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MARSH RESOURCES INC.



Pott Creek Mitigation Bank
Mitigation Banking Instrument
Lincoln County, North Carolina



March 28, 2001

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1. INTRODUCTION

Rummel, Klepper, and Kahl, LLP is submitting this prospectus for the Mitigation Banking Instrument(MBI) for the proposed 75-acre Pott Creek Wetland Mitigation Bank in Lincoln County, North Carolina. The project is intended to restore 52 acres of wetlands, and 5,400 linear feet of stream historically present on the site. The purpose of these restorations is to provide the North Carolina Department of Transportation (NCDOT) with mitigation credits needed to compensate for projects occurring within the Catawba River Basin. It is estimated in the next five to ten years, highway construction will impact 55 acres of riverine and 20 acres of non-riverine wetlands in the Catawba River Basin. This prospectus is intended to provide regulatory agencies with sufficient information on the establishment and operation of the mitigation bank and to initiate regulatory review through the Mitigation Bank Review Team (MBRT) process of the bank and its sponsor, Rummel, Klepper, and Kahl, LLP (RK&K) in partnership with Marsh Resources Inc. (MRI).

2. REGULATORY AGENCY INVOLVEMENT

According to the Vol. 60, No. 228 Federal Register Notice entitled *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks*, it is expected that the following federal and state agencies will comprise the Mitigation Bank Review Team (MBRT):

- Federal: Army Corps of Engineers (COE)-**Chair**
- Environmental Protection Agency (USEPA)
- US Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)
- Natural Resources Conservation Service (NRCS)
- State: North Carolina Department of Environmental and Natural Resources (NCDENR)
- Division of Water Quality (DWQ)

3. BANK GOALS AND OBJECTIVES (M_{DNU})

The Pott Creek Site is located in the Piedmont Physiographic province of North Carolina. The purpose of the restorations is to provide the North Carolina Department of Transportation(NCDOT) with mitigation credits needed to compensate for projects occurring within the Catawba River basin. It is estimated in the next five to ten years, highway construction will impact 55acres of riverine and 20 acres of non-riverine wetlands in the Catawba River Basin.

Pott Creek is the major waterway influencing the site and acting as the northern boundary. The upland area to the south of the wetland site contains two ponds, classified by the National Wetland Inventory as palustrine, unconsolidated bottom, permanently flooded, and impounded (PUBHh). There are several ditches on site which are currently facilitating drainage of the site into Pott Creek. The site is currently being utilized as a pasture and hay meadow.

The goal of the project is to restore the wetlands associated with the floodplain of Pott Creek. The site is currently drained by a series of ditches. The proposed design includes filling in the ditches and doing some minor grading to provide uniform distribution of water across the site. A shallow channel will be constructed that will serve to distribute the water. The channel will include meanders that closely resemble a natural stream based upon the reference reaches noted in **Appendix 6**. The site will be planted with nursery grown native trees, shrubs and herbaceous species. The primary source of water will be from surface water runoff from the local watershed. There are a few groundwater seeps that will be investigated further to determine if they can provide additional water to the site.

RK&K proposes to include a significant upland buffer to be placed in a conservation easement. The upland buffer area is an integral part of the wetland restoration program and will provide an improvement to the overall water quality by serving as a primary filter. The open upland areas will be reforested with native trees and shrubs.

4. OWNERSHIP OF BANK LANDS

The Pott Creek site is currently owned by Marsh Resources Inc. (MRI), a subcontractor of RK&K. Upon final acceptance by the resource agencies and the North Carolina Department of Transportation (NCDOT), MRI will deed the land to NCDOT or to an approved land holding entity. This entity may be a nonprofit organization (i.e., The Nature Conservancy, The Catawba Lands Conservancy) or the state. An endowment for perpetual management and monitoring of the site will be provided to the land holding entity and will be determined by MRI and the receiving organization.

5. BANK SIZE AND CLASSES OF WETLANDS AND/OR AQUATIC RESOURCES PROPOSED FOR INCLUSION IN THE BANK

There are presently no wetlands classified by National Wetland Inventory (NWI) on site. The majority of the site has been drained by a series of ditches and was recently used as pasture and hay meadow. Soils on the site have been delineated by a certified soil scientist and indicate the site contains 28.64 acres of drained wetlands (Chewacla (ChA) hydric soils) and 7.73 acres of wetlands (Wehadkee (We) hydric soils). Wetland and soils delineation mapping is included in **Appendix 1**.

The proposed bank size includes 52 acres of wetlands and 5,400 lf of stream. The mitigation approach for this site involves three planting zones. Species selected include native herbaceous emergent wetland plants and native wetland trees and shrubs. Zone A is the riverine system that occurs along the channel banks and within the channel. Zone B is the low marsh community that occurs from the edge of the channel. This is a transitional community from the channel to a bottom-land wetland. Zone C is the bottom-land wetland community that extends to the upland transition area. In addition, RK&K proposes to include a significant upland buffer to be placed in a conservation easement. The preliminary design drawings and planting schedule can be found in **Appendix 2** and **3**, respectively. Aerial photography of the site is provided in **Appendix 4**.

6. DESCRIPTION OF BASELINE CONDITIONS AT THE BANK SITE

Although there are not presently any on site National Wetland Inventory (NWI), mapping presently designates only two small wetland areas in the immediate vicinity of the Pott Creek site as shown on the map included in **Appendix 5**. These sites are located in the upland area to the south of the site and are classified by the NWI as palustrine, unconsolidated bottom, permanently flooded, and impounded (PUBHh).

6-1 SOILS

Soils on the site have been mapped by a certified soil scientist. Field investigation resulted in the delineation of 7.73 acres of wetlands (Wehadkee (We) hydric soil series) and 28.64 acres of drained wetlands (Chewacla (ChA) hydric soil series). The Chewacla loam series constitutes the majority of the site. This soil is seasonally inundated, consisting of very deep soil, somewhat poorly drained and associated with floodplains along creeks and rivers throughout the area. Infiltration is moderate, and runoff is slow. The soil is moderately permeable with a seasonally high water table within 0.5 to 1.5 feet. The depth to bedrock is more than five feet. The soils are fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts. This series is listed as a hydric soil type on the national list of hydric soils, but is not listed on the local list of hydric soils.

The entire floodplain of the site is mapped as Chewacla loam 0-2 percent slope, frequently flooded (ChA) in the Soil Survey of Lincoln County. Chewacla soils formed in recent alluvium derived from metamorphic and igneous rocks, and are somewhat poorly drained. The Chewacla series is classified as hydric in North Carolina by the Natural Resources Conservation Service (NRCS) based on the frequency and duration of flooding.

Soil profiles from twelve, hand-auger borings were examined and described to assess soil characteristics throughout the site. The soil borings were typically advanced to a depth of 60 inches or until groundwater was encountered. It was found that the majority of soils on the site closely resemble the official series description (OSD) prepared by the NRCS for Chewacla soils. Approximately 28 acres of the site contain Chewacla soils. Inclusions of dissimilar soils were also

identified on the site, including approximate 8 acres of poorly drained soils (Wehadkee series), and approximately 15 acres of well drained soils (Riverview series). A number of drainage ditches and a man-made levee along the banks of Pott Creek are present throughout the site. The ditches and flood control measures appear to have altered drainage to promote agricultural use of the site. The elimination of the drainage ditches and breaching the levee would re-establish frequent flooding for long duration on the site, and therefore restore the hydrology to drained, hydric soils under criterion 4 of the Criteria for Hydric Soils, established by the National Technical Committee for Hydric Soils (2000).

6-1.2 FERTILITY ANALYSIS

Soils were evaluated for fertility analysis at two locations on the Pott Creek Site, a ditched area on the western portion of the property and a forested area located in the middle of the property. A soil test was also prepared for the Hunting Creek Swamp reference ecosystem. Soils were tested for pH, nitrate nitrogen, phosphorous (P), potassium (K), and humus. The results for each site are listed below in **Table 1**.

TABLE 1. FERTILITY SAMPLING RESULTS					
Site	Soil Test Results				
	pH	Nitrate Nitrogen (lb/ac)	P (lb/ac)	K (lb/ac)	Humus
Pott Creek Ditch	6.0	20	100	280	2-medium
Pott Creek Forest	6.0	20	100	350	1-low
Hunting Creek	6.4	60	75	260	2-medium

The Pott Creek locations are heavily eroded as a result of cattle grazing, and in many areas, the upper soil layers are minimal to absent. Testing indicates that additional nitrogen is needed. The recommended quantity for both Pott Creek sites is 80 lb/ac of nitrogen fertilizer. In addition, the forested Pott Creek site had low organic matter, and organic matter inputs are recommended. Results for the Hunting Creek reference site suggest that soil components are sufficient and no additions are recommended.

The proposed plantings fall within a pH range of 4.5 to 8.0. Fertility testing indicates a pH of 6.0 at the Pott Creek Site. Soil test results indicate that soils are within the proposed planting standards.

6-2 HYDROLOGY

The Pott Creek site lies within the Catawba River Basin, subbasin 03-08-35, hydrologic unit code 03050102040020, which corresponds to Unit 10 as defined by N.C. Wetlands Restoration Program-Division of Water Quality (NCWRP). This subbasin has received a “Priority” designation by the (NCWRP). The South Fork of the Catawba River lies approximately 0.4 miles east of the project. A biological assessment site along SR 1217 and Potts Creek received a “Fair” rating by NCDENR: DWQ in 1997.

Pott Creek is classified as WS-IV from a point 0.3-mile upstream of SR 1217 to the South Fork of the Catawba River. Class WS-IV indicates waters protected as water supplies. These waters are found in moderately to highly developed watersheds where point source discharges of treated wastewater are permitted; local programs to control nonpoint source and stormwater discharge are required, and are suitable for all Class C uses.

The hydrologic inputs for the site consist of rain and surface water runoff within the sites drainage area, intermittent and perennial streams, drainage from an existing pond located upland from the wetland site, and potential groundwater springs and/or seeps within the drainage area of the site.

Flood Insurance Rate Mapping (FIRM) from the Federal Emergency Management Agency (1978) indicates the Pott Creek site is located in the 100-year flood zone, Zone A, as shown in **Appendix 7**.

The TR-55 model was used to determine total runoff at the site. The total drainage for the site is 538 acres. Runoff (Q) and peak discharge were calculated for 2-week, 2-year, and 5-year storms as presented below in **Table 2**.

TABLE 2. TR-55 DISCHARGE MODEL			
Storm Frequency	2-Week	2-Year	5-Year
Runoff (in.)	0.35	1.30	2.05
Peak Discharge (cfs)	77	112	183

A runoff of 0.35 inches produces a total volume of 638,529cf, which corresponds to a static water depth of 4 inches of water over the site. In order to produce wetland conditions, the infiltration rate will be reduced through soil amendments and/or grading the site. Hydrology data sheets for the TR-55 model are included in **Appendix 8**.

6-3 EVALUATION FOR PLANNED WETLANDS

The objective of the mitigation is to improve functions in order to return and protect the natural riverine and nonriverine wetlands associated with the floodplain of Pott Creek. An Evaluation for Planned Wetland (EPW) Report was prepared for two locations on the Pott Creek Site: a ditched area on the western portion of the property and a forested area located in the central portion of the property. An EPW was also prepared for a reference ecosystem, Hunting Creek Swamp. The reference ecosystem is a 136 acre floodplain forest located in Davie County, North Carolina.

Hunting Creek Swamp is located within the Yadkin-Pee Dee River Basin, approximately 12 miles northwest of Mocksville and 45 miles northeast of the Pott Creek site. The site is owned and managed by the North Carolina Wildlife Resource Commission (NCWRC). This site represents a protected, mature floodplain forest community. Hunting Creek Swamp, like the Pott Creek site, is located within the Piedmont Physiographic Region on a tertiary stream with soils in the adjacent floodplain. Soils at the site are composed almost entirely of the Chewacla (Ch) soil series with the Pacolet soil series located on the eastern portion of the site adjacent to County Line Rd (SR#1338).

Mature palustrine forested broad-leaved deciduous (PFO1) communities reside along Hunting Creek and palustrine emergent persistent (PEM1) and palustrine scrub-shrub broad leaved deciduous (PSS1) wetlands are located south of the stream. A site map is included in **Appendix 6**.

The Functional Capacity Index (FCI) was calculated for functions at each site and is listed in **Table 3**. The EPW report indicated that among the functions in need of improvement are shoreline bank erosion control, sediment stabilization, water quality, non-tidal stream/river fishery functions, and uniqueness heritage.

TABLE 3. EVALUATION FOR PLANNED WETLANDS FUNCTIONAL CAPACITY INDEX					
Functional Capacity Index					
Function	Site Location				
	Pott Creek Ditch		Pott Creek Forest		Hunting Creek
	Present	Planned	Present	Planned	Present
Shoreline Bank Erosion Control	0.44	0.76	0.35	0.40	0.39
Sediment Stabilization	0.11	0.67	0.11	0.61	0.70
Water Quality	0.35	0.71	0.35	0.54	0.59
Wildlife	0.16	0.57	0.33	0.55	0.50
Fish (Non-tidal stream/river)	0.20	0.63	0.36	0.66	0.70
Uniqueness Heritage	N/A	1.0	N/A	1.0	1.0

7. GEOGRAPHIC SERVICE AREA

The Pott Creek site is located within the Catawba River Basin, sub-basin 35 (03-08-35), hydrologic unit code - 03050102040020, which corresponds to Unit 10 as defined by N.C. Wetlands Restoration Program - Division of Water Quality. The drainage area to the site is approximately 538 acres. The geographic service area is proposed to include the entire Catawba River Basin.

8. WETLAND CLASSES OR OTHER AQUATIC RESOURCE IMPACTS SUITABLE FOR COMPENSATION

The proposed design will restore present pasture/hay meadow to the floodplain forest community historically associated with Pott Creek. The resulting wetland community will be suitable for compensation of impacts to floodplain forest communities, commonly found in the piedmont region of North Carolina. In addition, the design plan proposes 5,400 lf of stream restoration which may compensate for degraded and eroded streams located within the Catawba River Basin.

9. METHODS FOR DETERMINING CREDITS AND DEBITS

It is expected that restoration of the wetlands historically associated with the Pott Creek site will result in restoration credits in a 2:1 ratio. The US Army Corps of Engineers indicated to RK&K in its December 1, 1999 meeting that the inclusion of the upland buffer may reduce the wetland mitigation ratios. It is anticipated that a 2:1 replacement ratio will be reduced to a 1:1 ratio if a significant upland buffer as proposed is included as part of the overall design, however, final mitigation credits will be determined by the appropriate regulatory agencies during the MBRT process.

10. ACCOUNTING PROCEDURES

Within the MBI, an approved credit accounting procedure will be established. The accounting procedure will include a mechanism to track credit releases based on achieving and documenting mitigation bank milestones. Each approved credit deduction will be documented and the MBRT

will be notified. This notification will include a copy of the Bill of Sale and will refer to the permit number and conditions. An annual transaction ledger will be submitted to the MBRT lead agency by 31 December of each year.

11. PERFORMANCE STANDARDS FOR DETERMINING CREDIT AVAILABILITY AND BANK SUCCESS

All mitigation plans and banking documents will be submitted to MBRT for approval prior to bank transactions. Approval will require a demonstration of financial and legal assurances to create and operate the mitigation bank by the sponsor, RK&K. Monitoring will be performed for a minimum of five years or until success criteria are met and the bank is closed. Monitoring is proposed for both vegetation and hydrology. A final monitoring report will be submitted after the bank is closed and all the credits have been used.

12. REPORTING PROTOCOLS AND MONITORING PLANS

Monitoring of the wetland mitigation site will be performed until success criteria are met as defined in the COE permit and the MBI. Monitoring is proposed for vegetation and hydrology. The monitoring plan will be designed in accordance with the United States Army Corps of Engineers Compensatory Hardwood Mitigation Guidelines (1993a).

Vegetation

Prior to planting, the site will be inspected and checked for proper elevation and suitability of soils. Availability of acceptable, good quality plant species will be determined. The site will be inspected at completion of planting to verify that the proposed planting methods, including proper plant spacing, density, and species composition were implemented correctly.

During the first year, vegetation will receive a cursory, visual examination to evaluate the degree of overtopping of the seedlings by herbaceous plants. Quantitative sampling of the vegetation will

be performed between August 1 and November 30 at the end of the first year and after each growing season until the vegetation criterion is met.

In preparation of the quantitative sampling, 0.05 acre vegetative plots will be established in the reforested area. Plots will be randomly placed throughout the wetland mitigation site. Sample plot distribution will be correlated with the hydrological monitoring locations to help correlate data between vegetation and hydrology parameters. For each plot, species composition and density will be reported. Photo points will be taken within each zone. Monitoring will take place each year for a minimum of five years.

If for any monitoring year, vegetation survival is not successful, as determined by the Corps of Engineers criteria (85% cover), remedial action required by the COE may be performed. The site may need to be replanted.

Hydrology

Hydrology will be monitored through the use of monitoring gauges during each growing season for the first five years of the vegetative monitoring, or until performance criteria have been met, whichever occurs later. Ten monitoring gauges will be installed in accordance with COE guidelines (COE 1993b).

Hydrology will be considered successful if the soil is ponded, flooded, or saturated within 12 inches of the surface for at least 5 to 12.5% of the growing season, assuming normal precipitation.

If there are no normal precipitation years during the first five years of monitoring, to meet performance criteria, RK&K will continue to monitor hydrology on the site until it shows that the site has been inundated or saturated as described above during a normal precipitation year.

In the event there are years of normal precipitation during the monitoring period, and the data for that year do not show that the site has been inundated or saturated within the upper 12 inches of

the soil between 5 to 12.5% of the growing season, the COE may require remedial action. RK&K will perform such required remedial action, and continue to monitor hydrology on the site until the site has been inundated or saturated as described above, during a normal precipitation year. If the COE determines that further remediation is not appropriate, other options will be considered.

Macrobenthos

Benthic macroinvertebrates (or aquatic insects) will be monitored to demonstrate that mitigation has successfully replaced the ecological functions of a stream reach. Macroinvertebrate surveys will be conducted in the ditched areas, prior to restoration on the Pott Creek site. Initial surveys will also be conducted in the reference ecosystem.

After the restoration is in place, sampling will occur each year for five years at the approximate same time. The samples will be conducted during the summer months of June – September. A pebble count to assess channel materials will be done concurrent with each benthic sample.

RK&K will submit yearly mitigation monitoring reports within 60 calendar days of each field assessment period for five years following final site restoration. These reports will include, at a minimum, vegetative sample plot, well and rainfall monitoring data; macrobenthos monitoring; photographs, including a location key; the status of the conveyance efforts; and problems/resolution; and will be provided to both the COE and the North Carolina Division of Water Quality.

13. CONTINGENCY AND REMEDIAL ACTIONS AND RESPONSIBILITIES

The annual report will note any conditions requiring remedial action and the cause will be determined. The bank sponsor, RK&K, will be responsible for problems relating to design, construction or maintenance issues. The success of the debited restoration, creation, enhancement and preservation activities will be assured by RK&K.

14. FINANCIAL ASSURANCES

Performance and maintenance bonds in the sum of \$ 3,042,000 will be posted in fulfillment of NCDOT requirements. RK&K is a limited liability partnership based in Baltimore, Maryland with a branch partnership based in Raleigh, NC. A statement of assets, liabilities, and capital through March 2000 is included in **Appendix 9**. Marsh Resources Inc. (MRI) is a partner with RK&K in the Pott Creek Mitigation Bank. MRI is a wholly owned subsidiary of The Williams Companies, Inc. which is based in Tulsa, Oklahoma. MRI has a branch office located in Mooresville, NC. A balance sheet for Marsh Resources Inc. is included in **Appendix 10**.

15. COMPENSATION RATIOS

The expected compensation ratio for establishing mitigation credits in the bank will be determined through the MBI process but is expected to range as follows: restoration ratio from 1:1 to 2:1; enhancement ratio 2:1; creation ratio 3:1; preservation ratio 5:1 to 10:1. Credit ratios will also be documented on a permit-by-permit basis by the appropriate permitting agency.

The following is an estimate of the mitigation credits produced by the Pott Creek Bank.

PROPOSED MITIGATION CREDITS	
Assuming 1:1 ratio for restoration of drained wetland soils (37 acres)	37 wetland credits
Assuming 3:1 ratio for wetland creation (15 acres)	5 wetland credits
5,400 linear feet stream restoration credits	5,400 lf stream credits
Assuming 5:1 ratio for upland buffer enhancement (231 acres)	46 enhancement credits

Totals

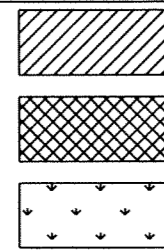
466 wetland mitigation credits
5,400 linear feet of stream restoration credits

16. PROVISIONS FOR LONG-TERM MANAGEMENT AND MAINTENANCE

The bank sponsor, RK&K in partnership with MRI, will be responsible for the success of the mitigation bank project. Monitoring of the site will continue for a minimum of five years, or until the restoration is deemed successful as described in Sections 11 and 12 above. The site will eventually be placed in a conservation easement and ownership will be transferred to either the North Carolina Department of Transportation or an approved land holding entity and, therefore, protected from future impacts. The term of the conservation easement will be in perpetuity and an endowment will be established for long range stewardship of the property.

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7	FEMA Mapping
8	Hydrology & Hydraulics Calculations
9	RK&K Financial Information
10	MRI Financial Information



Chewacla (ChA) Hydric Inclusion
 28.64 acres
 Wehadkee (We) Hydric Soil
 7.73 acres
 Jurisdictional Wetlands
 7.73 acres



North Carolina
 Department of Transportation
 Division of Highways
 Project Development and
 Environmental Analysis Branch
 P.O. Box 25201
 Raleigh, N.C. 27611

POTT CREEK AT KILLIAN ROAD
 LINCOLN COUNTY, NORTH CAROLINA



designed by: M.S.
 drawn by: M.S.
 checked by: J.T.P.

Pott Creek Wetland Mitigation Site

Wetlands & Hydric Soils

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Planting and seeding specifications are listed below:

Nursery Materials:

<u>Genus/Species</u>	<u>Common Name</u>	<u>Size</u>	<u>Zone</u>
<i>Pontederia cordata</i>	Pickeralweed	dormant bulbs	A
<i>Asclepias incarnata</i>	Swamp milkweed	seed	A/B
<i>Juncus effusus</i>	Soft Rush	seed	B
<i>Scirpus pungens</i>	Common three-square	seed	B
<i>Cornus amomum</i>	Silky Dogwood	bare root	B/C
<i>Viburnum dentatum</i>	Arrow wood	bare root	B/C
<i>Agrostis alba</i>	Redtop	seed	B/C
<i>Panicum virgatum</i>	Switch grass	seed	B/C
<i>Acer rubrum</i>	Red Maple	bare root	C
<i>Platanus occidentalis</i>	Sycamore	bare root	C
<i>Acer negundo</i>	Box elder	bare root	C

Specifications:

Zone A

Dormant bulbs of *Pontederia cordata* will be planted two feet on center throughout all elevations staked/flagged as Zone A. The bulbs will be at least one year of age.

Planting holes will be prepared that are 8" to 10" deep and approximately 6" wide, followed by successively:

- adding one fluid ounce (30 grams) of 8- to 9-month OSMOCOTE 18-6-12 fertilizer, or equivalent substitute, to the bottom of each planting hole. It is recommended to use a one fluid ounce ice cream scoop to disburse the fertilizer;
- placing one planting unit (bulb) on top of the fertilizer with the shoot pointing up; and
- backfilling the planting hole with substrate.

Zone B

Bare root stock will be planted six feet on center throughout all elevations staked/flagged as Zone A and B. Planting holes will be prepared that are 4" to 6" deep and approximately 6" wide, followed by successively:

- adding one fluid ounce (30 grams) of 8- to 9-month OSMOCOTE 18-6-12 fertilizer, or equivalent substitute, to the bottom of each planting hole. It

is recommended to use a one fluid ounce ice cream scoop to disburse the fertilizer;

- ❑ placing one planting unit on top of the fertilizer with the shoot pointing up; and
- ❑ backfilling the planting hole with substrate.

Zone C

All woody plants for planting in Zone C will be bare root. Shrubs and trees will be planted ten feet on center. Each planting hole is to be backfilled with a mixture of 50% existing substrate and 50% leaf compost, or a compost.

Upon backfilling the planting hole, two fluid ounces (60 grams) of 8- to 9-month release OSMOCOTE 18-6-12 fertilizer will be distributed around the roots of the plant approximately two inches (2") below the substrate surface. It is recommended to use a one fluid ounce ice cream scoop to disburse the fertilizer. The top of the root ball of the plant will be level with the substrate surface. Excess substrate shall be distributed around the planting sites. No saucers shall be constructed around the planting sites with the excess substrate.

Following planting, each tree and shrub shall be watered to the point of substrate saturation using on-site water.

A mixture of *Panicum virgatum* (Blackwell variety) and *Agrostis alba* shall be seeded throughout all unplanted areas in Zones B and C and around the planted trees and shrubs in Zone C. The seed mixture shall consist of 2 PLS lb (2 lb of Pure Live Seed) of *P. virgatum* and 1.0 PLS lb of *A. alba* for every 10,000 sq ft of area to be seeded. Where trees and shrubs have been planted in Zone C, seed shall be distributed with care being taken not to distribute seed on top of the planting holes of the trees and shrubs. Seed then shall be raked to within 1/8" of the substrate surface. No fertilizer shall be broadcast over the seeded area.

For all unplanted areas in Zone C, seed shall be broadcast using a cyclone seeder followed by subsurface sowing of the seed to within 1/8" of the substrate surface using an ATV with a cultipactor or a drag. No fertilizer shall be broadcast over the seeded areas.

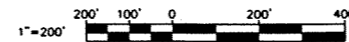


Source Data
 Property Lines - Wilkins & Associates, Inc.
 Aerial Photography - L. Robert Kimball and Associates



North Carolina
 Department of Transportation
 Division of Highways
 Project Development and
 Environmental Analysis Branch
 P.O. Box 25201
 Raleigh, N.C. 27611

POTT CREEK AT KILLIAN ROAD
 LINCOLN COUNTY, NORTH CAROLINA



designed by: M.S.
 drawn by: M.S.
 checked by: J.T.P.

Pott Creek Wetland Mitigation Site

AERIAL PHOTOGRAPHY



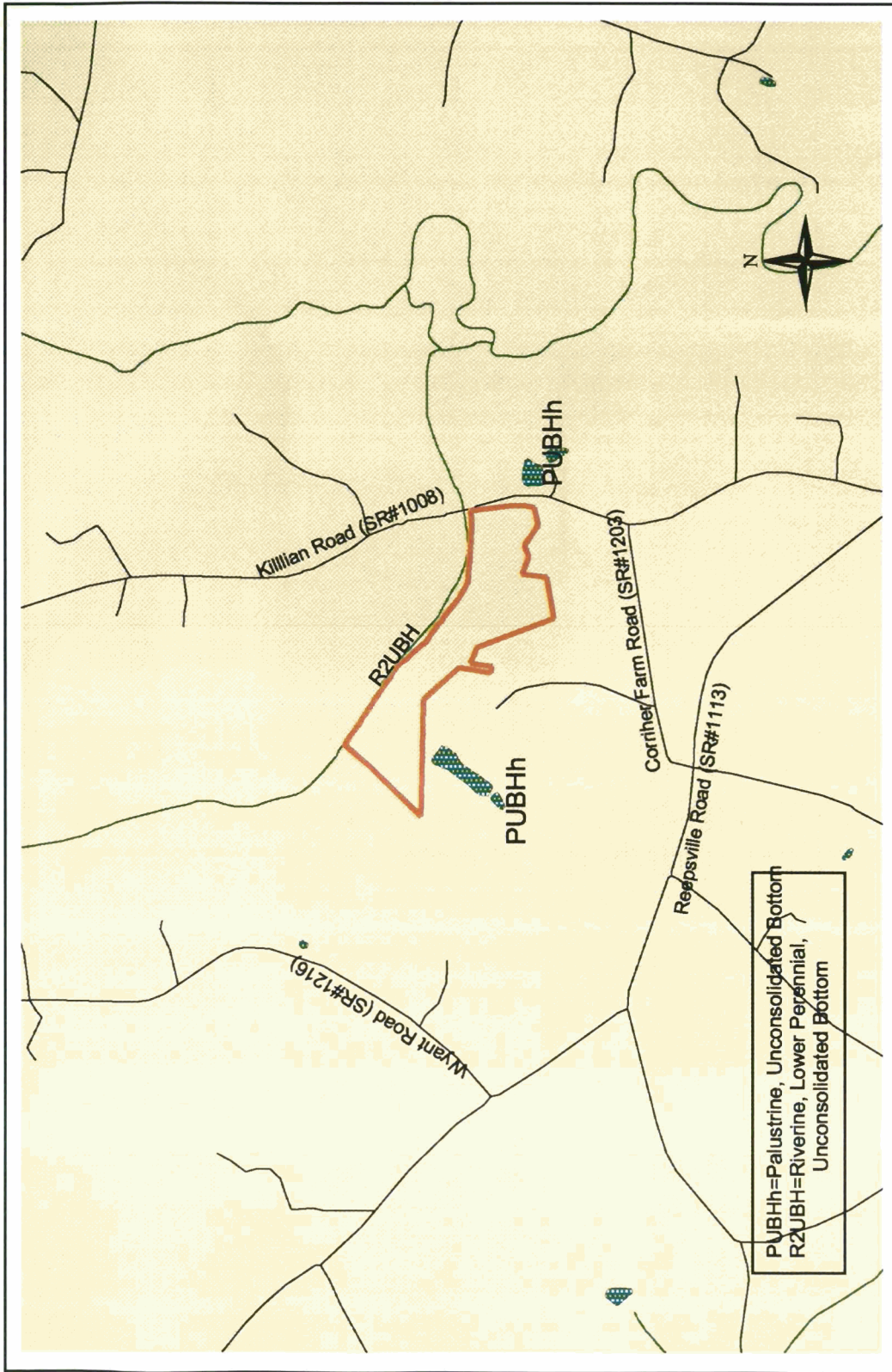
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date: March 28, 2001



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PUBHh=Palustrine, Unconsolidated Bottom
R2UBH=Riverine, Lower Perennial,
Unconsolidated Bottom

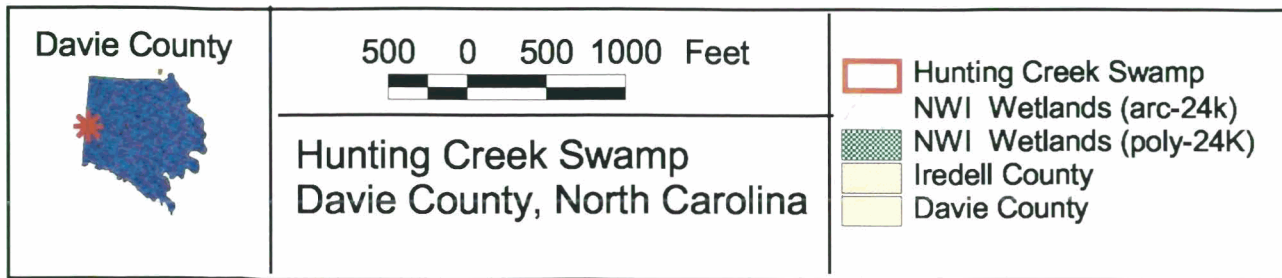
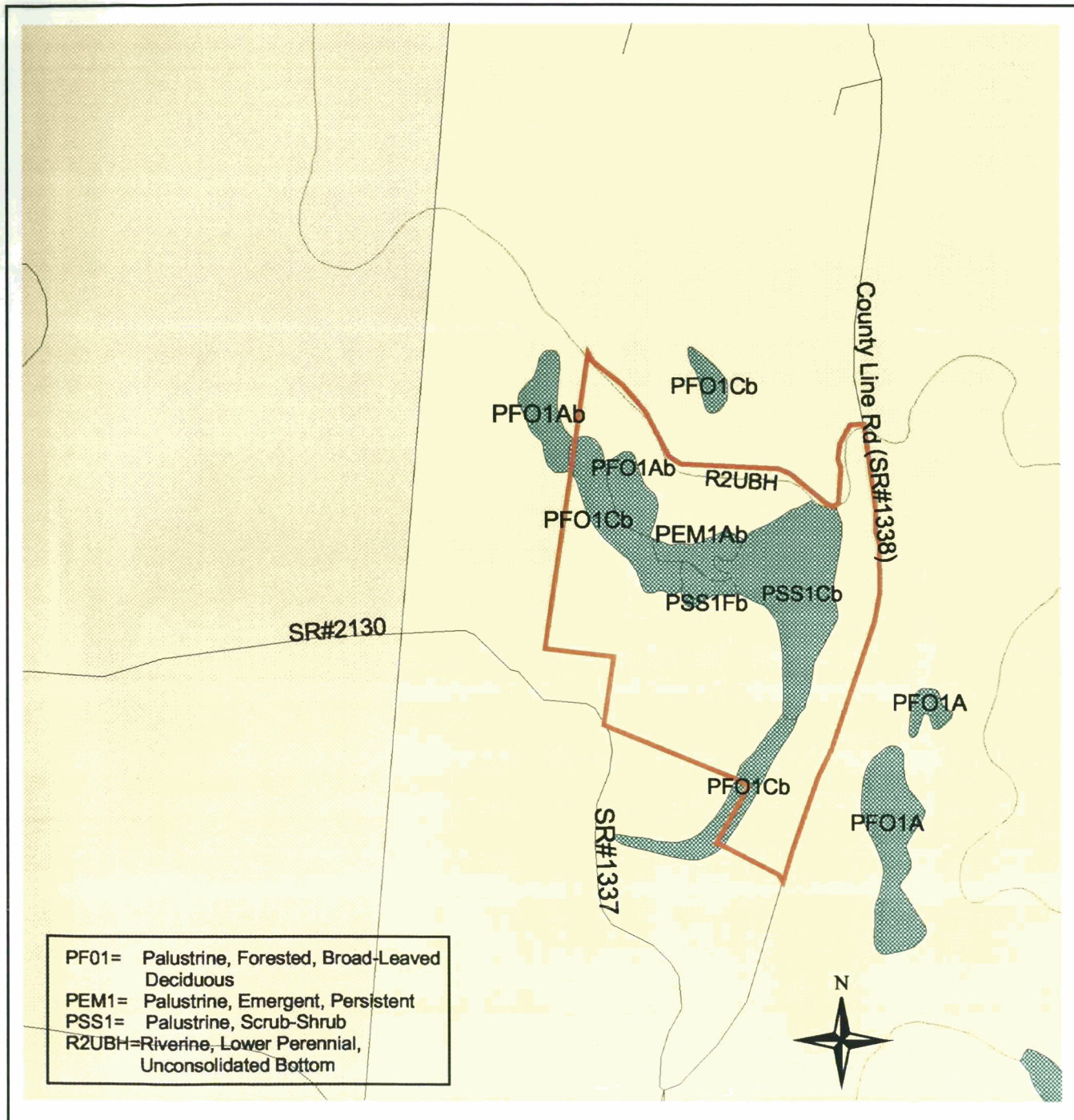
1000 0 1000 2000 Feet

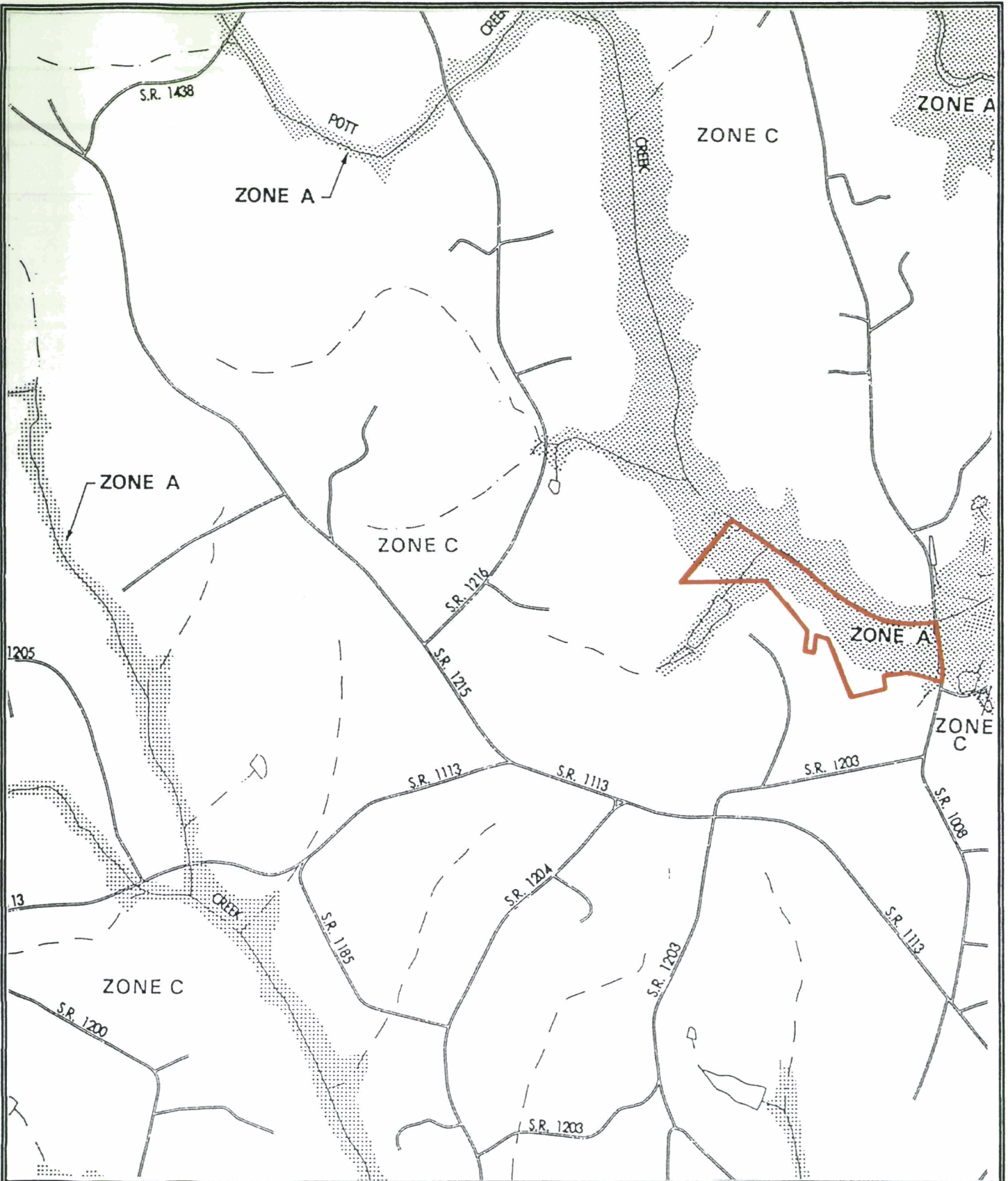


-  Pott Creek Site Boundary
-  NWI (arc-24k)
-  NWI (poly-24k)
-  Lincoln County

NWI Mapping
Pott Creek Mitigation Site
Lincoln County, North Carolina







Flood Insurance Rate Map
Pott Creek Wetland Mitigation Site
 Lincoln County, North Carolina
 August 4, 2000

North Carolina Department of Transportation
 Division of Highways
 Project Development and
 Environmental Analysis Branch



POTT CREEK WETLAND RESTORATION

Hydrology and Hydraulics

August 4, 2000

OBJECTIVE:

Determine the feasibility of sustaining a 51.2 acre wetland mitigation site located near the Daniels community, approximately 5 miles northwest of Lincolnton in Lincoln County, NC.

SITE:

The wetland storage area on the south side of Pott Creek and on the west side of SR1008, is composed of Chewacla soils. The FEMA Flood Hazard Boundary Map indicates the area is a Zone A classification; a detailed study has not been performed to determine the base flood elevations.

METHODOLGY:

The following were used to determine the performance of the site:

1. Hydrology - USDA/NRCS Technical Release 55 (TR-55), January 1999 ,
2. Hydraulics - USDA/NRCS Part 650 Engineering Handbook Chapter 19, Hydrology Tools for Wetland Determination, Section(e) Tool to Determine the Duration and Frequency of Surface Flooding of Depressional Areas, August 1997,
3. Hydraulics - Planning Hydrology for Constructed Wetlands by Gary J. Pierce, 1993

ANALYSIS:

Determine the required water budget to create a 51.2 Ac. wetland site with a suggested 6" depth of water after a two week storm event:

$$(51.2 \text{ Ac})(6'')(43,560\text{sf/Ac})(1'/12'') = 1,115,136 \text{ ft}^3$$

The wetland site SCS Runoff Curve Number = 71 (TR-55, Table 2-2c)

Determine the contributing runoff to the site:

Drainage Area = 538 Acres (USGS Reepsville Quadrangle Map)

Runoff Curve Number (weighted) = 75 (entire drainage basin)

Time of Concentration = 1.0 hr.

Existing Pond within the drainage basin = 5.7 Acres

2 week precipitation = 1.93" (per SCS Soil Survey of Lincoln Co., NC Table 1. The average monthly precipitation from April to November is 3.86", thus bi-weekly precipitation is $3.86/2=1.93$ ")

2 yr. And 5 yr. Precipitation = 3.5" and 4.4" respectively (TR-55, Fig. B-3 and B-4)

The following is the TR-55 analysis:

Project : POTT CREEK GRAPHICAL PEAK DISCHARGE METHOD Version 2.10
County : LINCOLN State: NC User: RK&K Date: 08-04-2000
Subtitle: WETLAND PLAYA ANALYSIS Checked: _____ Date: _____

Data: Drainage Area : 538 Acres
Runoff Curve Number : 75
Time of Concentration: 1.00 Hours
Rainfall Type : II
Pond and Swamp Area : NONE

Storm Number	1	2	3
Frequency (yrs)	14day	2	5
24-Hr Rainfall (in)	1.93	3.5	4.5
Ia/P Ratio	0.35	0.19	0.15
Runoff (in)	0.35	1.30	2.05
Unit Peak Discharge (cfs/acre/in)	0.414	0.512	0.534
Pond and Swamp Factor 0.0% Ponds Used	1.00	1.00	1.00
Peak Discharge (cfs)	77	359	589

As shown above, the two week storm runoff depth is 0.35" and subsequently the available volume of water to the site for a two week storm is:

$Vol. = (538 \text{ Ac})(43560 \text{ sf/Ac})(0.35")(1'/12") = 683,529 \text{ ft}^3 < \text{water budget required}$

The static depth over the wetland site without consideration of the losses = $683,529/(51.2)(43560) = .306' = 3.68"$, say 4"

Determine the Water Budget Required:

Compute the losses, L, within the wetland storage area:

$$L = S_w + F + O + E_d$$

Where: S_w = soil-water holding capacity
 F = total infiltration
 O = outflow = 0 (zero)
 E_d = average evaporation for critical duration in the growing season (note: month of July used)

S_w : Available Water Capacity = 0.15-0.24 in/in (SCS Soil Survey Lincoln County, NC Table 16)

Use average rate = $(0.15+0.24)/2 = .20$ in/in

Available depth of storage from field observation = 12", thus:

$$S_w = (12")(.20 \text{ in/in}) = 2.4"$$

F : Permeability = 0.6-2.0 in/hr (SCS Soil Survey Lincoln County, NC Table 16)
Use average rate of 1.3"/hr.

E_d : Use Gary Pierce reference for evapotranspiration computation, E_t :

$$E_t = 1.6(10T_a/I)^a \quad \text{where:}$$

E_t = potential evapotranspiration in cm/month

T_a = mean monthly air temp, °C (warmest month used- July)
= 77.2°F = 25.1°C

I = monthly heat index = $S(T_a/5)^{1.5}$

$S = (1000/CN) - 10 = (1000/71) - 10 = 4.085$

Thus: $I = 4.085(25.1/5)^{1.5} = 45.95$

$a = 0.49 + (.0179)(I) - .0000771(I)^2 + .000000675(I)^3$
= 1.215

Thus, $E_t = 1.6((10)(25.1)/45.95)^{1.215} = 12.59$ cm/mo

Latitude Adjustment: Site = 35°32'

Factors: 30°N = 1.17

40°N = 1.25

By interpolation, Factor = 1.21

Thus: $E_d = 1.21E_t = (1.21)(12.59) = 15.23$ cm/mo = .5077 cm/day = .0199 in/day
.0199 in/day = .28" per 2 weeks

The surface water lost to soil absorption = 2.4"

The surface water lost to evapotranspiration = .28"/2 weeks

Infiltration loss = 1.3"/hr.

CONCLUSION:

A 4" depth of runoff over the wetland site is available per the TR-55 analysis. However, the runoff will infiltrate within 2-3 hours as shown above. A wetland condition will result if the infiltration rate is reduced by applying soil amendments and/or grading the site with respect to the groundwater.

UNAUDITED

MARSH RESOURCES INC.

**Balance Sheet
April 30, 2000**

ASSETS

Current Assets:

Trade Receivables	\$ 60,000
Receivable from affiliate	60,540
Federal income taxes receivable from affiliate	18,410
Total current assets	<u>138,950</u>

Wetland mitigation bank	7,362,952
Accumulated depletion	(502,550)
Wetland mitigation bank, net	<u>6,860,402</u>

Advances to parent	<u>1,000</u>
--------------------	--------------

\$ 7,000,352

LIABILITIES AND STOCKHOLDER'S EQUITY

Current Liabilities:

Payables:

Trade	\$ 188,240
Trade related to construction	-
Affiliates	36,491
Affiliate related to construction	26,514
Advances from affiliate	6,430,398
Accrued federal income taxes payable to affiliate	-
Accrued state income tax	-
Total current liabilities	<u>6,681,643</u>

Common Stockholder's Equity:

Common Stock, \$1 stated value, 1,000 shares authorized, issued and outstanding	1,000
Retained earnings	317,709
Total common stockholder's equity	<u>318,709</u>

\$ 7,000,352

Rummel, Klepper & Kahl, LLP
Consulting Engineers
81 Mosher Street
Baltimore, Maryland 21217

Statement of Assets, Liabilities and Capital
Arising from Cash Transactions
March 31, 2000

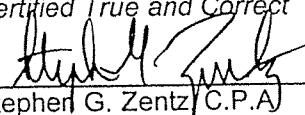
Assets

Current Assets		
Cash	671,299	
Notes & Loans Receivable	<u>2,767</u>	
Total Current Assets		674,066
Other Assets		
Computers, Telephone, Office Equip. & Vehicles	3,554,375	
Accumulated Depreciation & Amortization	<u>(2,378,265)</u>	1,176,110
Deposits :		
Prepaid Taxes	669,842	
Miscellaneous	<u>13,594</u>	<u>683,436</u>
Total Assets		<u><u>2,533,612</u></u>

Liabilities & Capital

Current Liabilities		
Withheld Payroll Taxes	48,385	
Withheld Employee Benefits Contrib.	<u>16,385</u>	
Total Current Liabilities		64,770
Capital		<u>2,468,842</u>
Total Liabilities & Capital		<u><u>2,533,612</u></u>

Certified True and Correct



Stephen G. Zentz (C.P.A.)
Partner