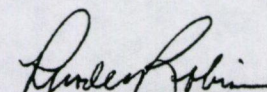


TRAIL RIDGE LANDFILL

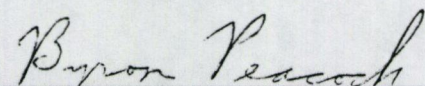
MONITORING REPORT OF WETLANDS
ADJACENT TO CLASS I STORMWATER POND

#1

January 1993



SUPERVISOR



PROJECT SCIENTIST

ENVIRONMENTAL SERVICES, INC.
8711 PERIMETER PARK BOULEVARD, SUITE 11
JACKSONVILLE, FLORIDA 32216

(904) 645-9900

TRAIL RIDGE LANDFILL

**MONITORING REPORT OF WETLANDS
ADJACENT TO CLASS I STORMWATER POND**

I. INTRODUCTION

The Florida Department of Environmental Regulation (DER) has required that the wetlands adjacent to the Class I stormwater pond be monitored in order to determine if there are any detrimental changes to the wetland vegetation or hydrology due to construction and operation of the pond. The monitoring work is required pursuant to condition #48 in permit SC 16-184444 (I.D. #1GMS3116P03090). A copy of this permit condition is included as attachment A.

On 3 January 1992 a baseline study was completed to establish the site conditions prior to pond construction. The following report summarizes the findings of the first of five annual studies subsequent to the base line report. Field data was collected from December 1992 through 15 January 1993. This report includes a description of the stormwater pond and wetland irrigation system, the adjacent wetlands, and the monitoring transects with vegetative sampling plots and piezometers.

II. STORMWATER POND AND WETLAND IRRIGATION SYSTEM

The Class I stormwater pond was constructed east of the Class I landfill cell within the Trail Ridge Landfill (Figure 1). Construction of the pond commenced in January 1992 and was completed in September/October 1992.

Figure 4 is a typical cross-sectional view through the edge of the pond. The pond bottom was excavated to elevation +80.0 feet. There is a 62 foot-wide berm surrounding the pond. The top of the berm was constructed at elevation +112.0 feet. The normal water level is designed to be at elevation +104.0 feet. Following certain storm events the main pond discharges to the south into a smaller dispersion pond. For a detailed description of the design and operation of the Class I stormwater pond, please refer to the engineering plans for the landfill.

There is an 8-inch diameter PVC force main pipe extending along the outer edge of the basin of the main pond (Figure 4). Sections of 2 inch diameter PVC pipe extend at right angles from the force main at intervals, as indicated on the plan. A valve was installed near the connection of the 8 inch and 2 inch PVC pipes to control the flow of water. At the opposite end, the 2 inch PVC pipes connects with 20 foot lengths of perforated 2 inch diameter PVC pipe (spreader pipes). Water discharges from the spreader pipes through 3/8 inch diameter holes. There are two holes per ring with each rings spaced three inches on center. The spreader pipes were installed approximately five (5) feet landward of the wetland jurisdiction line. No portion of the wetland irrigation system extends directly into the wetlands. The flow of water from the spreader pipes has been adjusted to prevent erosion downstream. Based on the results of the second monitoring report, the rate of discharge will be modified further in order to provide irrigation where it is most needed.

The wetlands adjacent to the stormwater pond will be monitored annually for an additional three years until January 1996 in order to detect any potential draw down to the water table. If there is a significant drawdown, water will be pumped into the force main and discharged through the spreader pipes at a controlled rate. The rate of discharge will be regularly adjusted (at the valves) so that the adjacent wetlands will have a more natural hydroperiod.

III. ADJACENT WETLANDS

A. Drainage Pattern

Wetlands border the stormwater pond to the south (wetland A), east (wetland B) and north (wetland c). These wetlands drain off-site to the east. Some of the water eventually flows to the north into Deep Creek, which is a tributary of St. Mary's River. Some of the water eventually flows to the south into Long Branch, which is a tributary of the North Fork of Black Creek.

The primary source of water for the wetlands on-site is ground water seepage. A portion of the rain that falls on the uplands along Trail Ridge enters the surficial water table and begins to flow down slope. The wetlands occur where the ground surface intercepts the seasonal high water table. Over time some of the wetlands have eroded uphill into Trail Ridge and formed relatively broad, linear drainageways, oriented east/west and perpendicular to the center line of the ridge. Part way downslope the wetland drainages broaden and connect with each other, forming a large wetland complex (Hell's Bay).

The wetlands located to the south and east of the Class I stormwater pond (wetlands A and B) are an example of this type of drainage pattern. The upstream drainage basin for this wetland is relatively large (700± acres). Considering the size of the Class I stormwater pond, any potential draw down effect should be relatively minor to those wetlands.

Other wetlands occur as essentially isolated pockets on the side of the slope. These wetlands may have formed where less permeable layers are located close to the surface. Such layers may consist of silt, loam, clay or a cemented spodic horizon (hardpan). These layers can create a perched water table during the rainy season, but otherwise the water table may occur far below the surface during drier seasons. Other isolated wetlands may occur in shallow depressional areas that naturally formed on the side of the slope.

The wetland located north of the stormwater pond (wetland C) may have formed as a result of a combination of slightly lower topography and an underlying, impermeable layer.

B. Elevations and Hydrology

The topography in the project area slopes down from west to east from elevation +120 feet to +100 feet (Figure 5). The deepest portions of the wetlands are approximately 2 to 3 feet lower than the adjacent uplands. The wetlands are roughly concave in cross section except where wetland A connects with wetland B. At this point the wetland floor slopes gradually down from south to north from elevation +112 feet to +108 feet. Wetland B slopes down from south to north from elevation +108 feet to +100 feet.

Through the deeper, central portions of wetlands A and B, there are a number of small drainage channels. These flow ways are generally 5 to 10 feet across and 1 to 2 feet deep and contains some water at almost all times. The surrounding hardwood swamp appears to be saturated at or near the surface for prolonged periods of time and is periodically inundated when the flow ways overflow during the rainy season. Upslope from the hardwood swamp are broad, fringing areas of seepage slope wetlands. These areas appear to be periodically saturated at or near the surface during the rainy season. During much of the year the water table is within 1 to 2 feet of the surface. However, during prolonged droughts the water table recedes to a greater depth. The seepage slopes do not appear to be inundated from the flow ways during most storm events.

ENVIRONMENTAL SERVICES, INC.

The western two thirds of wetland C has a seasonal high water table but is rarely, if ever, inundated. There are small pockets (<0.1 acre) scattered throughout this portion of the wetland that periodically contain shallow puddled water. During much of the year, the water table is more than 12 to 18 inches below the surface. Following prolonged droughts, the water table is 3 or more feet below the surface.

The eastern one third of wetland C ($3.0 \pm$ acres) consists of a deeper pocket of swamp and shrubby/grassy wetlands. Based on stain lines on the trees and past visual observations, this swamp periodically contains 12 to 18 inches of standing water. The water drains east through a narrow, incised channel into wetland B. During much of the year, this portion of wetland C is saturated at or near the surface. However, during drought conditions, the water table may recede at least 2 feet below the surface.

C. Soils

The Soil Survey of City of Jacksonville, Duval County, Florida (U.S. Department of Agriculture, Soil Conservation Service 1978) indicates three soil types in the study area (figure 6).

(1) Wesconnett fine sand

The main wetland drainage system to the south and east of the pond is mapped as containing Wesconnett fine sand. This soil is nearly level, very poorly drained and was formed in thick deposits of marine sands. It occurs in shallow depressions and large drainageways. Slopes are smooth to concave and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of 0 to 10 inches, or the soil is covered by water for 6 to 12 months during most years.

There is a weakly cemented spodic or hardpan layer typically between 2 and 32 inches below the surface and a second layer usually from 44 inches to at least 80 inches below the surface. Permeability is moderate to moderately rapid (0.6 to 6.0 inches/hour) in the spodic horizons and rapid (6.0 to 20.0 inches/hour) in all other layers. Included with this soil in mapping may be small areas of other soil types such as Maurepas muck and Pamlico muck.

(2) Ridgeland fine sand

Most of the wetland north of the stormwater pond is mapped as containing Ridgeland fine sand. This is a nearly level, poorly drained, acid soil that formed in marine sands. It occurs in broad flatwood areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for brief periods of 2 to 4 weeks, at a depth of 10 to 20 inches for 2 to 4 months, and at a depth of 20 to 40 inches for most of the remainder of the year. A few small areas of this soil are covered with water for periods of 1 to 2 weeks.

There are two weakly cemented spodic horizons, one between 6 and 16 inches of the surface and the second from 31 to at least 80 inches from the surface. The permeability is moderate to moderately rapid (0.6 to 6.0 inches/hour) in the spodic horizons and rapid (6.0 to 20 inches/hour) in all other layers.

(3) Lynn haven fine sand

A small portion of wetland C and the upland area where the pond is to be constructed are mapped as containing Lynn Haven fine sand. This is a nearly level, poorly drained soil that was formed in thick beds of marine sand. It occurs in broad flatwood areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months during most years.

There is a weakly cemented spodic horizon from 21 to at least 80 inches below the surface. Permeability is moderate to moderately rapid (0.6 to 6.0 inches/hour) in the spodic horizon and permeability is rapid (6.0 to 20.0 inches/hour) in the surface horizon.

D. Vegetation

There are five distinct types of wetlands in the study area (figure 7). Most of the wetlands have been significantly impacted in the past due to the silvicultural practices of the former land owner (Gilman Paper Company).

ENVIRONMENTAL SERVICES, INC.

(1) Mature hardwood swamp

The central portion of wetland A consists of relatively mature hardwood swamp. The canopy is dominated primarily by tupelo (Nyssa sylvatica var. biflora) with lesser amounts of sweet bay (Magnolia virginiana), swamp bay (Persea palustris), red maple (Acer rubrum), pond pine (Pinus serotina), and slash pine (Pinus elliottii). The shrub layer consists of dense patches of sweet gallberry (Ilex coriacea) mixed with lesser amounts of fetterbush (Lyonia lucida), bitter gallberry (Ilex glabra), dog hobble (Leucothoe axillaris), opossum haw (Viburnum nudum), Virginia willow (Itea virginica) and wax myrtle (Myrica cerifera and M. heterophylla). Ground cover species included dog hobble, fetterbush, cinnamon fern (Osmunda cinnamomea) sphagnum moss (Sphagnum sp.) and netted chain fern (Woodwardia areolata).

(2) Cut-over hardwood swamp

Most of wetland B and portions of wetlands A and C consist of hardwood swamp that was cut in the recent past by Gilman Paper Company. The trees appear to be approximately 20 years old. The canopy is dominated by a mixture of tupelo and sweet bay with lesser amounts of swamp bay and loblolly bay (Gordonia lasianthus). The shrub layer consists of tupelo and bays mixed with wax myrtle, dahoon holly (Ilex cassine), fetterbush, and sweet gallberry. Ground cover species include those listed above as well as large mats of sphagnum moss and patches of sedges (Carex sp. and Cyperus sp.) and grasses (Andropogon sp., Erianthus sp., Panicum sp. and Aristida sp.).

The swamp within wetland C has a canopy consisting of tupelo and pond cypress (Taxodium distichum var. nutans).

In general the cut-over swamps have no pines but have more sweet bay and less tupelo in the canopy and shrub layer, more wax myrtle and dahoon holly in the shrub layer, and more sphagnum moss and grasses and sedges in the ground cover as compared with the mature swamp. Over time as the trees mature, the tupelo may gradually increase in dominance. As the canopy closes, the shrub layer and ground cover will thin out and look more like that in the mature swamp.

(3) Pond pine seepage slope

Bordering wetland A on the north and south are broad fringing areas of pond pine seepage slope. The canopy is dominated by pond pine with lesser amounts of slash pine, loblolly pine (Pinus taeda), long leaf pine (Pinus palustris), swamp bay, sweet bay, and tupelo. The subcanopy consists primarily of swamp bay, sweet bay and tupelo. The shrub layer is relatively dense and consists of a mixture of sweet gallberry and bitter gallberry mixed with scattered wax myrtle, high bush blueberry (Vaccinium corymbosum), and Virginia willow. The ground cover consists of the same species listed above as well as scattered cinnamon fern.

(4) Pine/gallberry wetlands

This wetland type occurs as a narrow band around almost all of the wetlands. The band widens into a relatively broad fringe south of wetlands A and B and also comprises most of wetland C. The vegetation in wetland C consists of rows of planted slash pine with a dense shrub layer of bitter gallberry. Sweet bay, swamp bay, loblolly bay and tupelo saplings are widely scattered among the pines. Other shrubs include scattered high bush blueberry, sweet gallberry and choke berry (Aronia arbutifolia). Bamboo briar (Smilax lauiifolia) and cat briar (Smilax glauca) are common vines. Widely scattered under the gallberry are bog button (Eriocaulon sp.), club moss (Lycopodium sp.), hooded pitcher plant (Sarracenia minor), meadow beauty (Rhexia sp.), sphagnum moss, red root (Lachnanth caroliniana), blue maidencane (Amphicarpum muhlenbergianum), wire grass (Aristida sp.), yellow-eyed grass (Xyris sp.), cinnamon fern, netted chain fern, and St. Johns wort (Hypericum fasciculatum). This area has a seasonal high water table at or near the surface during parts of the rainy season as evidenced by the presence of crayfish borrows.

The area south of wetlands A and B consists of pine plantation with widely scattered clusters of bitter gallberry and an open ground cover of wire grass mixed with bog buttons and other herbaceous species listed above. This area has been bedded and planted with rows of slash pine.

Within the pine/gallberry portion of wetland C, there are a number of small (<0.1 acre) open patches vegetated with a mixture of listed and nonlisted species such as red root, St. Johns wort, and blue maidencane. Some of these pockets have enough listed species to be considered jurisdictional wetlands pursuant to Section 40C-4 F.A.C., Management and Storage of Surface Water (MSSW) permit. All of wetland C is mapped as being jurisdictional in the landfill's MSSW permit. However, most of the pine/gallberry portion of the wetland is dominated by nonlisted vegetation and, therefore, does not truly function as a "water in the State."

Historically the areas of pine/gallberry wetlands may have consisted of open savannahs of wire grass pine flatwoods. The vegetation was kept open by regular summer wildfires. After the property was converted into pine plantation, the fire regime was altered and summer wildfires were controlled or completely suppressed. As a result of the fire suppression, bitter gallberry may have gradually become the dominant shrub and ground cover plant in most areas. The ground cover vegetation has also been degraded somewhat due to intensive silvicultural practices such as bedding.

During the life span of the landfill, there should continue to be some changes in the vegetation in the pine/gallberry wetlands. The pines will continue to grow to maturity. Hardwoods, such as bays and tupelo, may gradually increase in numbers. Bitter gallberry and vines will continue to dominate and become taller and denser in the shrub and ground cover layers.

(5) Pine/St. Johns wort wetlands

Portions of wetlands A, B and C consist of pine/St. Johns wort wetlands. This wetland type appears to be a transitional zone between the pine/gallberry wetland and the hardwood swamp. The canopy and subcanopy consist of planted rows of slash pine with scattered swamp hay, sweet bay and tupelo. Due to the wetter condition of this area, the pines are more widely scattered and are smaller and stunted as compared with the pines in the pine/gallberry wetlands. The shrub layer consists primarily of St. John's wort (Hypericum fasciculatum) mixed with lesser amounts of bitter gallberry, sweet gallberry, wax myrtle, and titi (Cyrilla racemiflora). For some reason, approximately

one half of the St. Johns wort plants are dead. This may have occurred as a direct or indirect result of a recent severe freeze or prolonged drought. Ground cover vegetation consists of such species as sphagnum moss , grasses (Dicanthelium spp., Aristida sp., and Erianthus sp.), bog buttons, sedges (Carex sp. and Cyperus sp.), red root, and Asiatic coinwort (Centella asiatica).

Over time some succession may occur in this wetland type. Trees and shrubs may become more dominant and eventually shade out much of the ground cover species. The area may succeed into a transitional edge of bays, fetterbush and sweet gallberry.

IV. ESTABLISHMENT OF MONITORING TRANSECTS

Monitoring transects were established in the wetlands adjacent to the proposed stormwater pond (Figure 8). The number and specific locations of the transects were determined in the field by Environmental Services, Inc. and the Florida Department of Environmental Regulation on 11 December 1991. The transects extend through all five of the vegetative community types and cover representative areas of each of the main wetlands. Sunshine State Surveyors, Inc. surveyed the location of each transect and cut a line approximate 5 to 10 feet wide for access. Surface elevations were surveyed at intervals approximately 100 feet apart and marked with iron pins and PVC pipe.

Sampling stations were established about every 100 feet at the survey points, starting on the wetland jurisdiction line, and extending for a minimum length of 200 feet. A piezometer and square meter plot were established at each sampling station. The piezometers consist of perforated PVC pipe installed from 4 to 6 feet below the surface, depending on the location in the wetland. The initial water table readings from the baseline study were taken several days after the piezometers were installed. Each piezometer was capped after installation to prevent rainwater and debris from entering.

Square meter sampling plots were permanently marked with short sections of PVC pipe. Each station was established away from the centerline of the transects, in a representative area where the vegetation had not been disturbed. All ground cover vegetation within each plot was recorded according to species and percent coverage. General notes were made regarding the composition of the canopy, subcanopy and shrub layer in the immediate area and the presence or absence of surface water such as flow channels. Color photographs were taken of each sampling plot, and close-up

① 1/92

general photographs were taken along each transect (attachment B). In the baseline study, the color photographs of stations along Transect 1 were labeled in exactly the reverse order. The photographs along Transect 1 were labeled in the correct order in the current report.

The sampling stations were established at least 200 feet into each wetland because that is the maximum extent of potential draw down as calculated by the project engineers. In order to compare the vegetation and water table in unaffected portions of the wetlands, reference transects were established. The reference transects consist of the northern halves of transects 1 and 2, the eastern half of transect 3, and all of transects 6 and 7. The transects sufficiently cover each wetland area, from the lowest point to the wetland edge. Additional piezometers and square meter plots will be established as needed, based on future monitoring work.

The data sheets recorded for each transect are included as attachment C. The notes on vegetation are summarized in the previous discussion of wetland vegetative community types. The information on elevations and water tables are summarized below and indicated on figures 9 through 13.

V. RESULTS OF SECOND MONITORING ITERATION

A. Transect 1

Transect 1 is approximately 435 feet long (Figure 9). It extends through a section of pine/gallberry wetland and a St. Johns wort/grass pocket in the western half of Wetland C. At the time of sampling in December 1992, the water table was 9.0 to 10.0 feet below the surface in the southern half of the transect and approximately 2.5 feet below the surface in the northern half. As compared with the readings taken in December 1991, the water table dropped 6 feet in the southern half and rose 1 foot in the northern half. The area where the water table dropped is vegetated with gallberry and rows of planted slash pine. The rate of irrigation in Wetland C will be increased in order to counteract any potential drainage effects from the pond. Slash pine and gallberry are woody plants that can adapt to changes in groundwater levels. It is anticipated that the root systems of these plants will extend downward over time.

There was less red root (Lachnanthes caroliniana) recorded in the St. Johns wort/grass pocket as compared with the baseline study. However, the groundwater level in this area was higher, and the decrease in red root probably reflects a natural fluctuation in annual species composition. Other than the red root, there were no significant changes in species composition or coverage by dominant species along the transect.

B. Transect 2

Transect 2 is approximately 850 feet long (Figure 10). It extends through sections of pine/St. Johns wort, tupelo/cypress, and bay wetlands in the eastern half of Wetland C. The depth to the water table averaged 3 feet from the surface along the landward edges of the wetland. Within the tupelo/cypress portion of the wetland, there were approximately 4 to 6 inches of standing water near elevation +102.8 feet. As compared with the reading taken in December 1991, the water table rose 1.8 feet on average throughout the wetland. In profile view the water table appeared to be slightly mounded within the wetland.

There were no significant changes in species composition in the sampling plots along Transect 2.

C. Transect 3

Transect 3 is 536 feet long (Figure 11). It extends through sections of pine/St. Johns wort wetland and cut-over hardwood swamp. The depth to the water table averaged 1.75 feet below the surface along the wetland edges. The deeper portion of the wetland contained approximately 6 inches of standing water between elevations +103.3 feet and +104.1 feet. As compared with the readings taken in December 1991, the water table rose on average 0.6 feet. The water table was also slightly mounded within the wetland along Transect 3.

There were no significant changes in species composition in the sampling plots along Transect 3.

D. Transects 4 and 7

Transects 4 and 7 are each 400 feet long (Figure 12). Piezometers and sampling plots were established in the first 200 feet of each transect. The water table was 3.0 feet below the surface at the southern end of Transect 7 at the farthest point from the stormwater pond while the water table was only 0.5 feet from the surface 90 feet from the pond at the northern end of Transect 4. On average the water table along Transect 7 was 2.2 feet below the surface which was an increase of 0.4 feet as compared with the readings from December 1991. On average the water table was at the surface or within a few inches of the surface along Transect 4 which was an increase of 1.5 feet as compared with the readings from December 1991.

There were no significant changes in species composition in the sampling plots along Transects 4 and 7.

E. Transects 5 and 6

Transects 5 and 6 are each 400 feet long (Figure 13). Piezometers and sampling plots were established in the first 200 feet of each transect. At the time of sampling, the water table was 2.4 feet below the surface at the southern end of Transect 6 and 0.5 feet below the surface at the northern end of the transect. As compared with the readings from December 1991, the water table dropped along Transect 6 by an average of 0.2 feet.

There were flow ways scattered through the center of the hardwood swamp that contained water. The water table in the swamp was generally within 6 inches of the surface. The ordinary high water level in the swamp appears to be at elevation +114.5 feet.

The water table along the length of Transect 5 was between 5.8 and 6.2 feet below the surface. As compared with the reading taken in December 1991, the water table along the length of Transect 5 dropped between 3.0 and 3.8 feet. The wetland in this area is characterized as a stand of pond pine with a shrub layer of bitter gallberry and sweet gallberry and scattered saplings of bays and tupelo. This woody vegetation should adapt to a change in the water table by extending the roots deeper. Pines in particular have a deep tap root. Any potential draw-down to the water table will be compensated for with the irrigation system.

There were no significant changes in species composition in the sampling plots along Transects 5 and 6.

V. CONCLUSION

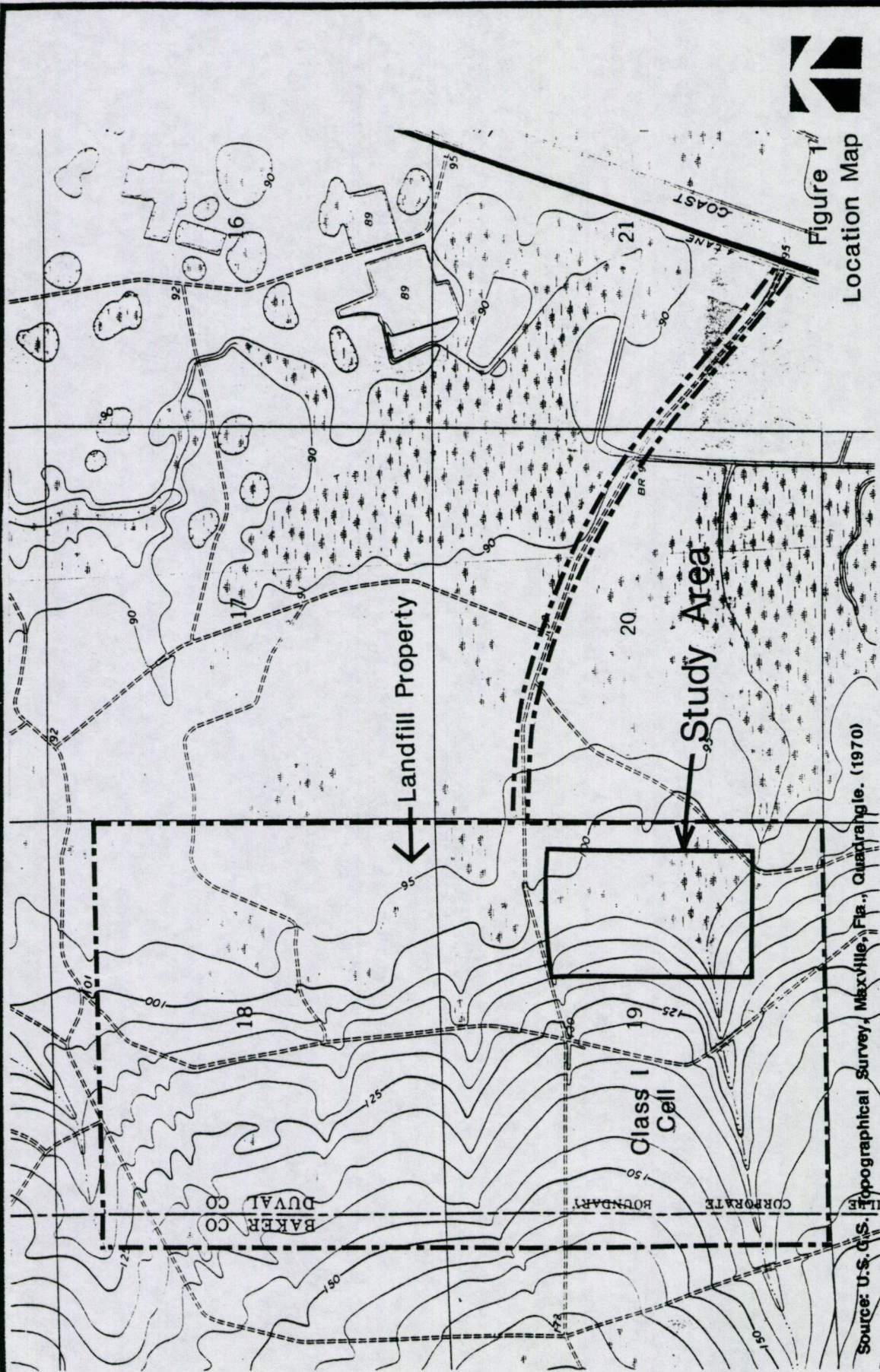
Based on the data collected in December 1992/January 1993, there were no significant changes in species composition in the vegetation sampling plots in any of the transects. As compared with the readings from the baseline study, the water table was either higher or at approximately the same level everywhere except along Transect 5 and at the southern end of Transect 1. Pumping from the irrigation system will be increased in these areas.

Future monitoring work will determine if the Class I stormwater pond will have any detrimental effects on the adjacent wetlands. The vegetation in the areas of potential draw-down is dominated by woody plants that are either transitional or upland and should readily adapt to a slight drop in the water table. Because the wetlands are not truly inundated by "waters of the State," any draw-down should not significantly affect overall wetland functions and values.

The proposed irrigation system should adequately compensate for any potential drawdown of the water table. The sampling stations along the transects will be monitored and compared with stations along the reference transects and with rainfall/weather data. If there is a significant detrimental change to the wetland vegetation in the study area that is directly attributable to the stormwater pond (and not due to succession or other natural forces such as disease or weather), the permittee will report it to the local DER office and modify the irrigation system accordingly.

Construction and operation of the Class I stormwater pond during the past 12 months has not had any detrimental effects on the vegetation of the adjacent wetlands. Any effects on wetland hydrology appear to have been negligible.

BP/kh
91-297-4.MR2
(3Jan93)



Project No. 91-297.4

Date 1/6/93

Scale 1"=2000'

Drawing No. 1 of 13

Trail Ridge Landfill Wetlands Monitoring Plan

England-Thims
& Miller, Inc.

Consulting & Design Engineers
351 S. Johna Blvd. #2, Jacksonville, FL 32216

ENVIRONMENTAL
SERVICES, INC.



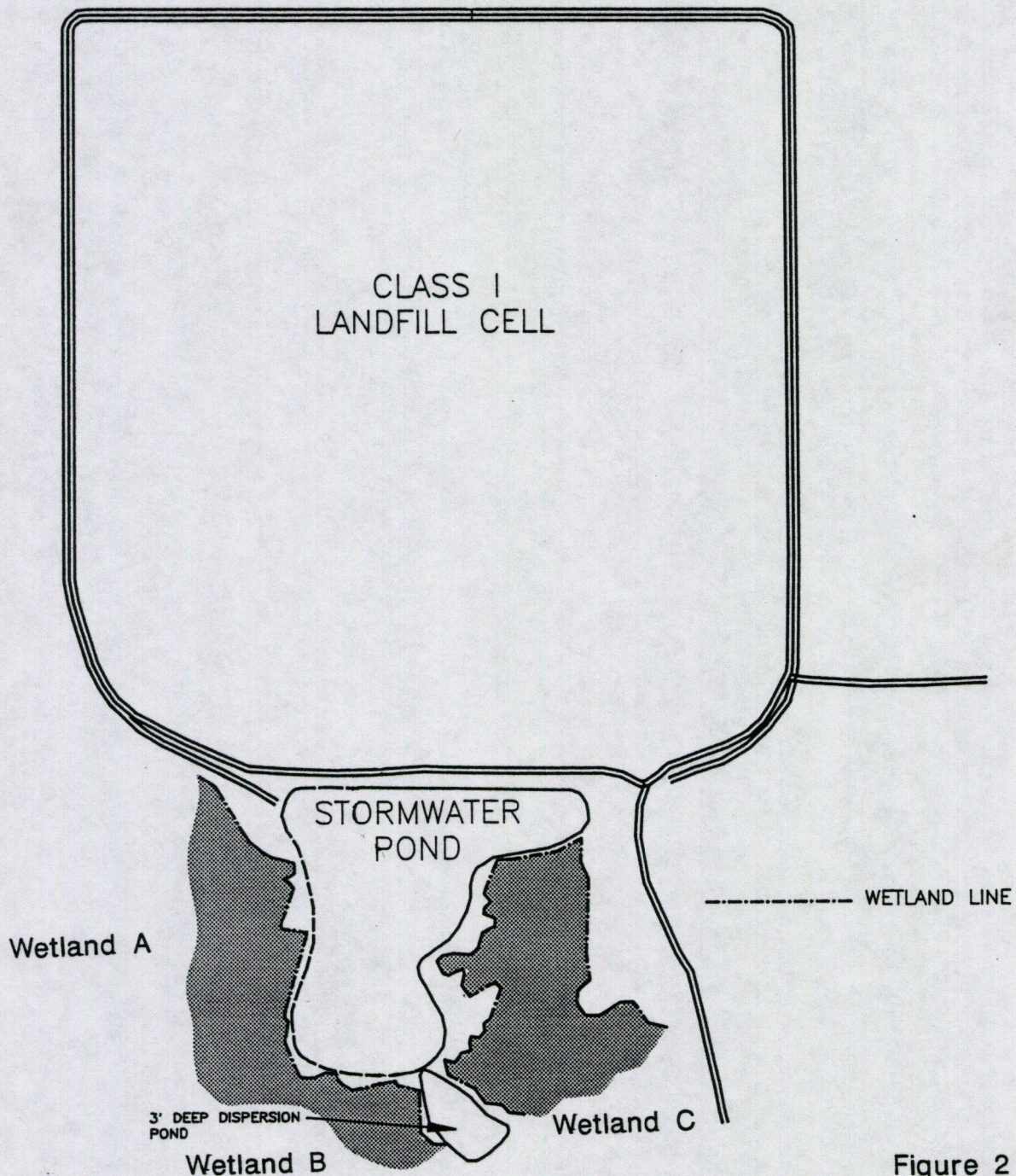


Figure 2
Plan View



**England-Thimms
& Miller, Inc.**
Consulting & Design Engineers
3131 St. Johns Bluff Rd. SE, Jacksonville, FL 32216

**ENVIRONMENTAL
SERVICES, INC.**

Trail Ridge Landfill

Wetlands Monitoring Plan

Proj No. 91-297.4

Date 1/6/93

Scale 1"=600'

Drawing No. 2 of 13

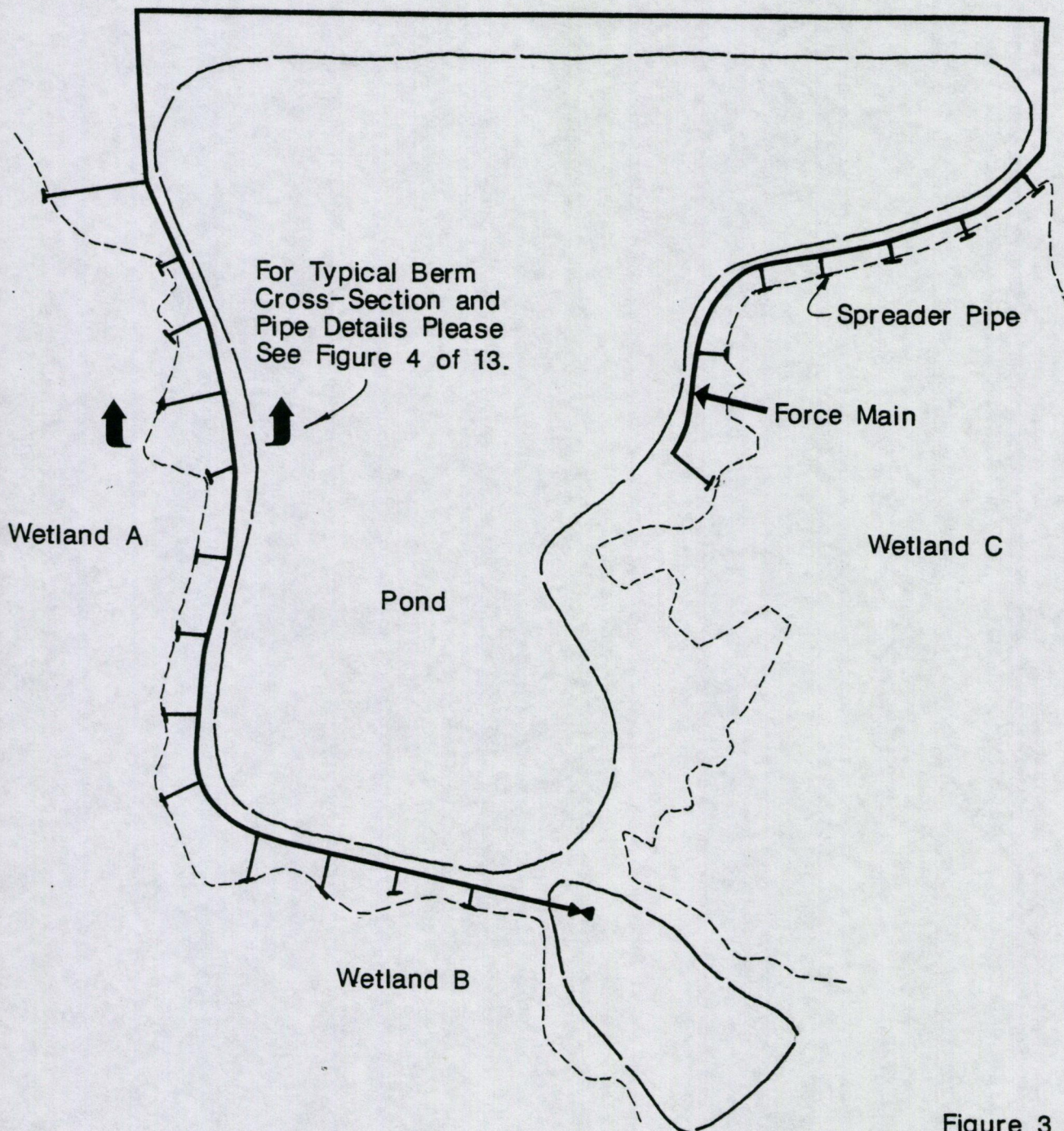


Figure 3
Detailed Plan View of
Wetland Irrigation System



**England-Thims
& Miller, Inc.**
Consulting & Design Engineers
3131 St. Johns Bluff Rd. SE, Jacksonville, FL 32216

**ENVIRONMENTAL
SERVICES, INC.**

Trail Ridge Landfill

Wetlands Monitoring Plan

Proj No. 91-297.4

Date 1/6/93

Scale 1"=200'

Drawing No. 3 of 13

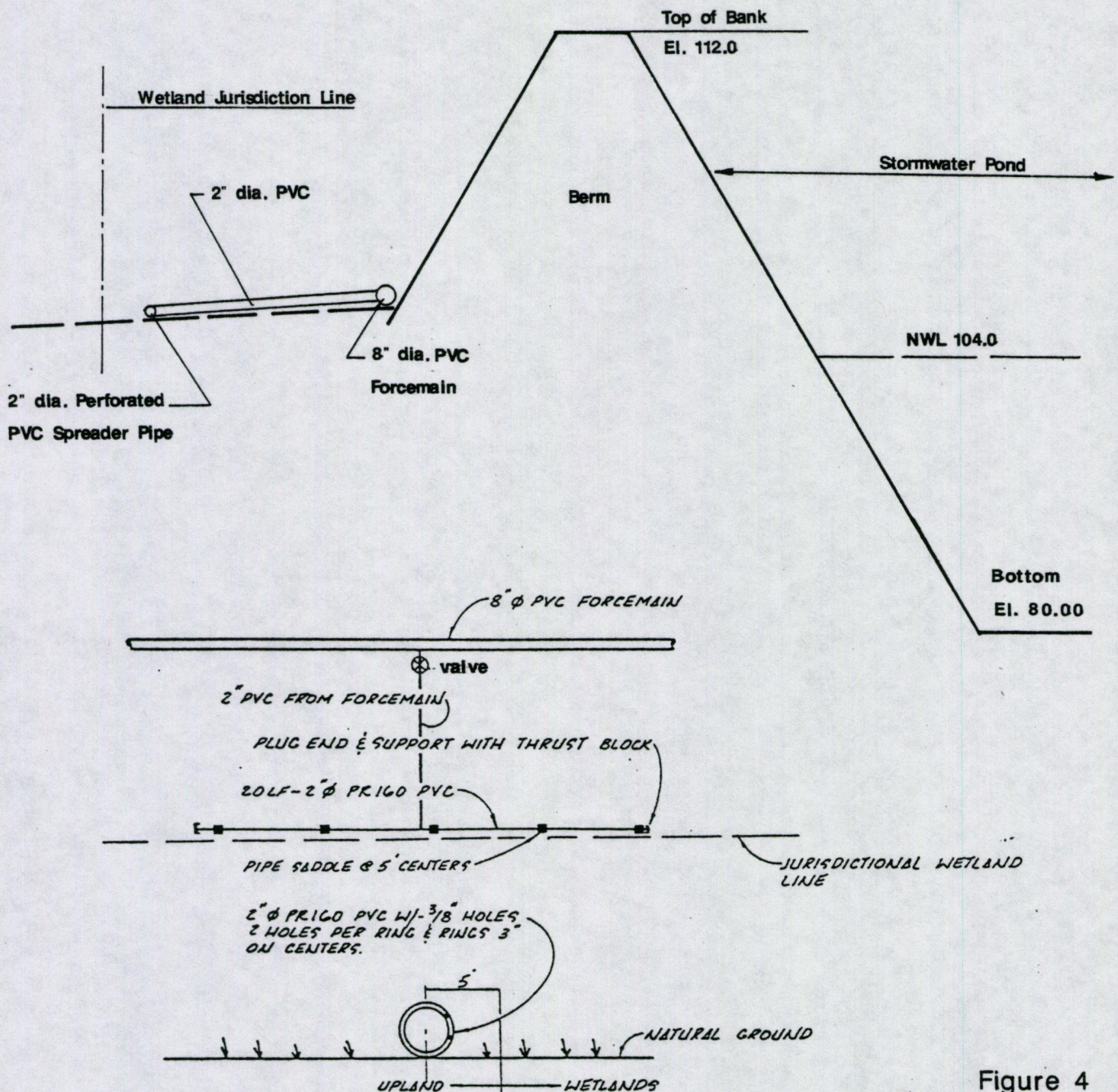


Figure 4
Plans for Wetland
Irrigation System



England-Thimby
& Miller, Inc.
Consulting & Design Engineers
3101 St. Johns Bluff Rd. SE, Jacksonville, FL 32216

ENVIRONMENTAL
SERVICES, INC.

Trail Ridge Landfill

Wetlands Monitoring Plan

Proj No.	91-297.4
Date	1/6/93
Scale	N.T.S.
Drawing No.	4 of 13

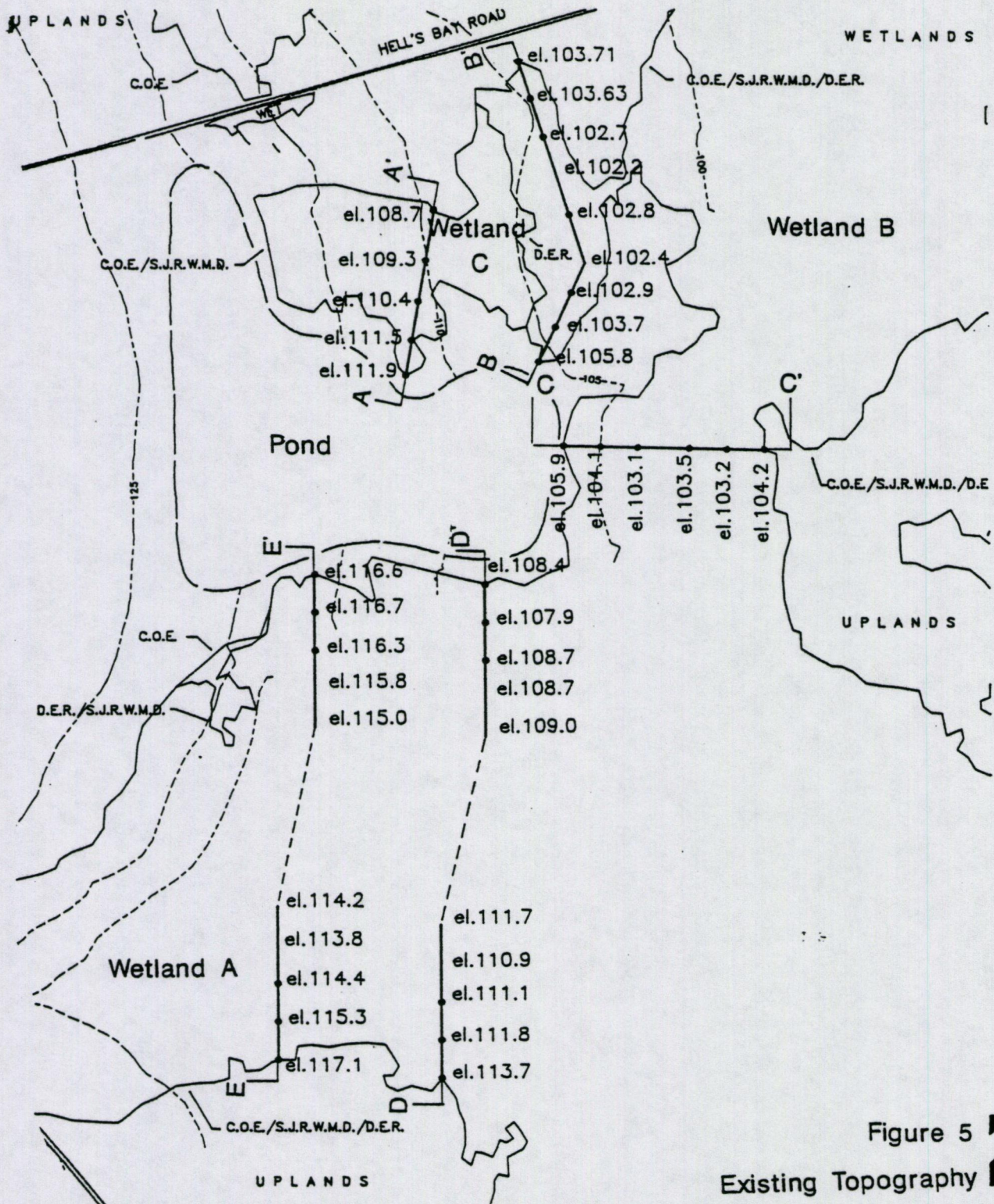


Figure 5
Existing Topography

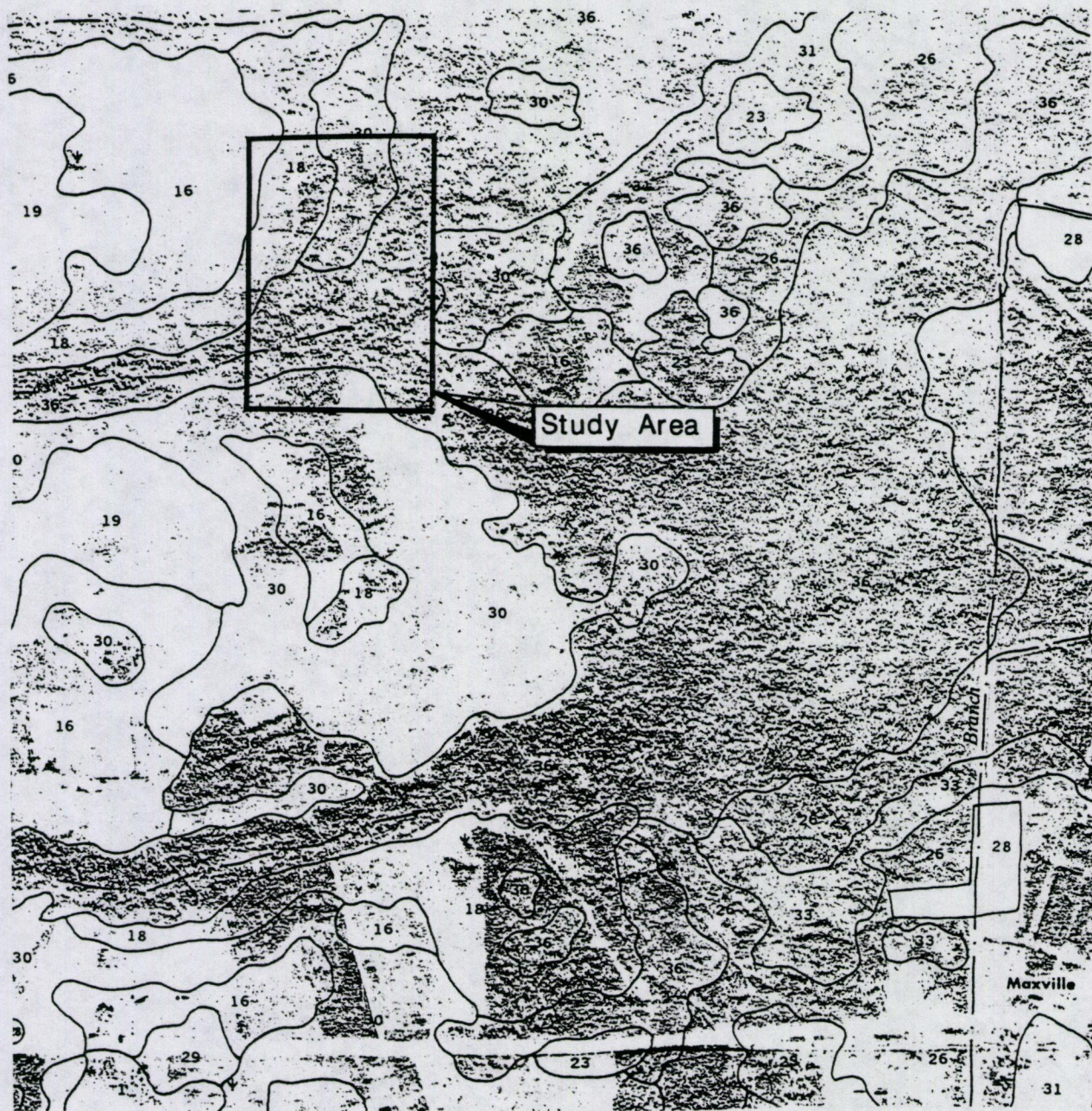


England-Thimby
& Miller, Inc.
Consulting & Design Engineers
3031 St. Johns Blvd. SE, Jacksonville, FL 32216

ENVIRONMENTAL
SERVICES, INC.

Trail Ridge Landfill Wetlands Monitoring Plan

Proj No.	91-297.4
Date	1/6/93
Scale	1"=400'
Drawing No.	5 of 13



Soil Legend:

- 18 - Lynn Haven fine sand
- 30 - Ridgeland fine sand
- 36 - Wesconnett fine sand

Source: U.S.D.A. Soils Survey for Duval County, Fla. (1978)

Figure 6
Soils Map



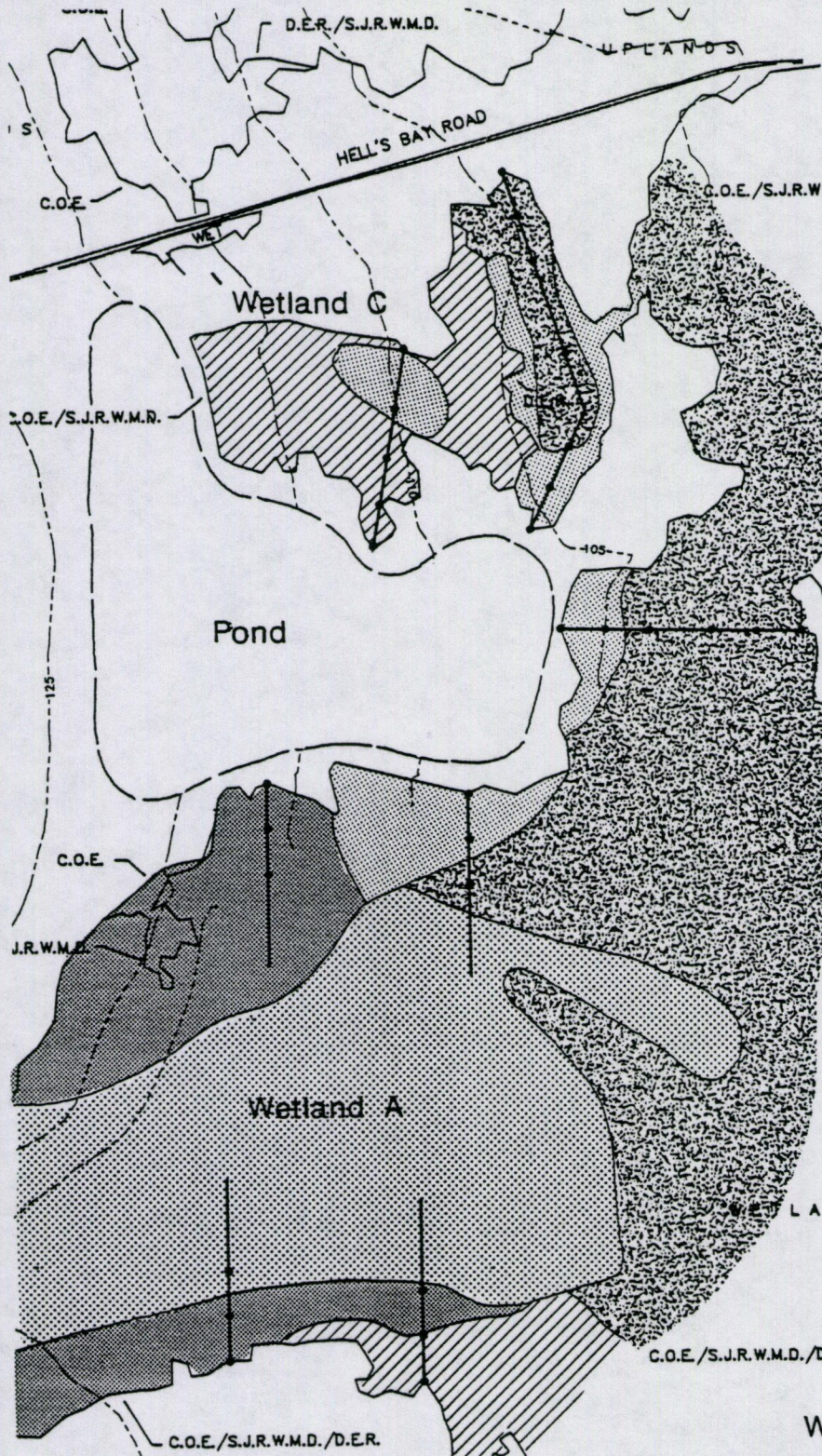
**England-Thimly
& Miller, Inc.**
Consulting & Design Engineers
5131 St. Johns Bluff Rd. SE, Jacksonville, FL 32216

**ENVIRONMENTAL
SERVICES, INC.**






**Trail Ridge
Landfill**

Wetlands Monitoring Plan

Proj No.	91-297.4
Date	1/6/93
Scale	1"=1667'
Drawing No.	6 of 13



Wetland Community Types:

-  - Hardwood Swamp (uncut)
-  - Hardwood Swamp (recently cut)
-  - Pond Pine Seepage Slope
-  - Planted Pine/St. Johns Wort
-  - Planted Pine/Gallberry

Wetland B

— Transects

● - Square Meter Plots
and Piezometers

Figure 7



Wetland Community Types



**England • Thims
& Miller, Inc.**
Consulting & Design Engineers
3131 St. Johns Bay Rd. St. Johns, AL 36776

**ENVIRONMENTAL
SERVICES, INC.**

**Trail Ridge
Landfill**

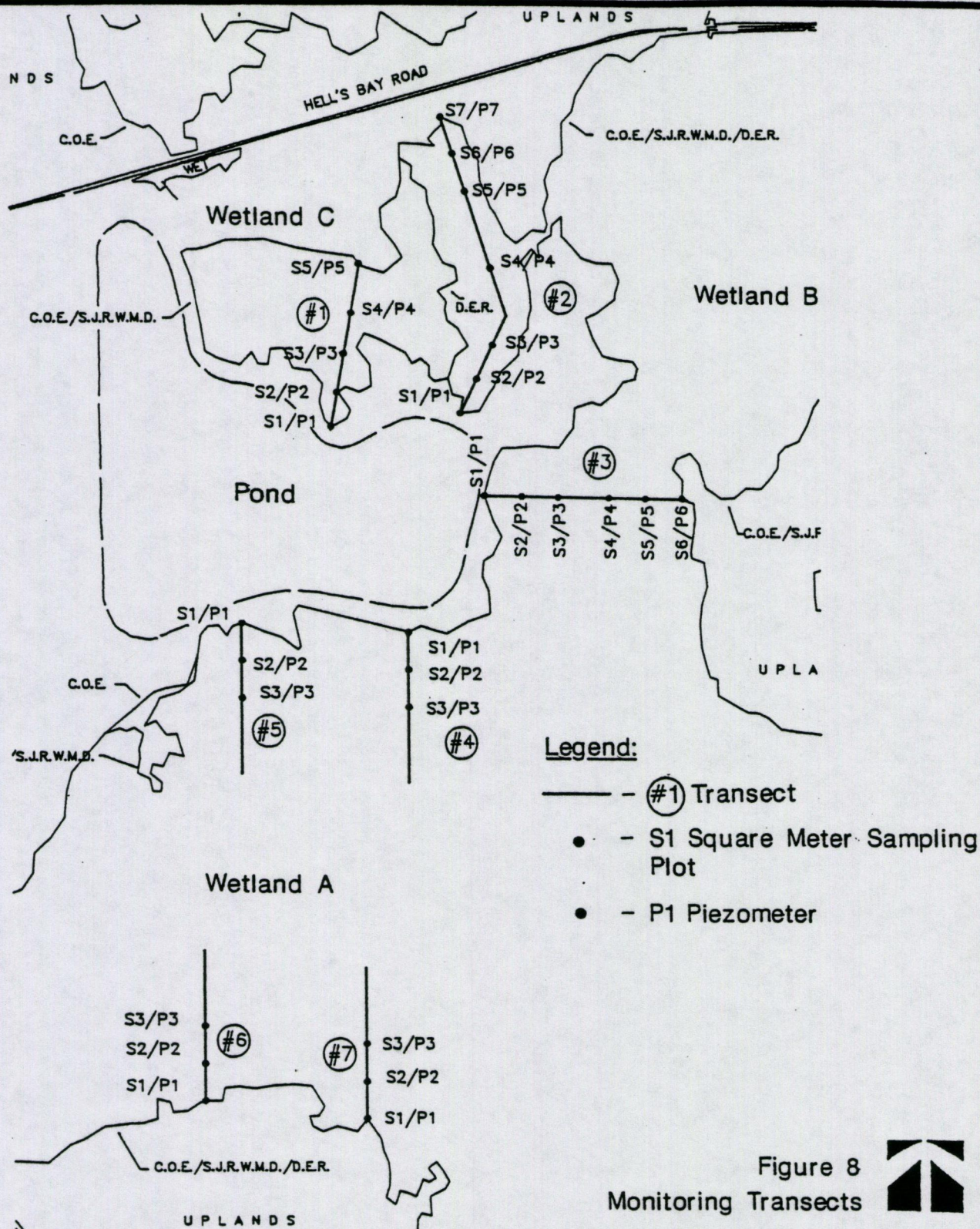
Wetlands Monitoring Plan

Proj No. 91-297.4

Date 1/6/93

Scale 1"=400'

Drawing No. 7 of 13



**England-Thimms
& Miller, Inc.**
Consulting & Design Engineers
501 St. Johns Street, Suite 200, Jacksonville, FL 32204

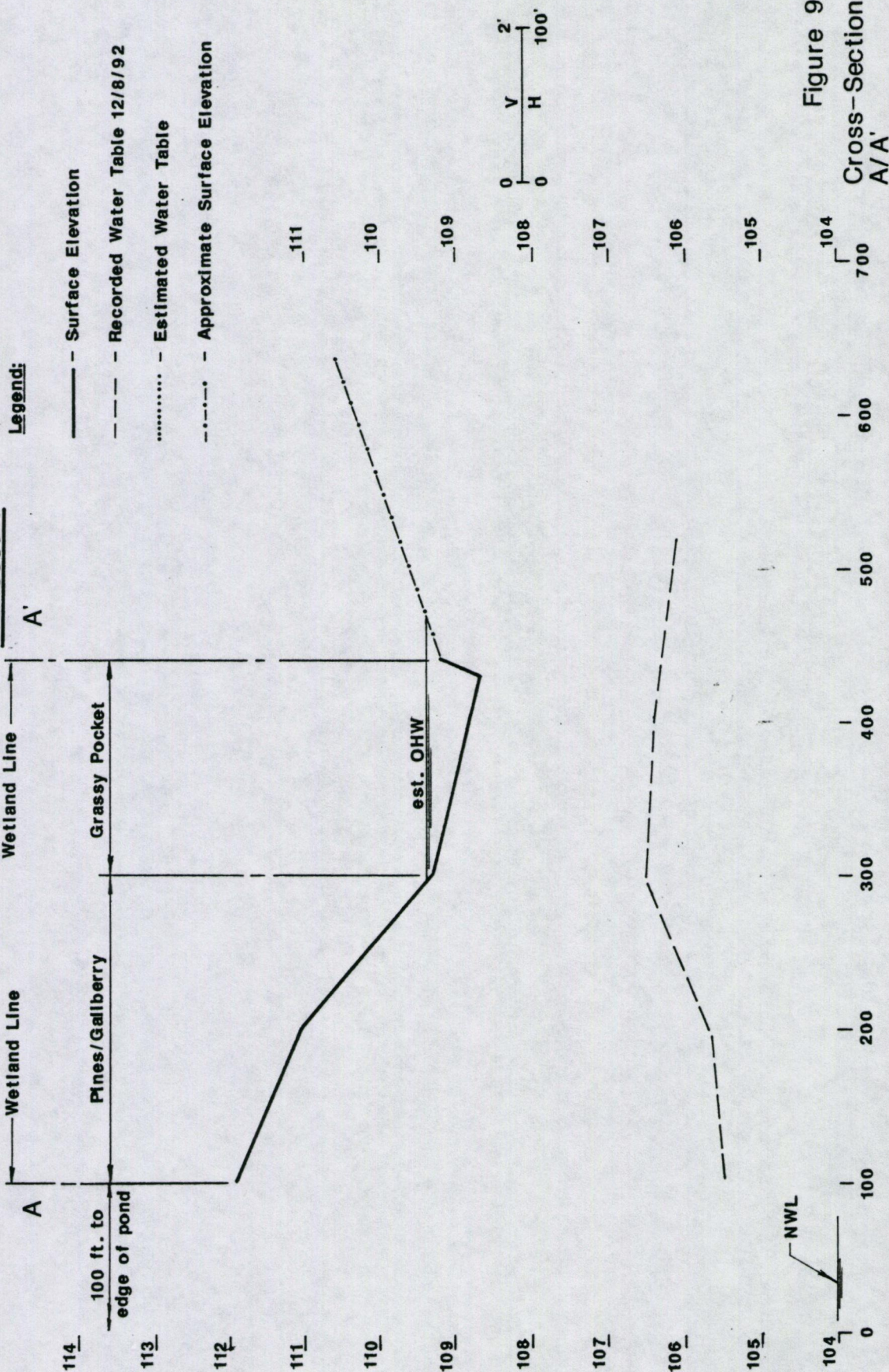
**ENVIRONMENTAL
SERVICES, INC.**

Trail Ridge Landfill

Wetlands Monitoring Plan

Proj No.	91-297.4
Date	1/6/93
Scale	1"=400'
Drawing No.	8 of 13

Transect 1



England-Thims
& Miller, Inc.



ENVIRONMENTAL
SERVICES, INC.

Trail Ridge Landfill Wetlands Monitoring Plan

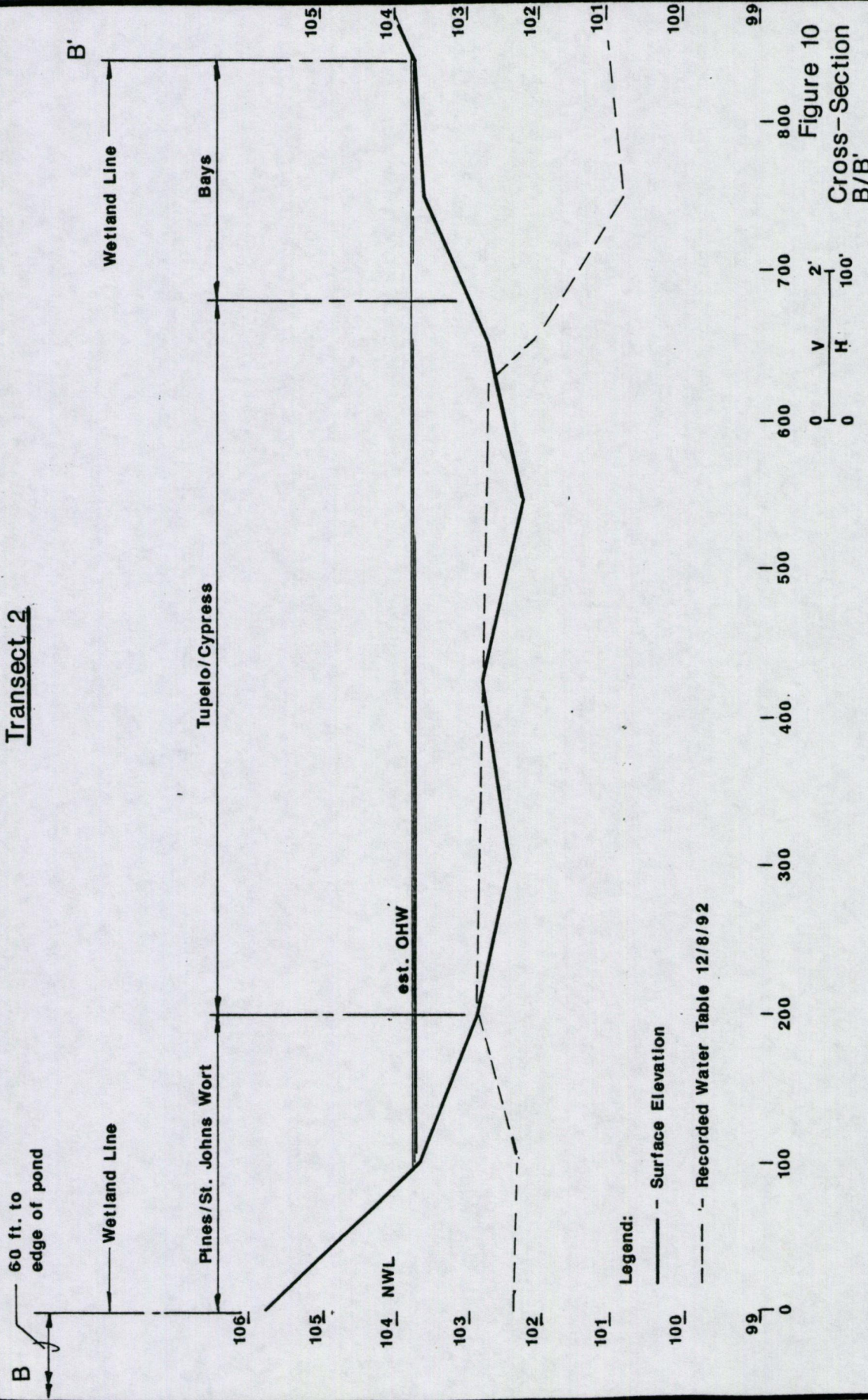
Project No. 91-297.4

Date revised 12/30/92

Scale as shown

Drawing No. 9 of 13

Transect 2



England-Thims
& Miller, Inc.



ENVIRONMENTAL
SERVICES, INC.

Trail Ridge Landfill Wetlands Monitoring Plan

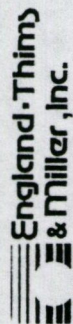
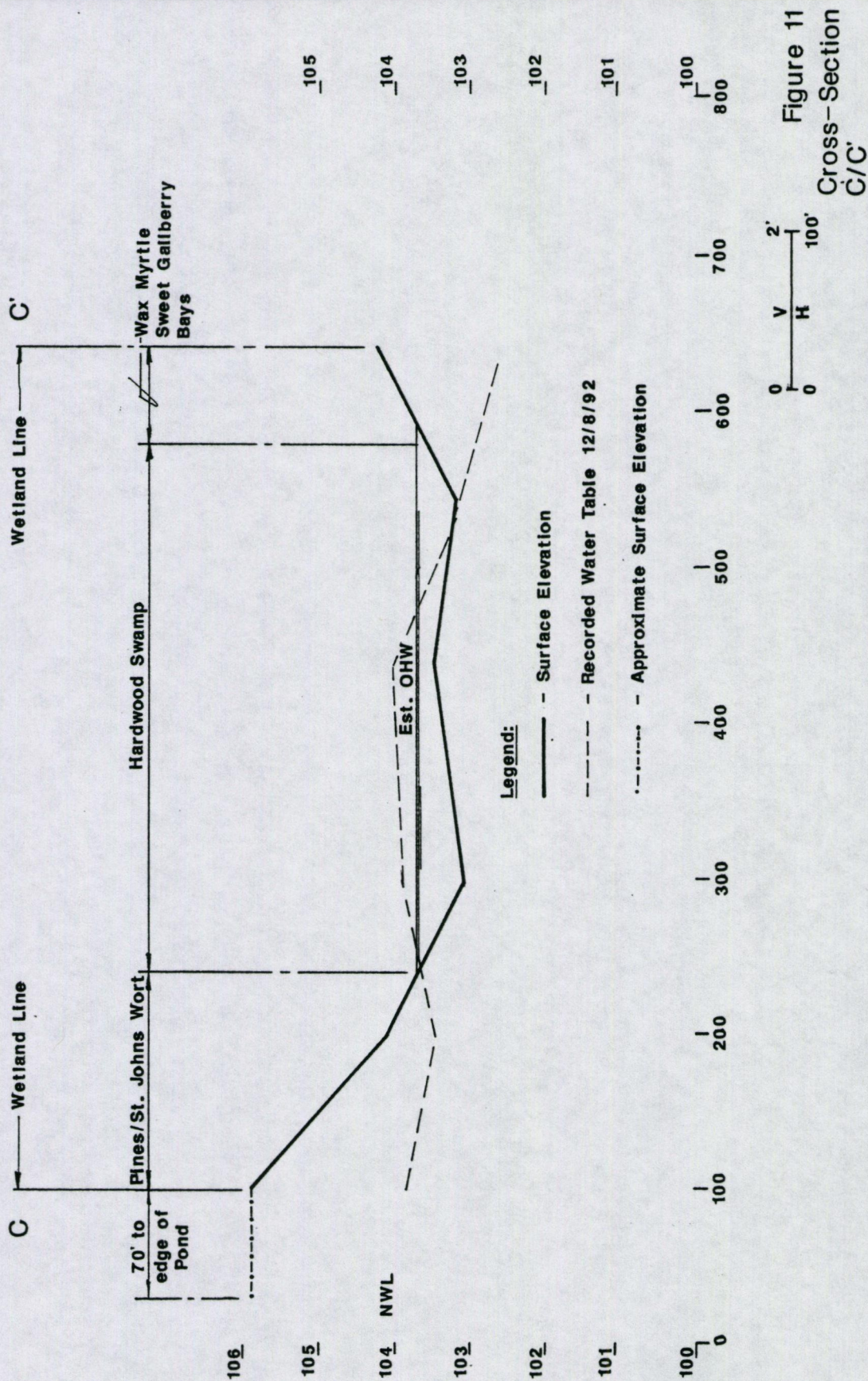
Project No. 91-297.4

Date revised 12/30/92

Scale as shown

Drawing No. 10 of 13

Transect 3



ENVIRONMENTAL SERVICES, INC.

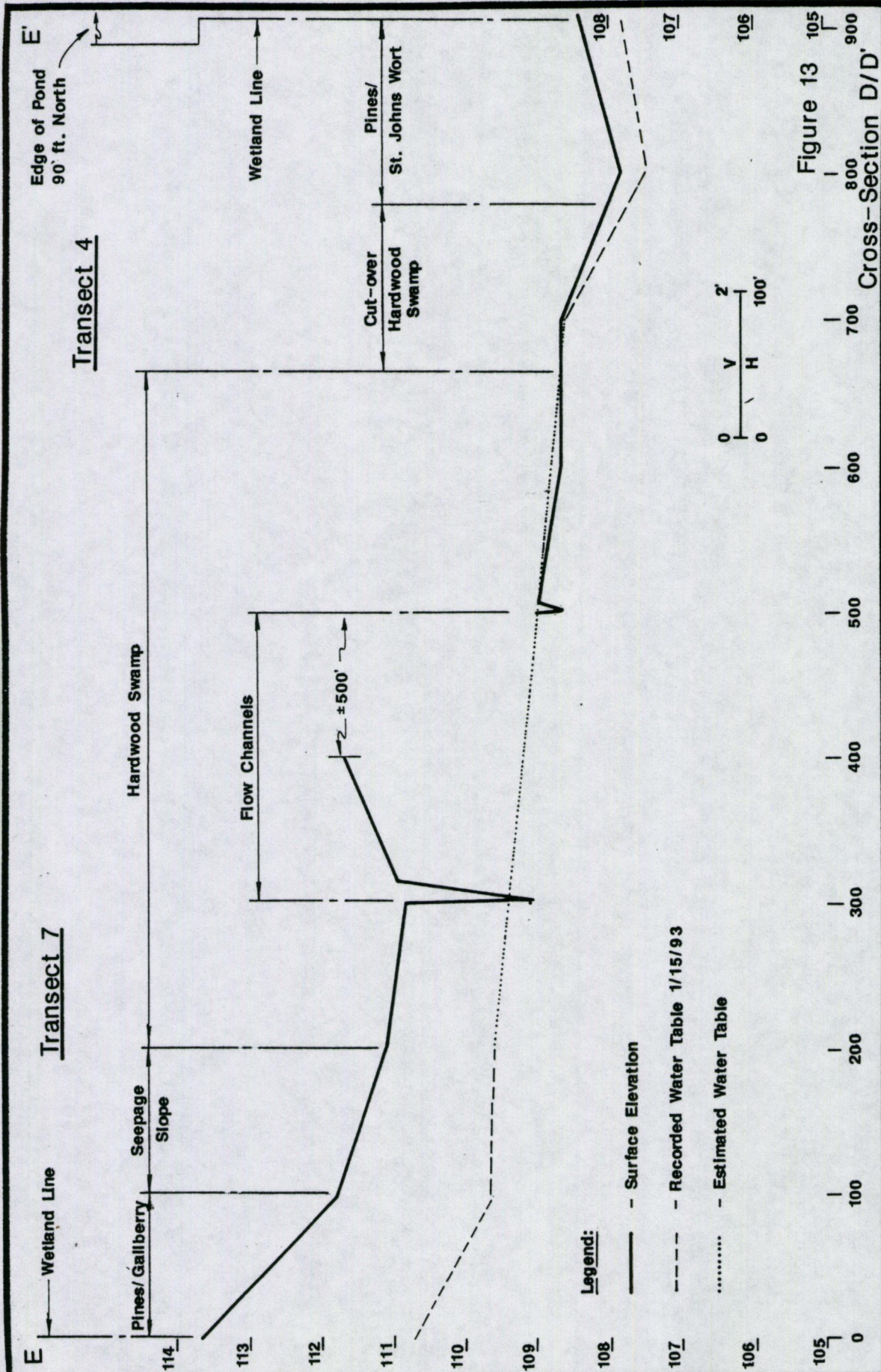
Trail Ridge Landfill Wetlands Monitoring Plan

Project No. 91-297.4

Date revised 12/30/92

Scale as shown

Drawing No. 11 of 13



England-Thimby
& Miller, Inc.
Consulting & Design Engineers
301 S. 28th Ave. Suite 20, Jacksonville, FL 32216



ENVIRONMENTAL
SERVICES, INC.

Trail Ridge Landfill

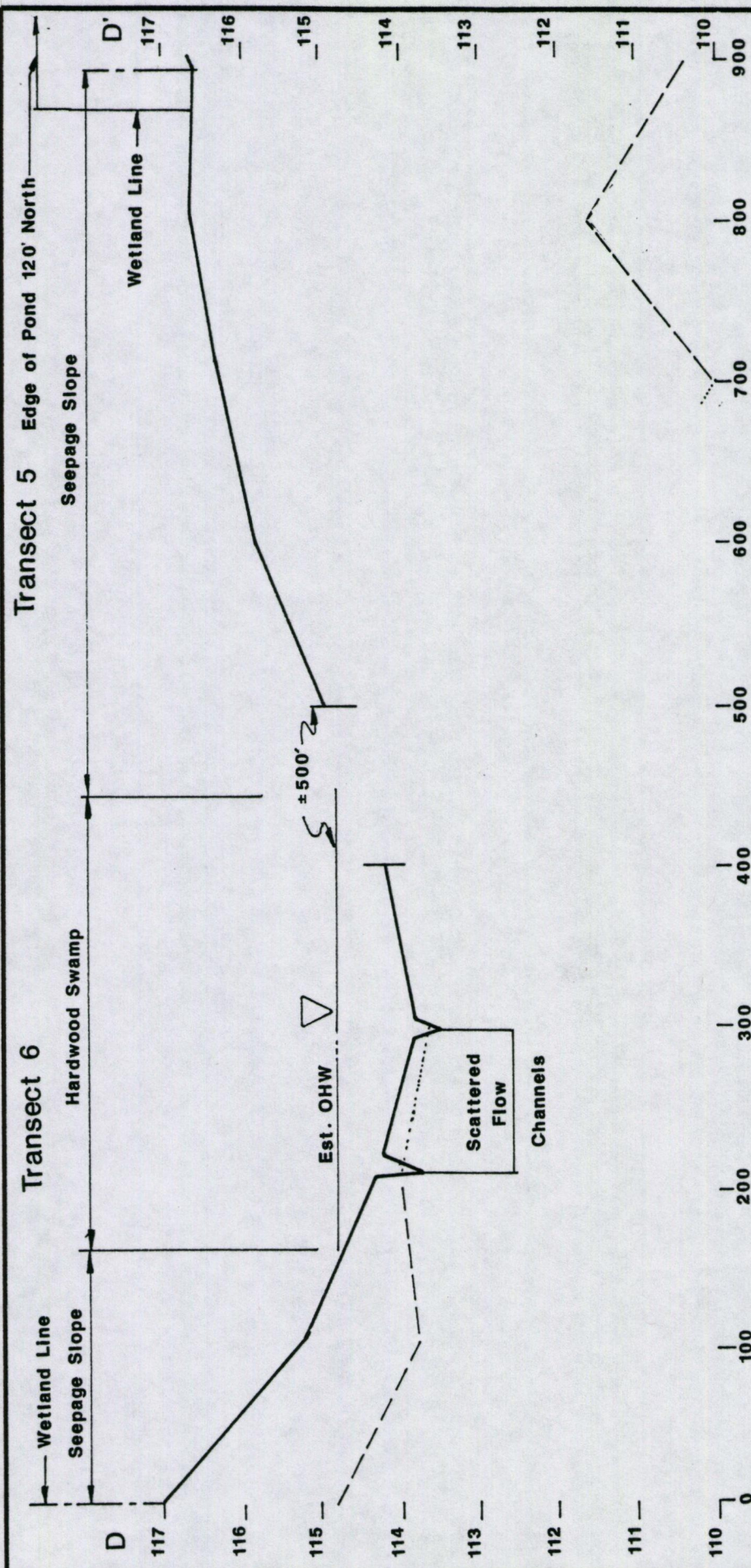
Wetlands Monitoring Plan

Project No. 91-297.4

Date revised 1/15/93

Scale as shown

Drawing No. 12 of 13




Legend

- Surface Elevation
- - - Recorded Water Table 1/15/93
- Estimated Water Table

Scale: Vert. 1"=2' Horiz. 1"=100'

Cross-Section E/E'
Figure 12

 ENVIRONMENTAL SERVICES, INC.	<p>Trail Ridge Landfill Wetlands Monitoring Plan</p>	<table><tr><td>Project No.</td><td>91-297.4</td></tr><tr><td>Date</td><td>revised 1/15/93</td></tr><tr><td>Scale</td><td>as shown</td></tr><tr><td>Drawing No.</td><td>13 of 13</td></tr></table>	Project No.	91-297.4	Date	revised 1/15/93	Scale	as shown	Drawing No.	13 of 13
Project No.	91-297.4									
Date	revised 1/15/93									
Scale	as shown									
Drawing No.	13 of 13									

Attachment A

Permit Condition
for
Wetlands Monitoring
at
Trail Ridge Landfill

48. In order to evaluate the effects of the discharging of water from the stormwater management systems by pumping into the adjacent wetlands, the permittee shall establish a monitoring plan which shall include the following:

I. For the Class I Stormwater Management System:

(a) A Base Line Data Study shall be conducted which shall include the following:

(1) A detailed scaled plan site drawing shall be submitted to the Departments Northeast District Office which contains the location of all wetland stormwater discharge structures to include details of the structures. The jurisdictional delineation line shall be depicted on the drawings.

(2) A series of line transects shall be established, divided into appropriate intervals, and vegetation shall be determined by the appropriate methodology which shall be approved, in writing, by the Department. The transect vegetational data shall be compiled in a report format and submitted to the Northeast District of the Department.

(3) The transects shall be established at appropriate intervals along the areas of discharge and extend into the wetland areas to the lowest elevation along each transect line. All transect lines shall be approved by the Department prior to data collection for the Base Line Study. All transects shall be clearly indicated on the site plan drawing required in (1) above.

(4) The transect lines shall be permanently marked and utilized for all wetland stormwater discharge monitoring requirements established in this permit.

(5) Photographs along each established transect line shall be submitted as part of the Base Line Data Study. These photographs shall be labeled so as to graphically depict each interval along each transect line.

(6) At the wetland/upland boundary and at the mid-elevation of each transect as required in (2) above, a piezometer shall be installed to determine ground water elevations in the wetland discharge areas. A reference piezometer shall be established at the same elevation as the mid-elevation piezometer for each transect at a point extended along

PERMITTEE:

Trail Ridge Landfill, Inc.

I.D. Number: GMS3116P03090

Permit/Cert Number: SC16-184444

Date of Issue: 12-24-91

Expiration Date: 12-24-96

SPECIFIC CONDITIONS (CONT'D):

each transect so as to be at the greatest distance from the stormwater pond. These ground water elevations shall be recorded as part of each transect evaluation the location of each piezometer shall be clearly indicated for each transect as required in (1) above on the scaled site plan for each monitoring report.

(7) The complete Base Line Study shall be submitted to the Northeast District Office prior to the commencement of the construction of the stormwater pond.

(b) The wetland areas of discharge shall be monitored at 1 year intervals commencing one year from the start date of the construction of the stormwater pond until the expiration date of this permit. These monitoring reports shall utilize the transect established in the Base Line Study and shall include all the information required in the Base Line Study. These monitoring reports shall be submitted no later than two (2) weeks after each monitoring event. The monitoring requirements shall be reviewed and/or revised by the Department at the time of renewal of this permit.

(c) The permittee shall notify the Northeast District Office of the Department, in writing, of the start date of the stormwater pond and the date of the first wetland stormwater discharge within seven (7) days of the event.

(d) In the event of any quantified vegetational species compositional changes along any interval of any transect during any monitoring event, the permittee shall include any such changes in that periods monitoring report and include any proposed changes in the discharge schedule to mitigate these changes. The Department shall review the proposed changes and the permittee shall take what remedial actions deemed necessary by the Department.

(e) The permittee shall take all appropriate measures to insure that the wetland stormwater discharge system does not cause erosion into any wetland area during construction and operation.

(f) The wetland stormwater discharge system shall be completed and operational prior to excepting any waste in the Phase I, Class I Landfill.

II. For the Class III Stormwater Management System:

(a) All provisions of paragraphs (a), (b), (c), (d), and (e), shall apply to the Class III Storm Water Management System Wetland Discharge System.

(b) The wetland discharge system shall be completed and operational no later than 180 days from the commencement of the excavation of the Class III Stormwater Management Pond.

(c) The permittee shall notify the Northeast District Office of the Department, in writing, of the "start date" of the excavation of the Class III Stormwater Management Pond within 7 days of the commencement of the activity.

Trail Ridge Landfill Wetland Monitoring Plan

Attachment B

Color Photographs
of
Wetlands Adjacent to Stormwater Pond
for
Class I Landfill Cell

T1 - Transect 1

S1 - Sampling Plot 1

Photographs taken
12/92

TRAIL RIDGE LANDFILL



T1

Planted Pine/Gallberry Wetland along Transect 1.

TRAIL RIDGE LANDFILL



T1-S2



T1-S3

General photograph of St. Johns Wort/Grassy Wetland Pocket along Transect 1.

TRAIL RIDGE LANDFILL



T1-S4



T1-S5

TRAIL RIDGE LANDFILL



Spreader pipe adjacent to Transect 1.

TRAIL RIDGE LANDFILL



T2

St. Johns Wort/Grassy Wetland in foreground with Tupelo/Cypress swamp in background.



T2-S1

TRAIL RIDGE LANDFILL



T2-S2



Flow channel through Transect 2

TRAIL RIDGE LANDFILL



T2-S3



T2-S4

TRAIL RIDGE LANDFILL



T2-S5



T2-S6

TRAIL RIDGE LANDFILL



T2-S7

TRAIL RIDGE LANDFILL



T3

Survey marker (right) and piezometer (left)



In center of cut-over Hardwood Swamp looking east.

TRAIL RIDGE LANDFILL



T3-S1



T3-S2

TRAIL RIDGE LANDFILL



T3-S3



T3-S4

TRAIL RIDGE LANDFILL



Flow channel in the middle of Transect 3



Area of saturated soils within Transect 3.

TRAIL RIDGE LANDFILL



T3-S5



T3-S6

TRAIL RIDGE LANDFILL



Flow channel adjacent to T3-P6.

TRAIL RIDGE LANDFILL



Cut-over Hardwood Swamp looking south along Transect 4.



T4-S1

TRAIL RIDGE LANDFILL

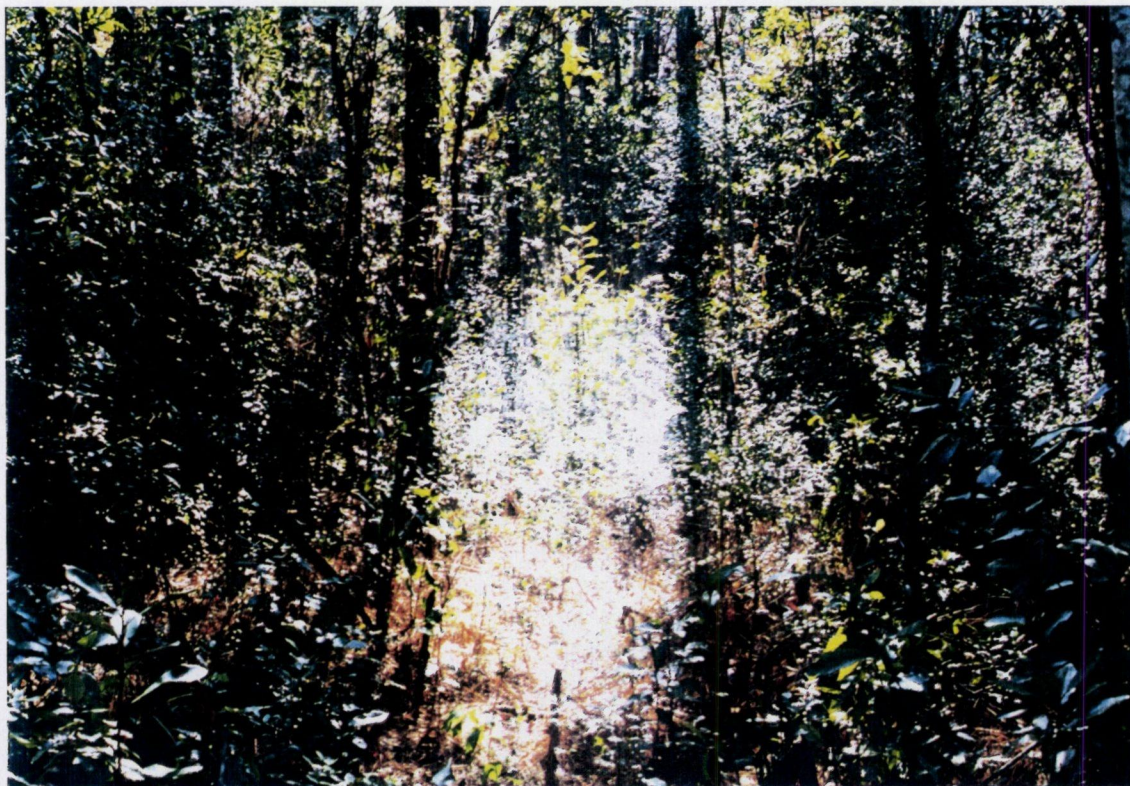


T4-S2



T4-S3

TRAIL RIDGE LANDFILL



Pond Pine Seepage Slope - Transect 5



T5-S1

TRAIL RIDGE LANDFILL



T5-S2



T5-S3

TRAIL RIDGE LANDFILL



Pond Pine Seepage Slope along Transect 6



Base of Tupelo within Transect 6

TRAIL RIDGE LANDFILL



T6-S1



T6-S2

TRAIL RIDGE LANDFILL



T6-S3

TRAIL RIDGE LANDFILL



Mature Hardwood Swamp along Transect 7



Transect 7

TRAIL RIDGE LANDFILL



T7-S2



T7-S3

Trail Ridge Landfill Wetland Monitoring Plan

Attachment C

Transect Data
from
December 1992

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE. December 1992	
TRANSECT NUMBER: 1		FIELD INVESTIGATOR. Dane Tullock	
<u>Hydrology</u> Piezometer No. P-1	<u>Water Elevation</u> <105.57' *	<u>Vegetation</u> Quadrat No. S-1	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
WETLAND COMMUNITY TYPE. Planted Pine/Gallberry			
NOTES: Quadrat could not be located. *Piezometer was dry at maximum depth			

(kh\2\Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE. December 1992	
TRANSECT NUMBER: 1		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-2	<u>Water Elevation</u> 105.76'	<u>Vegetation</u> Quadrat No. S-2	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Ilex glabra	U	100	
Aronia arbutifolia	U	5	
Magnolia virginiana	S	5	
Sphagnum sp	S	5	
Open (pine needles)		55	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Magnolia virginiana	S	Scattered in area	
Pinus elliotii	U	Planted in rows	
Nyssa sylvatica var b. flora	S	2 trees within 15'	
Eriocaulon sp	S	Scattered in groundcover	
Aronia arbutifolia	U	Scattered in groundcover	
Ilex glabra	U	Scattered in groundcover	
Smilax laurifolia	S	Scattered in groundcover	
WETLAND COMMUNITY TYPE. Planted Pine/Gallberry			
NOTES:			

(kh2Jan93(91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 1		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-3	<u>Water Elevation</u> 106.51'	<u>Vegetation</u> Quadrat No. S-3	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Sphagnum sp.	S	25	
Woodwardia areolata	T	5	
Osmunda cinnamomea	T	2	
Ernocaulon sp.	S	2	
Ilex glabra	U	100	
Smilax laurifolia	S	1	
Amphicarpum muhlenbergianum	U	60	
Open		5	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus elliotii	U	Planted in rows - stunted	
Magnolia virginiana	S	Sparse in canopy	
Ilex glabra	U	Scattered groundcover	
Ernocaulon sp.	S	Scattered groundcover	
Osmunda cinnamomea	T	Scattered groundcover	
Woodwardia areolata	T	Scattered groundcover	
WETLAND COMMUNITY TYPE: Planted Pine/Gallberry			
NOTES			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE. December 1992	
TRANSECT NUMBER. 1		FIELD INVESTIGATOR: Dane Tullock	
Hydrology Piezometer No. P-4	Water Elevation 106.33'	Vegetation Quadrat No. S-4	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Xyris jupicai	U	2	
Amphicarpum muhlenbergianum	U	80	
Ernocaulon sp	S	2	
Panicum sp.	U	1	
Hypericum fasciculatum	T	2	
Eleocharis sp	S	3	
Open ground		10	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Smilax laurifolia	S	Scattered groundcover	
Ilex glabra	U	Scattered groundcover	
Xyris jupicai	U	Scattered groundcover	
Pinus elliotii	U	Few - stunted	
Myrica cerifera	U	Scattered in subcanopy	
Nyssa sylvatica var. biflora	S	Scattered in subcanopy	
Acer rubrum	T	Scattered in subcanopy	
WETLAND COMMUNITY TYPE: Planted Pine/St. Johns Wort			
NOTES. Ground within plot saturated to surface Very few pines present in area of plot.			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE. December 1992	
TRANSECT NUMBER: 1		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-5	<u>Water Elevation</u> 106.06'	<u>Vegetation</u> Quadrat No. S-5	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Andropogon sp	U	20	
Lachnanthes caroliniana	T	3	
Amphicarpum muhlenbergianum	U	10	
Aristida stricta	U	2	
Open (pine needles)		65	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus elliotii	U	Sparse in canopy	
Acer rubrum	T	Several in subcanopy	
Gordonia lasianthus	S	1 or 2 trees	
Ilex myrtifolia	S	1 tree	
Hypericum fasciculatum	T	Scattered in groundcover	
Ilex glabra	T	Scattered in groundcover	
Nyssa sylvatica var biflora	S	2 saplings	
WETLAND COMMUNITY TYPE. Planted Pine/Gallberry			
NOTES. Pine canopy sparse near plot			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER. 2		FIELD INVESTIGATOR: Dane Tullock	
Hydrology Piezometer No P-1	Water Elevation 102.57'	Vegetation Quadrat No. S-1	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Smilax laurifolia	S	5	
Ilex glabra	U	70	
Amphicarpum muhlenbergianum	U	40	
Panicum sp.	T	15	
Andropogon sp	U	10	
Eriocaulon sp.	S	5	
Open		5	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Nyssa sylvatica var biflora	S	A few saplings	
Xyris jupicai	U	Dominant groundcover	
Eriocaulon sp.	S	Dominant groundcover	
Ilex glabra	U	Dominant groundcover	
Hypericum fasciculatum	T	Dominant groundcover	
Smilax laurifolia	S	Dominant groundcover	
Lycopodium allopecuroides	U	Dominant groundcover	
WETLAND COMMUNITY TYPE Planted Pine/St. Johns Wort			
NOTES			

(kh2Jan93/91-297.4)

**TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND**

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 2		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-2	<u>Water Elevation</u> 102.43'	<u>Vegetation</u> Quadrat No. S-2	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Ilex glabra	U	15	
Smilax laurifolia	S	15	
Sphagnum sp	S	15	
Ernocaulon sp	S	5	
Centella asiatica	T	5	
Myrica cerifera	U	5	
Open		40	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Hypericum fasciculatum	T	Dominant groundcover	
Smilax laurifolia	S	Dominant groundcover	
Ilex glabra	U	Dominant groundcover	
Ilex myrtifolia	S	Dominant subcanopy	
Ernocaulon sp.	S	Dominant groundcover	
Sphagnum sp.	S	Dominant groundcover	
Panicum sp.	U	Dominant groundcover	
Rhyncosphora sp	U	Dominant groundcover	
WETLAND COMMUNITY TYPE: Planted Pine/St. Johns Wort			
NOTES.			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 2		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-3	<u>Water Elevation</u> 102.8	<u>Vegetation</u> Quadrat No. S-3	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Magnolia virginiana	S	10	
Liquidambar styraciflua	T	5	
Sphagnum sp.	S	25	
Ilex glabra	U	15	
Aristida stricta	U	20	
Ernanthus sp.	U	5	
Nyssa sylvatica var. biflora	S	5	
Enocaulon sp.	S	10	
Open (water)		5	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Nyssa sylvatica var. biflora	S	Scattered in canopy	
Magnolia virginiana	S	Several small trees	
Sphagnum sp.	S	Several small trees	
Ernanthus sp.	U	Scattered groundcover	
Cynilla racemiflora	I	Scattered in subcanopy	
Enocaulon sp.	S	Scattered groundcover	
Eleocharis sp.	S	Scattered groundcover	
WETLAND COMMUNITY TYPE: Hardwood Swamp (Recently cut)			
NOTES. Standing water in transect.			

(kh2Jan93/91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 2		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-4	<u>Water Elevation</u> 102.8	<u>Vegetation</u> Quadrat No. S-4	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Magnolia virginiana	S	2 (1 sapling)	
Taxodium distichum	S	3 (1 sapling)	
Sphagnum sp.	S	95	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Ilex myrtifolia	S	Widely scattered	
Acer rubrum	T	Widely scattered	
Nyssa sylvatica var. biflora	S	Dominant canopy	
Taxodium distichum	S	Dominant canopy	
Pinus elliotii	U	Dominant canopy	
Magnolia virginiana	S	Dominant canopy	
Serenoa repens	U	Near transect	
Ilex glabra	U	Near transect	
Myrica cerifera	U	Dominant groundcover	
Sphagnum sp.	S	Dominant groundcover	
WETLAND COMMUNITY TYPE			
NOTES: Standing water in transect and square meter plot.			

(kh\2Jan93\91-297 4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 2		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-5	<u>Water Elevation</u> 102.8	<u>Vegetation</u> Quadrat No. S-5	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Magnolia virginiana	S	10	
Nyssa sylvatica var. biflora	S	5	
Eriocaulon sp	S	10	
Sphagnum sp.	S	40	
Rhynchospora sp	U	10	
Aristida stricta	U	50	
Open		5	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Nyssa sylvatica var. biflora	S	Dominant canopy & subcanopy	
Pinus ellottii	U	Dominant canopy & subcanopy	
Magnolia virginiana	S	Dominant canopy & subcanopy	
Taxodium distichum	S	Dominant canopy & subcanopy	
Eriocaulon sp.	S	Scattered groundcover	
Rhynchospora sp.	U	Scattered groundcover	
Sarracenia minor	T	Scattered groundcover	
WETLAND COMMUNITY TYPE: Hardwood Swamp (recently cut)			
NOTES. Standing water in transect and near plot.			

(kh2Jan93/91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 2		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-6	<u>Water Elevation</u> 100.86'	<u>Vegetation</u> Quadrat No. S-6	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Ilex glabra	U	20	
Ilex coracea	T	2 shrubs	
Magnolia virginiana	S	2 trees	
Nyssa sylvatica var. biflora	S	1 tree	
Open Ground		80	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Ilex coracea	T	Dominant vegetation	
Ilex myrtifolia	S	Dominant vegetation	
Magnolia virginiana	S	Dominant vegetation	
Pinus ellioti	U	Dominant vegetation	
WETLAND COMMUNITY TYPE: Hardwood Swamp (recently cut)			
NOTES			

(kh\2Jan93\91-2974)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER. 2		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-7	<u>Water Elevation</u> 101.07'	<u>Vegetation</u> Quadrat No. S-7	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Ilex cornacea	T	5 (1 shrub)	
Ilex glabra	U	80	
Myrica heterophylla	U	10 (1 shrub)	
Sphagnum sp	S	10	
Open		65	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus elliotii	U	Planted - sole canopy species	
Ilex glabra	U	Dominant groundcover	
Ilex cornacea	T	Dominant groundcover	
Smilax laurifolia	S	Dominant groundcover	
Vitis sp.	U	Dominant groundcover	
Ptendium aquilinum	U	Dominant groundcover	
WETLAND COMMUNITY TYPE: Planted Pine/Gallberry			
NOTES.			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE. December 1992	
TRANSECT NUMBER: 3		FIELD INVESTIGATOR Dane Tullock	
<u>Hydrology</u> Piezometer No. P-1	<u>Water Elevation</u> 103.8'	<u>Vegetation</u> Quadrat No. S-1	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Lycopodium alopecuroides	U	60	
Ernocaulon sp	S	20	
Myrica heterophylla	U	10	
Ilex glabra	U	10	
Xyris jupicai	U	5	
Open		40	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Magnolia virginiana	S	A few trees	
Nyssa sylvatica var biflora	S	Scattered among canopy	
Pinus elliotii	U	Dominant canopy	
Acer rubrum	T	A few saplings	
Ilex coracea	T	Dominant groundcover	
Ilex glabra	U	Dominant groundcover	
Smilax lauriflora	S	Dominant groundcover	
Lycopodium alopecuroides	U	Scattered among groundcover	
WETLAND COMMUNITY TYPE: Planted Pine/St. Johns Wort			
NOTES.			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 3		FIELD INVESTIGATOR: Dane Tullock	
Hydrology Piezometer No. P-2	Water Elevation 103.35'	Vegetation Quadrat No. S-2	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Sarracenia minor	T	10	
Sphagnum sp.	S	80	
Enocaulon sp	S	5	
Lycopodium alopecuroides	U	2	
Ilex cornacea	T	3	
Myrica heterophylla	U	5	
Hypericum fasciculatum	T	2 shrubs	
Open		15	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Cynilla racemiflora	I	Dominant canopy	
Magnolia virginiana	S	Several large trees	
Nyssa sylvatica var biflora	S	Several saplings	
Acer rubrum	T	A few trees	
Smilax laurifolia	S	Dominant groundcover	
Hypericum fasciculatum	T	Dominant groundcover	
Myrica heterophylla	U	Dominant groundcover	
Sphagnum sp	S	Dominant groundcover	
WETLAND COMMUNITY TYPE. Planted Pine/St. Johns Wort			
NOTES Soils in plot saturated to the surface			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 3		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No P-3	<u>Water Elevation</u> 103.9'	<u>Vegetation</u> Quadrat No. S-3	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Myrica heterophylla	U	20	
Lyonia lucida	T	50	
Ilex coracea	T	20	
Aronia arbutifolia	U	10	
Sphagnum sp	S	35	
Open		20	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Magnolia virginiana	S	30% - Canopy	
Taxodium distichum	S	1 large tree	
Persea palustris	S	30% - Canopy	
Nyssa sylvatica var biflora	S	30% - Canopy	
Ilex coracea	S	Dominant groundcover	
Lyonia lucida	T	Dominant groundcover	
Sphagnum sp	S	Dominant groundcover	
WETLAND COMMUNITY TYPE: Hardwood Swamp (recently cut)			
NOTES. Standing water in transect			

(kh2Jan93\91-297 4)

**TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND**

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 3		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-4	<u>Water Elevation</u> 104.11'	<u>Vegetation</u> Quadrat No. S-4	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Sphagnum sp.	S	95	
Eriocaulon sp.	S	2	
Myrica heterophylla	U	2	
Rhynchospora sp	U	1	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Sphagnum sp.	S	Dominant groundcover	
Andropogon sp	U	Scattered groundcover	
Nyssa sylvatica var. biflora	S	Dominant canopy	
Myrica heterophylla	U	Scattered in groundcover	
Lyonia lucida	T	Scattered in groundcover	
Ilex myrtifolia	S	Scattered in subcanopy	
WETLAND COMMUNITY TYPE: Hardwood Swamp (recently cut)			
NOTES: Flowing channel at base of peizometer with common arrowhead (<u>Sagittaria latifolia</u>). Standing water present in quadrat.			

(Rh\2Jan93\91-297 4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: December 1992	
TRANSECT NUMBER: 3		FIELD INVESTIGATOR: Dane Tullock	
Hydrology Piezometer No. P-5	Water Elevation 103.25'	Vegetation Quadrat No. S-5	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Groundcover:			
Sphagnum sp.	S	40	
Cyperus or Carex sp	T	10	
Open		50	
Subcanopy:			
Ilex glabra	U	Several shrubs	
Ilex coriacea	T	Several shrubs	
Nyssa sylvatica var. biflora	S	1 large sapling	
Cynilla racemiflora	I	1 small shrub	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Magnolia virginiana	S	Dominant canopy	
Nyssa sylvatica var. biflora	S	Dominant canopy	
Taxodium distichum	S	Dominant canopy	
Cynilla racemiflora	I	Dominant subcanopy	
Myrica heterophylla	U	Dominant groundcover	
Smilax laurifolia	S	Dominant groundcover	
Sphagnum sp	S	Dominant groundcover	
Eriocaulon sp.	S	Dominant groundcover	
WETLAND COMMUNITY TYPE: Hardwood Swamp (recently cut)			
NOTES: Large area of standing water near peizometer.			

(kh2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY	DATE: December 1992	
TRANSECT NUMBER. 3	FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-6	<u>Water Elevation</u> 102.48'	<u>Vegetation</u> Quadrat No. S-6
GROUND COVER & SHRUBS		
<u>Species</u>	<u>Status</u>	<u>% Cover</u>
Lyonia lucida	T	90
Cynilla racemiflora	I	5
Aronia arbutifolia	U	5
Ilex glabra	U	10
VEGETATION IN GENERAL VICINITY		
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>
Pinus elliotii	U	Dominant canopy - in rows
Magnolia virginiana	S	Scattered among pines
Nyssa sylvatica var. biflora	S	Scattered among pines
Lyonia lucida	T	Dominant groundcover
Serenoa repens	U	Scattered among <u>Lyonia</u>
Aronia arbutifolia	U	Scattered among <u>Lyonia</u>
Ilex glabra	U	Scattered among <u>Lyonia</u>
Ilex casine	S	Scattered among <u>Lyonia</u>
Cynilla racemiflora	I	Scattered among <u>Lyonia</u>
WETLAND COMMUNITY TYPE. Hardwood Swamp (recently cut)		
NOTES:		

(kh2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: January 15, 1993	
TRANSECT NUMBER: 4		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-1	<u>Water Elevation</u> 107.90'	<u>Vegetation</u> Quadrat No. S-1	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Groundcover:			
Lycopodium alopecuroides	U	1	
Woodwardia areolata	T	1	
Carex or Cyperus sp.	T	50	
Dicanthelium sp.	U	50	
Open			
Shrubs:			
Myrica heterophylla	U	20	
Ilex glabra	U	20	
Hypericum fasciculatum	T	10	
Open		65	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus elliotii	U	Sparse - in rows	
Acer rubrum	T	Scattered among pines	
Nyssa sylvatica var. biflora	S	Scattered among pines	
Magnolia virginiana	S	Scattered among pines	
Hypericum fasciculatum	T	Dominant groundcover	
Myrica heterophylla	U	Dominant groundcover	
Smilax laurifolia	S	Dominant groundcover	
Aronia arbutifolia	U	Dominant groundcover	
Xyris lupicai	U	Groundcover	
Panicum sp.	U	Groundcover	
WETLAND COMMUNITY TYPE: Planted Pine/St. Johns Wort			
NOTES.			

(kh\Jan93\91-297 4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY	DATE: January 15, 1993
TRANSECT NUMBER: 4	FIELD INVESTIGATOR: Dane Tullock

<u>Hydrology</u> Piezometer No. P-2	<u>Water Elevation</u> 107.44'	<u>Vegetation</u> Quadrat No. S-2
--	-----------------------------------	--------------------------------------

GROUND COVER & SHRUBS		
<u>Species</u>	<u>Status</u>	<u>% Cover</u>
Groundcover:		
Centella asiatica	T	2
Sarracenia minor	T	3
Enocaulon sp.	S	70
Myrica heterophylla	U	10
Sphagnum sp.	S	5
Aristida stricta	U	10
Open		60
Shrubs:		
Ilex glabra	U	50
Hypericum fasciculatum	T	50
Nyssa sylvatica var. biflora	S	Scattered

VEGETATION IN GENERAL VICINITY		
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>
Pinus elliotii	U	Scattered - planted in rows
Nyssa sylvatica var. biflora	S	Mixed subcanopy
Magnolia virginiana	S	Mixed subcanopy
Ilex glabra	U	Groundcover
Ilex coriacea	T	Groundcover
Myrica heterophylla	U	Groundcover
Hypericum fasciculatum	T	Groundcover

WETLAND COMMUNITY TYPE: Planted Pine/St. Johns Wort
NOTES:

(kh\Jan93\91-2974)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY	DATE: January 15, 1993	
TRANSECT NUMBER: 4	FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-3	<u>Water Elevation</u> 108.69'	<u>Vegetation</u> Quadrat No. S-3
GROUND COVER & SHRUBS		
<u>Species</u>	<u>Status</u>	<u>% Cover</u>
Ilex cornacea	T	100
Lyonia lucida	T	90
Magnolia virginiana	S	5
VEGETATION IN GENERAL VICINITY		
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>
Pinus elliotii	U	Dominant canopy
Acer rubrum	T	Dominant canopy
Cynilla racemiflora	U	Dominant canopy
Nyssa sylvatica var. biflora	S	Dominant canopy
Magnolia virginiana	S	Dominant canopy
Ilex cornacea	T	Dominant groundcover
Lyonia lucida	T	Dominant groundcover
Osmunda cinnamomea	T	Dominant groundcover
WETLAND COMMUNITY TYPE: Hardwood Swamp (recently cut)		
NOTES. Flowing water 2" in depth adjacent to peizometer.		

(kh\Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY	DATE: January 15, 1993	
TRANSECT NUMBER. 5	FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-1	<u>Water Elevation</u> <110.28' (Dry)*	<u>Vegetation</u> Quadrat No. S-1
GROUND COVER & SHRUBS		
<u>Species</u>	<u>Status</u>	<u>% Cover</u>
Ilex glabra	U	100
Smilax bona-nox	U	5
Pteridium aquilinum	U	5
VEGETATION IN GENERAL VICINITY		
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>
Pinus serotina	T	Dominant canopy
Magnolia virginiana	S	Mixed canopy & subcanopy
Nyssa sylvatica var. biflora	S	Mixed canopy & subcanopy
Persea palustris	S	Mixed canopy & subcanopy
Acer rubrum	T	Mixed canopy & subcanopy
Ilex glabra	U	Dominant groundcover
Osmunda cinnamomea	T	Scattered groundcover
WETLAND COMMUNITY TYPE: Pond Pine Seepage Slope		
NOTES: *Piezometer dry at maximum depth		

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS 1 - STORMWATER POND

SECOND STUDY		DATE: January 15, 1993	
TRANSECT NUMBER: 5		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-2	<u>Water Elevation</u> <111.44' (Dry)*	<u>Vegetation</u> Quadrat No. S-2	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Ilex cornacea	T	70	
Ilex glabra	U	20	
Magnolia virginiana	S	5	
Leucothoe axillans	T	5	
Open (Pine needles)			
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus serotina	T	Dominant canopy	
Ilex glabra	U	Dominant groundcover	
Ilex cornacea	T	Dominant groundcover	
Nyssa sylvatica var. biflora	S	Dominant subcanopy	
Magnolia virginiana	S	Dominant subcanopy	
Osmunda cinnamomea	T	Dominant groundcover	
WETLAND COMMUNITY TYPE: Pond Pine Seepage Slope			
NOTES. *Piezometer dry at maximum depth.			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: January 15, 1993	
TRANSECT NUMBER: 5		FIELD INVESTIGATOR: Dane Tullock	
Hydrology Piezometer No. P-3	Water Elevation <110.06' (Dry)*	Vegetation Quadrat No. S-3	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Ilex glabra	U	40	
Magnolia virginiana	S	5	
Aronia arbutifolia	U	2	
Myrica cerifera	U	10	
Open (Pine needles)		70	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus serotina	T	Dominant canopy	
Nyssa sylvatica var. biflora	S	Dense subcanopy	
Magnolia virginiana	S	Dense subcanopy	
Pinus elliotii	U	Dense subcanopy	
Myrica heterophylla	U	Dominant shrub & groundcover	
Myrica cerifera	U	Dominant shrub & groundcover	
Ilex glabra	U	Dominant shrub & groundcover	
WETLAND COMMUNITY TYPE: Pond Pine Seepage Slope			
NOTES: *Piezometer dry at maximum depth. Little to no herbaceous coverage in this area.			

(kh2Jan93(91-297)4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: January 15, 1993	
TRANSECT NUMBER: 6		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-1	<u>Water Elevation</u> 114.96'	<u>Vegetation</u> Quadrat No. S-1	
GROUND COVER & SHRUBS			
<u>Species:</u> *Shrubs	<u>Status</u>	<u>% Cover</u>	
Nyssa sylvatica var. biflora	S	5	
Ilex glabra	U	90	
Itea virginica	S	10	
Aronia arbutifolia	U	5	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus elliotii	U	Dominant canopy	
Persea palustris	S	Scattered subcanopy	
Magnolia virginiana	S	Scattered subcanopy	
Nyssa sylvatica var. biflora	S	Scattered subcanopy	
Ilex glabra	U	Dominant groundcover	
Aronia arbutifolia	U	Dominant groundcover	
Smilax laurifolia	S	Dominant groundcover	
WETLAND COMMUNITY TYPE: Pond Pine Seepage Slope			
NOTES: *No real groundcover species present in quadrat.			

(kh2Jan93/91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: January 15, 1993	
TRANSECT NUMBER: 6		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-2	<u>Water Elevation</u> 113.75'	<u>Vegetation</u> Quadrat No. S-2	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Ilex cornacea	T	70-80	
Open (Pine needles)		30-20	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus serotina	T	Dominant canopy	
Pinus elliotii	U	Dominant canopy	
Nyssa sylvatica var. biflora	S	Dominant canopy	
Acer rubrum	T	Dominant canopy	
Persea palustris	S	Dominant canopy	
Aronia arbutifolia	U	Dominant groundcover	
Ilex cornacea	T	Dominant groundcover	
WETLAND COMMUNITY TYPE: Pond Pine Seepage Slope			
NOTES.			

(kh\2Jan93\91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY	DATE: January 15, 1993	
TRANSECT NUMBER: 6	FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-3	<u>Water Elevation</u> 113.99'	<u>Vegetation</u> Quadrat No. S-3
GROUND COVER & SHRUBS		
<u>Species</u>	<u>Status</u>	<u>% Cover</u>
Leucothoe axillaris	T	100
Ilex coriacea	T	50
Nyssa sylvatic var. biflora	S	50
VEGETATION IN GENERAL VICINITY		
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>
Nyssa sylvatica var. biflora	S	50% Dominant canopy
Pinus serotina	T	5% Dominant canopy
Acer rubrum	T	5% Dominant canopy
Magnolia virginiana	S	5% Dominant canopy
Pinus elliotii	U	5% Dominant canopy
Lyonia lucida	T	Dominant groundcover
Leucothoe axillaris	T	Dominant groundcover
Ilex coriacea	T	Dominant groundcover
Woodwardia virginica	T	Dominant groundcover
Cynilla racemiflora	I	5% Dominant canopy
WETLAND COMMUNITY TYPE: Hardwood Swamp (uncut)		
NOTES. Small channel with standing water proximate to peizometer.		

(kh\2Jan93\91-2974)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY		DATE: January 15, 1993	
TRANSECT NUMBER: 7		FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-1	<u>Water Elevation</u> 110.80'	<u>Vegetation</u> Quadrat No. S-1	
GROUND COVER & SHRUBS			
<u>Species</u>	<u>Status</u>	<u>% Cover</u>	
Ilex glabra	U	90	
Smilax glauca	U	3	
Smilax laurifolia	S	2	
Dicranthelium sp.	U	5	
VEGETATION IN GENERAL VICINITY			
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>	
Pinus elliotti	U	Dominant canopy	
Magnolia virginiana	S	Dominant subcanopy	
Persea palustris	S	Dominant subcanopy	
Nyssa sylvatica var. biflora	S	Dominant subcanopy	
Ilex glabra	U	Dominant groundcover	
Smilax glauca	U	Dominant groundcover	
WETLAND COMMUNITY TYPE: Planted Pine/Gallberry			
NOTES:			

(kh2Jan93/91-2974)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY	DATE. January 15, 1993
TRANSECT NUMBER: 7	FIELD INVESTIGATOR: Dane Tullock

<u>Hydrology</u> Piezometer No. P-2	<u>Water Elevation</u> 109.79'	<u>Vegetation</u> Quadrat No. S-2
--	-----------------------------------	--------------------------------------

GROUND COVER & SHRUBS		
<u>Species</u>	<u>Status</u>	<u>% Cover</u>
Ita virginica	S	40
Aronia arbutifolia	U	10
Leucothoe axillaris	T	80

VEGETATION IN GENERAL VICINITY		
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>
Pinus elliotii	U	Dominant canopy
Ilex cassine	S	Dominant thick subcanopy
Persea palustris	S	Dominant thick subcanopy
Magnolia virginiana	S	Dominant thick subcanopy
Ilex coriacea	T	Dominant shrub & groundcover
Leucothoe axillaris	T	Dominant groundcover
Nyssa sylvatica var. biflora (sapling)	S	Dominant shrub & groundcover
Ilex glabra	U	Dominant groundcover
Sphagnum sp.	S	Dominant groundcover
Ericaulon sp.	S	Dominant groundcover

WETLAND COMMUNITY TYPE: Planted Pine/Gallberry
--

NOTES.

(kh2Jan93/91-297.4)

TRAILRIDGE LANDFILL - WETLANDS MONITORING PLAN
CLASS I - STORMWATER POND

SECOND STUDY	DATE: January 15, 1993	
TRANSECT NUMBER: 7	FIELD INVESTIGATOR: Dane Tullock	
<u>Hydrology</u> Piezometer No. P-3	<u>Water Elevation</u> 109.67'	<u>Vegetation</u> Quadrat No. S-3
GROUND COVER & SHRUBS		
<u>Species</u>	<u>Status</u>	<u>% Cover</u>
Persea palustris	S	2
Osmunda cinnamomea	T	3
Open		95
Nyssa sylvatica var. biflora	S	2 trees in quadrat
Persea palustris	S	2 saplings in quadrat
VEGETATION IN GENERAL VICINITY		
<u>Species</u>	<u>Status</u>	<u>Relative Abundance</u>
Nyssa sylvatica var. biflora	S	Dominant canopy
Pinus elliotii	U	Dominant canopy
Acer rubrum	T	Dominant canopy
Persea palustris	S	Dominant canopy
Ilex coriacea	T	Dominant subcanopy
Ilex glabra	U	Widely scattered
Leucothoe axillaris	T	Dominant groundcover
WETLAND COMMUNITY TYPE: Pond Pine Seepage Slope		
NOTES:		

(kh\2Jan93\91-297.4)