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NAS CECIL FIELD
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FINAL WETLANDS ASSESSMENT, WETLAND DELINEATION, AND TERRESTRIAL HABITAT MAPPING AT OPERABLE UNITS 1, 2 AND 7 (OU1) (OU2) (OU7) NAS CECIL FIELD FL
12/10/1993
ABB ENVIRONMENTAL

FINAL

WETLANDS ASSESSMENT, WETLAND DELINEATION, AND TERRESTRIAL HABITAT MAPPING AT OPERABLE UNITS 1, 2, AND 7

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

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Contract No.:

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December 10, 1993

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EXECUTIVE SUMMARY

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TABLE OF CONTENTS

FINAL

LIST OF FIGURES

FINAL

LIST OF TABLES

1.0 INTRODUCTION

A wetlands assessment and terrestrial habitat mapping was completed for several hazardous waste sites at NAS Cecil Field (Figure 1-1). The wetlands assessment includes identification and characterization of the wetlands present at Sites 1 and 2 (Operable Unit 1), Sites 3, 4, 5, and 17 (Operable Unit 2) and Site 16 (Operable Unit 7) (Figure 1-2). Identification and general mapping of terrestrial wildlife habitats was completed for the same Sites at the base.

The wetlands identification at Sites 1, 2, 3, 4, 5, and 17 were delineated according to current State of Florida and Federal guidelines (Section 3.0). A functional assessment of the attributes of these wetlands is provided in Section 4.0. The wetlands assessment will provide information necessary for the Remedial Investigations and Feasibility Studies for Operable Units 1, 2, and 7.

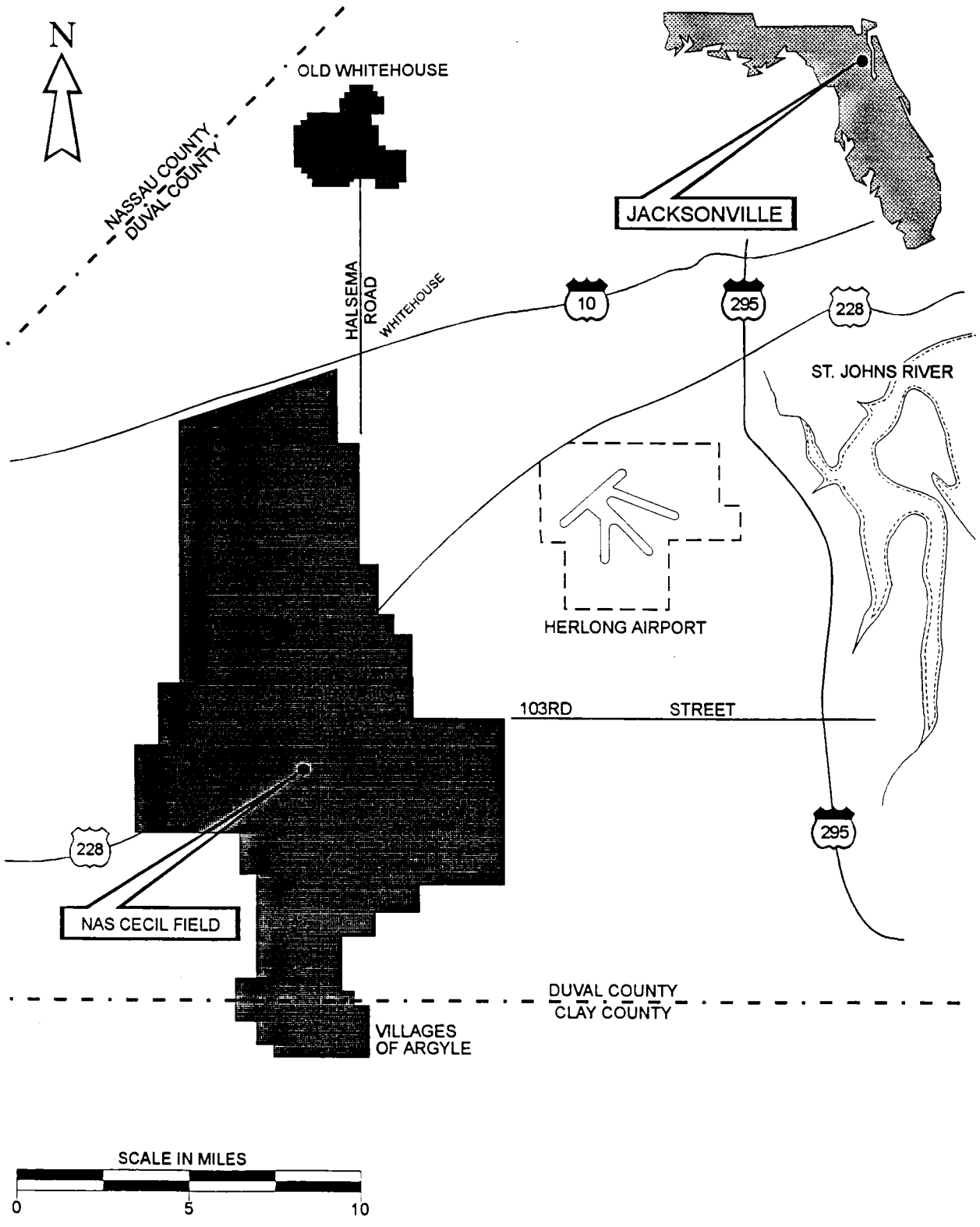
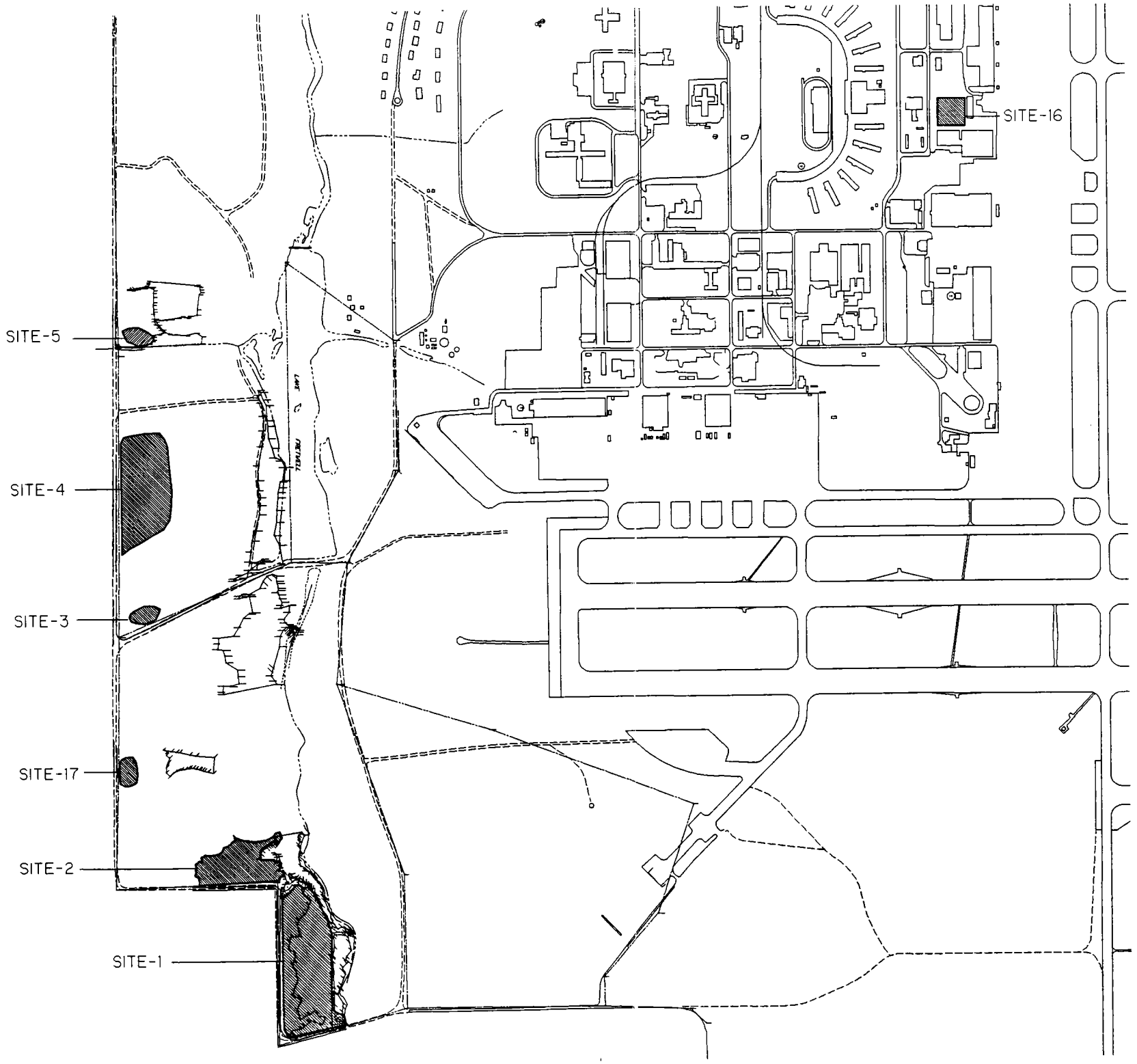


ABB Environmental Services, Inc.	**GENERAL LOCATION MAP** **NAS CECIL FIELD** **JACKSONVILLE, FLORDIA**	FIGURE NO. **1-1**



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LEGEND

PSC AREA

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BASE SITE MAP

NAS CECIL FIELD
JACKSONVILLE, FLORDIA

FIGURE NO.
1-2

2.0 WETLANDS IDENTIFICATION AND CHARACTERIZATION AND TERRESTRIAL HABITAT MAPPING

2.1 METHODOLOGY. Wetlands were identified in accordance with federal regulations (Environmental Laboratory, 1987a) and State of Florida guidelines (FDER, 1990). Wetlands were first identified qualitatively through review of available data including U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Maps, FEMA floodplain maps, available wetlands maps (SOUTHNAVFACENGCOM, 1989), aerial photographs, and topographic maps. A field investigation was completed from October 4 through October 18, 1993 to verify the presence of wetlands at these locations. Wetlands identified in the study area were classified according to systems developed by the USFWS (Cowardin et al. 1979) and the Florida Natural Areas Inventory (FNAI, 1990). Wetlands were classified based on information obtained from the field survey including vegetation structure and composition, topography, land form, substrate, soil moisture, condition, and climate. Table 2-1 presents this information for both classification systems identified on the sites. Both classification systems were used to describe the wetlands on each of the sites in the following sections.

Natural upland plant communities were classified according to the FNAI classification system. Communities were characterized based on vegetation structure and composition, topography, land form, substrate, soil moisture condition, climate, and fire. Table 2-2 presents this information for the FNAI upland systems identified on the sites. The information necessary for classification was collected during the field investigation (October 4 through October 18, 1993). Observations and information gathered during the survey were recorded on blue-line aerial photographs of the study area as well as in bound notebooks. The FNAI system was used to describe the uplands on each of the sites in the following sections. A list of dominant plant species observed on the sites is included in Appendix A.

2.2 RESULTS. Based on the review of the NWI maps, topographic maps and aerial photographs, wetlands were tentatively identified at Sites 1, 2, 3, 4, 5, and 17. Wetlands were not identified at Site 16. A field survey completed from October 4 to October 18, 1993 verified the preliminary findings. The characterization of the wetlands identified at Sites 1, 2, 3, 4, 5, and 17 is discussed in the following representative subsections.

The wetland communities at each of the sites are described according to their USFWS classification (Cowardin et at., 1979) and FNAI counterpart (FNAI, 1990). In general, two to three wetland community classes are present at each of the sites. The FNAI classification system describes undisturbed or relatively undisturbed vegetation communities. The wetland system for most of the Study Areas have at sometime in the past been significantly altered due to a variety of man-made disturbances including construction, modifications, or grading. Therefore, the description written in the FNAI classification system will not always directly describe what is observed in the Study Areas. Potential past disturbances and variances from the natural undisturbed communities are discussed.
Table 2-1

TABLE 2-1
Wetland Classification System Characteristics

USFWS (COWARDIN, 1979) CLASSIFICATION	CORRESPONDING FNAI (FNAI, 1990) CLASSIFICATION	DESCRIPTION	COMMON VEGETATION	FIRE FREQUENCY
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Floodplain Swamp	Occur on flooded soils along stream channels	(Usually buttrested hydrophytic trees) cypress, typelo, swamp titi, wax myrtle, large gallberry, royal fern	Usually too wet to support fire
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Bottomland Forest	Low-lying, closed canopy forest occuring on low-lying flatlands that border streams with distinct banks	Water oak, live oak, red maple, sweetgum, loblolly pine, cabbage palm, wax myrtle	Rarely burn
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Hydrick Hammock	Well developed hardwood forest on low, flat, wet sites	Cabbage palm, diamond-leaf oak, red cedar, red maple, swamp bay, sweetbay, water oak, saw palmetto, poison ivy, royal fern, Virginia creeper	Rarely burn
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Wet Flatwoods	Relatively open-canopy; flat, poorly drained terrain	Pond pine, slash pine, sweetbay, sedges, rushes, wax myrtle, gallberry, saw palmetto, pitcher plants	Natural fires probably occurred every 3 to 10 years during pre-Columbian times
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Seepage Slope	Usually saturated but rarely inundated	Pond pine, slash pine, longleaf pine, titi, gallberry, blueberry, fette bush, cinnamon fern, chain fern	Every 20 to 50 years
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Wet Prairie	Sparse, dense ground cover on low, relatively flat, poorly drained, sandy soils	Hatpins, wax myrtle, panicums, meadowbeauty, sunflower, pitcher plants, St. John's wort, sundews	Every 2 to 4 years
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Baygall	Densely forested, peat-filled seepage depression, usually saturated (high water table)	Sweet bay, swamp bay, red bay, loblolly bay, dahoon holly, gallberry, wax myrtle, possumhaw, chokeberry, poison ivy, cinnamon fern, chain fern, grape	Every 50 to 100 years or more
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Floodplain Marsh	Occur in river floodplains; flooded with flowing water approximately 250 days annually	Maidencane, button bush, dotted smartweed, arrowheads, pickerel weed, rushes, reed	Every 1 to 5 years

TABLE 2-1 (cont.)
Wetland Classifications System Characteristics

USFWS (COWARDIN, 1979) CLASSIFICATION	CORRESPONDING FNAI (FNAI, 1990) CLASSIFICATION	DESCRIPTION	COMMON VEGETATION	FIRE FREQUENCY
Palustrine Scrub/Shrub Broad-Leaved Deciduous	Bog	Occur on deep peat substrate,usually saturated or inundated	Titi, sphagnum moss, fetter bush, loblolly bay, redbay, sweetbay, blueberry, pitcher plants, sundew, arrowhead, bog buttons, hatpins	In shrubby types: every 3-8 years In woody types: every 50-150 years

TABLE 2-2
Upland Classification System Characteristics
(FNAI, 1990)

FNAI CLASSIFICATION	DESCRIPTION	COMMON VEGETATION	FIRE FREQUENCY
Upland Mixed Forest	well developed, closed-canopy forest and upland	southern magnolia, pignut, hickory sweetgum, maple, dogwood, live oak, loblolly pine	rarely burn
Mesic Flatwood	open-canopy forest of widely spaced pine trees and a dense ground cover of herbs and shrubs; relatively flat, moderately to pourly drained terrain	longleaf pine, slash pine, gallberry, saw palmetto, St. John's wort, huckleberry, blueberry, yellow-eyed grass	every 1 to 8 years
Dry Prairie	nearly treeless plain with a dense ground cover on relatively flat, moderately to poorly drained terrain	wiregrass, saw palmetto, broomsedge, carpet grass, Indian grass, rabbit tobacco, goldenrod, gallberry, fetterbush, blueberry	very 1 to 4 years
Scrubby Flatwoods	open canopy forest with sparse shrubby understory and areas of barren white sand	longleaf pine, slash pine, sand live oak, chapman's oak, myrtle oak, scrub oak, saw palmetto, stagges bush, blueberry, goldenrod	every 8 to 25 years

2.2.1 Site 1 The wetlands identified at Site 1 fall under three main Cowardin classes (Figure 2-1). The area that is adjacent at Rowell Creek on the eastern side of the berm is classified as Palustrine Forested Broad-Leaved Deciduous (Cowardin, 1979) or Floodplain Swamp (FNAI, 1990). The Floodplain Swamp class occurs along stream channels with a dominance of buttressed hydrophytic trees. This section of the study area is subject to intermittent flooding (floodwaters as high as 4 to 5 feet were observed during the site visit). Vegetation identified in this area include red maple (*Acer rubrum*), laurel oak (*Quercus laurifolia*), water ash (*Fraxinus caroliniana*), and bald cypress (*Taxodium distichum*).

The western part of the wetland system is Palustrine Scrub/Shrub Broad-Leaved Deciduous (Cowardin et al., 1979) or Wet Flatwoods and Seepage Slope (FNAI, 1990). This part of the wetland system is located on the former landfill. The soil moisture regime is very heterogeneous over the landfill. Within short distances (a few feet), there are areas holding water, supporting obligate (water-loving) plant species and areas that are well - drained supporting various upland species. Vegetation typical of this class and found in the study area include longleaf pine (*Pinus palustris*), loblolly pine (*Pinus Taeda*), slash pine (*Pinus elliotii*), wax myrtle (*Myrica cerifera*), and gallberry (*Ilex glabra*). The Wet Flatwoods are relatively open-canopy forests with dense ground cover. Typical plants identified include loblolly pine, slash pine, longleaf pine, sweetbay (*Magnolia virginiana*), wax myrtle, and gallberry. Due to the landfill activities, these areas have not succeeded into a natural state easily identified in the FNAI classification system.

The northern portion of this wetland system is Palustrine Emergent Persistent wetland (Cowardin, 1979) that is fed from a nearby artisan groundwater seep located at Site 2. The only FNAI classification that might resemble this area is the Floodplain Marsh. This class occurs in river floodplains. This area remains saturated or inundated due to the presence of the groundwater seep. Emergent grasses, herbs, and shrubs dominate this Floodplain Marsh. Vegetation present include arrowheads (*Sagittaria latifolia*), bog buttons (*Lachnocaulon anceps*), rushes (*Scirpus sp.*), sedges (*Carex sp.*), and dotted smartweed (*Polygonum punctatum*), among others.

The western border of Site 1 is an upland within the planted pine forest. This area does not support the hydrophytic vegetation nor the hydrology necessary to be classified as a wetland. Typical vegetation identified in this area include slash pine, longleaf pine, loblolly pine, red maple, sweetgum (*Liquidambar styraciflua*), sand blackberry (*Rubus cuneifolius*), blackberry (*Rubus sp.*), and muscadine grape (*Vitis rotundifolia*).

2.2.2 Site 2 The wetlands associated with Site 2 fall within two Cowardin classes; Palustrine Forested Broad-Leaved Deciduous, covering most of the area, and Palustrine Emergent Persistent on the south and southwestern sides (Figure 2-2). The Palustrine Forested area corresponds to two FNAI wetland classes, Floodplain Swamp and Bottomland Forest. The Bottomland Forest occurs along Rowell Creek. The soils are rarely inundated but instead tend to be saturated with a high water table. Typical plants identified in the Bottomland Forest include red maple, sweetgum, slash pine, loblolly pine, longleaf pine, loblolly bay (*Gordonia lasianthus*), sweetbay, cinnamon fern

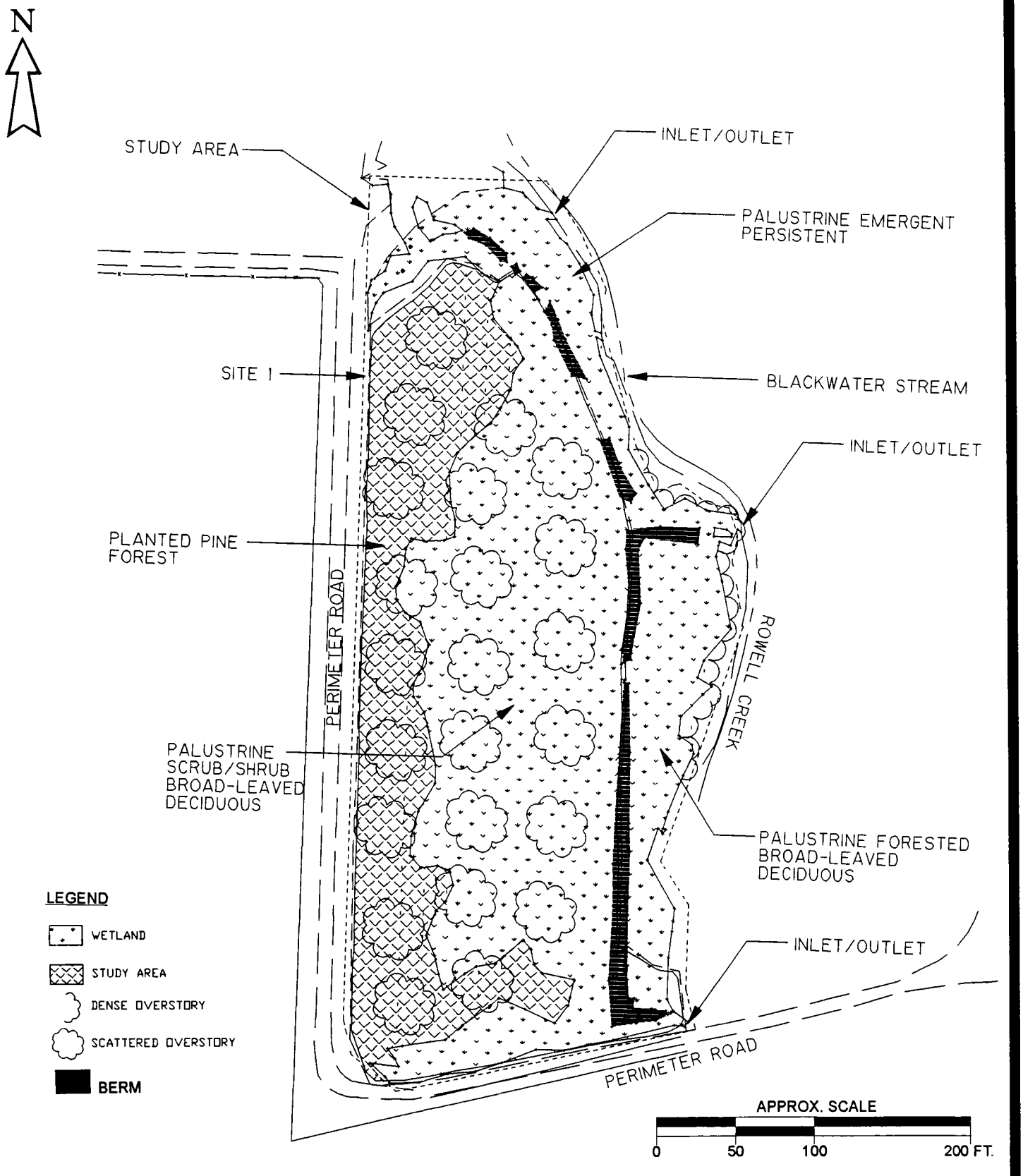
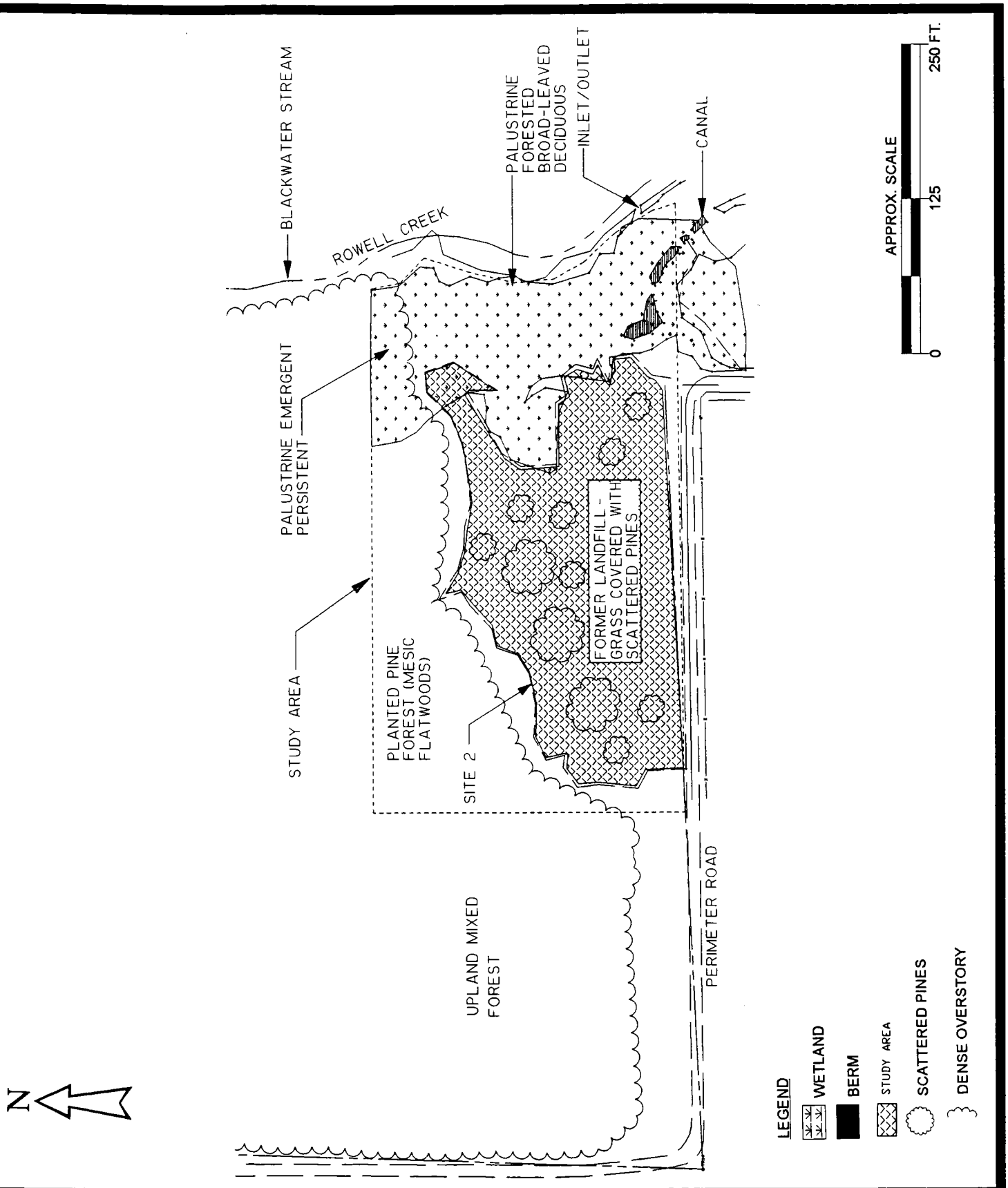


ABB Environmental Services, Inc.	**SITE 1 STUDY AREA** **NAS CECIL FIELD** **JACKSONVILLE, FLORDIA**	**FIGURE NO.** **2-1**



SITE 2 STUDY AREA

NAS CECIL FIELD

JACKSONVILLE, FLORDIA

FIGURE NO.

2-2

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(*Osmunda cinnamomea*), and wax myrtle. The Floodplain Swamp areas are located along Rowell Creek as well, but are in low-lying areas where floodwaters collect. Dominant vegetation present are buttressed hydrophytic trees including bald cypress, water ash, red maple, and laurel oak.

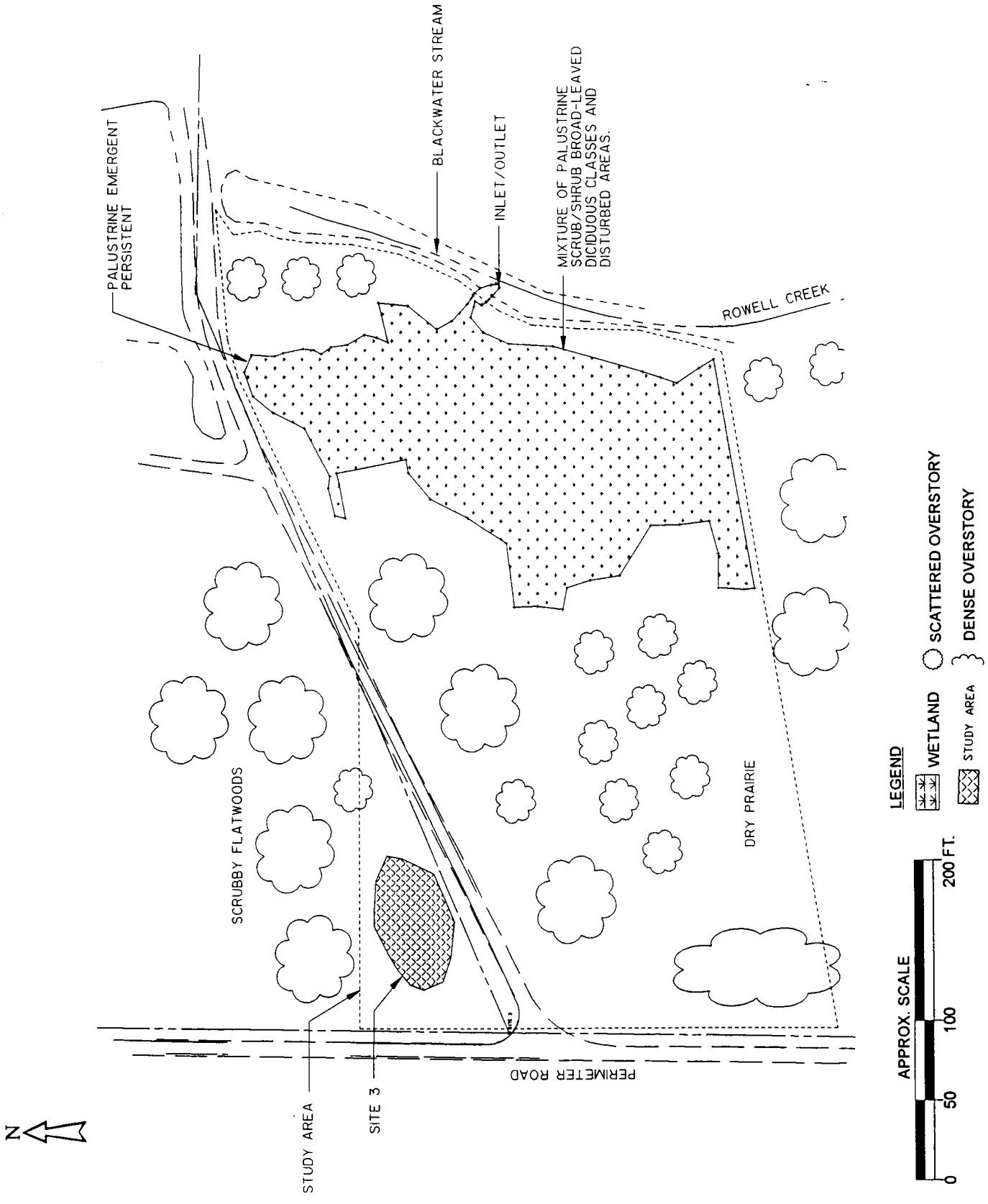
The Palustrine Emergent Persistent area is inundated by water from an artisan groundwater seep. The seep area is diverted into a human-made channel where it empties into an Emergent Persistent wetland area prior to entering Rowell Creek (Figure 2-2). This area is inundated throughout much of the year. Dominant vegetation identified include black willow (*Salix nigra*), sweetbay, royal fern (*Osmunda regalis*), hat pins (*Eriocaulon decangulare*), cattail (*Typha latifolia*), rushes, and sedges. Approximately, 60 percent of the Site 2 study area consists of upland plant communities. Directly over the former landfill is a grass covered area with a few scattered young (approximately 10 years) pine trees (*Pinus sp.*). The shrub and herb layer is dense and made up of such species as dog fennel (*Eupatorium capillifolium*), broomsedge (*Andropogon glomeratus*), ragweed (*Ambrosia sp.*), goldenrod (*Solidago fistulosa*), wild lettuce (*Lactuca sp.*), and myrtle oaks (*Quercus myrtifolia*). This plant community is disturbed and does not fall within any natural community FNAI type.

The northwestern corner of the study area is an Upland Mixed Forest (Figure 2-2). This area is a well-developed, closed-canopy forest of upland hardwoods. Plant species present include water oak (*Quercus nigra*), myrtle oak, and sweetgum. The trees in this area appear to be older than NAS Cecil Field (50 years), indicating no prior disturbance except a few monitoring well installations.

Bordering the northern side of the study area is a planted pine forest (Figure 2-2). Although this is a human controlled area containing drainage ditches and fire roads, characteristics of the Mesic Flatwood FNAI classification are evident. The area is relatively flat with poorly drained soils. Vegetation found in this area includes longleaf pine, slash pine, loblolly pine, saw palmetto (*Serenoa repens*), bog buttons (*Lachnocaulon anceps*), and gallberry.

2.2.3 Site 3 The Site 3 study area has been disturbed over the past year from sampling activities, therefore, it is difficult in many places to distinguish one wetland subclass from another. The area is mapped under the Cowardin system as a mixture of Palustrine Forested and Scrub-Shrub Broad-Leaved Deciduous classes with some Palustrine Emergent Persistent mixed in the northern portion (Figure 2-3). Identifying FNAI communities to represent this area is difficult due to the recent disturbances.

The forested and scrub-shrub communities can best be described in the FNAI classification system as Baygall, Wet Prairie, and Bottomland Forest. The Baygall community is typically found in flat areas or on slopes where high lowland water tables help maintain soil moisture. Dominant species of plants found in the Baygall community include sweetbay, swamp bay (*Persea palustris*), red bay (*Persea borbonia*), loblolly bay, netted chain fern (*Woodwardia areolata*), cinnamon fern, muscadine grape, and gallberry among others. A portion of this area is also considered Wet Prairie. This is characterized



SITE 3 STUDY AREA

NAS CECIL FIELD

JACKSONVILLE, FLORDIA

FIGURE NO.

2-3

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with sparse, dense ground cover of grasses and herbs. Dominant species include hatpins, wax myrtle, Panicum sp., St. John's wort (*Hypericum fasciculatum*), and meadowbeauty (*Rhexia virginica*) among others. The Bottomland Forest is characterized by a low-lying, closed canopy hardwood forest. Common plant species include red maple, sweetgum, various pines, wax myrtle, cinnamon ferns, and loblolly bay.

The Palustrine Emergent Persistent area can most closely be associated with the FNAI Floodplain Marsh classification. This area is dominated by emergent grasses, herbs, and shrubs including black willow, myrtle oak, climbing hempweed (*Mikania scandens*), scarlet pimpernel (*Anagallis arvensis*), bulrush (*Scirpus sp.*), and dotted smartweed (*Polygonum punctatum*) among others.

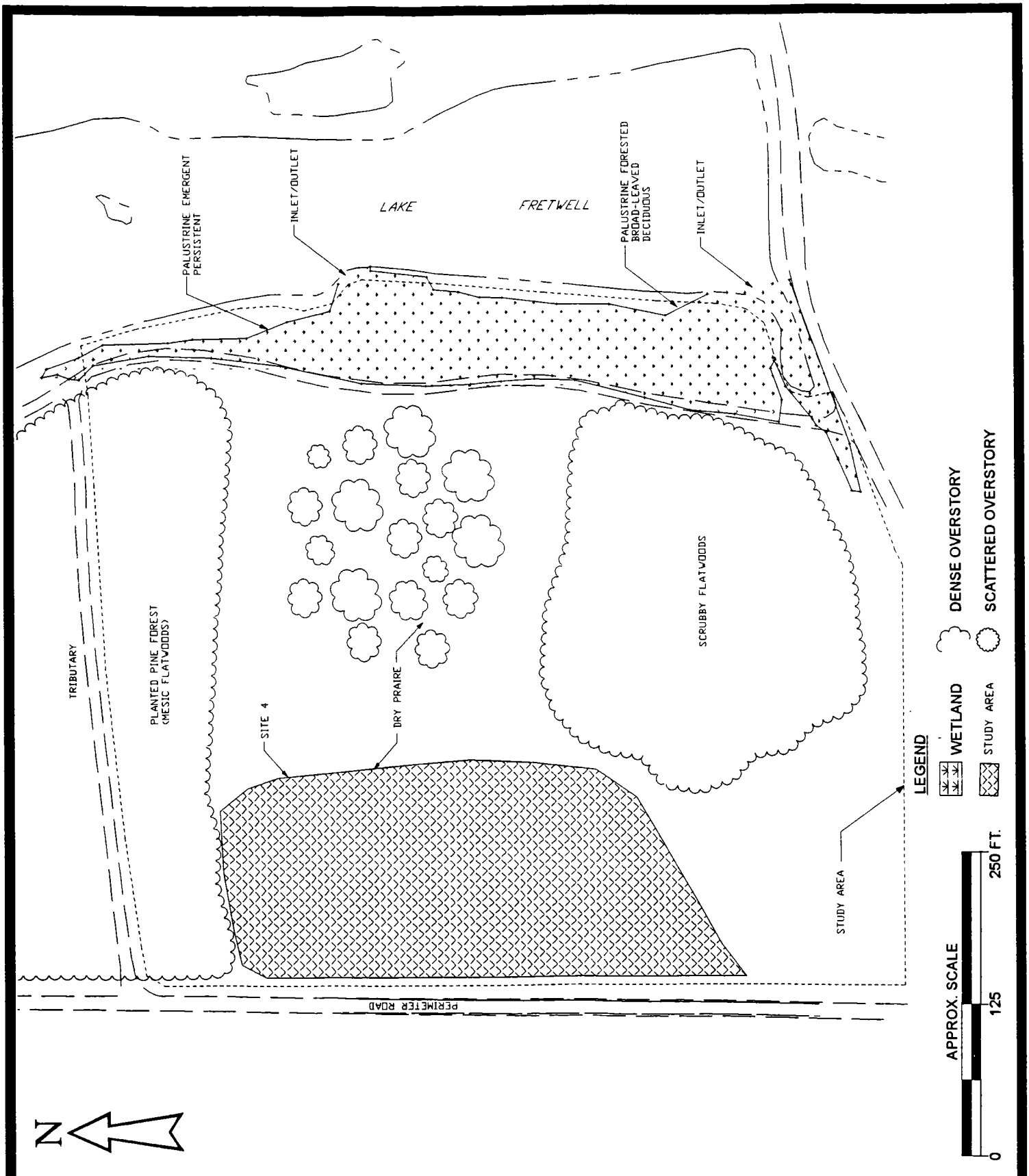
The upland areas in Site 3 predominantly resemble Dry Prairie with a small portion of the northern end of the study area most closely resembling Scrubby Flatwoods (FNAI, 1990; Figure 2-3). The Dry Prairie consists of flat, sandy soils with little to no trees and dense ground cover. Vegetation identified included ragweed, goldenrod, dog fennel, bracken fern (*Pteridium aquilinum*), wax myrtle, sand blackberry, golden ragweed (*Senecio aureus*), and muscadine grape.

The Scrubby Flatwoods consist of a small portion of Site 3 along the northern boundary. The area is flat and sandy with scattered pine trees, a sparse shrubby understory, and barren sand. Vegetation present includes longleaf pine, loblolly pine, saw palmetto, myrtle oak, goldenrod, and blackberry among others.

2.2.4 Site 4 The Site 4 study area contains Palustrine Forested Broad-Leaved Deciduous and Palustrine Emergent Persistent wetlands (Cowardin, 1979). The emergent persistent area occupies most of this wetland system and is situated on the northern portion (Figure 2-4).

The emergent persistent area can best be characterized by the FNAI system as a combination of Wet Prairie and Seepage Slope. This Wet Prairie is a treeless area with sparse to dense ground cover of grasses and herbs including rushes, hatpins, redroot (*Lachnanthes caroliniana*), sundews, and pitcher plants among others. This area was saturated or inundated during the field survey. This Seepage Slope is an area where moisture is maintained by downslope seepage. Typical plants include slash pine, pond pine (*Pinus serotina*), titi (*Cyrilla racemiflora*), wax myrtle, cinnamon fern, Virginia chain fern (*Woodwardia virginia*), sundew, and pitcher plants, among others.

The forested areas are Bottomland Forest and Baygall communities (FNAI, 1990). Typical plants in the Bottomland Forest include red maple, sweetgum, slash pine, loblolly bay, and wax myrtle. This Baygall community collects water from slope seepage. Common vegetation identified include sweetbay, swamp bay, red bay, and loblolly bay. Other plants associated with this system include wax myrtle, gallberry, cinnamon fern, Virginia chain fern, muscadine grape, sweetgum, and netted chain fern.



SITE 4 STUDY AREA

NAS CECIL FIELD

JACKSONVILLE, FLORDIA

FIGURE NO.

2-4

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Site 4 is predominantly upland with a small strip of wetland along the eastern edge of Lake Fretwell (Figure 2-4). This area historically, has been significantly disturbed over the years. A planted pine forest is present on the northern half of the study area. This is a human controlled area with drainage ditches and fire roads. Characteristics of this habitat include an open canopy forest of widely spaced loblolly, slash, and longleaf pine trees with little or no understory but a dense ground cover of various herbs and shrubs including saw palmetto, gallberry, sand blackberry, bracken fern, and laurel oak seedlings. This area most closely resembles the FNAI classification of Mesic Flatwood.

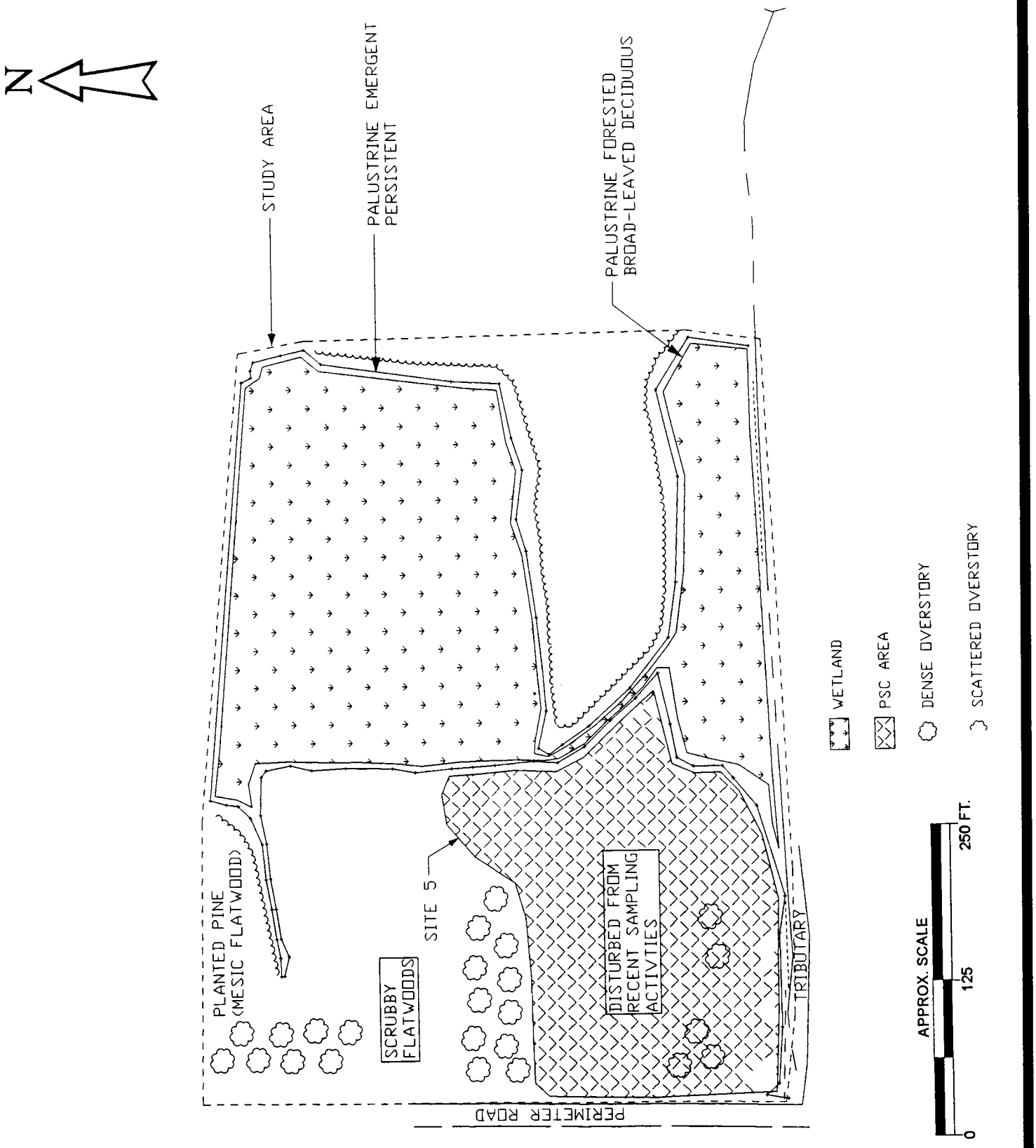
An area similar to the FNAI habitat class of Dry Prairie is located through most of the central portion of this study area (Figure 2-4). This area contains scattered scrubby trees, shrubs, and ground cover over a flat terrain. Vegetation identified include turkey oak, myrtle oak, saw palmetto, bracken fern, dog fennel, goldenrod, scarlet pimpernel, and longleaf pines.

Approximately one fourth of the study area on the southern side most closely resembles Scrubby Flatwood (FNAI, 1990) (Figure 2-4). Typical plants include longleaf pine, slash pine, loblolly pine, myrtle oak, turkey oak, saw palmetto, goldenrod, sunflower (*Helianthus angustifolius*), and dog fennel.

2.2.5 Site 5 Wetlands identified at Site 5 study area fall within two Cowardin classes; Palustrine Forested Broad-Leaved Deciduous to the south and along the tributary to Lake Fretwell and Palustrine Emergent Persistent in the larger area to the north (Figure 2-5).

The forested area on Site 5 study area can be associated with one main FNAI class, Floodplain Swamp. The area bordering the tributary is characterized by a flooded soils along a stream channel where the dominant trees are buttressed hydrophytic trees including bald cypress, alder (*Alunus serrulata*), and sweetbay. Other plants associated with this class in the area include titi, wax myrtle, gallberry, royal fern, black willow, blackberry, and swamp bay, among others.

The persistent emergent (Cowardin, 1979) area consists of a combination of three FNAI classes including Baygall, Bog, and Wet Prairie. These communities are located on the northern three quarters of the study area. The Baygall community is found in a flat area where a high lowland water table help maintain soil moisture. Dominant species of plants found in this Baygall community include sweetbay, swamp red bay, loblolly bay, netted chain fern, cinnamon fern, wild grape, and gallberry. Wet Prairie is characterized with sparse to dense ground cover of grasses and herbs. Dominant species identified at the site include hatpins, wax myrtle, Panicums, St. John's wort, meadowbeauty, sundew, and pitcher plants. The Bog is in an area where the soils are usually saturated or inundated. Vegetation identified includes titi, sphagnum moss, spatterdock (*Nuphar luteum*), fetterbush, gallberry, loblolly bay, redbay, sweetbay, sundew, and pitcher plant.



SITE 5 STUDY AREA

NAS CECIL FIELD

JACKSONVILLE, FLORDIA

FIGURE NO.

2-5

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The Site 5 study area contains upland plant communities on the west half of the area along Perimeter Road as well as between the two wetland classes (Figure 2-5). The upland classes include a planted pine area that most closely resembles a Mesic Flatwood community (FNAI, 1990). This area contains an open canopy forest of longleaf pine, slash pine, loblolly pine, saw palmetto, fetterbush, bog buttons, and gallberry.

An upland plant community most closely resembling the FNAI Scrubby Flatwood class is located in the central portion of the upland area (Figure 2-5). This area contains longleaf pine, slash pine, loblolly pine, muscadine grape, saw palmetto, wax myrtle, blackberry, and goldenrod.

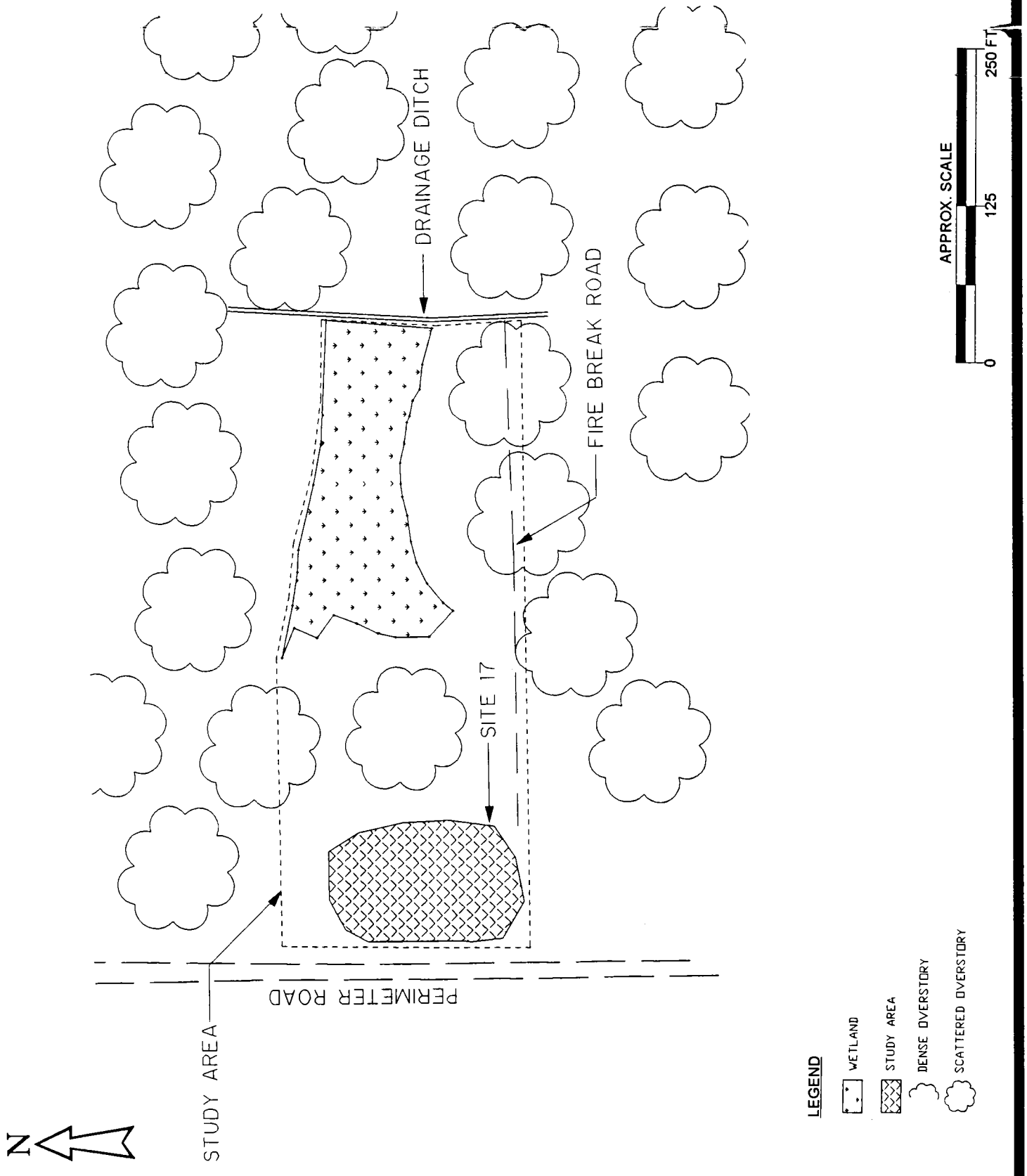
2.2.6 Site 17 The wetlands associated with the Site 17 study area are dominated by a Palustrine Forested Broad-Leaved Deciduous class (Cowardin, 1979) with two small Palustrine Emergent Persistent patches in the northern part of the study area (Figure 2-6). This area drains to the east eventually into Rowell Creek.

The forested area is described as a Hydric Hammock by the FNAI classification system. The forested area is a well developed hardwood forest with a variable understory of palms and ferns. Dominant plant species present in this area are red maple, swamp bay, sweetbay, sweetgum, royal fern, cinnamon fern, yellow jessamine, and virginia creeper, among others. This class is found on a low, flat, wet area. The smaller emergent persistent seepage areas can be generally classified as a Floodplain Marsh (FNAI, 1990). The seepage appears to be collecting water from a groundwater seep as well as from sheetflow runoff. This area is dominated by emergent grasses, herbs, and shrubs including arrowheads, pickerelweed (*Pontederia cordata*), buttonbush, and dotted smartweed, among others.

The Site 17 study area is approximately 60 percent upland (Figure 2-6). The upland areas contain planted pine forests and Scrubby Flatwoods (FNAI, 1990). The planted pine forests are human controlled with drainage ditches and fires roads cut throughout. The FNAI classification of Mesic Flatwood most closely resembles the planted pine area. Dominate vegetation identified includes loblolly pine, slash pine, longleaf pine, red maple, gallberry, muscadine grape, and blackberry.

A small portion in the northwest corner of the study area most closely resembles a Scrubby Flatwood class (FNAI, 1990 and Figure 2-6). Vegetation identified in this area include longleaf pine, loblolly pine, saw palmetto, goldenrod, and myrtle oaks.

2.2.7 Site 16 Site 16 consists of a small mowed patch of grass between two parking lots in an industrial area where an underground seepage pit was located (Figure 2-7). The survey conducted at this site revealed only the presence of mowed grasses. No wetlands were identified in this area.



SITE 17 STUDY AREA

NAS CECIL FIELD

JACKSONVILLE, FLORDIA

FIGURE NO.

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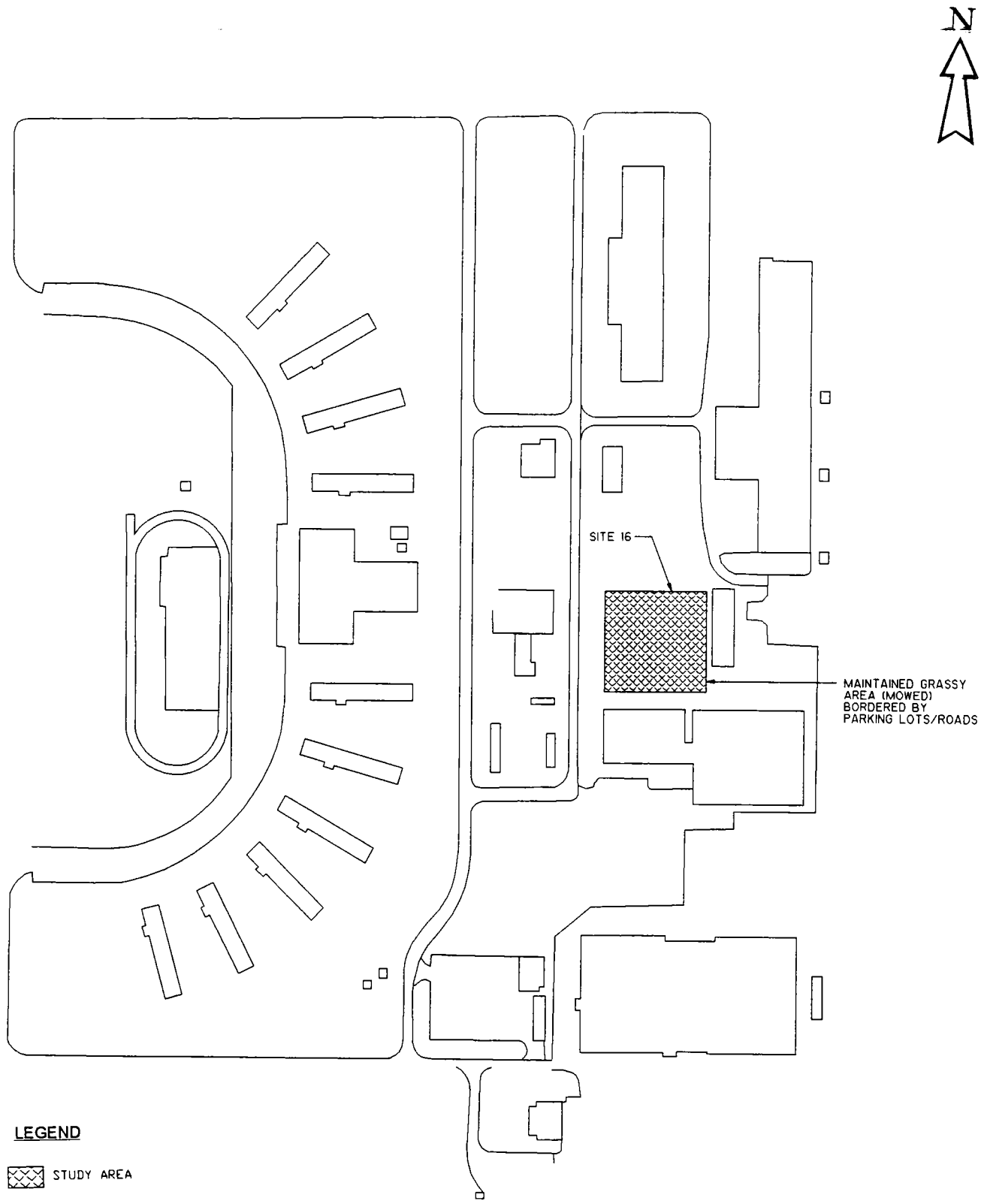

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SITE 16 STUDY AREA

NAS CECIL FIELD

JACKSONVILLE, FLORDIA

FIGURE NO.

2-7

3.0 WETLANDS DELINEATION

The jurisdictional boundaries were delineated for the wetlands identified at Sites 1, 2, 3, 4, 5, and 17. Wetlands are lands transitional between terrestrial and aquatic systems that are inundated or saturated by surface water or groundwater 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 (Federal Register 11982, 1980). Wetland determinations were based on guidelines established in the Corps of Engineers (COE) *Wetland Delineation Manual* (Environmental Laboratory 1987a). It is also necessary to satisfy requirements of the Florida Department of Environmental Protection's (DEP) wetland determination (DER, 1990). Based on a review of regulations and discussions with Florida DEP representatives, it was determined that by using the Army Corps Delineation technique to make wetland determinations, the State of Florida guidelines would fall within the federal determination (Pope, 1993). The delineation determinations will satisfy both state and federal guidelines. The 1987 COE sampling procedures were used to identify and delineate wetlands (Environmental Laboratory, 1987a). The field evaluation was conducted from October 4 through October 18, 1993. The 1987 COE *Wetland Delineation Manual* specifies the characteristics and indicators of hydrophytic vegetation, hydric soils, and wetland hydrology must be present for an area to be regulated as a wetland. The State of Florida specifies that an area is a wetland if it is connected to a surface water body and has specific hydrophytic vegetation present (DER, 1990). All wetlands identified on the Sites of concern have a connection to a surface water body of the State. For these sites, these waters are Rowell Creek and Lake Fretwell.

Evidence of hydrophytic vegetation, hydric soils and wetland hydrology, was collected during the field survey in potential wetland areas and adjacent upland areas. Soils could not be sampled over former landfill, due to the close proximity of landfill material to the land surface, as well as the increased potential for environmental hazard exposure. Dominant plants within each vegetation layer were identified by ocular estimation at specific sample plots. Each plant species was classified according to moisture tolerance and placed into one of the indicator categories specified in Table 3-1. The Army Corps' *List of Plant Species that Occur in Wetlands, Region 2 - Southeast* (Environmental Laboratory, 1987b) was referenced to determine plant indicator status. Test soil pits were dug to a depth of at least 16 inches at each plot. Information concerning soil texture, moisture content, soil matrix color, presence of mottles and gleying, presence of organic streaking, and other indicators of hydric soil was collected at each sample location. Soil and mottle colors were determined using the Munsell Soil Color Chart (Kollmorgen Instruments, 1988). Evidence of wetland hydrology was determined for each pit based on surface inundation or depth to saturated soils or groundwater. Hydrologic field indicators including wetland drainage patterns and water marks were also noted. In undisturbed conditions, all three of these technical criteria - hydrophytic vegetation, hydric soils, and wetland hydrology - must be satisfied to classify a site as a wetland (Environmental Laboratory, 1987a).

Table 3-1
Plant Species Indicator Category Definitions
(Environmental Laboratory, 1987b)
NAS Cecil Field, Jacksonville, Florida

Category	Definition
Obligate Wetland: (OBL)	Plants that almost always occur in wetlands (estimated probability >99%) under natural conditions.
Facultative Wetland: (FACW)	Plants that usually occur in wetlands (estimated probability 67-99%), but are occasionally found in non-wetlands areas.
Facultative: (FAC)	Plants that are equally likely to occur in wetlands or non-wetlands (estimated probability 35-67%).
Facultative Upland: (FACU)	Plants that usually occur in non-wetlands (estimated probability 67-99%).
Upland: (UPL)	Plants that almost always occur in non-wetlands (estimated probability >99%) under natural conditions.

Field data from the sample plots were recorded on standard 1987 COE wetland delineation forms (Appendix B). The wetland boundaries were flagged with surveyor's ribbon.

3.1 SITE 1. A wetland system was identified in the Site 1 Study Area (Figure 2-1). Indicators of wetland hydrology, hydric soils, and hydrophytic vegetation were observed, and the wetland boundaries were mapped. A summary of the wetland classes, indicator species, and approximate acreage is presented in Table 3-2 and discussed below.

The wetland system located in the Site 1 study area contains three wetland classes (Figure 2-1). The western half of the wetland system contains a scrub-shrub broad-leaved deciduous community. Planted pine trees were identified over much of this area; however, they were not considered a natural dominant species in the vegetation community. Pooling from sheetflow and soil saturation was observed throughout the wetlands. Proceeding downslope on the topographic gradient relatively speaking, is a palustrine forested broad-leaved deciduous community. The area is temporarily flooded at various times of the year by Rowell Creek (this was observed in the field on October 30, 1993). It also receives runoff from the scrub-shrub community slightly upslope. The area of highest moisture regime was on the northern end of the wetland systems. This area borders Site 2 study area where there is a permanently flooded groundwater seep. Water from this seep enters Site 1 on the northern end that has created a small palustrine emergent persistent wetland community. During times of heavy rain, all communities mix from flooding of Rowell Creek through breaches in the creek channel and along the berm.

Soils examined in this wetland are very poorly drained Typics and consist of loam, loamy sand, and sand. Below the root zone and organic layer is a thin layer of white sand that passes into very dark gray (10YR 3/1) and gray (10YR 5/2) sands and loamy sands. The soils exhibit mottling in the upper 12 inches, especially below a depth of approximately 8 inches, where mottling abundance is as great as 35 percent. This wetland is adjacent to Rowell Creek, which periodically inundates the area during times of heavy precipitation. The soils in this area have been mapped as Wesconnett fine sand, but soil examined did not appear to be consistent with published descriptions of the Wesconnett. The wetland also is adjacent to a landfill (PSC 1) and may have been graded and/or filled during construction of the landfill or during other, possibly undocumented, base activities.

The majority of the site is either forested or scrub-shrub. The forested community is dominated by red maple, and laurel oak in the overstory and water ash in the shrub/sapling layer. A dense overstory combined with intermittent flooding (scouring the forested floor) inhibits growth of a herbaceous layer. Bald cypress trees were identified throughout the area but were not considered dominant.

The scrub-shrub community was dominated by red maple, sweetgum, and wax myrtle in the tree layer. The shrub/sapling layer was dominated by red maple, sweetgum, wax myrtle and gallberry. The herb layer contained cinnamon fern,

Table 3-2
Wetland Classes in the Site 1 Study Area
NAS Cecil Field, Jacksonville, Florida

Wetland Class	Indicator Species (Common Name)	Approximate Acreage
Palustrine Scrub-Shrub Broad-Leaved Deciduous	red maple, sweetgum, wax myrtle, royal fern, gallberry, and cinnamon fern	1.5
Palustrine Forested Board-Leaved Deciduous	laurel oak, water ash, red maple, and bald cypress	3
Palustrine Emergent Persistent	arrowheads, rushes, sedges, and black willow	1.5

royal fern, chain fern, bugleweed (*Lycopus virginicus*), *Carex sp*, *Juncus sp*, and golden groundsel, among others.

The seep emergent wetland area is dominated by black willow, wax myrtle, and bald cypress in the tree layer along the edges; arrowheads, rushes, and sedges, among others in the herb layer; and water ash, sweetgum, and black willow were observed in the shrub/sapling layer.

3.2 SITE 2. A summary of the wetland classes, indicator species (common name), and approximate acreage found at Site 2 is presented in Table 3-3. Of the approximate 12-acre study area, approximately 4 acres were found to be jurisdictional wetlands. The wetland system contains two major wetland classes including a Palustrine Emergent Persistent wetland community that remains permanently flooded due to a groundwater seep. The remaining area is classified as a Palustrine Forested Broad-Leaved Deciduous community (Figure 2-2). During heavy rain, this area becomes saturated or inundated from the flooding of Rowell Creek as well as from sheetflow runoff. This was observed during field survey.

Soils examined in this wetland are very poorly drained Typic haplaquods and consist of loam and loamy sand. The soils are black (10YR 2/1) with dark brown and gray mottling. Mottled intervals occur in the upper 6 inches and abundance is as great as 20 percent. Evidence of hydric conditions, such as sulfidic odor, reducing conditions, and high organic content are apparent. The soils in this area have been mapped as Arents and Westconnett fine sand. Arents are nearly level, poorly drained soils that have been reworked by man-made earth-moving operations. These soils are present; activities related to the construction of the landfill and its subsequent operation account for their presence. Characteristics consistent with published descriptions of the Westconnett, however, were not observed. The landfill activities and presence of the Arents likely account for the absence of the Wesconnett soils.

The majority of the wetlands within the Site 2 study area were forested. The overstory is dominated by sweetgum, red maple, and slash pine. The understory (shrub/sapling layer) contains swampbay, red maple, and red bay. Cinnamon fern dominated the herb layer.

The Palustrine Emergent Persistent community is composed wax myrtle, laurel oak and in the tree layer. The shrub/sapling layer contains red bay, swampbay, black willow, red maple, and sweet gum. The herb layer includes royal fern, hatpins, *Juncus sp.*, *Carex sp.*, and cattails.

The boundaries of the wetland systems at Site 2 are shown on Figure 2-2. The wetland boundaries were determined by noting visible changes in vegetation, soils, and/or hydrology.

3.3 SITE 3. The boundaries of the wetlands identified at Site 3 are shown on Figure 2-3. Of the approximate 15 acres encompassed by the study area, approximately 6.7 acres are jurisdictional wetlands (Table 3-4).

Table 3-3
Wetland Classes of the Site 2 Study Area
NAS Cecil Field, Jacksonville, Florida

Wetland Class	Indicator Species (Common Name)	Approximate Acreage
Palustrine Emergent Persistent	rushes, sedges, royal fern, cattails, and hatpins	0.5
Palustrine Forested Broad-Leaved Deciduous	sweetgum, swampbay, red maple, red bay, slash pine, and cinnamon fern	3.5

Table 3-4
Wetland Classes of the Site 3 Study Area
NAS Cecil Field, Jacksonville, Florida

Wetland Class	Indicator Species (Common Name)	Approximate Acreage
Palustrine Emergent Persistent	black willow, wax myrtle, cattails, rushes, anagallis, Scirpus, and dotted smartweed	0.5
Palustrine Forested and Scrub-Shrub Broad-Leaved Deciduous	red maple, wax myrtle, red bay, swampbay, sweetbay, hatpins, and bush beard bluestem	6.2

The wetland system located in Site 3 includes three wetland classes. Wetlands at the northeastern corner are Palustrine Emergent Persistent (Cowardin, 1979) (Figure 2-3). The remaining area varies between palustrine forested and palustrine shrub-scrub broad-leaved deciduous and evergreen classes. Due to recent disturbances, it is difficult to separate these classes within the wetland without some low altitude aerial photographs. This wetland area slopes gradually down to the east into the canal and Rowell Creek. The palustrine emergent depression area is to be fed from shallow groundwater and pooling from sheetflow runoff.

Soils examined in this wetland are poorly drained Typic haplaquods and consist sand and loamy sand. Construction debris, fill material, and rock fragments were intermixed with native material in several locations. Soils are various shades of brown (2.5Y 5/2) and gray (10YR 4/2) with mottling abundance as great as 40 percent; mottling occurs with a few inches of the ground surface and extends at least to a depth of 16 inches. The soils in this area have been mapped as Arents and Ridgeland fine sand. Soils examined at the wetland exhibit characteristics typical of the Arents, which have been reworked by man-made, earth-moving activities. Characteristic typical of the Ridgeland fine sand, however, were not observed. The modification inherent in the Arents may explain the absence of Ridgeland characteristics.

Dominant vegetative species identified in the emergent area include black willow and wax myrtle in the tree layer; *Scirpus sp.*, cattails, and rushes *(Juncus effusus)* in the shrub/sapling layer; dotted smartweed, anagallis (*Anagallis arvensis*), and *Juncus sp.* in the herbaceous layer.

The overstory in the scrub-shrub and forested areas were dominated by wax myrtle, red maple, red bay, and sweetbay. The understory included baccharis, wax myrtle, red maple, red bay, and sweetbay. The vines identified included muscadine grape and Virginia creeper. The herb layer contains eupatorium (*Eupatorium sp.*), bush beard bluestem (*Andropogon glomeratus*), and hatpins among others.

3.4 SITE 4. Of the approximate 30 acres of the Site 4 study area, approximately 4.5 acres are jurisdictional wetlands (Table 3-5). Palustrine Emergent Persistent communities occupy much of this wetland system (Figure 2-4). The remainder of the area contains Palustrine Forested Broad-Leaved Deciduous communities. Both communities within this system's moisture regime are influenced by sheetflow and ditch diversion runoff as well as flooding from Lake Fretwell.

Soil examined in this wetland are poorly drained Typics and Typic haplaquods and consist primarily of loamy sand, with intermixed sand and loam. Soils are brown (7.5YR 7/1) and gray (10YR 3/2) and exhibit well-developed mottling, the abundance of which is as much as 40 percent. Observed indicators of hydric soil include sulfidic odor, high organic content, gleyed or low-chroma colors, and organic streaking. The soils in this area have been mapped as Ridgeland fine sand, but characteristics typical of the Ridgeland were not observed. Removal or filling from base activities may be responsible for the absence of Ridgeland characteristics.

Table 3-5
Wetland Classes of the Site 4 Study Area
NAS Cecil Field, Jacksonville, Florida

Wetland Class	Indicator Species (Common Name)	Approximate Acreage
Plustrine Emergent Persistent	black willow, wax myrtle, cattails, rushes, anagallis, Scirpus, and dotted smartweed	1.5
Palustrine Forested and Scrub-Shrub Broad-Leaved Deciduous	red maple, wax myrtle, red bay, swampbay, sweetbay, hatpins, and bush beard bluestem	3.0

The Emergent Persistent community is dominated by a herbaceous layer containing cinnamon fern, hatpins, redroot, foxtail clubmoss (*Lycopodium alopecuroides*), royal fern, and hooded pitcher plant among others.

The forested area's overstory is dominated by pond pine, slash pine, wax myrtle, sweetgum, swamp bay, and sweet bay. The understory contains wax myrtle, swamp bay, sweet bay, sweetgum, red maple, and baccharis with the herb layer dominated by royal fern and cinnamon fern.

3.5 Site 5. Approximately 3.2 acres of jurisdictional wetlands were delineated at Site 5 (Table 3-6) (Figure 2-5). The wetland system located at Site 5 consists of two wetland classes joined by a ditch (Figure 2-5). The moisture regime of the northern Palustrine Emergent Persistent wetland is influenced by a shallow water table, sheetflow, and ditch diversion runoff from upslope areas. The Emergent wetland area flows into the Palustrine Forested Broad-Leaved Deciduous wetland during times of heavy precipitation (Figure 2-5).

Soils examined in this wetland are poorly and very poorly drained Typics and Typic haplaquods consisting of sand and loamy sand. Soils are gray (10YR 5/2) and black (N 2.5), with brown (7.5YR 3/3) reddish brown (5YR 3/2) horizons also developed. Mottled horizons are developed, with mottling abundance up to 30 percent. A prominent characteristic of the soils in this wetland is the presence of a dense, well-cemented, hard pan horizon. This horizon occurred at depths between 12 and 18 inches below ground surface; a soil probe could not penetrate the layer. Organic streaking, gleyed or low-chroma colors, and evidence of human alteration or reworking are also present. Soils in this area have been mapped as Arents and Wesconnett fine sand (SCS, 1978). Characteristics typical of the Arents were observed, but the soils lack Wesconnett characteristics. The palustrine forested overstory is dominated by sweetbay, swampbay, water ash, and bald cypress. The understory was dominated by wax myrtle, black willow sweetbay, and swampbay. The herbaceous layer consisted of royal fern, and cinnamon fern.

The palustrine emergent persistent area is dominated with red bay and black willow in the overstory and cowbane (*Oxipolis filiformis*), redroot, fleabane (*Pluchea sp.*), water lilies, and hooded pitcher plant in the herbaceous layer.

3.6 SITE 17. Approximately 1.1 of the 4 acres composing Site 17 were identified and delineated as jurisdictional wetlands (Table 3-7; Figure 2-6). The wetlands are dominated by a Palustrine Forested Broad-Leaved Deciduous community (Figure 2-6). Runoff from upslope areas contribute water to this poorly drained area. There are two small seasonal groundwater seep areas located on the northern end of the study area. These seeps produce two Palustrine Emergent Persistent wetlands (Figure 2-7).

Soils examined in the forested wetland are poorly and very poorly drained Typic haplaquods and consist of loamy sand. Soil are black N(2.5) and gray (10YR 7/1) and exhibit mottled horizons, with mottling abundance up to 20 percent. Sulfidic odor, high organic content, and organic streaking are present. Soils in this area are mapped as both Wesconnett find sand and

Table 3-6
Wetland Classes of the Site 5 Study Area
NAS Cecil Field, Jacksonville, Florida

Wetland Class	Indicator Species (Common Name)	Approximate Acreage
Palustrine Emergent Persistent	red bay, black willow, red root, fleabane, cowbane, hooded pitcher plant, and water lilies	2.2
Palustrine Forested Broad-Leaved Deciduous	sweetbay, swampbay, water ash, bald cypress, wax myrtle, royal fern, and cinnamon fern	1

Table 3-7
Wetland Classes in the Site 17 Study Area Wetland System
NAS Cecil Field, Jacksonville, Florida

Wetland Classes	Indicator Species (Common Name)	Approximate Acreage
Palustrine Forested Borad-Leaved Deciduous	sweetbay, swampbay, red maple, common persimmon, wax myrtle, and cinnamon fern	0.9
Palustrine Emergent Persistent	rushes, sedges, and arrowheads	0.2

Ridgeland find sand; however, the reddish brown interval typical of the Wesconnett and the pale brown colors typical of the Ridgeland were not observed. Absence of these characteristics indicates disturbance from base activities. The forested area within this wetland system is dominated by an overstory consisting of sweetbay, swampbay, red maple, and common persimmon. The shrub/sapling layer included sweetbay, red maple, wax myrtle, and swampbay. The herb layer was dominated by cinnamon fern. The vine layer included wild grape and honeysuckle (*Lonicera japonica*).

The smaller emergent persistent areas are made up predominantly of a herbaceous layer. Herbs include *Juncus sp.*, *Carex sp.*, and *Sagittaria sp.* These areas drain into and are surrounded by the forested wetlands.

4.0 FUNCTIONAL ASSESSMENT

4.1 METHODOLOGY. The wetlands associated with sites 1, 2, 3, 4, 5, and 17 were evaluated for their value and ability to perform certain wetland functions. The functional assessment was completed using a computer model called the Wetland Evaluation Technique (WET) (Adamus et al., 1987). Use of this model results in a qualitative probability rating of HIGH, MODERATE, or LOW for wetland functions and values in terms of social significance, effectiveness, and opportunity. Details regarding the WET model objectives, input parameters, and limitations are presented below in Section 4.1.1.

4.1.1 The WET Model WET is a "broad-brush" approach to wetland evaluation, and is based on information about predictors of wetland functions that can be gathered relatively quickly (Adamus et al., 1991). The objective of a WET assessment is to evaluate the functions and values of a wide variety of wetland types that occur in the United States using a method that is reproducible and rapid.

WET evaluates functions and values in terms of social significance, effectiveness, and opportunity. Functions are physical, chemical, and biological processes or attributes of wetlands that are vital to the integrity of the wetland system, and operate whether or not they are viewed as important to society. Conversely, values are wetland attributes that are not necessarily important to the integrity of the wetland system itself, but are perceived a being valuable to society. Social significance assesses the benefits a wetland provides to society in terms of its special attributes, strategic location, and potential economic value. Effectiveness assesses the capability of a wetland to perform a function due to its physical, chemical, or biological characteristics. Opportunity assesses the ability of a wetland to perform a function to its maximum level of effectiveness (US ACOE, 1991).

This characterization is done by answering a series of questions that establish values for a set of variables that characterize a wetland and the surrounding area. These variable values are subsequently analyzed by the model in a set of interpretation keys that define the relationship between wetland functions and values as defined in the technical literature. The interpretation keys assign a qualitative probability rating of HIGH, MODERATE, or LOW to functions and values in terms of Social Significance,Effectiveness, and Opportunity.

The functions and values evaluated by the WET model are listed below:

Groundwater Recharge
Groundwater Discharge
Wildlife Diversity/Abundance
Floodflow Alteration
Aquatic Diversity/Abundance
Production Export
Sediment Stabilization
Uniqueness/Heritage (values)
Sediment/Toxicant Retention
Recreation (values)
Nutrient Removal/Transformation

Groundwater recharge is the movement (usually downward) of surface water, whereas groundwater discharge is the movement (usually laterally or upward) of groundwater into surface water (US ACOE, 1991). Processes that affect groundwater movement include groundwater flow rates and storage capacity, direction and location (within the wetland) of groundwater movement, and evapotranspiration. Groundwater movement can be influenced by constricted outlets in the wetland or by the presence of dams.

Floodflow alteration is the process by which peak flows from run-off, surface flow, groundwater interflow and discharge, and precipitation enter a wetland and are stored or delayed in their downslope journey (US ACOE, 1991). Processes that affect floodflow alteration include magnitude and duration of storms, run-off from upslope areas, above-ground storage capacity, below-ground storage capacity, and position of wetland in the watershed.

Sediment stabilization consists both of shoreline anchoring and dissipation of erosive forces (US ACOE, 1991). Shoreline anchoring is the stabilization of soil at the water's edge or in shallow water by roots and other plant parts. Dissipation of erosive forces is the lessening of energy associated with currents, water level fluctuations, or groundwater flow. Processes affecting sediment stabilization include energy associated with erosive forces, frictional resistance offered by the wetland, position of the wetland relative to the upland and incoming erosive forces, ability of wetland plants to anchor the soil, and erodibility of uplands being protected.

Sediment/Toxicant Retention is the process by which suspended solids and chemical contaminants such as pesticides and heavy metals adsorbed to them are retained and deposited within a wetland. Deposition of sediments may ultimately lead to removal of toxicants through burial, chemical breakdown, or temporary assimilation into plant tissues (US ACOE, 1991). Factors affecting sediment/toxicant retention include the amount of incoming sediment, particle size and density of suspended sediment, difference in energy levels of suspending forces within the wetland versus upcurrent areas, vertical layering caused by salinity and temperature in waters bearing the sediment, flocculation, agglomeration, and precipitation, bioturbation and mobilization, and storage capacity of the wetland.

Nutrient removal/transformation includes the storage of nutrients within the sediment or plant substrate; the transformation of inorganic nutrients to their organic forms; and the transformation and subsequent removal of on nutrient (nitrogen) as a gas (US ACOE, 1991). Processes that affect nutrient removal/transformation are biological uptake and processing, sedimentation and accumulation of organic matter in the substrate, adsorption and nutrient interactions with sediments, and chemical and microbial processes including denitrification, nitrogen fixation, and ammonia volatilization.

Production export refers to the flushing of relatively large amounts of organic material (specifically, carbon from net annual primary and secondary productivity) from the wetland to downstream or adjacent deeper waters (US ACOE, 1991). Factors affecting production export include productivity of

potential food sources (macroscopic and microscopic), nitrogen-fixing ability of potential food sources, and dispersal and cycling of potential food sources.

Aquatic diversity/abundance is the support of a notably great onsite diversity and/or abundance of fish or invertebrates that are mainly confined to the water and saturated soils (US ACOE, 1991). Factors affecting this function include water quality (physical and chemical), water quantity (hydroperiod, flow, and depth), cover, substrate, interspersion, and availability and quality of food sources.

Wildlife diversity/abundance is the support of a notably great onsite diversity and/or abundance of wetland-dependent birds. This focus on birds should in no way imply that other wetland-dependent wildlife are any less important or dependent on wetlands, and future revisions of the WET model will incorporate other vertebrate groups (US ACOE, 1991). The major factors affecting this function include area size, availability of cover, availability of food, availability of specialized habitat needs, spatial and temporal arrangement of the aforementioned factors, isolation from disturbance, and absence of contaminants.

Recreation includes both consumptive (e.g., sport fishing, food gathering, hunting) and non-consumptive (e.g., swimming, canoeing, kayaking, birding) forms of recreation that are water dependent and occur in either an incidental or obligatory manner in wetlands (US ACOE, 1991).

Uniqueness/heritage includes use of wetlands for aesthetic enjoyment, nature study, education, scientific research, open space, preservation of rare or endemic species, protection of archaeologically or geologically unique features, maintenance of historic sites, and an infinite number of other mostly intangible uses.

Traditional methods of assessing wetland functions and values rely on detailed, site-specific studies, or, more commonly, on professional judgement. Detailed site-specific studies are time consuming and cost prohibitive and professional judgement may have limited reproducibility (US ACOE, 1991). WET was developed to strike a balance between these two approaches, and to provide an evaluation technique that assesses most of the recognized wetland functions and values, is applicable to a wide variety of wetland types, is reproducible and rapid, and has a sound technical basis in the scientific literature. Inherent in this approach are certain limitations and biases that should be noted prior to interpreting the results.

For example, WET is designed to alert users to the <u>probability</u> that a particular wetland performs specific functions, and to provide insight as to the local, regional, and national significance of those functions. WET should be used to provide one of many inputs into decision making processes regarding the wetland evaluated. If further study is indicated, more quantitative methods, such as the Habitat Evaluation Procedure (HEP) (USFWS, 1980) or the Habitat Evaluation System (HES) (US ACOE, 1980) should be used. Further, the WET model is primarily based on technical literature,with varying limitations in study conclusions. In running the model, all 11 functions and values are

evaluated for social significance, but only floodflow alteration, sediment/ toxicant retention, and nutrient removal/transformation are assessed for opportunity. All 9 functions are evaluated for effectiveness. In addition, unless a function or value is strongly "HIGH" or "LOW", the model has a tendency to default to a "MODERATE" rating. Finally, the current version of the model evaluates wildlife diversity/abundance in relation to wetland-dependent birds, but not for other vertebrates.

4.1.2 WET Model Input Parameters Use of the WET model requires input of yes or no answers for a series of 31 questions used to evaluate social significance of the wetland, and 50 questions to evaluate the effectiveness and opportunity of the wetland to perform a function. Information input into the WET model was obtained from several sources, including discussions with Naval Air Station environmental personnel, ABB Environmental Services personnel, review of existing site reports, and onsite observations during the field work. Input datasets for each wetland are provided in Appendix C.

4.2 RESULTS. The output of the WET model for wetlands associated with Sites 1, 2, 3, 4, 5, and 17 are summarized in Tables 4-1 through 4-6. Results from the Social Significance, Effectiveness, and Opportunity functional assessments are presented in the following sections.

4.2.1 Social Significance Evaluation A Social Significance Evaluation was performed on the wetlands associated with each site. All wetlands received the same social significance rating for all functions. An explanation for these ratings is discussed below.

Each of the six sites is rated HIGH for three functions, including groundwater recharge, groundwater discharge, and wildlife diversity/abundance. Sites 4 and 5 are also rated HIGH for uniqueness/heritage. The functions of sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and aquatic diversity/abundance are rated MODERATE for all six sites, while floodflow alteration and recreation are rated as LOW.

The HIGH rating for groundwater recharge is a result of the presence of wells in the area that may be utilizing groundwater. These wetlands are, therefore, of potential value in terms of replenishing an aquifer for consumptive use. The presence of a wetland-dependent threatened and endangered species resulted in a HIGH rating for groundwater discharge, since this function may play a significant role in maintaining habitat for the alligator. The HIGH rating for wildlife diversity/abundance results from permitted hunting in these areas. Hunting is a typical wildlife management tool in areas where wildlife is abundant and natural predators are absent.

The LOW rating for floodflow alteration is explained by the presence of potential hazardous waste sites, within or adjacent to the wetlands, that could be inundated by flooding of the area. The potential for contaminant release into floodwaters detracts from any potential benefit the wetlands could perform in terms of a reduction in flooding downstream. Because the wetlands are located on a military base, and have restricted public access and reduced recreational use, a LOW rating for recreation was assigned to these areas.

Table 4-1
Summary of WET Results for Site 1
NAS Cecil Field, Jacksonville, Florida

	Social Significance	Effectiveness	Opportunity
Ground Water Recharge	H	L	*
Ground Water Discharge	H	H	*
Floodflow Alteration	L	H	H
Sediment Stabilization	M	H	*
Sediment/Toxicant Retention	M	H	H
Nutrient Removal/Transformation	M	H	H
Production Export	*	M	*
Wildlife Diversity/Abundance	H	*	*
Wildlife D/A Breeding	*	H	*
Wildlife D/A Migration	*	L	*
Wildlife D/A Wintering	*	H	*
Aquatic Diversity/Abundance	M	L	*
Uniqueness/Heritage	M	*	*
Recreation	L	*	*

Note: "H" = High, "M" = Moderate, "L" = Low, "U" = Uncertain, and "*"'s identify conditions where functions and values are not evaluated.

Table 4-2
Summary of WET Results for Site 2
NAS Cecil Field, Jacksonville, Florida

	Social Significance	Effectiveness	Opportunity
Ground Water Recharge	H	L	*
Ground Water Discharge	H	H	*
Floodflow Alteration	L	H	H
Sediment Stabilization	M	H	*
Sediment/Toxicant Retention	M	H	H
Nutrient Removal/Transformation	M	H	H
Production Export	*	M	*
Wildlife Diversity/Abundance	H	*	*
Wildlife D/A Breeding	*	H	*
Wildlife D/A Migration	*	L	*
Wildlife D/A Wintering	*	H	*
Aquatic Diversity/Abundance	M	L	*
Uniqueness/Heritage	M	*	*
Recreation	L	*	*

Note: "H" = High, "M" = Moderate, "L" = Low, "U" = Uncertain, and "*"'s identify conditions where functions and values are not evaluated.

Table 4-3
Summary of WET Results for Site 3
NAS Cecil Field, Jacksonville, Florida

	Social Significance	Effectiveness	Opportunity
Ground Water Recharge	H	L	*
Ground Water Discharge	H	H	*
Floodflow Alteration	L	H	H
Sediment Stabilization	M	H	*
Sediment/Toxicant Retention	M	H	H
Nutrient Removal/Transformation	M	H	H
Production Export	*	M	*
Wildlife Diversity/Abundance	H	*	*
Wildlife D/A Breeding	*	L	*
Wildlife D/A Migration	*	L	*
Wildlife D/A Wintering	*	L	*
Aquatic Diversity/Abundance	M	L	*
Uniqueness/Heritage	M	*	*
Recreation	L	*	*

Note: "H" = High, "M" = Moderate, "L" = Low, "U" = Uncertain, and "*"'s identify conditions where functions and values are not evaluated.

Table 4-4
Summary of WET Results for Site 4
NAS Cecil Field, Jacksonville, Florida

	Social Significance	Effectiveness	Opportunity
Ground Water Recharge	H	L	*
Ground Water Discharge	H	M	*
Floodflow Alteration	L	H	H
Sediment Stabilization	M	H	*
Sediment/Toxicant Retention	M	H	H
Nutrient Removal/Transformation	M	H	M
Production Export	*	M	*
Wildlife Diversity/Abundance	H	*	*
Wildlife D/A Breeding	*	H	*
Wildlife D/A Migration	*	L	*
Wildlife D/A Wintering	*	H	*
Aquatic Diversity/Abundance	M	L	*
Uniqueness/Heritage	H	*	*
Recreation	L	*	*

Note: "H" = High, "M" = Moderate, "L" = Low, "U" = Uncertain, and "*"'s identify conditions where functions and values are not evaluated.

Table 4-5
Summary of WET Results for Site 5
NAS Cecil Field, Jacksonville, Florida

	Social Significance	Effectiveness	Opportunity
Ground Water Recharge	H	L	*
Ground Water Discharge	H	M	*
Floodflow Alteration	L	H	H
Sediment Stabilization	M	H	*
Sediment/Toxicant Retention	M	H	H
Nutrient Removal/Transformation	M	H	M
Production Export	*	M	*
Wildlife Diversity/Abundance	H	*	*
Wildlife D/A Breeding	*	H	*
Wildlife D/A Migration	*	L	*
Wildlife D/A Wintering	*	H	*
Aquatic Diversity/Abundance	M	L	*
Uniqueness/Heritage	H	*	*
Recreation	L	*	*

Note: "H" = High, "M" = Moderate, "L" = Low, "U" = Uncertain, and "*"'s identify conditions where functions and values are not evaluated.

Table 4-6
Summary of WET Results for Site 17
NAS Cecil Field, Jacksonville, Florida

	Social Significance	Effectiveness	Opportunity
Ground Water Recharge	H	L	*
Ground Water Discharge	H	H	*
Floodflow Alteration	L	M	H
Sediment Stabilization	M	H	*
Sediment/Toxicant Retention	M	H	H
Nutrient Removal/Transformation	M	H	H
Production Export	*	M	*
Wildlife Diversity/Abundance	H	*	*
Wildlife D/A Breeding	*	H	*
Wildlife D/A Migration	*	L	*
Wildlife D/A Wintering	*	H	*
Aquatic Diversity/Abundance	M	L	*
Uniqueness/Heritage	M	*	*
Recreation	L	*	*

Note: "H" = High, "M" = Moderate, "L" = Low, "U" = Uncertain, and "*"'s identify conditions where functions and values are not evaluated.

4.2.2 Effectiveness and Opportunity Evaluation The effectiveness and opportunity evaluation assesses the capability and opportunity of a wetland to perform functions. The evaluation has three levels of assessment. Each successive level adds to the information gathered during previous levels to build a more detailed characterization of the wetland and the surrounding area. The level(s) chosen depend on time and information available, as well as the confidence required. The level 1 evaluation can be conducted in the office using information resources such as USGS topographic maps, county soil surveys, aerial photos, National Wetland Inventory maps, and site reports. A Level 2 assessment requires a site visit for observation and data collection. A Level 3 assessment requires detailed, and sometimes long term, physical, chemical, and biological monitoring data from the wetland site.

Using the information resources described above, and information obtained during the site visit, a Level 1 and 2 effectiveness and opportunity evaluation were conducted for all wetlands associated with Sites 1, 2, 3, 4, 5, and 17. As shown on Tables 4-1 through 4-6, effectiveness and opportunity ratings are similar for Sites 1, 2, and 3, and for Sites 4 and 5. Effectiveness and opportunity ratings differed for Site 17. Results are presented for each group of wetlands below.

4.2.2.1 Sites 1, 2, and 3 These wetlands are all adjacent to Rowell Creek, downstream of the dam, and are in close proximity to one another. All three study areas received the same effectiveness and opportunity rating for all parameters with the exception of wildlife diversity/abundance for breeding and wintering birds. In these cases, Sites 1 and 2 received HIGH ratings for these functions, whereas Site 3 received a LOW rating.

For the remaining functions, groundwater discharge, floodflow alteration, sediment stabilization, sediment/toxicant retention, and nutrient removal/transformation were all rated HIGH, whereas production export was rated MODERATE, and groundwater recharge, wildlife diversity/abundance for migrating birds, and aquatic diversity/abundance were rated LOW.

The HIGH effectiveness rating for groundwater discharge is primarily explained by the relatively shallow water table in the area, coupled with high annual precipitation rates, resulting in saturated soil conditions. The location of sites 1, 2, and 3 downstream of the dam may also explain the HIGH rating for groundwater discharge, since the pressure head often increases downstream from dams (Adamus, 1991). The HIGH effectiveness and opportunity ratings for floodflow alteration are due to undeveloped and unpaved wetland areas along Rowell Creek that have the capacity for surface water areas to greatly expand during flooding. In addition, the large size of the watershed in comparison to wetlands in Sites 1, 2, and 3 creates a greater opportunity for potential floodflow alteration in these areas. HIGH ratings for sediment stabilization can be attributed to the presence of herbaceous, scrub-shrub, or forested vegetation in each of these three wetlands. The presence of such vegetation will tend to bind sediments and soils and dissipate erosive forces during flooding. The HIGH effectiveness rating for sediment/toxicant retention is a result of constricted outlets, substantial erect vegetation within the wetlands, and generally low velocity of water movement in these areas, attributable to the gradual topographic gradient. The HIGH opportunity rating

for sediment/toxicant retention is attributable to potential sources of contamination in the vicinity of these wetlands. The HIGH rating for nutrient removal/transformation can be explained by the same characteristics that leads to sediment retention in these wetlands. Other factors that contribute to nutrient removal and transformation in these systems include low water velocity, presence of significant vegetation with little or no dead forested or scrub-shrub areas, and saturated, fine, mineral soils. The result of these factors is an environment that is effective in removing significant amounts of nutrients and transforming nitrogen into its gaseous form. Finally, the wetland associated with Sites 1 and 2 received HIGH ratings for wildlife diversity/abundance for breeding and wintering birds, whereas the wetland associated with Site 3 received a LOW rating for these parameters. These differences can be explained by the relatively dense vegetation providing food and cover in Sites 1 and 2, and relatively large area when compared to Site 3. In addition, these wetlands are located in a relatively large (3600 acre) watershed in an area of high rainfall. Such watersheds provide a greater source of nutrients to the wetland, which can be utilized by breeding bird populations. This is also important in the support of wintering birds in areas such as Northern Florida, where surface water does not freeze in the winter. Conversely, although Site 3 is within the same watershed, it is greatly disturbed and supports large areas of early successional plant growth. Although such an area is likely to provide appropriate cover, many of the other needs of breeding or wintering bird populations would not be met (e.g., food sources or lack of disturbance). Other factors that may contribute to the LOW rating for Site 3 include the lack of permanent outlets coupled with potential sources of toxins.

The LOW effectiveness rating for groundwater recharge is a result of the relatively flat terrain and slow infiltration rates of soils in these areas. Field observations confirmed many factors contributing to the slow infiltration rates, including saturated conditions, and the existence of a hardpan layer at shallow depths in some areas. In addition, all three sites contain both inlets and outlets, and Sites 2 has surface drainages. These features result in less standing water in these areas, and a concommittant reduced effectiveness in groundwater recharge. In addition, all three wetlands received a LOW rating for aquatic diversity/abundance. This is primarily the result of the relatively small size of the wetlands (i.e., less than 40 acres), restricted outlets, potentially toxic inputs, and saturated conditions. Finally, all three sites received a LOW rating for wildlife diversity/abundance of migrating birds. Since these sites are located in a high precipitation region, and there are numerous wetlands within the same and nearby watersheds, this reduces the importance of any one wetland for use by migrating birds.

4.2.2.2 Sites 4 and 5 Wetlands associated with Sites 4 and 5 differ from those further downstream, in that they are located upstream of the dam on Rowell Creek that occurs between Sites 4 and 3. Upstream of the dam, Lake Fretwell provides recreational facilities, in the form of a boating pavilion, and supports a small resident alligator population. For both sites 4 and 5, three functions (groundwater recharge, wildlife diversity/abundance for migrating birds, and aquatic diversity/abundance) were rated LOW, two (groundwater discharge and production export) were rated MODERATE, and six

(floodflow alteration, sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and wildlife diversity/abundance for breeding and wintering birds) were rated HIGH.

Groundwater discharge for wetlands associated with Sites 4 and 5 was rated MODERATE. This reduced rating from those observed for Sites 1, 2, and 3 is due to the presence of a dam located immediately downstream of these two wetlands. In particular, this surface water impoundment, coupled with high precipitation rates potentially result in a greater amount of water entering the system from surficial runoff than from groundwater discharge. These factors, in addition to the relatively flat terrain and surface drainages in Site 5, also contribute to the LOW effectiveness rating for groundwater recharge.

HIGH ratings for floodflow alteration, sediment stabilization, sediment/toxicant retention, and nutrient removal/transformation at Sites 4 and 5 can be explained by similar characteristics seen in Sites 1, 2, and 3. For example, there are large, undeveloped areas, with a large capacity for water storage, resulting in a HIGH rating for floodflow alteration. In addition, the existence of forested or scrub-shrub vegetation provides frictional resistance to moving water. Similarly, substantial vegetation and low water velocity due to the relatively flat terrain, as well as potential contamination sources near these wetlands, contribute to the HIGH ratings for sediment stabilization, and sediment/toxicant retention. These characteristics, plus the saturated, fine, mineral soils observed in the field, contribute to the HIGH effectiveness rating for nutrient removal/transformation, as discussed for wetlands associated with Sites 1, 2, and 3.

The HIGH rating for wildlife diversity/abundance for breeding and wintering birds in Site 4 is due to the long, narrow shape, providing edge both to the west of the wetland, and on the east, along Lake Fretwell, as well as variation in vegetation classes within the wetland. For the wetland in Site 5, the HIGH rating is primarily due to diversity in vegetation composition, including dense scrub-shrub areas, which may provide ample cover and food. The LOW ratings for wildlife diversity/abundance for migrating birds. As discussed for Sites 1, 2, and 3, the location of Sites 4 and 5 in a region with abundant wetlands that do not freeze in the winter reduces the importance of any one wetland for migratory birds.

Finally, the LOW rating for aquatic diversity/abundance is primarily the result of the relatively small size of the wetlands (i.e., less than 40 acres), restricted outlets, potentially toxic inputs, and saturated conditions.

4.2.2.3 Site 17 The wetland associated with Site 17 is a small area (1.1 acres), located north of Site 2, and south of Site 3. This area is primarily inundated from surface water runoff, however, it is within the same watershed as the other sites, and can be expected to flood during extremely high water conditions. This wetland received a MODERATE rating for floodflow alteration and production export, a HIGH rating for groundwater discharge, sediment stabilization, sediment/toxicant retention, nutrient removal/transformation,

and wildlife diversity/abundance for breeding and wintering birds, and a LOW rating for groundwater recharge, wildlife diversity/abundance for migrating birds, and aquatic diversity/abundance.

The reduced rating for floodflow alteration in comparison to the other sites can be explained by its size and location relative to Rowell Creek. Although this wetland is comprised of a large depression that could potentially store floodwater, it is only one acre in size, and is much further away from Rowell Creek than the other wetlands in this system. It would only flood from the creek during extreme flood events, and due to its small size, would offer little in terms of floodflow alteration. The LOW rating for groundwater recharge is attributable to the small size of the site, and little standing water, resulting in little effectiveness in terms of groundwater recharge. The LOW rating for wildlife diversity/abundance during migration is primarily due to the small size of the wetland and no open water. Its location in a region with numerous wetlands reduces the importance of this site for migrating birds. Its small size and lack of standing water contributes to the LOW rating for aquatic diversity/abundance.

The HIGH ratings for groundwater discharge, sediment stabilization, sediment/toxicant retention, and nutrient removal/transformation can be explained by factors similar to those observed for the other wetlands at NAS Cecil Field. For example, the relatively shallow water table and high precipitation rates have the potential for promoting groundwater discharge into the wetland. Substantial vegetation in the area provides frictional resistance to moving water, whereas the relatively flat topography and nearby source of potential contamination contribute to sediment stabilization and sediment/toxicant retention. Likewise, these conditions, plus the fine, mineral soils result in a situation that is highly effective for nutrient removal/transformation.

Finally, as discussed for the other sites, the HIGH rating for wildlife diversity/abundance for breeding and wintering birds can be explained by the site's location in a large watershed, which is a potential nutrient source, and the regional location in an area where surface water does not freeze during the winter months.

4.3 CONCLUSIONS. All wetlands associated with Sites 1, 2, 3, 4, 5, and 17 were evaluated for several functions and values in terms of social significance, effectiveness, and opportunity. The details regarding the assignment of ratings were provided in Sections 4.1 and 4.2. Interpretation of the reported results is provided below.

Sites 1 and 2 are in close proximity to one another, and effectively represent one interacting wetland system. In contrast to much of the surrounding area that has been planted in pine forests, both areas support unique and relatively irreplaceable vegetational communities that support an abundance of wildlife. Site 1 contains a cypress dome with numerous mature bald cypress trees and associated mature hardwood species, whereas Site 2 contains a floodplain swamp and bottomland forest that also supports mature bald cypress trees. The ecological diversity in these areas was confirmed through the observation of numerous wildlife species representing all trophic levels.

These included direct observation of individuals and signs of numerous lower trophic level organisms (e.g., insects, rodents, and armadillo), as well as direct observation of several predators, including barred owl, screech owl, sharp-shinned hawk, pygmy rattlesnake, water moccasin, and other water snakes. Disturbances of potential sources of contamination in these areas and creation of access corridors would likely result in increased siltation in the bottomland forests, and would have detrimental effects on the local ecosystem by reducing the width of the existing forest corridor in these areas. Recent studies have shown that such fragmentation in forest width has detrimental effects on breeding songbirds, and likely would adversely affect other organisms as well (Line, 1994). A breeding bird survey would further document use of these areas by songbirds.

Site 3 has already been significantly disrupted, by bulldozer activity within the site and in a large area surrounding the site. Wildlife diversity and abundance in this area was observed to be low. However, Site 3 did rank HIGH for several functions, such as groundwater discharge, floodflow alteration, sediment stabilization, sediment/toxicant retention, and nutrient removal/transformation. Since the inherent vegetation and soil characteristics prior to disturbance contributed to these effectiveness ratings, any further disturbances in this area should consider mitigation efforts to minimize the loss of these wetland attributes.

Sites 4 and 5 are directly adjacent to Lake Fretwell, a base-wide picnic and recreational facility. These areas were observed to support not only an endangered species, the American Alligator, but also numerous unique plant and animal associations. Both areas support well established populations of bog-like insectivorous plants, such as sundew and pitcher plant, which may be difficult to re-establish following disturbance. Site 5 also contains a diversity of vegetation classes throughout the site, as well as mature cypress trees, especially along the southern edge. Several species representing all trophic levels were observed using sites 4 and 5, including the American Alligator, great blue heron, sharp-shinned hawk, anhinga, osprey, pygmy rattlesnake, various turtles, armadillo, and numerous furbearing animals. In addition to wildlife uses of these two sites, Site 5, in particular likely serves as a wetland filter for surficial runoff prior to being discharged to Lake Fretwell. Disturbance in this area has already been initiated, through the installation of numerous monitoring wells. It is recommended that appropriate mitigation measures be implemented to prevent the loss of attributes and functions associated with these wetland systems.

In an area surrounded by numerous acres of planted pine trees, which provide little vegetation diversity to support wildlife, Site 17 is comprised of a hardwood stand. Numerous wildlife species were observed in this area, including cottontail rabbit, armadillo, white tailed deer, and sharp shinned hawk. In addition to its functional value in support of wildlife diversity and abundance, the vegetation and topography at Site 17 are effective in sediment stabilization, by offering frictional drag and dissipating erosive forces. It is recommended that disruptive activities in this area be minimized to maintain the functions and values associated with these wetland systems.

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APPENDIX A

Dominant Plant Species Observed at the Sites

PLANT LIST FOR SPECIES OBSERVED AT NAS CECIL FIELD [1]

COMMON NAME	SCIENTIFIC NAME
Netted chain fern	Woodwardia areolata
Virginia chain fern	Woodwardia virginica
Resurrection fern	Polypodium polypodioides
Bracken fern	Pteridium aquilinum
Climbing fern	Lygodium japonicum
Royal fern	Osmunda regalis
Cinnamon fern	Osmunda cinnamomea
Foxtail clubmoss	Lycopodium alopecuroides
Longleaf pine	Pinus palustris
Loblolly pine	Pinus Taeda
Pond pine	Pinus serotina
Slash pine	Pinus elliotii
Baldcypress	Taxodium distichum
Arrowhead	Sagittaria latifolia
Cane	Arundinaria gigantea
Broomsedge	Andropogon glomeratus
Rushes	Scirpus sp.
Sedges	Carex sp.
Cattail	Typha latifolia
Yellow-eyed grass	Xyris sp.
Saw palmetto	Serenoa repens
Dwarf palmetto	Sabal minor
Redroot	Lachnanthes caroliniana
Hat pins	Eriocaulon decangulare
Bog buttons	Lachnocaulon anceps

Wax myrtle	Myrica cerifera
Black willow	Salix nigra
Alder	Alnus serrulata
Laurel Oak	Quercus laurifolia
Water Oak	Quercus nigra
Stinging nettle	Urtica dioica
Dotted smartweed	Polygonum punctatum
Sweetbay	Magnolia virginiana
Spatterdock	Nuphar luteum
Round-leaved sundew	Drosera rotundifolia
Hooded pitcher plant	Sarracenia minor
Sweetgum	Liquidambar styraciflua
Sand blackberry	Rubus cuneifolius
Blackberry	Rubus sp.
Wild black cherry	Prunus serotina
Rabbit bells	Crotalaria rotundifolia
Poison sumac	Toxicodendron vernix
Titi	Cyrilla racemiflora
Gallberry	Ilex glabra
Red maple	Acer rubrum
Muscadine grape	Vitis rotundifolia
Virginia creeper	Parthenocissus quinquefolia
St. Johnswort	Hypericum fasciculatum
Loblolly bay	Gordonia lasianthus
Swamp bay	Persea palustris
Red bay	Persea borbonia
Dogwood	Cornus foemina
Meadowbeauty	Rhexia virginica

Scarlet pimpernel	Anagallis arvensis
Persimmon	Diospyros virginiana
Water Ash	Fraxinus caroliniana
Yellow jessamine	Gelsemium sempervirens
Bugleweed	Lycopus virginicus
Purple gerardia	Agalinus purpurea
Trumpet creeper	Campsis radicans
Ragweed	Ambrosia sp.
Flat topped goldenrod	Euthamia minor
Goldenrod	Solidago fistulosa
Wild lettuce	Lactuca sp.
Dog fennel	Eupatorium capillifolium
Climbing hempweed	Mikania scandens
Sunflower	Helianthus angustifolius
Camphor weed	Pluchea odorata
Golden ragwort	Senecio aureus

(1) Arranged in taxonomic order

APPENDIX B

1987 Army Corps Forms

W17- DP-B

SOILS

Map Unit Name (Series and Phase): Ridgeland — Drainage Class: PD

Taxonomy (Subgroup): Typic Haplaquod — Field Observations Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3		5YR 3/3			roots, pine needles decaying, loamy sand
3-8		N 2.5/	10YR 7/1	5%	black w/salt throughout loamy sand
8-16+		10YR 7/1	N 2.5/	20%	white sand w black spots and splotches

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Did not see the dark nor pale brown colors discussed in Ridgeland mapped series

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	(Circle)
Wetland Hydrology Present?	Yes (No)	Is this Sampling Point Within a Wetland? Yes No
Hydric Soils Present?	Yes No	

Remarks:

W17-DP-B

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: NAS Cecil Field / PSC 17
Applicant/Owner: ABB-ES / NAVY
Investigator: Barth + Ballie

Date: 10/15/93
County: Duval
State: FL

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area? (If needed, explain on reverse.)	Yes	No

Community ID: _____
Transect ID: _____
Plot ID: _____

VEGETATION

	Dominant Plant Species	Stratum	Indicator
*	1. Acer rubrum	T	FAC
*	2. Acer rubrum	S	FAC
*	3. Ilex glabra	S	FACW
	4. Myrica cerifera	S	FAC+
*	5. Vitis rotundifolia	V	FAC
	6. Serenoa repens	S	FACU
	7. Osmunda cinnamomea	H	FACW+
X	8. Ilex glabra	H	FACW
*	9. Vitis rotundifolia	H	FAC
	10.		
	11.		
	12.		
	13.		
	14.		
	15.		
	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). _____

Remarks: planted pine area
50' pines x 50% cover
scattered cinnamon fern

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water:	N/A	(in.)
Depth to Free Water in Pit:	N/A	(in.)
Depth to Saturated Soil:	N/A	(in.)

Wetland Hydrology Indicators:
Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: planted pine area

W17- ~~DP~~ -A

SOILS

Map Unit Name (Series and Phase): Wesconnett

Drainage Class: VPD

Taxonomy (Subgroup): Typic Haplaquod

Field Observations Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4		N2.5/			loam - high organic
4-16+		N2.5/	10YR 7/2	15%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: stains fingers black
4-16+ - predominantly black w/sand (white) splattered throughout
Never saw the reddish brown mapped in the Wesconnet series

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

Approved by HQUSACE 3/92

W17 DF 4

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: NAS Cecil Field / PSC 17	Date: 10/15/93
Applicant/Owner: ABB-ES / NAVY	County: Duval
Investigator: Bolling / Beatty	State: FL
Do Normal Circumstances exist on the site? (Yes) No	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Plot ID:

* = Dominant

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
*	1. [illegible]	T			9. [illegible]	S	
	2. Pinus serotina	T			10. Ilex glabra	S	
	3. Acer rubrum	T			11. [illegible]	V	
	4. [illegible]	T			12. Rubus sp		
	5. [illegible]	S		*	13. Osmunda cinnamomea	H	
*	6. [illegible]				14. Woodwardia	H	
	7. [illegible]	S			15. Vitis rotundifolia	V	
	8. Myrica cerifera	S			16. Smilax sp		

Chain fern

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: [illegible] 70% [illegible] [illegible] Vitis large depression area Acer 20% + [illegible] edge [illegible] planted pine area w/ open canopy

[illegible]

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water:	NA	(in.)
Depth to Free Water in Pit:	10	(in.)
Depth to Saturated Soil:	6	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ✓ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ✓ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Buttressing trunks
Shallow root systems

W5 - ~~DP~~ - D

SOILS

Map Unit Name (Series and Phase): Leonard Drained Drainage Class: VPL

Taxonomy (Subgroup): Typic Field Observations Confirm Mapped Type? Yes / No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1		10YR 2/1	N/A		Loamy sand (1)
1-7		10YR 6/4	10YR 2/2	10%	Loamy sand
		"	N 2.5	10%	
7-10		10YR 3/1	w/10YR 3/2	10%	" "
10-16		2.5Y 2.5/1	N 2.5/	20%	" " (2)

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- X Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: (1) FRIABLE
(2) Black staining, can nearly get ribbon
Drainage pan, dk rod @ 17"

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

US - DP - 1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: PSC 5	Date: 10 7 93
Applicant/Owner: NAS CECIL FIELD	County: Duval
Investigator: BOLLING/BEATTY	State: Fla
Do Normal Circumstances exist on the site? (Yes) No	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID:
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Sarracenia pinpurea	Herb	OBL
2. Cyrilla racemiflora	Sh.	FACW
3.		
4.		
5.		
6.		
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9. Pinus taeda		FAC
10. Ilex cassine		FACW
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NA	(in.)
Depth to Free Water in Pit:		(in.)
Depth to Saturated Soil:	4	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Thin layer of algae growing on soil

WS-DP-C

SOILS

Map Unit Name (Series and Phase): Wiscoy variant — Drainage Class: VPD

Taxonomy (Subgroup): typic — Field Observations Confirm Mapped Type? Yes (No) (4)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		10YR 2/1	NA	NA	Loamy sand (1)
2-5		10YR 5/2	10YR 4/5	20%	" "
5-7		N 2.5	10YR 2/1	30%	" " (2)
7-?		7.5YR 3/3	" NA	NA	sand (3)

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- X High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: (1) Alot of root material intermixed, friable
(2) Black staining
(3) Hard, cemented, could not bore through
(4) Soil survey states 2-10" w black fine sand also doesn't mention hardpan — inclusion or variation?

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No (Circle)	Is this Sampling Point Within a Wetland? (Yes) No (Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	(Yes) No	

Remarks:
Large amount of concrete rubble in this area

Approved by HQUSACE 3/92

NS - DP - C

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: PSC 5 - / Cecil Field	Date: 10-7-93
Applicant/Owner: ABB - Env / Navy	County: Duval
Investigator: Sullivan / Beatty	State: Florida
Do Normal Circumstances exist on the site? Yes (No)	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID:
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Panicum repens	Herb	OBL
2. Lycopus virginicus	"	OBL
3. Eleocharis subarticulata		FACW- (*)
4. Carex sp	"	OBL + FACW
5. Sesuvium maritimum	"	FACW
6. Myrica cerifera	Shrub	FAC+
7. Salix nigra	"	OBL
8. Ilex glabra	"	FACW

Dominant Plant Species	Stratum	Indicator
9. Juncus taeda	tree	FAC
10. " elliottii	"	FACW
11. Acer rubrum	"	FAC
12.		
13.		
14.		
15.		
16.		

Locally Planted

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks: (*) from Fig 2 - Not Listed

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NA	(in.)
Depth to Free Water in Pit:	2	(in.)
Depth to Saturated Soil:	1	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

WS - DP - B

SOILS

Map Unit Name (Series and Phase): Arents

Drainage Class: PD

Taxonomy (Subgroup):

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		High Organic Content 9.5 YR 2.5/2	NA	NA	very friable visible plant parts organic content -
2-4		2.5 YR 5/1	NA	NA	(sand) salt & pepper look
4-8		N2.5	NA	NA	loamy sand / mostly pepper with sprinkles of salt
8-?(16+)		10YR 6/1	" NA	NA	sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Soils which have been reworked by humans - This area was planted with Pines. sand layers - looks like fill

WETLAND DETERMINATION

		(Circle)
Hydrophytic Vegetation Present?	Yes (No)	
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
Is this Sampling Point Within a Wetland?	Yes (No)	

Remarks: Soils which have l

Approved by HQUSACE 3/92

W5-DP-5

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cecil Field NAS / Site 5 — Date: 10/5/93
Applicant/Owner: ABB-ES / NAVY — County: Duval
Investigator: Bolling/Beatty — State: Florida

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

OT RECENT

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Acer Rubrum	Tree	FAC
2. Serenoa Repens	Shrub	FACW*
3. Gaillardia Pulchella	Herb	FACW
4. " " "	Shrub	FACW
5. Pteridium Aquilinum	Herb	FACW*
6. Quercus Nigra	Tree	FAC
7. Quercus Laurifolia	Shrub	FACW
8. Pinus Tadea	Tree	FAC
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: * Pines are dominant but they have been planted by Forestry people.
✓ = dominant * Rare in 2 in Nat'l List

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)
Depth to Free Water in Pit: NA (in.)
Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:
No indicators of hydrology present

W5-DP-A

SOILS

Map Unit Name (Series and Phase): Wescomett

Drainage Class: VP

Taxonomy (Subgroup): Typic Haplaquods

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6		10YR 5/2	10YR 4/3 > N2.5 > 5Y7/2	5% / 7% / 7%	Loamy Sand
6-14		N2.5	NA	NA	Loamy Sand
14-?	(HARD - CEMENTED)	5YR 3/2 10YR 4/3	NA	NA	Loamy Sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: 0-6 inches = gray bands, not black > Black starts at ~6 (in some place, 4) inches bls.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks: call SCS concerning organic pan potential - discrepancy in Org. Soil determination is the color directly above the spodic horizon - should be grey - we saw red/brown (5YR 3/2) - very hard

Approved by HQUSACE 3/92

W5-DP-A

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: NAS CECIL -WS Applicant/Owner: ABB-ES/NAVY Investigator:	Date: County: Duval State:
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Zachanthes Carotinosana	herb	OBL
2. Oxypolis Filiformis	herb	FACW+
3. Persea Borbonia	Tree	FACW
4. Pluchea sp.	herb	(FACW)
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 14 (in.)

Depth to Saturated Soil: 10 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ✓ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ✓ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

WH - DP - D

SOILS

Map Unit Name (Series and Phase): Ridgeland

Drainage Class: PD

Taxonomy (Subgroup): Typic

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		10YR 7/1	2.5Y 3/1	40%	Sand
2-14		2.5Y 2/1	N2.5/ 2.5Y 5/3	30% ? 5%	loamy Sand
14-16+		2.5Y 5/2	N2.5	40%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: organic staining on fingers

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes No

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

Approved by HQUSACE 3/92

UPLAND

W4 DP D

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: PSC 4 / Cecil Field NAS	Date: 10/13/93
Applicant/Owner: ABB-ES / NAVY	County: Duval
Investigator: Belling / Beatty	State: FL
Do Normal Circumstances exist on the site? **(Yes)** No	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes **(No)**	Transect ID:
Is the area a potential Problem Area? Yes **(No)** (If needed, explain on reverse.)	Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
goldenrod	1. Solidago fistulosa	S/H	FAC+	9.			
flat-topped goldenrod	2. Euthamia minor	H	FAC	10.			
Pine - loblolly	3. Pinus taeda	T	FAC	11.			
Pine slash	4. " elliottii	T	FACW	12.			
Dewberry	5. Rubus cuneifolius	S	FACU	13.			
grass	6.			14.			
	7.			15.			
	8.			16.			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

W4-DP-C

SOILS

Map Unit Name (Series and Phase): Ridgeland

Drainage Class: PD

Taxonomy (Subgroup): Typic

Field Observations Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4		25Y 4/1	N2.5/		loamy sand
4-16+?		10YR 2/1	N2.5/	20%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: staining fingers w/organic in sand

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

W4 DP C

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Site 4/ Cecil Field NAS	Date: 1 3 93
Applicant/Owner: NAB-ESI/NAVY	County: Duval
Investigator: SELLING BCF	State: FL
Do Normal Circumstances exist on the site? (Yes) No	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID:
(If needed, explain on reverse.)	

* = Dominants

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Myrica cerifera	S	FAC+
2. Pinus serotina	T	FACW+
3. Carex ~~sp~~ Rhynchospora *	H	
4. Osmunda cinnamomea	H	FACW
5. Lachnanthes Carolinana	H	OBL
6. Lyonia ?		
7. Ilex sp all 19 species = FACW+ to OBL	H	OBL
8. Lycopodium alopecuroides	H	OBL
9. Eriocaulon decangulare	H	OBL
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water:	NA	(in.)
Depth to Free Water in Pit:	14	(in.)
Depth to Saturated Soil:	12	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

WH-PP-B

SOILS

Map Unit Name (Series and Phase): Ridgeland — Drainage Class: PD

Taxonomy (Subgroup): Typic — Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1		N2.5/			loamy sand
1-14		10YR 7/1	N2.5/	20%	loamy sand
14-?		10YR 2/1	N2.5/	5%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)
Wetland Hydrology Present? Yes No
Hydric Soils Present? Yes No

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

WL4 DP 3

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: PSC 4
Applicant/Owner: NAS CECIL FIELD
Investigator: BOLLING/BEATTY

Date: 10 13 93
County: Duval
State: FL

Do Normal Circumstances exist on the site? Yes No
Is the site significantly disturbed (Atypical Situation)? Yes No
Is the area a potential Problem Area? Yes No
(If needed, explain on reverse.)

Community ID: _____
Transect ID: _____
Plot ID: _____

* = Dominants

VEGETATION

	Dominant Plant Species	Stratum	Indicator
*	1. Pinus taeda	T	FAC
*	2. Xyris sp	H	OBL
	3. Serenoa repens	S	FACU
	4. Osmunda cinnamomea	H	FACW+
	5. Ilex glabra	H	FACW
	6. " "	S	FACW
	7. Acer rubrum	S	FAC
	8.		
	9. Hypericum		
	10.		
	11.		
	12.		
	13.		
	14.		
	15.		
	16.		

-4 petals

Tall herbs

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). _____

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)
Depth to Free Water in Pit: 15 (in.)
Depth to Saturated Soil: 13 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

WH-~~DP~~-A

SOILS

Map Unit Name (Series and Phase): Ridgeland / Typic Hapludox Drainage Class: PD

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1		N2.5/			LOAM
1-14		7.5YR 7/1	N 3/	40%	loamy sand
14-?		10YR 3/2	N2.5/ 10YR 7/2 / 5YR2.5/1	10% / 10%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks: Possibly mapped soil below potential fill layer? Gray soils down to 14" - No mention in Soil Survey.

W4 - PP- A

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: PSC4 / Cecil Field NAS
Applicant/Owner: ABB-ES / NAVY
Investigator: Bolling / Beatty

Date: 10 13 93
County: DUVAL
State: FL

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

* Dominant — Others

	Dominant Plant Species	Stratum	Indicator
*	1. Slash Pine P. elliottii	S	FACW
*	2. Sweetbay Ilex glabra	S	FACW
*	3. P. elliottii	T	FACW
*	4. Osmunda cinnamomea	H	FACW+
	5. Hydrocotyle Eriocaulon decangulare	H	OBL
	6. Myrica cerifera	S	FAC+
	7. Lachnanthes caroliniana	H	OBL
	8. Lycopodium alopecuroides	H	OBL
	9. Hypericum fasciculatum	S	FACW+
	10. Acer rubrum	S	FAC
	11. Sarracenia minor	H	OBL
	12.		
	13.		
	14.		
	15.		
	16.		

Bottom not Myrtle Redroot

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: 8 (in.)

Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ✓ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

- excavation and offsite disposal of contaminated soil and sediment to a hazardous waste landfill.

3.5 ADDITIONAL DATA REQUIREMENTS. To develop a better conceptual understanding of the contaminant problem at the six sites comprising OUs 3, 4, 5, and 6; better define the ARARs; and narrow the range of remedial alternatives that have been identified, additional site-specific data on the nature and extent of contamination, the pathways for contaminant migration, and potential receptors must be collected. Given the information contained in the existing database, the following list of general data requirements was developed for completion of the RI/FS for each of the six sites comprising OUs 3, 4, 5, and 6:

- the nature and extent of soil contamination resulting from previous activities at each site,

- the nature and extent of groundwater contamination resulting from previous activities at each site,

- the nature and extent of surface water and sediment contamination in the creeks and tributaries at Sites 8 and 10 and water and soil contamination in drainage swales and ditches at Sites 14 and 15 resulting from previous activities at these sites (surface water and sediment are not found at Sites 7 and 11),

- the nature and extent of contamination in tissues of ecological receptors resulting from previous activities at each site, and

- the shallow and intermediate aquifer system characteristics at each site including the groundwater flow directions and hydraulic gradients onsite and offsite, hydraulic properties (i.e., hydraulic conductivities), contaminant transport properties (i.e., distribution coefficients), and the groundwater and surface water interactive flows at streams located near the sites.

It is possible to eliminate technologies and alternatives during this preliminary screening based on technical implementability or cost reasons. Alternatives that are potentially viable at this stage in the investigation are discussed below for the general categories of groundwater and surface water and soil and sediment and apply, as appropriate, to each of the OUs.

3.4.1 Groundwater and Surface Water General groundwater and surface water remedial alternatives for OUs 3, 4, 5, and 6 include the following:

- the no action alternative consisting of periodic monitoring of the groundwater and surface water,
- institutional controls to prevent use of contaminated water coupled with provision of an alternate water supply to those impacted by site contamination until natural attenuation of contaminants so they no longer pose an unacceptable risk,
- institutional controls and alternate water supplies combined with containment (e.g., vertical or hydraulic barriers) of the water contamination until natural attenuation of contaminants so they no longer pose an unacceptable risk,
- *in-situ* treatment techniques such as bioremediation and air sparging,
- extraction and onsite treatment of contaminated groundwater and surface water combined with either onsite or offsite disposal of treated water, and
- extraction and offsite disposal of contaminated groundwater and surface water to a hazardous waste treatment facility.

3.4.2 Soil and Sediment General soil and sediment remedial alternatives for OUs 3, 4, 5, and 6 include the following:

- the no action alternative consisting of periodic monitoring of all affected media (e.g., soil and water);
- institutional controls to prevent direct contact with contaminated soil and sediment, consists of fencing and deed restrictions until natural attenuation of contaminants so they no longer pose an unacceptable risk;
- institutional controls combined with containment of the contaminated soil and sediment (e.g., capping or barriers) until natural attenuation of contaminants so they no longer pose an unacceptable risk;
- *in-situ* treatment techniques such as bioremediation, vapor extraction, and air sparging.
- excavation and onsite treatment of contaminated soil and sediment combined with either onsite or offsite disposal of treated material; and

Table 3-8 (Continued)
Preliminary Remedial Action Objectives, General Response Actions, Technology Types, and Process Options For OU 6

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Environmental Media	Remedial Action Objectives	General Response Actions	Technology Types	Process Options
Soil	For Human Health:	No action	None	Not applicable
	Prevent ingestion and direct contact with soil having carcinogens in excess of a total excess cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict land use), or fencing
			Monitoring	Monitoring of contaminated media
		Containment	Capping	Clay, soil, synthetic, asphalt, concrete, and multi-layer
			Vertical barriers	Slurry wall, grout curtain, vibrating beam, sheet piling
	Prevent ingestion and direct contact with soil having non-carcinogens in excess of a hazard quotient greater than 1.		Horizontal barriers	liners, grout injection, and block displacement
			Erosion controls	Grading and revegetation
			Dust and vapor suppression	Water, membranes or tarpaulins, organic agents or foam
	For Environmental Protection:		Surface water controls	Diversion and collection
	Prevent migration of contaminants that would result in groundwater not meeting remedial action objectives.	Removal	Excavation	Solids excavation
		Treatment	In-situ	Chemical, sorption, vitrification, and bioremediation
			Biological	Compositing, slurry-phase, and landfarming
	Prevent ingestion and direct contact with contaminants in soil exhibiting toxicity to test organisms or associated with adverse effects to growth, reproduction, or survival of terrestrial wildlife species.		Chemical	Neutralization, oxidation
			Thermal	Molten solids processing, thermal desorption, and incineration
			Offsite	Transportation and treatment at hazardous waste landfill
		Disposal	Onsite and offsite	Landfill (onsite or offsite), encapsulation, and backfill
Air	For Human Health:	No action	None	Not applicable
	Prevent inhalation of carcinogens in excess of a total cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict land use), or fencing
			Monitoring	Monitoring of contaminated media
		Removal	Gas collection	Passive vents, and active gas collection systems

Table 3-8
Preliminary Remedial Action Objectives, General Response Actions, Technology Types, and Process Options For OU 6

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Environmental Media	Remedial Action Objectives	General Response Actions	Technology Types	Process Options
Groundwater	For Human Health:	No Action	None	Not applicable
	Prevent ingestion, inhalation, and direct contact with water having carcinogens in excess of maximum contaminant levels or a total cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict excavation and groundwater use)
			Alternate water supply	Bottled water, or public, or base water supply
			Monitoring	Monitoring of contaminated media
		Containment	Capping	Clay, soil, synthetic, asphalt, concrete, and multi-layer
	Prevent ingestion, inhalation, and direct contact with water having non-carcinogens in excess of maximum contaminant levels or a hazard quotient greater than 1.		Vertical barriers	Slurry wall, grout curtain, vibrating beam, sheet piling, liners, and hydraulic mounds.
			Horizontal barriers	Liners, grout injection, and block displacement
		Collection	Extraction and pumping	Extraction wells and interceptor trenches
	For Environmental Protection:			
	Restore groundwater aquifer to acceptable contaminant concentrations.	Treatment	In-situ	Sparging, vapor extraction, and bioaccumulation
			Physical	Flocculation, gravity separation, oil-water separation, filtration, crystallization, and membrane separations, evaporation
			Chemical	Neutralization, precipitation, ion exchange, and reduction
			Offsite	Transportation and treatment at hazardous waste facility
		Discharge	Onsite and offsite	Surface water, Navy-owned treatment works, or groundwater (injection wells, infiltration galleries)

Table 3-7 (Continued)
Preliminary Remedial Action Objectives, General Response Actions, Technology Types, and Process Options For OU 5

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Environmental Media	Remedial Action Objectives	General Response Actions	Technology Types	Process Options
Soil	For Human Health:	No action	None	Not applicable
	Prevent ingestion and direct contact with soil having carcinogens in excess of a total excess cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict land use), or fencing
			Monitoring	Monitoring of contaminated media
		Containment	Capping	Clay, soil, synthetic, asphalt, concrete, and multi-layer
			Vertical barriers	Slurry wall, grout curtain, vibrating beam, and sheet piling
	Prevent ingestion and direct contact with soil having non-carcinogens in excess of a hazard quotient greater than 1.		Horizontal barriers	Liners, grout injection, and block displacement
			Erosion controls	Grading and revegetation
			Dust and vapor suppression	Water, membranes or tarpaulins, organic agents and foam
	Prevent direct contact with unexploded ordnance.	Removal	Surface water controls	Diversion and collection
	For Environmental Protection:	Treatment	Excavation	Unexploded ordnance removal and solids excavation
	Prevent migration of contaminants that would result in groundwater not meeting remedial action objectives.		In-situ	Chemical, sorption, vitrification
			Stabilize and solidify	Lime-based, Portland cement, and proprietary reagent
			Physical	Soil washing
			Chemical	Neutralization
			Thermal	Molten solids processing
	Prevent ingestion and direct contact with contaminants in soil exhibiting toxicity to test organisms or associated with adverse effects to growth, reproduction, or survival of terrestrial wildlife species.		Offsite	Transportation and treatment at hazardous waste landfill
		Disposal	Onsite and offsite	Landfill (onsite or offsite), encapsulation, backfill
Air	For Human Health:	No action	None	Not applicable
	Prevent inhalation of carcinogens in excess of a total cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict land use), and fencing
			Monitoring	Monitoring of contaminated media
		Removal	Gas collection	Passive vents, and active gas collection systems

Table 3-7
Preliminary Remedial Action Objectives, General Response Actions, Technology Types, and Process Options For OU 5

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Environmental Media	Remedial Action Objectives	General Response Actions	Technology Types	Process Options
Groundwater	For Human Health:	No Action	None	Not applicable
	Prevent ingestion, inhalation, and direct contact with water having carcinogens in excess of maximum contaminant levels or a total cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict excavation and groundwater use)
			Alternate water supply	Bottled water or public or base water supply
			Monitoring	Monitoring of contaminated media
		Containment	Capping	Clay, soil, synthetic, asphalt, concrete, multi-layer
	Prevent ingestion, inhalation, and direct contact with water having non-carcinogens in excess of maximum contaminant levels or a hazard quotient greater than 1.		Vertical barriers	Slurry wall, grout curtain, vibrating beam, sheet piling, liners, and hydraulic mounds
			Horizontal barriers	Liners, grout injection, and block displacement
		Collection	Extraction and pumping	Extraction wells, interceptor trenches
	For Environmental Protection:	Treatment	In-situ	Sparging, vapor extraction, bioaccumulation
	Restore groundwater aquifer to acceptable contaminant concentrations.		Physical	Flocculation, gravity separation, oil-water separation, filtration, crystallization, membrane separations, evaporation
			Chemical	Neutralization, precipitation, ion exchange, reduction
			Offsite	Transportation and treatment at hazardous waste facility
		Discharge	Onsite and offsite	Surface water, Navy-owned treatment works, groundwater (injection wells, infiltration galleries)

Table 3-6 (Continued)
Preliminary Remedial Action Objectives, General Response Actions, Technology Types, and Process Options For OU 4

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Environmental Media	Remedial Action Objectives	General Response Actions	Technology Types	Process Options
Soil and Sediment	For Human Health:	No action	None	Not applicable
	Prevent ingestion and direct contact with soil and sediment having carcinogens in excess of a total excess cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict land use), and fencing
			Monitoring	Monitoring of contaminated media
		Containment	Capping	Clay, soil, synthetic, asphalt, concrete, and multi-layer
			Vertical barriers	Slurry wall, grout curtain, vibrating beam, and sheet piling
	Prevent ingestion and direct contact with soil and sediment having non-carcinogens in excess of a hazard quotient greater than 1.		Horizontal barriers	Liners, grout injection, and block displacement
			Erosion controls	Grading, and revegetation
			Dust and vapor suppression	Water, membranes or tarpaulins, organic agents, and foam
	For Environmental Protection:		Sediment controls	Coffer dams, curtain barriers, and capping barriers
		Removal	Surface water controls	Diversion and/or pumping
	Prevent migration of contaminants that would result in groundwater and surface water not meeting remedial action objectives.	Treatment	Excavation	Solids excavation, dredging and dewatering (for sediment)
			In-situ	Chemical, sorption, vitrification, vapor extraction, and bioremediation
	Prevent ingestion and direct contact with contaminants in soil and sediment exhibiting toxicity to test organisms or associated with adverse effects to growth, reproduction, or survival of terrestrial wildlife species or aquatic receptors.		Stabilize and solidify	Lime-based, Portland cement, and proprietary reagent
			Chemical	Neutralization
			Thermal	Molten solids processing, low thermal desorption, and incineration
		Disposal	Offsite	Transportation and treatment at hazardous waste landfill
			Onsite and offsite	Landfill (onsite or offsite), encapsulation, and backfill
Air	For Human Health:	No action	None	Not applicable
	Prevent inhalation of carcinogens in excess of a total cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict land use), and fencing
			Monitoring	Monitoring of contaminated media
		Removal	Gas collection	Passive vents, and active gas collection systems

Table 3-6
Preliminary Remedial Action Objectives, General Response Actions, Technology Types, and Process Options For OU 4

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Environmental Media	Remedial Action Objectives	General Response Actions	Technology Types	Process Options
Groundwater and Surface Water	For Human Health:	No Action	None	Not applicable
	Prevent ingestion, inhalation, and direct contact with water having carcinogens in excess of maximum contaminant levels (groundwater) and ambient water quality criteria (surface water) or a total excess cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict excavation and groundwater use)
			Alternate water supply	Bottled water or public or base water supply
			Monitoring	Monitoring of contaminated media
		Containment	Capping	Clay, soil, synthetic, asphalt, concrete, and multi-layer
			Vertical barriers	Slurry wall, grout curtain, vibrating beam, sheet piling, liners, and hydraulic mounds
	Prevent ingestion, inhalation, and direct contact with water having non-carcinogens in excess of maximum contaminant levels (groundwater) and ambient water quality criteria (surface water) or a hazard quotient greater than 1.		Horizontal barriers	Liners, grout injection, and block displacement
			Surface water controls	Diversion and/or pumping
		Collection	Extraction and pumping	Extraction wells and interceptor trenches
		Treatment	In-situ	Sparging, vapor extraction, and bioremediation
			Physical	Flocculation, gravity separation, oil-water separation, filtration, freeze crystallization, and membrane separations
			Chemical	Neutralization, precipitation, ion exchange, and UV oxidation
	For Environmental Protection:		Offsite	Transportation and treatment at hazardous waste facility
	Prevent direct contact in receiving surface water system with contaminants in excess of risk-based remedial levels or applicable surface water standards.	Discharge	Onsite and offsite	Surface water, Navy-owned treatment works, and groundwater (injection wells, and infiltration galleries)

Table 3-5 (Continued)
Preliminary Remedial Action Objectives, General Response Actions, Technology Types, and Process Options For OU 3

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Environmental Media	Remedial Action Objectives	General Response Actions	Technology Types	Process Options
Soil and Sediment	For Human Health:	No action	None	Not applicable
	Prevent ingestion and direct contact with soil and sediment having carcinogens in excess of a total excess cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict land use), or fencing
			Monitoring	Monitoring of contaminated media
		Containment	Capping	Clay, soil, synthetic, asphalt, concrete, and multi-layer
			Vertical barriers	Slurry wall, grout curtain, vibrating beam, and sheet piling
	Prevent ingestion and direct contact with soil and sediment having non-carcinogens in excess of a hazard quotient greater than 1.		Horizontal barriers	Liners, grout injection, and block displacement
			Erosion controls	Grading and revegetation
			Dust and vapor suppression	Water, membranes or tarpaulins, and organic agents or foam
			Sediment controls	Coffer dams, curtain barriers, and capping barriers
	For Environmental Protection:	Removal	Surface water controls	Diversion and/or pumping
	Prevent migration of contaminants that would result in groundwater and surface water not meeting remedial action objectives.	Treatment	Excavation	Solids excavation, dredging and dewatering (for sediment)
			In-situ	Chemical, sorption, vitrification, vapor extraction, and bioremediation
	Prevent ingestion and direct contact with soil and sediment exhibiting toxicity to test organisms or associated with adverse effects to growth, reproduction, or survival of terrestrial wildlife species or aquatic receptors.		Stabilize and solidify	Lime-based, Portland cement, and proprietary reagent
			Chemical	Neutralization
			Thermal	Molten solids processing, low thermal desorption, and incineration
		Disposal	Offsite	Transportation and treatment at hazardous waste landfill
			Onsite and offsite	Landfill (onsite or offsite), encapsulation, and backfill
Air	For Human Health:	No action	None	Not applicable
	Prevent inhalation of carcinogens in excess of a total cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict land use), and fencing
			Monitoring	Monitoring of contaminated media
		Removal	Gas collection	Passive vents, and active gas collection systems

Table 3-5
Preliminary Remedial Action Objectives, General Response Actions, Technology Types, and Process Options For OU 3

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Environmental Media	Remedial Action Objectives	General Response Actions	Technology Types	Process Options
Groundwater and Surface Water	<u>For Human Health:</u>	No action	None	Not applicable
	Prevent ingestion, inhalation, or direct contact with water having carcinogens in excess of maximum contaminant levels (groundwater) and ambient water quality criteria (surface water) or a total cancer risk of greater than 10^{-4} to 10^{-6}.	Institutional actions	Access controls	Deed restrictions (restrict excavation and groundwater use)
			Alternate water supply	Bottled water, or public or base water supply
			Monitoring	Monitoring of contaminated media
		Containment	Capping	Clay, soil, synthetic, asphalt, concrete, and multi-layer
			Vertical barriers	Slurry wall, grout curtain, vibrating beam, sheet piling, liners, and hydraulic mounds.
	Prevent ingestion, inhalation, or direct contact with water having non-carcinogens in excess of maximum contaminant levels (groundwater) and ambient water quality criteria (surface water) or a hazard quotient greater than 1.		Horizontal barriers	Liners, grout injection, and block displacement
			Surface water controls	Diversion and/or pumping
		Collection	Extraction and pumping	Extraction wells and interceptor trenches
		Treatment		
	<u>For Environmental Protection:</u>		In-situ	Sparging, vapor extraction, and bioremediation
			Physical	Flocculation, gravity separation, oil-water separation, filtration, and freeze crystallization
	Prevent direct contact or ingestion in receiving surface water system with contaminants in excess of risk-based remedial levels or applicable surface water standards.		Chemical	Neutralization, precipitation, ion exchange, and ultraviolet (UV) oxidation
		Discharge	Offsite	Transportation and treatment at hazardous waste facility
			Onsite and offsite	Surface water, Navy-owned treatment works, or groundwater (injection wells and infiltration galleries)

Table 3-4 (Continued)
Potential Action-Specific ARARs, Criteria, and Guidance

Remedial Investigation and Feasibility Study Workplan
Operable Units 3, 4, 5, and 6
NAS Cecil Field, Jacksonville, Florida

Standard, Requirement, Criteria, or Limitation	Citation	Requirements Synopsis	Status
Florida Hazardous Waste Rules	Chapter 17-730, FAC	Adopts by reference appropriate sections of 40 CFR and establishes minor additions to these regulations concerning the generation, storage, treatment, transportation, and disposal of hazardous wastes.	Relevant and appropriate.
Florida Industrial Wastewater Facilities Regulations	Chapter 17-660, FAC	Sets minimum treatment standards for effluent based on water quality considerations and technology. Also establishes general permit requirements for four specific operations.	Relevant and appropriate.
Florida Water Quality Based Effluent Limitations	Chapter 17-650, FAC	States that all activities and discharges, except dredge and fill, must meet effluent limitations based on technology or water quality.	Relevant and appropriate.
Florida Water Well Permitting and Construction Requirements	Chapter 17-532, FAC	Establishes the minimum standards for the location, construction, repair, and abandonment of water wells. Permitting requirements and procedures are established.	Relevant and appropriate.
Groundwater Permitting and Monitoring Requirements	Chapter 17-522, FAC	Establishes permitting and monitoring requirements for installations discharging to groundwater.	To be considered
Florida Underground Injection Control Regulations	Chapter 17-28, FAC	Establishes a State Underground Injection Control Program consistent with Federal requirements and appropriate to the hydrogeology of Florida.	To be considered
Florida Rules on Permits	Chapter 17-4 FAC	Establishes procedures for obtaining permits for sources of pollution.	Relevant and appropriate.
Florida Air Pollution Rules	Chapter 17-2 FAC	Establishes permitting requirements for owners or operators of any source that emits any air pollutant.	Relevant and appropriate.

Notes: ARARs = applicable or relevant and appropriate requirements.
TSDFs = treatment, storage, and disposal facilities.

W3-DP-E

SOILS

Map Unit Name (Series and Phase): Arents

Drainage Class: PD

Taxonomy (Subgroup):

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		2.5Y 3/1			loamy sand
2-16+		2.5Y 6/3	10YR 6/1 10YR 5/8	15% 5%	sand - fill material

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: top 16" = fill material - white/yellow w/calcium/limestone type chucks

WETLAND DETERMINATION

		(Circle)
Hydrophytic Vegetation Present?	Yes	(No)
Wetland Hydrology Present?	Yes	(No)
Hydric Soils Present?	Yes	(No)

Is this Sampling Point Within a Wetland? Yes (No)

Remarks:

W3-DP-E

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cecil Field NAS / PSC 3 — Date: 10/15/93
Applicant/Owner: ABB-ES / NAVY — County: Duval
Investigator: Bolling / Beatty — State: FL

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Myrica cerifera	T	FAC+
2. Acer rubrum	T	FAC
3. Prunus serotina	S	FACU
4. Myrica cerifera	S	FAC+
5. Baccharis halimifolia	S	FAC
6. Persea borbonia	S	FACW
7. Persea borbonia	T	FACW
8. Salix nigra	S	OBL
9. Eupatorium capillifolium	H	FAC-
10. Andropogon glomeratus	H	FACW+
11. Rubus cuneifolius	H	FACU
12. Vitis rotundifolia	V	FAC
13. Crataegus		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: At point: 25% cover - Prunus } roads cut in adjacent
50% " - Myrica } to pond, open grassy
area - dog fennel, broom sedge, goldenrod, grapes, rubus

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)
Depth to Free Water in Pit: NA (in.)
Depth to Saturated Soil: 10 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

~~W3~~ DP-C

SOILS

Map Unit Name (Series and Phase): Arents

Drainage Class: PD

Taxonomy (Subgroup):

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-5		2.5Y 2.5/1	white/yellow chunks throughout		loam
5-16+		2.5Y 5/2	2.5Y 2.5/1	40% - layers (horizontal)	loamy sand ~~sandy loam~~

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

W3-DP-C

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: NAS Cecil Field / ~~NA~~ PSC 3
Applicant/Owner: ABB-ES / NAVY
Investigator: Rollica / Poatty

Date: 10/15/93
County: Duval
State: FL

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator
*	1. Myrica cerifera	T	FAC+
*	2. Acer rubrum	T	FAC
	3. Sambucus canadensis	S	FACW-
	4. Vitis rotundifolia	V	FAC
*	5. Myrica cerifera	S	FAC+
	6. Persea borbonia	S	FACW
*	7. Baccharis halimifolia	S	FAC
	8. Cornus foemina	S	FACW-
	9. VA Creeper/Parthenocissus virginiana	V	FAC
	10. Vitis rotundafolia	V	FAC
	11. Rubus cuneifolias	S	FACU
	12. Toxicendu vernix	S	OBL
	13. Acer rubrum	H	FAC
	14. Salix nigra	T	OBL
	15.		
	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: at datapoint: cover 40% Myrica cerifera
40% acer rubrum

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)
Depth to Free Water in Pit: 6 (in.)
Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
✓ Saturated in Upper 12 Inches
✓ Water Marks
✓ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Shallow root systems

~~W3 - DP-D~~

SOILS

Map Unit Name (Series and Phase): Ridgeland (?)

Drainage Class: PD

Taxonomy (Subgroup): Typic Haplaquod

Field Observations Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1		10YR 2/1	10YR 7/2	10%	loamy sand
1-16+		10YR 2/1 & ~~[illegible]~~	2.5Y 6/2	50/50	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks: Significant recent disturbance in the area from well installation & sampling

Approved by HQUSACE 3/92

W3-DP-D

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cecil Field NAS / PSC 3	Date: 12/15/93
Applicant/Owner: ABB-ES NAVY	County: Duval
Investigator: Bolling / Beatty	State: FL
Do Normal Circumstances exist on the site? (Yes) No	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID:
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator
*	1. Pinus	T	
*	2. Nyssa sylvatica	S	
	3. Acer rubrum	S	FAC
*	4. Rubrus cumerifolias	S	FACU
	5. Pinw		
D fern	6. Hex glalva	S	FACW
	7. Eupatorium capillifolium	S	FAC-
	8. Osmunda cinnamomea	H	FACW+
	9. Helianthus angustifolius	H	FAC+
	10. Euthamia minor	H	FAC
	11. Lachnanthes caroliniana	H	OBL
	12. Swamp bay Persea borbonia		FACW
	13.		
	14.		
	15.		
	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:
Pine w 3 cones at nodes
5 = toothed lvs w/ orangish berries
Disturbed area - bulldozed roach cuts
Swamps & sucket bay - dying

HYDROLOGY

- ___ Recorded Data (Describe in Remarks):
  - ___ Stream, Lake, or Tide Gauge
  - ___ Aerial Photographs
  - ___ Other
- ✓ No Recorded Data Available

Field Observations:

Depth of Surface Water:	0 (in.)
Depth to Free Water in Pit:	0 (in.)
Depth to Saturated Soil:	0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ✓ Inundated
- ✓ Saturated in Upper 12 Inches
- ✓ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ✓ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: standing water at ground level

W3-PP-B

SOILS

Map Unit Name (Series and Phase): Arents

Drainage Class: PD

Field Observations Confirm Mapped Type? (Yes) No

Taxonomy (Subgroup):

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		N2.5/	white solid piece	10%	loamy sand
2-6		10YR 4/2	10YR 4/3 / N2.5/ / 10YR 7/2	5% / 20% / 15%	loamy sand / rock fragments
6-16		2.5Y 5/2	N2.5	25%	loamy sand / white fragments

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Fill material - chunks of rock, debris, etc. throughout 16 inch profile

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)	
Wetland Hydrology Present?	Yes	No		
Hydric Soils Present?	Yes	No		
Is this Sampling Point Within a Wetland?	Yes	No	(Circle)	

Remarks:

W3-DP-B

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cecil Field NAS / PSC 3 — Date: 01/15/93
Applicant/Owner: ABB-ES / NAVY — County: Duval
Investigator: Bollinger / Gaither — State: FL

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
Pine 1. Pinus elliottii	T	FACW
* 2. Murica cerifera	T	FAC+
cherry 3. Prunus seroterra	T	FACU
* 4. Myria cerifera	S	FAC+
dogfennel * 5. Eupatorium capillifolium	S	FAC-
* 6. Solidago fistulosa	H	FAC+
7. Pinus elliottii	S	FACW
1 plum 8. Plum? Prunus sp. need fruit	T	?

Dominant Plant Species	Stratum	Indicator
9. Broomsedge / Andropogon glomeratus	S	FACW+
*10. Rubrus cumefolius	H	FACU
11. Acer rubrum	H	FAC
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: "Plum" - horizontal lenticels on trunk
higher elev terr. adjacent wet area - very open canopy x 10% cover
Mostly myrica w/ Dogfennel & Goldenrod
Pine cone w/longer needles, branch from sapling

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)
Depth to Free Water in Pit: 12 (in.)
Depth to Saturated Soil: 10 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
✓ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

W3-DP-A

SOILS

Map Unit Name (Series and Phase): Arents

Drainage Class: _____

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): _____

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Due to 8+ inches inundation - soils were not observed

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Assumed (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

Approved by HQUSACE 3/92

W3-DP-A

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: NAS Cecil Field / PSC3
Applicant/Owner: ABB-ES / NAVY
Investigator: Bollinn / Beatty

Date: 12/15/93
County: Duval
State: FL

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Salix nigra	T	OBL
2. Myrica cerifera	T	Fac+
3. Mikania scandens	V	FacW+
4. Scirpus (Rush)	S	
5. ? BRENDA ?	S	OBL
6. Juncus effusus	S	FACW+
7. Vitis rotundifolia	V	FAC
8. Polygonum punctatum	H	FACW+
9. Anagallis arvensis	H	FACU+
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: standing water, emergent rushes, ?, mostly salix - 10% cover dominant aerial cover
few wax myrtle
vine - composite, opposite heart shaped lvs, disk fls only - climbing hempweed

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 8+ (in.)
Depth to Free Water in Pit: NA (in.)
Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:
Primary Indicators:
✓ Inundated
✓ Saturated in Upper 12 Inches
✓ Water Marks
___ Drift Lines
___ Sediment Deposits
✓ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Glades lobelia - L glandulosa
tall grass - Erianthus, or rice (oryza), Arundo, Phragmites
rush - Scirpus pendulus or S. Cyperinus

W2 - DP-C

SOILS

Map Unit Name (Series and Phase): Wiscoy silt — Drainage Class: VPD

Taxonomy (Subgroup): Typic Hapludalf — Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		~~10YR 2/1~~ 2.5YR 2.5/1			loam high organic content - roots, litter, etc
3-10		10YR 2/1			loam
10-16+		10YR 2/1	10YR 5/1	20%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	Is this Sampling Point Within a Wetland? (Circle) Yes No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

Approved by HQUSACE 3/92

Location ~ 30 ft East of channel in 2

W2-DP-C

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: NAS Cecil Field / PSC 2	Date: 10/15/93
Applicant/Owner: ABB-ES / NAVY	County: Duval
Investigator: Rollins / Beatty	State: FL
Do Normal Circumstances exist on the site? (Yes) No	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID:
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Liquidambar	T		9.		
2. Acer rubrum	T		10.		
3. Pinus sp ?	—		11.		
4. Magnolia virginiana	S		12.		
5. Acer rubrum	S		13.		
6. Persea borbonia	S		14.		
7. Sinmmun Fern	H		15.		
8. Saw Palmetto			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

- ___ Recorded Data (Describe in Remarks):
  - ___ Stream, Lake, or Tide Gauge
  - ___ Aerial Photographs
  - ___ Other
- ✓ No Recorded Data Available

Field Observations:

Depth of Surface Water:	NA	(in.)
Depth to Free Water in Pit:	4	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: moss at base of trees to about 5 inches

W2-DP-13

SOILS

Map Unit Name (Series and Phase): Arents

Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-16+		10YR 2/1	N2.5/? 10YR 6/2	20%? 10%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

W2-DP-B

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: NAS Cecil Field / PSC 2
Applicant/Owner: ABB-ES / NAVY
Investigator: Bolling / Beatty

Date: 10/15/93
County: Duval
State: FL

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Blackberry	H	
2. Goldenrod	H	
3. Dewberry	H	
4. Ragweed	H	
5. Baccharis	S	
6. Pines	S	
7. Pine	T	
8. Grasses	H	
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)

Depth to Free Water in Pit: N/A (in.)

Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

WI-DP-B

SOILS

Map Unit Name (Series and Phase): Pinconnett

Drainage Class: VPD

Taxonomy (Subgroup): Typic

Field Observations Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-8		7.5 YR 2.5/1	NA	NA	loamy sand
8-18+		10YR 7/2	7.5YR 2.5/1	20%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ? Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Distinct contrast layer (black/white) - questionable streaking/ mottles in yellow/gray layer

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks: This area is located on 1st ledge from WI-DP-A. There is a grass which seems to grow along this ledge.

Approved by HQUSACE 3/92

WI - DP- B

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: PSC 1 / Cecil Field
Applicant/Owner: NAVY / ABB-ES
Investigator: Rolling / Beauty

Date: 10/10/93
County: Duval
State: FL

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: _____
Transect ID: _____
Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Panicum hemitomon Jan.	Herb	FACW
2. Woodwardia areolata	Herb	OBL
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). _____

Remarks: Moss & Algae found on base of trunks to about 2 feet in this area

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: 19 (in.)

Depth to Saturated Soil: 18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

W2 DP-A

SOILS

Map Unit Name (Series and Phase): Wesconnett

Drainage Class: VPD

Taxonomy (Subgroup): Typic Hydraquent

Field Observations
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		10YR 2/1			roots - loam
2-16+		10YR 2/1	N2.5/ 10YR 3/2	20%/20%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ✓ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	(Circle)	Is this Sampling Point Within a Wetland? (Circle) Yes No
Wetland Hydrology Present?	Yes	No		
Hydric Soils Present?	Yes	No		

Remarks:

W2 - DP-A

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: NAS Cecil Field / PSC 2	Date: 10/15/93
Applicant/Owner: ABB-ES / NAVY	County: Duval
Investigator: Bolling / Beatty	State: FL
Do Normal Circumstances exist on the site? (Yes) No	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID:
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Wax Myrtle	T		9. Juncus sp	H	
2. Laurel Oak	T		10. [illegible]	H	
3. Pine	T		11. [illegible]	H	
4. Slash Pine	S		12. [illegible]	H	
5. Magnolia Virginiana	S		13. [illegible]	H	
6. Black Cherry	S		14. [illegible]	H	
7. Acer Rubrum	S		15.		
8. Liquidambar	S		16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ ___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ✓ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ✓ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Saturated to surface

WI-DP-A

SOILS

Map Unit Name (Series and Phase): WESCOTT

Drainage Class: VPD

Taxonomy (Subgroup): Typic

Field Observations Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		10YR 2/1	NA	NA	root & organic matter throughout LOAM
2-8		N3/	NA	NA	roots throughout (stems) LOAM - dry & powdery
8-11		10YR 5/2	mottles and/or streaking 10YR 3/1	35%	Loamy sand (streaks?)
11-? (16+)		10YR 3/1	10YR 2/1	10%	loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Not mapped because of 8-? range not reddish brown. There is a thin (~3 inch) layer of yellow/white type sand. then darker gray/brown sand

WETLAND DETERMINATION

		(Circle)
Hydrophytic Vegetation Present?	(Yes)	No
Wetland Hydrology Present?	(Yes)	No
Hydric Soils Present?	(Yes)	No

Is this Sampling Point Within a Wetland? (Yes) No (Circle)

Remarks: This sample point was in the low area of this "alcove". No standing water at this time but evidence that it is inundated during certain times of the year, (No Redb layer). - This area on east side of berm separating landfill area. Trees are mature trees present - '72 aerial shows mature vegetation.

W1 - DP - 1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: PSC 1 / Cecil Field
Applicant/Owner: NAVY / ABB-ES
Investigator: BOLLING / REATTY

Date: 10/10/93
County: Duval
State: FL

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: _____
Transect ID: _____
Plot ID: _____

VEGETATION

	Dominant Plant Species	Stratum	Indicator
*	1. Acer rubrum	T	FAC
*	2. Quercus laurifolia	T	FACW
	3. [illegible]	T	OBL
	4. Fraxinus caroliniana	T	OBL
	5. Diospyros virginiana	T	FAC
	6. Liquidambar styraciflua	T	FAC+
*	7. Fraxinus caroliniana	S/S	OBL
	8. Quercus laurifolia	S/S	FACW
	9. Acer rubrum	S/S	FAC
	10. Liquidambar styraciflua	S/S	FAC+
	11.		
	12.		
	13.		
	14.		
	15.		
	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:
No herb layer in canopy area -

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: 6 (in.)
Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
✓ Saturated in Upper 12 Inches
✓ Water Marks
___ Drift Lines
___ Sediment Deposits
✓ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

APPENDIX C

WET Input Data Sets

WET Input Dataset for Site 1

s1 - n	6.2 - y	12Be(w) - n	13Ba(d) - n
s2 - n	7 - y	12Be(d) - n	13Bb(x) - n
s3 - n	8.1 - n	12C(x) - n	13Bb(w) - n
s4 - n	8.2 - y	12C(w) - n	13Bb(d) - n
s5 - n	8.3 - n	12C(d) - n	13Bc(x) - n
s6 - n	8.4 - y	12Ca(x) - n	13Bc(w) - n
s7 - n	9.1 - y	12Ca(w) - n	13Bc(d) - n
s8 - y	9.2 - y	12Ca(d) - n	13Bd(x) - n
s9 - n	9.3 - y	12Cb(x) - n	13Bd(w) - n
s10 - n	10A - n	12Cb(w) - n	13Bd(d) - n
s11 - n	10B - y	12Cb(d) - n	13Be(x) - y
s12 - n	10C - n	12Cc(x) - n	13Be(w) - y
s13 - n	10D - n	12Cc(w) - n	13Be(d) - y
s14 - n	10E - n	12Cc(d) - n	13C(x) - n
s15 - y	10F - n	12Cd(x) - n	13C(w) - n
s16 - y	11(x) - n	12Cd(w) - n	13C(d) - n
s17 - n	11(w) - n	12Cd(d) - n	13Ca(x) - n
s18 - n	11(d) - n	12D(x) - n	13Ca(w) - n
s19 - n	12A(x) - y	12D(w) - n	13Ca(d) - n
s20 - n	12A(w) - y	12D(d) - n	13Cb(x) - n
s21 - y	12A(d) - y	12Da(x) - n	13Cb(w) - n
s22 - i	12Aa(x) - n	12Da(w) - n	13Cb(d) - n
s23 - n	12Aa(w) - n	12Da(d) - n	13Cc(x) - n
s24 - n	12Aa(d) - n	12Db(x) - n	13Cc(w) - n
s25 - n	12Ab(x) - n	12Db(w) - n	13Cc(d) - n
s26 - n	12Ab(w) - n	12Db(d) - n	13Cd(x) - n
s27 - n	12Ab(d) - n	12E(x) - n	13Cd(w) - n
s28 - n	12Ac(x) - n	12E(w) - n	13Cd(d) - n
s29 - n	12Ac(w) - n	12E(d) - n	13D(x) - n
s30 - y	12Ac(d) - n	13A(x) - n	13D(w) - n
s31 - y	12Ad(x) - n	13A(w) - n	13D(d) - n
1.1 - n	12Ad(w) - n	13A(d) - n	13Da(x) - n
1.2 - y	12Ad(d) - n	13Aa(x) - n	13Da(w) - n
1.3 - n	12Ae(x) - y	13Aa(w) - n	13Da(d) - n
2.1.1 - n	12Ae(w) - y	13Aa(d) - n	13Db(x) - n
2.1.2 - n	12Ae(d) - y	13Ab(x) - n	13Db(w) - n
2.1.3 - n	12B(x) - n	13Ab(w) - n	13Db(d) - n
2.2.1 - n	12B(w) - n	13Ab(d) - n	13E(x) - n
2.2.2 - y	12B(d) - n	13Ac(x) - n	13E(w) - n
3.1 - y	12Ba(x) - n	13Ac(w) - n	13E(d) - n
3.2 - n	12Ba(w) - n	13Ac(d) - n	14.1(x) - n
3.3 - y	12Ba(d) - n	13Ad(x) - n	14.1(w) - n
4.1 - n	12Bb(x) - n	13Ad(w) - n	14.1(d) - n
4.2A - n	12Bb(w) - n	13Ad(d) - n	14.2(x) - n
4.2B - y	12Bb(d) - n	13Ae(x) - n	14.2(w) - n
4.2C - n	12Bc(x) - n	13Ae(w) - n	14.2(d) - n
4.2D - n	12Bc(w) - n	13Ae(d) - n	15.1A - y
5.1.1 - y	12Bc(d) - n	13B(x) - y	15.1B - n
5.1.2 - n	12Bd(x) - n	13B(w) - y	15.1C - n
5.2 - y	12Bd(w) - n	13B(d) - y	15.2 - i
blank - u	12Bd(d) - n	13Ba(x) - n	16A(x) - y
6.1 - n	12Be(x) - n	13Ba(w) - n	16A(w) - y

WET Input Dataset for Site 1

16A(d) - y	31.3(x) - n	36.1.1(x) - n	43B(d) - n
16B(x) - n	31.3(w) - n	36.1.1(w) - n	43C(x) - n
16B(w) - n	31.3(d) - n	36.1.1(d) - n	43C(w) - n
16B(d) - n	31.4(x) - i	36.1.2(x) - y	43C(d) - n
16C(x) - n	31.4(w) - i	36.1.2(w) - y	43D(x) - n
16C(w) - n	31.4(d) - i	36.1.2(d) - y	43D(w) - n
16C(d) - n	31.5(x) - y	36.2.1(x) - n	43D(d) - n
17 - n	31.5(w) - y	36.2.1(w) - n	43E(x) - n
18 - y	31.5(d) - y	36.2.1(d) - n	43E(w) - y
19.1A - i	31.6A(x) - n	36.2.2(x) - n	43E(d) - n
19.1B - n	31.6A(w) - n	36.2.2(w) - n	43F(x) - n
19.2 - n	31.6A(d) - n	36.2.2(d) - n	43F(w) - n
19.3 - n	31.6B(x) - y	36.2.3(x) - n	43F(d) - n
20.1 - i	31.6B(w) - y	36.2.3(w) - n	43G(x) - n
20.2 - i	31.6B(d) - y	36.2.3(d) - n	43G(w) - n
21A - y	31.6C(x) - n	37 - n	43G(d) - n
21B - n	31.6C(w) - n	38.1 - n	43H(x) - n
21C - n	31.6C(d) - n	38.2 - y	43H(w) - n
21D - n	31.6D(x) - n	38.3 - n	43H(d) - n
21E - n	31.6D(w) - n	38.4 - n	43I(x) - n
22.1.1 - y	31.6D(d) - n	38.5 - n	43I(w) - n
22.1.2 - i	31.6E(x) - n	38.6 - n	43I(d) - n
22.2 - n	31.6E(w) - n	38.7 - y	44A(x) - y
22.3 - n	31.6E(d) - n	38.8 - i	44A(w) - n
23 - y	32A - n	39 - y	44A(d) - y
24.1 - i	32B - n	40.1 - n	44B(x) - n
24.2 - n	32C - n	40.2 - y	44B(w) - y
24.3 - n	32D - n	41.1 - i	44B(d) - n
24.4 - y	32E - n	41.2 - i	44C(x) - n
24.5 - n	32F - n	42.1.1(x) - y	44C(w) - n
25.1 - n	32G - y	42.1.1(w) - y	44C(d) - n
25.2A - i	32H - n	42.1.1(d) - y	44D(x) - n
25.2B - i	32I - n	42.1.2(x) - n	44D(w) - n
25.3 - n	32J - n	42.1.2(w) - n	44D(d) - n
26.1 - y	32K - n	42.1.2(d) - n	44E(x) - n
26.2 - y	33A - n	42.1.3(x) - n	44E(w) - n
26.3 - n	33B - n	42.1.3(w) - n	44E(d) - n
27.1 - y	33C - n	42.1.3(d) - n	44F(x) - n
27.2 - y	33D - n	42.2.1(x) - y	44F(w) - n
27.3 - n	33E - n	42.2.1(w) - y	44F(d) - n
28 - n	33F - n	42.2.1(d) - y	44G(x) - n
29.1 - y	33G - y	42.2.2(x) - n	44G(w) - n
29.2 - y	33H - n	42.2.2(w) - n	44G(d) - n
30(x) - n	33I - n	42.2.2(d) - n	44H(x) - n
30(w) - n	33J - n	42.2.3(x) - n	44H(w) - n
30(d) - n	33K - n	42.2.3(w) - n	44H(d) - n
31.1(x) - y	34.1 - n	42.2.3(d) - n	44I(x) - n
31.1(w) - y	34.2 - y	43A(x) - y	44I(w) - n
31.1(d) - y	34.3.1 - n	43A(w) - n	44I(d) - n
31.2(x) - n	34.3.2 - i	43A(d) - y	45A - n
31.2(w) - n	35.1 - y	43B(x) - n	45B - n
31.2(d) - n	35.2 - i	43B(w) - n	45C - y

WET Input Dataset for Site 1

45D - n	48B(w) - n	49.2(x) - n	55.3 - u
45E - n	48B(d) - n	49.2(w) - n	55.4 - u
45F - n	48C(x) - n	49.2(d) - n	56.1 - u
45G - n	48C(w) - n	49.3(x) - n	56.2 - u
46A(x) - y	48C(d) - n	49.3(w) - n	57.1 - u
46A(w) - y	48D(x) - n	49.3(d) - n	57.2 - u
46A(d) - y	48D(w) - n	50(x) - n	58 - u
46B(x) - n	48D(d) - n	50(w) - n	59.1 - u
46B(w) - n	48E(x) - n	50(d) - n	59.2 - u
46B(d) - n	48E(w) - n	51.1 - u	60 - u
46C(x) - n	48E(d) - n	51.2 - u	61 - u
46C(w) - n	48F(x) - n	52.1 - u	62 - u
46C(d) - n	48F(w) - n	52.2 - u	63.1 - u
47A - y	48F(d) - n	53.1 - u	63.2 - u
47B - n	49.1.1(x) - n	53.2 - u	64 - u
47C - n	49.1.1(w) - n	54(x) - u	CR - u
48A(x) - y	49.1.1(d) - n	54(w) - u	1 - u
48A(w) - y	49.1.2(x) - n	54(d) - u	2 - u
48A(d) - y	49.1.2(w) - n	55.1 - u	3 - u
48B(x) - n	49.1.2(d) - n	55.2 - u	4 - u

WET Input Dataset for Site 2

s1 - n	6.2 - y	12Be(w) - n	13Ba(d) - n
s2 - n	7 - y	12Be(d) - n	13Bb(x) - n
s3 - n	8.1 - n	12C(x) - n	13Bb(w) - n
s4 - n	8.2 - y	12C(w) - n	13Bb(d) - n
s5 - n	8.3 - y	12C(d) - n	13Bc(x) - n
s6 - n	8.4 - n	12Ca(x) - n	13Bc(w) - n
s7 - n	9.1 - y	12Ca(w) - n	13Bc(d) - n
s8 - y	9.2 - y	12Ca(d) - n	13Bd(x) - n
s9 - n	9.3 - y	12Cb(x) - n	13Bd(w) - n
s10 - n	10A - n	12Cb(w) - n	13Bd(d) - n
s11 - n	10B - y	12Cb(d) - n	13Be(x) - n
s12 - n	10C - n	12Cc(x) - n	13Be(w) - n
s13 - n	10D - n	12Cc(w) - n	13Be(d) - n
s14 - n	10E - n	12Cc(d) - n	13C(x) - n
s15 - y	10F - n	12Cd(x) - n	13C(w) - n
s16 - y	11(x) - n	12Cd(w) - n	13C(d) - n
s17 - n	11(w) - n	12Cd(d) - n	13Ca(x) - n
s18 - n	11(d) - n	12D(x) - n	13Ca(w) - n
s19 - n	12A(x) - y	12D(w) - n	13Ca(d) - n
s20 - n	12A(w) - y	12D(d) - n	13Cb(x) - n
s21 - y	12A(d) - y	12Da(x) - n	13Cb(w) - n
s22 - i	12Aa(x) - n	12Da(w) - n	13Cb(d) - n
s23 - n	12Aa(w) - n	12Da(d) - n	13Cc(x) - n
s24 - n	12Aa(d) - n	12Db(x) - n	13Cc(w) - n
s25 - n	12Ab(x) - n	12Db(w) - n	13Cc(d) - n
s26 - n	12Ab(w) - n	12Db(d) - n	13Cd(x) - n
s27 - n	12Ab(d) - n	12E(x) - n	13Cd(w) - n
s28 - n	12Ac(x) - n	12E(w) - n	13Cd(d) - n
s29 - n	12Ac(w) - n	12E(d) - n	13D(x) - y
s30 - y	12Ac(d) - n	13A(x) - n	13D(w) - y
s31 - y	12Ad(x) - n	13A(w) - n	13D(d) - y
1.1 - n	12Ad(w) - n	13A(d) - n	13Da(x) - y
1.2 - y	12Ad(d) - n	13Aa(x) - n	13Da(w) - y
1.3 - n	12Ae(x) - y	13Aa(w) - n	13Da(d) - y
2.1.1 - n	12Ae(w) - y	13Aa(d) - n	13Db(x) - n
2.1.2 - n	12Ae(d) - y	13Ab(x) - n	13Db(w) - n
2.1.3 - n	12B(x) - n	13Ab(w) - n	13Db(d) - n
2.2.1 - n	12B(w) - n	13Ab(d) - n	13E(x) - n
2.2.2 - y	12B(d) - n	13Ac(x) - n	13E(w) - n
3.1 - y	12Ba(x) - n	13Ac(w) - n	13E(d) - n
3.2 - n	12Ba(w) - n	13Ac(d) - n	14.1(x) - n
3.3 - y	12Ba(d) - n	13Ad(x) - n	14.1(w) - n
4.1 - n	12Bb(x) - n	13Ad(w) - n	14.1(d) - n
4.2A - n	12Bb(w) - n	13Ad(d) - n	14.2(x) - n
4.2B - y	12Bb(d) - n	13Ae(x) - n	14.2(w) - n
4.2C - n	12Bc(x) - n	13Ae(w) - n	14.2(d) - n
4.2D - n	12Bc(w) - n	13Ae(d) - n	15.1A - y
5.1.1 - y	12Bc(d) - n	13B(x) - n	15.1B - n
5.1.2 - n	12Bd(x) - n	13B(w) - n	15.1C - n
5.2 - y	12Bd(w) - n	13B(d) - n	15.2 - i
blank - u	12Bd(d) - n	13Ba(x) - n	16A(x) - y
6.1 - n	12Be(x) - n	13Ba(w) - n	16A(w) - y

WET Input Dataset for Site 2

16A(d) - y
16B(x) - n
16B(w) - n
16B(d) - n
16C(x) - n
16C(w) - n
16C(d) - n
17 - n
18 - y
19.1A - i
19.1B - n
19.2 - n
19.3 - n
20.1 - i
20.2 - i
21A - y
21B - n
21C - n
21D - n
21E - n
22.1.1 - y
22.1.2 - i
22.2 - n
22.3 - n
23 - y
24.1 - i
24.2 - n
24.3 - n
24.4 - y
24.5 - n
25.1 - n
25.2A - i
25.2B - i
25.3 - y
26.1 - y
26.2 - n
26.3 - y
27.1 - y
27.2 - y
27.3 - n
28 - n
29.1 - y
29.2 - y
30(x) - n
30(w) - n
30(d) - n
31.1(x) - y
31.1(w) - y
31.1(d) - y
31.2(x) - n
31.2(w) - n
31.2(d) - n
31.3(x) - n
31.3(w) - n
31.3(d) - n
31.4(x) - i
31.4(w) - i
31.4(d) - i
31.5(x) - y
31.5(w) - y
31.5(d) - y
31.6A(x) - n
31.6A(w) - n
31.6A(d) - n
31.6B(x) - n
31.6B(w) - n
31.6B(d) - n
31.6C(x) - y
31.6C(w) - y
31.6C(d) - y
31.6D(x) - n
31.6D(w) - n
31.6D(d) - n
31.6E(x) - n
31.6E(w) - n
31.6E(d) - n
32A - n
32B - n
32C - n
32D - n
32E - y
32F - n
32G - n
32H - n
32I - n
32J - n
32K - n
33A - n
33B - n
33C - n
33D - n
33E - y
33F - n
33G - n
33H - n
33I - n
33J - n
33K - n
34.1 - n
34.2 - y
34.3.1 - n
34.3.2 - i
35.1 - n
35.2 - i
36.1.1(x) - n
36.1.1(w) - n
36.1.1(d) - n
36.1.2(x) - y
36.1.2(w) - y
36.1.2(d) - y
36.2.1(x) - n
36.2.1(w) - n
36.2.1(d) - n
36.2.2(x) - n
36.2.2(w) - n
36.2.2(d) - n
36.2.3(x) - n
36.2.3(w) - n
36.2.3(d) - n
37 - n
38.1 - n
38.2 - y
38.3 - n
38.4 - n
38.5 - n
38.6 - n
38.7 - y
38.8 - i
39 - y
40.1 - n
40.2 - y
41.1 - i
41.2 - i
42.1.1(x) - y
42.1.1(w) - y
42.1.1(d) - y
42.1.2(x) - n
42.1.2(w) - n
42.1.2(d) - n
42.1.3(x) - n
42.1.3(w) - n
42.1.3(d) - n
42.2.1(x) - y
42.2.1(w) - y
42.2.1(d) - y
42.2.2(x) - n
42.2.2(w) - n
42.2.2(d) - n
42.2.3(x) - n
42.2.3(w) - n
42.2.3(d) - n
43A(x) - y
43A(w) - n
43A(d) - y
43B(x) - n
43B(w) - y
43B(d) - n
43C(x) - n
43C(w) - n
43C(d) - n
43D(x) - n
43D(w) - n
43D(d) - n
43E(x) - n
43E(w) - n
43E(d) - n
43F(x) - n
43F(w) - n
43F(d) - n
43G(x) - n
43G(w) - n
43G(d) - n
43H(x) - n
43H(w) - n
43H(d) - n
43I(x) - n
43I(w) - n
43I(d) - n
44A(x) - n
44A(w) - n
44A(d) - n
44B(x) - n
44B(w) - n
44B(d) - n
44C(x) - n
44C(w) - n
44C(d) - y
44D(x) - y
44D(w) - n
44D(d) - n
44E(x) - n
44E(w) - y
44E(d) - n
44F(x) - n
44F(w) - n
44F(d) - n
44G(x) - n
44G(w) - n
44G(d) - n
44H(x) - n
44H(w) - n
44H(d) - n
44I(x) - n
44I(w) - n
44I(d) - n
45A - n
45B - n
45C - y

WET Input Dataset for Site 2

45D - n	48B(w) - n	49.2(x) - n	55.3 - u
45E - n	48B(d) - n	49.2(w) - n	55.4 - u
45F - n	48C(x) - n	49.2(d) - n	56.1 - u
45G - n	48C(w) - n	49.3(x) - n	56.2 - u
46A(x) - y	48C(d) - n	49.3(w) - n	57.1 - u
46A(w) - y	48D(x) - n	49.3(d) - n	57.2 - u
46A(d) - y	48D(w) - n	50(x) - n	58 - u
46B(x) - n	48D(d) - n	50(w) - n	59.1 - u
46B(w) - n	48E(x) - n	50(d) - n	59.2 - u
46B(d) - n	48E(w) - n	51.1 - u	60 - u
46C(x) - n	48E(d) - n	51.2 - u	61 - u
46C(w) - n	48F(x) - n	52.1 - u	62 - u
46C(d) - n	48F(w) - n	52.2 - u	63.1 - u
47A - y	48F(d) - n	53.1 - u	63.2 - u
47B - n	49.1.1(x) - n	53.2 - u	64 - u
47C - n	49.1.1(w) - n	54(x) - u	CR - u
48A(x) - y	49.1.1(d) - n	54(w) - u	1 - u
48A(w) - y	49.1.2(x) - n	54(d) - u	2 - u
48A(d) - y	49.1.2(w) - n	55.1 - u	3 - u
48B(x) - n	49.1.2(d) - n	55.2 - u	4 - u

WET Input Dataset for Site 3

s1 - n
s2 - n
s3 - n
s4 - n
s5 - n
s6 - n
s7 - n
s8 - y
s9 - n
s10 - n
s11 - n
s12 - n
s13 - n
s14 - n
s15 - y
s16 - y
s17 - n
s18 - n
s19 - n
s20 - n
s21 - y
s22 - i
s23 - n
s24 - n
s25 - n
s26 - n
s27 - n
s28 - n
s29 - n
s30 - y
s31 - y
1.1 - n
1.2 - y
1.3 - n
2.1.1 - n
2.1.2 - n
2.1.3 - n
2.2.1 - n
2.2.2 - y
3.1 - y
3.2 - n
3.3 - y
4.1 - n
4.2A - n
4.2B - y
4.2C - n
4.2D - n
5.1.1 - y
5.1.2 - n
5.2 - y
blank - u
6.1 - n
6.2 - y
7 - y
8.1 - n
8.2 - y
8.3 - n
8.4 - y
9.1 - y
9.2 - y
9.3 - y
10A - n
10B - y
10C - n
10D - n
10E - n
10F - n
11(x) - n
11(w) - n
11(d) - n
12A(x) - n
12A(w) - n
12A(d) - n
12Aa(x) - n
12Aa(w) - n
12Aa(d) - n
12Ab(x) - n
12Ab(w) - n
12Ab(d) - n
12Ac(x) - n
12Ac(w) - n
12Ac(d) - n
12Ad(x) - n
12Ad(w) - n
12Ad(d) - n
12Ae(x) - n
12Ae(w) - n
12Ae(d) - n
12B(x) - y
12B(w) - y
12B(d) - y
12Ba(x) - n
12Ba(w) - n
12Ba(d) - n
12Bb(x) - n
12Bb(w) - n
12Bb(d) - n
12Bc(x) - y
12Bc(w) - y
12Bc(d) - y
12Bd(x) - n
12Bd(w) - n
12Bd(d) - n
12Be(x) - n
12Be(w) - n
12Be(d) - n
12C(x) - n
12C(w) - n
12C(d) - n
12Ca(x) - n
12Ca(w) - n
12Ca(d) - n
12Cb(x) - n
12Cb(w) - n
12Cb(d) - n
12Cc(x) - n
12Cc(w) - n
12Cc(d) - n
12Cd(x) - n
12Cd(w) - n
12Cd(d) - n
12D(x) - n
12D(w) - n
12D(d) - n
12Da(x) - n
12Da(w) - n
12Da(d) - n
12Db(x) - n
12Db(w) - n
12Db(d) - n
12E(x) - n
12E(w) - n
12E(d) - n
13A(x) - n
13A(w) - n
13A(d) - n
13Aa(x) - n
13Aa(w) - n
13Aa(d) - n
13Ab(x) - n
13Ab(w) - n
13Ab(d) - n
13Ac(x) - n
13Ac(w) - n
13Ac(d) - n
13Ad(x) - n
13Ad(w) - n
13Ad(d) - n
13Ae(x) - n
13Ae(w) - n
13Ae(d) - n
13B(x) - n
13B(w) - n
13B(d) - n
13Ba(x) - n
13Ba(w) - n
13Ba(d) - n
13Bb(x) - n
13Bb(w) - n
13Bb(d) - n
13Bc(x) - n
13Bc(w) - n
13Bc(d) - n
13Bd(x) - n
13Bd(w) - n
13Bd(d) - n
13Be(x) - n
13Be(w) - n
13Be(d) - n
13C(x) - n
13C(w) - n
13C(d) - n
13Ca(x) - n
13Ca(w) - n
13Ca(d) - n
13Cb(x) - n
13Cb(w) - n
13Cb(d) - n
13Cc(x) - n
13Cc(w) - n
13Cc(d) - n
13Cd(x) - n
13Cd(w) - n
13Cd(d) - n
13D(x) - y
13D(w) - y
13D(d) - y
13Da(x) - y
13Da(w) - y
13Da(d) - y
13Db(x) - n
13Db(w) - n
13Db(d) - n
13E(x) - n
13E(w) - n
13E(d) - n
14.1(x) - n
14.1(w) - n
14.1(d) - n
14.2(x) - n
14.2(w) - n
14.2(d) - n
15.1A - y
15.1B - n
15.1C - n
15.2 - i
16A(x) - y
16A(w) - y

WET Input Dataset for Site 3

16A(d) - y	31.3(x) - n	36.1.1(x) - n	43B(d) - n
16B(x) - n	31.3(w) - n	36.1.1(w) - n	43C(x) - n
16B(w) - n	31.3(d) - n	36.1.1(d) - n	43C(w) - n
16B(d) - n	31.4(x) - i	36.1.2(x) - y	43C(d) - n
16C(x) - n	31.4(w) - i	36.1.2(w) - y	43D(x) - n
16C(w) - n	31.4(d) - i	36.1.2(d) - y	43D(w) - n
16C(d) - n	31.5(x) - y	36.2.1(x) - y	43D(d) - n
17 - n	31.5(w) - y	36.2.1(w) - y	43E(x) - n
18 - y	31.5(d) - y	36.2.1(d) - y	43E(w) - n
19.1A - i	31.6A(x) - n	36.2.2(x) - y	43E(d) - n
19.1B - n	31.6A(w) - n	36.2.2(w) - y	43F(x) - n
19.2 - n	31.6A(d) - n	36.2.2(d) - y	43F(w) - n
19.3 - n	31.6B(x) - n	36.2.3(x) - n	43F(d) - n
20.1 - i	31.6B(w) - n	36.2.3(w) - n	43G(x) - n
20.2 - i	31.6B(d) - n	36.2.3(d) - n	43G(w) - n
21A - y	31.6C(x) - n	37 - y	43G(d) - n
21B - n	31.6C(w) - n	38.1 - n	43H(x) - n
21C - n	31.6C(d) - n	38.2 - y	43H(w) - n
21D - n	31.6D(x) - n	38.3 - n	43H(d) - n
21E - n	31.6D(w) - n	38.4 - n	43I(x) - n
22.1.1 - y	31.6D(d) - n	38.5 - n	43I(w) - n
22.1.2 - i	31.6E(x) - y	38.6 - n	43I(d) - n
22.2 - n	31.6E(w) - y	38.7 - y	44A(x) - n
22.3 - n	31.6E(d) - y	38.8 - i	44A(w) - n
23 - y	32A - n	39 - y	44A(d) - n
24.1 - i	32B - n	40.1 - n	44B(x) - n
24.2 - n	32C - n	40.2 - y	44B(w) - n
24.3 - n	32D - n	41.1 - i	44B(d) - y
24.4 - y	32E - y	41.2 - i	44C(x) - n
24.5 - n	32F - n	42.1.1(x) - y	44C(w) - n
25.1 - n	32G - n	42.1.1(w) - y	44C(d) - n
25.2A - i	32H - n	42.1.1(d) - y	44D(x) - y
25.2B - i	32I - n	42.1.2(x) - n	44D(w) - n
25.3 - n	32J - n	42.1.2(w) - n	44D(d) - n
26.1 - y	32K - n	42.1.2(d) - n	44E(x) - n
26.2 - y	33A - n	42.1.3(x) - n	44E(w) - y
26.3 - n	33B - n	42.1.3(w) - n	44E(d) - n
27.1 - y	33C - n	42.1.3(d) - n	44F(x) - n
27.2 - y	33D - n	42.2.1(x) - y	44F(w) - n
27.3 - n	33E - y	42.2.1(w) - y	44F(d) - n
28 - y	33F - n	42.2.1(d) - y	44G(x) - n
29.1 - y	33G - n	42.2.2(x) - n	44G(w) - n
29.2 - y	33H - n	42.2.2(w) - n	44G(d) - n
30(x) - n	33I - n	42.2.2(d) - n	44H(x) - n
30(w) - n	33J - n	42.2.3(x) - n	44H(w) - n
30(d) - n	33K - n	42.2.3(w) - n	44H(d) - n
31.1(x) - y	34.1 - n	42.2.3(d) - n	44I(x) - n
31.1(w) - y	34.2 - y	43A(x) - y	44I(w) - n
31.1(d) - y	34.3.1 - n	43A(w) - n	44I(d) - n
31.2(x) - y	34.3.2 - i	43A(d) - y	45A - n
31.2(w) - y	35.1 - y	43B(x) - n	45B - n
31.2(d) - y	35.2 - i	43B(w) - y	45C - y

WET Input Dataset for Site 3

45D - n	48B(w) - n	49.2(x) - n	55.3 - u
45E - n	48B(d) - n	49.2(w) - n	55.4 - u
45F - n	48C(x) - n	49.2(d) - n	56.1 - u
45G - n	48C(w) - n	49.3(x) - n	56.2 - u
46A(x) - y	48C(d) - n	49.3(w) - n	57.1 - u
46A(w) - y	48D(x) - n	49.3(d) - n	57.2 - u
46A(d) - y	48D(w) - n	50(x) - n	58 - u
46B(x) - n	48D(d) - n	50(w) - n	59.1 - u
46B(w) - n	48E(x) - n	50(d) - n	59.2 - u
46B(d) - n	48E(w) - n	51.1 - u	60 - u
46C(x) - n	48E(d) - n	51.2 - u	61 - u
46C(w) - n	48F(x) - n	52.1 - u	62 - u
46C(d) - n	48F(w) - n	52.2 - u	63.1 - u
47A - y	48F(d) - n	53.1 - u	63.2 - u
47B - n	49.1.1(x) - n	53.2 - u	64 - u
47C - n	49.1.1(w) - n	54(x) - u	CR - u
48A(x) - y	49.1.1(d) - n	54(w) - u	1 - u
48A(w) - y	49.1.2(x) - n	54(d) - u	2 - u
48A(d) - y	49.1.2(w) - n	55.1 - u	3 - u
48B(x) - n	49.1.2(d) - n	55.2 - u	4 - u

WET Input Dataset for Site 4

s1 - y	6.2 - y	12Be(w) - n	13Ba(d) - n
s2 - n	7 - y	12Be(d) - n	13Bb(x) - n
s3 - n	8.1 - y	12C(x) - n	13Bb(w) - n
s4 - n	8.2 - n	12C(w) - n	13Bb(d) - n
s5 - n	8.3 - y	12C(d) - n	13Bc(x) - y
s6 - n	8.4 - n	12Ca(x) - n	13Bc(w) - y
s7 - n	9.1 - y	12Ca(w) - n	13Bc(d) - y
s8 - y	9.2 - y	12Ca(d) - n	13Bd(x) - n
s9 - y	9.3 - y	12Cb(x) - n	13Bd(w) - n
s10 - n	10A - y	12Cb(w) - n	13Bd(d) - n
s11 - n	10B - n	12Cb(d) - n	13Be(x) - n
s12 - n	10C - n	12Cc(x) - n	13Be(w) - n
s13 - n	10D - n	12Cc(w) - n	13Be(d) - n
s14 - n	10E - n	12Cc(d) - n	13C(x) - n
s15 - y	10F - n	12Cd(x) - n	13C(w) - n
s16 - y	11(x) - n	12Cd(w) - n	13C(d) - n
s17 - n	11(w) - n	12Cd(d) - n	13Ca(x) - n
s18 - y	11(d) - n	12D(x) - n	13Ca(w) - n
s19 - n	12A(x) - n	12D(w) - n	13Ca(d) - n
s20 - n	12A(w) - n	12D(d) - n	13Cb(x) - n
s21 - y	12A(d) - n	12Da(x) - n	13Cb(w) - n
s22 - i	12Aa(x) - n	12Da(w) - n	13Cb(d) - n
s23 - n	12Aa(w) - n	12Da(d) - n	13Cc(x) - n
s24 - n	12Aa(d) - n	12Db(x) - n	13Cc(w) - n
s25 - n	12Ab(x) - n	12Db(w) - n	13Cc(d) - n
s26 - n	12Ab(w) - n	12Db(d) - n	13Cd(x) - n
s27 - n	12Ab(d) - n	12E(x) - n	13Cd(w) - n
s28 - n	12Ac(x) - n	12E(w) - n	13Cd(d) - n
s29 - n	12Ac(w) - n	12E(d) - n	13D(x) - n
s30 - y	12Ac(d) - n	13A(x) - n	13D(w) - n
s31 - y	12Ad(x) - n	13A(w) - n	13D(d) - n
1.1 - n	12Ad(w) - n	13A(d) - n	13Da(x) - n
1.2 - y	12Ad(d) - n	13Aa(x) - n	13Da(w) - n
1.3 - n	12Ae(x) - n	13Aa(w) - n	13Da(d) - n
2.1.1 - n	12Ae(w) - n	13Aa(d) - n	13Db(x) - n
2.1.2 - n	12Ae(d) - n	13Ab(x) - n	13Db(w) - n
2.1.3 - n	12B(x) - y	13Ab(w) - n	13Db(d) - n
2.2.1 - y	12B(w) - y	13Ab(d) - n	13E(x) - n
2.2.2 - n	12B(d) - y	13Ac(x) - n	13E(w) - n
3.1 - y	12Ba(x) - n	13Ac(w) - n	13E(d) - n
3.2 - n	12Ba(w) - n	13Ac(d) - n	14.1(x) - n
3.3 - y	12Ba(d) - n	13Ad(x) - n	14.1(w) - n
4.1 - n	12Bb(x) - n	13Ad(w) - n	14.1(d) - n
4.2A - n	12Bb(w) - n	13Ad(d) - n	14.2(x) - n
4.2B - y	12Bb(d) - n	13Ae(x) - n	14.2(w) - n
4.2C - n	12Bc(x) - y	13Ae(w) - n	14.2(d) - n
4.2D - n	12Bc(w) - y	13Ae(d) - n	15.1A - y
5.1.1 - y	12Bc(d) - y	13B(x) - y	15.1B - n
5.1.2 - n	12Bd(x) - n	13B(w) - y	15.1C - n
5.2 - y	12Bd(w) - n	13B(d) - y	15.2 - i
blank - u	12Bd(d) - n	13Ba(x) - n	16A(x) - y
6.1 - n	12Be(x) - n	13Ba(w) - n	16A(w) - y

WET Input Dataset for Site 4

16A(d) - y
16B(x) - n
16B(w) - n
16B(d) - n
16C(x) - n
16C(w) - n
16C(d) - n
17 - n
18 - y
19.1A - y
19.1B - n
19.2 - n
19.3 - n
20.1 - i
20.2 - i
21A - y
21B - n
21C - n
21D - n
21E - n
22.1.1 - y
22.1.2 - i
22.2 - n
22.3 - n
23 - y
24.1 - i
24.2 - n
24.3 - n
24.4 - y
24.5 - n
25.1 - n
25.2A - i
25.2B - i
25.3 - n
26.1 - n
26.2 - i
26.3 - i
27.1 - y
27.2 - y
27.3 - n
28 - n
29.1 - y
29.2 - y
30(x) - n
30(w) - n
30(d) - n
31.1(x) - y
31.1(w) - y
31.1(d) - y
31.2(x) - y
31.2(w) - y
31.2(d) - y
31.3(x) - n
31.3(w) - n
31.3(d) - n
31.4(x) - i
31.4(w) - i
31.4(d) - i
31.5(x) - y
31.5(w) - y
31.5(d) - y
31.6A(x) - n
31.6A(w) - n
31.6A(d) - n
31.6B(x) - y
31.6B(w) - y
31.6B(d) - y
31.6C(x) - n
31.6C(w) - n
31.6C(d) - n
31.6D(x) - y
31.6D(w) - y
31.6D(d) - y
31.6E(x) - n
31.6E(w) - n
31.6E(d) - n
32A - y
32B - n
32C - n
32D - n
32E - n
32F - n
32G - y
32H - n
32I - n
32J - n
32K - n
33A - n
33B - n
33C - n
33D - n
33E - n
33F - n
33G - y
33H - n
33I - n
33J - n
33K - n
34.1 - n
34.2 - n
34.3.1 - y
34.3.2 - n
35.1 - y
35.2 - i
36.1.1(x) - n
36.1.1(w) - n
36.1.1(d) - n
36.1.2(x) - y
36.1.2(w) - y
36.1.2(d) - y
36.2.1(x) - n
36.2.1(w) - n
36.2.1(d) - n
36.2.2(x) - n
36.2.2(w) - n
36.2.2(d) - n
36.2.3(x) - n
36.2.3(w) - n
36.2.3(d) - n
37 - n
38.1 - n
38.2 - y
38.3 - n
38.4 - n
38.5 - n
38.6 - n
38.7 - y
38.8 - i
39 - y
40.1 - n
40.2 - y
41.1 - i
41.2 - i
42.1.1(x) - y
42.1.1(w) - y
42.1.1(d) - y
42.1.2(x) - n
42.1.2(w) - n
42.1.2(d) - n
42.1.3(x) - n
42.1.3(w) - n
42.1.3(d) - n
42.2.1(x) - y
42.2.1(w) - y
42.2.1(d) - y
42.2.2(x) - n
42.2.2(w) - n
42.2.2(d) - n
42.2.3(x) - n
42.2.3(w) - n
42.2.3(d) - n
43A(x) - n
43A(w) - n
43A(d) - y
43B(x) - y
43B(w) - n
43B(d) - n
43C(x) - n
43C(w) - n
43C(d) - n
43D(x) - n
43D(w) - n
43D(d) - n
43E(x) - n
43E(w) - y
43E(d) - n
43F(x) - n
43F(w) - n
43F(d) - n
43G(x) - n
43G(w) - n
43G(d) - n
43H(x) - n
43H(w) - n
43H(d) - n
43I(x) - n
43I(w) - n
43I(d) - n
44A(x) - n
44A(w) - n
44A(d) - n
44B(x) - n
44B(w) - n
44B(d) - n
44C(x) - n
44C(w) - n
44C(d) - y
44D(x) - y
44D(w) - n
44D(d) - n
44E(x) - n
44E(w) - y
44E(d) - n
44F(x) - n
44F(w) - n
44F(d) - n
44G(x) - n
44G(w) - n
44G(d) - n
44H(x) - n
44H(w) - n
44H(d) - n
44I(x) - n
44I(w) - n
44I(d) - n
45A - n
45B - n
45C - y

WET Input Dataset for Site 4

45D - n	48B(w) - n	49.2(x) - y	55.3 - u
45E - n	48B(d) - n	49.2(w) - y	55.4 - u
45F - n	48C(x) - n	49.2(d) - y	56.1 - u
45G - n	48C(w) - n	49.3(x) - n	56.2 - u
46A(x) - y	48C(d) - n	49.3(w) - n	57.1 - u
46A(w) - y	48D(x) - n	49.3(d) - n	57.2 - u
46A(d) - y	48D(w) - n	50(x) - n	58 - u
46B(x) - n	48D(d) - n	50(w) - n	59.1 - u
46B(w) - n	48E(x) - n	50(d) - n	59.2 - u
46B(d) - n	48E(w) - n	51.1 - u	60 - u
46C(x) - n	48E(d) - n	51.2 - u	61 - u
46C(w) - n	48F(x) - n	52.1 - u	62 - u
46C(d) - n	48F(w) - n	52.2 - u	63.1 - u
47A - y	48F(d) - n	53.1 - u	63.2 - u
47B - n	49.1.1(x) - y	53.2 - u	64 - u
47C - n	49.1.1(w) - y	54(x) - u	CR - u
48A(x) - y	49.1.1(d) - y	54(w) - u	1 - u
48A(w) - y	49.1.2(x) - n	54(d) - u	2 - u
48A(d) - y	49.1.2(w) - n	55.1 - u	3 - u
48B(x) - n	49.1.2(d) - n	55.2 - u	4 - u

WET Input Dataset for Site 5

s1 - y	6.2 - y	12Be(w) - n	13Ba(d) - n
s2 - n	7 - y	12Be(d) - n	13Bb(x) - n
s3 - n	8.1 - n	12C(x) - n	13Bb(w) - n
s4 - n	8.2 - y	12C(w) - n	13Bb(d) - n
s5 - n	8.3 - n	12C(d) - n	13Bc(x) - n
s6 - n	8.4 - y	12Ca(x) - n	13Bc(w) - n
s7 - n	9.1 - y	12Ca(w) - n	13Bc(d) - n
s8 - y	9.2 - y	12Ca(d) - n	13Bd(x) - n
s9 - y	9.3 - y	12Cb(x) - n	13Bd(w) - n
s10 - n	10A - n	12Cb(w) - n	13Bd(d) - n
s11 - n	10B - y	12Cb(d) - n	13Be(x) - n
s12 - n	10C - n	12Cc(x) - n	13Be(w) - n
s13 - n	10D - n	12Cc(w) - n	13Be(d) - n
s14 - n	10E - n	12Cc(d) - n	13C(x) - n
s15 - y	10F - n	12Cd(x) - n	13C(w) - n
s16 - y	11(x) - n	12Cd(w) - n	13C(d) - n
s17 - n	11(w) - n	12Cd(d) - n	13Ca(x) - n
s18 - y	11(d) - n	12D(x) - y	13Ca(w) - n
s19 - n	12A(x) - n	12D(w) - y	13Ca(d) - n
s20 - n	12A(w) - n	12D(d) - y	13Cb(x) - n
s21 - y	12A(d) - n	12Da(x) - y	13Cb(w) - n
s22 - i	12Aa(x) - n	12Da(w) - y	13Cb(d) - n
s23 - n	12Aa(w) - n	12Da(d) - y	13Cc(x) - n
s24 - n	12Aa(d) - n	12Db(x) - n	13Cc(w) - n
s25 - n	12Ab(x) - n	12Db(w) - n	13Cc(d) - n
s26 - n	12Ab(w) - n	12Db(d) - n	13Cd(x) - n
s27 - n	12Ab(d) - n	12E(x) - n	13Cd(w) - n
s28 - n	12Ac(x) - n	12E(w) - n	13Cd(d) - n
s29 - n	12Ac(w) - n	12E(d) - n	13D(x) - n
s30 - y	12Ac(d) - n	13A(x) - y	13D(w) - n
s31 - y	12Ad(x) - n	13A(w) - y	13D(d) - n
1.1 - n	12Ad(w) - n	13A(d) - y	13Da(x) - n
1.2 - y	12Ad(d) - n	13Aa(x) - n	13Da(w) - n
1.3 - n	12Ae(x) - n	13Aa(w) - n	13Da(d) - n
2.1.1 - n	12Ae(w) - n	13Aa(d) - n	13Db(x) - n
2.1.2 - y	12Ae(d) - n	13Ab(x) - n	13Db(w) - n
2.1.3 - n	12B(x) - n	13Ab(w) - n	13Db(d) - n
2.2.1 - n	12B(w) - n	13Ab(d) - n	13E(x) - n
2.2.2 - y	12B(d) - n	13Ac(x) - n	13E(w) - n
3.1 - y	12Ba(x) - n	13Ac(w) - n	13E(d) - n
3.2 - n	12Ba(w) - n	13Ac(d) - n	14.1(x) - n
3.3 - y	12Ba(d) - n	13Ad(x) - n	14.1(w) - n
4.1 - n	12Bb(x) - n	13Ad(w) - n	14.1(d) - n
4.2A - n	12Bb(w) - n	13Ad(d) - n	14.2(x) - n
4.2B - y	12Bb(d) - n	13Ae(x) - y	14.2(w) - n
4.2C - n	12Bc(x) - n	13Ae(w) - y	14.2(d) - n
4.2D - n	12Bc(w) - n	13Ae(d) - y	15.1A - y
5.1.1 - y	12Bc(d) - n	13B(x) - n	15.1B - n
5.1.2 - n	12Bd(x) - n	13B(w) - n	15.1C - n
5.2 - n	12Bd(w) - n	13B(d) - n	15.2 - i
blank - u	12Bd(d) - n	13Ba(x) - n	16A(x) - y
6.1 - n	12Be(x) - n	13Ba(w) - n	16A(w) - y

WET Input Dataset for Site 5

16A(d) - y	31.3(x) - y	36.1.1(x) - n	43B(d) - n
16B(x) - n	31.3(w) - y	36.1.1(w) - n	43C(x) - n
16B(w) - n	31.3(d) - y	36.1.1(d) - n	43C(w) - n
16B(d) - n	31.4(x) - i	36.1.2(x) - y	43C(d) - n
16C(x) - n	31.4(w) - i	36.1.2(w) - y	43D(x) - n
16C(w) - n	31.4(d) - i	36.1.2(d) - y	43D(w) - n
16C(d) - n	31.5(x) - y	36.2.1(x) - n	43D(d) - n
17 - n	31.5(w) - y	36.2.1(w) - n	43E(x) - n
18 - y	31.5(d) - y	36.2.1(d) - n	43E(w) - y
19.1A - y	31.6A(x) - n	36.2.2(x) - n	43E(d) - n
19.1B - n	31.6A(w) - n	36.2.2(w) - n	43F(x) - n
19.2 - n	31.6A(d) - n	36.2.2(d) - n	43F(w) - n
19.3 - n	31.6B(x) - n	36.2.3(x) - n	43F(d) - n
20.1 - y	31.6B(w) - n	36.2.3(w) - n	43G(x) - n
20.2 - n	31.6B(d) - n	36.2.3(d) - n	43G(w) - n
21A - y	31.6C(x) - n	37 - n	43G(d) - n
21B - n	31.6C(w) - n	38.1 - n	43H(x) - n
21C - n	31.6C(d) - n	38.2 - y	43H(w) - n
21D - n	31.6D(x) - y	38.3 - n	43H(d) - n
21E - n	31.6D(w) - y	38.4 - n	43I(x) - n
22.1.1 - y	31.6D(d) - y	38.5 - n	43I(w) - n
22.1.2 - n	31.6E(x) - n	38.6 - n	43I(d) - n
22.2 - n	31.6E(w) - n	38.7 - y	44A(x) - y
22.3 - n	31.6E(d) - n	38.8 - i	44A(w) - n
23 - y	32A - n	39 - y	44A(d) - y
24.1 - i	32B - n	40.1 - n	44B(x) - n
24.2 - n	32C - n	40.2 - y	44B(w) - n
24.3 - y	32D - n	41.1 - i	44B(d) - n
24.4 - y	32E - n	41.2 - i	44C(x) - n
24.5 - n	32F - n	42.1.1(x) - y	44C(w) - y
25.1 - n	32G - y	42.1.1(w) - y	44C(d) - n
25.2A - i	32H - n	42.1.1(d) - y	44D(x) - n
25.2B - i	32I - n	42.1.2(x) - n	44D(w) - n
25.3 - n	32J - n	42.1.2(w) - n	44D(d) - n
26.1 - n	32K - n	42.1.2(d) - n	44E(x) - n
26.2 - i	33A - n	42.1.3(x) - n	44E(w) - n
26.3 - i	33B - n	42.1.3(w) - n	44E(d) - n
27.1 - y	33C - n	42.1.3(d) - n	44F(x) - n
27.2 - y	33D - n	42.2.1(x) - y	44F(w) - n
27.3 - n	33E - n	42.2.1(w) - y	44F(d) - n
28 - n	33F - n	42.2.1(d) - y	44G(x) - n
29.1 - y	33G - y	42.2.2(x) - n	44G(w) - n
29.2 - y	33H - n	42.2.2(w) - n	44G(d) - n
30(x) - n	33I - n	42.2.2(d) - n	44H(x) - n
30(w) - n	33J - n	42.2.3(x) - n	44H(w) - n
30(d) - n	33K - n	42.2.3(w) - n	44H(d) - n
31.1(x) - y	34.1 - n	42.2.3(d) - n	44I(x) - n
31.1(w) - y	34.2 - n	43A(x) - n	44I(w) - n
31.1(d) - y	34.3.1 - y	43A(w) - n	44I(d) - n
31.2(x) - y	34.3.2 - n	43A(d) - y	45A - n
31.2(w) - y	35.1 - y	43B(x) - y	45B - n
31.2(d) - y	35.2 - y	43B(w) - n	45C - y

WET Input Dataset for Site 5

45D - n	48B(w) - n	49.2(x) - y	55.3 - u
45E - n	48B(d) - n	49.2(w) - y	55.4 - u
45F - n	48C(x) - n	49.2(d) - y	56.1 - u
45G - n	48C(w) - n	49.3(x) - n	56.2 - u
46A(x) - y	48C(d) - n	49.3(w) - n	57.1 - u
46A(w) - y	48D(x) - n	49.3(d) - n	57.2 - u
46A(d) - y	48D(w) - n	50(x) - n	58 - u
46B(x) - n	48D(d) - n	50(w) - n	59.1 - u
46B(w) - n	48E(x) - n	50(d) - n	59.2 - u
46B(d) - n	48E(w) - n	51.1 - u	60 - u
46C(x) - n	48E(d) - n	51.2 - u	61 - u
46C(w) - n	48F(x) - n	52.1 - u	62 - u
46C(d) - n	48F(w) - n	52.2 - u	63.1 - u
47A - y	48F(d) - n	53.1 - u	63.2 - u
47B - n	49.1.1(x) - y	53.2 - u	64 - u
47C - n	49.1.1(w) - y	54(x) - u	CR - u
48A(x) - y	49.1.1(d) - y	54(w) - u	1 - u
48A(w) - y	49.1.2(x) - n	54(d) - u	2 - u
48A(d) - y	49.1.2(w) - n	55.1 - u	3 - u
48B(x) - n	49.1.2(d) - n	55.2 - u	4 - u

WET Input Dataset for Site 17

s1 - n	6.2 - y	12Be(w) - n	13Ba(d) - n
s2 - n	7 - y	12Be(d) - n	13Bb(x) - n
s3 - n	8.1 - n	12C(x) - n	13Bb(w) - n
s4 - n	8.2 - y	12C(w) - n	13Bb(d) - n
s5 - n	8.3 - n	12C(d) - n	13Bc(x) - n
s6 - n	8.4 - y	12Ca(x) - n	13Bc(w) - n
s7 - n	9.1 - y	12Ca(w) - n	13Bc(d) - n
s8 - y	9.2 - n	12Ca(d) - n	13Bd(x) - n
s9 - n	9.3 - y	12Cb(x) - n	13Bd(w) - n
s10 - n	10A - n	12Cb(w) - n	13Bd(d) - n
s11 - n	10B - y	12Cb(d) - n	13Be(x) - n
s12 - n	10C - n	12Cc(x) - n	13Be(w) - n
s13 - n	10D - n	12Cc(w) - n	13Be(d) - n
s14 - n	10E - n	12Cc(d) - n	13C(x) - n
s15 - y	10F - n	12Cd(x) - n	13C(w) - n
s16 - y	11(x) - n	12Cd(w) - n	13C(d) - n
s17 - n	11(w) - n	12Cd(d) - n	13Ca(x) - n
s18 - n	11(d) - n	12D(x) - n	13Ca(w) - n
s19 - n	12A(x) - y	12D(w) - n	13Ca(d) - n
s20 - n	12A(w) - y	12D(d) - n	13Cb(x) - n
s21 - y	12A(d) - y	12Da(x) - n	13Cb(w) - n
s22 - i	12Aa(x) - n	12Da(w) - n	13Cb(d) - n
s23 - n	12Aa(w) - n	12Da(d) - n	13Cc(x) - n
s24 - n	12Aa(d) - n	12Db(x) - n	13Cc(w) - n
s25 - n	12Ab(x) - n	12Db(w) - n	13Cc(d) - n
s26 - n	12Ab(w) - n	12Db(d) - n	13Cd(x) - n
s27 - n	12Ab(d) - n	12E(x) - n	13Cd(w) - n
s28 - n	12Ac(x) - n	12E(w) - n	13Cd(d) - n
s29 - n	12Ac(w) - n	12E(d) - n	13D(x) - y
s30 - y	12Ac(d) - n	13A(x) - n	13D(w) - y
s31 - y	12Ad(x) - n	13A(w) - n	13D(d) - y
1.1 - n	12Ad(w) - n	13A(d) - n	13Da(x) - y
1.2 - y	12Ad(d) - n	13Aa(x) - n	13Da(w) - y
1.3 - n	12Ae(x) - y	13Aa(w) - n	13Da(d) - y
2.1.1 - n	12Ae(w) - y	13Aa(d) - n	13Db(x) - n
2.1.2 - n	12Ae(d) - y	13Ab(x) - n	13Db(w) - n
2.1.3 - n	12B(x) - n	13Ab(w) - n	13Db(d) - n
2.2.1 - n	12B(w) - n	13Ab(d) - n	13E(x) - n
2.2.2 - y	12B(d) - n	13Ac(x) - n	13E(w) - n
3.1 - y	12Ba(x) - n	13Ac(w) - n	13E(d) - n
3.2 - n	12Ba(w) - n	13Ac(d) - n	14.1(x) - n
3.3 - y	12Ba(d) - n	13Ad(x) - n	14.1(w) - n
4.1 - n	12Bb(x) - n	13Ad(w) - n	14.1(d) - n
4.2A - n	12Bb(w) - n	13Ad(d) - n	14.2(x) - n
4.2B - y	12Bb(d) - n	13Ae(x) - n	14.2(w) - n
4.2C - n	12Bc(x) - n	13Ae(w) - n	14.2(d) - n
4.2D - n	12Bc(w) - n	13Ae(d) - n	15.1A - y
5.1.1 - y	12Bc(d) - n	13B(x) - n	15.1B - n
5.1.2 - n	12Bd(x) - n	13B(w) - n	15.1C - n
5.2 - y	12Bd(w) - n	13B(d) - n	15.2 - i
blank - u	12Bd(d) - n	13Ba(x) - n	16A(x) - y
6.1 - n	12Be(x) - n	13Ba(w) - n	16A(w) - y

WET Input Dataset for Site 17

16A(d) - y
16B(x) - n
16B(w) - n
16B(d) - n
16C(x) - n
16C(w) - n
16C(d) - n
17 - n
18 - y
19.1A - i
19.1B - n
19.2 - n
19.3 - n
20.1 - i
20.2 - i
21A - y
21B - n
21C - n
21D - n
21E - n
22.1.1 - y
22.1.2 - i
22.2 - n
22.3 - n
23 - y
24.1 - i
24.2 - n
24.3 - n
24.4 - y
24.5 - n
25.1 - n
25.2A - i
25.2B - i
25.3 - n
26.1 - y
26.2 - y
26.3 - n
27.1 - y
27.2 - y
27.3 - n
28 - n
29.1 - y
29.2 - y
30(x) - n
30(w) - n
30(d) - n
31.1(x) - y
31.1(w) - y
31.1(d) - y
31.2(x) - n
31.2(w) - n
31.2(d) - n
31.3(x) - n
31.3(w) - n
31.3(d) - n
31.4(x) - i
31.4(w) - i
31.4(d) - i
31.5(x) - y
31.5(w) - y
31.5(d) - y
31.6A(x) - n
31.6A(w) - n
31.6A(d) - n
31.6B(x) - y
31.6B(w) - y
31.6B(d) - y
31.6C(x) - n
31.6C(w) - n
31.6C(d) - n
31.6D(x) - n
31.6D(w) - n
31.6D(d) - n
31.6E(x) - n
31.6E(w) - n
31.6E(d) - n
32A - n
32B - n
32C - n
32D - n
32E - y
32F - n
32G - n
32H - n
32I - n
32J - n
32K - n
33A - n
33B - n
33C - n
33D - n
33E - y
33F - n
33G - n
33H - n
33I - n
33J - n
33K - n
34.1 - n
34.2 - y
34.3.1 - n
34.3.2 - i
35.1 - n
35.2 - i
36.1.1(x) - n
36.1.1(w) - n
36.1.1(d) - n
36.1.2(x) - y
36.1.2(w) - y
36.1.2(d) - y
36.2.1(x) - y
36.2.1(w) - y
36.2.1(d) - y
36.2.2(x) - n
36.2.2(w) - n
36.2.2(d) - n
36.2.3(x) - n
36.2.3(w) - n
36.2.3(d) - n
37 - n
38.1 - n
38.2 - y
38.3 - n
38.4 - n
38.5 - n
38.6 - n
38.7 - y
38.8 - i
39 - y
40.1 - n
40.2 - y
41.1 - i
41.2 - i
42.1.1(x) - y
42.1.1(w) - y
42.1.1(d) - y
42.1.2(x) - n
42.1.2(w) - n
42.1.2(d) - n
42.1.3(x) - n
42.1.3(w) - n
42.1.3(d) - n
42.2.1(x) - y
42.2.1(w) - y
42.2.1(d) - y
42.2.2(x) - n
42.2.2(w) - n
42.2.2(d) - n
42.2.3(x) - n
42.2.3(w) - n
42.2.3(d) - n
43A(x) - y
43A(w) - n
43A(d) - y
43B(x) - n
43B(w) - y
43B(d) - n
43C(x) - n
43C(w) - n
43C(d) - n
43D(x) - n
43D(w) - n
43D(d) - n
43E(x) - n
43E(w) - n
43E(d) - n
43F(x) - n
43F(w) - n
43F(d) - n
43G(x) - n
43G(w) - n
43G(d) - n
43H(x) - n
43H(w) - n
43H(d) - n
43I(x) - n
43I(w) - n
43I(d) - n
44A(x) - n
44A(w) - n
44A(d) - n
44B(x) - n
44B(w) - n
44B(d) - y
44C(x) - n
44C(w) - n
44C(d) - n
44D(x) - y
44D(w) - n
44D(d) - n
44E(x) - n
44E(w) - y
44E(d) - n
44F(x) - n
44F(w) - n
44F(d) - n
44G(x) - n
44G(w) - n
44G(d) - n
44H(x) - n
44H(w) - n
44H(d) - n
44I(x) - n
44I(w) - n
44I(d) - n
45A - n
45B - n
45C - y

WET Input Dataset for Site 17

45D - n	48B(w) - n	49.2(x) - n	55.3 - u
45E - n	48B(d) - n	49.2(w) - n	55.4 - u
45F - n	48C(x) - n	49.2(d) - n	56.1 - u
45G - n	48C(w) - n	49.3(x) - n	56.2 - u
46A(x) - y	48C(d) - n	49.3(w) - n	57.1 - u
46A(w) - y	48D(x) - n	49.3(d) - n	57.2 - u
46A(d) - y	48D(w) - n	50(x) - n	58 - u
46B(x) - n	48D(d) - n	50(w) - n	59.1 - u
46B(w) - n	48E(x) - n	50(d) - n	59.2 - u
46B(d) - n	48E(w) - n	51.1 - u	60 - u
46C(x) - n	48E(d) - n	51.2 - u	61 - u
46C(w) - n	48F(x) - n	52.1 - u	62 - u
46C(d) - n	48F(w) - n	52.2 - u	63.1 - u
47A - y	48F(d) - n	53.1 - u	63.2 - u
47B - n	49.1.1(x) - n	53.2 - u	64 - u
47C - n	49.1.1(w) - n	54(x) - u	CR - u
48A(x) - y	49.1.1(d) - n	54(w) - u	1 - u
48A(w) - y	49.1.2(x) - n	54(d) - u	2 - u
48A(d) - y	49.1.2(w) - n	55.1 - u	3 - u
48B(x) - n	49.1.2(d) - n	55.2 - u	4 - u