the interlopers, made Fort San Mateo a source of grief for Menéndez (Lyon 1976:153). The French Catholic Dominique DeGourges, along with a large contingent of local natives, attacked and burned the fort in April 1568 (Bennett 1965). DeGourges was more intent on revenge than re-colonization, so he and his men returned to France upon destruction of the fort.

A weak attempt was made by the Spanish to re-outfit the fort, but it was soon abandoned for Fort San Pedro on Cumberland Island (Barrientos 1965; Hann 1996:66-67; Lyon 1982:57; Solís de Merás 1964). Placed near the native settlement of Tacatacuru, the Spanish soldiers stationed at the fort were also repeatedly harassed by local Timucua, resulting in its eventual abandonment in 1573. Written accounts present strong support for the existence of a native alliance between Saturiwa, Tacatacuru, and the other Timucua groups in the St. Marys region at contact. The documents indicate that at the same time the relations between Saturiwa and inland Timucua groups, such as the Outina along the middle reaches of the St. Johns River were volatile and at times violent (Bennett 1975; Lawson 1992).

With the removal of the French, it was the Spanish, based primarily in settlements at St. Augustine and Santa Elena, who interacted almost exclusively with the Timucua of northeastern Florida and southeastern Georgia after 1568. Between AD 1565 and 1587, relations between the Spaniards and the coastal Timucua were uneasy, with the natives repeatedly attacking soldiers who happened to stray from their fortified outposts (Hann 1996; Lyon 1976). European presence clearly challenged the political might of the indigenous societies. While documentation is rather mute with regard to native activities during the 1570s, it appears that the Spaniard's retaliatory tactics were intensive, as they burned or destroyed native villages, fishweirs, plantings, and other holdings (Hann 1996:68; Solís de Merás 1964).Hann (1996:70) suggests that the "fire and blood" strategy on the part of the Spaniards "convinced enough of the Indians of the desirability of peace to force the hands of leaders who had chosen war."

From an archaeological perspective, the contact era Timucua of northeastern Florida are represented by San Pedro pottery, a distinctive grog-tempered ware (Ashley and Rolland 1997b). In terms of surface treatments, the series consists mostly of plain, check stamped, and cob marked wares, and to a lesser extent, cord marked, textile impressed and complicated stamped types (Ashley and Rolland 1997b; Deagan 1978; Herron 1986; McMurray 1973; Milanich 1971b, 1972). Recent analysis suggests that while the overwhelming number of vessels in assemblages are grog tempered, the range includes some sand and sand/sparse grog tempered wares (Ashley and Rolland 1997a; Ashley and Thunen 2000). Details concerning some technological aspects of San Pedro pottery can be found elsewhere (see Ashley 2001; Ashley and Rolland 1997b). Another archaeological occurrence in northeastern Florida coincident with the emergence of San Pedro pottery is the recovery of preserved corn. Thus the cultivation of corn by coastal Timucua appears to be a very late development (post AD 1500).

3.7 Mission Period (A.D. 1587-1702)

Spain established a garrison community at present-day St. Augustine in 1565, and soon afterwards Jesuit friars set out to convert native populations to Christianity through missionization (Gannon 1965; McEwan 1993; Milanich 1999). Beginning in the late-sixteenth century, the coastal Timucua along with Guale Indians to the north were the first to be congregated at mission villages, taught the Catholic doctrine, and introduced to the Hispanic way of life, as part of Spain's colonization process. Sustained Spanish interaction with the native peoples of the region began in earnest with the arrival of Franciscan friars and the establishment in 1587 of the missions San Juan del Puerto on Fort George Island and San Pedro de Mocama on Cumberland Island (Gannon 1965:38). San Juan and San Pedro were each a *doctrina* since they maintained a resident priest. Such villages included a church, *convento* (friar's residence), and possibly a detached kitchen (Saunders 1990; Worth 1998:42). Satellite villages located near a *doctrina* and within a priest's evangelical jurisdiction were referred to as *visitas*, which themselves may also have had a small church or open chapel for a priest's use. The Mocama visita of Santa Maria de la Sena was located on Amelia Island (possibly at Harrison Homestead site) during the first half of the seventeenth century (Worth 1997).

The imposition of missions at Timucuan villages without incident intimates that the once antagonistic coastal Indians had become more tolerant of Spanish presence in the region. There is no mention at this time or in documents of the 1570s and 1580s of any of the early high-profile Timucans, like Saturiwa or Tacatacuru. The demise of these two prominent individuals, relentless enemies of the Spanish, very well may have factored into the coastal Timucua's apparent reversal of attitude toward Spanish presence in the region (Hann 1996:70). Ironically, Don Juan, the reported cacique at the mission San Pedro (Tacatacuru) in 1587, was a fervent supporter of the Spanish (Deagan 1978:102; Hann 1996:146), and one would suspect that if traditional rules of inheritance were in practice, he was a blood relative (nephew?) of Tacatacuru.

The early mission period in the St. Marys region is also represented by San Pedro series pottery, which has been recovered at several mission-related sites in Camden County, Georgia and Nassau, Duval, and northern St. Johns counties, Florida (Ashley and Rolland 1997b). The archaeological location of the missions of San Juan and San Pedro are known and have been subjected to varying degrees of archaeological investigation. San Juan del Puerto (8DU53) has received the most attention, but detailed broad-scale excavations are lacking (Dickinson 1989; Dickinson and Wayne 1985; Griffin 1960; Hart 1982; Hart and Fairbanks 1981; Jones 1967; Russo et al. 1993). Work at San Pedro (Dungeness Wharf, 9CAM14) has consisted mostly of surface collections (Milanich 1971b), and the limited testing that has taken place has been poorly reported (Ehrenhard 1976, 1981).

At least four suspected early seventeenth century *visitas* have been sampled to some extent as well, and all have yielded San Pedro pottery (Ashley and Thunen 2000; Johnson 1998; Johnson and Ste. Claire 1988; FAS 1994; Russo et al. 1993; Smith et al. 2001). Admittedly, however, these are all large multi-component sites that have also produced both St. Marys and later mission-period San Marcos wares. Strangely, European artifacts (e.g., beads, axes, hoes, etc), save for small amounts of olive jar, have been infrequently recovered at these suspected satellite villages

By the mid-seventeenth century, nonlocal Guale Indians from coastal Georgia were relocated to missions in northeastern Florida (Saunders 2000; Worth 1995). Native sites of the seventeenth and early eighteenth century in northeastern Florida are marked by the presence of San Marcos

(Altamaha) series pottery, a grit-tempered ware often stamped with complicated or simple designs (Larson 1978; Otto and Lewis 1974; Saunders 1992, 2000; Smith 1948). Although the appearance of San Marcos pottery on sites in Florida has traditionally been interpreted as evidence of Guale occupation, it now appears that San Marcos pottery was dominant mid-seventeenth century mission ware manufactured by coastal Guale, Yamassee and Mocama Indians (Hann 1996; Saunders 2000; Worth 1995, 1997).

The Atlantic coastal mission system same to an end in 1702, when Carolina militia and allied Yamassee Indians attacked and burned Mocama and Guale missions north of St. Augustine (Arnade 1960). Those Guale Indians inhabiting Amelia Island at the time of attack dispersed themselves, with many heading to St. Augustine. These missions were never rebuilt.

3.8 Historic Period

The first recorded encounter between northeastern Florida natives and Europeans in the Jacksonville area began with Jean Ribault's (1964) brief exploration of the St. Johns River estuary in 1562. In the ensuing years, French, Spanish, and British colonists would all claim and occupy northeastern Florida at various times. The French colony at Fort Caroline was short lived, and by late 1565 it had fallen to Spanish forces under the command of Pedro de Menéndez (Bennett 1964, 1968, 1975; Lawson 1992). With the removal of the French from *La Florida*, it was the Spanish, based primarily in settlements at St. Augustine and Santa Elena, who interacted almost exclusively with the natives of the St. Marys region after 1568. Spain controlled Florida from 1565 to 1763 and again from 1783 to 1821. During the intervening twenty years (1763-1783), Great Britain controlled what is today present-day Florida.

Florida was acquired from Spain in 1819 and officially became a U.S Territory in 1821, with Duval County being established the next year. In 1832, the community of Cowford, renamed Jacksonville in honor of Andrew Jackson, became the ninth Florida town to incorporate (Tebeau 1971:146). During the Territorial Period (1821-1845), Jacksonville became a major shipping point, from which agricultural produce grown within the interior of the peninsula was dispersed to other areas (Davis 1964; Ward 1985). Lumber processing and shipping also became important economic enterprises. As the general economic prosperity of the Territory grew so did interest in statehood, with Florida officially accepted into Statehood in 1845 (Tebeau 1971).

St. Augustine first attracted the attention of American travelers such as Ralph Waldo Emerson in the 1820's, and citrus production flourished in the area until a severe freeze occurred in 1835. During the Seminole Wars, it served as a major military headquarters. During the Civil War (1861-1865), St. Augustine was one of the first (1862) important ports in the South to be captured by Union troops, but it was spared hostile bombardment and widespread destruction (Davis 1964). After a brief period of economic decline, the city rebounded and grew into a major railhead, while steamboat traffic along the St. Johns River opened the entire central portion of the county to exploitation and settlement via settlements such as Switzerland, Orangedale, and Picolata.

St. Augustine expanded quickly, with the population center spreading out from the downtown business district into outlying areas, largely due to the construction of magnificent hotels by Henry Flagler. In the 1890's, Thomas Hastings began growing vegetables for these hotels, which soon sparked widespread potato production; today, potatoes remain the major agricultural crop of St. Johns County. The early 1900 were also marked by several decades of intense naval stores activity within the pine flatwoods of St. Johns County. With the advent of the automobile, additional bridges and roads were built, and St. Augustine continued to grow in population and size. Today, the Castillo de San Marcos of St. Augustine is a major tourist attraction, and the city itself is a flourishing business center.

The methodology for the project included researching, compiling, and preparing a historical contextual narrative for the St. Augustine - St. Johns County Airport. Research was conducted at St. Augustine Historical Society Research Library; the Clerk of Court, St. Johns County Courthouse, St. Augustine, Florida; Florida State Archives, Tallahassee; Map and Imagery Library at the University of Florida; and P. K. Yonge Library of Florida History at the University of Florida. The research furnished contextual references that assisted in evaluating the resources, and developing an understanding of the historic pattern of development of the airport. Following the research, an outline and strategy were devised to prepare the report. In conjunction with composing the narrative, illustrations were incorporated into the text to help the reader visualize the history of the property.

3.9 Colonial Periods, 1516-1821

Between the sixteenth century and the 1760s, the Spanish Crown experienced significant difficulties developing Florida into more than a military outpost at St. Augustine. It encouraged settlers to develop farmsteads outside of the town, but attacks by Native Americans and Colonial southerners to the north hampered growth. In 1702, the Spanish erected a series of fortifications to protect St. Augustine. Later, additional forts were installed to broaden their line of defense. Several of those were located within the present county jurisdiction, including Fort Matanzas, Fort Picolata, and Fort San Diego. Work on those fortifications began in the late-seventeenth century and improvements were made during the eighteenth century. During the era, the Spanish created a trail between St. Augustine and Picolata, leading led to one of the oldest crossing points on the St. Johns River. A second trail extended northward to Cow Ford, another St. Johns River crossing at modern-day Jacksonville (Adams Bell Weaver 1985:17, 20).

Between 1655 and 1702, Spanish settlers carved ranches out of the wilderness along the coast, Diego Plains, and the St. Johns River. Spanish governors issued land grants to encourage settlement of the region and create a diverse economy. Grants of the period included Aramasaca (near Switzerland and Julington Creek); Casacola north of St. Augustine; Diego Plains; La Baria (east of Picolata); Palica (near the Matanzas River and Moses Creek); Picolata (astride Six Mile

Creek and St. Johns River); San Onofre y Pirirgirigua (near Deep Creek); and Tocoy (between Deep Creek and Tocoi Creek). As depicted on the Gordon Map of c. 1740 (Figure 3-1), the project area lies near the southern end of Casacola Plantation (Hulbert 1915:56; Adams Bell Weaver 1985:18, 22).

Farmers and ranchers cleared land for cattle and citrus. But, the growth of English colonies to the north and forays by those settlers and militia into Florida de-stabilized the nascent agricultural economy and mission system. In 1702, Governor John Moore of South Carolina attacked St. Augustine and burned the city. Later, in 1740, James Oglethorpe led his Georgia troops into Florida. Oglethorpe captured Fort San Diego and Fort Picolata, using the former as his Florida headquarters. In 1743, he again invaded Florida, and burned Fort San Diego upon his departure. Although Oglethorpe’s troops had destroyed Fort Picolata in 1739, the Spanish rebuilt it in 1755 with coquina. The incursions by the English dampened further expansion of the land grant system, and the nascent economy based on cattle ranching and citrus languished (Adams Bell Weaver 1985:18, 22; Sastre 1995:26-29, 32, 35).

In 1763, the Spanish Crown, for its part in backing the defeated French in the Seven Year’s War, agreed to surrender Florida to England in the Treaty of Paris. The British Crown appointed James Grant as governor of East Florida with a dividing line established between East Florida and West Florida at the Apalachicola River. St. Augustine became the provincial capital of East Florida. In July 1764, Juan Elixio de la Puente sold the Casacola Plantation associated with the airport property to Jesse Fish, who held the property throughout the British period. Under the terms of the Treaty of Paris, Spanish residents were permitted eighteen months to dispose of their properties after the exchange of flags. Few property owners found buyers. Instead, many former residents, before departing for Havana or Mexico, conveyed their properties to the King's agent and royal engineer Juan Puente. But, Puente also experienced several challenges disposing of the property, which included a small number of English settlers, the promise of land grants to new settlers from the English Crown, and the military character of England's occupation. Confounded by few property sales, Puente resorted to a confidential arrangement with Fish, one of the few residents that Puente believed he could trust with the properties. In July 1764, the Spanish official transferred approximately 200 houses, lots, and properties in and around St. Augustine to Fish. Virtually overnight, Fish amassed a realty empire in St. Augustine and maintained many of those properties throughout the British period. His holdings then amounted to approximately one-third of the real estate in St. Augustine and one-half of the city's dwellings, in addition to many plantations well outside the city. Despite the extensive and widespread holdings, Fish is best known for El Vergel Plantation on Anastasia Island. During the interval, Fish established partnerships with John Gordon and Jacobus Kip. The investment partnership of Fish & Gordon claimed millions of acres along Florida's northeast coastline and astride the St. Johns River. Containing 1,058 square leagues, the properties consisted of large estates, plantations, and tracts of lands, including Palica and Pupo, Pajacara, San Diego and La Nea, San Buena Ventura and Tocoy, Santa Lucia, San Lorenzo de Aramasaca, San Matheo, San Nicholas, San Geronimo, Arato and Exapile, Picalata, San Onosre and Pirigirigua, San Phelipe and Aracu, Los Corrales, Yquirico, Saint Ana de Asasa, Tococruz, Yuisai, La Rosa del Diabolo, Aquitasique, La Chua, Abosalla, and Tampa. Governor Grant refused to register their deeds, and in 1772 Fish & Gordon appealed to King George, III,

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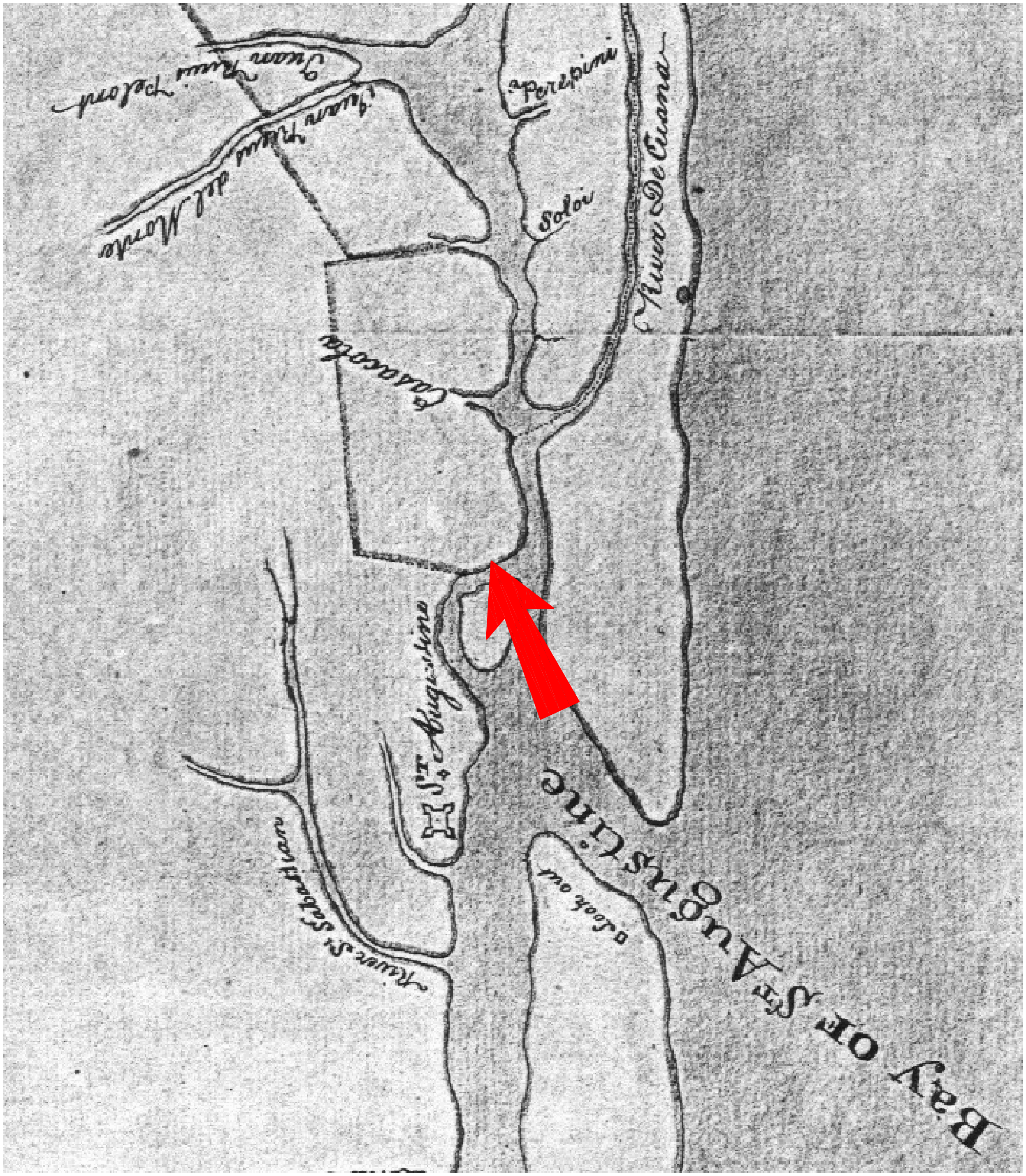

Casacola and St. Augustine, c. 1740
(Hulbert 1915:56)

Bland & Associates, Inc.
Archaeological and Historic Preservation Consultants

An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-1

Figure: 3-1
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

approval of which never arrived. Lord Hillsborough pointed out to King George, III that the Fish-Gordon holdings represented "the best plantations lands in the province, better lands even than His Majesty's lands in the West Indies." Casacola was among the few plantations that Fish retained. Casacola is also one of the relatively few plantations that endured the transitions and changes in flags in 1763, 1784, and 1821 (Gold 1973:5-6, 8; Gannon 1993:20-23; Harper 1958:118; Schafer 1982:49-50; Schafer 2001:7; Rogers 1976:479; Siebert 1929 1:68; Mowat 1943:21-26, 53-55, 61).

In 1765, Indian leaders and Crown officials met at Picolata, where they agreed to limit English expansion to the northeastern part of the province. The British invalidated most Spanish land grants and implemented a liberal land grant system. British accounts, including those of William Bartram, indicated that huge citrus groves sprinkled the banks of the St. Johns River and near St. Augustine. Within several years, Grant's Villa, the governor's plantation, became a model plantation producing indigo and functioning like a modern agricultural experiment station (Gannon 1993:20-23; Harper 1958:118; Schafer 1982:49-50; Rogers 1976:479; Siebert 1929 1:68; Mowat 1943:21-26, 53-55, 61).

The British found Florida with few remaining European settlers, for more than 3,000 people left with the evacuating Spanish. Without colonists, the English government realized its plans for developing the province were threatened. Consequently, Grant and the British Crown launched a vigorous public relations and land grant program designed to encourage settlers and development. The program enjoyed some success, for between 1764 and 1770, approximately 3,000,000 acres of grants were issued by the Crown in East Florida alone. But, only sixteen grants were settled by English grantees by the outbreak of the American Revolution (Rogers 1976:479; Siebert 1929 1: 68; Mowat 1943:21-26, 53-55, 61; Schafer 1995:1-11).

The Tolomato River became a popular site for grantees and some plantation building. Published in 1769, William DeBrahm's map of East Florida (Figure 3-2) depicted the region between the Atlantic Ocean and the mouth of the St. Johns River southward to modern-day Brevard County. Grants and plantations documented by DeBrahm along the Tolomato River included Robert Bisset, Henry Cunningham, Fish's Casacola, William Drayton, William Mills, Rich Mount, and David Yetts (DeBrahm 1769).

A native of Germany who was trained as an engineer, William Gerard DeBrahm immigrated to America in the 1740s, arrived in Georgia in 1751, and published his first map of the colony in 1752. DeBrahm's skill as a cartographer soon extended beyond Georgia, and England's surveyor general called upon the engineer to develop plans for defenses and coastal maps. He was appointed surveyor general for the southern district of North America in 1764 and relocated to St. Augustine in 1765 to serve as East Florida's surveyor general of lands. But, friction developed between Governor Grant and DeBrahm, who was ordered to London in 1771 to answer charges of malpractice in his official capacity. In 1773, while in London awaiting his hearing, DeBrahm published a lengthy textual report replete with maps of the coasts of South Carolina, Georgia, and East Florida. In 1774, he was reinstated as East Florida's provincial surveyor, all the while retaining the title of surveyor general of the southern district of North America (DeVorsey 1971:6-8, 33-35, 46-47).

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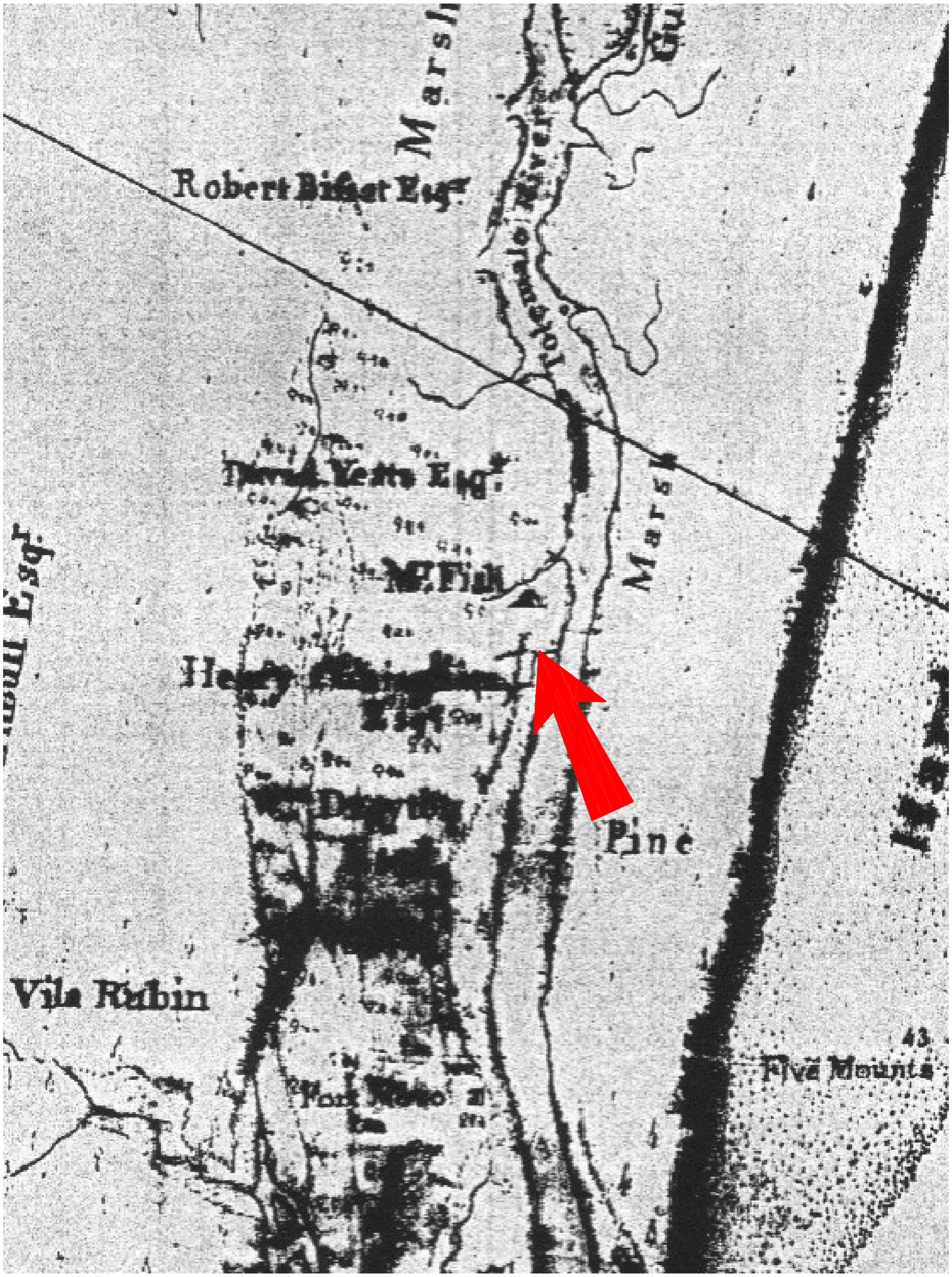

Tolomato River Region, 1769
(DeBrahm 1769)

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Archaeological and Historic Preservation Consultants

An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-2

Figure: 3-2
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

In addition to financial compensation, DeBrahm received various land grants in Georgia and Florida for his loyalty and services to the British Crown. DeBrahm acquired substantial landholdings in Georgia in the 1750s. By 1757, he based his operations at “Anaugusta” near Ebenezer, when he remained until 1760, when he built a home in Savannah. Despite his superior abilities at mapping, DeBrahm "was not a great planter and did not understand how to use slavery and land to gain riches." Still, DeBrahm played an important role in charting Florida, marking the extent and names of grants, an important contribution to the cartographic history of Florida’s brief British period (1764-1783) (Gallay 1989:98; DeVorsey 1971:27-29, 34, 44; DeBrahm 1769).

DeBrahm’s plats and maps aided the British Crown in conceptualizing the development of East Florida. The British Crown conceived settlement in the province far different than the settlement patterns used in neighboring Georgia and South Carolina, where colonial and trustee officials had issued relatively small tracts. In East Florida, large grants of property ranged between 5,000 and 20,000 acres. Because of their relatively large size, Henry Laurens of South Carolina saw little promise in the colony. An agent for several prominent English investors, Laurens cautioned Governor Grant and various grantees about the difficulty of developing and securing good plantation lands in large quantities. He also believed that one young motivated South Carolinian could “…do more essential service in that Young Colony than fifty Noble Men with patents for 20,000 acres each” (Rogers 1976:485).

Grant encouraged settlement by improving existing roads, such as the alignment between St. Augustine and Picolata, and established new roads, most importantly, the King’s Road. By December 1767, the route for the road had been surveyed between St. Augustine and Mosquito Inlet to the south. Completed from the provincial capital to the Matanzas swamp by 1772, the road was opened to Mosquito Inlet in late-1774 and into South Georgia by 1775. The road followed a relatively long, circuitous inland route through uplands and pine forests to avoid a shorter, but more expensive alignment through extensive creeks, marshes, and rivers closer to Florida’s coastline. The Reverend John Forbes praised the effort, stating that “…the road really may with propriety be called the King’s Highway: it forms a wide beautiful avenue, not a stump or tree to be found.” Later called by historians “Florida’s First Highway,” the King’s Road encouraged some British investors and settlers to organize plantations near its alignment, which ran well west of the project tract (Coombs 1975:37-74; Adams Schafer Steinbach Weaver 1997:1-2).

Throughout the American Revolution, the royal province of East Florida remained conspicuously loyal to the Crown. East Floridians realized that the amount of money expended in the province by the British government greatly exceeded the taxes they paid. They also needed the protection of the Crown. Residents of the sparsely settled region could not afford to protect themselves from Indians. In addition, African-American inhabitants outnumbered whites two-to-one, and an exposed coastline, vulnerable to French and Spanish warships, also demanded security measures. The presence of the British Army irritated colonists in heavily populated areas in England’s older colonies, but in Florida their presence gave residents a sense of well-being. In 1782, many Loyalists from Charleston and Savannah fled to Florida during the conflict to avoid persecution by patriots. The population of East Florida increased from 3,000 in 1776 to nearly 17,000 by 1784. But, many of those Loyalists and settlers abandoned the colony in the latter year, when the British

Crown returned Florida to Spain as part of its agreement outlined in the Treaty of Paris, which ended the American Revolution (Proctor 1978:1-7).

Development in East Florida slowed following the transfer of Florida to Spain in 1784. To promote settlement, the Spanish Crown emulated British policy by improving roads and awarding large land grants. In 1790, the Crown issued a royal order that opened East Florida to all English speaking settlers professing the Roman Catholic faith. Among the few requirements for land ownership leading to the establishment of a farm or plantation included evidence of financial resources and the swearing of an oath of allegiance to Spain. Contrary to official policy elsewhere in the Spanish empire, the Crown permitted non-Catholics to settle and receive land grants in Florida. Still, military conflict became endemic in the colony in the 1790s, in part, because of the economic and social unrest prevailing throughout Europe that persisted between the French Revolution and the Napoleonic Wars (Tanner 1963:13-36; Miller 1974:1-10).

In March 1792, to help meet the conditions of the creditors of the Estate of Jesse Fish, Governor Quesada sold Casacola at public auction to John Taton. In the next seventeen years, Casacola was owned by Taton, Thomas Travers, F. M. Arredondo, and Bryan Connor whose widow Susan Medin sold the property for $1,400 to Pablo Sabate in 1809. The Sabate family arrived in St. Augustine in 1777, refugees from the failed Turnbull settlement at New Smyrna. A Minorcan, Sabate earned a living farming and fishing, and later operated a tavern in St. Augustine. In 1803, before his acquisition of Casacola, Sabate received 200 acres in San Diego from the Spanish Crown as part of his quota for maintaining a family of twelve persons. In 1818, he again petitioned the Spanish Crown, this time for 2,500 acres of pine land west of Casacola for the raising of cattle. Late in the second Spanish period, headright and service grants accounted for a large number of acres furnished to settlers and loyal subjects of Spain. Between 1815 and 1818, the Crown awarded seventy-eight head right grants, amounting to 47,496 acres, or twenty-two percent of all grants later confirmed by the United States Board of Land Commissioners. In contrast, service grants to veterans during the same four years amounted to 322,884 acres, which accounted for more property than all the head right grants awarded during the entire second Spanish period. The service grants were most often associated with military service or government duty. Eighteen individuals received most of the service grants awarded by the Spanish Crown, and eleven received more than 10,000 acres each during those four years (Hoffman 2002:269-271; Confirmed S1 Spanish Land Grants Florida State Archives).

In the early nineteenth century, the United States sought to acquire Florida from Spain. The largely undeveloped area tempted the expansionist government and private land speculators lobbied in Washington for its acquisition. Over the years, Florida had presented the federal government with numerous problems. Spanish control of Florida stunted economic growth in the lower South by limiting access to the Gulf of Mexico. The area provided a haven for runaway slaves and Seminole Indians, who became involved in armed conflicts with settlers residing in Georgia and Alabama. Florida provided a setting for contraband trade and slave smuggling. Amelia Island, especially, with its close proximity to Georgia and a deepwater port, was a center of this activity. Due to its strategic geographic location, Florida was perceived by the government to pose a threat to national security. The area could serve as a base for attacks against the United States if acquired by a foreign power, particularly England. When Andrew Jackson invaded Florida during the First Seminole Indian War (1815-1818), it became clear that Spain no longer could hold or control Florida. Incidents on Amelia Island in 1812 and 1817 disrupted the United States' negotiations with Spain over acquisition of Florida. During the War of 1812, federal troops invaded Fernandina, setting into motion a series of events that resulted in marauders raiding plantations and destroying property throughout Northeast Florida. Pablo Sabate joined two dozen other memorialists from St. Augustine, including F.M. Arredondo and F. J. Fatio, who petitioned the United States Congress for compensation suffered during the War of 1812. From their positions as secretary of state and then president James Madison, James Monroe, and John Quincy Adams helped implement a new bold United States policy that expanded the executive branch’s power in foreign affairs. In 1819, mounting pressure from the United States forced the signing of the Adams-Onis Treaty, which transferred authority over Florida in 1821. As part of the treaty, the United States relinquished all claims to Texas, transferred much of Spain’s claims in the Pacific Northwest to the United States, and assumed the unpaid damage claims of Florida’s citizens, which amounted to approximately $5,000,000 (Dovell 1952 1:169-170; Merk 1963:15; House of Representatives 22d Congress 1st Session "Inhabitants of East Florida" Report No. 223 1832:5-6).

3.10 Territorial and Statehood Periods, 1821-1860

In 1821, the United States government created the Territory of Florida and named Andrew Jackson military governor. Jackson initiated the Americanization of Florida, naming Tallahassee the seat of the territorial government and providing for county courts and trials by jury. Using the Suwannee River as the dividing line, Jackson created Escambia County out of the former West Florida province and St. Johns County out of the former East Florida province. St. Augustine was assigned the seat of government (WPA 1936).

In 1822, the Congress appointed a board of land commissioners, who reviewed and either confirmed or rejected private claims in Florida. A process that often included translating Spanish documents, obtaining old surveys from archives, and deposing witnesses, the reviewing of claims slowed the public survey and land sales by the state and federal governments. Still, by the end of 1825, the East Florida commissioners had confirmed 325 claims and rejected sixty-one others. Although Sabate indicated that Casacola had never been surveyed and that he could not produce a plat, the land commissioners approved his claim in 1828, predicated on a chain of title extending back to 1764. An act of the United States Congress confirmed the grant in April 1830. Later, in 1836, deputy-surveyor Henry Washington certified the Casacola plat (Figure 3-3) with 2,133.58 acres, rather than the 12,000 acres that Sabate initially claimed. One of Sabate's rejected claims was the 2,500 acre St. Marks Pond grant. The Congress furnished final adjudication for eighty-eight other claims that consisted of 3,000 or more acres. Several large grants were adjudicated in the courts during the 1830s and later affirmed by the United States Supreme Court (WPA 1940; FSA Confirmed S1; FSA Unconfirmed S1; Tebeau 1971:123-124).

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Pablo Sabate's Casacola Grant, 1834
(FSA Confirmed S1)

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Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-3

Figure: 3-3
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

In the 1820s, the federal government initiated the process of surveying the public lands and reviewing private claims throughout Florida. Surveying began in Tallahassee in 1824, and public land offices initiated sales at the territorial capital in 1825 and from St. Augustine in 1826. Surveyors laid out the parallel basis, range and township lines, then subdivided those areas with sections and private claims associated with Spanish land grants. Surveyed in 1834, 1848, 1849, and 1850, the township which contains the current project tract presented challenges to the deputy surveyors and chainmen, in part, because of the extensive private claims, and, in part, because of the creeks, rivers, and wetlands (Butler 1835; Putnam 1849).

Supervising chainmen and markers Amos Lee, James N. Lee, John Townsend, and Isaac Varnes, deputy surveyor Henry Washington surveyed township six south, range twenty-nine east in early 1834. Washington found much of the terrain, including at Casacola, “flat poor 3rd [rate] pine & saw palmetto.” At the Pablo Sabate grant, Washington traversed and recorded the meanders of Arroway [Araquay] Creek, Indian Creek, and the marshes of the North River. At the fiftieth station in the traverse, Washington "established a pine post in the in the west margin of Arroway Cr. at the point where Arroway Bridge once stood agreeably to the testimony taken." Along the north boundary of the Sabate grant, Washington recorded several old roads, a pond, "a cat pine," and Casacola. Published by the surveyor general’s department in 1834, a resulting township plat depicted only some of the Spanish land grants and private claims in the region, leaving the filling out of other property lines for a subsequent survey. The plat revealed no features within the Sabate grant (DEP Volume 59 Field Notes 1834:274-277; Butler 1834).

The following year, the Second Seminole War erupted, altering the landscape of the region, resulting in new roads and bridges, an increase of steamboat traffic, and the establishment of numerous forts. Maps prepared under the direction of various generals depicted various roads and forts, but many were insufficient in scale to note the precise location of those features. The Abert's Map of 1838 (Figure 3-4) was typical of the period, and did not indicate any structures in the project tract. The King’s Road was a critical artery between the Ancient City and coastal and interior forts and posts. Notwithstanding those developments, it appears that no war-time or settlement activities occurred in the project tract. In December 1835, the war erupted, causing panic and alarm across northeast and middle Florida. The conflict extended between 1835 and 1842, and raged throughout much of the territory, but was particularly brutal in Florida’s peninsula. Bloody engagements took place from Jacksonville to the Suwannee River and deep into the Everglades. Frontier settlements were especially vulnerable to Indian raids. Many plantations were abandoned as settlers withdrew to fortified areas and established communities. A few established towns provided staging points for federal troops and safe havens for planters and settlers compelled to abandon their lands. Many of America’s highest ranking military officers were outfought by Seminoles, who fought an guerilla-style warfare. Earlier, in 1823, the territorial government and the Seminoles signed the Treaty of Moultrie Creek south of St. Augustine. The treaty established an Indian reservation in interior of the peninsula, but had little effect in stemming encroachment by whites into Seminole lands. In October 1837, federal troops under a flag of truce captured Seminole leaders Osceola and Coa Hadjo, setting off further debates in Congress about the nature of the war and its continued funding. Still, by January 1838, federal troops had broken the Seminoles’s organized resistance, but, amid continued sporadic violence, the war sputtered to a

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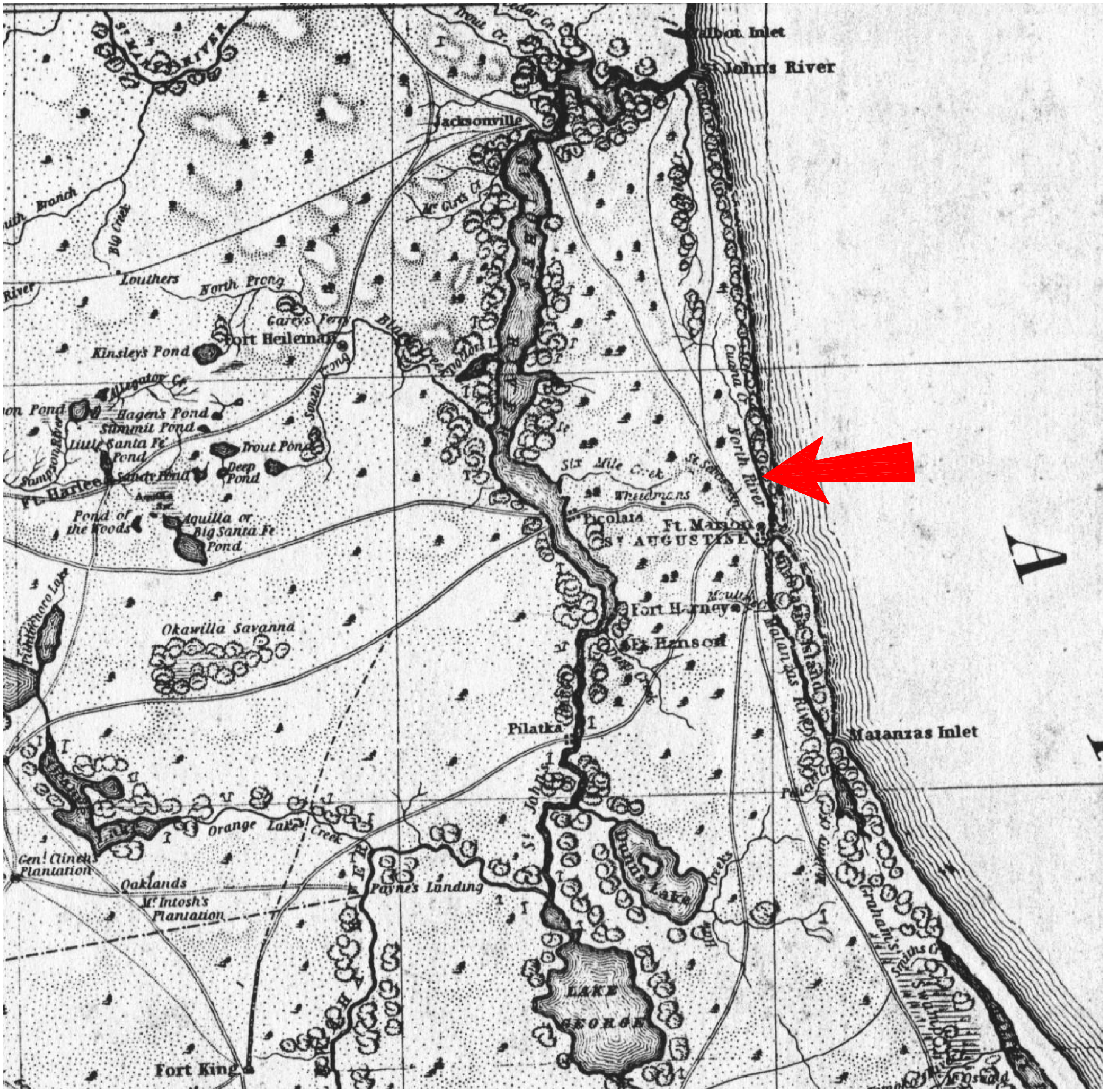

Northeast Florida during the Second Seminole War, 1838
(Abert 1838)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
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Figure 3-4

Figure: 3-4
Project No.: BAIJ08010184.02
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fitful and bloody end four years later. Peace of sorts came in 1842, when most of the remaining Seminoles were shipped west to Oklahoma Territory, and a few of the tribe moved south into the Everglades. The United States' Indian removal policy met some of its fiercest resistance from Florida's Seminoles. The Second Seminole War proved to be one of America's longest and costliest Indian wars, amounting to approximately $40,000,000 with the additional effect of destroying much of the incipient plantation growth and plunging the territory's economy into a recession (Mahon 1967:150-151, 326; Dovell 1952 1:418; Knetsch 2003:105-106).

In 1845, three years after the official close of the Seminole war, Florida gained admittance into the Union as a slave state. The congressional action paired Florida with the State of Iowa, which maintained a balance between the free and slave state representation in the United States Senate. In 1848, 1849, and 1850, the surveyor-general's office conducted subsequent surveys of the township associated with the project tract. Deputy-surveyor R. W. Norris directed several markers and chainmen, relocating corners and lines established nearly two decades earlier and documenting the remaining private claims. In 1853, the surveyor-general's office issued another plat of the township (Figure 3-5), this time depicting all of the private claims and clearly depicting the alignment of the Jacksonville Road. The project tract spanned an area between the Sabate grant and public lands in Section 25, which remained un-surveyed into the middle of the twentieth century. In 1857, the surveyor-general developed another plat of the Sabate grant (Figure 3-6), compiled from Washington's field notes and his 1834 survey included in the Sabate dossier submitted to the land commissioners. Surveyor-General John Westcott recomputed the acreage of the Sabate grant at 2,438.49. Westcott located the site of the Araquey Bridge at the south end of the grant and made several references to Araquey or Pablo road in the transcription of the field notes (Putnam 1853; FSA Confirmed S1). The project tract does not appear to have any improvements during the nineteenth century.

3.11Civil War, Reconstruction & Late 19th & Early 20th Century Contexts, 1861-1930

In the same way that no farming or development activities have been documented in the project area in the colonial and antebellum periods, no military activities appear to have occurred there during the Civil War. Although the conflict curtailed economic growth of plantations and the nascent tourist trade initiated by steamboats along the St. Johns River during the 1850s, the war appears to have had little effect on the project tract.

The third state to secede from the Union, Florida joined the Confederate States of America in January 1861. Later that year, the United States Coast Survey published a map of the Tolomato River from information compiled by F. W. Dorr, an officer and engineer in the Army's Corps of Engineers. Dorr had conducted surveys of the river and St. Augustine's harbor in 1859 and 1860. One of the first detailed federal cartographic resources to identify the area, the map (Figure 3-7) depicted the Casacola and Sanchez plantations with a system of paths or roads, buildings, and fields along the Tolomato River, but no features within the project tract. Within months of Florida's secession, the Confederate government requested that Florida supply 5,000 troops. Many male

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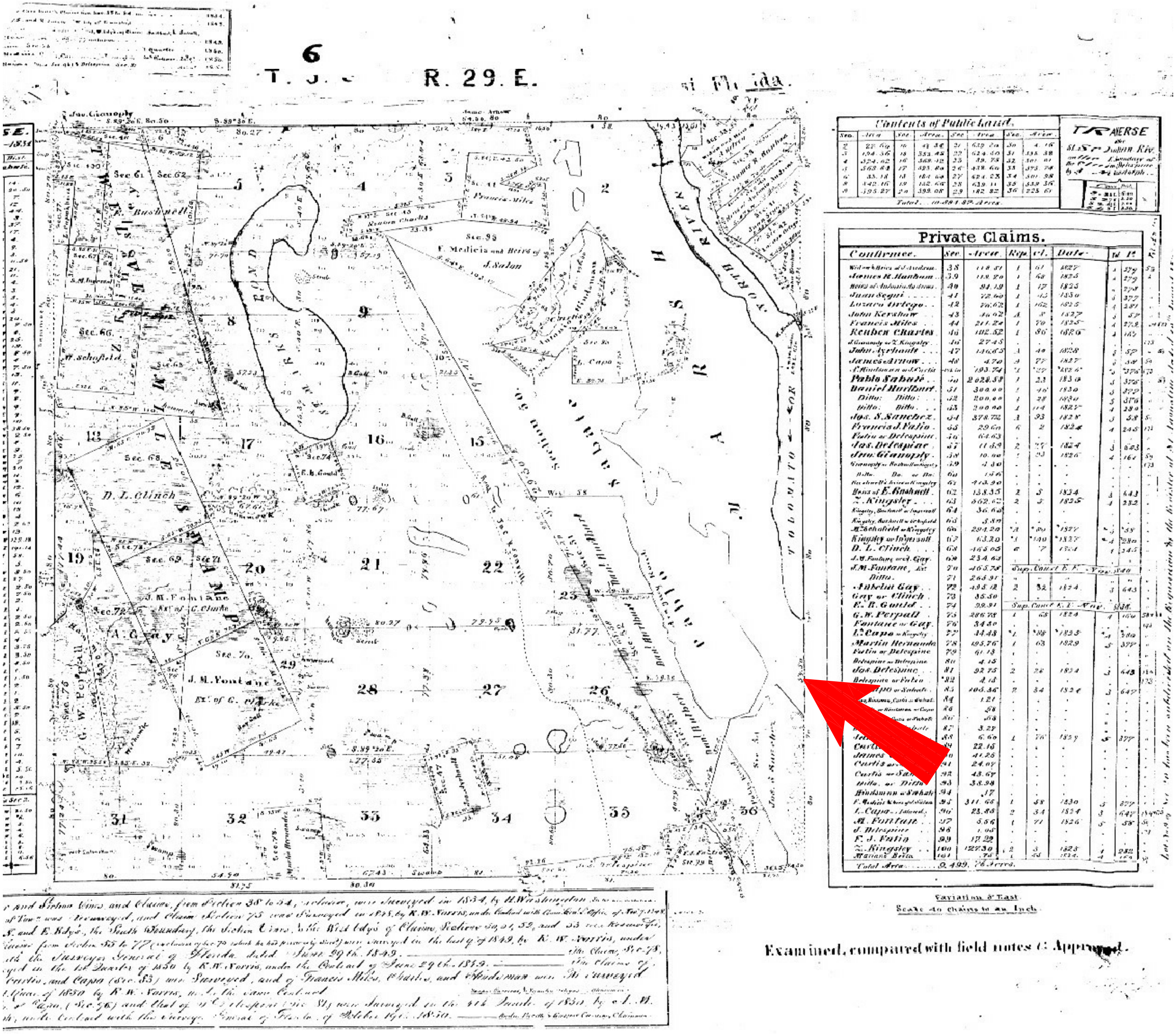

Township 6 South, Range 29 East, 1853
(Butler 1853)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-5

Figure: 3-5	
Project No.: BAIJ08010184.02	
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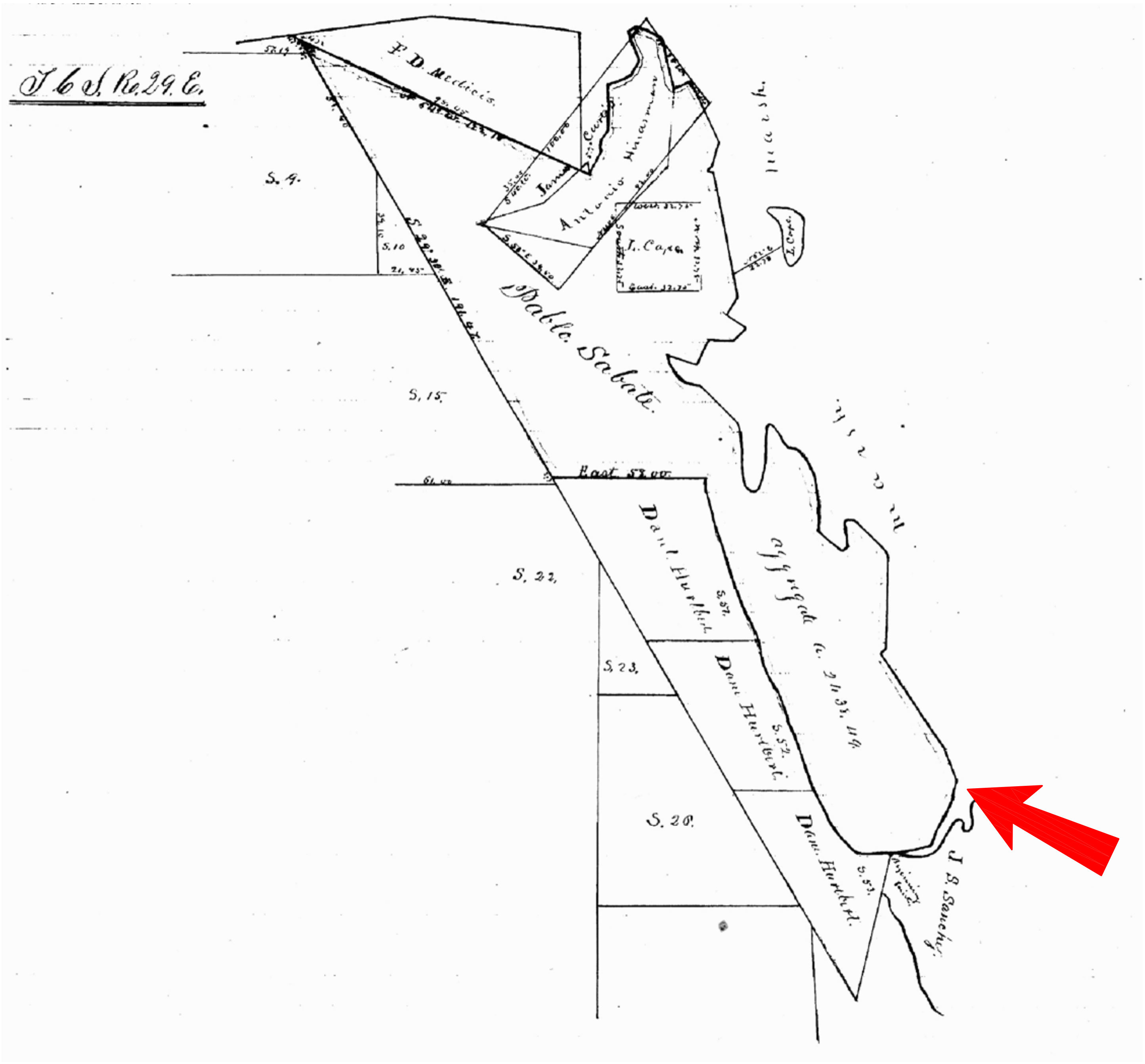

Casacola and Pablo Sabate Grant, 1857
(Westcott 1857)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-6

Figure: 3-6
Project No.: BAIJ08010184.02
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Date: May 2010

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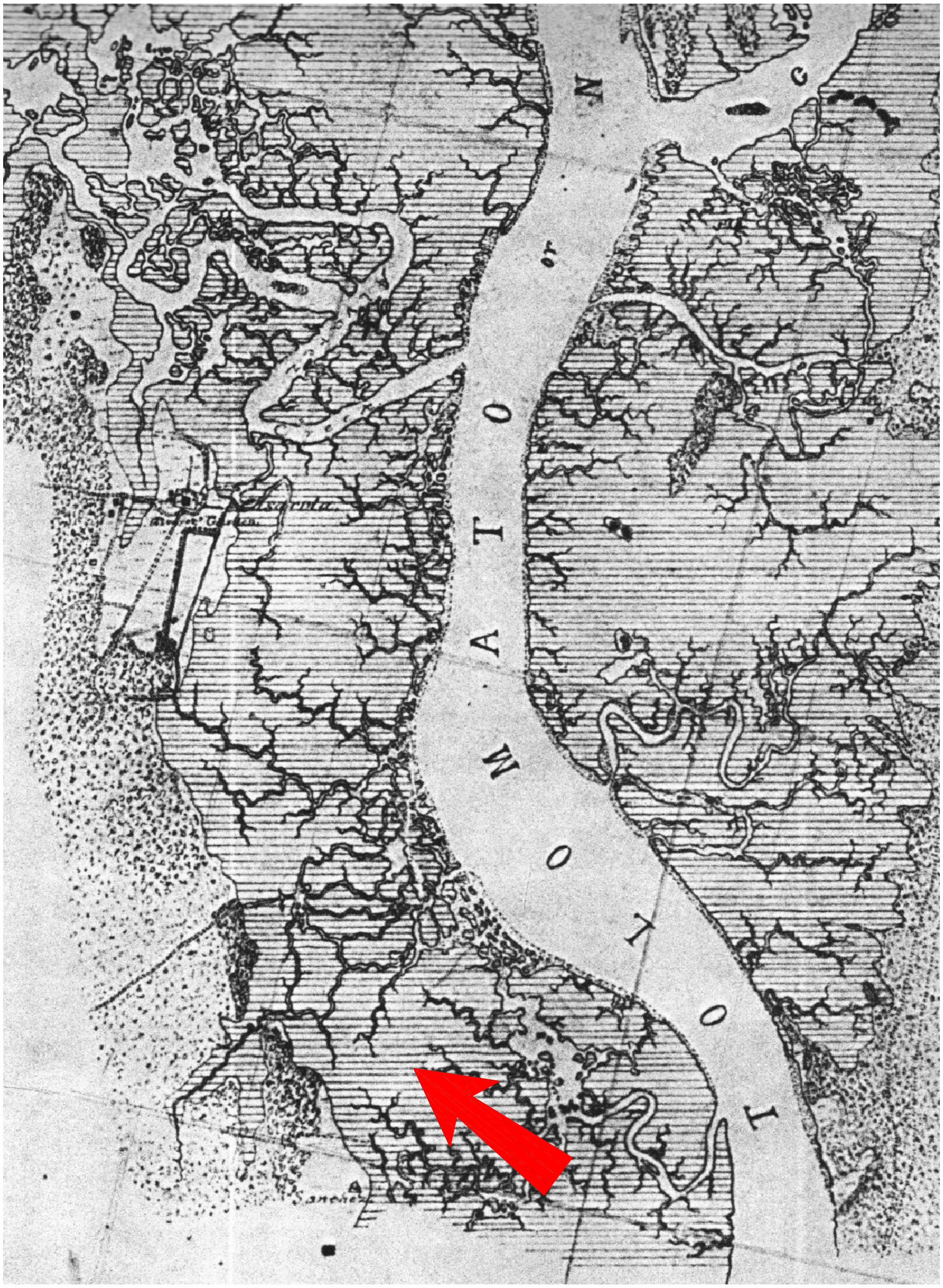

Casacola and Sabate Grant, 1861
(Dorr 1861)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-7

Figure: 3-7
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

residents abandoned their farms to join the army, leaving the rural economy with only one-half of its work force. Federal steamships patrolled the coastline and gunboats sailed into ports at Jacksonville and St. Augustine in 1862 to accept the surrender of those cities by civilian authorities. Union troops made little effort to extend their control beyond the limits of those towns initially, in part, because the region east of the St. Johns River and north of Matanzas Inlet became known as “Lincoln’s congressional district in East Florida.” Union gunboats sailed the length of the St. Johns River in 1862, in part, to destroy blockade runners and prevent Confederate troops from crossing to the east bank of the river. A map prepared by Federal cartographers in 1864 (Figure 3-8) indicates no buildings or man-made resources stood in the project tract (Buker 1986:3-9, 18).

In the decade following Lee’s surrender at Appomattox, Florida, along with the rest of the South, endured a turbulent period of Federal Reconstruction. Although the state did not suffer the extensive destruction that occurred in other areas of the South, most of its cities had been occupied by Federal troops, and some interior settlements abandoned. Floridians faced the daunting task of rebuilding their society. The war decimated the state’s economy and compelled Floridians to develop a labor system that did not depend on bondsmen for labor. Throughout the state property values plummeted, and agricultural and industrial production declined. The state’s financial institutions collapsed. Punctuated by violence, lawlessness, and unscrupulous politics, Reconstruction proved in some ways as difficult as the war. Indicative of the historically wet condition of the property, the project tract remained in un-surveyed lands held by the State of Florida during the nineteenth century and into the 1940s (Shofner 1974:17-18, 154-155; Tax Rolls, 1925, 1935, 1940, 1945 Clerk of Court St. Johns County Courthouse).

In the 1880s, the adjacent Tolomato River became part of the Intracoastal Waterway, a project that was completed along Florida's east coast in the 1910s. Several investors organized the Florida Coast Line Canal and Transportation Company (FCLC&TC) to improve navigation along Florida's coast. John Westcott of St. Augustine served as president of the company, which agreed to land grants in exchange for dredging work by the State of Florida. The company devised a plan and reached an agreement with the state, which stipulated that the FCLC&TC would receive 3,840 acres of public lands for each mile of canal dredged and constructed. Dredging began in 1883 and by 1890 the company’s general manager, George F. Miles, reported that most of the system had a channel five feet deep and fifty feet wide at mean low water. In the initial phase of development, some areas along the Halifax River, Indian River, Matanzas River, and Tolomato River required no dredging. The work earned the company over 500,000 acres of the state’s public lands. The company experienced financial difficulties in 1892, when it turned to Henry Flagler for assistance. The railroad baron extended the company a mortgage for $100,000, and in turn he became its figurehead Although the company met the minimum threshold of its agreement, periodic examinations and surveys by the U. S. Army Corps of Engineers revealed many channel and shoal deficiencies. Other studies revealed that inland navigation along Florida’s east coast had improved only marginally. In 1894, the federal government reluctantly assumed control of a seventy-seven mile stretch of the Indian River between Goat Creek in Brevard County and Jupiter Inlet (Akin 1988:177-178; Dovell 1952 2:786-788).

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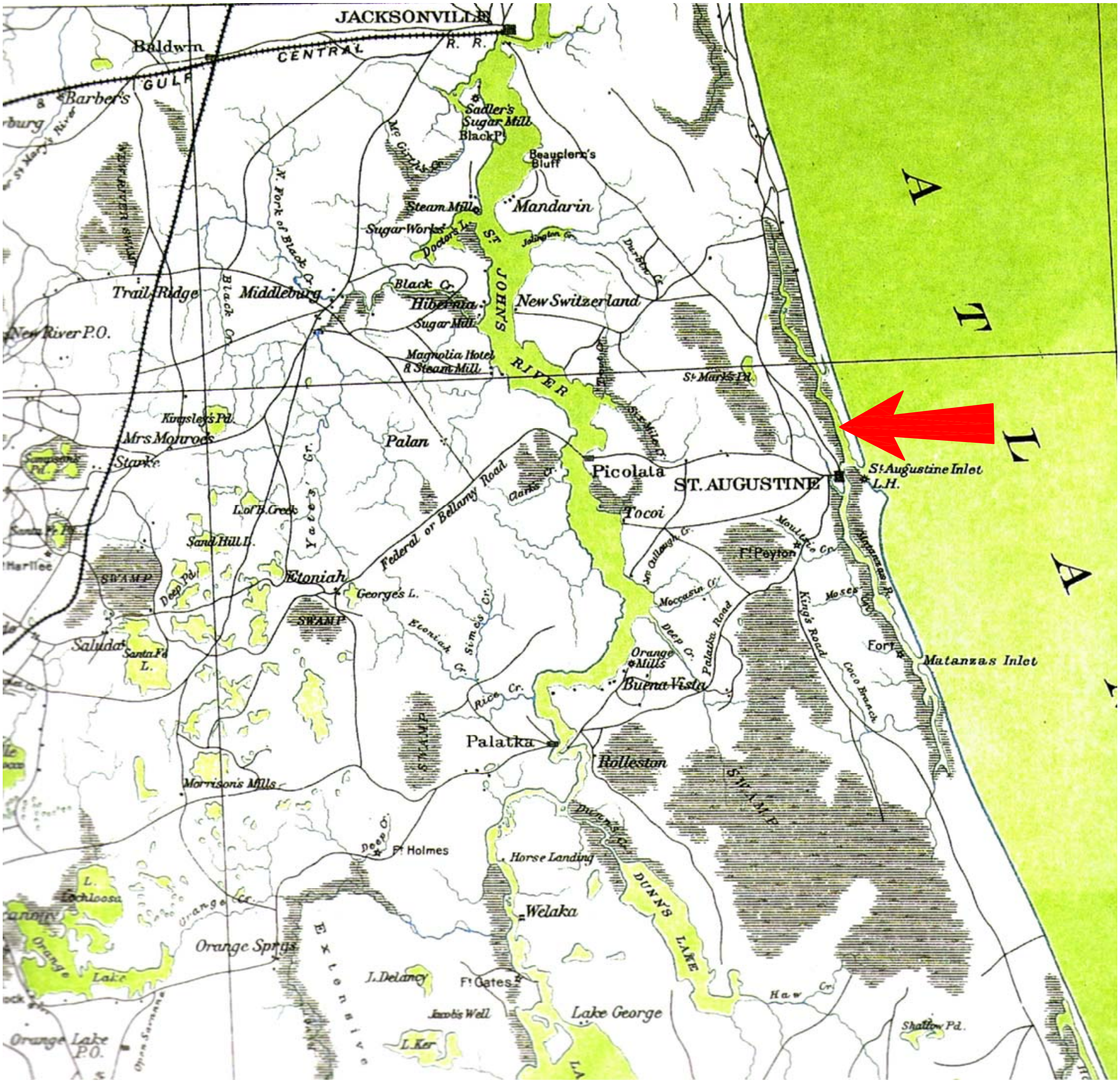

Northeast Florida during the Civil War, 1864
(Cowles 1891-1895:plate 143)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-8

Figure: 3-8
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

The FCLC&TC completed its final phase in the construction of the waterway in 1912 at a cost of $3,504,635. Extending 360 miles from the mouth of the St. Johns River to Biscayne Bay, the channel had a nominal width of fifty feet and a depth of five feet. But, irregular maintenance still hampered navigation, which could be accomplished safely only in small vessels at high tide. Colonel William Craighill of the Corps of Engineers recommended the federal government improve the waterway only after the FCLC&TC relinquished its rights and privileges to the route. He noted that the *St. Lucie*, a 120-foot steamer weighing 165 tons and capable of carrying 130 passengers, had difficulty navigating several channels, and travelers experienced delays because the ship often became grounded (Dovell 1952 2:786-788; U.S. Congress House 1890:1-5; U.S. Congress House 1918a; U.S. Congress House 1926:4, 10-11, 14, 80-81).

It soon became clear that the nascent waterway provided few tangible benefits to businesses and residents along Florida’s east coast. A report prepared in 1918 indicated that although the shorelines and inland areas of the state’s east coast counties contained one-third of the valuation of the state and eighteen percent of the state’s land mass, only two percent of the area then supported crops or developments. Even more discouraging, Major-General W. M. Black reported that “the existing Florida East Coast canal is too narrow and too shoal, even where maintained to full-project dimensions, to form an economical and efficient water route.” Only four commercial boats used the waterway between Jacksonville and Daytona Beach, each drawing approximately four feet of water and weighing fewer than 100 tons. Greater in number were smaller pleasure craft, which in 1918 amounted to nearly 300 yachts carrying seasonal tourists who made annual pilgrimages along the waterway (U.S. Congress House 1918b:2, 7; U.S. Congress House 1926:81).

In 1910 and again in 1916 the canal company failed to negotiate transferring the waterway maintenance to the federal government. In 1917, the U.S. Department of Agriculture published a soils map of St. Johns County (Figure 3-9); which reveals no development in the project tract. The parties finally reached an agreement in the 1927, when the Florida Inland Navigation District (FIND) was organized with authorization to purchase the waterway for the federal government. Composed of commissioners from the state’s eleven east coast counties, FIND issued bonds and transferred the rights-of-way to the federal government in 1929 to what is known today as the Intracoastal Waterway. The Corps of Engineers completed the dredging work between the St. Johns River and the navigable part of the Tolomato River in January 1934. In 1938, Lieutenant-Colonel Earl North of the Corps of Engineers reported that the channel of the Intracoastal Waterway between the St. Johns River and St. Augustine was at least eight feet deep and 100 feet wide. Beyond private launches and boats, North found that the commercial shipping along the Tolomato River consisted of fishing boats and a seasonal shrimp fleet that sailed along Florida's east coast. Between August 1936 and July 1937, he recorded 1,122 fishing and shrimping boats sailing along the Intracoastal Waterway between the St. Johns River and St. Augustine, the majority of those northbound. By 1956, the channel in the Intracoastal Waterway north of St. Augustine had been dredged to 125 feet wide and twelve feet deep (Cash 1938 4:593; Dovell 1952 2: 786-788; Buker 1975:122-123; U.S. Congress House 1938a:3, 17, 38).

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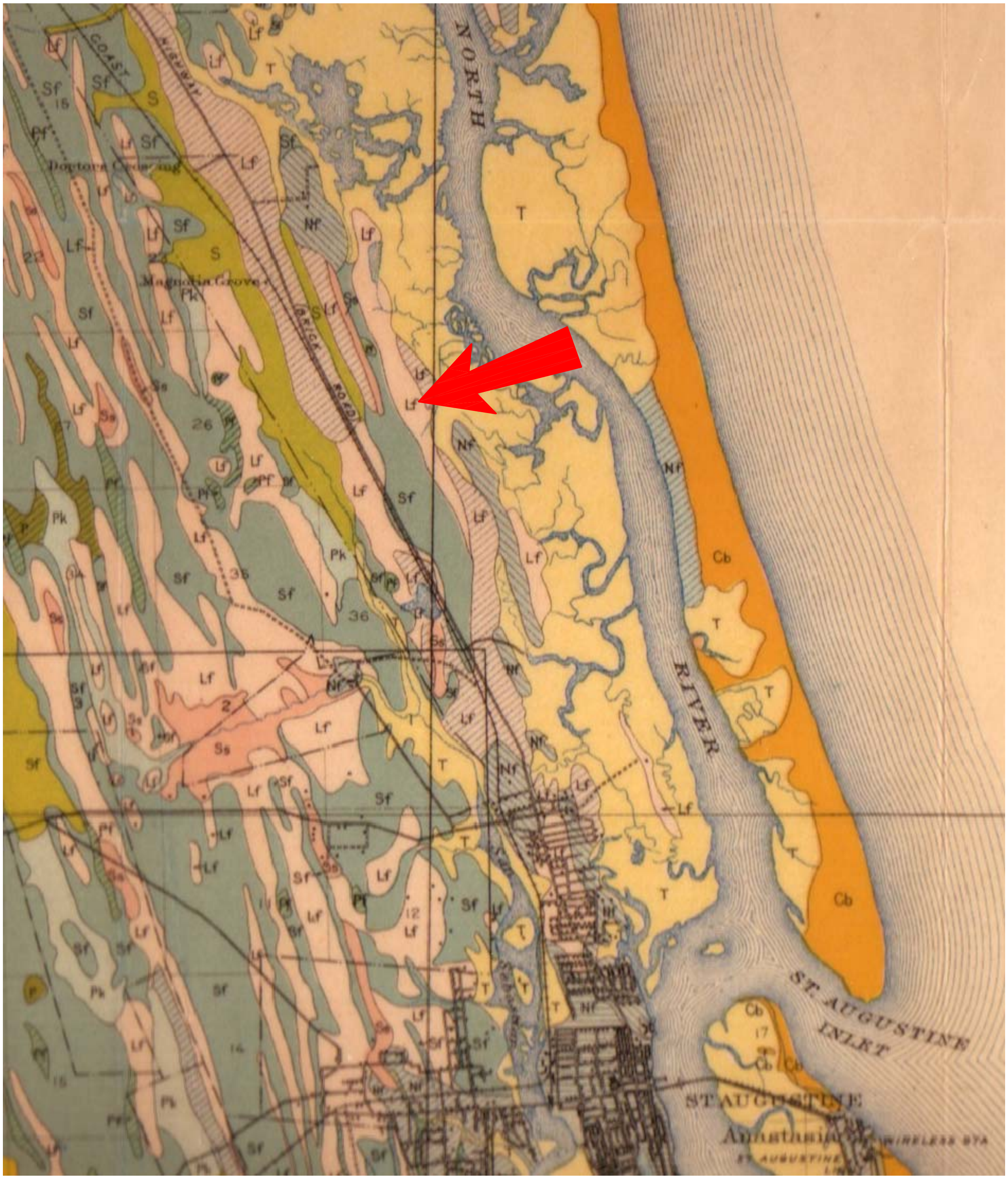

Casacola and St. Augustine, 1917
(USDA 1917)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-9

Figure: 3-9
Project No.: BAIJ08010184.02
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Date: May 2010

3.12 St. Augustine Airport, World War II & Post-War Developments, 1930-1960

Development of the St. Augustine-St. Johns County Airport began several years after the creation of FIND and the dredging of the Intracoastal Waterway north of the Tolomato River. The city's early aviation heritage linked aircraft with St. Augustine's water front. In 1911, businessman Charles Hopkins, Jr. introduced the first airplane flight in St. Augustine, arranging the event with the Curtiss Exhibition Company. Exhibitions arranged by the company and the St. Augustine Power Boat Club included daring flights, stunts, and a race between an aircraft and a speedboat. Subsequent barnstorming pilots moored their seaplanes along the bay front. They hosted exhibitions, races, and publicity stunts, and flew passengers over the city. The director of a serial weekly silent film, "The Perils of Pauline," photographed several flying scenes in St. Augustine. In 1916, Canadian flyers trained for World War I at an aviation school in St. Augustine, and the United States Army acquired the Little Links Golf Course, which it leveled and marked as an airfield, the first in the city. In the 1920s, Mable Cody's Flying Circus and Gates Flying Circus performed in St. Augustine. In 1926, the *New York Times* published photographs of Cody climbing out of a speed boat zipping along the Matanzas River up a rope ladder and into a biplane. In 1927, the City investigated and then abandoned the idea of building an airfield at Davis Shores. Then, in 1928, the Jaycees initiated another airfield campaign, resulting in the municipal government leasing the Lorillard Race Track off State Road 16, which was converted into an airfield. Lucius Rees and J.W. Richbourg established St. Augustine Flying Enterprises, Inc. to operate the airport, carry passengers, and service aircraft (*New York Times*, 9 May 1926; *St. Augustine Record*, 29 June, 2, 12 August, 29 September 1927, 19 April, 22 May 1928; http://saapa.org/Documents/KSGJ-History.pdf).

In December 1933, after approximately five years of searching for a site to develop a permanent airport, the municipal government reached an agreement with the developers of property adjacent to the Araquay Park Subdivision. Developed by Bennett Armstrong, J. N. Bradshaw, William Pike, and H. H. Redding, Araquay Park experienced some development during the 1920s, but most lots remained vacant, if not unsold. The developers envisioned and acquired the area farther north of the initial subdivision for future development. But, the death of Armstrong and Bradshaw and the collapse of the Florida Land Boom compelled their heirs to reorganize and then sell some of the holdings of Araquay Park Estates, Inc. By the early 1930s, the heirs struggled simply to pay the taxes on the undeveloped properties. On 20 December 1933, they offered 210 acres in the Sabate grant north of Araquay Park Subdivision to the City of St. Augustine for its airport at a price of $10,000, but settled on $8,000 later that month. The city government considered two other sites, including one at Davis Shores, but selected the Sabate grant because of its affordability and its proximity to the city, the Dixie Highway, and the Intracoastal Waterway. The City received a $40,000 grant from the Civil Works Administration (CWA), a New Deal "alphabet program," to acquire the site and begin developing an airport. The site for the new airport occupied the south end of Township 6 South, Range 29 East, Section 50 at the south end of the Sabate grant radiating between the Tolomato River and the Dixie Highway (*St. Augustine Record*, 13 December 1925, 14, 20, 28, 28 December 1933).

On 11 January 1934, Araquay Estates, Inc. conveyed the property to the City of St. Augustine. By March 1934, the City had secured Grant 55-44 from the Federal Emergency Relief Administration

(FERA), another New Deal program. During the Great Depression, municipal governments desperate to complete public projects often blended resources from multiple alphabet agencies, which were created by the Roosevelt administration to assist the unemployed and help municipalities cope with building infrastructure. After withdrawing an application to the Public Works Administration (PWA), St. Augustine's municipal officials initiated the St. Augustine Civic Center (NR 2005) project on Castillo Drive through the CWA. Although one elected official objected to the City spending any additional monies on public improvements, all agreed that the civic center provided a far better use of CWA monies than raking parks and clearing ditches and gutters. In 1935, residents and administrators celebrated the completion of the building under the FERA banner (Deed Book 105, p. 565 Clerk of Court St. Johns County Courthouse; *St. Augustine Record,* 3 August, 20 October 1933, 13, 14, 15 February 1935, 14 February 1936).

St. Augustine Airport experienced a similar blending of New Deal agencies to complete its initial development. The CWA grant provided sufficient funds to continue the clearing process for the first runway in 1934. Measuring 4,000 feet by 500 feet, it extended in a northeast-southwest alignment. City manager Eugene Masters expressed interest in creating a seaplane base at the site because of its proximity to the Intracoastal Waterway, but no New Deal funding was authorized for the project. After exhausting its CWA and FERA grants, the City submitted a series of applications to the Works Projects Administration (WPA), one of the longest-running of the New Deal agencies. By October 1936, the WPA had initiated clearing runways for a three-way airfield. The runways extended, roughly, in north-south, northwest-southeast, and northeast-southwest alignments converging near the southwest corner of the airport and the Dixie Highway. By March 1937, the WPA had assisted in the completion of two small hangars, was constructing an administration building, but had shelved plans for a larger hangar. In February 1938, the federal government authorized another WPA project for $15,950 to complete the runways. Project managers selected asphalt for the paving surface because concrete was too expensive and grass too dangerous in proximity to the Tolomato River and for the humid climate. But, funding shortfalls prevented completion of the project, which only cleared and leveled some of the runway system and left it unpaved. In March 1940, a giant Stinson twelve-passenger tri-motor aircraft landed at St. Augustine Airport. Weighing 10,000 pounds and producing 1,000 horsepower, the aircraft provided citizens rides at the cost of 50¢ per ride and $1.50 for air tours on Sundays (*St. Augustine Record*, 16 March 1934, 29 October 1936, 16 March 1937, 16 February 1938, 28 March 1940).

St. Augustine Airport benefited from the nation's increased military defense expenditures after war broke out in Europe in June 1939. In August 1940, Roy Schroder, the state WPA administrator, authorized another WPA project at the St. Augustine Airport, this time for $29,085. Subsequently, the WPA authorized another $110,000 grant to improve the airport. Between 1935 and 1939, in Florida's fifth congressional district alone, the WPA built several airports, improved six, and made an addition to one. By the middle of 1940, the WPA had allocated $513,881 for projects in St. Johns County. At St. Augustine, the 1940 WPA project consisted of draining and grading of land around the airfield and extending and widening the runways, along with the installation of lights. In his comments to the *St. Augustine Record*, Schroder indicated that airfields in St. Augustine and Orlando were being improved as "pertinent to the interest in the general defense program now being carried on in Florida by the Navy and War Departments." The *Record* suggested that the two airports "will be used as auxiliary air bases, the local base for the Jacksonville Naval Air Station" (*St. Augustine Record*, 4 April, 26 July, 22, 28, 30 August, 7 November 1940).

The St. Augustine Airport derives its World War II significance through its association with the Jacksonville Naval Air Station (NAS), which became one of the largest naval air stations on the east coast. Indeed, because of Florida's long coastline, relatively inexpensive property values, and good weather, the Sunshine State by war's end contained twenty-three naval air stations and naval auxiliary air stations, more than any other state in the union. In addition, the Department of the Navy developed numerous auxiliary landing fields (ALF), naval air facilities (NAF), naval auxiliary air facilities (NAAF), naval auxiliary air stations (NAAS), and outlying fields (OLF) to support the larger installations. Pensacola Naval Air Station, the nation's oldest, underwent expansion at the same time that architects and contractors were building Jacksonville Naval Air Station. The principal mission assigned to NAS Jacksonville was to provide training for naval aviators and the support personnel necessary to maintain naval air capability. Cadets received their primary instruction at Jacksonville, many of whom then received secondary instruction. Those assigned to carrier planes received advanced flight school training at Pensacola or Corpus Christi. The station also coordinated air patrol activities flown from small naval air stations and naval auxiliary air stations scattered along the coast of Florida and Georgia. In Florida, other naval air stations developed during World War II were located at Banana River, Daytona Beach, DeLand, Fort Lauderdale, Key West, Lake City, Melbourne, Miami, Sanford, and Vero Beach. Each cost about $5,000,000 to construct, including an administration building, barracks and other residential facilities, dispensary, instruction buildings, a hangar, and a main field and several satellite fields. The Navy designed these naval air stations to support about 1,400 enlisted men and 300 officers. Although the Navy developed some of these from scratch, the department built several using municipal airports. Aircraft from NAS Jacksonville conducted patrols over the Atlantic Ocean, where German submarine warfare reached a crescendo in 1942. Naval air station historian M.L. Shettle, Jr. indicated that three naval auxiliary air stations—Cecil Field, Green Cove Springs, and Mayport—supported NAS Jacksonville with. In addition, twelve outlying fields supported NAS Jacksonville and its auxiliaries, including St. Augustine Outlying Field (OLF). During World War II, OLF St. Augustine supported NAAS Green Cove Springs, also known as Lee Field, for gunnery training of naval aviators and for familiarization purposes (Shettle 1995 1:7, 91, 103, 233; Furer 1959: 381; "Building for Defense," 1940:37).

On 1 September 1940, municipal officials reached an agreement with Commander V. F. Grant of NAS Jacksonville to use St. Augustine Airport as an outlying field for the naval air station. The agreement stipulated that the Navy would begin operations as soon as the WPA completed its clearing and paving project. The *Record* reported that "The training program at the airport will find a commander here each day during the training hours, after which private ships will be permitted free use of the field. This means that each afternoon after about 3:30 o'clock, and all of Saturday and Sunday, the field will be open for private use." Commander Grant expressed high praise to the city's officials and residents for their cooperation. He estimated that the airport would initially support NAS Jacksonville several hours each day, but not on the weekends. Later that week, the WPA assigned seventy-six laborers to the airport project, anticipating they would complete the "…leveling and grading of runways, and construction of drainage ditches, and other incidental work to make the field suitable for the planes expected to be stationed here every week as part of the national defense program." The WPA estimated the project would be completed in December 1940. But, in November 1940, the city hired civil engineer C. M. Johnson to survey the airport so it would conform to the Civil Aeronautics Authority (CAA) defense expansion program in Florida. Johnson was to survey the location for "…three runways 500 feet wide with the center 150 feet paved, the runways will run east and west, north and south, and southwest and northeast, and will range from 3,500 to 4,500 feet in length." Speculating on the future development of the airfield, the *Record* reported that "…it may be necessary to fill in the marsh on the eastern side." An aerial taken in February 1942 (Figure 3-10) indicates the WPA project had cleared the airfield and paved narrow asphalt runways. The following year, the U.S. Geological Survey published a topographical map of the St. Augustine. It depicted the airport in name only (Figure 3-11), and did not record any physical features associated with its development, perhaps as a wartime security measure (*St. Augustine Record*, 1, 5 September 1940).

In January 1941, the City passed a resolution to accept more federal aid to help speed the development of the airport, this time $60,000 from the Civil Aeronautics Administration (CAA). But, in March 1941, three encumbrances against the property in the form of mortgages threatened the CAA grant and to stall any additional WPA work. Perhaps discouraged with the glacial pace of runway development, various local agencies turned to discussing support facilities. In November 1941, J. Carver Harris of the St. Augustine Aero Club and the St. Augustine-St. Johns County Chamber of Commerce announced plans for a two-story administration building at the airport. They anticipated the design would include rooms for the CAA, the Department of the Navy, and for private pilot training. Although future plans called for a third floor with a tower, it remains unclear if any of the administration building was built in 1941 (*St. Augustine Record*, 3 January, 18 March, 25 November 1941).

After the United States entered World War II, development of the St. Augustine Airport by the Department of the Navy was "shrouded in official secrecy," a characterization provided by the *St. Augustine Record*. The federal government expropriated the property through Case Number 494-J, Civil, which it filed in the United States District Court, Southern District of Florida. When the Navy acquired the site, in addition to the airfield it contained two hangars. The Navy hired Jacksonville civil engineer Robert M. Angas to confirm the legal description, boundaries, and current condition of the airport. Angas prepared many early surveys and drawings of naval air stations and supporting fields in Florida and Georgia for the Department of the Navy. A native of England, Angas graduated from Georgia School of Technology in 1907 and began his career as a draftsman for the Jacksonville engineering firm of Phillips and Turnbull. Between 1908 and 1911, he supervised development of the Indian River Association's property at Hobe Sound, worked on construction projects in France during World War I, and then found employment with Chase & Company after returning to Florida. In 1924, Angas opened an engineering consulting business in Jacksonville. In the 1920s and 1930s, he helped develop projects for several leading Florida firms, including the Hobe Sound Company, Ponte Vedra Company, Telfair Stockton & Company, and

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← SUBJECT AREA

St. Augustine Outlying Field (OLF), 1942
(USDA 1942)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-10

Figure: 3-10
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

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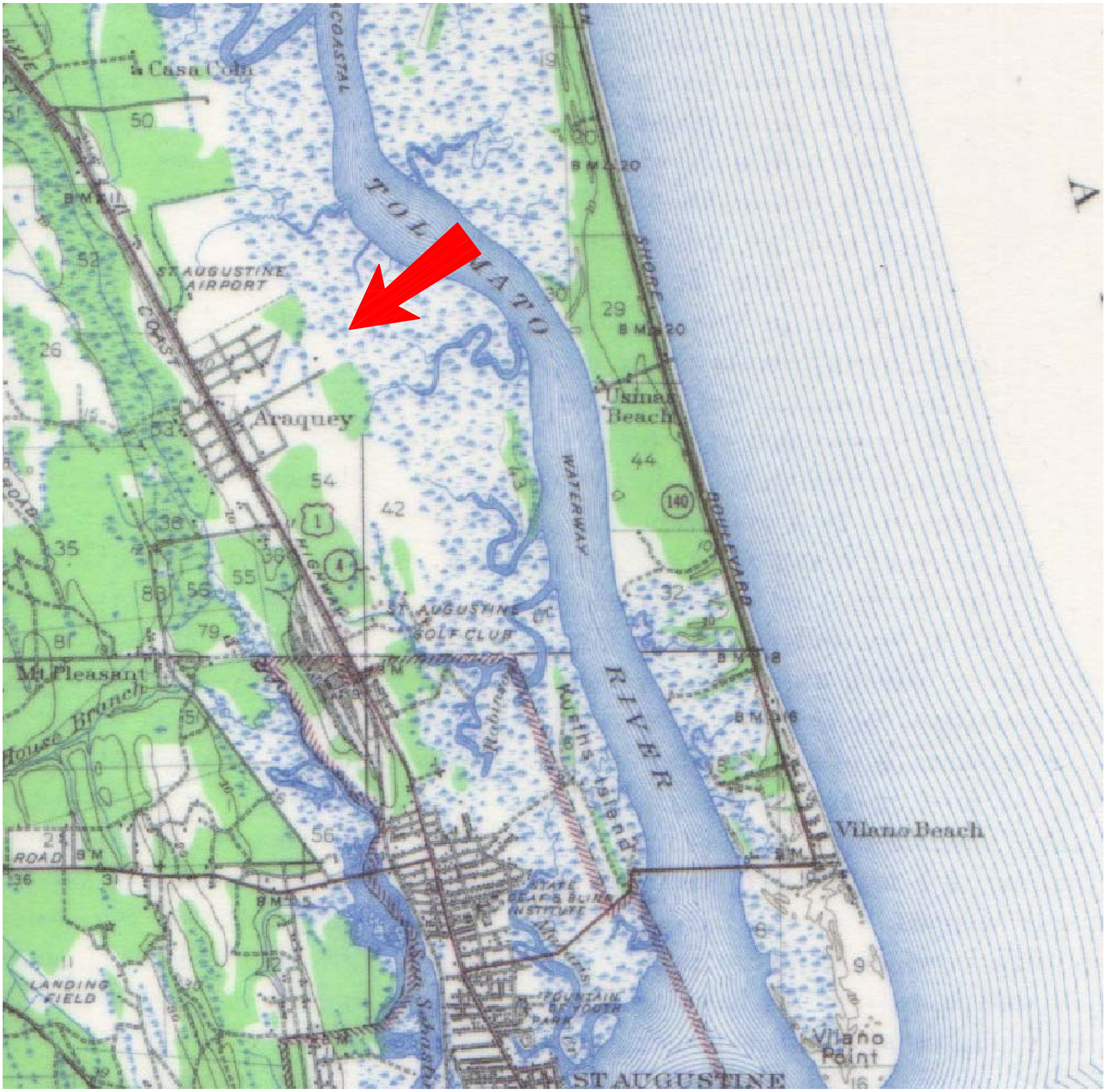
← SUBJECT AREA



St. Augustine Outlying Field (OLF), 1943
(USGS 1943)

Bland & Associates, Inc. Archaeological and Historic Preservation Consultants	An Intensive Cultural Resource Assessment Survey of the St. Augustine Airport Expansion St. Johns County, Florida *Figure 3-11*	Figure: 3-11 Project No.: BAIJ08010184.02 Scale: Not to Scale Date: May 2010

the Florida State Armory Board. During World War II, Angas prepared preliminary engineering studies for the Department of the Navy for naval air stations at Banana River, Datyona Beach, DeLand, Green Cove Springs, Jacksonville, Lake City, Mayport, Melbourne, Miami, Sanford, and Vero Beach. In addition, he helped lay out seventeen satellite landing fields with paved runways, eight grass training fields, a large machine-gun range, and bombing ranges. Following the war, his clients and projects included the Fernandina Port Authority, Gandy Bridge at Tampa Bay, and various citrus growers. In 1950, he formed a partnership with Russell De Grove and Richard Lampp. A fellow and president of the Florida Engineering Society, Angas served eight years on the Florida State Board of Engineering Examiners and later as chairman of the National Council of State Boards Engineering Examiners (Deed Book 169, p. 342 St. Johns County Courthouse; Dovell 1952 3:203-204).

In April 1942, Angas delivered to Lieutenant N.W. Herzberg, the officer in charge of construction at NAS Jacksonville, a "map of St. Augustine Field" that depicted the site with 276 acres consisting of "187 acres of firm land owned by the City of St. Augustine, 68 acres of salt marsh claimed or supposedly claimed by the City of St. Augustine, and 21 additional acres to be acquired by condemnation." The current project tract was located within the sixty-eight acres of salt marsh. As part of contract NOy-3651 with the Department of the Navy, Angas executed drawing number NAS 65-1-1, a topographical map of the "old CAA field" at St. Augustine, which he completed in 1943. Other facilities documented by Angas for the Navy in St. Johns County included Switzerland Outlying Field and Trout Creek Outlying Field. In mid 1942, confounded by the culture of secrecy at the airport, the *St. Augustine Record* contacted United States Senator Charles O. Andrews and Congressman Joe Hendricks about information pertaining to the airport. After receiving some information, the *Record* reported that the Navy had hired three contractors to adapt the St. Augustine Airport for use as an outlying field for gunnery training. Construction of OLF St. Augustine was supervised by the Duval Engineering and Contracting Company and George D. Auchter Company of Jacksonville and the Batson-Cook Company of West Point, Georgia. The improvements included providing one runway with an additional 100 feet in width, and constructing an armory and an operations building. The construction of those and various other buildings provided an impetus for the *St. Augustine Record* to report the city airport at various times as a naval air station or naval auxiliary air station, rather than its official Navy designation as an outlying field. The Navy began operations at OLF St. Augustine in late 1942 (PKY Angas Papers Box 1 File 36, Box 30 File 58; *St. Augustine Record*, 10 July, 2 September 1942).

The initial commanding officer at OLF St. Augustine was Lieutenant Kent Robinson and then Lieutenant-Commander Kimball Salisbury. Lieutenant Henry W. Colburn served as the gunnery officer who supervised a small contingent of enlisted men. The Navy quartered its OLF St. Augustine personnel in a nearby tourist camp rather than constructing a barracks at the field. The men maintained and equipped tow planes with target sleeves. Several other personnel manned a Navy crash boat and maintained contact with the field crew to respond to emergencies. Naval aviators stationed at Green Cove Springs were generally in the final stages of their training, and made regular use of the gunnery range near St. Augustine. In the spring of 1943, the Navy quartered and trained more than 2,500 pilots and enlisted men at Green Cove Springs. In May

1943, VF-1, CVG based in Clay County conducted gunnery practice using Grumman F4F Wildcat and Grumman F6F Hellcat fighter aircraft. Gunnery practice flights consisted of aircraft deployed from Green Cove Springs flying to St. Augustine, where they encountered tow planes trailing sleeves that they used for target practice. Other training exercises based at Green Cove Springs included camera gunnery, strafing and bombing, formation flying, and primary combat. Occasionally, fighter aircraft landed at St. Augustine. One of those in April 1943 was a naval fighter bearing seven small Japanese flag emblems, representing the number of destroyed Japanese aircraft by the naval aviator. In a "service special edition" of the *St. Augustine Record*, the editors published photographs of Grumman TBF Avenger torpedo bombers over OLF St. Augustine and a high-speed Navy crash boat. Typically, however, articles in the *Record* about the local Coast Guard station and the Army's nearby Camp Blanding easily outstripped coverage on OLF St. Augustine (*St. Augustine Record,* 25 April 1943; Coletta and Bauer 1985:221-222).

During the war, the *Record* followed developments associated with several nearby military installations. Chatterbox columns titled "Coast Guard Soundings" and "Blanding Bugle" provided weekly columns about St. Augustine's Coast Guard Station and Camp Blanding. Weekly sports columns identified baseball games between the Coast Guard's "Colonels," NAS Jacksonville's "Fliers," and teams at Mayport Naval Station and Camp Blanding. A selection of the *Record*'s wartime sports columns reveal no baseball games with teams from OLF St. Augustine. Several aircraft based at NAAS Green Cove Springs crashed in St. Johns County during training missions. One of those crashed six miles west of St. Augustine on the Tocoi Road and another on the beach between Atlantic Ocean and Salt Run. A third aircraft based at NAS Jacksonville crashed in the woods about six miles west of St. Augustine (*St. Augustine Record*, 21 April 1941, 3, 14 May, 23, 27 August 1943; 9 April, 28 May 1944).

In May 1946, the Department of the Navy returned the airport to the City, but held a revocable permit. The City agreed to maintained the airport in good condition and protect the government property located at the airport against loss and damage. After the municipal government discussed future operations at the airport, city officials designated Peterson Hall and Auerbach Haviland, former World War I pilots, as operators and concessionaires. The administration building was designated for the airport manager. In addition, the building designated as "R" on the Navy's map of the airfield, really a series of hutments joined together southwest of the administration building, was leased to Aero Marine, Inc. By September 1946, sixty citizens and former military personnel had utilized the airport for flight training. They included Andy Harrold, J. Dexter Phinney, and Doug Thompson. Some veterans took advantage of the G.I. Bill to earn their pilot's licenses at the airport. Flight Services, Inc. was among the early commercial flight instruction schools to operate at the airport. Some of those students included Kenneth Christie, Hiram Collins, Julian Lester, and Alva Touchton. Aircraft used to provide flight instruction included an Aeronca, Globe Swift, Republic Seabee, and Taylorcraft. Aero Marine, Inc. acquired a new Piper Cub to instruct pilots and also moored a seaplane near the inlet because the airport then had no seaplane ramp or channel to the Intracoastal Waterway (*St. Augustine Record,* 3, 5 May, 6 September, 16 November 1946, 12 June 1947).

In March 1947, the City established regular passenger service with Florida Airways connecting at Gainesville, Jacksonville, Lake City, Orlando, and Tallahassee. The commercial service included the first regular airmail into St. Augustine. That month, Hal Auerbach and Bill Haviland purchased a new Republic RC-3 Seabee, the least expensive all-metal amphibian aircraft then produced in the United States. In the post-war era, aircraft manufacturers anticipated that military pilots returning from overseas would purchase civilian planes for pleasure and sport. But, that market never materialized. Still, Auerbach and Haviland were so impressed by their first Seabee that they purchased a second, which Auerbach flew from Pennsylvania to St. Augustine. In 1948, responding to flagging sales, Republic ended production of the Seabee, one of the most successful sea-and-land planes produced in the 1940s. In addition, instructors and freshly-minted pilots made numerous flights from St. Augustine Airport, largely pleasure flights but some business trips. An instructor and businessman, Robert Peterson made aerial photography and fire patrol flights over the properties of the Robinson Improvement Company in St. Johns County in June 1947. Peterson also provided flight instruction to fifteen new pilots that year. After receiving their licenses, Chester Bennett and Frank Waters flew to Valdosta, Georgia and Franks Waters and his wife to Savannah. Cross-state solos became a popular pastime. In the first half of 1947, Herman Bowen, William Evans, Doris Holman William Jordan, Gilbert Kuter, and Robert Owen completed round-trip cross-state solos to Pass-A-Grille and other Gulf Coast destinations (*St. Augustine Record*, 18, 28 March, 12 June 1947).

In June 1947, the federal government through the War Assets Administration deeded the property associated with the airport to the City of St. Augustine. Citing the outlying field as surplus federal property, the conveyance transferred to the municipal government "All runways, taxiways, aprons, field marking and lighting, drainage system, communications system, wind tee, fueling, water, sewage, disposal and electrical systems." In addition, the government conveyed Buildings A, B, C, D, E,, F, G, H, I, and maintenance equipment that were "…the same property acquired by the United States of America in condemnation proceedings entitled United States of America, vs. 276 acres of land, more or less, in St. Johns County, et al, Case No. 494-J" (Deed Book 169, p. 344 Clerk of Court St. Johns County Courthouse).

Later that year, Beverly Whitfield of Orlando won an air show competition at St. Augustine Airport hosted by the Southeastern Section Convention of the Florida Chapter Ninety-Nines. Founded in 1929, the Ninety-Nines emerged as the largest and oldest organization of female pilots in the nation. Their mission consisted of promoting world fellowship through flight, providing networking and scholarships to young women, and preserving women in aviation. In August 1948, the Florida Chapter Ninety-Nines hosted St. Augustine's American Legion Air Show. The air show included races, low altitude inverted flights, and aerobatics by Whitfield and Betty Skelton of Tampa, the international aeronautics champion women's division (*St. Augustine Record,* 29 July 1948).

In July 1949, the City leased the airport to Jack Barber. But, declining revenues and decreases in commercial flights and pilot training compelled Barber to end the lease the following year. In September 1950, after failing to locate another lessee, the municipal government closed the airport. Owners of private aircraft could still maintain their planes and use the runways for flights "at their own risk." One of those was Governor Fuller Warren (1949-1953), who flew into St. Augustine in a DC-3 in 1951 to enjoy the premier of "Distant Drums," much of which was filmed at Castillo de Sans Marcos in St. Augustine Distributed by Warner Brothers, the movie was set in the Everglades during the Second Seminole War, directed by Raoul Walsh, and starred Gary Cooper as Captain Quincy Wyatt and Robert Barrat as General Zachary Taylor. At the airport, Warren met Sidney Capo, a young boy and native of St. Augustine who played the "half-breed son" of Captain Wyatt in the movie. Although the City closed all of its services at the airport, it permitted airplane owners to contact fuel oil companies in St. Augustine to deliver gasoline, oil, and other supplies to the airport. Most city commissioners agreed that since the end of World War II, the municipal government had largely failed to make the airport profitable. The small amount of traffic and activity at the site had resulted in little more than "a white elephant," a financial burden and a liability to taxpayers. In 1952, the U.S. Department of Agriculture developed aerial photographs of St. Johns County, including the airport. Unfortunately, the individual tiles depicting the airport are not available from the University of Florida. An index sheet, however, depicts the faint outlines of the airport (Figure 3-12) with its three World War II vintage runways (*St. Augustine Record*, 12 September 1950; FSA 1951).

In the early 1950s, the local government sought to revitalize the airport as a commercial venture with an adjacent industrial park. In 1954, after engaging in negotiations with several potential lessees, the municipal government succeeded in attracting Fairchild Engine and Airplane Corporation to St. Augustine for the operation of its aircraft division and to build a large aircraft modification plant. The State of Florida assisted in the effort by donating state lands around the airport to the company. By then, the company operated factories at Costa Mesa and Manhattan, California; Hagerstown, Maryland; Long Island, New York; Mesa, Arizona; and Wycliffe, Ohio. The company constructed a 30,000 square foot building to house a manufacturing facility, which it initially used to modify C-119 Flying Boxcars and C-123 Providers and manufacture Boeing B-52 components. In 1956, the U.S. Geological Survey published a topographical map of St. Augustine. It depicted the airport (Figure 3-13) with four runways. The fourth runway, Runway 13/31, was constructed about 1955, apparently, as part of the agreement with Fairchild to operate in St. Augustine. In addition, several new buildings were constructed along U.S. Highway 1. Fairchild operated out of the largest of those buildings. Established in 1920, Fairchild Aerial Camera Corporation expanded and reorganized into Fairchild Aviation Corporation in 1925. During its first decade of business, the company developed a number of subsidiary businesses, including aerial cameras, airplanes, engines, and instruments. In the 1930s, the company reorganized into the Fairchild Engine and Airplane Corporation and purchased Duramold Aircraft Corporation, Ranger Engineering Corporation, and Taylorcraft Aviation, Inc. By World War II, Fairchild manufactured military and private airplanes and parts, military and commercial aerial cameras, machine gun cameras, photographic laboratory equipment, aviation instruments, gun synchronizers, sound recording and broadcasting station equipment, audio amplifiers, radio compasses, navigational equipment and miscellaneous precision devices. By the early 1950s, Fairchild maintained manufacturing plants at Farmingdale, Roosevelt Field, and Valley Stream on Long Island, New York; a guided missile plant at Wyandanch, New York; and other manufacturing facilities at Pasadena, California and Hagerstown, Maryland (*St. Augustine Record*, 18 June 1954; *Wall Street Journal*, 22 June 1954; *Washington Post*, 23 August 1954, 4

LEGEND

⬅ SUBJECT AREA

St. Augustine Airport, 1952
(USDA 1952)

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Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-12

Figure: 3-12
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

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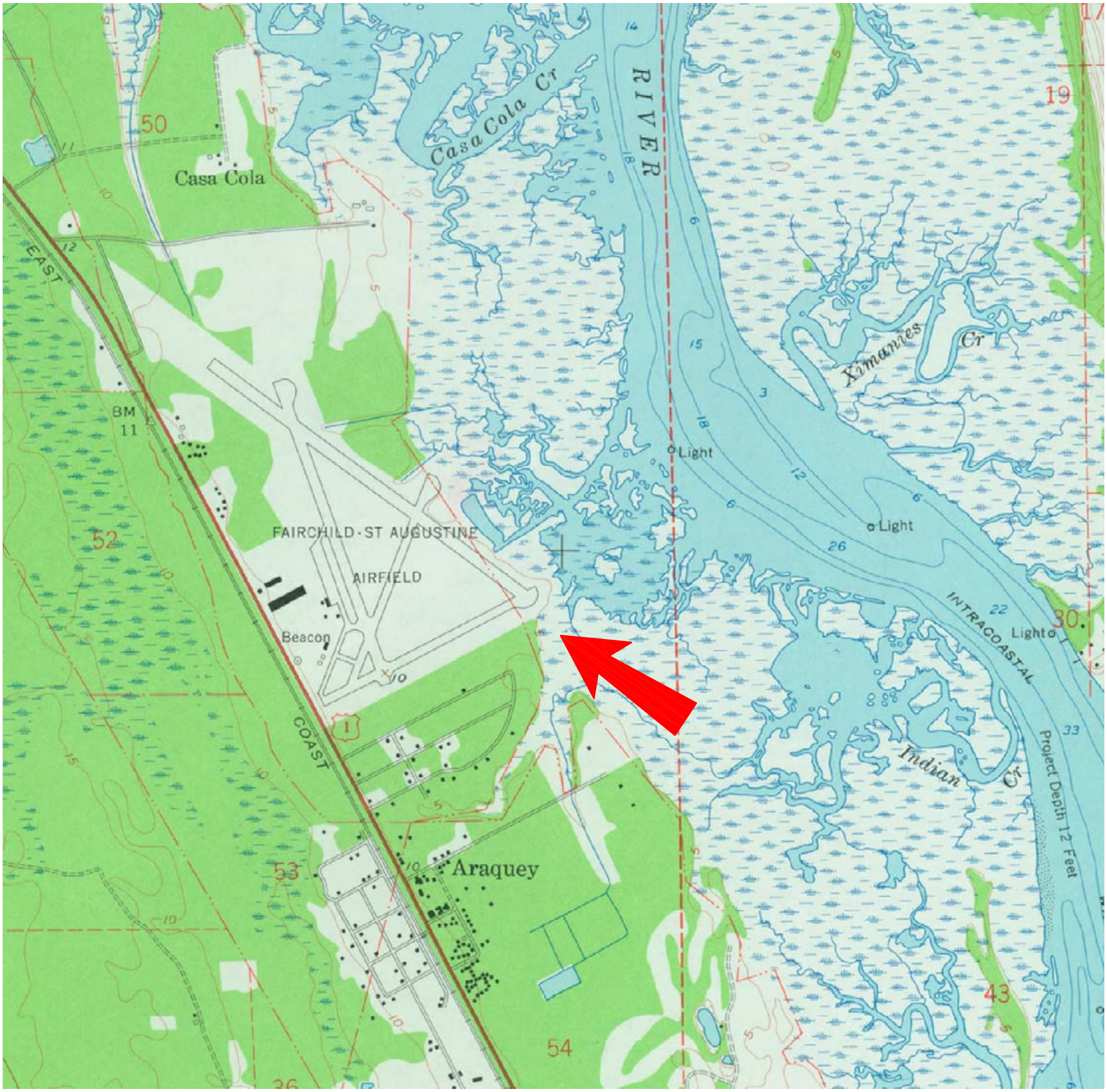
⬅ SUBJECT AREA



St. Augustine Airport, 1956
(USGS 1956)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-13

Figure: 3-13
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

August 1962; *New York Times*, 25 September 1925, 21 November 1936; Moody 1940:807-808; Moody 1953:1949).

Fairchild's plant in St. Augustine provided the company with a presence in the American South near a major naval air station and the St. Augustine Coast Guard Station. Fairchild built and modified a range of airplanes used by the Air Force, Coast Guard, and Navy. One of its earliest contracts in St. Augustine was modifying the C-82 Packet, an aircraft the company had developed during World War II. Designed by Fairchild for the Army Air Corps to transport cargo, personnel, and mechanized equipment, the C-82 was redesigned by Fairchild into the C-119 Flying Boxcar, which was produced at its Hagerstown, Maryland factory and made its initial flight in 1947. The U.S. Air Force made extensive use of the Flying Boxcar during the Korean War as a troop and equipment transport. Fairchild ceased production in 1955, but the aircraft was modified into the 1960s for a variety of uses. In 1962, Fairchild's St. Augustine factory repaired and inspected 200 C-119s. As late as 1969, Fairchild earned $15,200,000 for repair and modifications to Flying Boxcars. Fairchild also built and modified C-123 Providers for the Air Force into "flare ships," with night attack capability, and as "ranch hands" for defoliation missions in Vietnam. Fairchild also built and modified C-123 aircraft for the U. S. Coast Guard for search-and-rescue missions. Initially designed as an assault glider, the Provider became highly regarded for its ruggedness, reliability, and ability to operate from short and unimproved airstrips. It was also easily converted to a range of missions. In 1964, Fairchild executed a contract for $1,775,233 with the U.S. Air Force to convert Boeing KC-97 Stratotankers from in-flight refueling aircraft into air-sea rescue airplanes. Introduced in 1950, the Stratotanker was a variant of the older Boeing C-97 transport plane. The KC-97 served as the backbone of the U.S. Air Force's aerial refueling tanker fleet until its replacement by the Boeing KC-135 in 1978. One of the largest aircraft to land at St. Augustine Airport, the KC-97 had a crew of five, was powered by four engines, and weighed 82,500 pounds unloaded. Some variants of the KC-97 had four radial propeller engines and two jet engines (*St. Augustine Record*, 18 June 1954; *Washington Post*, 4 August 1962; *Wall Street Journal*, 14 January 1964, 12 June 1969; Swanborough and Bowers 1976; http://en.wikipedia.org/wiki/C-123_Provider Accessed 4.20.2010; http://en.wikipedia.org/wiki/KC-97_Stratotanker Accessed 4.20.2010).

Fairchild also modified World War II vintage Martin B-26 Marauders at St. Augustine Airport. A twin-engine aircraft with a reputation as a "widow maker" and "flying coffin," the B-26 was unpopular with many pilots. During the war, the aircraft was used for training purposes at Avon Park Army Air Field and MacDill Field in Tampa, where numerous crashes were reported. Still, many B-26s survived the conflict, and Fairchild modified sixty-two of those in 1957 for the U.S. Air Force and the Brazilian Air Force (*St. Augustine Record*, 18 March, 3 June 1956, 14 July 1957).

Beyond the construction of Runway 13/31, various improvements were made to the airport, in part, to accommodate the needs of Fairchild, in part, to support larger airplanes, and, in part, to meet federal requirements necessary for private industry to be eligible for government contracts. It appears that the highest percentage of air traffic at the airport then consisted of relatively large military aircraft converted, inspected, modified, and repaired by Fairchild. An aerial (Figure 3-14) prepared for the U.S. Department of Agriculture in 1960 depicted the airport with a newly-paved segment in Runway 13/31. In 1964, Runway 13/31 was extended 1,300 feet, and another extension was built in 1966. The southern extension of Runway 13/31 included filling wetlands and dredging a narrow channel from the Intracoastal Waterway to the newly-built extension. Aerials and topographic maps published in 1970, 1971, 1980, and 1988 (Figures 3-15, 3-16, 3-17, 3-18) illustrate a period of expansion and development at the airport. Some of that development came on the heels of the creation of the St. Augustine-St. Johns County Airport Authority. In 1963, the Florida Legislature authorized the St. Augustine-St. Johns County Airport Authority, a taxing district that the voters of St. Johns County approved in an election on 5 May 1964. The new authority was infused with annual funding levels that the City of St. Augustine previously had not been able to collect through its tax base. The governor appointed the first three authority members after which they were elected. In July 1964, at the organizational meeting X.L. Pellicer was elected chairman, and on 3 November 1964 voters approved a $900,000 bond issue for airport improvements. In 1965, the City of St. Augustine conveyed the airport property to the airport authority, and contracts were awarded for extending and lighting the runways. In 1966, a new administration building was constructed and two hangars built to accommodate either six single engine planes or four two-engine planes. In 1973, a federal grant for $54,500 built a Very High Frequency Omni Range Terminal, or TVOR, and provided new markings for one runway. In 1978, Runway 6/24 was extended eastward 200 feet. In addition, radio remote control and runway lighting devices were installed, and upward protrusions on glide paths were removed. Aerials taken of the airport in 1990 (Figure 3-19) indicate that during the previous decade a system of taxiways were built to support the runways. Beyond that improvement, the original northwest-southeast runway was converted to Taxiway B2 (*St. Augustine Record*, 24 November 1964, 20 March 1966, 20/21 March 1976, 4 December 1978, 24 November 1989; USDA 1980:12109-22; USDA 1990:1489-11).

Some alterations to the airport were made in direct support of its commercial partner. Fairchild overhauled the Navy's Martin P-5 Marlin (P5M), a large flying boat that entered service in 1951. In 1965, the seaplane ramp and taxi channel between the Intracoastal Waterway and the airport were built and dredged to accommodate Fairchild's modification of the seaplane. Aerials and topographical maps show clearly changes to the landscape and wetlands. The taxi channel initially measured 400 feet wide and 2,000 feet long. Pilots landed the aircraft in the waterway, idled along the taxi channel, up the seaplane ramp, and across the runway system into the Fairchild facility. There the company modified the Marlins for the Navy's Bureau of Weapons. Modifications made to the P-5M included raising the flight deck for improved visibility, replacing the nose turret with a radome, removing the dorsal turret, and streamlining the wing floats. The Navy deployed the P-5M during the Vietnam conflict for a variety of uses, including maritime surveillance and patrolling the Mekong Delta. In 1970, Fairchild modified fifty T-28B Trojans into T-28D fighter bombers for the U.S. Air Force. Built by North American between 1950 and 1957, the T-28 replaced the older T-6 Texan trainer. The Air Force deployed the T-28 on a limited basis during the Vietnam conflict as a counter-insurgency tactical aircraft with fighter-bomber capabilities. As modified by Fairchild, the Trojan's armament consisted of two or six mounted pylons capable of carrying bombs, napalm, rockets, and machine gun or canon pods.

LEGEND

⬅ SUBJECT AREA

St. Augustine Airport, 1960
(USDA 1960)

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Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-14

Figure: 3-14
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

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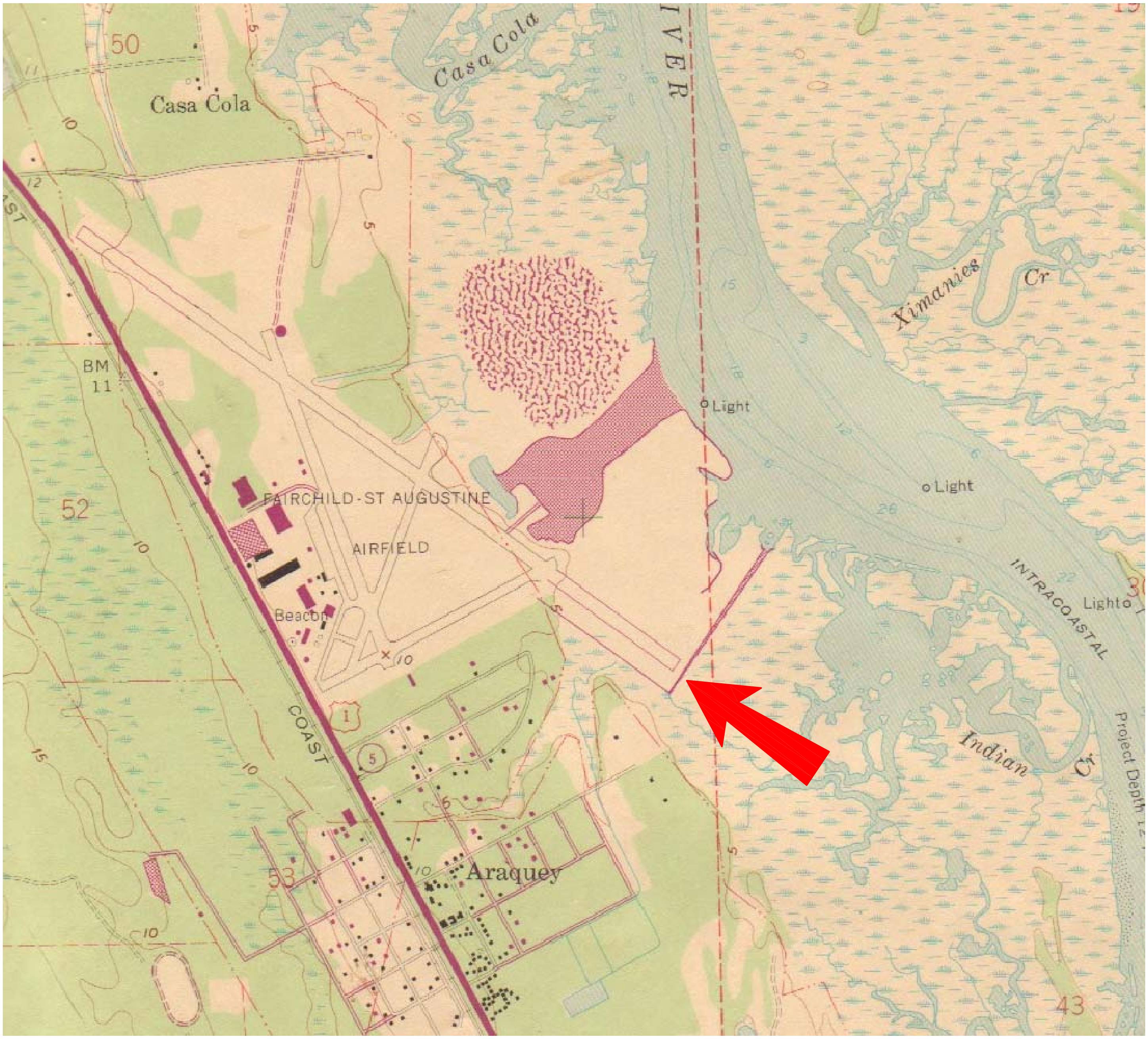

St. Augustine-St. Johns County Airport, 1970
(USGS 1970)

Bland & Associates, Inc. Archaeological and Historic Preservation Consultants	An Intensive Cultural Resource Assessment Survey of the St. Augustine Airport Expansion St. Johns County, Florida *Figure 3-15*	Figure: 3-15 Project No.: BAIJ08010184.02 Scale: Not to Scale Date: May 2010

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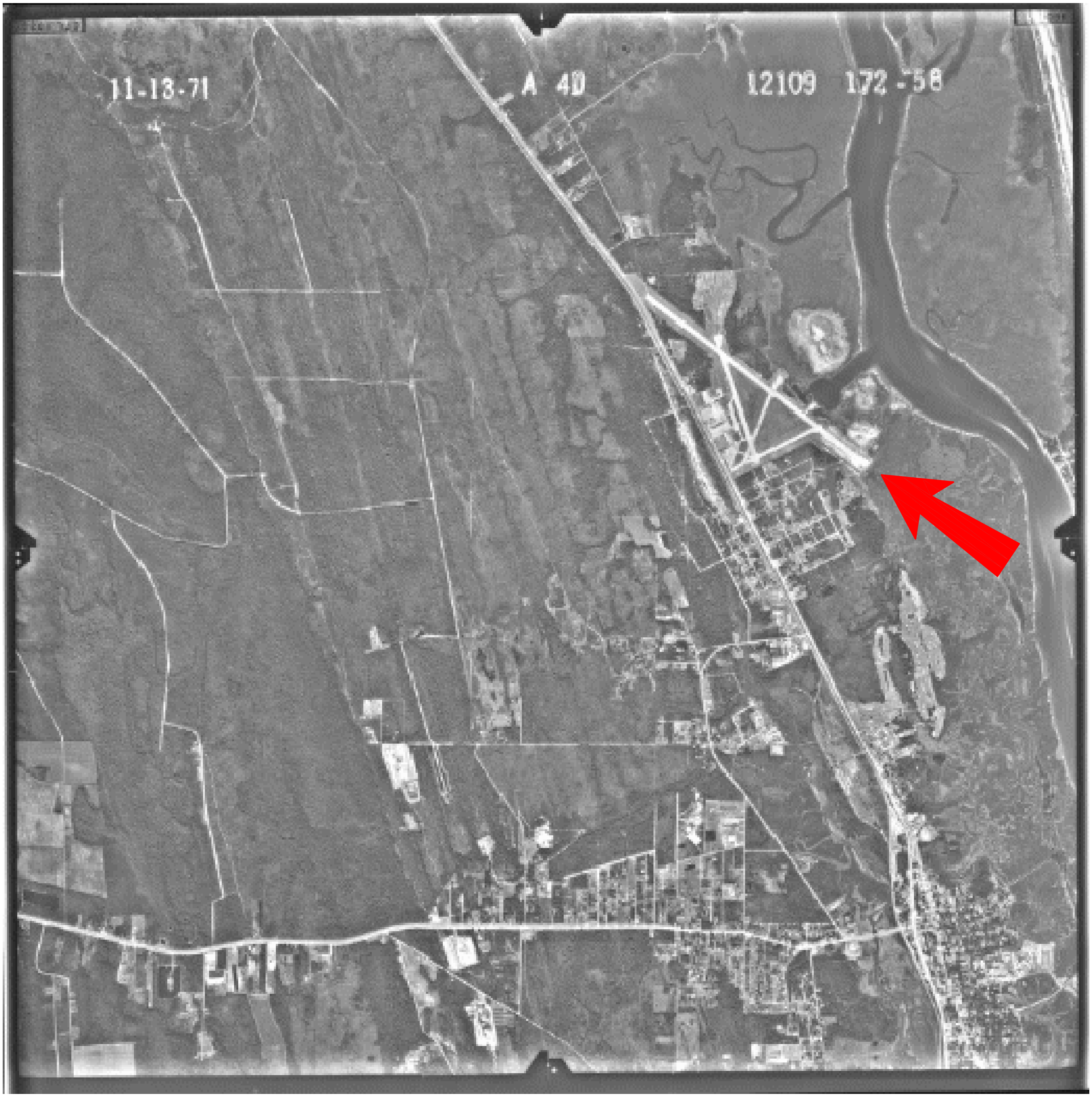
← SUBJECT AREA



St. Augustine-St. Johns County Airport, 1971
(USDA 1971)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-16

Figure: 3-16
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

LEGEND

← SUBJECT AREA

St. Augustine-St. Johns County Airport, 1980
(USDA 1980)

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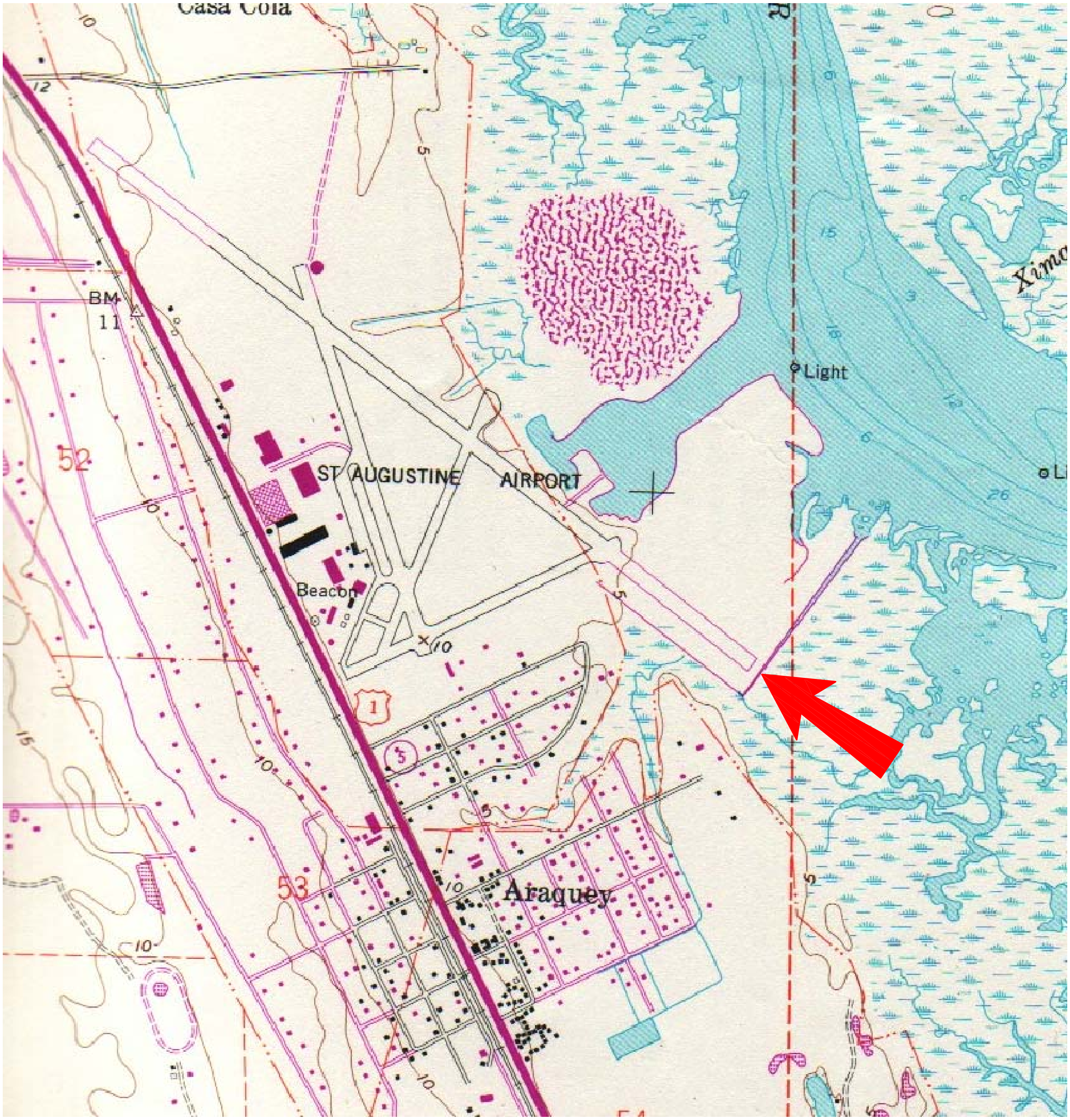
An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-17

Figure: 3-17
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

LEGEND

⬅ SUBJECT AREA



St. Augustine-St. Johns County Airport, 1988
(USGS 1988)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-18

Figure: 3-18
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

LEGEND

⬅ SUBJECT AREA

St. Augustine-St. Johns County Airport, 1990
(USDA 1990)

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An Intensive Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Figure 3-19

Figure: 3-19
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

In September 1976, when Fairchild left the airport's industrial park, St. Augustine lost 200 jobs and two decades of aircraft modification by one of the nation's leading aviation companies (*St. Augustine Record*, 18 March, 3 June 1956, 14 July 1957, 20 August 1965, 15 September 1976; Oyster and Meonch 1992; Swanborough and Bowers 1976; Thompson 1999; http://en.wikipedia.org/wiki/B-26_Marauder Accessed 4.20.2010).

The previous decade, the Moser family had established an agreement with the airport authority first as interim airport director and then as a fixed base operator. The authority's first fixed base operators experienced financial difficulties, which required the authority to make other arrangements until the authority hired the Mosers. Over the following decades, the Mosers developed the airport it into a viable commercial operation. A retired U.S. Air Force colonel and World War II pilot, Ernie Moser was a barnstorming pilot who designed and flew his own aerobatic shows. He included his son, James Moser, at the age of sixteen. Their "flying circus" became known "for landing [Piper] J-3 Cubs on small platforms built on top of moving pickup trucks." In 1966, the family began managing the airport. When they assumed control, the airport supported six private aircraft. In 1967, the Mosers incorporated Aero Sport, Inc., which executed a lease with the authority as a fixed base operator. The Mosers marketed the airport to develop a variety of general aviation services, and revived popular flying circuses. The airport became the site for regional meetings of the Experimental Aircraft Association. Eventually, the airport also supported corporate jets and aircraft owned by and/or serving the Florida National Guard, Professional Golf Association (PGA) Tour, and Ring Power Corporation (*Florida Times Union*, 30 June 1999).

In 1980, Grumman Aerospace, Inc. reached a preliminary agreement to acquire fifty-seven acre in St. Augustine's industrial park contiguous to the airport. The aircraft company organized Grumman St. Augustine Corporation, a subsidiary of Grumman Aerospace, Inc., to modify and overhaul aircraft. In 1985, Fairchild initiated negotiations with Grumman to acquire its St. Augustine factory. Grumman subsequently acquired, occupied, and adapted the former Fairchild facility for its manufacturing operations. Organized in 1929, Grumman initially built military aircraft for the federal government, but in 1936 expanded into the private sector. Between the 1930s and 1940s, Grumman designed and built a fleet of luxury amphibian aircraft for private industry. Those aircraft included the Duck, Widgeon, Grey Goose, and Mallard. During World War II, the company designed and built for the Navy the F4F Wildcat and the F6F Hellcat, two of the most successful fighters in naval aviation history, and the TBF Avenger. All carrier-based airplanes, the Wildcat and Hellcat were single-seat single-engine propeller-driven fighter aircraft and the Avenger a single-engine three-crew torpedo bomber. The folding-wing design developed by Grumman for those aircraft provided the Navy with reliable planes in combat and minimized the footprints of the planes aboard aircraft carriers. Later, near the end of the war, Grumman developed the F7F Tigercat. The first twin-engine aircraft used by the Navy and United States Marine Corps, the Tigercat continued Grumman's long line of "cat" named fighter aircraft. Between December 1941 and January 1944, Grumman constructed 6,746 airplanes and sales reached $323,749,331 in 1944. By the end of the war, the company had built 16,945 combat aircraft. In addition, General Motors built another 13,473 Grumman-designed aircraft. After the war, however, Grumman's annual sales declined to $24,241,248. But, with the onset of the

Korean War in 1950 sales and production again rose. In 1994, Northrup Corporation acquired Grumman and Vought Aircraft, and two years later the defense and electronic systems division of Westinghouse Electric Corporation. In the 1990s, California-based Northrup Grumman Corporation was the major contractor of the B2 bomber (*New York Times*, 2 October 1941, 24 March 1994, 20 April 1995; *Wall Street Journal*, 18 June, 12 August 1980; *St. Augustine Record*, 31 October 1985; Moody 1940; 547; Moody 1953:1179; Grumman 1946:121; Grumman History Center Archives).

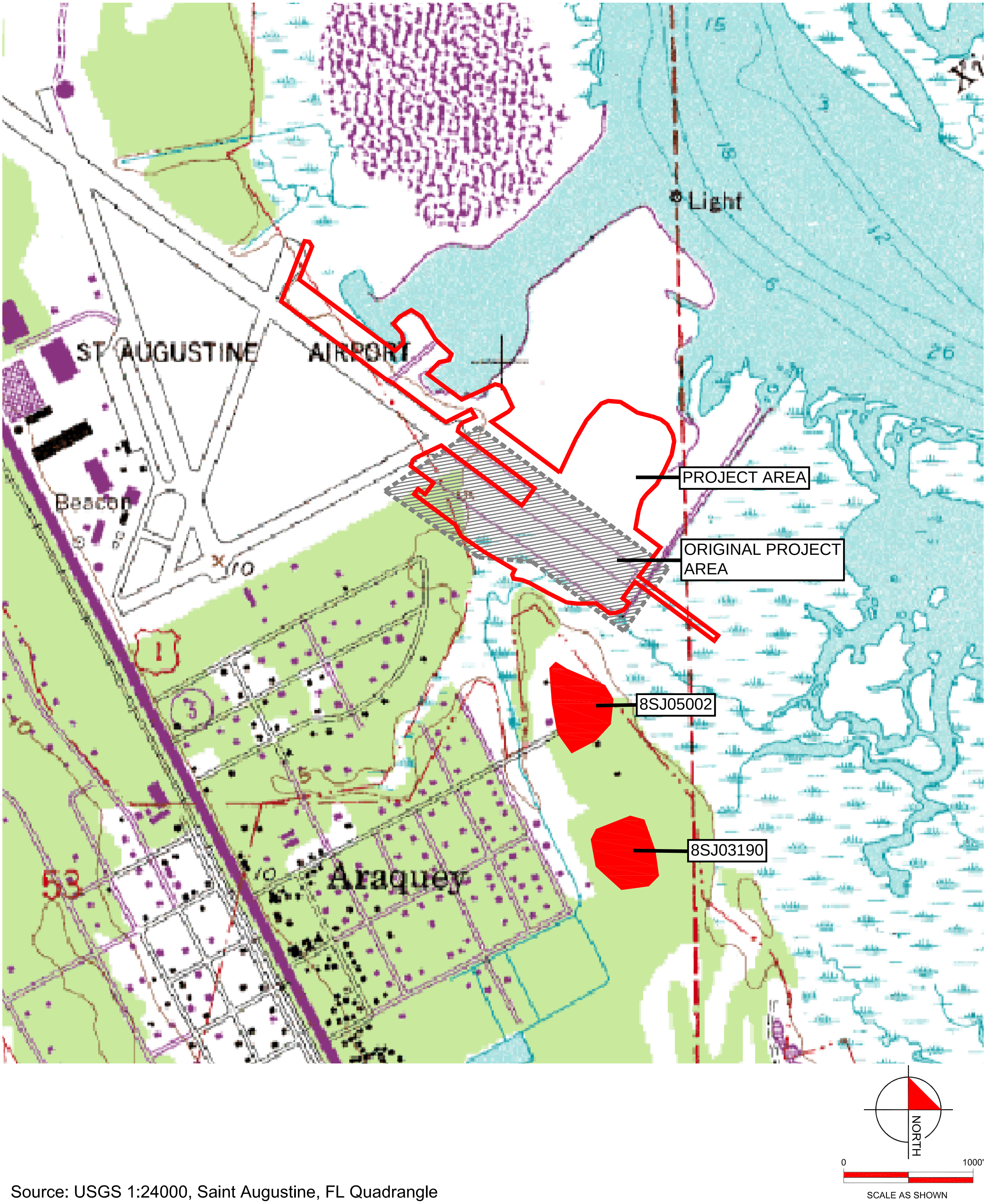
In the early 1990s, the St. Augustine-St. Johns County Airport Authority hired Reynolds, Smith and Hills, Inc. of Jacksonville to design a new terminal building. In 1994, the Shah Construction Company supervised construction of the facility. In the 1990s, Aero Sport, Inc. became the distributor of the German-built Extra aerobatic plane and opened a aerobatic school at the airport. An increase in take off-and-landings compelled the construction of an air control tower and then expansion into the Araquay Park Subdivision. By 1999, the Moser family had helped build the airport into the home for approximately 250 aircraft. In 2003, public officials dedicated Moser Terminal "in grateful appreciation of the effort and dedication of the Moser Family to the development of the St. Augustine Airport." That year, Michael Slingluff, Aero Sport's president, said, "We've gone from grassroots to business aviation… [yet] We continue to service the needs of sports aviation. On a daily basis, 20 to 30 jets are arriving and departing St. Augustine Airport for destinations worldwide. The attraction of the airport lies in the ease of access in and out, the close proximity to Jacksonville's south side, and the growing business environment in St. Johns County." In 2006, Galaxy Aviation, an upscale fixed based operator, acquired Aero Sport, Inc. and presently operates out of St. Augustine-St. Johns County Airport. In 2010, *U.S. News & World Report* rated St. Augustine among the best places in the nation to live, in part, because of its employment sector, including Northrup Grumman Corporation ("Best Places," *U.S. News & World Report*, April 4, 2010; *Florida Times Union*, 30 June 1999; *St. Augustine Record*, 20 April 1999, 5 December 2003).

IV. PREVIOUS RESEARCH

William Bartram (1958:42-43, 349-350) was among the first to mention the presence of prehistoric archaeological sites in Florida, when, in the 1770s, he noted earthen Indian mounds outside Old Town Fernandina in Northeast Florida. Later nineteenth century investigators of Florida antiquities included Brinton (1859, 1872), Wyman (1868, 1875), Mitchell (1875), Stearns (1869), and LeBaron (1884). Among the most well known individuals in early Florida archaeology was a wealthy Philadelphia socialite named Clarence B. Moore (1896), who excavated sand burial mounds in Florida and throughout the southeastern United States in the1890s. Although some sites were investigated in the middle 20th century by researchers such as Goggin (1951) and Wiley (1949), prior to the 1970s relatively few archaeological investigations had been conducted within St. Johns County. However, this situation changed with the emergence of legally mandated archaeological investigations. Cultural resource management (CRM), as it is now called, has changed the pace and scope of archaeology within the Southeast. Most CRM projects are funded by governmental agencies or private organizations responsible for certain kinds of construction or development projects. Under specific conditions, these entities must fulfill legal requirements concerning the proper recording and evaluation of archaeological sites and cultural resources before their undertakings can commence. Since 1970, several hundred archaeological, architectural, and historic resource investigations have been conducted within St. Johns County. These investigations have preceded municipal, commercial, and residential development; road and bridge construction or modification; pipeline construction; and cell tower and utilities installation. Today, there are over 12,000 cultural resources recorded in the county.

In regard to St. Johns County, a 1987 survey by Stanley Bond located numerous historic period resources from the British and Second Spanish periods. In addition, the presence of 19th century sites associated with the turpentine industry was noted throughout the County; Bond (and others) have observed that Herty cup fragments indicative of 20th century turpentine activities are commonly observed in the pine forests (Smith and Bond 1984; Blount 1993; Butler 1998). While no previously recorded cultural resources occur within or adjacent to the current project tract, a review of the archaeological site file records maintained by the Florida Master Site File (FMSF) indicated that two archaeological sites had been previously recorded in the general vicinity of the project tract. In addition, other such resources or archaeological sites might occur within the current project tract, thus necessitating this regulatory survey. These previously recorded sites are reviewed below (Figure 3).

<u>8SJ05002</u>: Site 8SJ05002 was recorded in 2006. The site is located in St. Johns County, Florida and can be found on the USGS St. Augustine, FL (1992) map in Section 13 of Township 6 South, Range 27 East. This site is called the “Sesona Midden” site. It is a late prehistoric shell midden from the Late Archaic period. The site appears to be the northern extension of Araquey Midden. This site has not been evaluated by the SHPO.



Source: USGS 1:24000, Saint Augustine, FL Quadrangle

Bland & Associates, Inc.
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Addendum Report to the Cultural Resource Assessment
Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Previously Recorded Sites

Figure: 3
Project No.: BAIJ08010184.02
Scale: 1" = 1000'-0"
Date: May 2010

8SJ03190: Site 8SJ03190 was recorded in 1987. The site is located in St. Johns County, Florida and can be found on the USGS St. Augustine, FL (1992) map in Section 54 of Township 6 South, Range 29 East. This site is called the “Araquey Midden” site. This midden was the location of the 18th century Guale/Mocama Indian village Capuaca. Eight loci were investigated at 8SJ3190, revealing over 300 postholes and 105 features, including a square structure, a well, a hearth, and several trash pits. Two clusters of agricultural furrows in the center of the site appear to be related to the operation of the plantation associated with the nearby Sanchez residence (8SJ3228). This site is potentially eligible for NRHP (April 16, 2004).

V. RESEARCH DESIGN AND METHODOLOGY

5.1 Research Design

A project-specific research design was developed before fieldwork commenced. Its formulation was preceded by: a review of FMSF records to identify the location of previously recorded archaeological sites within or near the project area: an examination of St. Johns County soil maps (USDA 1983) and archaeological predictive model: an inspection of historic and modern aerial photographs to search for extant or inactive waterways, vegetative patterns, roads, disturbed areas, or other anomalies relating to past human activity; a review of the St. Augustine, Florida, USGS topographic quadrangle maps; and a review of numerous historic maps. The assumption behind this kind of pre-fieldwork planning is that human activities tend to be carried out in locations that afford maximum access to desired or culturally important resources; this tendency is often repeated so that it is patterned and consistent enough to be predictable. The results of other cultural resource assessment surveys conducted in the vicinity, combined with the specific topographic and soil characteristics, can suggest the potential presence of archaeological sites.

5.2 Field Methods

Field methods used during the present investigation included subsurface shovel testing and surface inspection in areas of exposed ground surface. Shovel testing was conducted throughout the project tract. Tests were spaced in order to compensate for the presence of push piles, wet and low-lying areas, and currently existing landform modifications such as paved areas. Horizontal accuracy was maintained through the use of Suunto, KB-44 and KB-77, line-of-sight handheld compasses. As recommended by the office of the Florida State Historic Preservation Office (SHPO), all shovel tests were approximately 50-cm square and dug to a depth of at least one meter below surface. Following completion of the shovel test to a depth of 100 cmbs (1.0 mbs), a AMSL steel auger was then used to drill the test even deeper to achieve a total subsurface depth of 2.62 mbs. All excavated soils were sifted through ¼” wire mesh.

Surface inspections were also extensively conducted in clearings and disturbed areas; surface visibility was good in some locations since portions of the project tract consisted of broken grassy areas. In addition, close attention was also paid to vegetational or soil patterns that might mark the location of any cultural resource. Relevant field information was recorded for each shovel test, which included shovel test number and location, soil conditions, stratigraphic description, degree of disturbance, and depths at which artifacts were recovered. All shovel test locations were plotted on a boundary survey map supplied by the client.

5.3 Procedures to Deal With Unexpected Results

Archaeologists frequently encounter unanticipated features that require efforts that exceed the scope of project expectations. In such cases it is sometimes necessary to reevaluate the research design and/or seek additional funding to address unexpected discoveries. It is our policy to amend a project research design as needed to ensure that proper treatment and evaluation are afforded to unexpected findings. Coordination with the county and the office of the SHPO is a necessary step in such an approach. Unexpected findings might include the discovery of human remains, which would require additional coordination with the state archaeologist in compliance with Chapter 872.05, Florida Statutes, or a medical examiner if the remains appear less than 75 years old. The recovery of unexploded ordinance or hazardous materials (HAZMAT) would also constitute an unexpected discovery.

5.4 Informant Interviews

Local residents can often provide a wealth of information about a project tract. Informant interviews are always conducted with the client. The client is specifically asked about numerous historic topics such as battlefields, cemeteries (marked and unmarked), structures (residential and commercial), previously recorded cultural resources, historic markers, previous property owners, historic land use and improvements (industrial and agricultural), roads, waterways, docks, and any other relevant factors. If possible, we also speak with the project tract neighbors, as well as the current inhabitants of the project tract during the fieldwork phase of each project, if such people exist. Also, a copy of each report is provided to any pertinent, CLG (Certified Local Government) historic preservation professional. Informant interviews and historic property usage patterns as reviewed in any available environmental reports are also reviewed, as are property appraiser records. We also check local county history data (local historic society books, websites, local librarians, etc.) as well as our in house collection of historic aerials and historic maps (USDA, USGS, DOT) and atlases. Specifically for his project, Kevin C. Harvey, the Operations Manager for the St. Augustine Airport Authority, provided valuable assistance.

5.5 Laboratory Methodology

Because no artifacts were recovered, laboratory processing and analysis was not necessary. All field documents pertaining to the survey were labeled and packed for permanent curation. Presently, field documents, photographs, notes, forms, drawings, and maps are being housed at the BAI laboratory pending selection of a permanent curation facility.

5.6 Defining Cultural Resources and Archaeological Sites

The goals of the present survey were to locate and define cultural resources within the project area and to evaluate their significance and potential for contributing additional data through future research. *Cultural resources* are nonrenewable and historical resources that include archaeological sites, architectural features, and objects (natural and human-made) associated with human activity. An *archaeological site* is a discrete and potentially interpretable locus of cultural material. For the present study, an archaeological site was defined as a concentration of two or more artifacts (older than 50 years) within 30 m of each other that indicate past human activity within area they were recovered. Finds consisting of only one artifact older than 50 years are referred to as *isolated finds*.

5.7 Issues of Significance

All recorded cultural resources must be evaluated with respect to their eligibility for inclusion in the *National Register of Historic Places (NRHP)*. Determinations of site significance are made with reference to the guidelines established by the Department of the Interior for eligibility to the *National Register of Historic Places*. In order for an archaeological site (cultural resource) to be deemed significant in the legal sense, it must satisfy one (or more) of four rigid criteria (labeled A through D) established in 36 Code of Federal Regulations (CFR) Part 60.4. These include:

Criterion A: association with important events (or patterns of events) in prehistory or history.

Criterion B: association with important people of the past.

Criterion C: possess distinctive characteristics of a type, period, or method of construction, architecture, etc.

Criterion D: known or likely to yield data important in prehistory or history.

In practice, these criteria must be applied to each component of all cultural resources that occur within a project tract. Most historical or archaeological sites generally qualify under Criterion D; i.e., have yielded or are likely to yield information important to interpretation of the past. In accordance with *National Register Bulletin 15* (National Register Branch 1982, as revised 1995:39-50), cultural resources must be assessed with regard to "seven aspects of integrity:" location, design, setting, materials, workmanship, feeling, and association. To "retain historic integrity, a historic property will always possess several, and usually most, of the aspects" (National Register Branch 1982, as revised 1995:44). Traditionally, artifact frequency, artifact diversity, site integrity, and site clarity (Glassow 1977), as well as the ability of the site to contribute to the regional and theoretical database (Butler 1987:821-826) are the physical and substantive characteristics upon which an archaeological site is evaluated.

In sum, significant cultural resources are those meeting the criteria of eligibility for inclusion in the *National Register of Historic Places*, based upon interpretations of site integrity, preservation, uniqueness, and future research potential. According to the National Historic Preservation Act (NHPA), any significant cultural resource included in or eligible for *NRHP* is deemed a historical property.

5.8 Historic Research Methodology

The methodology for the historical context associated with this report consisted of researching, compiling, and preparing a historical narrative associated with the specific tracts investigated by the archaeologists and historian. Research was conducted at the Clerk of Court, Recording Department at St. Johns County Courthouse, St. Augustine, Florida; St. Augustine Historical Society Research Library in St. Augustine, Florida; P.K. Yonge Library of Florida History, and Map Library, University of Florida in Gainesville, Florida. The research furnished contextual references that assisted in understanding the historic patterns of land use and ownership and development at the airport. Following the research, an outline and strategy were devised to prepare a historical report. In conjunction with composing the narrative, illustrations were incorporated into the text to help the reader visualize the history of the project area.

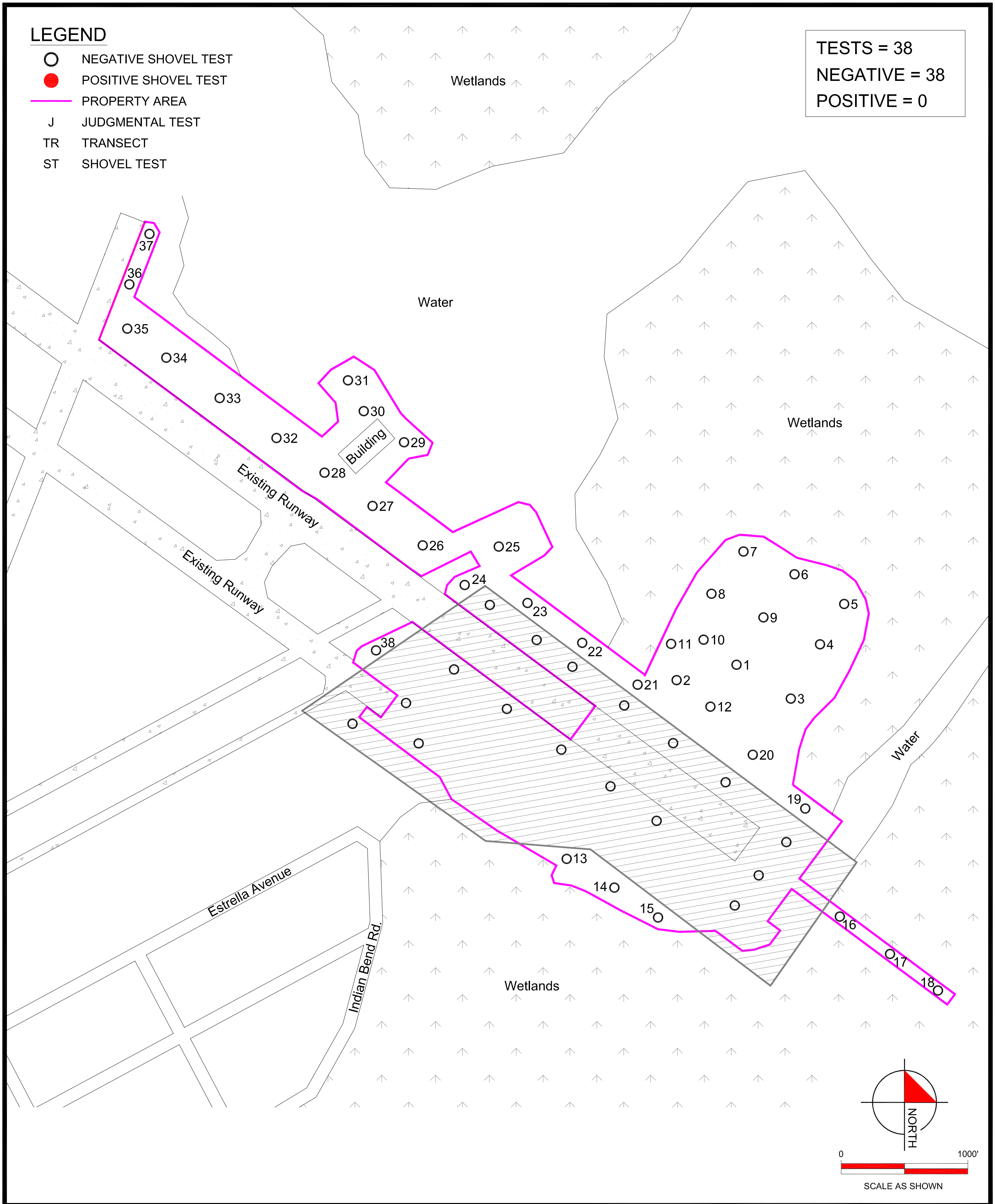
VI. RESULTS OF INVESTIGATION

6.1 Testing Results

Records maintained at the FMSF indicate that the project tract does not contain any historic structures or archaeological sites. A review of the American Battlefield Protection Program (ABPP) database to check whether the project tract encompassed any historical battlefields indicated no military sites were near the project vicinity. A review of the Scenic America Organization (SAO) and the Alliance of National Heritage Areas (ANHA) holdings to determine the presence of historic corridors indicated the project tract does not border any scenic byways governed by a corridor management plan. The 1917 St. Augustine USGS (1:62500) quadrangle map (USGS 1917), the 1924 USDA soil map (USDA 1924), the 1983 USDA soil map (USDA 1983), and the current USGS (1956, photo-revised 1992) quadrangle map all indicate the absence of structures within the project tract at those times. As reviewed in Chapter III, numerous other historic maps and aerial photographs indicate the absence of historic structures within the project tract. As the historic aerial photographs and documentation reviewed in Chapter III indicates, the current project tract consisted entirely of marsh before it was filled for use as an airport in the 20th century.

The project tract currently contains portions of runways associated with the St. Augustine Airport. Several pedestrian surveys were conducted in clear areas, and along road-cuts and ditches, and within other areas of subsurface disturbance. BAI personnel were accompanied by St. Augustine Airport escorts at all times while in the field. No historic artifacts, historic land improvements, historic docks, or prehistoric artifacts were noted on the exposed ground surface during these pedestrian surveys; no historic structures were encountered. The entire project tract was extensively tested with (Figure 4) thirty eight subsurface tests; these tests were placed in the grassy medians and accessible areas around the currently existing runways, ramps, lighting systems, and buildings.

All shovel tests were negative for cultural material, and each test encountered fill materials consistent with the mapped soil type, which consisted of disturbed soil associated with the Urban Land Complex. At a depth of 100 centimeters below surface (cmbs), all of these tests were deep augered to depths below 262 cmbs in order to test for deeply buried deposits; these auger tests encountered buried, water-logged, dark grey muck and the water table. Each test was carefully back-filled, packed, and re-covered; extra care was taken to ensure that each test was returned to a completely flat surface. It should be noted that tests were not marked with flagging tape, pin flags, or anything else due to the relative proximity of aircraft operating along the flight line; nearly all shovel tests were photographed while in progress. In summary, all subsurface tests and pedestrian surveys were negative, and no artifacts, isolated finds, historic standing structures, or historic structural remnants were encountered.



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Addendum Report to the Cultural Resource Assessment Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Shovel Testing Results

Figure: 4
Project No.: BAIJ08010184.02
Scale: 1" = 1000'-0"
Date: May 2010

Figure 6-1: Auger Test In Banded Fill

Figure 6-2: Auger Test In Banded Fill At Water Table

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Addendum Report to the Cultural Resource Assessment Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Photos

Figure: 6-1, 6-2
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

6.2 The St. Augustine Airport (8SJ05465)

No historic structures were encountered within the project tract. Specifically, no World War II era structures exist at the St. Augustine Airport. However, some portions of the underlying runway lay-out may or may not conform to the original pattern of the historic runways from that era. Based upon these results, and in consultation with DHR, the St. Augustine Airport and its runways was generally recorded with Florida Master Site File (FMSF) Resource Group (RG) Form Number 8SJ05465 in order to note its World War II era history. All Ancillary data, such as the completed Florida Master Site File (FMSF) Forms and a FMSF Survey Logsheet, were filed with the FMSF and are also provided in the Appendices of this report. A complete history of the airport follows.

<u>The St. Augustine Airport (8SJ05465)</u>: On 11 January 1934, the City of St. Augustine acquired the property subsequently developed into its airport. The municipal government used a blending of funds from New Deal agencies to complete the airport's initial development. The Civil Works Administration (CWA) and Federal Emergency Relief Administration (FERA) provided initial grants. Then, the City submitted a series of applications to the Works Projects Administration (WPA), one of the longest-running of the New Deal agencies. By October 1936, the WPA had initiated clearing runways for a three-way airfield. The runways extended, roughly, in north-south, northwest-southeast, and northeast-southwest alignments converging near the southwest corner of the airport and the Dixie Highway. By March 1937, the WPA had assisted in the completion of two small hangars, was constructing an administration building, but had shelved plans for a larger hangar. In February 1938, the federal government authorized another WPA project for $15,950 to complete the runways. Project managers selected asphalt for the paving surface because concrete was too expensive and grass too dangerous in proximity to the Tolomato River and for the humid climate. But, funding shortfalls prevented completion of the project, which only cleared and leveled some of the runway system and left it unpaved (*St. Augustine Record*, 16 March 1934, 29 October 1936, 16 March 1937, 16 February 1938, 28 March 1940).

St. Augustine Airport benefited from the nation's increased military defense expenditures after war broke out in Europe in June 1939. In August 1940, Roy Schroder, the state WPA administrator, authorized another WPA project at the St. Augustine Airport, this time for $29,085. Subsequently, the WPA authorized another $110,000 grant to improve the airport. The 1940 WPA project consisted of draining and grading around the airfield and extending and widening the runways, along with the installation of lights. In his comments to the *St. Augustine Record*, Schroder indicated that airfields in St. Augustine and Orlando were being improved as "pertinent to the interest in the general defense program now being carried on in Florida by the Navy and War Departments." The *Record* suggested that the two airports "will be used as auxiliary air bases, the local base for the Jacksonville Naval Air Station" (*St. Augustine Record*, 4 April, 26 July, 22, 28, 30 August, 7 November 1940).

The St. Augustine Airport derives its World War II significance through its association with the Jacksonville Naval Air Station (NAS), which became one of the largest naval air stations on the east coast. Naval air station historian M.L. Shettle, Jr. indicated that three naval auxiliary air stations—Cecil Field, Green Cove Springs, and Mayport—supported NAS Jacksonville with. In addition, twelve outlying fields supported NAS Jacksonville and its auxiliaries, including St. Augustine Outlying Field (OLF). During World War II, OLF St. Augustine supported NAAS Green Cove Springs, also known as Lee Field, for gunnery training of naval aviators and for familiarization purposes (Shettle 1995 1:7, 91, 103, 233; Furer 1959: 381; "Building for Defense," 1940:37).

On 1 September 1940, municipal officials reached an agreement with Commander V. F. Grant of NAS Jacksonville to use St. Augustine Airport as an outlying field for the naval air station. The agreement stipulated that the Navy would begin operations as soon as the WPA completed its clearing and paving project. The *Record* reported that "The training program at the airport will find a commander here each day during the training hours, after which private ships will be permitted free use of the field. This means that each afternoon after about 3:30 o'clock, and all of Saturday and Sunday, the field will be open for private use." Commander Grant expressed high praise to the city's officials and residents for their cooperation. He estimated that the airport would initially support NAS Jacksonville several hours each day, but not on the weekends. Later that week, the WPA assigned seventy-six laborers to the airport project, anticipating they would complete the "…leveling and grading of runways, and construction of drainage ditches, and other incidental work to make the field suitable for the planes expected to be stationed here every week as part of the national defense program." The WPA estimated the project would be completed in December 1940. But, in November 1940, the city hired civil engineer C. M. Johnson to survey the airport so it would conform to the Civil Aeronautics Authority (CAA) defense expansion program in Florida. Johnson was to survey the location for "…three runways 500 feet wide with the center 150 feet paved, the runways will run east and west, north and south, and southwest and northeast, and will range from 3,500 to 4,500 feet in length." Speculating on the future development of the airfield, the *Record* reported that "…it may be necessary to fill in the marsh on the eastern side." An aerial taken in February 1942 indicates the WPA project had cleared the airfield and paved narrow asphalt runways. The following year, the U.S. Geological Survey published a topographical map of the St. Augustine. It depicted the airport in name only, and did not record any physical features associated with its development, perhaps as a wartime security measure (*St. Augustine Record*, 1, 5 September 1940).

In January 1941, the City passed a resolution to accept more federal aid to help speed the development of the airport, this time $60,000 from the Civil Aeronautics Administration (CAA). But, in March 1941, three encumbrances against the property in the form of mortgages threatened the CAA grant and to stall any additional WPA work. Perhaps discouraged with the glacial pace of runway development, various local agencies turned to discussing support facilities. In November 1941, J. Carver Harris of the St. Augustine Aero Club and the St. Augustine-St. Johns County Chamber of Commerce announced plans for a two-story administration building at the airport. They anticipated the design would include rooms for the CAA, the Department of the Navy, and for private pilot training. Although future plans called for a third floor with a tower, it remains unclear if any of the administration building was built in 1941 (*St. Augustine Record*, 3 January, 18 March, 25 November 1941).

After the United States entered World War II, development of the St. Augustine Airport by the Department of the Navy was "shrouded in official secrecy," a characterization provided by the *St. Augustine Record*. The federal government expropriated the property through Case Number 494-J, Civil, which it filed in the United States District Court, Southern District of Florida. When the Navy acquired the site, in addition to the airfield the airport contained two hangars. The Navy hired Jacksonville civil engineer Robert M. Angas to confirm the legal description, boundaries, and current condition of the airport (Deed Book 169, p. 342 St. Johns County Courthouse; Dovell 1952 3:203-204).

In April 1942, Angas delivered to Lieutenant N.W. Herzberg, the officer in charge of construction at NAS Jacksonville, a "map of St. Augustine Field" that depicted the site with 276 acres consisting of "187 acres of firm land owned by the City of St. Augustine, 68 acres of salt marsh claimed or supposedly claimed by the City of St. Augustine, and 21 additional acres to be acquired by condemnation." As part of contract NOy-3651 with the Department of the Navy, Angas executed drawing number NAS 65-1-1, a topographical map of the "old CAA field" at St. Augustine, which he completed in 1943. In mid 1942, confounded by the culture of secrecy at the airport, the *St. Augustine Record* contacted United States Senator Charles O. Andrews and Congressman Joe Hendricks about information pertaining to the airport. After receiving some information, the *Record* reported that the Navy had hired three contractors to adapt the St. Augustine Airport for use as an outlying field for gunnery training. Construction of OLF St. Augustine was supervised by the Duval Engineering and Contracting Company and George D. Auchter Company of Jacksonville and the Batson-Cook Company of West Point, Georgia. The improvements included providing one runway with an additional 100 feet in width, and the construction of an armory and an operations building. The construction of those and various other buildings provided an impetus for the *St. Augustine Record* to report the city airport at various times as a naval air station or naval auxiliary air station, rather than its official Navy designation as an outlying field. The Navy began operations at OLF St. Augustine in late 1942 (PKY Angas Papers Box 1 File 36, Box 30 File 58; *St. Augustine Record*, 10 July, 2 September 1942).

The initial commanding officer at OLF St. Augustine was Lieutenant Kent Robinson and then Lieutenant-Commander Kimball Salisbury. Lieutenant Henry W. Colburn served as the gunnery officer who supervised a small contingent of enlistedmen. The Navy quartered its OLF St. Augustine personnel in a nearby tourist camp rather than constructing a barracks at the field. The men maintained and equipped tow planes with target sleeves. Several other personnel manned a Navy crash boat and maintained contact with the field crew to respond to emergencies. Naval aviators stationed at Green Cove Springs were generally in the final stages of their training, and made regular use of the gunnery range near St. Augustine. In the spring of 1943, the Navy quartered and trained more than 2,500 pilots and enlistedmen at Green Cove Springs. In May 1943, VF-1, CVG based in Clay County conducted gunnery practice using Grumman F4F Wildcat and Grumman F6F Hellcat fighter aircraft. Gunnery practice flights consisted of aircraft deployed from Green Cove Springs flying to St. Augustine, where they encountered tow planes trailing sleeves that they used for target practice. Other training exercises based at Green Cove Springs included camera gunnery, strafing and bombing, formation flying, and primary combat.

Occasionally, fighter aircraft landed at St. Augustine. One of those in April 1943 was a naval fighter bearing seven small Japanese flag emblems, representing the number of destroyed Japanese aircraft by the naval aviator. In a "service special edition" of the *St. Augustine Record*, the editors published photographs of Grumman TBF Avenger torpedo bombers over OLF St. Augustine and a high-speed Navy crash boat. Typically, however, articles in the *Record* about the local Coast Guard station and the Army's nearby Camp Blanding easily outstripped coverage on OLF St. Augustine (*St. Augustine Record,* 25 April 1943; Coletta and Bauer 1985:221-222).

Several aircraft based at NAAS Green Cove Springs crashed in St. Johns County during training missions, presumably target practice near St. Augustine. One of those crashed six miles west of St. Augustine on the Tocoi Road and another on the beach between Atlantic Ocean and Salt Run. A third aircraft based at NAS Jacksonville crashed in the woods about six miles west of St. Augustine (*St. Augustine Record,* 21 April 1941, 3, 14 May, 23, 27 August 1943; 9 April, 28 May 1944).

In May 1946, the Department of the Navy returned the airport to the City, but held a revocable permit. The City agreed to maintain the airport in good condition and protect the government property located at the airport against loss and damage. After the municipal government discussed future operations at the airport, city officials designated Peterson Hall and Auerbach Haviland, former World War I pilots, as operators and concessionaires. The administration building was designated for the airport manager. In addition, the building designated as "R" on the Navy's map of the airfield, really a series of hutments joined together southwest of the administration building, was leased to Aero Marine, Inc. By September 1946, sixty citizens and former military personnel had utilized the airport for flight training. They included Andy Harrold, J. Dexter Phinney, and Doug Thompson. Some veterans took advantage of the G.I. Bill to earn their pilot's licenses at the airport. Flight Services, Inc. was among the early commercial flight instruction schools to operate at the airport. Some of those students included Kenneth Christie, Hiram Collins, Julian Lester, and Alva Touchton. Aircraft used to provide flight instruction included an Aeronca, Globe Swift, Republic Seabee, and Taylorcraft. Aero Marine, Inc. acquired a new Piper Cub to instruct pilots and also moored a seaplane near the inlet because the airport then had no seaplane ramp or channel to the Intracoastal Waterway (*St. Augustine Record,* 3, 5 May, 6 September, 16 November 1946, 12 June 1947).

In March 1947, the City established regular passenger service with Florida Airways connecting at Gainesville, Jacksonville, Lake City, Orlando, and Tallahassee. The commercial service included the first regular airmail into St. Augustine. That month, Hal Auerbach and Bill Haviland purchased a new Republic RC-3 Seabee, the least expensive all-metal amphibian aircraft then produced in the United States. In the post-war era, aircraft manufacturers anticipated that military pilots returning from overseas would purchase civilian planes for pleasure and sport. But, that market never materialized. Still, Auerbach and Haviland were so impressed by their first Seabee that they purchased a second, which Auerbach flew from Pennsylvania to St. Augustine. In 1948, responding to flagging sales, Republic ended production of the Seabee, one of the most successful sea-and-land planes produced in the 1940s. In addition, instructors and freshly-minted pilots made numerous flights from St. Augustine Airport, largely pleasure flights but some business trips. An instructor and businessman, Robert Peterson made aerial photography and fire patrol flights over the properties of the Robinson Improvement Company in St. Johns County in June 1947. Peterson also provided flight instruction to fifteen new pilots that year. After receiving their licenses, Chester Bennett and Frank Waters flew to Valdosta, Georgia and Franks Waters and his wife to Savannah. Cross-state solos became a popular pastime. In the first half of 1947, Herman Bowen, William Evans, Doris Holman William Jordan, Gilbert Kuter, and Robert Owen completed round-trip cross-state solos to Pass-A-Grille and other Gulf Coast destinations (*St. Augustine Record*, 18, 28 March, 12 June 1947).

In June 1947, the federal government through the War Assets Administration deeded the property associated with the airport to the City of St. Augustine. Citing the outlying field as surplus federal property, the conveyance transferred to the municipal government "All runways, taxiways, aprons, field marking and lighting, drainage system, communications system, wind tee, fueling, water, sewage, disposal and electrical systems." In addition, the government conveyed Buildings A, B, C, D, E,, F, G, H, I, and maintenance equipment that were "…the same property acquired by the United States of America in condemnation proceedings entitled United States of America, vs. 276 acres of land, more or less, in St. Johns County, et al, Case No. 494-J" (Deed Book 169, p. 344 Clerk of Court St. Johns County Courthouse).

Later that year, Beverly Whitfield of Orlando won an air show competition at St. Augustine Airport hosted by the Southeastern Section Convention of the Florida Chapter Ninety-Nines. Founded in 1929, the Ninety-Nines emerged as the largest and oldest organization of female pilots in the nation. Their mission consisted of promoting world fellowship through flight, providing networking and scholarships to young women, and preserving women in aviation. In August 1948, the Florida Chapter Ninety-Nines hosted St. Augustine's American Legion Air Show. The air show included races, low altitude inverted flights, and aerobatics by Whitfield and Betty Skelton of Tampa, the international aeronautics champion women's division (*St. Augustine Record*, 29 July 1948).

In July 1949, the City leased the airport to Jack Barber. But, declining revenues and decreases in commercial flights and pilot training compelled Barber to end the lease the following year. In September 1950, after failing to locate another lessee, the municipal government closed the airport. Owners of private aircraft could still maintain their planes and use the runways for flights "at their own risk." One of those was Governor Fuller Warren (1949-1953), who flew into St. Augustine in a DC-3 in 1951 to enjoy the premier of "Distant Drums," much of which was filmed at Castillo de Sans Marcos in St. Augustine Distributed by Warner Brothers, the movie was set in the Everglades during the Second Seminole War, directed by Raoul Walsh, and starred Gary Cooper as Captain Quincy Wyatt and Robert Barrat as General Zachary Taylor. At the airport, Warren met Sidney Capo, a young boy and native of St. Augustine who played the "half-breed son" of Captain Wyatt in the movie. Although the City closed all of its services at the airport, it permitted airplane owners to contact fuel oil companies in St. Augustine to deliver gasoline, oil, and other supplies to the airport. Most city commissioners agreed that since the end of World War II, the municipal government had largely failed to make the airport profitable. The small amount of traffic and activity at the site had resulted in little more than "a white elephant," a financial burden and a liability to taxpayers. In 1952, the U.S. Department of Agriculture developed aerial photographs of St. Johns County, including the airport. Unfortunately, the individual tiles depicting the airport are not available from the University of Florida. An index sheet, however, depicts the faint outlines of the airport with its three World War II vintage runways (*St. Augustine Record*, 12 September 1950; FSA 1951).

In the early 1950s, the local government sought to revitalize the airport as a commercial venture with an adjacent industrial park. In 1954, after engaging in negotiations with several potential lessees, the municipal government succeeded in attracting Fairchild Engine and Airplane Corporation to St. Augustine for the operation of its aircraft division and to build a large aircraft modification plant. The State of Florida assisted in the effort by donating state lands around the airport to the company. By then, the company operated factories at Costa Mesa and Manhattan, California; Hagerstown, Maryland; Long Island, New York; Mesa, Arizona; and Wycliffe, Ohio. The company constructed a 30,000 square foot building to house a manufacturing facility, which it initially used to modify C-119 Flying Boxcars and C-123 Providers and manufacture Boeing B-52 components. In 1956, the U.S. Geological Survey published a topographical map of St. Augustine. It depicted the airport with four runways. The fourth runway, Runway 13/31, was constructed about 1955, apparently, as part of the agreement with Fairchild to operate in St. Augustine. In addition, several new buildings were constructed along U.S. Highway 1. Fairchild operated out of the largest of those buildings. Established in 1920, Fairchild Aerial Camera Corporation expanded and reorganized into Fairchild Aviation Corporation in 1925. In the 1930s, the company reorganized into the Fairchild Engine and Airplane Corporation and purchased Duramold Aircraft Corporation, Ranger Engineering Corporation, and Taylorcraft Aviation, Inc. By World War II, Fairchild manufactured military and private airplanes and parts, military and commercial aerial cameras, machine gun cameras, photographic laboratory equipment, aviation instruments, gun synchronizers, sound recording and broadcasting station equipment, audio amplifiers, radio compasses, navigational equipment and miscellaneous precision devices. By the early 1950s, Fairchild maintained manufacturing plants at Farmingdale, Roosevelt Field, and Valley Stream on Long Island, New York; a guided missile plant at Wyandanch, New York; and other manufacturing facilities at Pasadena, California and Hagerstown, Maryland (*St. Augustine Record*, 18 June 1954; *Wall Street Journal*, 22 June 1954; *Washington Post*, 23 August 1954, 4 August 1962; *New York Times*, 25 September 1925, 21 November 1936; Moody 1940:807-808; Moody 1953:1949).

Fairchild's plant in St. Augustine provided the company with a presence in the American South near a major naval air station and the St. Augustine Coast Guard Station. Fairchild built and modified a range of airplanes used by the Air Force, Coast Guard, and Navy. One of its earliest contracts in St. Augustine was modifying the C-82 Packet, an aircraft the company had developed during World War II. Designed by Fairchild for the Army Air Corps to transport cargo, personnel, and mechanized equipment, the C-82 was redesigned by Fairchild into the C-119 Flying Boxcar, which was produced at its Hagerstown, Maryland factory and made its initial flight in 1947. The U.S. Air Force made extensive use of the Flying Boxcar during the Korean War as a troop and equipment transport. Fairchild ceased production in 1955, but the aircraft was modified into the 1960s for a variety of uses. In 1962, Fairchild's St. Augustine factory repaired and inspected 200 C-119s. As late as 1969, Fairchild repaired and modified Flying Boxcars in St. Augustine. Fairchild also built and modified C-123 Providers for the Air Force into "flare ships," with night attack capability, and as "ranch hands" for defoliation missions in Vietnam. Fairchild also built and modified C-123 aircraft for the U. S. Coast Guard for search-and-rescue missions. Initially designed as an assault glider, the Provider became highly regarded for its ruggedness, reliability, and ability to operate from short and unimproved airstrips. In 1964, Fairchild converted Boeing KC-97 Stratotankers from in-flight refueling aircraft into air-sea rescue airplanes. Introduced in 1950, the Stratotanker was a variant of the older Boeing C-97 transport plane. The KC-97 served as the backbone of the U.S. Air Force's aerial refueling tanker fleet until its replacement by the Boeing KC-135 in 1978. One of the largest aircraft to land at St. Augustine Airport, the KC-97 had a crew of five, was powered by four engines, and weighed 82,500 pounds unloaded. Some variants of the KC-97 had four radial propeller engines and two jet engines (*St. Augustine Record*, 18 June 1954; *Washington Post*, 4 August 1962; *Wall Street Journal*, 14 January 1964, 12 June 1969; Swanborough and Bowers 1976; http://en.wikipedia.org/wiki/C-123_Provider Accessed 4.20.2010; http://en.wikipedia.org /wiki/KC-97_Stratotanker Accessed 4.20.2010).

Fairchild also modified World War II vintage Martin B-26 Marauders at St. Augustine Airport. A twin-engine aircraft with a reputation as a "widow maker" and "flying coffin," the B-26 was unpopular with many pilots. During the war, the aircraft was used for training purposes at Avon Park Army Air Field and MacDill Field in Tampa, where numerous crashes were reported. Still, many B-26s survived the conflict, and Fairchild modified sixty-two of those in 1957 for the U.S. Air Force and the Brazilian Air Force (*St. Augustine Record*, 18 March, 3 June 1956, 14 July 1957).

Beyond the construction of Runway 13/31, various improvements were made to the airport, in part, to accommodate the needs of Fairchild, in part, to support larger airplanes, and, in part, to meet federal requirements necessary for private industry to be eligible for government contracts. It appears that the highest percentage of air traffic at the airport then consisted of relatively large military aircraft converted, inspected, modified, and repaired by Fairchild. An aerial prepared for the U.S. Department of Agriculture in 1960 depicted the airport with a newly-paved segment in Runway 13/31. In 1964, Runway 13/31 was extended 1,300 feet, and another extension was built in 1966. The southern extension of Runway 13/31 included filling wetlands and dredging a narrow channel from the Intracoastal Waterway to the newly-built extension. Aerials and topographic maps published in 1970, 1971, 1980, and 1988 illustrate a period of expansion and development at the airport. Some of that development came on the heels of the creation of the St. Augustine-St. Johns County Airport Authority. In 1963, the Florida Legislature authorized the St. Augustine-St. Johns County Airport Authority, a taxing district that the voters of St. Johns County approved in an election on 5 May 1964. The new authority was infused with annual funding levels that the City of St. Augustine previously had not been able to collect through its tax base. The governor appointed the first three authority members after which they were elected. In July 1964, at the organizational meeting X.L. Pellicer was elected chairman, and on 3 November 1964 voters approved a $900,000 bond issue for airport improvements. In 1965, the City of St. Augustine conveyed the airport property to the airport authority, and contracts were awarded for extending and lighting the runways. In 1966, a new administration building was constructed and two hangars built to accommodate either six single engine planes or four two-engine planes. In 1973, a federal grant for $54,500 built a Very High Frequency Omni Range Terminal, or TVOR, and provided new markings for one runway. In 1978, Runway 6/24 was extended eastward 200 feet. In addition, radio remote control and runway lighting devices were installed, and upward protrusions on glide paths were removed. Aerials taken of the airport in 1990 indicate that during the previous decade a system of taxiways were built to support the runways. Beyond that improvement, the original northwest-southeast runway was converted to Taxiway B2 (*St. Augustine Record*, 24 November 1964, 20 March 1966, 20/21 March 1976, 4 December 1978, 24 November 1989; USDA 1980:12109-22; USDA 1990:1489-11).

Some alterations to the airport were made in direct support of its commercial partner. Fairchild overhauled the Navy's Martin P-5 Marlin (P5M), a large flying boat that entered service in 1951. In 1965, the seaplane ramp and taxi channel between the Intracoastal Waterway and the airport were built and dredged to accommodate Fairchild's modification of the seaplane. Aerials and topographical maps show clearly changes to the landscape and wetlands. The taxi channel initially measured 400 feet wide and 2,000 feet long. Pilots landed the aircraft in the waterway, idled along the taxi channel, up the seaplane ramp, and across the runway system into the Fairchild facility. There the company modified the Marlins for the Navy's Bureau of Weapons. Modifications made to the P-5M included raising the flight deck for improved visibility, replacing the nose turret with a radome, removing the dorsal turret, and streamlining the wing floats. The Navy deployed the P-5M during the Vietnam conflict for a variety of uses, including maritime surveillance and patrolling the Mekong Delta. In 1970, Fairchild modified fifty T-28B Trojans into T-28D fighter bombers for the U.S. Air Force. Built by North American between 1950 and 1957, the T-28 replaced the older T-6 Texan trainer. The Air Force deployed the T-28 on a limited basis during the Vietnam conflict as a counter-insurgency tactical aircraft with fighter-bomber capabilities. As modified by Fairchild, the Trojan's armament consisted of two or six mounted pylons capable of carrying bombs, napalm, rockets, and machine gun or canon pods. In September 1976, when Fairchild left the airport's industrial park, St. Augustine lost 200 jobs and two decades of aircraft modification by one of the nation's leading aviation companies (*St. Augustine Record*, 18 March, 3 June 1956, 14 July 1957, 20 August 1965, 15 September 1976; Oyster and Meonch 1992; Swanborough and Bowers 1976; Thompson 1999; http://en.wikipedia.org/wiki/B-26_Marauder Accessed 4.20.2010).

The previous decade, the Moser family had established an agreement with the airport authority first as interim airport director and then as a fixed base operator. The authority's first fixed base operators experienced financial difficulties, which required the authority to make other arrangements until the authority hired the Mosers. Over the following decades, the Mosers developed the airport it into a viable commercial operation. A retired U.S. Air Force colonel and World War II pilot, Ernie Moser was a barnstorming pilot who designed and flew his own aerobatic shows. He included his son, James Moser, at the age of sixteen. Their "flying circus" became known "for landing [Piper] J-3 Cubs on small platforms built on top of moving pickup trucks." In 1966, the family began managing the airport. When they assumed control, the airport supported six private aircraft. In 1967, the Mosers incorporated Aero Sport, Inc., which executed a lease with the authority as a fixed base operator. The Mosers marketed the airport to develop a variety of general aviation services, and revived popular flying circuses. The airport became the site for regional meetings of the Experimental Aircraft Association. Eventually, the airport also supported corporate jets and aircraft owned by and/or serving the Florida National Guard, Professional Golf Association (PGA) Tour, and Ring Power Corporation (*Florida Times Union*, 30 June 1999).

In 1980, Grumman Aerospace, Inc. reached a preliminary agreement to acquire fifty-seven acre in St. Augustine's industrial park contiguous to the airport. The aircraft company organized Grumman St. Augustine Corporation, a subsidiary of Grumman Aerospace, Inc., to modify and overhaul aircraft. In 1985, Fairchild initiated negotiations with Grumman to acquire its St. Augustine factory. Grumman subsequently acquired, occupied, and adapted the former Fairchild facility for its manufacturing operations. Organized in 1929, Grumman initially built military aircraft for the federal government, but in 1936 expanded into the private sector. Between the 1930s and 1940s, Grumman designed and built a fleet of luxury amphibian aircraft for private industry. Those aircraft included the Duck, Widgeon, Grey Goose, and Mallard. During World War II, the company designed and built for the Navy the F4F Wildcat and the F6F Hellcat, two of the most successful fighters in naval aviation history, and the TBF Avenger. All carrier-based airplanes, the Wildcat and Hellcat were single-seat single-engine propeller-driven fighter aircraft and the Avenger a single-engine three-crew torpedo bomber. The folding-wing design developed by Grumman for those aircraft provided the Navy with reliable planes in combat and minimized the footprints of the planes aboard aircraft carriers. Later, near the end of the war, Grumman developed the F7F Tigercat and then the F8F Bearcat. The first twin-engine aircraft used by the Navy and United States Marine Corps, the Tigercat and the single-engine Bearcat continued Grumman's long line of "cat" named fighter aircraft. In 1994, Northrup Corporation acquired Grumman and Vought Aircraft, and two years later the defense and electronic systems division of Westinghouse Electric Corporation. In the 1990s, California-based Northrup Grumman Corporation was the major contractor of the B2 bomber (*New York Times*, 2 October 1941, 24 March 1994, 20 April 1995; *Wall Street Journal*, 18 June, 12 August 1980; *St. Augustine Record*, 31 October 1985; Moody 1940; 547; Moody 1953:1179; Grumman 1946:121; Grumman History Center Archives).

In the early 1990s, the St. Augustine-St. Johns County Airport Authority hired Reynolds, Smith and Hills, Inc. of Jacksonville to design a new terminal building. In 1994, the Shah Construction Company supervised construction of the facility. In the 1990s, Aero Sport, Inc. became the distributor of the German-built Extra aerobatic plane and opened a aerobatic school at the airport. An increase in take off-and-landings compelled the construction of an air control tower and then expansion into the Araquay Park Subdivision. By 1999, the Moser family had helped build the airport into the home for approximately 250 aircraft. In 2003, public officials dedicated Moser Terminal "in grateful appreciation of the effort and dedication of the Moser Family to the development of the St. Augustine Airport." That year, Michael Slingluff, Aero Sport's president, said, "We've gone from grassroots to business aviation… [yet] We continue to service the needs of sports aviation. On a daily basis, 20 to 30 jets are arriving and departing St. Augustine Airport for destinations worldwide. The attraction of the airport lies in the ease of access in and out, the close proximity to Jacksonville's south side, and the growing business environment in St. Johns County." In 2006, Galaxy Aviation, an upscale fixed based operator, acquired Aero Sport, Inc. and presently operates out of St. Augustine-St. Johns County Airport. In 2010, *U.S. News & World Report* rated St. Augustine among the best places in the nation to live, in part, because of its employment sector, including Northrup Grumman Corporation ("Best Places," *U.S. News & World Report*, April 4, 2010; *Florida Times Union*, 30 June 1999; *St. Augustine Record*, 20 April 1999, 5 December 2003).

Explanation of Evaluation: No historic buildings, structures, or objects were recorded as part of the standing structures survey in the project tract (Figure 6-3 through Figure 6-6). Because the runways and taxiways inside the project tract were built after 1960, they do not warrant consideration for the NRHP on an individual basis and do not contribute to a historic district. Although Runway 13/31 was built in the mid-1950s, the Airport Authority did not build the segment of the runway in the project tract until 1966. The shoulder segment of Runway 13/31 between Runways 2/20 and 6/24 and inside the project tract was built in the mid-1950s, but the paved segment of 13/31 is excluded from the project. In 1934, the City began clearing Runways 2/20 and 6/24 and paved them in 1941. The northeastern segments of those runways adjacent to or in the project tract were not cleared and paved until 1965 and subsequently improved in 1970s. The Works Progress Administration (WPA) performed most of the initial work on the airport. Later, in the 1980s, the airport authority converted a third runway built by the WPA into a taxiway. Similarly, the seaplane ramp, apron, and taxi channel were built and dredged, respectively, in 1965 and subsequently improved. Aerials indicate that the system of taxiways supporting the runways was built between 1980 and 1990. Airports are historically defined by their system of runways and their circulation pattern around hangars and terminals. To that end, the closing of one of the original runways, part of which presently serves as Taxiway B, and the extensions of Runway 13/31 at both ends by approximately 2,000 feet indicates that the airport has insufficient historic physical integrity and is therefore excluded from consideration for the NRHP.

6.3 Conclusion

Although no significant cultural resources were recorded during the present investigation, this work will add to our current knowledge of World War II aeronautic activities within St. Johns County. This historic research data can be integrated into a broad-scale and comprehensive regional history of St. Johns County. Based upon the results of this survey, it is recommended that the proposed project be authorized to proceed as planned without further concern for impacts to significant cultural resources.

Figure 6-3: Seaplane Ramp and Taxiway Looking North (8SJ05465)

Figure 6-4: End of Main Runway 13-31 Looking Northwest (8SJ05465)

Figure 6-5: Southeast End of Taxiway C Looking Northwest (8SJ05465)

Figure 6-6: VHF Radio Structure and Gravel Road Looking Northeast (8SJ05465)

Bland & Associates, Inc.
Archaeological and Historic Preservation Consultants

Addendum Report to the Cultural Resource Assessment Survey of the St. Augustine Airport Expansion
St. Johns County, Florida
Photos

Figure: 6-5, 6-6
Project No.: BAIJ08010184.02
Scale: Not to Scale
Date: May 2010

VII. SUMMARY AND RECOMMENDATIONS

During April 2010, an intensive cultural resource assessment survey was conducted by Bland & Associates, Inc. (BAI) of an approximately 36+/- acre parcel at the St. Augustine-St. Johns County Airport located at 4796 U.S. 1 North in St. Johns County, Florida. The project tract can be found in Section 50, Township 6 South, Range 29 East of the St. Augustine, Florida USGS topographic quadrangle map. The taxpayer identification number (TPIN) for this parcel is 074840 0000. The proposed project is "Taxiway C Replacement, RSA Compliance, and Approach Lighting System." The purpose of the project is to modify portions of the St. Augustine Airport runway system. This project was assigned Federal Aviation Administration (FAA) AIP Project Number 3-12-0073-023-2008 and DHR Number 2010-00007.

This survey was performed at the request Passero Associates, LLC in order to comply with state, county and federal regulations regarding the management of cultural resources that might occur within the project area. During this 2010 phase of testing, extensive fieldwork was conducted in order to locate cultural resources. The current investigation also included extensive background research that focused upon the history of the tract, with a particular emphasis upon World War II activities at the airport. An additional thirty-eight tests were then excavated within the project tract, all of which were negative. These deep subsurface shovel tests indicated that the soils present within the 38 +/-acre project tract consisted of very disturbed and very poorly drained soils composed entirely of fill. It should be noted that in all cases these shovel tests were deep cored with an AMSL steel auger to a depth in excess of 2.62 meters below surface (mbs). These deep tests all encountered fill materials overlying muck and water. Historic background research, and time-sequenced aerial photographs, as reviewed within Chapter IV of this report, also indicated that the project tract is composed of fill. In summary, no artifacts were found within the project tract during fieldwork.

In addition, no historic structures were encountered within the project tract. Specifically, no World War II era structures exist at the St. Augustine Airport, although some portions of the underlying runway lay-out may or may not conform to the original pattern of the historic runways from that era. Based upon these results, and in consultation with DHR, the St. Augustine Airport and its runways was generally recorded with Florida Master Site File (FMSF) Resource Group (RG) Form Number 8SJ05465 in order to note its World War II era history. Although no significant cultural resources were recorded during the present investigation, this work will add to our current knowledge of World War II aeronautic activities within St. Johns County. This historic research data can be integrated into a broad-scale and comprehensive regional history of St. Johns County. Based upon the results of this survey, it is recommended that the proposed project be authorized to proceed as planned without further concern for impacts to significant cultural resources.

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Ent D (FMSF only)__/__/__

Survey Log Sheet

Survey # (FMSF only)________

Florida Site Master File
Version 2.0 9/97

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (Name and project phase) Intensive CRAS Addendum Report / St. Augustine Airport Modification Project

Report Title (exactly as on title page) An Addendum Report to the 2009 Intensive Cultural Resource Assessment Survey of the St. Augustine Airport Modifications, St. Johns County, FL

Report Author(s) (as on title page— individual or corporate; last names first) Bland, Myles

Publication Date (year) 2010 Total Number of Pages in Report (Count text, figures, tables, not site forms) ___

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Supervisor(s) of Fieldwork (whether or not the same as author[s]; last name first) Bland, Myles - RPA No. 10650

Affiliation of Fieldworkers (organization, city) Bland & Associates, Inc. (BAI)

Key Words/Phrases (Don't use the county, or common words like *archaeology*, *structure*, *survey*, *architecture*. Put the most important first. Limit each word or phrase to 25 characters.) Addendum Report to the 2009 CRAS of the St. Augustine Airport Modifications / DHR 2010-00007 / World War II aviation

Survey Sponsors (corporation, government unit, or person who is directly paying for fieldwork)

Name Passero Associates, LLC

Address/Phone 13453 North Main Street, Suite 106, Jacksonville, Florida 32218 / (904) 757-6016

Recorder of *Log Sheet* Myles Bland RPA No. 10650 Date *Log Sheet* Completed 5 / 11 / 10

Is this survey or project a continuation of a previous project? ☐ No X Yes: Previous survey #(s) [FMSF only] ________

Mapping

Counties (List each one in which field survey was done - do not abbreviate; use supplement sheet if necessary) St. Johns County

USGS 1:24,000 Map(s): Map Name/Date of Latest Revision (use supplement sheet if necessary): St. Augustine (1992), Florida

Description of Survey Area

Dates for Fieldwork: Start 4 / 10 End 4 / 10 Total Area Surveyed (fill in one) __ hectares 36 +/- acres

Number of Distinct Tracts or Areas Surveyed 1

If Corridor (fill in one for each): Width _____ meters _____ feet Length _______ kilometers ________ miles

Survey Log Sheet of the Florida Master Site File

Research and Field Methods

Types of Survey (check all that apply): X archaeological X architectural X historical/archival ☐ underwater ☐ other: ____

Preliminary Methods (Check as many as apply to the project as a whole. If needed write others at bottom).

X Florida Archives (Gray Building)
X Florida Photo Archives (Gray Building)
X FMSF site property search
X FMSF survey search
X library research- *local public*
X library-special collection – *nonlocal*
X Public Lands Survey (maps at DEP)
X local informant(s)
X local property or tax records
X newspaper files
X literature search
☐ Sanborn Insurance maps
X windshield
X aerial photography
X other (describe) historic maps

Archaeological Methods (Describe the proportion of properties at which method was used by **writing in** the corresponding letter. Blanks are interpreted as "None.")

F(-ew: 0-20%), **S**(-ome: 20-50%); **M**(-ost: 50-90%); or **A**(-ll, Nearly all: 90-100%). If needed write others at bottom.

☐ Check here if **NO** archaeological methods were used.

_A_ surface collection, controlled
___ surface collection, **<u>un</u>**controlled
_A_ shovel test-1/4"screen
___ shovel test-1/8" screen
___ shovel test 1/16"screen
___ shovel test-unscreened
__ other (describe): ____
___ other screen shovel test (size: ____)
___ water screen (finest size: ____)
___ posthole tests
___ auger (size:____)
___ coring
__ test excavation (at least 1x2 M)
___ block excavation (at least 2x2 M)
___ soil resistivity
___ magnetometer
___ side scan sonar
___ unknown

Historical/Architectural Methods (Describe the proportion of properties at which method was used by **writing in** the corresponding letter. Blanks are interpreted as "None.")

F(-ew: 0-20%), **S**(-ome: 20-50%); **M**(-ost: 50-90%); or **A**(-ll, Nearly all: 90-100%). If needed write others at bottom.

☐ Check here if **NO** historical/architectural methods were used.

___ building permits
___ commercial permits
___ interior documentation
___ other (describe): ____
___ demolition permits
_A_ exposed ground inspected
__ local property records
__ neighbor interview
__ occupant interview
___ occupation permits
___ subdivision maps
___ tax records
___ unknown

Scope/Intensity/Procedures CRAS of the approximately 36 acre, St. Augustine Airport Expansion / 38 total 50 x 50 cm shovel tests installed / tests then bored to 2.62 mbs / no positive tests or historic structures encountered / no further work recommended

Survey Results (cultural resources recorded)

Site Significance Evaluated? XYes ☐ No If *Yes*, circle NR-eligible/significant site numbers below.

Site Counts: Previously Recorded Sites 0 Newly Recorded Sites 1 (RG form for airport to note its WW 2 history)

Previously Recorded Site #'s (List site #'s without "8." Attach supplementary pages if necessary)
None

Newly Recorded Site #'s (Are you sure all are originals and not updates? Identify methods used to check for updates, ie, researched the FMSF records. List site #'s without "8." Attach supplementary pages if necessary.) 8SJ05465

Site Form Used: ☐ SmartForm X FMSF Paper Form ☐ Approved Custom Form: Attach copies of written approval from FMSF Supervisor.

DO NOT USE ▪▪▪▪▪▪SITE FILE USE ONLY▪▪▪▪▪▪DO NOT USE

BAR Related
☐ 872 ☐ 1A32
☐ CARL ☐ UW
#__________

BHP Related
☐ State Historic Preservation Grant
☐ Compliance Review: CRAT

ATTACH PLOT OF SURVEY AREA ON PHOTOCOPIES OF USGS 1:24,000 MAP(S)

☑ Original
☐ Update

RESOURCE GROUP FORM
FLORIDA MASTER SITE FILE
Version 4.0 1/07

Site #8 SJ05465
Recorder# ____
Field Date 4 / 14 / 10
Form Date 4 / 21 / 10

NOTE: **Use this form to document districts, landscapes, building complexes and linear resources** as described in the box below. Cultural resources contributing to the Resource Group should also be documented individually at the Site File. **Do not use this form for National Register multiple property submissions** (MPSs). National Register MPSs are treated as Site File manuscripts and are associated to the individual resources included under the MPS cover using the Site File manuscript number.

Check ONE box that best describes the Resource Group:

☐ **Historic district** (NR category "district"): buildings and NR structures only: NO archaeological sites
☐ **Archaeological district** (NR category "district"): archaeological sites only: NO buildings or NR structures
☐ **Mixed district** (NR category "district"): includes more than one type of cultural resource (example: archaeological sites and buildings)
☐ **Building complex** (NR category usually "building(s)"): multiple buildings in close spatial and functional association
☑ **Designed historic landscape** (NR category usually "district" or "site"): can include multiple resources (see *National Register Bulletin #18*, page 2 for more detailed definition and examples: e.g. parks, golf courses, campuses, resorts, etc.)
☐ **Rural historic landscape** (NR category usually "district" or "site"): can include multiple resources and resources not formally designed (see *National Register Bulletin #30, Guidelines for Evaluating and Documenting Rural Historic Landscapes* for more detailed definition and examples: e.g. farmsteads, fish camps, lumber camps, traditional ceremonial sites, etc.)
☐ **Linear resource** (NR category usually "structure"): Linear resources are a special type of rural historic landscape and can include canals, railways, roads, etc.

Resource Group Name St. Augustine-St. Johns County Airport ____ Multiple Listing [DHR only] ____
Project Name Taxiway C Replacement, RSA Compliance and Approach Lighting System St. Aug-SJC Airport Authority FMSF Survey # ____
National Register Category (please check one): ☐ building(s) ☐ structure ☑ district ☐ site ☐ object
Linear Resource Type (if applicable): ☐ canal ☐ railway ☐ road ☐ other (describe): ____
Ownership: ☐private-profit ☐private-nonprofit ☐private-individual ☐private-nonspecific ☐city ☐county ☐state ☐federal ☐Native American ☐foreign ☐unknown

LOCATION & MAPPING

Address (if applicable, include N,S,E,W; #; St., Ave., etc.) 4796 US Highway 1 North
City/Town (within 3 miles) St. Augustine ____ In Current City Limits? ☐yes ☑no ☐unknown
County or Counties (do not abbreviate) St. Johns
Name of Public Tract (e.g., park) ____
1) Township 6S Range 29E Section 50 ¼ section: ☐NW ☐SW ☐SE ☐NE Irregular-name: Pablo Sabate
2) Township ____ Range ____ Section ____ ¼ section: ☐NW ☐SW ☐SE ☐NE
3) Township ____ Range ____ Section ____ ¼ section: ☐NW ☐SW ☐SE ☐NE
4) Township ____ Range ____ Section ____ ¼ section: ☐NW ☐SW ☐SE ☐NE
USGS 7.5' Map Name(s) & Date(s) (boundaries must be plotted on attached photocopy of map; label with map name and publication date) ____
St. Augustine, Fla. 1956; Photorevised 1988; Minor Revision 1992
Plat, Aerial, or Other Map (map's name, originating office with location) St. Johns County Property Appraiser
Landgrant Pablo Sabate
Verbal Description of Boundaries (description does not replace required map) ____

DHR USE ONLY OFFICIAL EVALUATION DHR USE ONLY

NR List Date
____/____/______
☐ Owner Objection

SHPO – Appears to meet criteria for NR listing: ☐yes ☐no ☐insufficient info Date ____/____/______ Init.________
KEEPER – Determined eligible: ☐yes ☐no Date ____/____/______
NR Criteria for Evaluation: ☐a ☐b ☐c ☐d (see *National Register Bulletin 15*, p. 2)

RESOURCE GROUP FORM

Site #8 SJ05465

HISTORY & DESCRIPTION

Construction date: Exactly 1934 (year) Approximately ______ (year) Earlier than ______ (year) Later than ______ (year)

Architect/Designer(last name first): Johnson, C. M. Builder(last name first): WPA

Total number of individual resources included in this Resource Group: # of contributing 0 # of non-contributing 0

Time period(s) of significance (for prehistoric districts, use archaeological phase name and approximate dates; for historical districts, use date range(s), e.g. *1895-1925)*

1934-1960

Narrative Description (*National Register Bulletin 16A* pp. 33-34; fit a summary into 3 lines or attach supplementary sheets if needed) See continuation sheet

RESEARCH METHODS (check all that apply)

☑ FMSF record search (sites/surveys)
☑ FL State Archives/photo collection
☑ property appraiser / tax records
☑ cultural resource survey
☐ other methods (specify)

☑ library research
☑ city directory
☑ newspaper files
☑ historic photos

☐ building permits
☑ occupant/owner interview
☐ neighbor interview
☐ interior inspection

☐ Sanborn maps
☑ plat maps
☑ Public Lands Survey (DEP)
☑ HABS/HAER record search

Bibliographic References (use Continuation Sheet, give FMSF Manuscript # if relevant) See continuation sheet

OPINION OF RESOURCE SIGNIFICANCE

Potentially eligible individually for National Register of Historic Places? ☐ yes ☐ no ☑ insufficient information

Potentially eligible as contributor to a National Register district? ☐ yes ☐ no ☑ insufficient information

Explanation of Evaluation (required, see *National Register Bulletin 16A* p. 48-49. Attach longer statement, if needed, on separate sheet.) See continuation sheet

Area(s) of Historical Significance (see *National Register Bulletin 15*, p. 8 for categories: e.g. "architecture", "ethnic heritage", "community planning & development", etc.)

Commerce, Military, Transportation

DOCUMENTATION

Accessible Documentation Not Filed with the Site File - including field & analysis notes, photos, plans, other important documents that are permanently accessible: For each separately maintained collection, describe (1) document type(s),* (2) maintaining organization,* (3) file or accession nos., and (4) descriptive information.

RECORDER INFORMATION

Recorder Name Bland, Myles & Sidney Johnston

Recorder Contact Information (Address / Phone / Fax / Email) Bland & Associates, Inc. Jacksonville, FL; (800) 605-4478; mbland@bland.cc

Recorder Affiliation

Required Attachments

❶ PHOTOCOPY OF USGS 7.5' MAP WITH DISTRICT BOUNDARY CLEARLY MARKED

❷ LARGE SCALE STREET, PLAT OR PARCEL MAP WITH RESOURCES MAPPED & LABELED

❸ TABULATION OF ALL INLCUDED RESOURCES (name, FMSF #, contributing? Y/N, resource category, street address or township-range-section if no address)

❹ PHOTOS OF GENERAL STREETSCAPE OR VIEWS (Optional: aerial photos, views of typical resources) Photos may be archival B&W prints OR digital image files. If submitting digital image files, they must be included on disk or CD AND in hard copy format (plain paper is acceptable). Digital images must be at least 1600 x 1200 pixels, 24-bit color, jpeg or tiff.

8SJ05465 CONTINUATION SHEET

Narrative Description

On 11 January 1934, the City of St. Augustine acquired the property subsequently developed into its airport. The municipal government used a blending of funds from New Deal agencies to complete the airport's initial development. The Civil Works Administration (CWA) and Federal Emergency Relief Administration (FERA) provided initial grants. Then, the City submitted a series of applications to the Works Projects Administration (WPA), one of the longest-running of the New Deal agencies. By October 1936, the WPA had initiated clearing runways for a three-way airfield. The runways extended, roughly, in north-south, northwest-southeast, and northeast-southwest alignments converging near the southwest corner of the airport and the Dixie Highway. By March 1937, the WPA had assisted in the completion of two small hangars, was constructing an administration building, but had shelved plans for a larger hangar. In February 1938, the federal government authorized another WPA project for $15,950 to complete the runways. Project managers selected asphalt for the paving surface because concrete was too expensive and grass too dangerous in proximity to the Tolomato River and for the humid climate. But, funding shortfalls prevented completion of the project, which only cleared and leveled some of the runway system and left it unpaved (*St. Augustine Record*, 16 March 1934, 29 October 1936, 16 March 1937, 16 February 1938, 28 March 1940).

St. Augustine Airport benefited from the nation's increased military defense expenditures after war broke out in Europe in June 1939. In August 1940, Roy Schroder, the state WPA administrator, authorized another WPA project at the St. Augustine Airport, this time for $29,085. Subsequently, the WPA authorized another $110,000 grant to improve the airport. The 1940 WPA project consisted of draining and grading around the airfield and extending and widening the runways, along with the installation of lights. In his comments to the *St. Augustine Record*, Schroder indicated that airfields in St. Augustine and Orlando were being improved as "pertinent to the interest in the general defense program now being carried on in Florida by the Navy and War Departments." The *Record* suggested that the two airports "will be used as auxiliary air bases, the local base for the Jacksonville Naval Air Station" (*St. Augustine Record*, 4 April, 26 July, 22, 28, 30 August, 7 November 1940).

The St. Augustine Airport derives its World War II significance through its association with the Jacksonville Naval Air Station (NAS), which became one of the largest naval air stations on the east coast. Naval air station historian M.L. Shettle, Jr. indicated that three naval auxiliary air stations—Cecil Field, Green Cove Springs, and Mayport—supported NAS Jacksonville with. In addition, twelve outlying fields supported NAS Jacksonville and its auxiliaries, including St. Augustine Outlying Field (OLF). During World War II, OLF St. Augustine supported NAAS Green Cove Springs, also known as Lee Field, for gunnery training of naval aviators and for familiarization purposes (Shettle 1995 1:7, 91, 103, 233; Furer 1959: 381; "Building for Defense," 1940:37).

On 1 September 1940, municipal officials reached an agreement with Commander V. F. Grant of NAS Jacksonville to use St. Augustine Airport as an outlying field for the naval air station. The agreement stipulated that the Navy would begin operations as soon as the WPA completed its clearing and paving project. The *Record* reported that "The training program at the airport will find a commander here each day during the training hours, after which private ships will be permitted free use of the field. This means that each afternoon after about 3:30 o'clock, and all of Saturday and Sunday, the field will be open for private use." Commander Grant expressed high praise to the city's officials and residents for their cooperation. He estimated that the airport would initially support NAS Jacksonville several hours each day, but not on the weekends. Later that week, the WPA assigned seventy-six laborers to the airport project, anticipating they would complete the "…leveling and grading of runways, and construction of drainage ditches, and other incidental work to make the field suitable for the planes expected to be stationed here every week as part of the national defense program." The WPA estimated the project would be completed in December 1940. But, in November 1940, the city hired civil engineer C. M. Johnson to survey the airport so it would conform to the Civil Aeronautics Authority (CAA) defense expansion program in Florida. Johnson was to survey the location for "…three runways 500 feet wide with the center 150 feet paved, the runways will run east and west, north and south, and southwest and northeast, and will range from 3,500 to 4,500 feet in length." Speculating on the future development of the airfield, the *Record* reported that "…it may be necessary to fill in the marsh on the eastern side." An aerial taken in February 1942 indicates the WPA project had cleared the airfield and paved narrow asphalt runways. The following year, the U.S. Geological Survey published a topographical map of the St. Augustine. It depicted the airport in name only, and did not record any physical features associated with its development, perhaps as a wartime security measure (*St. Augustine Record*, 1, 5 September 1940).

In January 1941, the City passed a resolution to accept more federal aid to help speed the development of the airport, this time $60,000 from the Civil Aeronautics Administration (CAA). But, in March 1941, three encumbrances against the property in the form of mortgages threatened the CAA grant and to stall any additional WPA work. Perhaps discouraged with the glacial pace of runway development, various local agencies turned to discussing support facilities. In November 1941, J. Carver Harris of the St. Augustine Aero Club and the St. Augustine-St. Johns County Chamber of Commerce announced plans for a two-story administration building at the airport. They anticipated the design would include rooms for the CAA, the Department of the Navy, and for private pilot training. Although future plans called for a third floor with a tower, it remains unclear if any of the administration building was built in 1941 (*St. Augustine Record*, 3 January, 18 March, 25 November 1941).

After the United States entered World War II, development of the St. Augustine Airport by the Department of the Navy was "shrouded in official secrecy," a characterization provided by the *St. Augustine Record*. The federal government expropriated the property through Case Number 494-J, Civil, which it filed in the United States District Court, Southern District of Florida. When the Navy acquired the site, in addition to the airfield the airport contained two hangars. The Navy hired Jacksonville civil engineer Robert M. Angas to confirm the legal description, boundaries, and current condition of the airport (Deed Book 169, p. 342 St. Johns County Courthouse; Dovell 1952 3:203-204).

In April 1942, Angas delivered to Lieutenant N.W. Herzberg, the officer in charge of construction at NAS Jacksonville, a "map of St. Augustine Field" that depicted the site with 276 acres consisting of "187 acres of firm land owned by the City of St. Augustine, 68 acres of salt marsh claimed or supposedly claimed by the City of St. Augustine, and 21 additional acres to be acquired by condemnation." As part of contract NOy-3651 with the Department of the Navy, Angas executed drawing number NAS 65-1-1, a topographical map of the "old CAA field" at St. Augustine, which he completed in 1943. In mid 1942, confounded by the culture of secrecy at the airport, the *St. Augustine Record* contacted United States Senator Charles O. Andrews and Congressman Joe Hendricks about information pertaining to the airport. After receiving some information, the *Record* reported that the Navy had hired three contractors to adapt the St. Augustine Airport for use as an outlying field for gunnery training. Construction of OLF St. Augustine was supervised by the Duval Engineering and Contracting Company and George D. Auchter Company of Jacksonville and the Batson-Cook Company of West Point, Georgia. The improvements included providing one runway with an additional 100 feet in width, and the construction of an armory and an operations building. The construction of those and various other buildings provided an impetus for the *St. Augustine Record* to report the city airport at various times as a naval air station or naval auxiliary air station, rather than its official Navy designation as an outlying field. The Navy began operations at OLF St. Augustine in late 1942 (PKY Angas Papers Box 1 File 36, Box 30 File 58; *St. Augustine Record*, 10 July, 2 September 1942).

The initial commanding officer at OLF St. Augustine was Lieutenant Kent Robinson and then Lieutenant-Commander Kimball Salisbury. Lieutenant Henry W. Colburn served as the gunnery officer who supervised a small contingent of enlistedmen. The Navy quartered its OLF St. Augustine personnel in a nearby tourist camp rather than constructing a barracks at the field. The men maintained and equipped tow planes with target sleeves. Several other personnel manned a Navy crash boat and maintained contact with the field crew to respond to emergencies. Naval aviators stationed at Green Cove Springs were generally in the final stages of their training, and made regular use of the gunnery range near St. Augustine. In the spring of 1943, the Navy quartered and trained more than 2,500 pilots and enlistedmen at Green Cove Springs. In May 1943, VF-1, CVG based in Clay County conducted gunnery practice using Grumman F4F Wildcat and Grumman F6F Hellcat fighter aircraft. Gunnery practice flights consisted of aircraft deployed from Green Cove Springs flying to St. Augustine, where they encountered tow planes trailing sleeves that they used for target practice. Other training exercises based at Green Cove Springs included camera gunnery, strafing and bombing, formation flying, and primary combat. Occasionally, fighter aircraft landed at St. Augustine. One of those in April 1943 was a naval fighter bearing seven small Japanese flag emblems, representing the number of destroyed Japanese aircraft by the naval aviator. In a "service special edition" of the *St. Augustine Record*, the editors published photographs of Grumman TBF Avenger torpedo bombers over OLF St. Augustine and a high-speed Navy crash boat. Typically, however, articles in the *Record* about the local Coast Guard station and the Army's nearby Camp Blanding easily outstripped coverage on OLF St. Augustine (*St. Augustine Record*, 25 April 1943; Coletta and Bauer 1985:221-222).

Several aircraft based at NAAS Green Cove Springs crashed in St. Johns County during training missions, presumably target practice near St. Augustine. One of those crashed six miles west of St. Augustine on the Tocoi Road and another on the beach between Atlantic Ocean and Salt Run. A third aircraft based at NAS Jacksonville crashed in the woods about six miles west of St. Augustine (*St. Augustine Record*, 21 April 1941, 3, 14 May, 23, 27 August 1943; 9 April, 28 May 1944).

In May 1946, the Department of the Navy returned the airport to the City, but held a revocable permit. The City agreed to maintain the airport in good condition and protect the government property located at the airport against loss and damage. After the municipal government discussed future operations at the airport, city officials designated Peterson Hall and Auerbach Haviland, former World War I pilots, as operators and concessionaires. The administration building was designated for the airport manager. In addition, the building designated as "R" on the Navy's map of the airfield, really a series of hutments joined together southwest of the administration building, was leased to Aero Marine, Inc. By September 1946, sixty citizens and former military personnel had utilized the airport for flight training. They included Andy Harrold, J. Dexter Phinney, and Doug Thompson. Some veterans took advantage of the G.I. Bill to earn their pilot's licenses at the airport. Flight Services, Inc. was among the early commercial flight instruction schools to operate at the airport. Some of those students included Kenneth Christie, Hiram Collins, Julian Lester, and Alva Touchton. Aircraft used to provide flight instruction included an Aeronca, Globe Swift, Republic Seabee, and Taylorcraft. Aero Marine, Inc. acquired a new Piper Cub to instruct pilots and also moored a seaplane near the inlet because the airport then had no seaplane ramp or channel to the Intracoastal Waterway (*St. Augustine Record*, 3, 5 May, 6 September, 16 November 1946, 12 June 1947).

In March 1947, the City established regular passenger service with Florida Airways connecting at Gainesville, Jacksonville, Lake City, Orlando, and Tallahassee. The commercial service included the first regular airmail into St. Augustine. That month, Hal Auerbach and Bill Haviland purchased a new Republic RC-3 Seabee, the least expensive all-metal amphibian aircraft then produced in the United States. In the post-war era, aircraft manufacturers anticipated that military pilots returning from overseas would purchase civilian planes for pleasure and sport. But, that market never materialized. Still, Auerbach and Haviland were so impressed by their first Seabee that they purchased a second, which Auerbach flew from Pennsylvania to St. Augustine. In 1948, responding to flagging sales, Republic ended production of the Seabee, one of the most successful sea-and-land planes produced in the 1940s. In addition, instructors and freshly-minted pilots made numerous flights from St. Augustine Airport, largely pleasure flights but some business trips. An instructor and businessman, Robert Peterson made aerial photography and fire patrol flights over the properties of the Robinson Improvement Company in St. Johns County in June 1947. Peterson also provided flight instruction to fifteen new pilots that year. After receiving their licenses, Chester Bennett and Frank Waters flew to Valdosta, Georgia and Franks Waters and his wife to Savannah. Cross-state solos became a popular pastime. In the first half of 1947, Herman Bowen, William Evans, Doris Holman William Jordan, Gilbert Kuter, and Robert Owen completed round-trip cross-state solos to Pass-A-Grille and other Gulf Coast destinations (*St. Augustine Record*, 18, 28 March, 12 June 1947).

In June 1947, the federal government through the War Assets Administration deeded the property associated with the airport to the City of St. Augustine. Citing the outlying field as surplus federal property, the conveyance transferred to the municipal government "All runways, taxiways, aprons, field marking and lighting, drainage system, communications system, wind tee, fueling, water, sewage, disposal and electrical systems." In addition, the government conveyed Buildings A, B, C, D, E,, F, G, H, I, and maintenance equipment that were "…the same property acquired by the United States of America in condemnation proceedings entitled United States of America, vs. 276 acres of land, more or less, in St. Johns County, et al, Case No. 494-J" (Deed Book 169, p. 344 Clerk of Court St. Johns County Courthouse).

Later that year, Beverly Whitfield of Orlando won an air show competition at St. Augustine Airport hosted by the Southeastern Section Convention of the Florida Chapter Ninety-Nines. Founded in 1929, the Ninety-Nines emerged as the largest and oldest organization of female pilots in the nation. Their mission consisted of promoting world fellowship through flight, providing networking and scholarships to young women, and preserving women in aviation. In August 1948, the Florida Chapter Ninety-Nines hosted St. Augustine's American Legion Air Show. The air show included races, low altitude inverted flights, and aerobatics by Whitfield and Betty Skelton of Tampa, the international aeronautics champion women's division (*St. Augustine Record*, 29 July 1948).

In July 1949, the City leased the airport to Jack Barber. But, declining revenues and decreases in commercial flights and pilot training compelled Barber to end the lease the following year. In September 1950, after failing to locate another lessee, the municipal government closed the airport. Owners of private aircraft could still maintain their planes and use the runways for flights "at their own risk." One of those was Governor Fuller Warren (1949-1953), who flew into St. Augustine in a DC-3 in 1951 to enjoy the premier of "Distant Drums," much of which was filmed at Castillo de Sans Marcos in St. Augustine Distributed by Warner Brothers, the movie was set in the Everglades during the Second Seminole War, directed by Raoul Walsh, and starred Gary Cooper as Captain Quincy Wyatt and Robert Barrat as General Zachary Taylor. At the airport, Warren met Sidney Capo, a young boy and native of St. Augustine who played the "half-breed son" of Captain Wyatt in the movie. Although the City closed all of its services at the airport, it permitted airplane owners to contact fuel oil companies in St. Augustine to deliver gasoline, oil, and other supplies to the airport. Most city commissioners agreed that since the end of World War II, the municipal government had largely failed to make the airport profitable. The small amount of traffic and activity at the site had resulted in little more than "a white elephant," a financial burden and a liability to taxpayers. In 1952, the U.S. Department of Agriculture developed aerial photographs of St. Johns County, including the airport. Unfortunately, the individual tiles depicting the airport are not available from the University of Florida. An index sheet, however, depicts the faint outlines of the airport with its three World War II vintage runways (*St. Augustine Record*, 12 September 1950; FSA 1951).

In the early 1950s, the local government sought to revitalize the airport as a commercial venture with an adjacent industrial park. In 1954, after engaging in negotiations with several potential lessees, the municipal government succeeded in attracting Fairchild Engine and Airplane Corporation to St. Augustine for the operation of its aircraft division and to build a large aircraft modification plant. The State of Florida assisted in the effort by donating state lands around the airport to the company. By then, the company operated factories at Costa Mesa and Manhattan, California; Hagerstown, Maryland; Long Island, New York; Mesa, Arizona; and Wycliffe, Ohio. The company constructed a 30,000 square foot building to house a manufacturing facility, which it initially used to modify C-119 Flying Boxcars and C-123 Providers and manufacture Boeing B-52 components. In 1956, the U.S. Geological Survey published a topographical map of St. Augustine. It depicted the airport with four runways. The fourth runway, Runway 13/31, was constructed about 1955, apparently, as part of the agreement with Fairchild to operate in St. Augustine. In addition, several new buildings were constructed along U.S. Highway 1. Fairchild operated out of the largest of those buildings. Established in 1920, Fairchild Aerial Camera Corporation expanded and reorganized into Fairchild Aviation Corporation in 1925. In the 1930s, the company reorganized into the Fairchild Engine and Airplane Corporation and purchased Duramold Aircraft Corporation, Ranger Engineering Corporation, and Taylorcraft Aviation, Inc. By World War II, Fairchild manufactured military and private airplanes and parts, military and commercial aerial cameras, machine gun cameras, photographic laboratory equipment, aviation instruments, gun synchronizers, sound recording and broadcasting station equipment, audio amplifiers, radio compasses, navigational equipment and miscellaneous precision devices. By the early 1950s, Fairchild maintained manufacturing plants at Farmingdale, Roosevelt Field, and Valley Stream on Long Island, New York; a guided missile plant at Wyandanch, New York; and other manufacturing facilities at Pasadena, California and Hagerstown, Maryland (*St. Augustine Record*, 18 June 1954; *Wall Street Journal*, 22 June 1954; *Washington Post*, 23 August 1954, 4 August 1962; *New York Times*, 25 September 1925, 21 November 1936; Moody 1940:807-808; Moody 1953:1949).

Fairchild's plant in St. Augustine provided the company with a presence in the American South near a major naval air station and the St. Augustine Coast Guard Station. Fairchild built and modified a range of airplanes used by the Air Force, Coast Guard, and Navy. One of its earliest contracts in St. Augustine was modifying the C-82 Packet, an aircraft the company had developed during World War II. Designed by Fairchild for the Army Air Corps to transport cargo, personnel, and mechanized equipment, the C-82 was redesigned by Fairchild into the C-119 Flying Boxcar, which was produced at its Hagerstown, Maryland factory and made its initial flight in 1947. The U.S. Air Force made extensive use of the Flying Boxcar during the Korean War as a troop and equipment transport. Fairchild ceased production in 1955, but the aircraft was modified into the 1960s for a variety of uses. In 1962, Fairchild's St. Augustine factory repaired and inspected 200 C-119s. As late as 1969, Fairchild repaired and modified Flying Boxcars in St. Augustine. Fairchild also built and modified C-123 Providers for the Air Force into "flare ships," with night attack capability, and as "ranch hands" for defoliation missions in Vietnam. Fairchild also built and modified C-123 aircraft for the U. S. Coast Guard for search-and-rescue missions. Initially designed as an assault glider, the Provider became highly regarded for its ruggedness, reliability, and ability to operate from short and unimproved airstrips. In 1964, Fairchild converted Boeing KC-97 Stratotankers from in-flight refueling aircraft into air-sea rescue airplanes. Introduced in 1950, the Stratotanker was a variant of the older Boeing C-97 transport plane. The KC-97 served as the backbone of the U.S. Air Force's aerial refueling tanker fleet until its replacement by the Boeing KC-135 in 1978. One of the largest aircraft to land at St. Augustine Airport, the KC-97 had a crew of five, was powered by four engines, and weighed 82,500 pounds unloaded. Some variants of the KC-97 had four radial propeller engines and two jet engines (*St. Augustine Record*, 18 June 1954; *Washington Post*, 4 August 1962; *Wall Street Journal*, 14 January 1964, 12 June 1969; Swanborough and Bowers 1976; http://en.wikipedia.org/wiki/C-123_Provider Accessed 4.20.2010; http://en.wikipedia.org
/wiki/KC-97_Stratotanker Accessed 4.20.2010).

Fairchild also modified World War II vintage Martin B-26 Marauders at St. Augustine Airport. A twin-engine aircraft with a reputation as a "widow maker" and "flying coffin," the B-26 was unpopular with many pilots. During the war, the aircraft was used for training purposes at Avon Park Army Air Field and MacDill Field in Tampa, where numerous crashes were reported. Still, many B-26s survived the conflict, and Fairchild modified sixty-two of those in 1957 for the U.S. Air Force and the Brazilian Air Force (*St. Augustine Record*, 18 March, 3 June 1956, 14 July 1957).

Beyond the construction of Runway 13/31, various improvements were made to the airport, in part, to accommodate the needs of Fairchild, in part, to support larger airplanes, and, in part, to meet federal requirements necessary for private industry to be eligible for government contracts. It appears that the highest percentage of air traffic at the airport then consisted of relatively large military aircraft converted, inspected, modified, and repaired by Fairchild. An aerial prepared for the U.S. Department of Agriculture in 1960 depicted the airport with a newly-paved segment in Runway 13/31. In 1964, Runway 13/31 was extended 1,300 feet, and another extension was built in 1966. The southern extension of Runway 13/31 included filling wetlands and dredging a narrow channel from the Intracoastal Waterway to the newly-built extension. Aerials and topographic maps published in 1970, 1971, 1980, and 1988 illustrate a period of expansion and development at the airport. Some of that development came on the heels of the creation of the St. Augustine-St. Johns County Airport Authority. In 1963, the Florida Legislature authorized the St. Augustine-St. Johns County Airport Authority, a taxing district that the voters of St. Johns County approved in an election on 5 May 1964. The new authority was infused with annual funding levels that the City of St. Augustine previously had not been able to collect through its tax base. The governor appointed the first three authority members after which they were elected. In July 1964, at the organizational meeting X.L. Pellicer was elected chairman, and on 3 November 1964 voters approved a $900,000 bond issue for airport improvements. In 1965, the City of St. Augustine conveyed the airport property to the airport authority, and contracts were awarded for extending and lighting the runways. In 1966, a new administration building was constructed and two hangars built to accommodate either six single engine planes or four two-engine planes. In 1973, a federal grant for $54,500 built a Very High Frequency Omni Range Terminal, or TVOR, and provided new markings for one runway. In 1978, Runway 6/24 was extended eastward 200 feet. In addition, radio remote control and runway lighting devices were installed, and upward protrusions on glide paths were removed. Aerials taken of the airport in 1990 indicate that during the previous decade a system of taxiways were built to support the runways. Beyond that improvement, the original northwest-southeast runway was converted to Taxiway B2 (*St. Augustine Record*, 24 November 1964, 20 March 1966, 20/21 March 1976, 4 December 1978, 24 November 1989; USDA 1980:12109-22; USDA 1990:1489-11).

Some alterations to the airport were made in direct support of its commercial partner. Fairchild overhauled the Navy's Martin P-5 Marlin (P5M), a large flying boat that entered service in 1951. In 1965, the seaplane ramp and taxi channel between the Intracoastal Waterway and the airport were built and dredged to accommodate Fairchild's modification of the seaplane. Aerials and topographical maps show clearly changes to the landscape and wetlands. The taxi channel initially measured 400 feet wide and 2,000 feet long. Pilots landed the aircraft in the waterway, idled along the taxi channel, up the seaplane ramp, and across the runway system into the Fairchild facility. There the company modified the Marlins for the Navy's Bureau of Weapons. Modifications made to the P-5M included raising the flight deck for improved visibility, replacing the nose turret with a radome, removing the dorsal turret, and streamlining the wing floats. The Navy deployed the P-5M during the Vietnam conflict for a variety of uses, including maritime surveillance and patrolling the Mekong Delta. In 1970, Fairchild modified fifty T-28B Trojans into T-28D fighter bombers for the U.S. Air Force. Built by North American between 1950 and 1957, the T-28 replaced the older T-6 Texan trainer. The Air Force deployed the T-28 on a limited basis during the Vietnam conflict as a counter-insurgency tactical aircraft with fighter-bomber capabilities. As modified by Fairchild, the Trojan's armament consisted of two or six mounted pylons capable of carrying bombs, napalm, rockets, and machine gun or canon pods. In September 1976, when Fairchild left the airport's industrial park, St. Augustine lost 200 jobs and two decades of aircraft modification by one of the nation's leading aviation companies (*St. Augustine Record*, 18 March, 3 June 1956, 14 July 1957, 20 August 1965, 15 September 1976; Oyster and Meonch 1992; Swanborough and Bowers 1976; Thompson 1999; http://en.wikipedia.org/wiki/B-26_Marauder Accessed 4.20.2010).

The previous decade, the Moser family had established an agreement with the airport authority first as interim airport director and then as a fixed base operator. The authority's first fixed base operators experienced financial difficulties, which required the authority to make other arrangements until the authority hired the Mosers. Over the following decades, the Mosers developed the airport it into a viable commercial operation. A retired U.S. Air Force colonel and World War II pilot, Ernie Moser was a barnstorming pilot who designed and flew his own aerobatic shows. He included his son, James Moser, at the age of sixteen. Their "flying circus" became known "for landing [Piper] J-3 Cubs on small platforms built on top of moving pickup trucks." In 1966, the family began managing the airport. When they assumed control, the airport supported six private aircraft. In 1967, the Mosers incorporated Aero Sport, Inc., which executed a lease with the authority as a fixed base operator. The Mosers marketed the airport to develop a variety of general aviation services, and revived popular flying circuses. The airport became the site for regional meetings of the Experimental Aircraft Association. Eventually, the airport also supported corporate jets and aircraft owned by and/or serving the Florida National Guard, Professional Golf Association (PGA) Tour, and Ring Power Corporation (*Florida Times Union*, 30 June 1999).

In 1980, Grumman Aerospace, Inc. reached a preliminary agreement to acquire fifty-seven acre in St. Augustine's industrial park contiguous to the airport. The aircraft company organized Grumman St. Augustine Corporation, a subsidiary of Grumman Aerospace, Inc., to modify and overhaul aircraft. In 1985, Fairchild initiated negotiations with Grumman to acquire its St. Augustine factory. Grumman subsequently acquired, occupied, and adapted the former Fairchild facility for its manufacturing operations. Organized in 1929, Grumman initially built military aircraft for the federal government, but in 1936 expanded into the private sector. Between the 1930s and 1940s, Grumman designed and built a fleet of luxury amphibian aircraft for private industry. Those aircraft included the Duck, Widgeon, Grey Goose, and Mallard. During World War II, the company designed and built for the Navy the F4F Wildcat and the F6F Hellcat, two of the most successful fighters in naval aviation history, and the TBF Avenger. All carrier-based airplanes, the Wildcat and Hellcat were single-seat single-engine propeller-driven fighter aircraft and the Avenger a single-engine three-crew torpedo bomber. The folding-wing design developed by Grumman for those aircraft provided the Navy with reliable planes in combat and minimized the footprints of the planes aboard aircraft carriers. Later, near the end of the war, Grumman developed the F7F Tigercat and then the F8F Bearcat. The first twin-engine aircraft used by the Navy and United States Marine Corps, the Tigercat and the single-engine Bearcat continued Grumman's long line of "cat" named fighter aircraft. In 1994, Northrup Corporation acquired Grumman and Vought Aircraft, and two years later the defense and electronic systems division of Westinghouse Electric Corporation. In the 1990s, California-based Northrup Grumman Corporation was the major contractor of the B2 bomber (*New York Times*, 2 October 1941, 24 March 1994, 20 April 1995; *Wall Street Journal*, 18 June, 12 August 1980; *St. Augustine Record*, 31 October 1985; Moody 1940; 547; Moody 1953:1179; Grumman 1946:121; Grumman History Center Archives).

In the early 1990s, the St. Augustine-St. Johns County Airport Authority hired Reynolds, Smith and Hills, Inc. of Jacksonville to design a new terminal building. In 1994, the Shah Construction Company supervised construction of the facility. In the 1990s, Aero Sport, Inc. became the distributor of the German-built Extra aerobatic plane and opened a aerobatic school at the airport. An increase in take off-and-landings compelled the construction of an air control tower and then expansion into the Araquay Park Subdivision. By 1999, the Moser family had helped build the airport into the home for approximately 250 aircraft. In 2003, public officials dedicated Moser Terminal "in grateful appreciation of the effort and dedication of the Moser Family to the development of the St. Augustine Airport." That year, Michael Slingluff, Aero Sport's president, said, "We've gone from grassroots to business aviation… [yet] We continue to service the needs of sports aviation. On a daily basis, 20 to 30 jets are arriving and departing St. Augustine Airport for destinations worldwide. The attraction of the airport lies in the ease of access in and out, the close proximity to Jacksonville's south side, and the growing business environment in St. Johns County." In 2006, Galaxy Aviation, an upscale fixed based operator, acquired Aero Sport, Inc. and presently operates out of St. Augustine-St. Johns County Airport. In 2010, *U.S. News & World Report* rated St. Augustine among the best places in the nation to live, in part, because of its employment sector, including Northrup Grumman Corporation ("Best Places," *U.S. News & World Report*, April 4, 2010; *Florida Times Union*, 30 June 1999; *St. Augustine Record*, 20 April 1999, 5 December 2003).

Explanation of Evaluation

No historic buildings, structures, or objects were recorded as part of the standing structures survey in the project tract. Because the runways and taxiways inside the project tract were built after 1960, they do not warrant consideration for the NRHP on an individual basis and do not contribute to a historic district. Although Runway 13/31 was built in the mid-1950s, the Airport Authority did not build the segment of the runway in the project tract until 1966. The shoulder segment of Runway 13/31 between Runways 2/20 and 6/24 and inside the project tract was built in the mid-1950s, but the paved segment of 13/31 is excluded from the project. In 1934, the City began clearing Runways 2/20 and 6/24 and paved them in 1941. The northeastern segments of those runways adjacent to or in the project tract were not cleared and paved until 1965 and subsequently improved in 1970s. The Works Progress

Administration (WPA) performed most of the initial work on the airport. Later, in the 1980s, the airport authority converted a third runway built by the WPA into a taxiway. Similarly, the seaplane ramp, apron, and taxi channel were built and dredged, respectively, in 1965 and subsequently improved. Aerials indicate that the system of taxiways supporting the runways was built between 1980 and 1990. Airports are historically defined by their system of runways and their circulation pattern around hangars and terminals. To that end, the closing of one of the original runways, part of which presently serves as Taxiway B, and the extensions of Runway 13/31 at both ends by approximately 2,000 feet indicates that the airport has insufficient historic physical integrity and is therefore excluded from consideration for the NRHP.

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