



US Army Corps
Of Engineers
Wilmington District

PUBLIC NOTICE

Issue Date: June 13, 2005
Comment Deadline: July 12, 2005
Corps Action ID #: 200400096

All interested parties are hereby advised that the Wilmington District, Corps of Engineers (Corps) has received an application for work within jurisdictional waters of the United States. Specific plans and location information are described below and shown on the attached plans. This Public Notice and all attached plans are also available on the Wilmington District Web Site at www.saw.usace.army.mil/wetlands

Applicant: Mr. Raiford Trask, III
302-A Raleigh Street
Wilmington, North Carolina 28412

AGENT (if applicable): Mr. Jim Spangler
Spangler Environmental, Inc.
3961-B Market Street
Wilmington, North Carolina 28403

Authority

The Corps will evaluate this application and decide whether to issue, conditionally issue, or deny the proposed work pursuant to applicable procedures of Section 404 of the Clean Water Act (33 U.S.C. 1344).

Location

The approximately 70-acre tract is located along the eastside of Military Cutoff Road at its intersection with Sir Tyler Drive, approximately 1.4 miles north of Eastwood Road, in Wilmington, New Hanover County, North Carolina. The site contains adjacent jurisdictional wetlands and unnamed tributaries to Howe Creek, a tributary to the Atlantic Intracoastal Waterway, a navigable water of the United States. Site coordinates are 34.23867N, -77.82671W.

Existing Site Conditions

The proposed project area is currently a predominantly vacant tract of land that is a mixture of forested and maintained (mowed) herbaceous areas. The tract is bounded by Military Cutoff Road to the West, Old MacCumber Station Road to the North and East,

and Renaissance Park to the South. Existing features to the site include Sir Tyler Boulevard, Ashes Drive, two office buildings, stormwater management facilities and a powerline easement. Previous Department of Army authorizations for the site include a September 19, 1999 verification (Action ID #199900340) to utilize Nationwide Permit 26 for the construction of road crossings on Sir Tyler Drive and a February 12, 2001 verification (Action ID # 200100061) to utilize Nationwide Permit 39 for the construction of a stormwater pond and drainage swale. The surrounding land use to the west is Mayfaire Town Center, a mixed-use development; to the south is Renaissance Park, a commercial/business and office/institutional development; and to the north and east are Lucia Point and Landfall residential communities.

Applicant's Stated Purpose

The purpose of the project is to construct a mixed-use development comprised of commercial, commercial/residential, and office usages.

Project Description

The applicant has proposed to construct a mixed-use development at the subject location named Research Park at Westfall. The proposed project includes: 1) the construction of an office park consisting of five buildings with associated parking; 2) the construction of a two-story 24,000 square foot building with associated parking; 3) the construction of a 9,175 square foot building with associated parking; 4) the construction of an approximately 20,000 square foot per floor hotel, 1,618 square foot recreational court facility, 2,580 square foot pool facility and associated parking; 5) the construction of a three-story 74,785 square foot office building with associated parking; 6) the construction of a five building commercial/office area and associated parking; 7) the construction of a 1,585 square foot walking bridge and connected sidewalk; and 8) the construction of approximately 3,030 square feet of roadway infrastructure.

Proposed impacts to jurisdictional waters and wetlands include the discharge of fill material into 0.59 acres of riparian wetland, 0.64 acres of non-riparian wetland and 200 linear feet of stream channel. Plans showing the work are included with this public notice. Specific jurisdictional impacts are:

- Impact Area 1 is located immediately north of the cul-de-sac at the end of Sir Tyler Drive. Impacts to 0.645 acre of non-riparian wetland are proposed for the construction of an office building, parking and roadway access.
- Impact Area 2 is located southwest of the cul-de-sac at the end of Sir Tyler Drive. Impacts to 0.283 acre of riparian wetland are proposed for the construction of a two office buildings, parking driveway accesses, and green space.

- Impact Area 3 is located south of Sir Tyler Drive, east of Ashes Drive, adjacent to an unnamed tributary to Howe Creek. Impacts to 0.020 acres of riparian wetland are proposed for the construction of a driveway and construction access for an office building.
- Impact Area 4 is located north of Sir Tyler Drive, north of the intersection of Sir Tyler Drive and Ashes Drive, adjacent to an unnamed tributary to Howe Creek. Impacts to 0.140 acre of riparian wetland are proposed for the construction of a hotel and associated pool facility and parking.
- Impact Area 5 is located south of Sir Tyler Drive, west of Ashes Drive. Impacts to 0.030 acre of riparian wetland are proposed for the construction of associated parking for a proposed three-story office building.
- Impact Areas 6 and 7 are located north of Sir Tyler Drive, immediately east of Military Cutoff Road. Impacts to 0.114 acres of riparian wetland and 200 linear feet of an unnamed tributary to Howe Creek are proposed for the construction of two road crossings.

The applicant has also submitted a mitigation proposal with their application that includes on-site creation of 0.33 acres of non-riparian wetland, on-site preservation of all remaining wetlands and waters of the U.S., and providing 2:1 payment to the North Carolina Ecosystem Enhancement Program/In-Lieu-Fee program for 0.59 acres of riparian wetland, 0.56 acres of non-riparian wetland and 200 linear feet of stream channel impacts. The mitigation statement and wetland creation plan are included with this public notice.

Other Required Authorizations

This notice and all applicable application materials are being forwarded to the appropriate State agencies for review. The Corps will generally not make a final permit decision until the North Carolina Division of Water Quality (NCDWQ) issues, denies, or waives State certification required by Section 401 of the Clean Water Act (PL 92-500). The receipt of the application and this public notice in the NCDWQ Central Office in Raleigh serves as application to the NCDWQ for certification. A waiver will be deemed to occur if the NCDWQ fails to act on this request for certification within sixty days of the date of the receipt of this notice in the NCDWQ Central Office. Additional information regarding the Clean Water Act certification may be reviewed at the NCDWQ Central Office, 401 Oversight and Express Permits Unit, 2321 Crabtree Boulevard, Raleigh, North Carolina 27604-2260. All persons desiring to make comments regarding the application for certification under Section 401 of the Clean Water Act should do so in writing delivered to the North Carolina Division of Water Quality (NCDWQ), 1650 Mail Service Center, Raleigh, North Carolina 27699-1650 Attention: Ms Cyndi Karoly by July 5, 2005.

The applicant has not provided to the Corps, a certification statement that his/her proposed activity complies with and will be conducted in a manner that is consistent with the approved North Carolina Coastal Zone Management Program. Pursuant to 33 CFR 325.2(b)(2), the Corps can not issue a permit for the proposed work until the applicant submits such a certification to the Corps and the North Carolina Division of Coastal Management (NCDCM), and the NCDCM notifies the Corps that it concurs with the applicant's consistency certification.

Essential Fish Habitat

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. The Corps' initial determination is that the proposed project will not adversely impact EFH or associated fisheries managed by the South Atlantic or Mid Atlantic Fishery Management Councils or the National Marine Fisheries Service.

Cultural Resources

The Corps has consulted the latest published version of the National Register of Historic Places and is not aware that any registered properties, or properties listed as being eligible for inclusion therein are located within the project area or will be affected by the proposed work. Presently, unknown archeological, scientific, prehistoric, or historical data may be located within the project area and/or could be affected by the proposed work.

Endangered Species

The Corps has reviewed the project area, examined all information provided by the applicant and consulted the latest North Carolina Natural Heritage Database. Based on available information, the Corps has determined pursuant to the Endangered Species Act of 1973, that the proposed project will have no effect on federally listed endangered or threatened species or their formally designated critical habitat.

Evaluation

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values (in accordance with Executive Order 11988), land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property

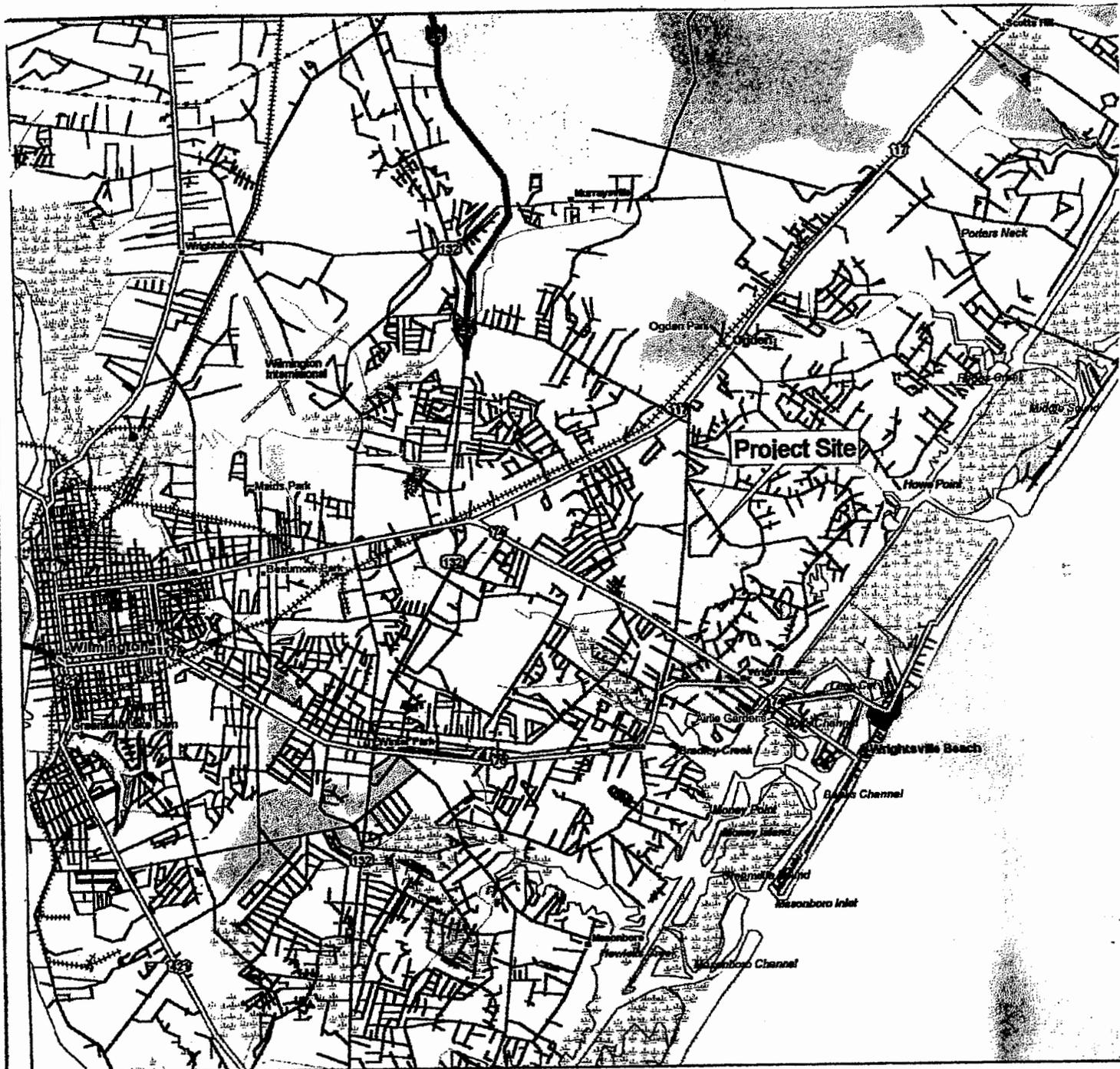
ownership, and, in general, the needs and welfare of the people. For activities involving the discharge of dredged or fill materials in waters of the United States, the evaluation of the impact of the activity on the public interest will include application of the Environmental Protection Agency's 404(b)(1) guidelines.

Commenting Information

The Corps is soliciting comments from the public; Federal, State and local agencies and officials; Indian Tribes and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment (EA) and/or an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA). Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider the application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing. Requests for a public hearing shall be granted, unless the District Engineer determines that the issues raised are insubstantial or there is otherwise no valid interest to be served by a hearing.

Written comments pertinent to the proposed work, as outlined above, will be received by the Corps of Engineers, Wilmington District, until 5 pm, July 12, 2005. Comments should be submitted to Jennifer S. Frye, Post Office Box 1890, Wilmington, North Carolina, 28402-1890, at (910) 251-4923.



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<p>PROJECT NO. DATE BY CHECKED BY</p>	<p>Research Park at Westfall General Location Map Wilmington, North Carolina</p>	<p>404/401 Permit Application</p>	 <p>3361-D Market Street Wilmington, NC 28403 ENVIRONMENTAL, INC. 910 343-9375</p>
<p>Scale: 1 : 100,000 Map Rotation: 0° Magnetic Declination: 0.0°W</p>	<p>Copyright © 2004 Spangler Environmental, Inc.</p>		

Block 18: Nature of Activity

The nature of the proposed project is the construction of a mixed-use development, which will be comprised of commercial, commercial/residential and office usages. Proposed activities include the construction of roadway infrastructure and buildings of various sizes, the discharge of fill material into wetlands, resulting in 1.23 acres of wetland impact, and the installation of two culverts into an unnamed tributary to Howe Creek, resulting in 200 linear feet of perennial stream impact (Please see site plan labeled "Drawing C1 - Wetland Impact Research Park.").

The proposed project includes: 1) the construction an office building park consisting of five buildings with associated parking, with a portion of one of the buildings and its parking being constructed on fill; 2) the construction of a two-story 24,000 square foot building with associated parking which will be partially constructed on fill; 3) the construction of a 9,175 square foot building with associated parking, with a portion of the building and parking being constructed on fill; 4) the construction of an approximately 20,000 square foot per floor hotel, 1,618 square foot recreational court facility, 2,580 square foot pool facility and associated parking, with a portion of the hotel building, pool and parking being constructed on fill; 5) the construction of a three-story 74,785 square foot office building with associated parking, with a portion of the parking being constructed on fill; 6) the construction of a five building commercial/office area and associated parking entirely on uplands, with the buildings sized at 10950, 15695, 5080, 5640 and 5630 square feet; 7) the construction of a 1585 square foot walking bridge and connected sidewalk; and 8) the construction of a approximately 3030 square feet of roadway infrastructure, which will include installation of two corrugated steel culverts to provide crossing access of an unnamed tributary to Howe Creek. The roadway at each crossing will be 30 feet wide, with an additional 30 feet of culvert head wall and 40 feet of rip-rap apron, for a total at each culvert of 100 linear feet, and will be installed using mechanical equipment. There are 2,300 square feet of wetland impact associated with each culvert as well. The bottoms of each culvert will be placed at least two feet below the stream channel substrate so as to allow for aquatic life passage.

One permanent retaining wall will be constructed to minimize wetland impacts. At all of the activities listed above, silt fence will be installed to prevent the impact of non-permitted wetlands and waters due to sedimentation. Slope stabilization will be performed in accordance with New Hanover County ordinances.

One wetland creation area of 14,310 square feet (0.33 acres) is to be constructed adjacent to the existing wetland that is immediately north of the Sir Tyler Drive cul-de-sac.

Block 19: Project Purpose

The purpose of this project is to construct a mixed-use development comprised of commercial, commercial/residential and office usages. This type of development will be consistent with surrounding developments and will be in compliance with the current City of Wilmington zoning designation of Office and Institution.



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This corridor of Military Cutoff Road is being widened to accommodate the increase in traffic flow resulting from development, both residential and commercial, of the adjacent and surrounding areas. The proposed development will be situated on property that is bordered to the west by Mayfaire Town Center, another mixed-use development; Renaissance Park to the south, a commercial development; and to the north and east by Lucia Point and Landfall, residential developments. The project will promote interconnectivity by providing inter-development roadway access to Renaissance Park. Such interconnectivity with surrounding developments will allow users/residents to work and shop in the same neighborhood, thus reducing the amount of traffic on the surrounding roadway infrastructure. The impacts to wetlands and streams that are proposed will provide the necessary developable land on which the project is to be constructed. Each area of impact has been designed so that impacts will be minimized while still providing enough area on which to construct the proposed buildings, and roadway infrastructure to meet the needs of the developing area.

Block 20: Reason for Discharge

This project will include the discharge of soil fill material into wetlands, and the installation of two culverts in an unnamed tributary to Howe Creek. There are seven (7) proposed areas of wetland impact. They are labeled on the enclosed site plan with red hatching and are described as follows:

Impact Area 1: This area is located on Tract E, immediately north of the cul-de-sac at the end of Sir Tyler Drive. At this location, the proposed 28,112 square feet (0.64 acres) of wetland impact will provide continuous upland on which approximately half of the 33,562.5 square foot office building with associated parking and drive will be constructed. The City of Wilmington parking ratios for office buildings in O&I zoning require a minimum of 1 space per 300 square feet and a maximum of 1 per 200 square feet of building area. The applicant has proposed 167812.5 square feet of office building, which requires between 839 and 559 parking spaces. Currently there are 578 proposed parking spaces for this office park.

A power line easement is present in the western portion of this tract, and the construction of multi-story buildings in the easement is not feasible. The area west of the easement is a proposed wetland mitigation area. This leaves the proposed impact area as being the most suitable for providing area for building and parking construction to meet the parking requirements of the O&I zoning designation for office building. A retaining wall has been proposed for the western side of the parking area, which will minimize the impact. Details for the retaining wall have been included on the site plan.

Impact Area 2: This area is located on combined Tracts 37/38, south and west of the cul-de-sac at the end of Sir Tyler Drive. At this location, the proposed 12,345 (0.33 acres) square feet of wetland impact will provide continuous upland on which a two-story 24,600 square foot building, 90 parking spaces, driveway and green space will be constructed. A small portion of the impact will also be used to assist in providing upland for parking associated with the office building development referenced in Impact Area 1. Under O&I zoning, the proposed 24,600 square foot building requires between 82 and 109



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parking spaces. Lots 37 and 38 were combined to create enough developable area, but the location and orientation of the wetlands on the lots prevents development of the building with the required number of parking spaces without impacts. Silt fence will be placed at the toe-of-slope to prevent impact of non-permitted wetlands/waters via erosion of fill slopes and sedimentation.

Impact Area 3: This area is located on Tract 40, north of Ashes Drive, and south of Sir Tyler Drive and an unnamed tributary to Howe Creek. At this location, the proposed 875 square feet (0.02 acres) of wetland impact will provide continuous upland on which an approximately 9,175 square foot building and approximately 9090 square feet of associated parking and driveway will be constructed. In order to access the interior of this tract, the wetlands present on the tract must be crossed, and this impact will also provide the area needed for staging and storage of building materials on this small parcel. Silt fence will be placed at toe-of-slope to prevent impact of non-permitted wetlands/waters via erosion of fill slopes and sedimentation.

Impact Area 4: This area is located on Lot 27, north of Sir Tyler Drive, northwest of Ashes Drive and between the two unnamed tributaries to Howe Creek. At this location, the proposed 6,084 square feet (0.14 acres) of wetland impact will provide continuous upland on which an approximately 20,000 square foot per floor hotel will be constructed, along with a 1,618 square foot recreation court facility, 2,580 square foot pool area, 104 parking spaces and associated driveway. The presence of a stormwater pond and an unnamed tributary limits the configuration and size of the proposed hotel, resulting in wetland impacts from the hotel building footprint, needed parking and pool facility. The proposed footprint was supplied by NBJ Architecture and is a standard design, known as "101 Suites Alternate 2," used for the design and construction of Homewood Suites Hotels. The wetland impacts provide upland for the pool facility, part of the hotel building, parking, and reflect toe of slope.

Impact Area 5: This area is located on Lot 12, which is south of Sir Tyler Drive and east of Military Cutoff Road. At this location, the proposed 1,323 square feet (0.03 acres) of wetland impact will provide continuous upland for the development of a three-story, 74,785 total square foot building, 250 parking spaces, driveway. Using City of Wilmington parking ratio requirements for office space in O&I zoning, a minimum of 249 parking spaces are required. The size of the tract, along with additional uplands being taken by the Department of Transportation for the Military Cutoff Road-widening project necessitates the impact of these wetlands in order to meet the parking requirement.

Impact Area 6: This area is located on Lot 27, and is the first of two stream culverts used to provide access to areas north of the hotel site from Sir Tyler Drive. This culvert includes 100 linear feet of stream impact. The culvert will be constructed of corrugated metal with a rip-rap apron on the downstream side. There are also 2,300 square feet of wetland impact associated with the culvert, as the elevation of the ground in the floodplain of the stream is raised up to create a level surface for the roadway culvert crossing. This culvert is needed in order to maintain continuous connectivity between Sir Tyler Drive and the upland north of Sir Tyler Drive along Military Cutoff Road. A right in-right out driveway is proposed which will help to access this area, but traffic going south on Military Cutoff



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would not be able to access this area without making a U-turn or turning into Mayfaire Town Center and turning around to make a left turn to access the right-in entrance. Silt fence will be installed to prevent slope erosion and sedimentation into the unnamed tributary during construction and prior to slope stabilization. Details for this culvert have been provided in the drawing labeled "C3 - Details Research Park."

Impact Area 7: This area is also located on Lot 27, and is the second of two stream culverts used to provide access to areas north of the hotel site from Sir Tyler Drive. This culvert includes 100 linear feet of stream impact. The culvert will be constructed of corrugated metal with a rip-rap apron on the downstream side. There are also 2,300 square feet of wetland impact associated with the culvert, as the elevation of the ground in the floodplain of the stream is raised up to create a level surface for the roadway culvert crossing. This culvert will provide a drive-thru service lane on the north side of the Caribou Coffee shop that is proposed for construction in this location. This franchise requires a drive-thru customer service lane. With the roadway setback, there is not enough area for the drive-thru, nor enough entry turning radius for it to be on the east side. An additional stream crossing would be needed for the west side of the building. In order to avoid further stream impacts, a footbridge, with no wetland impacts, is proposed to provide access from the parking area of this building instead of covering the stream with impervious parking and/or driveway. Details for this culvert and the footbridge have been provided in the drawing labeled "C3 - Details Research Park."

Block 21: Type of Material Being Discharged and the Amount of Each Type in Cubic Yards

Impact Area 1: $28,112 \text{ ft}^2 \times 2.5 \text{ feet average depth} = 70,280 \text{ ft}^3 = 2,603.0 \text{ yd}^3$ of sand fill

Impact Area 2: $12,345 \text{ ft}^2 \times 1.5 \text{ feet average depth} = 18,517.5 \text{ ft}^3 = 685.8 \text{ yd}^3$ of sand fill

Impact Area 3: $875 \text{ ft}^2 \times 1 \text{ foot average depth} = 875 \text{ ft}^3 = 32.4 \text{ yd}^3$ of sand fill

Impact Area 4: $6,084 \text{ ft}^2 \times 2 \text{ feet average depth} = 12,168 \text{ ft}^3 = 450.7 \text{ yd}^3$ of sand fill

Impact Area 5: $1,323 \text{ ft}^2 \times 0.5 \text{ feet average depth} = 661.5 \text{ ft}^3 = 24.5 \text{ yd}^3$ of sand fill

Impact Area 6 (Culvert 1): $2,300 \text{ ft}^2 \times 1 \text{ foot average depth} = 2,300 \text{ ft}^3 = 85.2 \text{ yd}^3$ of sand fill and rip-rap

Impact Area 7 (Culvert 2): $2,300 \text{ ft}^2 \times 1 \text{ foot average depth} = 2,300 \text{ ft}^3 = 85.2 \text{ yd}^3$ of sand fill and rip-rap

Block 22: Surface Area in Acres of Wetlands or Other Waters Filled

Impact Area 1: 0.645 acres to be filled using mechanical equipment to discharge the fill material

Impact Area 2: 0.283 acres to be filled using mechanical equipment to discharge the fill material

Impact Area 3: 0.020 acres to be filled using mechanical equipment to discharge the fill material

Impact Area 4: 0.140 acres to be filled using mechanical equipment to discharge the fill material

Impact Area 5: 0.030 acres to be filled using mechanical equipment to discharge the fill material

Impact Area 6: 0.057 acres (includes culvert) to be filled using mechanical equipment to discharge the fill material and install the corrugated metal culvert

Impact Area 7: 0.057 acres (includes culvert) to be filled using mechanical equipment to discharge the fill material and install the corrugated metal culvert



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CUMULATIVE AND SECONDARY IMPACTS

The project site is located in a section of New Hanover County that has been experiencing growth for several years, including the expansion of Military Cutoff Road, Mayfaire Town Center, Landfall Shopping Center and gated golf-course community. Because the surrounding areas are already developed, no new development of utility infrastructure or ancillary uses will result in order to service the needs of this development. All utility infrastructure is in place, including stormwater, electrical, sewer and water, and roadway. A copy of the stormwater permit and revision have been included.

All stormwater infrastructure has been permitted and is currently installed and functioning as designed. The stormwater structures will control the discharge run-off volume of the proposed impervious surface during and after storm events. This will prevent the run-off from impervious surface from overburdening the channels that flow through the site and flooding downstream areas. The stormwater structures will also address water quality concerns related to run-off from impervious surface through 85% Total Suspended Solid removal that will occur within the structures (please see attached stormwater permit).

As required by New Hanover County and the State of North Carolina, an erosion control plan will be created that will address the concern of off-site sedimentation caused by erosion of exposed areas and slopes. Specifically, this plan will incorporate Best Management Practices to control sedimentation into Howe Creek and its tributaries, reducing the possibility of adverse effects to downstream water quality as a result of the proposed project.

The proposed impacts to riparian wetlands within the floodplain of tributaries to Howe Creek have been reduced from approximately 0.74 acres and two stream relocations to approximately 0.58 acres distributed over six areas including two stream culverts. No impacts have been proposed to the floodplain wetlands of Howe Creek. Such minimization of impacts along the riparian corridor should result in no adverse effects to downstream water quality or stream degradation as a result of the proposed project. Other wetland impacts, 0.64 acres, are to non-riparian wetlands.

Research pertaining to threatened and endangered species was performed by access US Fish and Wildlife Service's Endangered Species website. The habitats listed for threatened and endangered species were not observed on the proposed project site. Also, NCDENR Natural Heritage website was accessed to research State listed endangered and threatened species, and contacted via mail. The search yielded seven (7) species – one (1) mammal, two (2) reptiles, and four (4) plants – listed as either threatened or endangered for the USGS topo quad in which the project is located. However, none of their listed habitats were observed on the proposed project site, and response from the Natural Heritage Program did not identify any records of significant natural communities or priority natural areas at, or within a mile of the project site. This documentation has been included in Appendix A.



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The State Historic Preservation Office was also contacted to determine whether or not this project will impact any National Historic Registry properties or historic districts. No response has been received, but no historic properties or districts within the project boundary were found on their website.

ALTERNATIVES ANALYSIS

Each impact area was analyzed using alternative design plans in to determine the most feasible development plans. The following discussion provides the results of that analysis. An alternative site plan has been included as "Drawing C2 – Alternative Analysis Plan."

Impact Area 1: Avoidance of this impact would translate into a loss of 33562.5 square feet of office space in the office park at the cul-de-sac of Sir Tyler Drive, valued at \$2,785,687.50. Recouping this loss would require increasing the heights of the remaining buildings, thus exceeding the building height limits as established by the City of Wilmington zoning ordinance. This would necessitate a special use permit, which might be denied due to the close proximity of residential development on properties adjacent to the east. The original site plan did not incorporate a retaining wall and entailed 36,847 square feet (0.85 acres) of wetland impact. The proposed site plan incorporates a retaining wall to minimize the impact at 28,112 square feet (0.64 acres). The presence of the power line easement along the western border limits the full usage of this area to avoid impacts as well.

The undeveloped area immediately to the west has preliminary plans and is not available to recoup the loss of office space if this impact is avoided. A copy of the preliminary plan has been included in Figure 3. The preliminary development plans for this area avoid wetland impacts.

Impact Area 2: Avoidance of this impact would translate into a loss of 24,600 square feet of office space at Lot 37/38, valued at \$2,041,800. This avoidance can be seen in "Drawing C2 – Alternative Analysis Plan."

Impact Area 3: Avoidance of this impact would result in a loss of 9,115 square feet of office space at Lot 40, valued at \$756,545. The parcel adjacent to the west is owned by a different party, so there is no way to access the interior of the site and construct the proposed building and parking without impacting the wetlands present. This avoidance can be seen in "Drawing C2 – Alternative Analysis Plan."

Impact Area 4: Avoidance of this impact would result in the hotel not being developed as planned, resulting in a loss of \$1,800,000. The original plan for the hotel site included relocating the unnamed tributaries of Howe Creek to the east and west, and impacting approximately 0.34 acres of wetlands and 264 linear feet of stream channel impact, requiring possibly two stream relocations. This can be seen in



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“Drawing C2 – Alternative Analysis Plan.” The proposed site plan includes only 0.14 acres of wetland impact.

Impact Area 5: Avoidance of this impact would result in a loss of 10 parking spaces at Lot 12, thus not meeting the minimum parking requirement for O&I established by the City of Wilmington zoning ordinance. The Department of Transportation stream creation project located immediately west prevents expanding the parking area west to avoid wetland impacts. The site plan proposes 1,323 square feet of impact (0.03 acres) which was reduced from the original impact of 2,395 square feet of impact (0.05 acres), as can be seen in Figure 2.

Impact Area 6: Avoidance of this impact would not allow development the office and commercial area along Military Cutoff Road north of Sir Tyler Drive because the only ingress/egress would be via a right in/right out only driveway, forcing users to perform a U-turn in order to access that part of the development and causing bottlenecks at the egress onto Military Cutoff as traffic attempts to enter onto the busy thoroughfare. This would result in a loss of 43,265 square feet of office/commercial building valued at \$8,653,000. This can be seen in “Drawing C2 – Alternative Analysis Plan.”

Impact Area 7: Avoidance of this impact would result in the proposed Caribou coffee shop not being developed as planned because the drive-thru lane that this franchise requires cannot be installed on any other side of the building. Avoiding this impact would result in a loss of 11,775 square feet of developable land valued at \$297,351. This can be seen in “Drawing C2 – Alternative Analysis Plan.”

Economic calculations are based upon acreage and building square footage values provided by Brian Eckel, Cape Fear Commercial.

Developing the area between Howe Creek and the five-building office complex at the end of Sir Tyler Drive and north of the existing drainage swale to recoup financial losses due to wetland impact avoidance is not feasible because a former New Hanover County Landfill comprises much of this area, as can be seen in Figure 2 of the attached “Conceptual Wetland Creation Plan – Research Park.” Performing the assessment of subsurface conditions and recovering that area through remediation would require an indeterminable amount of resources and time. Also, the former landfill area is currently not permitted for stormwater. Providing this necessary utility would require a modification to the existing stormwater permit, which would result in the existing wet detention pond (immediately east of Howe Creek) that would service this area and is currently serving other areas of the project, being converted to an infiltration basin. The amount of surface area that would be needed for this conversion would take up most, if not all, of the developable land in this area due to current State of North Carolina design standards for infiltration basins that require at least two feet of soil between the bottom of the basin and the seasonal high water table, and the close proximity of the water table to ground surface in this area. Also, an increase of surface area for a larger stormwater device may result in encroachment into or near the landfill and possibly an expedited pathway of contaminant migration into Howe Creek.

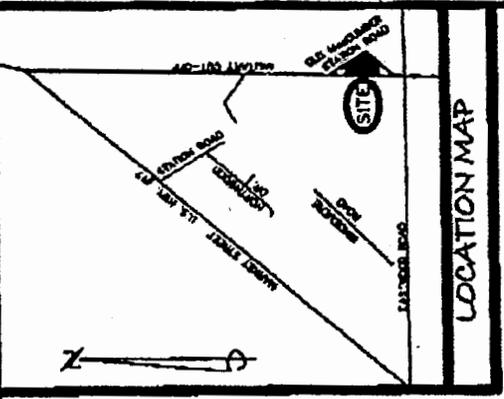
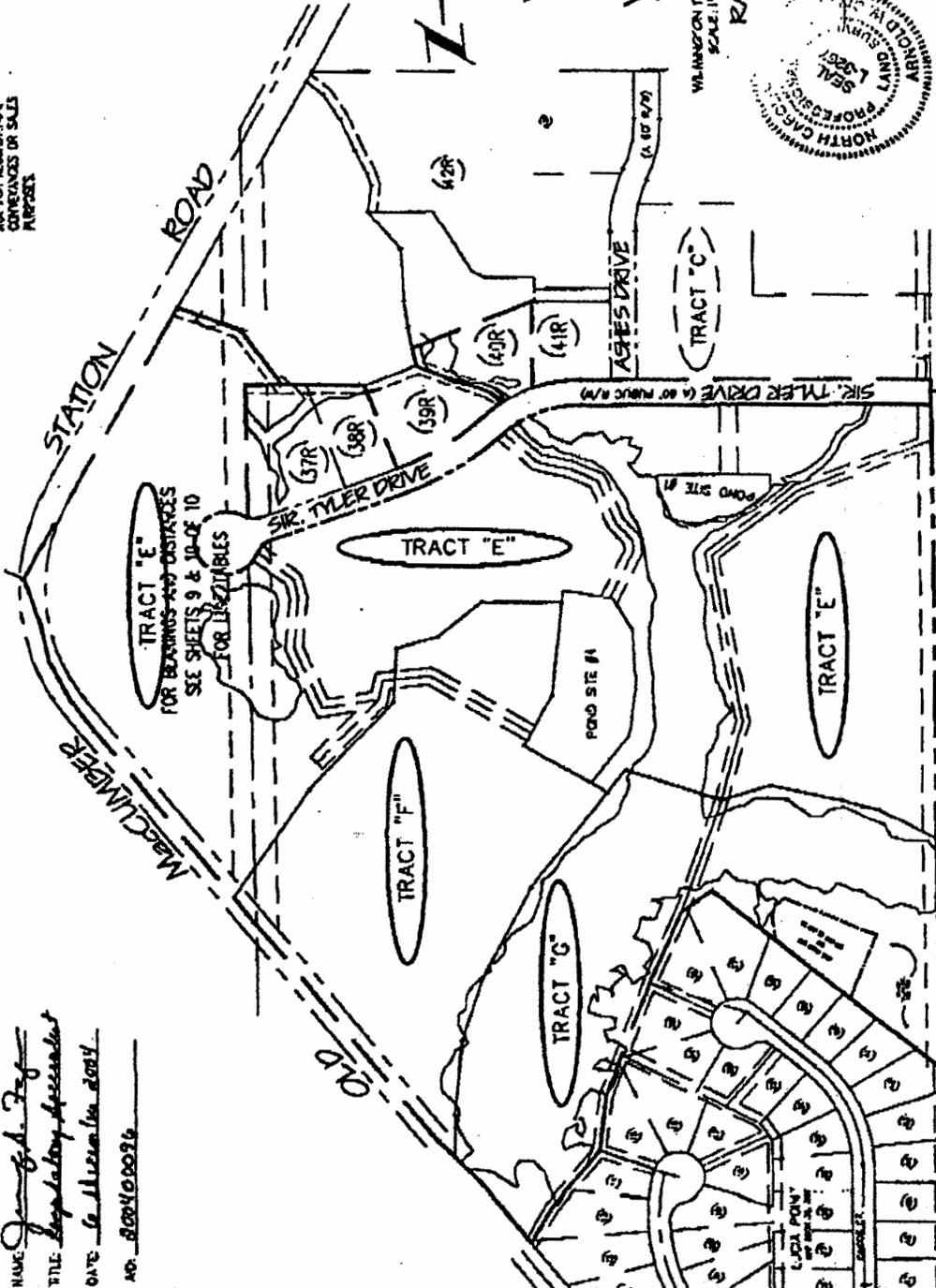


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THIS CERTIFIES THAT THIS COPY OF THIS PLAN ACCURATELY SHOWS THE BOUNDARY OF THE JURISDICTION OF SECTION 404 OF THE CLEAN WATER ACT AS DETERMINED BY THE UNDERSIGNED ON THIS DATE. UNLESS THERE IS A CHANGE IN THE LAW OF OUR PUBLISHED REGULATIONS, THIS DETERMINATION OF SECTION 404 JURISDICTION MAY BE RELIED UPON FOR A PERIOD NOT TO EXCEED FIVE YEARS FROM THIS DATE. THIS DETERMINATION WAS MADE UTILIZING THE 1987 COPY OF ENGINEERS WETLANDS DELINEATION MANUAL.

NAME: J. G. Foy
 TITLE: Regulatory Specialist
 DATE: 6 November 2004
 NO: 2004020026

PRELIMINARY
 NOT FOR RECORDATION,
 CONVEYANCES OR SALES
 PURPOSES



N.C. GRID '83
 MAP BOOK 35, PAGE 373

WETLAND DELINEATION
 OF
 LOTS 57R, 58R, & 40R
 AND
 TRACTS G, F, & E
 OF
 WESTFALL PARK
 AS SHOWN IN MAP BOOK PAGE 78 AND
 MAP BOOK PAGE 3000 RESPECTIVELY
 OF THE NEW HANOVER COUNTY REGISTER
 FOR NORTH CAROLINA
 WASHINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA
 SCALE: 1" = 200'
 FOR NO. 2004020026
 RAIFORD G. TRASK, JR.
 1202 EASTWOOD ROAD
 WASHINGTON, NC 27889 NOV 29 2004
 PHONE: (919) 915-0779



SCALE: 1" = 200'
 SHEET 01 OF 10

MILITARY CUT-OFF ROAD (S.R. 1459 A 100' PUBLIC R/W)

NO. 2004020026
 WESTFALL PARK

N.C. GRID '83
MAP BOOK 35, PAGE 373

LANDFALL ASSOCIATES
BOOK 1514, PAGE 1564

PRELIMINARY
NOT FOR RESUBMITTAL
CONTRACTS OR SALES
PURPOSES



WETLAND DELINEATION OF AND TRACTS: G. F. & E OF WESTFALL PARK

SHEET 02 OF 10

STATION

FOR BEARINGS AND DISTANCES
SEE SHEETS 9 & 10 OF 10
FOR LINE TABLES

RAFDOS G. TRASK, JR.
FUTURE DEVELOPMENT

RUN OF SMALL BRANCH
IS THE PROPERTY LINE
SEE SHEET 03 OF 10

TRACT "E"
1,600,450 SF.
36.83 AC. (TOTAL TRACT)
0.54 AC. (POND SITE #1)
78,265 SF.
1.78 AC. (POND SITE #2)

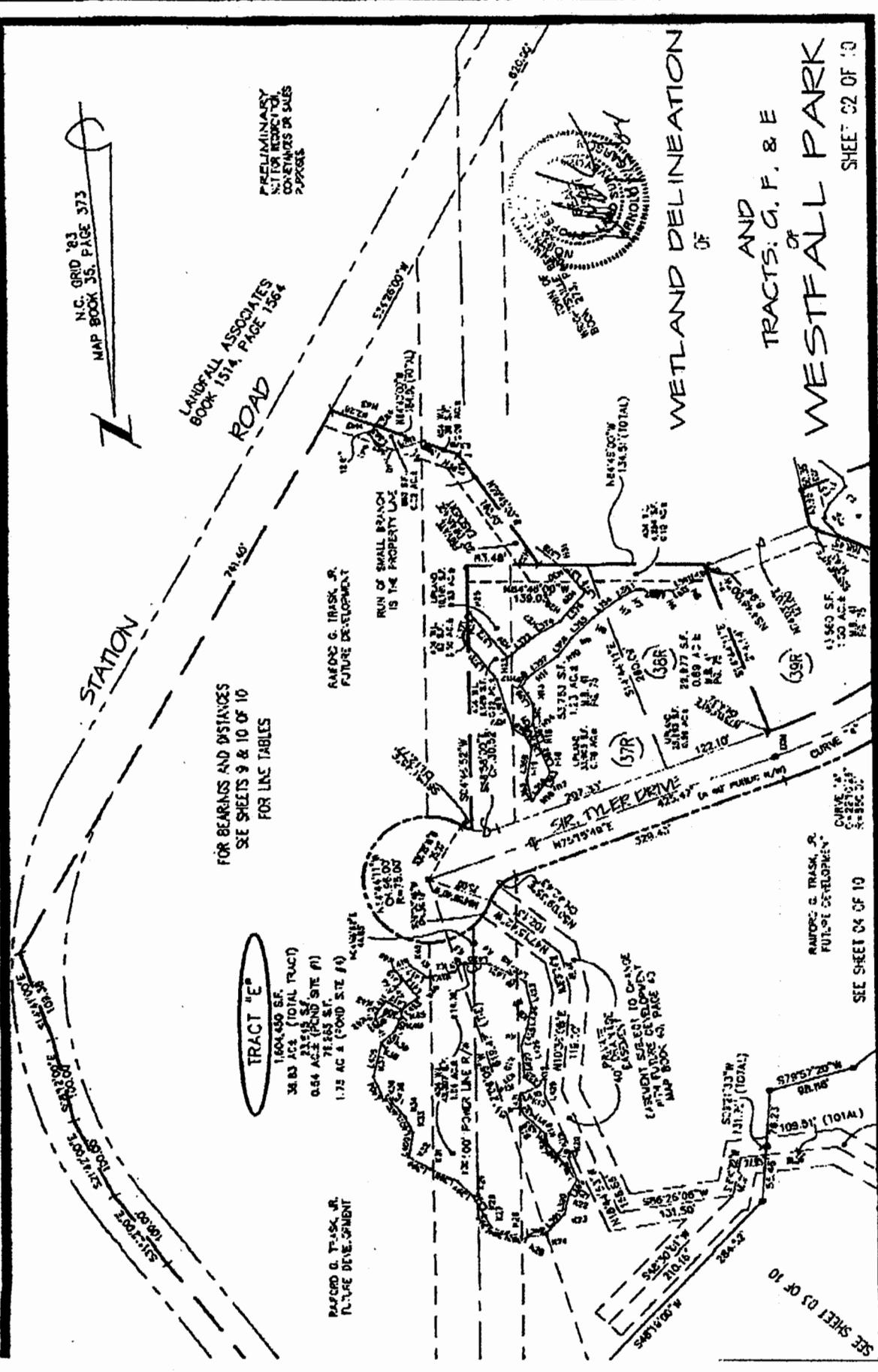
RAFDOS G. TRASK, JR.
FUTURE DEVELOPMENT

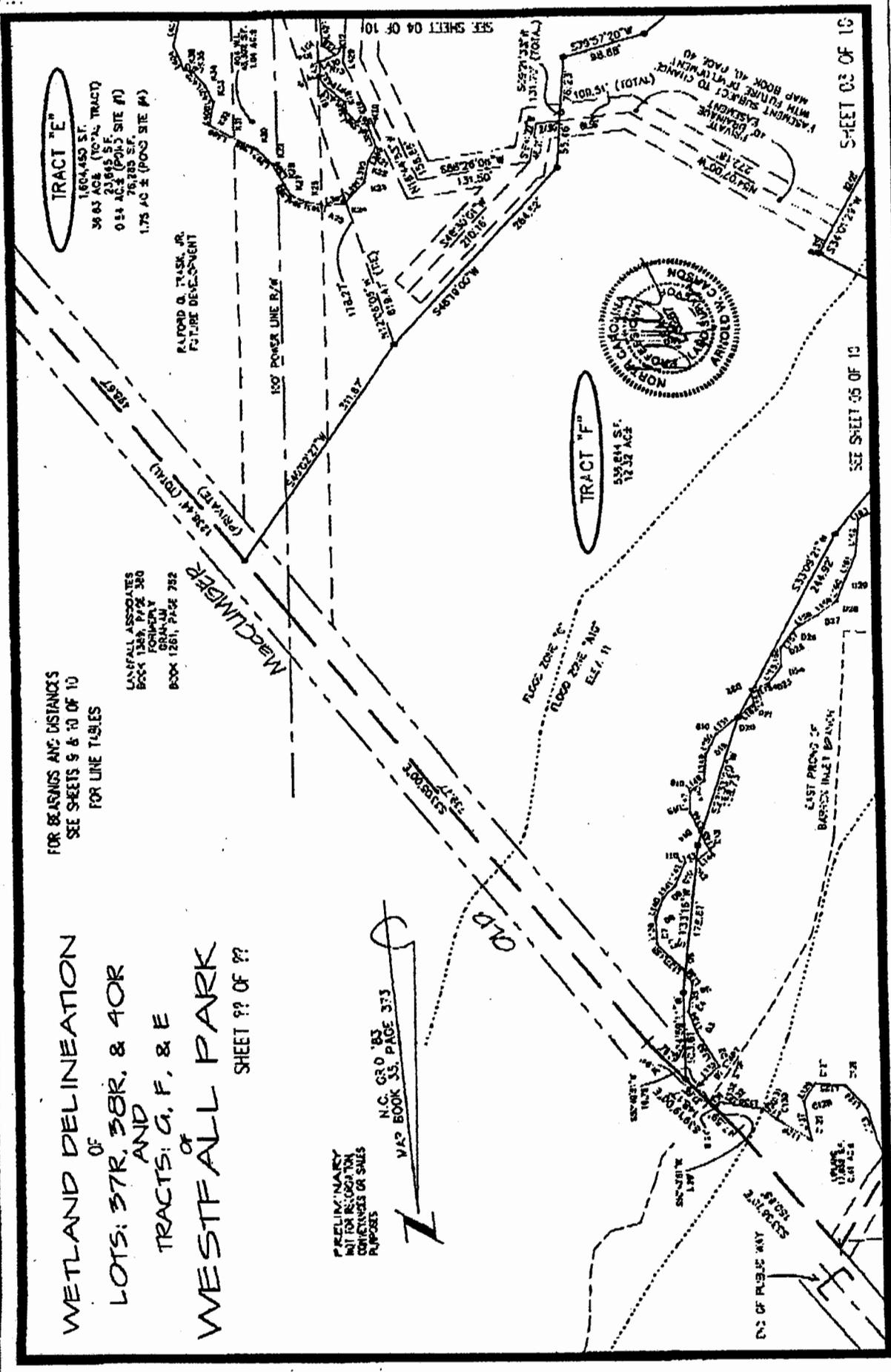
PRIVATE
10' SETBACK TO CHANGE
WITH FUTURE DEVELOPMENT
MAP BOOK 40, PAGE 43

RAFDOS G. TRASK, JR.
FUTURE DEVELOPMENT

SEE SHEET 04 OF 10

SEE SHEET 03 OF 10





FOR BEARINGS AND DISTANCES
SEE SHEETS 9 & 10 OF 10
FOR LINE TABLES

LANFALL ASSOCIATES
BOOK 1289, PAGE 380
FORSEY &
BRIDGEMAN
BOOK 1281, PAGE 282

WETLAND DELINEATION
OF
LOTS: 37R, 38R, & 40R
AND
TRACTS: G, F, & E
OF
WESTFALL PARK
SHEET ?? OF ??

PRELIMINARY
NOT FOR RESOLUTION
CONVEYANCE OR SALES
PURPOSES

N.C. GEO. '83
MAP BOOK 33, PAGE 373

TRACT "E"
160,450 SF.
39.63 AC (TOTAL TRACT)
23,945 SF
0.54 AC ± (POSS. SITE #1)
76,785 SF.
1.75 AC ± (POSS. SITE #2)

TRACT "F"
5,884 SF.
13.52 AC ±



SHEET 03 OF 10

SEE SHEET 05 OF 10

SEE SHEET 04 OF 10

RALPH D. TASK, JR.
FUTURE DEVELOPMENT

150' POWER LINE R/W

MacLumber

OLD

WEST PRONG OF
BOBBER INLET BRANCH

NO. OF FEET IN VARY

SEVERAL
SHEETS

NOTE:
 THIS TRACT IS LOCATED IN ZONES A10 & C
 ACCORDING TO THE FEDERAL EMERGENCY
 AGENCY'S FLOOD INSURANCE RATE MAP
 COMMUNITY PANEL NUMBER 370148 0085 E.
 DATED SEPTEMBER 3, 1973
 THE FLOOD LINE SHOWN HEREON WAS DETERMINED
 UTILIZING SAO FLOOD INSURANCE RATE MAP IN
 CONJUNCTION WITH THE NEW HANCOCK COUNTY
 ZONING MAP #31.

FOR BEARINGS AND DISTANCES
 SEE SHEETS 9 & 10 OF 10
 FOR LIVE TABLES

LANE/FALL ASSOCIATES
 SOCK 1514, PAGE 1384

SEE SHEET 02 OF 10
 N.C. ORD '83
 MAP BOOK 35, PAGE 373

TRACT "E"
 160,450 SF. TRACT
 36.81 AC (TOTAL SITE #1)
 0.54 AC (POND SITE #1)
 78,285 SF.
 1.78 AC (POND SITE #2)

RAJFORD G. TRASK, JR.
 FUTURE DEVELOPMENT



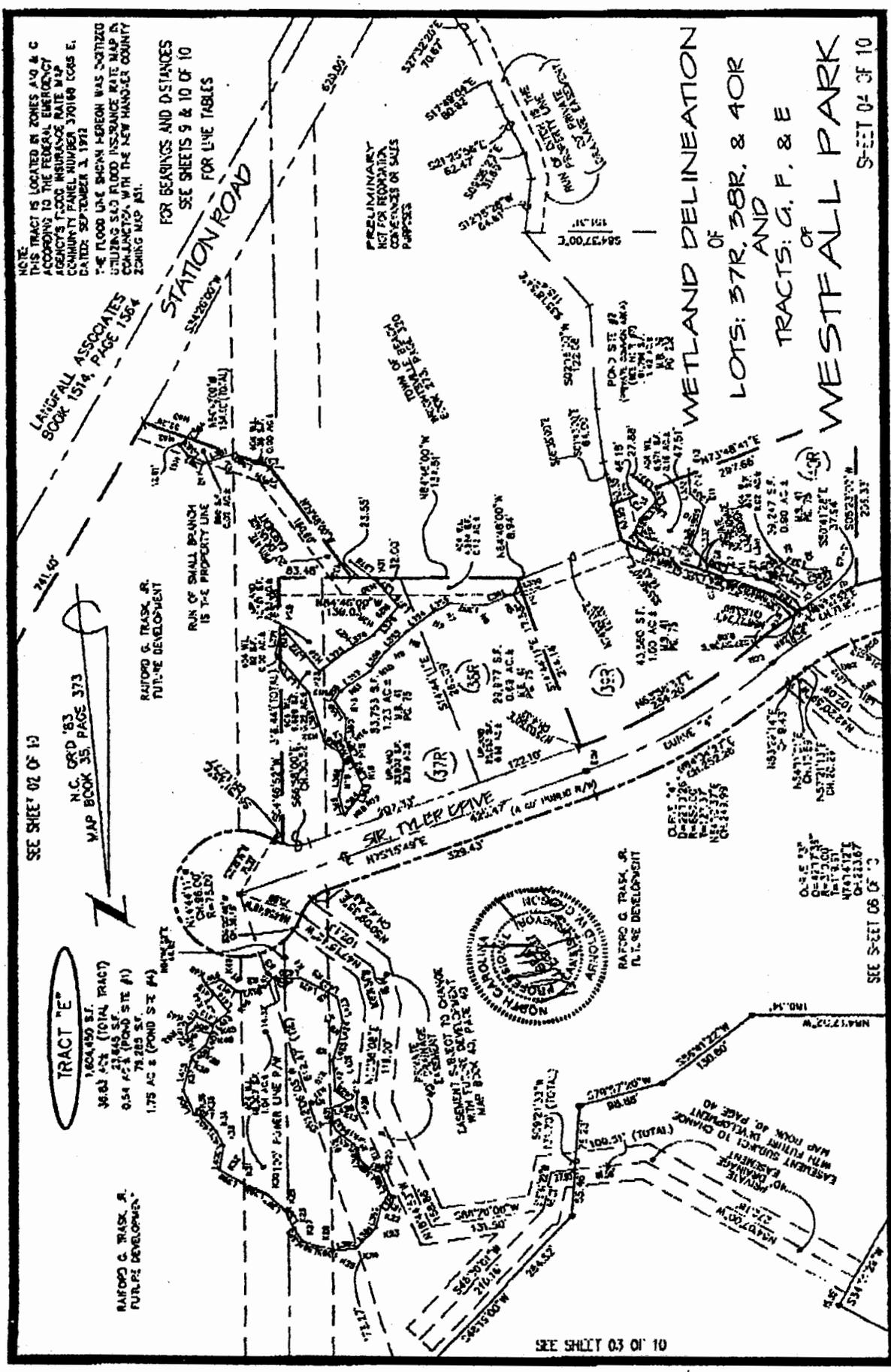
RAJFORD G. TRASK, JR.
 FUTURE DEVELOPMENT

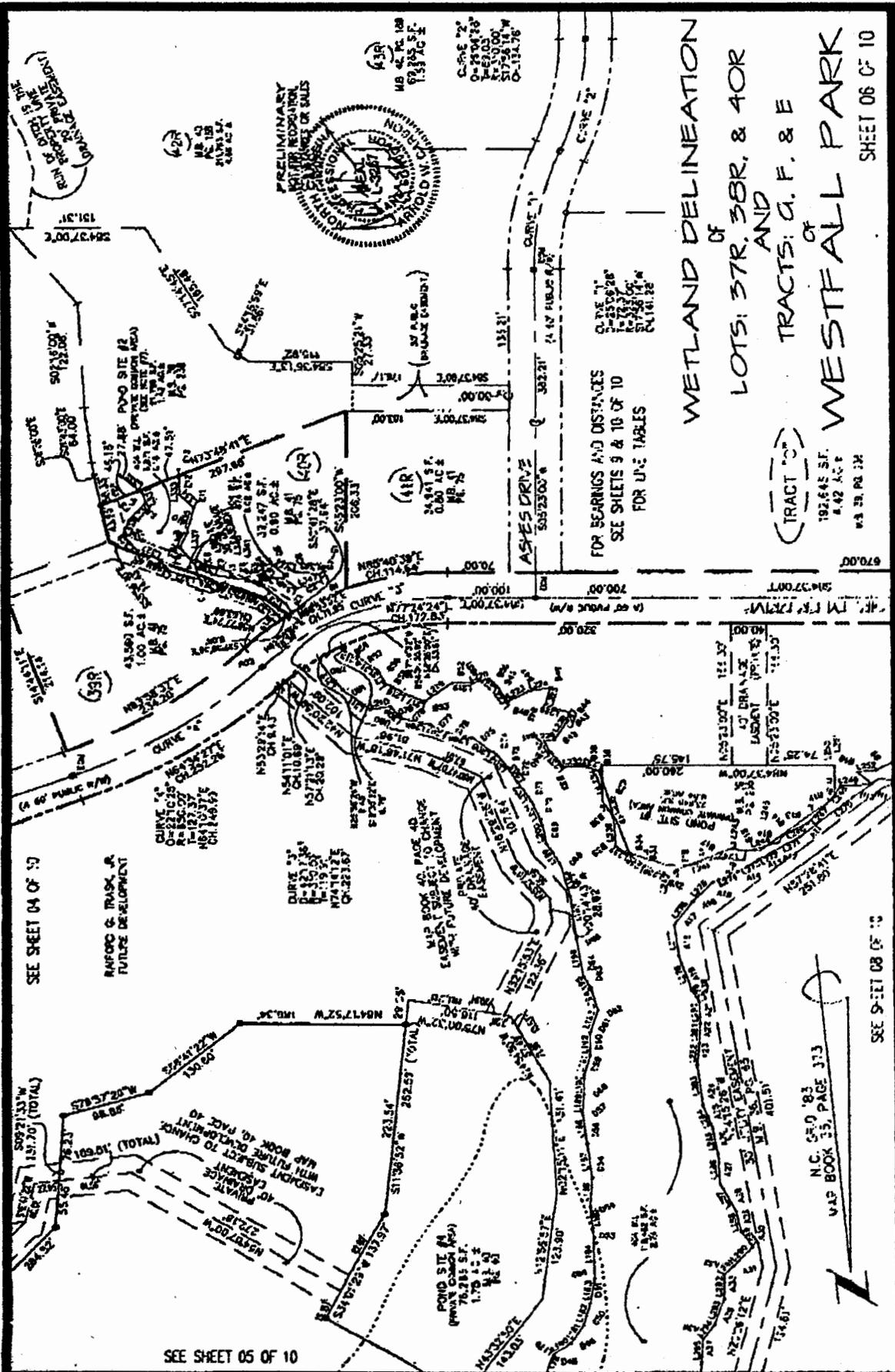
SEE SHEET 03 OF 10

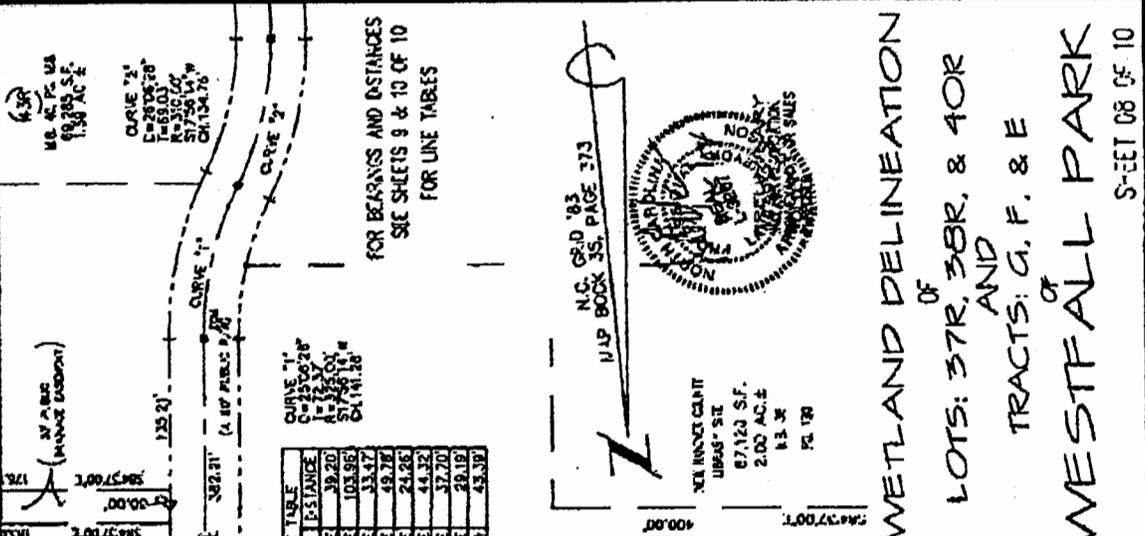
WETLAND DELINEATION
 OF
 LOTS: 37R, 38R, & 40R
 AND
 TRACTS: G, F, & E
 OF
 WESTFALL PARK

SEE SHEET 04 OF 10

SEE SHEET 06 OF 10







FOR BEARINGS AND DISTANCES
SEE SHEETS 9 & 10 OF 10
FOR LINE TABLES

LINE	BEARING	DISTANCE
L1	N 27° 21' 00" E	39.20
L2	N 58° 30' 00" E	103.96
L3	S 51° 14' 57" E	33.47
L4	N 31° 14' 57" E	49.78
L5	S 58° 24' 00" E	24.28
L6	S 55° 21' 39" E	44.32
L7	S 19° 24' 55" E	37.70
L8	S 58° 24' 00" E	28.19
L9	S 16° 23' 00" W	43.39

(TRACT "C")
192,645 S.F.
4.42 AC ±
MB. 24 PG. 28



N.C. G.S.D. '83
MAP BOOK 35, PAGE 373

SEE INVOICE CAPT
URBAS' SITE
87,163 S.F.
2.00 AC ±
MB. 3 PG. 18

(412)
34,941 S.F.
0.80 AC ±
MB. 2 PG. 15

SEE SHEET 06 OF 10
MAP BOOK 35, PAGE 40
CASEMENT SUBJECT TO CHANGE
WITH FUTURE DEVELOPMENT

ROAD SITE #1
(PRIVATE ROAD) AREA
76,253 S.F.
1.75 AC ±
MB. 6 PG. 6

SEE SHEET 07 OF 10

30' UTILITY EASEMENT 542.31'
1852.71'

MILITARY CUT-OFF ROAD

(E.S. 1605 A 100' PUBLIC R/W)

PRELIMINARY
NOT FOR RECORDATION,
CONVEYANCES OR SALES
PURPOSES



WETLAND DELINEATION
OF
LOTS: 37R, 38R, & 40R
AND
TRACTS: G, F, & E
OF
WESTFALL PARK

SHEET 09 OF 10

LINE TABLE				LINE TABLE				LINE TABLE				LINE TABLE			
LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	
L1	N83°00'35"E	19.07	L1	S85°31'02"W	11.47	L1	S18°27'47"E	16.13	L1	S85°41'52"W	21.84				
L2	N02°32'47"E	4.38	L2	N01°14'42"E	30.73	L2	S18°27'47"E	74.73	L2	S18°27'47"E	23.62				
L3	N12°42'12"E	13.71	L3	S12°31'02"E	11.24	L3	S10°17'41"E	34.18	L3	S15°54'20"W	37.44				
L4	N02°38'03"E	23.60	L4	S20°48'03"E	27.09	L4	S27°11'34"E	37.25	L4	S03°31'37"W	61.11				
L5	S02°53'37"W	10.55	L5	N01°10'40"E	31.37	L5	S01°56'20"E	34.16	L5	S01°40'23"E	23.59				
L6	S65°33'38"E	39.30	L6	S66°43'08"W	15.65	L6	N30°53'20"E	33.70	L6	S02°15'28"W	31.65				
L7	N75°15'02"E	29.71	L7	N59°55'22"W	22.84	L7	N59°17'04"E	01.03	L7	S02°11'15"E	39.89				
L8	S44°19'10"E	27.12	L8	N57°38'10"E	31.77	L8	N59°17'04"E	49.68	L8	S02°11'15"E	31.20				
L9	S54°35'24"E	17.34	L9	N05°30'47"E	27.89	L9	S56°38'10"E	20.22	L9	S10°06'47"W	20.89				
L10	S34°31'19"E	17.34	L10	S01°56'34"W	15.84	L10	S56°38'10"E	48.47	L10	S08°08'39"W	22.24				
L11	S23°30'04"E	26.35	L11	S64°24'07"E	26.45	L11	N45°08'27"E	3.33	L11	S07°28'52"W	23.74				
L12	S81°07'50"E	14.68	L12	N01°13'02"W	18.20	L12	S83°38'11"E	27.01	L12	S05°24'53"W	27.77				
L13	S61°26'07"E	24.42	L13	N26°37'28"E	22.40	L13	S28°44'11"E	47.19	L13	S43°33'30"W	21.10				
L14	N01°17'34"E	20.90	L14	S19°37'46"E	11.50	L14	S15°54'17"E	27.30	L14	S71°11'41"E	13.17				
L15	N03°22'07"E	15.21	L15	N13°08'54"E	43.61	L15	S14°26'33"W	33.46	L15	S78°54'03"E	13.17				
L16	S55°28'12"E	21.57	L16	N03°14'48"W	18.09	L16	S46°14'27"E	21.60	L16	S04°28'20"E	43.33				
L17	S81°28'04"E	12.34	L17	N65°31'45"W	19.73	L17	S42°08'10"E	27.16	L17	S02°28'23"E	43.92				
L18	S39°18'56"E	20.61	L18	N39°16'18"W	18.63	L18	S38°38'17"E	23.91	L18	S11°24'24"E	31.57				
L19	S54°58'21"E	27.68	L19	N43°43'48"E	13.35	L19	S39°24'31"W	31.48	L19	S27°30'54"E	24.80				
L20	N13°26'24"E	27.59	L20	N79°47'48"E	4.57	L20	S25°29'11"W	24.76	L20	S09°29'34"E	23.86				
L21	S48°32'13"E	36.31	L21	N24°14'20"E	18.01	L21	N49°51'49"E	22.28	L21	S27°45'04"E	23.93				
L22	N15°21'57"E	21.48	L22	N33°18'27"E	23.30	L22	S48°20'17"W	33.85	L22	S21°18'53"E	27.42				
L23	N7°24'53"E	33.84	L23	N18°52'07"W	7.01	L23	S42°18'27"W	15.45	L23	S27°54'21"E	19.88				
L24	N72°27'25"W	24.13	L24	N18°52'07"W	17.43	L24	S27°20'28"W	11.76	L24	S24°11'28"E	20.34				
L25	N72°27'25"W	17.09	L25	N37°12'58"W	17.79	L25	S27°20'28"W	41.09	L25	S03°24'17"E	33.30				
L26	N43°31'50"W	8.46	L26	N33°18'27"E	17.02	L26	S20°44'51"E	24.18	L26	S27°28'03"E	23.72				
L27	N03°00'01"E	23.22	L27	N39°05'42"W	12.64	L27	S09°26'33"W	24.43	L27	S27°07'41"E	21.84				
L28	N20°11'53"E	14.14	L28	N40°10'15"E	24.94	L28	S17°51'20"W	15.44	L28	N49°34'17"W	28.92				
L29	N43°31'18"E	24.66	L29	N71°53'15"E	18.84	L29	S24°51'20"W	24.45	L29	S21°50'23"E	17.93				
L30	N78°11'53"E	17.75	L30	S41°27'30"E	17.43	L30	S33°42'21"W	24.56	L30	N57°11'36"W	34.33				
L31	S25°17'32"E	23.84	L31	S24°50'42"E	14.28	L31	S35°55'36"W	24.54	L31	N49°34'17"W	28.92				
L32	S47°07'41"E	19.85	L32	N50°57'46"E	27.08	L32	S25°10'07"W	34.99	L32	S37°22'31"E	26.48				
L33	S41°26'47"W	12.87	L33	N49°15'15"W	13.90	L33	S12°34'27"E	15.44	L33	N57°22'07"W	18.27				
L34	S41°26'47"W	50.26	L34	N47°12'01"W	24.81	L34	S74°51'20"W	21.24	L34	N49°34'17"W	28.92				
L35	S51°16'17"E	8.98	L35	N65°14'05"W	24.43	L35	S43°53'54"W	28.22	L35	N57°11'36"W	34.33				
L36	S71°46'24"E	27.73	L36	N46°24'07"E	26.14	L36	S42°44'50"W	27.78	L36	N57°11'36"W	34.33				
L37	S81°37'33"E	24.85	L37	N34°14'32"E	26.14	L37	S42°44'50"W	33.48	L37	N57°11'36"W	34.33				
L38	S11°24'24"E	34.85	L38	S58°57'30"E	13.30	L38	S42°44'50"W	33.48	L38	N57°11'36"W	34.33				
L39	N34°00'05"E	31.84	L39	N49°19'20"E	6.09	L39	S42°44'50"W	27.89	L39	N57°11'36"W	34.33				
L40	S23°10'05"E	3.30	L40	N49°19'20"E	13.02	L40	S42°44'50"W	28.84	L40	N57°11'36"W	34.33				
L41	N15°20'38"E	30.00	L41	N82°37'07"E	7.63	L41	S42°44'50"W	28.84	L41	N57°11'36"W	34.33				
L42	N15°20'38"E	14.44	L42	N48°27'42"E	22.04	L42	S42°44'50"W	44.00	L42	N57°11'36"W	34.33				
L43	N52°39'21"E	16.86	L43	N17°47'58"E	33.53	L43	S42°44'50"W	15.40	L43	N57°11'36"W	34.33				
L44	S15°27'27"E	13.02	L44	N39°18'17"E	23.24	L44	S42°44'50"W	27.47	L44	N57°11'36"W	34.33				
L45	N28°48'02"E	20.36	L45	N39°18'17"E	19.71	L45	S42°44'50"W	30.70	L45	N57°11'36"W	34.33				
L46	N15°20'38"E	23.19	L46	N39°18'17"E	19.71	L46	S42°44'50"W	19.19	L46	N57°11'36"W	34.33				
L47	N15°20'38"E	34.61	L47	N15°10'45"W	27.29	L47	S42°44'50"W	28.00	L47	N57°11'36"W	34.33				
L48	N15°20'38"E	1.80	L48	N15°10'45"W	14.64	L48	S42°44'50"W	28.00	L48	N57°11'36"W	34.33				
L49	N15°20'38"E	35.86	L49	N15°10'45"W	14.64	L49	S42°44'50"W	28.00	L49	N57°11'36"W	34.33				
L50	N15°20'38"E	1.80	L50	N15°10'45"W	14.64	L50	S42°44'50"W	28.00	L50	N57°11'36"W	34.33				
L51	N15°20'38"E	21.00	L51	N15°10'45"W	14.64	L51	S42°44'50"W	28.00	L51	N57°11'36"W	34.33				
L52	N15°20'38"E	8.27	L52	N17°45'40"E	23.18	L52	S42°44'50"W	28.00	L52	N57°11'36"W	34.33				
L53	N15°20'38"E	22.00	L53	N17°45'40"E	18.67	L53	S42°44'50"W	28.00	L53	N57°11'36"W	34.33				
L54	N15°20'38"E	20.00	L54	N17°45'40"E	18.67	L54	S42°44'50"W	28.00	L54	N57°11'36"W	34.33				
L55	N15°20'38"E	8.81	L55	N17°45'40"E	18.67	L55	S42°44'50"W	28.00	L55	N57°11'36"W	34.33				
L56	N15°20'38"E	30.25	L56	N17°45'40"E	18.67	L56	S42°44'50"W	28.00	L56	N57°11'36"W	34.33				
L57	N15°20'38"E	11.69	L57	N17°45'40"E	18.67	L57	S42°44'50"W	28.00	L57	N57°11'36"W	34.33				
L58	N15°20'38"E	11.69	L58	N17°45'40"E	18.67	L58	S42°44'50"W	28.00	L58	N57°11'36"W	34.33				
L59	N15°20'38"E	11.69	L59	N17°45'40"E	18.67	L59	S42°44'50"W	28.00	L59	N57°11'36"W	34.33				
L60	N15°20'38"E	29.63	L60	N17°45'40"E	18.67	L60	S42°44'50"W	28.00	L60	N57°11'36"W	34.33				

PRELIMINARY
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CONVEYANCES OR SALES
PURPOSES



WETLAND DELINEATION
OF
LOTS: 37R, 38R, & 40R
AND
TRACTS: G. F. & E
OF
WESTFALL PARK

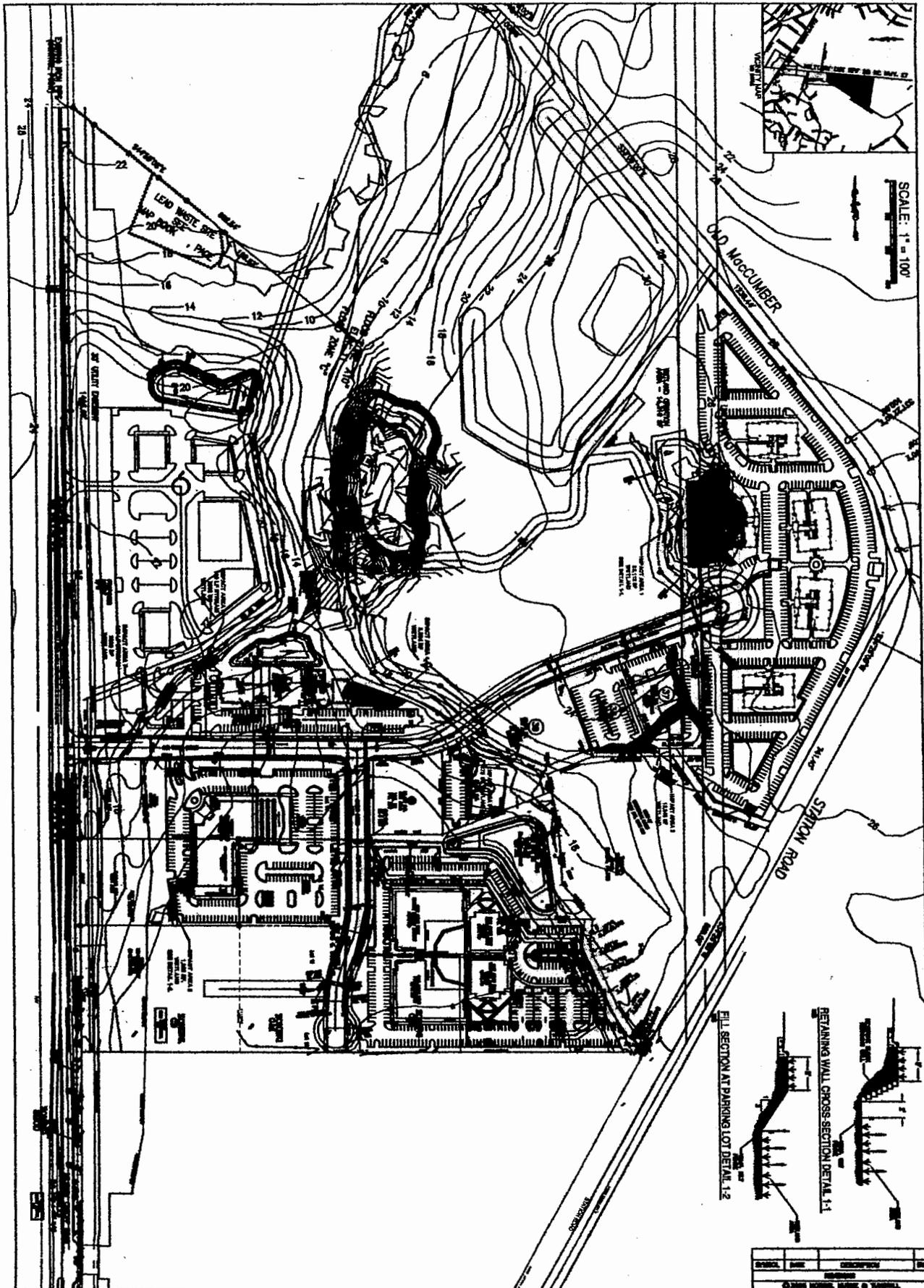
SHEET 10 OF 10

LINE TABLE											
LINE	BEARING	DISTANCE									
L201	S72°30'00"W	45.90	L351	S72°30'00"W	73.17	L501	N17°20'00"W	31.87	L651	N58°43'37"W	26.43
L202	N81°02'00"W	37.70	L352	S72°30'00"W	18.78	L502	N17°20'00"W	31.87	L652	N58°43'37"W	26.43
L203	S18°18'22"W	10.35	L353	S60°58'00"W	27.47	L503	N08°20'12"E	18.37	L653	N08°20'12"E	29.78
L204	S78°29'31"W	37.80	L354	S61°59'20"W	31.84	L504	N03°20'12"E	24.36	L654	N16°07'45"E	28.81
L205	S89°27'41"W	19.25	L355	N68°07'41"W	27.55	L505	S08°32'33"E	24.50	L655	N24°31'45"E	20.87
L206	S89°28'24"W	20.42	L356	N68°07'41"W	27.55	L506	S14°43'55"E	30.58	L656	N32°11'55"E	12.87
L207	S49°01'33"W	34.41	L357	N01°41'04"W	24.11	L507	S18°14'00"E	13.37	L657	N07°46'32"E	24.87
L208	S35°42'01"W	18.83	L358	N03°20'12"E	24.36	L508	S21°52'54"E	18.08	L658	N16°07'45"E	18.33
L209	S35°42'01"W	18.83	L359	N03°20'12"E	24.36	L509	S21°52'54"E	18.08	L659	N16°07'45"E	18.33
L210	S12°31'41"E	21.00	L360	S47°31'28"W	21.82	L510	S25°48'01"E	60.73	L660	N03°11'11"E	8.54
L211	S68°58'44"W	25.68	L361	S47°31'28"W	21.82	L511	N17°20'00"W	31.87	L661	N03°11'11"E	20.46
L212	S70°17'03"W	45.94	L362	N58°43'37"W	27.77	L512	N17°20'00"W	31.87	L662	N03°11'11"E	20.46
L213	S70°17'03"W	45.94	L363	N58°43'37"W	27.77	L513	N17°20'00"W	31.87	L663	N03°11'11"E	20.46
L214	S42°16'31"W	23.16	L364	N20°43'55"W	33.54	L514	S25°48'01"E	60.73	L664	N03°11'11"E	20.46
L215	S11°27'27"W	28.21	L365	N20°43'55"W	33.54	L515	S25°48'01"E	60.73	L665	N03°11'11"E	20.46
L216	S17°28'12"W	33.81	L366	N11°13'55"W	37.53	L516	S25°48'01"E	60.73	L666	N03°11'11"E	20.46
L217	N84°53'57"W	18.73	L367	N11°13'55"W	37.53	L517	S25°48'01"E	60.73	L667	N03°11'11"E	20.46
L218	N59°15'08"W	27.45	L368	N08°10'20"W	25.82	L518	S25°48'01"E	60.73	L668	N03°11'11"E	20.46
L219	S22°16'14"W	29.87	L369	N01°56'49"W	27.55	L519	S25°48'01"E	60.73	L669	N03°11'11"E	20.46
L220	N42°54'24"E	24.57	L370	N01°56'49"W	27.55	L520	S25°48'01"E	60.73	L670	N03°11'11"E	20.46
L221	N87°20'04"E	24.57	L371	S41°36'44"E	37.51	L521	N16°45'20"E	37.92	L671	N03°11'11"E	20.46
L222	N87°20'04"E	24.57	L372	S41°36'44"E	37.51	L522	N16°45'20"E	37.92	L672	N03°11'11"E	20.46
L223	N87°20'04"E	24.57	L373	S41°36'44"E	37.51	L523	N16°45'20"E	37.92	L673	N03°11'11"E	20.46
L224	N87°20'04"E	24.57	L374	S41°36'44"E	37.51	L524	N16°45'20"E	37.92	L674	N03°11'11"E	20.46
L225	N87°20'04"E	24.57	L375	S41°36'44"E	37.51	L525	N16°45'20"E	37.92	L675	N03°11'11"E	20.46
L226	N87°20'04"E	24.57	L376	S41°36'44"E	37.51	L526	N16°45'20"E	37.92	L676	N03°11'11"E	20.46
L227	N87°20'04"E	24.57	L377	S41°36'44"E	37.51	L527	N16°45'20"E	37.92	L677	N03°11'11"E	20.46
L228	N87°20'04"E	24.57	L378	S41°36'44"E	37.51	L528	N16°45'20"E	37.92	L678	N03°11'11"E	20.46
L229	N87°20'04"E	24.57	L379	S41°36'44"E	37.51	L529	N16°45'20"E	37.92	L679	N03°11'11"E	20.46
L230	N87°20'04"E	24.57	L380	S41°36'44"E	37.51	L530	N16°45'20"E	37.92	L680	N03°11'11"E	20.46
L231	N87°20'04"E	24.57	L381	S41°36'44"E	37.51	L531	N16°45'20"E	37.92	L681	N03°11'11"E	20.46
L232	N87°20'04"E	24.57	L382	S41°36'44"E	37.51	L532	N16°45'20"E	37.92	L682	N03°11'11"E	20.46
L233	N87°20'04"E	24.57	L383	S41°36'44"E	37.51	L533	N16°45'20"E	37.92	L683	N03°11'11"E	20.46
L234	N87°20'04"E	24.57	L384	S41°36'44"E	37.51	L534	N16°45'20"E	37.92	L684	N03°11'11"E	20.46
L235	N87°20'04"E	24.57	L385	S41°36'44"E	37.51	L535	N16°45'20"E	37.92	L685	N03°11'11"E	20.46
L236	N87°20'04"E	24.57	L386	S41°36'44"E	37.51	L536	N16°45'20"E	37.92	L686	N03°11'11"E	20.46
L237	N87°20'04"E	24.57	L387	S41°36'44"E	37.51	L537	N16°45'20"E	37.92	L687	N03°11'11"E	20.46
L238	N87°20'04"E	24.57	L388	S41°36'44"E	37.51	L538	N16°45'20"E	37.92	L688	N03°11'11"E	20.46
L239	N87°20'04"E	24.57	L389	S41°36'44"E	37.51	L539	N16°45'20"E	37.92	L689	N03°11'11"E	20.46
L240	N87°20'04"E	24.57	L390	S41°36'44"E	37.51	L540	N16°45'20"E	37.92	L690	N03°11'11"E	20.46
L241	N87°20'04"E	24.57	L391	S41°36'44"E	37.51	L541	N16°45'20"E	37.92	L691	N03°11'11"E	20.46
L242	N87°20'04"E	24.57	L392	S41°36'44"E	37.51	L542	N16°45'20"E	37.92	L692	N03°11'11"E	20.46
L243	N87°20'04"E	24.57	L393	S41°36'44"E	37.51	L543	N16°45'20"E	37.92	L693	N03°11'11"E	20.46
L244	N87°20'04"E	24.57	L394	S41°36'44"E	37.51	L544	N16°45'20"E	37.92	L694	N03°11'11"E	20.46
L245	N87°20'04"E	24.57	L395	S41°36'44"E	37.51	L545	N16°45'20"E	37.92	L695	N03°11'11"E	20.46
L246	N87°20'04"E	24.57	L396	S41°36'44"E	37.51	L546	N16°45'20"E	37.92	L696	N03°11'11"E	20.46
L247	N87°20'04"E	24.57	L397	S41°36'44"E	37.51	L547	N16°45'20"E	37.92	L697	N03°11'11"E	20.46
L248	N87°20'04"E	24.57	L398	S41°36'44"E	37.51	L548	N16°45'20"E	37.92	L698	N03°11'11"E	20.46
L249	N87°20'04"E	24.57	L399	S41°36'44"E	37.51	L549	N16°45'20"E	37.92	L699	N03°11'11"E	20.46
L250	N87°20'04"E	24.57	L400	S41°36'44"E	37.51	L550	N16°45'20"E	37.92	L700	N03°11'11"E	20.46
L251	N87°20'04"E	24.57	L401	S41°36'44"E	37.51	L551	N16°45'20"E	37.92	L701	N03°11'11"E	20.46
L252	N87°20'04"E	24.57	L402	S41°36'44"E	37.51	L552	N16°45'20"E	37.92	L702	N03°11'11"E	20.46
L253	N87°20'04"E	24.57	L403	S41°36'44"E	37.51	L553	N16°45'20"E	37.92	L703	N03°11'11"E	20.46
L254	N87°20'04"E	24.57	L404	S41°36'44"E	37.51	L554	N16°45'20"E	37.92	L704	N03°11'11"E	20.46
L255	N87°20'04"E	24.57	L405	S41°36'44"E	37.51	L555	N16°45'20"E	37.92	L705	N03°11'11"E	20.46
L256	N87°20'04"E	24.57	L406	S41°36'44"E	37.51	L556	N16°45'20"E	37.92	L706	N03°11'11"E	20.46
L257	N87°20'04"E	24.57	L407	S41°36'44"E	37.51	L557	N16°45'20"E	37.92	L707	N03°11'11"E	20.46
L258	N87°20'04"E	24.57	L408	S41°36'44"E	37.51	L558	N16°45'20"E	37.92	L708	N03°11'11"E	20.46
L259	N87°20'04"E	24.57	L409	S41°36'44"E	37.51	L559	N16°45'20"E	37.92	L709	N03°11'11"E	20.46
L260	N87°20'04"E	24.57	L410	S41°36'44"E	37.51	L560	N16°45'20"E	37.92	L710	N03°11'11"E	20.46
L261	N87°20'04"E	24.57	L411	S41°36'44"E	37.51	L561	N16°45'20"E	37.92	L711	N03°11'11"E	20.46
L262	N87°20'04"E	24.57	L412	S41°36'44"E	37.51	L562	N16°45'20"E	37.92	L712	N03°11'11"E	20.46
L263	N87°20'04"E	24.57	L413	S41°36'44"E	37.51	L563	N16°45'20"E	37.92	L713	N03°11'11"E	20.46
L264	N87°20'04"E	24.57	L414	S41°36'44"E	37.51	L564	N16°45'20"E	37.92	L714	N03°11'11"E	20.46
L265	N87°20'04"E	24.57	L415	S41°36'44"E	37.51	L565	N16°45'20"E	37.92	L715	N03°11'11"E	20.46
L266	N87°20'04"E	24.57	L416	S41°36'44"E	37.51	L566	N16°45'20"E	37.92	L716	N03°11'11"E	20.46
L267	N87°20'04"E	24.57	L417	S41°36'44"E	37.51	L567	N16°45'20"E	37.92	L717	N03°11'11"E	20.46
L268	N87°20'04"E	24.57	L418	S41°36'44"E	37.51	L568	N16°45'20"E	37.92	L718	N03°11'11"E	20.46
L269	N87°20'04"E	24.57	L419	S41°36'44"E	37.51	L569	N16°45'20"E	37.92	L719	N03°11'11"E	20.46
L270	N87°20'04"E	24.57	L420	S41°36'44"E	37.51	L570	N16°45'20"E	37.92	L720	N03°11'11"E	20.46
L271	N87°20'04"E	24.57	L421	S41°36'44"E	37.51	L571	N16°45'20"E	37.92	L721	N03°11'11"E	20.46
L272	N87°20'04"E	24.57	L422	S41°36'44"E	37.51	L572	N16°45'20"E	37.92	L722	N03°11'11"E	20.46
L273	N87°20'04"E	24.57	L423	S41°36'44"E	37.51	L573	N16°45'20"E	37.92	L723	N03°11'11"E	20.46
L274	N87°20'04"E	24.57	L424	S41°36'44"E	37.51	L574	N16°45'20"E	37.92	L724	N03°11'11"E	20.46
L275	N87°20'04"E	24.57	L425	S41°36'44"E	37.51	L575	N16°45'20"E	37.92	L725	N03°11'11"E	20.46
L276	N87°20'04"E	24.57	L426	S41°36'44"E	37.51	L576	N16°45'20"E	37.92	L726	N03°11'11"E	20.46
L277	N87°20'04"E	24.57	L427	S41°36'44"E	37.51	L577	N16°45'20"E	37.92	L727	N03°11'11"E	20.46
L278	N87°20'04"E	24.57	L428	S41°36'44"E	37.51	L578	N16°45'20"E	37.92	L728	N03°11'11"E	20.46
L279	N87°20'04"E	24.57	L429	S41°36'44"E	37.51	L579	N16°45'20"E	37.92	L729	N03°11'11"E	20.46
L280	N87°20'04"E	24.57	L430	S41°36'44"E	37.51	L580	N16°45'20"E	37.92	L730	N03°11'11"E	20.46

PROPOSED SITE PLAN



SPANGLER
ENVIRONMENTAL, INC.



C1

DATE: 11/11/88
 DRAWN BY: [Signature]

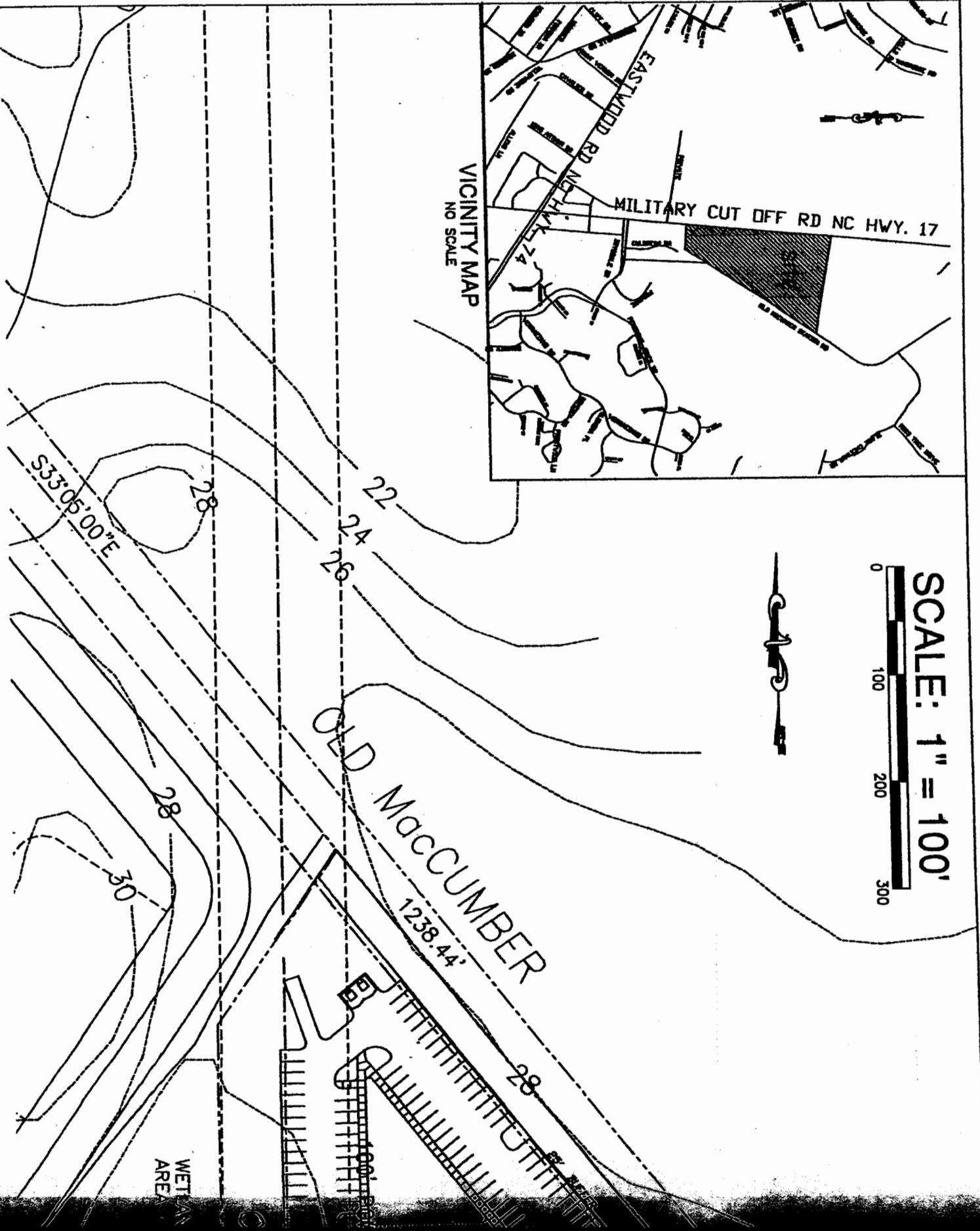
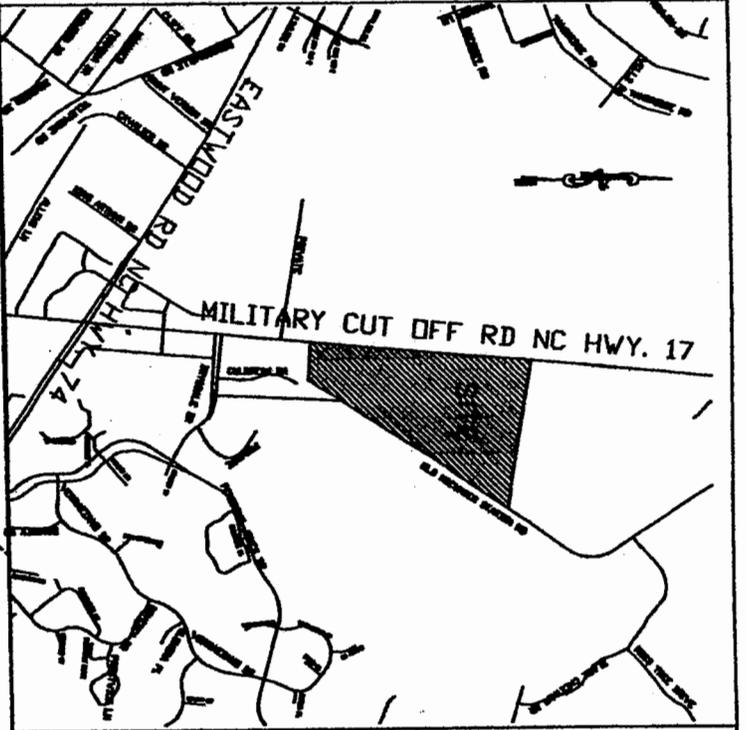
NORRIS, KUSKE & TUNSTALL
CONSULTING ENGINEERS, INC.
 100 MARKET STREET, SUITE 200
 WILMINGTON, DE 19801
 PHONE (302) 238-0000
 FAX (302) 238-0000

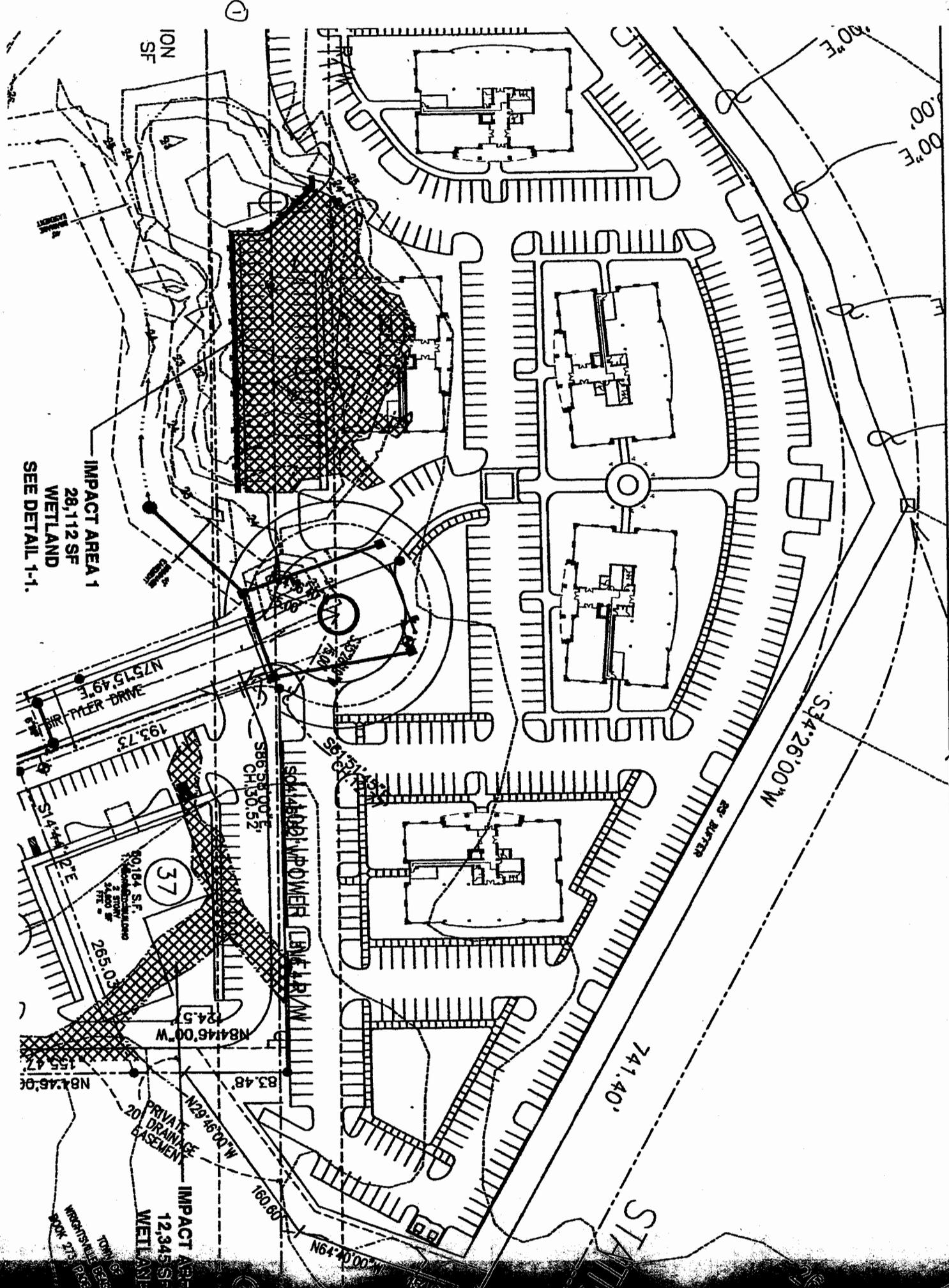
OWNER:
 NAME:
 ADDRESS:
 CITY/STATE:
 ZIP:

WETLANDS IMPACT
RESEARCH PARK
WILMINGTON, N. C.

NO.	DATE	DESCRIPTION	BY

VICINITY MAP
NO SCALE





IMPACT AREA 1
 28,112 SF
 WETLAND
 SEE DETAIL 1-1.

37
 9,018 SF
 WETLAND

IMPACT AREA 2
 12,345 SF
 WETLAND

PRIVATE DRAINAGE
 BASEMENTS
 20'

STAIR

24" BURIED

ION
 SF

1

26

3

REVISIONS

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**WETLANDS IMPACT
RESEARCH PARK**

WILMINGTON, N. C.

4

NORRIS, KUSKE & TUNSTALL
CONSULTING ENGINEERS, INC.

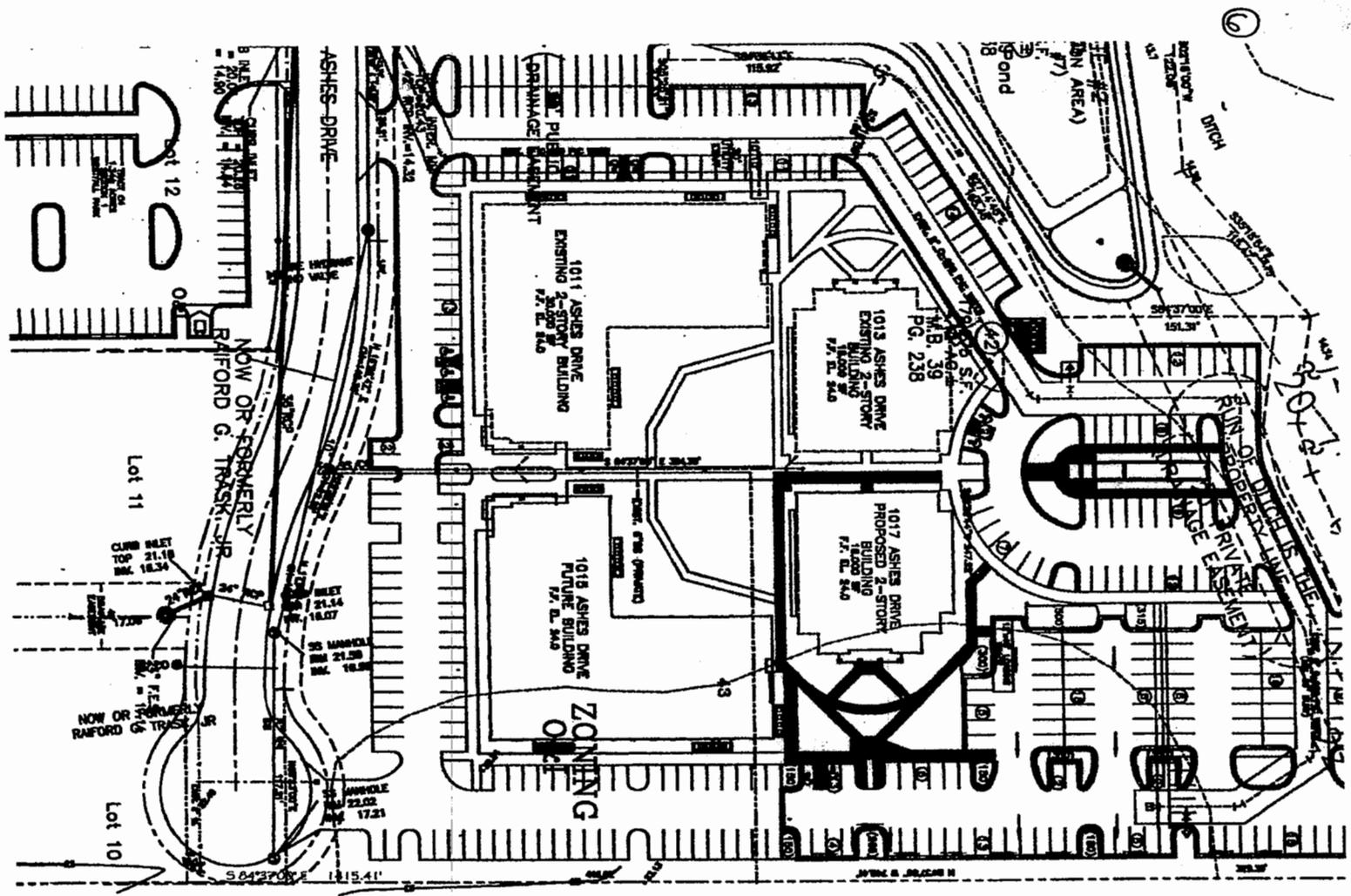
902 MARKET STREET
WILMINGTON, NC, 28401
PHONE (910) 343-9653
FAX (910) 343-9604
office@nkteng.com

7 W 1326.67

OWNER:

NAME:
ADDRESS:
CITY/STATE:
TELE:





1011 ASHES DRIVE
EXISTING 2-STORY BUILDING
F.V. E.L. S.M.D.

1013 ASHES DRIVE
EXISTING 10-STORY BUILDING
F.V. E.L. S.M.D.

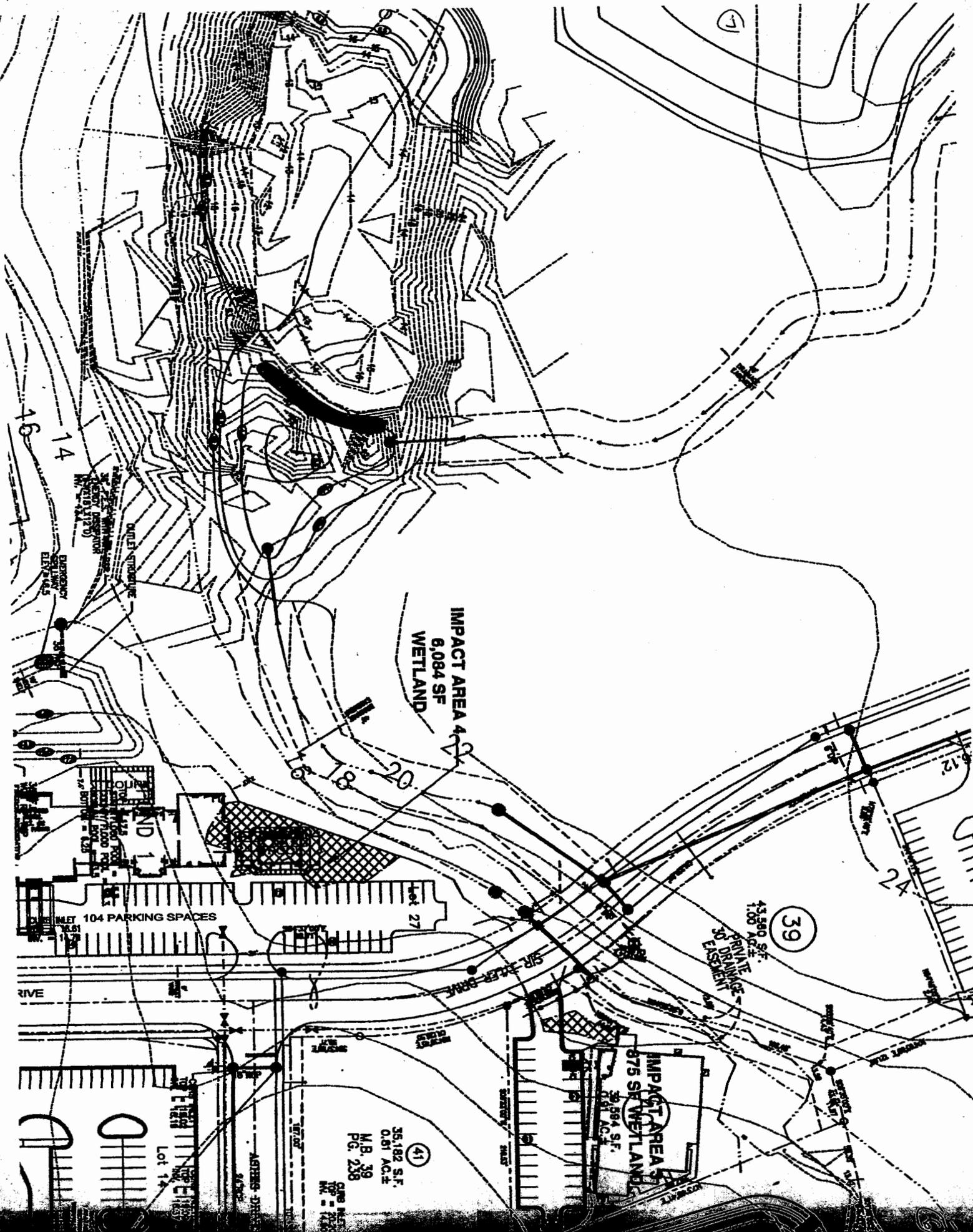
1017 ASHES DRIVE
PROPOSED 4-STORY BUILDING
F.V. E.L. S.M.D.

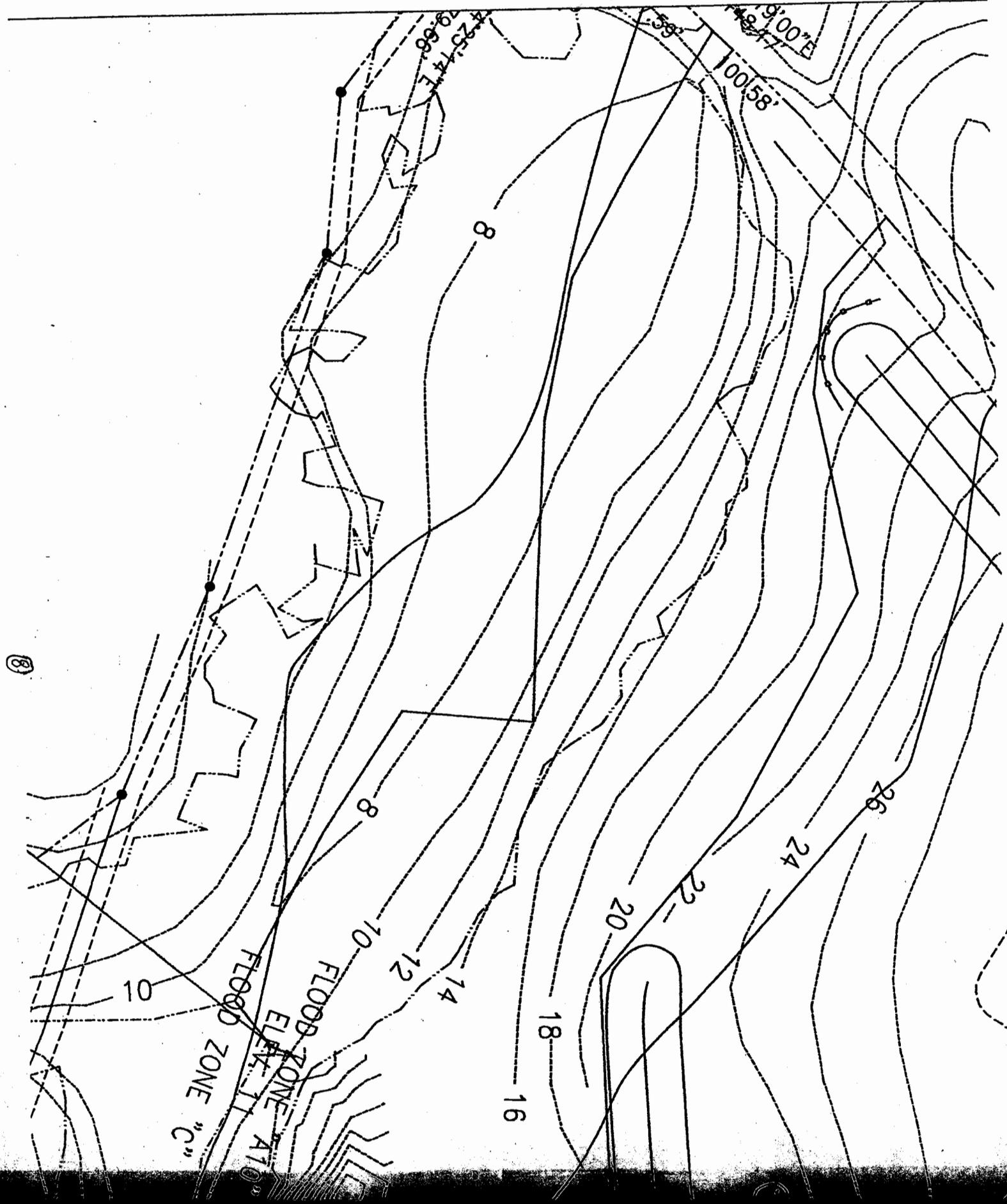
1018 ASHES DRIVE
FUTURE BUILDING
F.V. E.L. S.M.D.

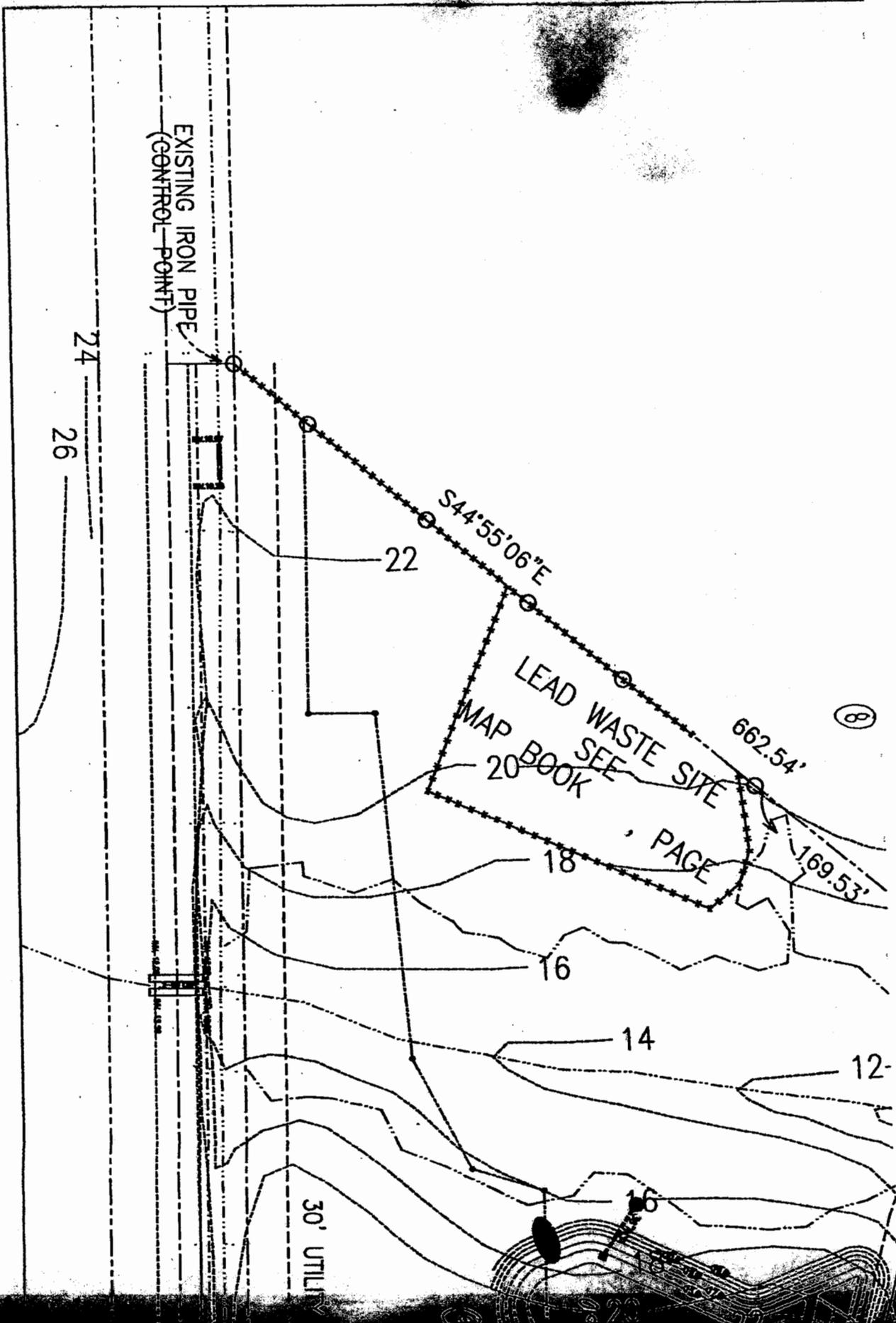
ZONING

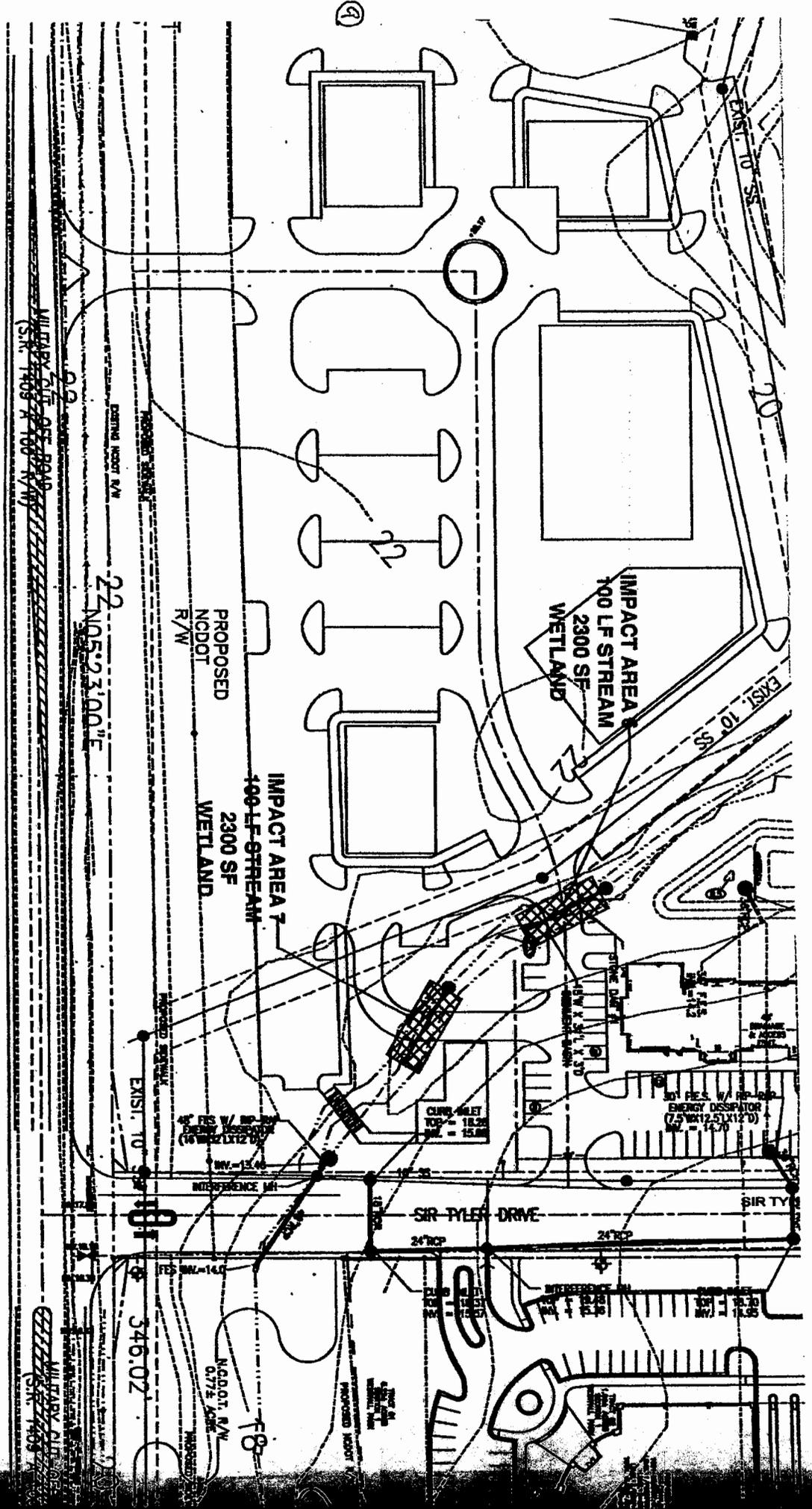
STATION ROAD

NOV 20 1963









MILITARY CLUB
S.N. 1408 A 100' R/W

MILITARY CLUB
S.N. 1408 A 100' R/W

22' NOS 23'00" E

346.02'

PROPOSED
NCDOT
R/W

IMPACT AREA 7
100 LF STREAM
2300 SF
WETLAND

SIR TYLER DRIVE
24' RCP

50' P.E.S. W/ R.F. - 6"
ENERGY DISSIPATOR
(7.5' x 12.5' x 12' D)
15.0'

NCDOT, N/W
0.77% ACB

18'

9

EXIST. TO SS

EXIST. TO SS

EXIST. TO

SIR TYLER

PROPOSED IMPACT

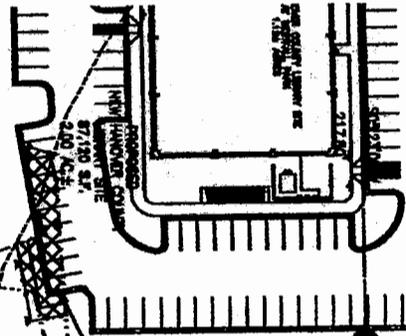
EXIST. TO

PROPOSED IMPACT

PROPOSED IMPACT

PROPOSED IMPACT

10



IMPACT AREA 5
1,323 SF.
WETLAND
SEE DETAIL 1-2.

ZONING
CB
OWNER
RTOC PROPERTIES,
LLC

PROPOSED
NEW HANOVER COUNTY
LIBRARY SITE
(TO BE ABANDONED)

N.C.D.O.T. R/W
0.2854 ACRES
PROP. 1992, 1992, 1992, 1992
217.80'

EXISTING 10' SS

URBAN

R/W

URBAN
G11 ZONING
OR ZONING

PROPOSED HIGHWAY R/W

PROPOSED HIGHWAY R/W

PROPOSED REDEVELOP BY OTHERS

ZONING
SHOD

OWNER
BRODY ZIMMER,
LLC

MILITARY CUTOFF ROAD
(PUBLIC)
(S.R. 1409-A-100' R/W)

04184

DES. JST
CKD. JPN
DRWN. NKS

DATE 04/15/05

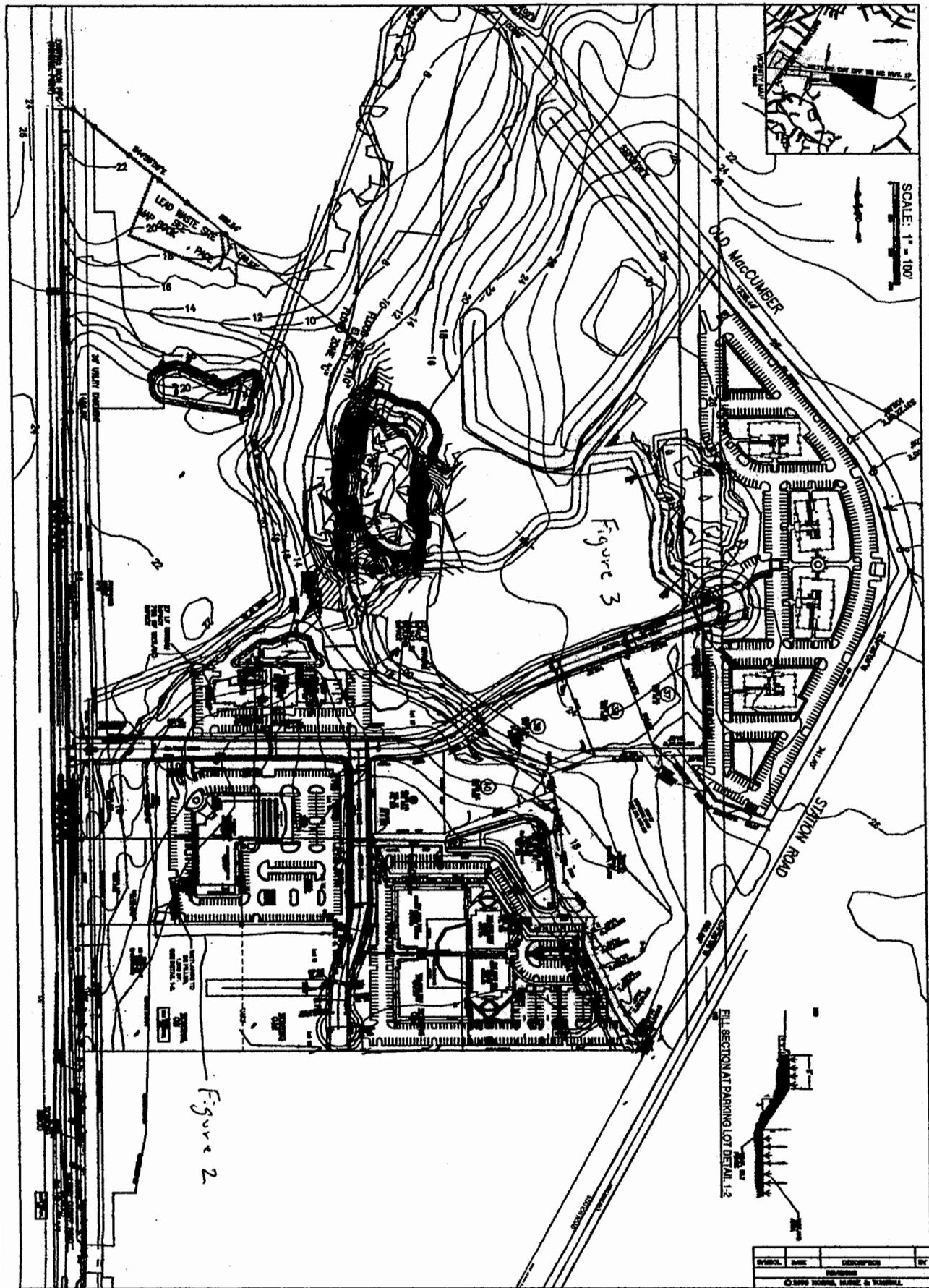
(1)

C1

ALTERNATIVE ANALYSIS SITE PLAN



SPANGLER
ENVIRONMENTAL, INC.



C2

DATE
BY
CHECKED BY

NORRIS, KUSKE & TUNSTALL
CONSULTING ENGINEERS, INC.

ONE MARKET STREET, SUITE 2100-2100
WILMINGTON, NC, 28401 PHONE (910) 343-6800
FAX (910) 343-6800
www.nkt.com

OWNER:
DATE:
ADDRESS:
CITY/STATE:
TITLE:

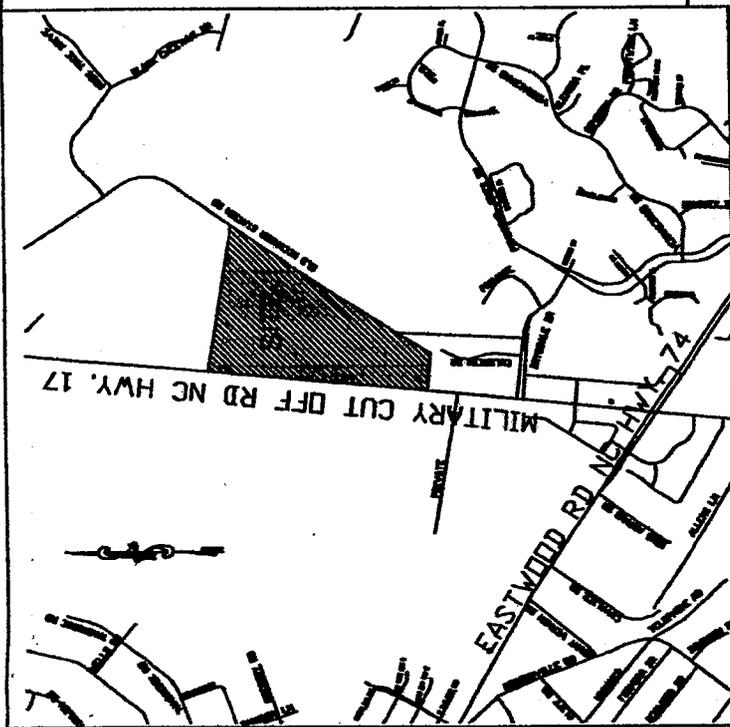
ALTERNATIVE ANALYSIS PLAN
RESEARCH PARK

WILMINGTON, N. C.

NO.	DATE	DESCRIPTION	BY

© 2000 NORRIS, KUSKE & TUNSTALL

SCALE: 1" = 100'



VICINITY MAP
NO SCALE

OLD MACCUMBER
1238.44'

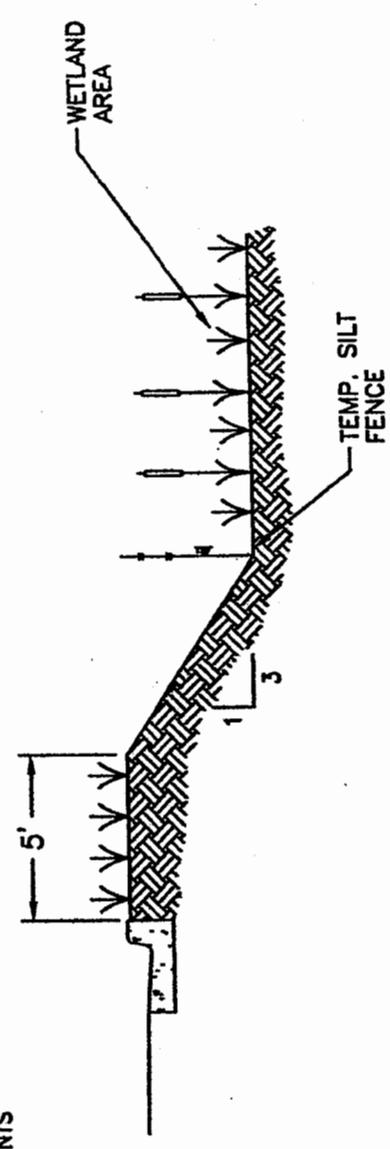
22
24
26

28
30
33.05.00'E

①

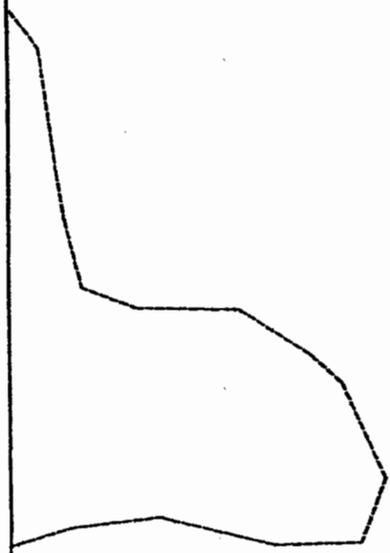
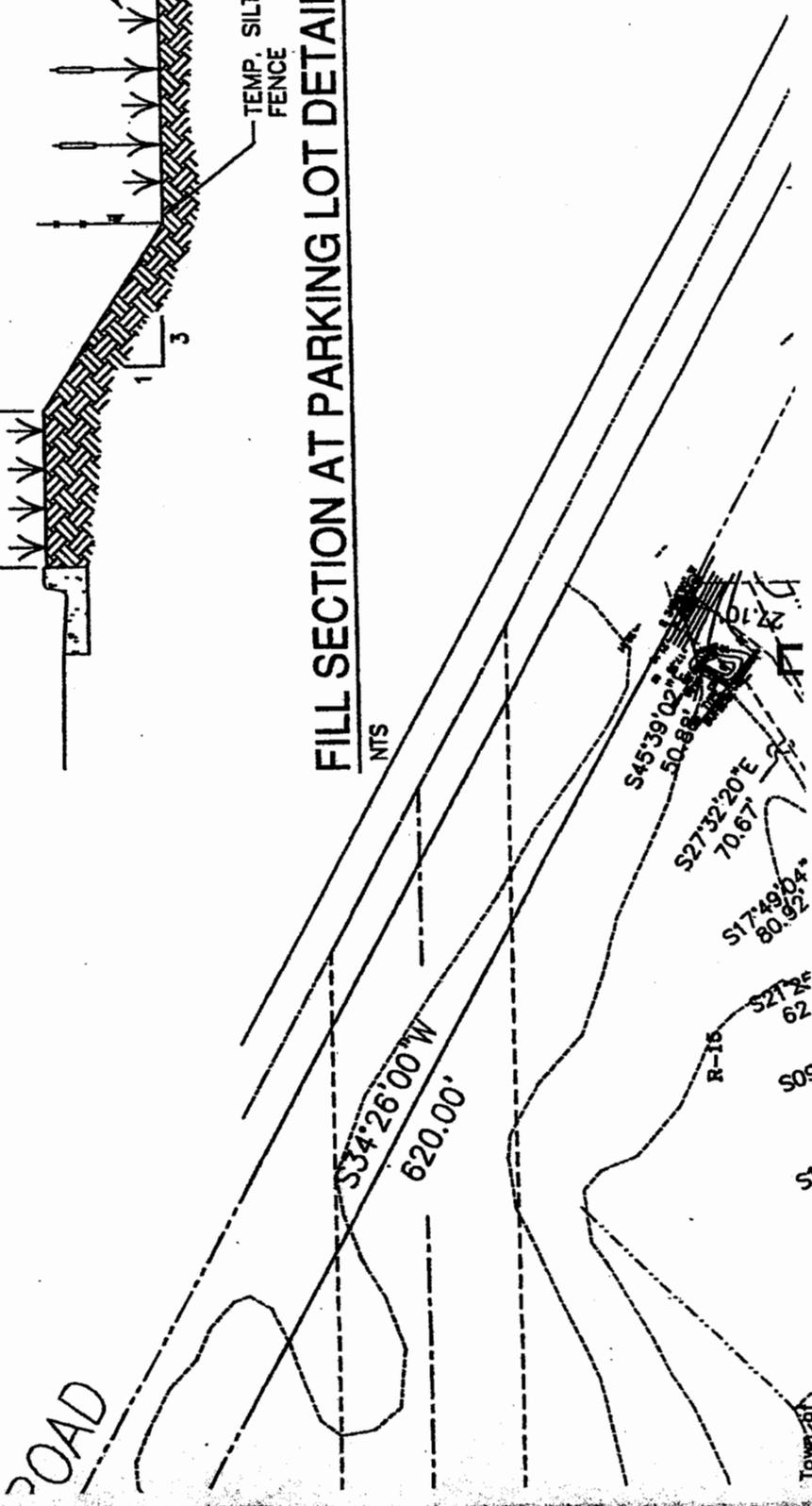
SYMBOL	DATE	DESCRIPTION	BY

③



FILL SECTION AT PARKING LOT DETAIL 1-2

NTS



NTS

Township

REVISIONS

②

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ALTERNATIVE ANALYSIS PLAN RESEARCH PARK

④

WILMINGTON. N. C.

FORM 1325-C

⑤

NORRIS, KUSKE & TUNSTALL
CONSULTING ENGINEERS, INC.

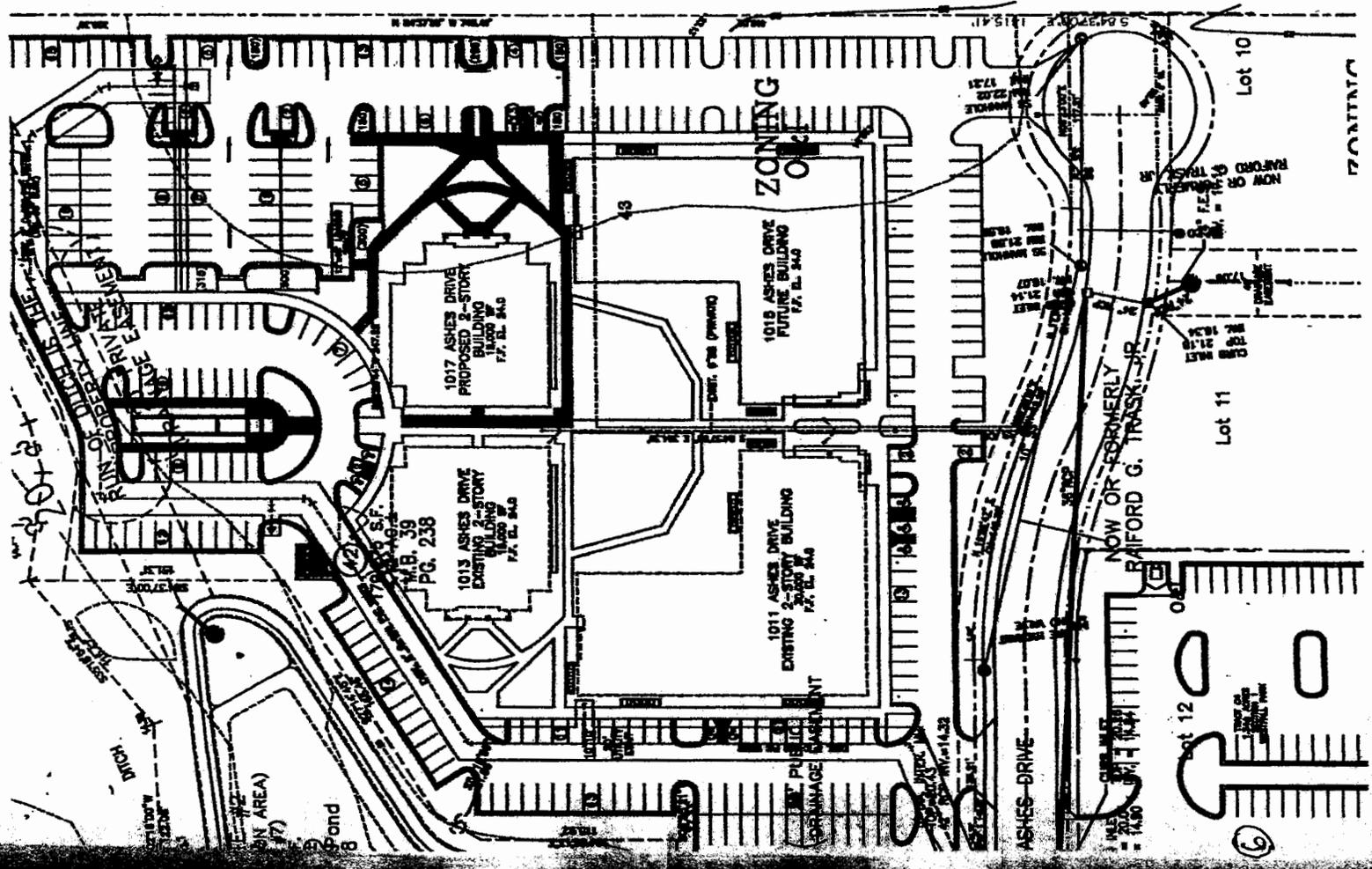
902 MARKET STREET PHONE (910) 343-9653
WILMINGTON, NC, 28401 FAX (910) 343-9604
office@nkteng.com

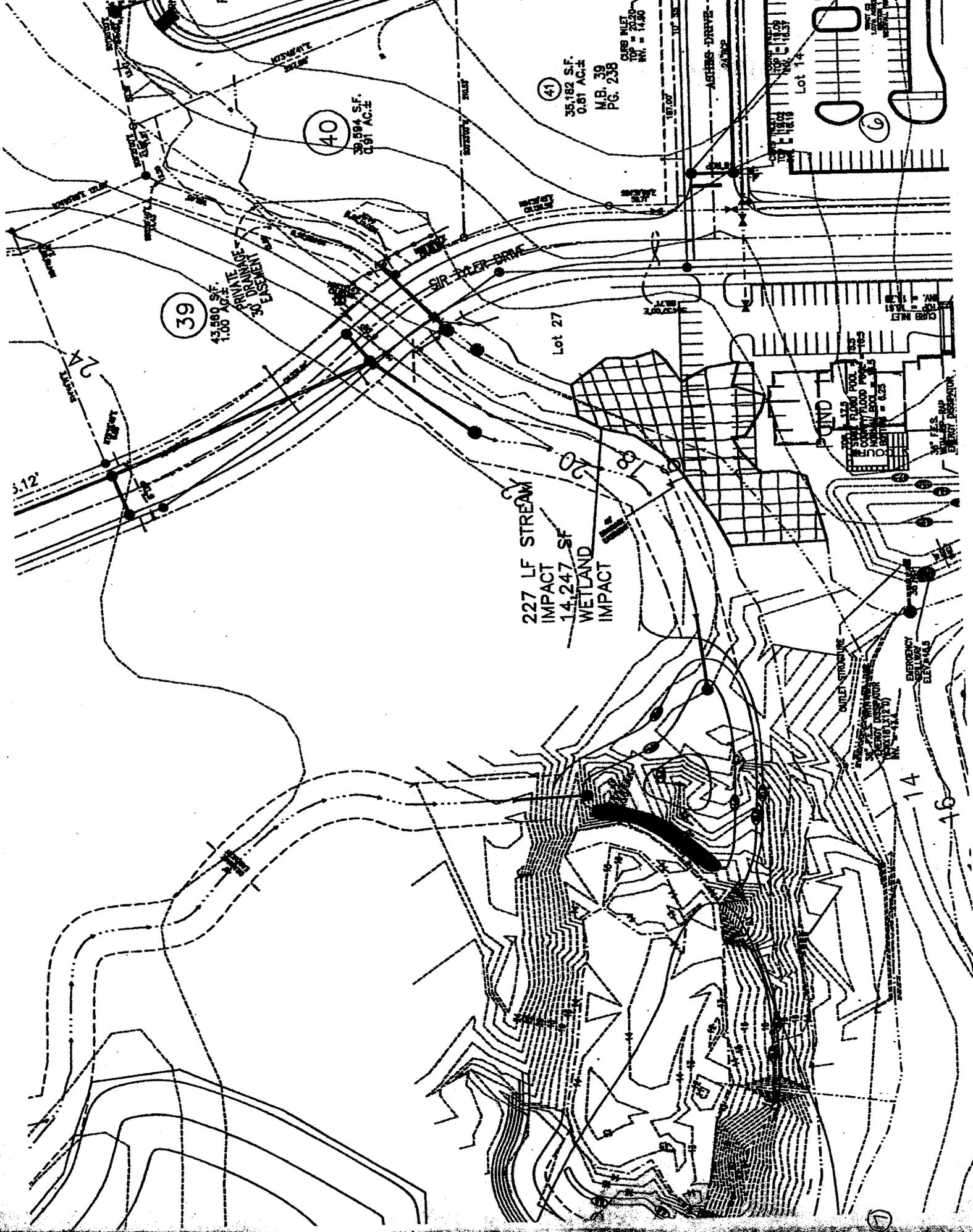
OWNER:
NAME:
ADDRESS:
CITY/STATE:
TELE:

⑤

STATION ROAD
1700 1/3
1704

5





227 LF STREAM
IMPACT
14,247 SF
WETLAND
IMPACT

39

45,860 SF.
1.00 AC.±

40

39,594 SF.
0.91 AC.±

41

35,182 SF.
0.81 AC.±
M.B. 39
P.G. 238

SEE PLOT
TOP = 70.20
B.M. = 14.80

Lot 14
1975
1978
1980
1983

6

Lot 27

Lot 20

Lot 18

Lot 14

Lot 16

3.12'

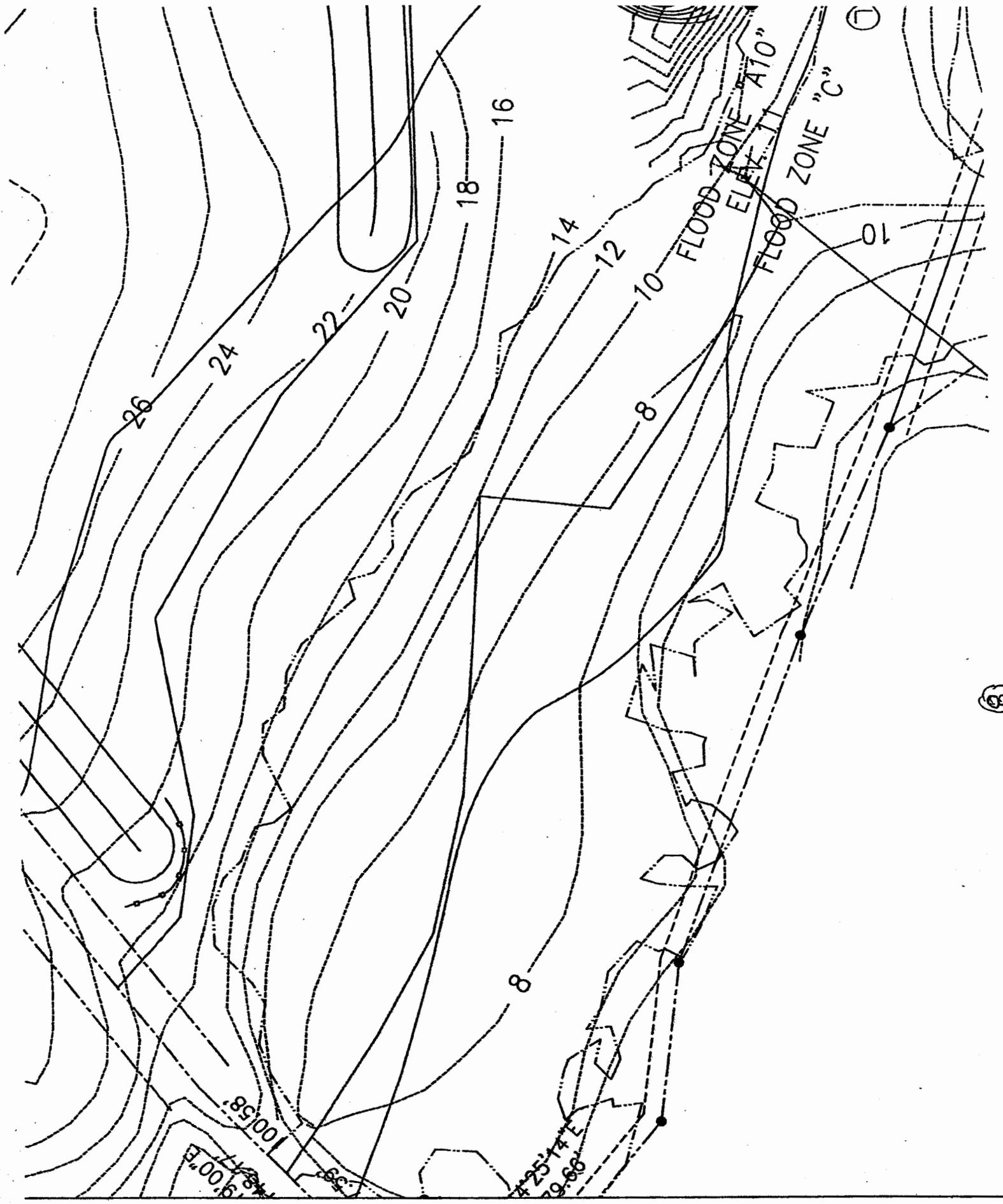
POND
30 F.E.S. WALL AND
ENERGY DISSIPATOR
EMERGENCY BELLYWALL
ELEV. 14.4
1975
1978
1980
1983

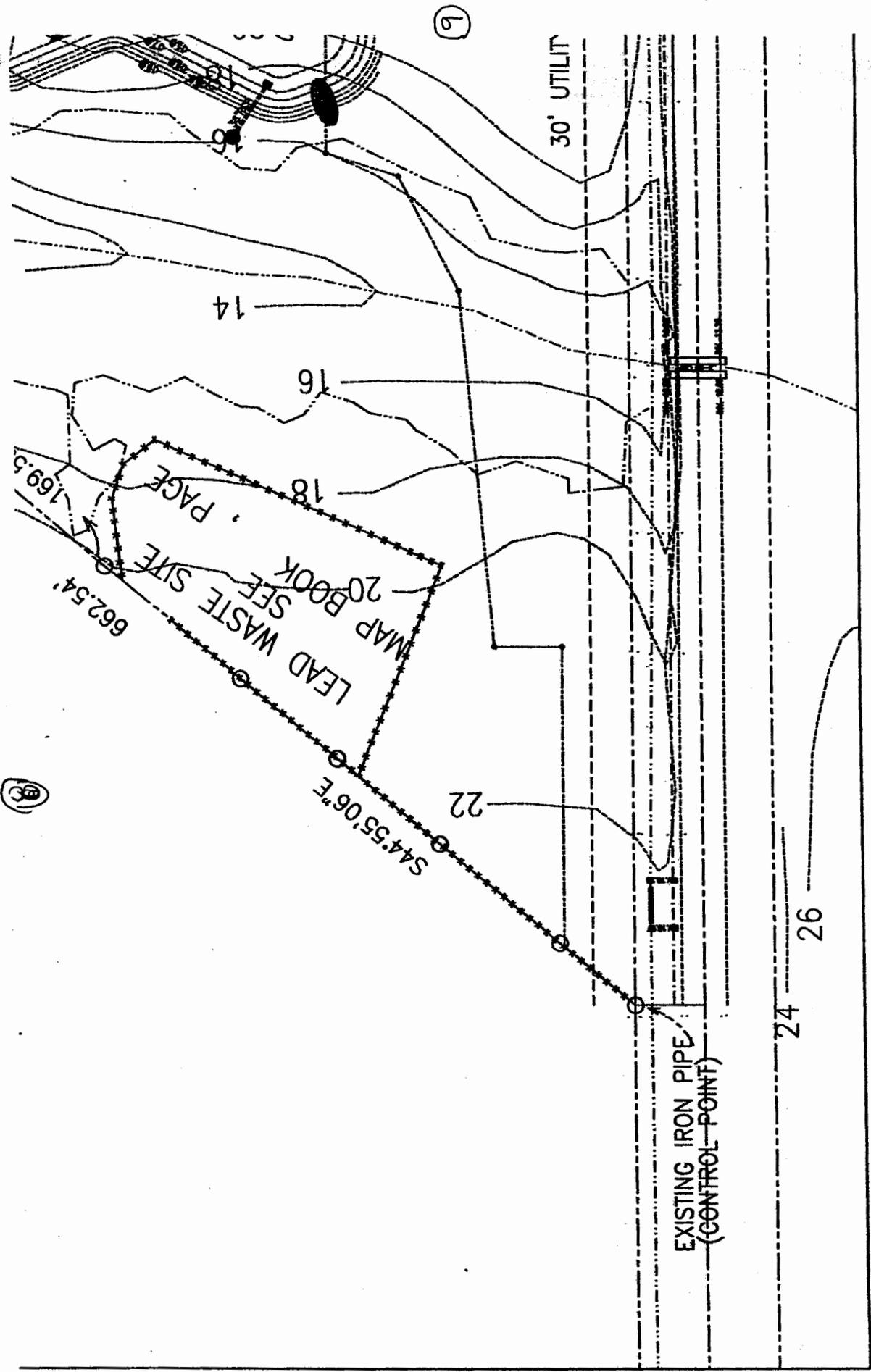
ASTERS DRIVE

SIR POLER DRIVE

EMERGENCY BELLYWALL
ELEV. 14.4
1975
1978
1980
1983

EMERGENCY BELLYWALL
ELEV. 14.4





①

②

11

0.1 ZONING
CB ZONING

WETLANDS TO
BE FILLED,
1,323 SF.
SEE DETAIL 1-2.

ZONING
CB

OWNER
RITOC PROPERTIES,
LLC

PROPOSED RIGHT R/W

PRESENT
NEW HAMPSHIRE COUNTY
LIBRARY SITE
(TO BE ABANDONED)

BOOK 1502, PAGE 440
217.80' x 217.80'

AC.DOT. R/W
0.888 ACRE

PROPOSED RIGHTWALK

EXIST. 10' R/W

217.80'

MILITARY CUTOFF ROAD
(PUBLIC)

(S.R. 1409-A-100, R/W)

ZONING
SHOD

OWNER
BRODY ZIMMER,
LLC

R/W

10

C2

DATE 04/15/01

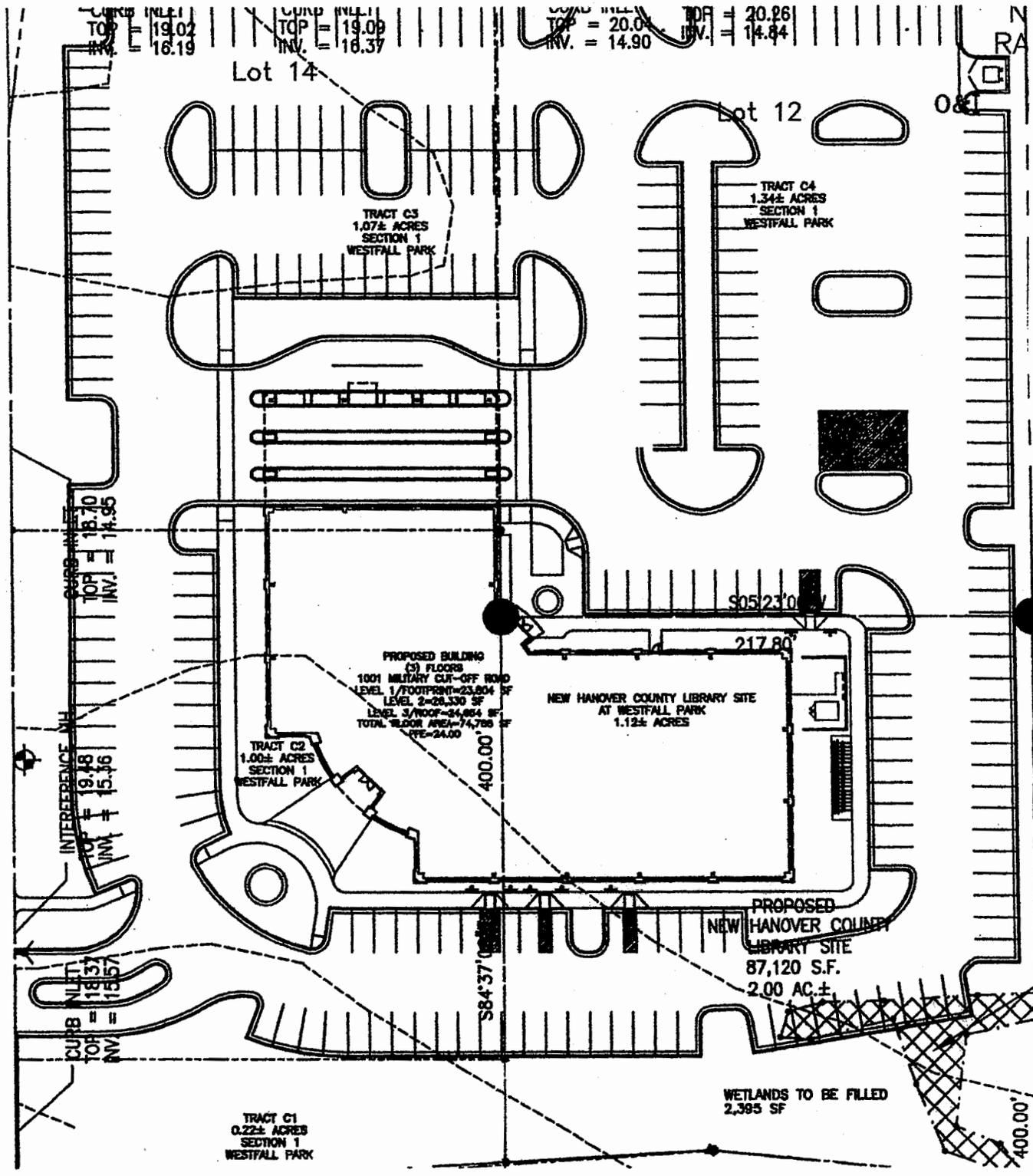
DRWN. NKS

CKD. JPN

DES. JST

04184





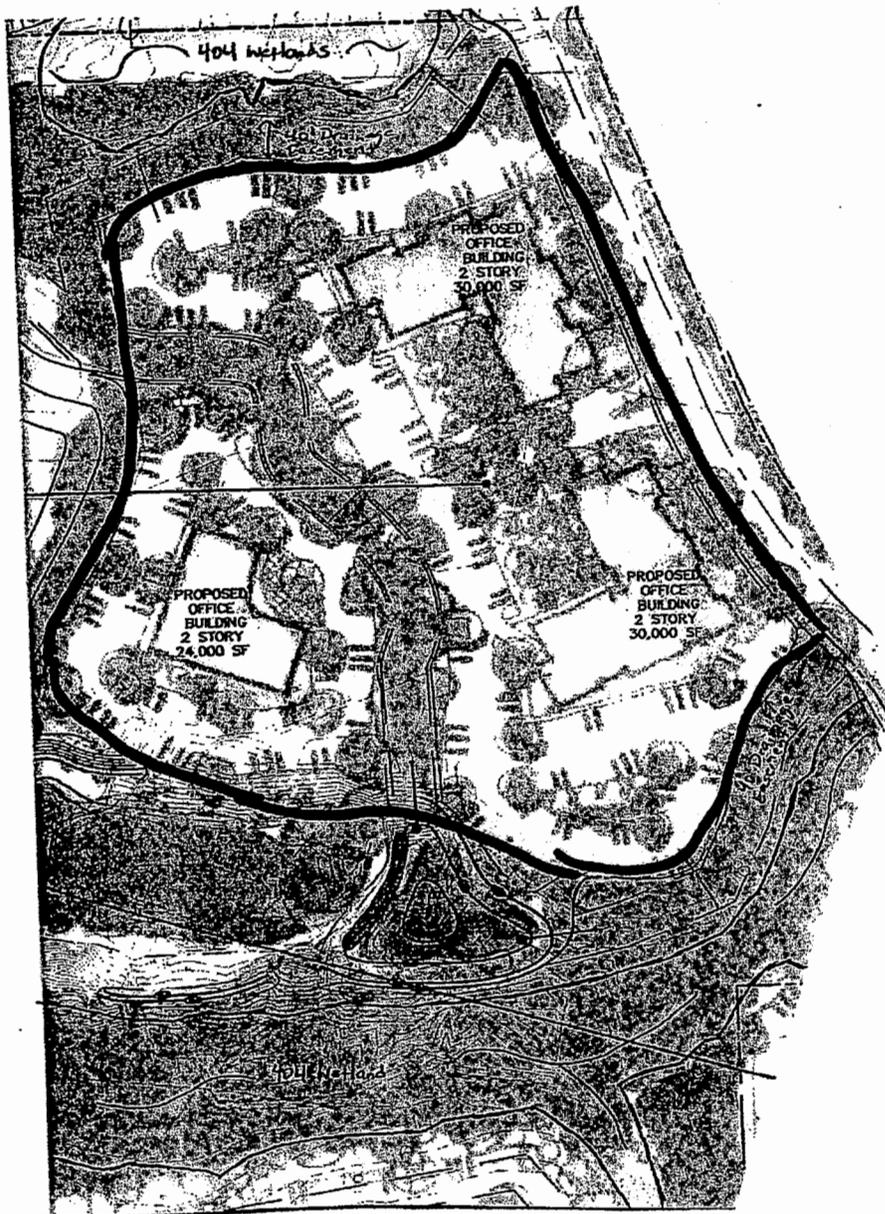
PROJECT NO.	1010000001
DATE	5-18-05
DESIGNED BY	P. Madden
CHECKED BY	
DATE	
PROJECT NO.	

Research Park at Westfall
 Impact Area 5 - Increased Impact
 Wilmington, North Carolina

404/401 Permit Application
 copyright © 2004 Spangler Environmental, Inc.

DATE	5-18-05
DESIGNED BY	P. Madden
CHECKED BY	
DATE	
PROJECT NO.	
2	


 3961 - B Market Street
 Wilmington, NC 28403
 SPANGLER ENVIRONMENTAL, INC. (910) 343-9375



Area west of Impact Area 1
 Preliminary Plan
 Wilmington, North Carolina

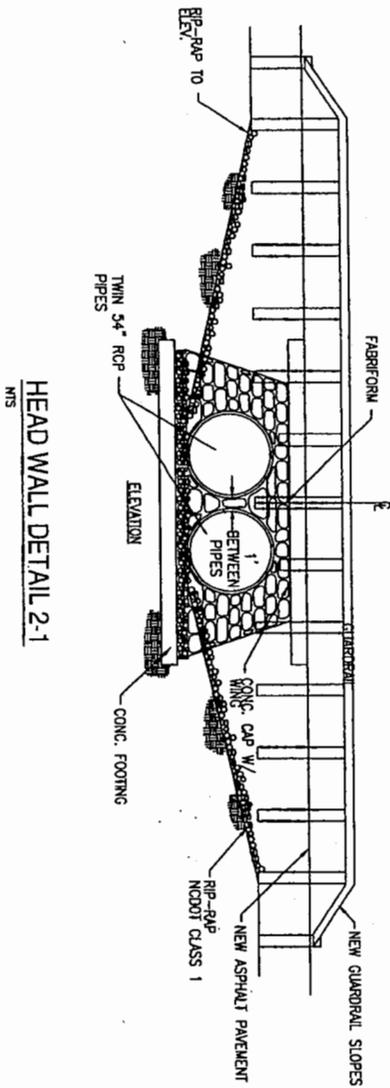
Mecklenburg County Landfill

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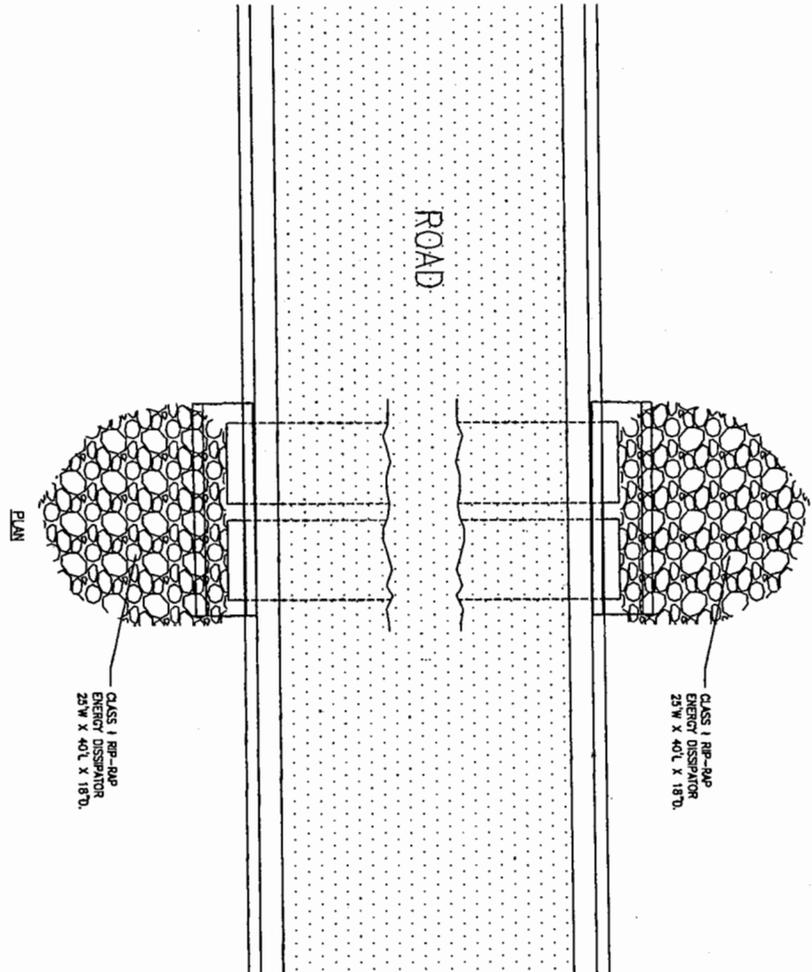
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	<p>NORRIS, KUSKE & TUNSTALL CONSULTING ENGINEERS, INC.</p> <p>802 MARKET STREET, SUITE 200, WILMINGTON, DE 19801 PHONE: (302) 541-9655 FAX: (302) 541-9656 WWW.NKTUNSTALL.COM</p>	<p>OWNER: _____ NAME: _____ ADDRESS: _____ CITY/STATE: _____ ZIP: _____</p>	<p>DETAILS RESEARCH PARK</p> <p>WILMINGTON, N.C.</p>
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MITIGATION STATEMENT

JUN 06

REGULATORY

Total impacts for the proposed project are 0.59 acres of riparian wetland impacts, 0.64 acres of non-riparian wetland impacts, and 200 linear feet of stream impact. Three types of mitigation are proposed for this project as compensation for the proposed wetland and stream impacts: onsite creation, onsite preservation, and in-lieu mitigation provided by the Ecosystem Enhancement Program.

The onsite mitigation will include the creation of 14,310 square feet (0.33 acres) of Non-Riverine Swamp Forest as an extension of the existing wetland located immediately north of the Sir Tyler Drive cul-de-sac (see site plan for location). Please see the attached "Conceptual Wetland Creation Plan - Research Park" for details. Onsite preservation of non-impacted wetlands, waters of the US, and the wetlands created onsite will be performed as well. This will be done through a conservation easement or similar vessel as deemed appropriate by the USACE and the State of North Carolina. The areas of preservation will include Howe Creek and associated riparian wetland, the non-impacted portion of its tributaries and associated riparian wetland, the portion of the non-riparian wetland near the Sir Tyler Drive cul-de-sac that will not be impacted, and the proposed wetland creation area.

The Ecosystem Enhancement Program was petitioned for in-lieu compensatory mitigation coverage for 0.56 acres of riparian wetland impact, 0.73 acres of non-riparian wetland impacts and 120 linear feet of warm stream impacts, for which they have agreed to provide. This correspondence is attached for your review. However, additional site design was done after this acceptance. This resulted in an alteration to the amount of wetland and stream channel impacts for which EEP agreed to provide compensatory mitigation. In lieu wetland and stream channel mitigation requests changed from amounts listed above to 0.59 riparian, 0.56 non-riparian, and 200 linear feet of stream channel. We have submitted a revised mitigation request form to the EEP for these impacts, and anticipate receiving coverage in the near future.



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Conceptual Wetland Creation Plan- Research Park

Target:

Create a wetland biological community on the site in an effort to mitigate for the proposed wetland impacts to occur at the site.

Creation Area Benchmarks:

- Establishment and maintenance of water table within 12 inches of the soil surface for at least 12.5% of the growing season
- Natural recruitment of hydrophytic vegetation as defined as dominance (greater than 50% basal area for tree species, 50% aerial coverage for herbaceous species) of species with wetland indicator status wetter than FAC, and a total creation area stem density of 450 woody stems/acre (or 80% aerial coverage) for tree species and a total aerial coverage of 40% for herbaceous/shrub species in the creation area beside the cul-de-sac.

Site Description And Creation Strategies:

Geographic Position

The Research Park Development is located east of Military Cutoff Road in Wilmington, New Hanover County, North Carolina. The site is located approximately 1.0 mile north of the intersection of Eastwood Road and Military Cutoff Road, and approximately 1.75 miles west of the Intracoastal Waterway. The site can be found on the Wrightsville Beach USGS 7.5 Minute Quadrangle in Figure 1, and on the New Hanover County Soil Survey in Figure 2.

The northern and eastern boundaries of the project site are adjacent to residential housing developments. The southern boundary is adjacent to a commercial development, and Military Cutoff Road creates the western boundary.

Site Characteristics

Topography

The project site is situated in an area between the Intracoastal Waterway and the tidal Howe Creek. However, the section of Howe Creek within the project site is non-tidal. Palustrine floodplain wetlands are present, which grade up to upland forest communities. Tributaries to Howe Creek and the associated wetlands are also present on the project site. One other different

wetland community is present on site – a pocketed, depression area. Elevations over the site range from 13 feet to 30 feet above sea level.

Soils

Soils in the riparian wetlands have dark surficial, A horizon, and a depleted sub-surficial layer, B horizon. Munsell color for the A horizon of the wetland soils generally ranges from 5YR 2.5/1 to 7.5 YR 2.5/1, and the thickness of the surficial layer extends down to between 6”- 8”. This layer displayed a high organic content and was often silty. The B horizon below the surficial layer displays a broader range of color. These lower soil depths key out on a Munsell chart between 2.5Y 3/1 to 5YR 4/1. This soil horizon was observed to be fine sand

The A horizon soil of the pocket depression area display a Munsell color of 7.5YR 3/3, and has a thickness of 3”-6”. This soil horizon has a high organic content and was observed to be silty sand. The B horizon soil displays a Munsell color of 10YR 3/1, and was observed to be fine sand.

According to the publication, *Hydric Soils of the United States*, and the *New Hanover County Soil*, the following hydric soil series exist on this site: Johnston, Torhunta, Leon, Rains, and Murville. The upland soils that are present on the site include Onslow, Norfolk, and Lynchburg. Hydric soils information is included in Appendix C.

Hydrology

The presence of wetland hydrology on this site is likely due primarily to: 1) surface and subsurface water flow in the floodplains along Howe Creek and its tributaries; and 2) precipitation and some subsurface flow into the depressional area.

Floodplain

Although Howe Creek is a perennial stream with tidal influence present downstream of the project site, it typically has water velocity and volume that is seasonally consistent. Sediment loads appear to be small, and the few alluvial landforms are not distinguishing characteristics. The exception being after heavy rain events, when sediment loads can be much greater and stream velocity and volume can cause overflow out of the small, interwoven channels, with flow resembling more of a normal river or large stream system, depositing sediment outside of the channel.

Depressional Areas

The depressional area observed on the project site is located east of the former landfill. This area is permanently inundated, with water depths varying seasonally. This wetland is hydrologically fed by precipitation and possible groundwater discharge.

Vegetation

At this point, a minority of the site has had some degree of vegetation alteration, primarily small-scale tree and underbrush removal for the purpose of developing individual lots. Additionally, as can be seen on the New Hanover County Soil Survey (Figure 2), the site had not been cleared prior to the mid-1980's, and some of the area was being used for agricultural purposes. The landfill has also been demarcated on the soil survey. Much of the existing vegetation outside of the few developed lots, particularly along Howe Creek and its tributaries, is the original, predevelopment growth, and provides an accurate assessment of the natural vegetation growth succession. A portion of the depressional area is located within a power line easement, and has thus been maintained. This has resulted in primary growth emerging in the maintained easement.

The upland forest communities are dominated by *Quercus alba*, *Pinus taeda*, *Pinus palustris*, *Acer rubrum*, and *Ilex glabra*. The floodplain wetlands are dominated by *Taxodium distichum*, *Quercus phellos*, *Quercus michauxii*, *Liquidambar styraciflua*, and *Acer rubrum* in the canopy. *Persea borbonia*, *Myrica cerifera*, *Leucothoe racemosa*, and *Carpinus caroliniana* in the understory, with *Osmunda cinnamomea*, *Thelypteris thelypteroides*, *Vitis spp.*, *Panicum hemitomom*, *Woodwardia areolata*, *Polygonum punctatum*, *Murdannia keisak*, and *Juncus effuses* are dominant herbaceous species. In the depressional area, *Taxodium distichum* dominates the canopy, with *Liquidambar styraciflua*, and *Acer rubrum* in the understory. *Leucothoe racemosa*, *Myrica cerifera*, and *Alnus serrulata* dominate the shrub strata, with the herbaceous layer being very sparse, only *Osmunda cinnamomea* being dominant.

The floodplain and depressional wetland systems observed on the project site is a varying combination of communities. For the floodplain areas, the associated communities are the Dry-Mesic Oak--Hickory Forest, which represents the elevated areas, and grades down into a Coastal Plain Small Stream Swamp Blackwater Subtype. For the depressional area, the associated communities are the Wet Pine Flatwood, which represents the elevated area, and grades down into a Nonriverine Swamp Forest as described in the Classification of Natural Communities of North Carolina, (Shafale and Weakley, 1990) Third Approximation. Such classification will be used throughout this wetland creation plan for the purpose of clarity and reference.

The Dry-Mesic Oak--Hickory Forest is described as being mid slopes, low ridges, upland flats, and other dry-mesic upland areas on acidic soils, with the hydrology being terrestrial, dry-mesic. Vegetation in these communities is dominated by oaks and hickories, including *Quercus alba*, *Quercus rubra*, *Quercus velutina*, *Carya alba*, *Carya ovalis*, *Carya glabra*, *Pinus* species, *Liriodendron tulipifera*, and *Liquidambar styraciflua*. The understory may contain *Acer rubrum*, *Cornus florida*, *Oxydendrum arboreum*, *Ilex opaca*, and *Nyssa sylvatica*. The shrub layer may include *Viburnum rafinesquianum*, *Vaccinium stamineum*, *Vaccinium pallidum*, and *Envoymus Americana*, and a fairly sparse herb layer.

The Wet Pine Flatwood is described as being seasonally wet to usually wet sites, generally on flat or nearly flat Coastal Plain sediments, with the hydrology being palustrine, seasonally saturated, but may become quite dry for part of the year. Vegetation in these communities typically has a *Pinus palustris*, *Pinus taeda*, or *Pinus serotina* canopy, absent understory or one with invading hardwoods. A low shrub layer containing *Ilex glabra*, *Gaylussacia frondosa*, *Gaylussacia dumosa*, *Kalmia carolina*, *Lyonia mariana*, *Magnolia virginiana*, *Persea borbonia*, and *Arundinaria gigantea* is usually present.

The Coastal Plain Small Stream Swamp Blackwater Subtype is described as being floodplain or small backwater streams in which separate fluvial features and associated vegetation are too small or poorly developed to distinguish. The hydrology is defined as palustrine, intermittently, temporarily, or seasonally flooded with a tendency towards highly variable flow regimes, with floods of short duration, and periods of very low flow. The vegetation is dominated by *Taxodium distichum*, *Nyssa biflora*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Acer rubrum*, *Quercus laurifolia*, *Quercus lyrata*, *Quercus michauxii*, *Betula nigra*, *Ulmus Americana*, *Pinus taeda*, and *Pinus serotina*. The understory may contain *Carpinus caroliniana*, *Acer rubrum*, *Ilex opaca*, *Magnolia virginiana*, *Persea borbonia*, and *Cyrilla racemiflora*. The shrub layer can be sparse to extremely dense and contain *Leucothoe racemosa*, *Leucothoe axillaries*, *Itea virginica*, *Lyonia lucida*, and *Vaccinium elliotii*.

The Nonriverine Swamp Forest is described as being wet, poorly drained upland flats and peat deposits with rare mineral influx from overland or tidal flooding. The hydrology is palustrine, seasonally or frequently saturated or shallowly flooded by high water tables. The vegetation is dominated by *Taxodium distichum*, *Taxodium ascendens*, *Nyssa biflora*, *Pinus taeda*, *Chamaecyparis thyoides*, *Pinus serotina*, *Liriodendron tulipifera*, and *Acer rubrum* in the canopy. The understory may be open to dense and contain *Magnolia virginiana*, *Persea borbonia*, *Cyrilla racemiflora*, *Lyonia lucida*, *Clethra alnifolia*, *Vaccinium* spp., and *Smilax laurifolia*. Typical herbs include *Woodwardia virginica*, *Woodwardia areolata*, *Carex* spp., and *Sphagnum* spp.

Proposed Creation Strategy

All wetland creation areas are proposed to be extensions of existing wetland communities, so the excavation, grading, and plant choices for the creation areas will be done so as to reflect the hydrological and vegetative conditions of the adjacent existing wetlands. The following list

equates the target Community Type as indicated by the characteristics of the adjacent wetland with the proposed mitigation location:

Mitigation Area 1¹: Nonriverine Swamp Forest

Notes: ¹ Please see Figure 3 for location of mitigation area.

All on-site work will occur under the direct supervision of the wetland scientists, soil scientists, and engineers that have been responsible for the Restoration Plan, and Wetland Delineation.

Topographic Modification

The topographic adjustment to the upland area adjacent to the existing wetland is the first step in the creation of the mitigation area. Exhibits showing the post-construction contours of the proposed mitigation locations are included in Appendix B as Figure 3. One reference monitoring well has been installed in upland near the existing adjacent wetland to provide the water table depth to guide the needed depth of excavation. The transitional topography of the upland/wetland boundary of the existing wetlands will be mimicked in the excavation of the creation areas (i.e. 3:1 slope down to existing wetland boundary will correlate into 3:1 slope down to creation area boundary). The existing, adjacent depression area will form the model for the down slope topography. In this manner, a natural topography will be created, which in turn will encourage natural wetland conditions. The topographic modifications will be made in such a way as to preserve as many of the tree species identified in the planting list that are currently present in the proposed creation area.

Lowering the elevation of the planned creation area will result in surface and subsurface soils being exposed to the water table, creating greater reducing conditions, that will, over time, result in hydric soil conditions comparable to the existing adjacent wetland.

Natural Recruitment of Seed Material

Because healthy, diverse vegetative communities are present in the existing wetland adjacent to the creation area, natural recruitment of the native seed material will be used. This will be done by simply allowing the existing plant species to migrate into the creation area through natural means of germination and root stabilization.

Hand Planting of Native Species

If natural recruitment does not meet the success criteria stated below within three years of the completion of the creation area, a cover crop of low-growing herbaceous wetland species should be planted, as the beginning of the growing season dictates, in order to attain the vegetation success criteria. Plant clippings will be sprigged in areas where a native species is present that

will allow for such activity, in particular the smooth alder found in the existing wetland adjacent to Mitigation area 1. Planting of bare-root seedlings of species, identified in Appendix A, within the creation area should commence in March of the next growing season to allow maximum time for establishment during the first year's growth. Planting locations for each creation area are specified in Appendix B. The planting list for the specific creation area was based upon the species identified in the existing wetland area adjacent to the creation area. Hand planting shall occur to such extent to satisfy the vegetation density success criteria specified below in "Vegetation Monitoring."

Creation Area Monitoring

Hydrology

Goal: Reestablish and maintain wetland hydrology, as defined as a water table at or above 12 inches in soil profile depth for at least 12.5% of the growing season for three successive, normal rainfall years.

Shallow water table monitoring wells have been placed in upland areas adjacent to where creation will be performed and will be examined at three times during the growing season and one time outside the growing season. Monitoring will commence at the beginning of the growing season immediately following contouring of the creation area. Data obtained from the United States Geological Survey (USGS) and/or National Weather Service will be used as reference for calibrating rainfall to water table depths for normal year.

Vegetation Monitoring

Goal: Maintain an average stem count of 450 woody stems/acre or 80% aerial coverage of species of wetland indicator status FAC or wetter. An aerial coverage of 40% will be obtained for herbaceous vegetation with species of wetland indicator status of FAC or wetter for three successive growing seasons.

The vegetation in the creation area will be monitored on a quarterly basis over randomly chosen sample locations (utilizing a random numbers table and grid system over the creation area) that cover at least 10% of the creation site. The aerial cover and/or stem count will be quantified as well as the wetland indicator status of the species within the sampling location. Additional notes will be made on the general health of the vegetation and the extent to which the sampled location is representative of the creation area in general.

Appendix A - Planting List

All plant species are bare-root seedlings unless otherwise specified

Mitigation Area 2 – Nonriverine Swamp Forest

Acer rubrum

Persea borbonia

Myrica cerifera

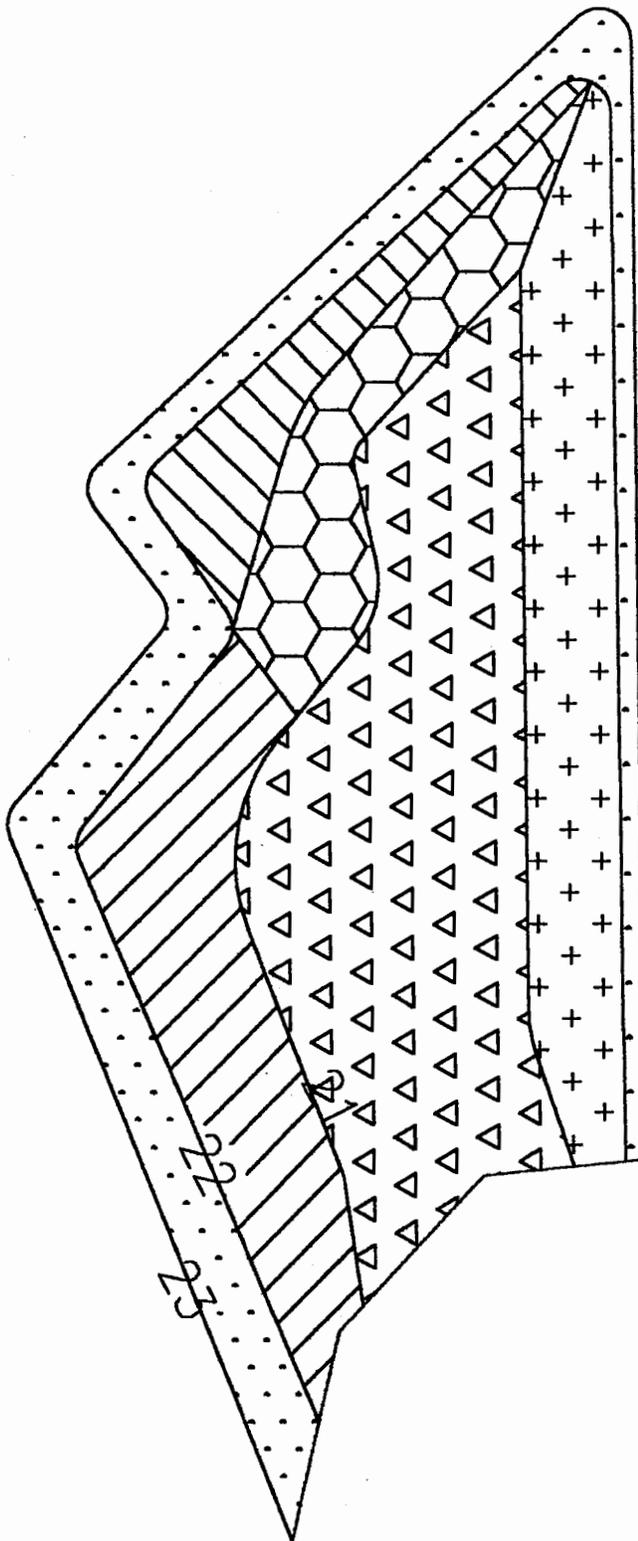
Taxodium distichum

Osmunda cinnamomea

Alnus serrulata

Leucothoe racemosa

Appendix B – Planting Location Plan



-  Baldcypress (*Taxodium distichum*)
-  Red Maple (*Acer rubrum*)
-  Sweetgum (*Liquidambar styraciflua*)
-  Smooth Alder (*Alnus serrulata*)
-  Fetterbush (*Leucothoe racemosa*)
-  Red Bay (*Persea borbonia*)

Mitigation Planting Plan
 Research Park 404/401 Permit
 Wilmington, NC

Project: Mitigation Plan
 DATE: 08/11/09
 DRAWN: J. K. SPANGLER
 CHECKED: J. K. SPANGLER
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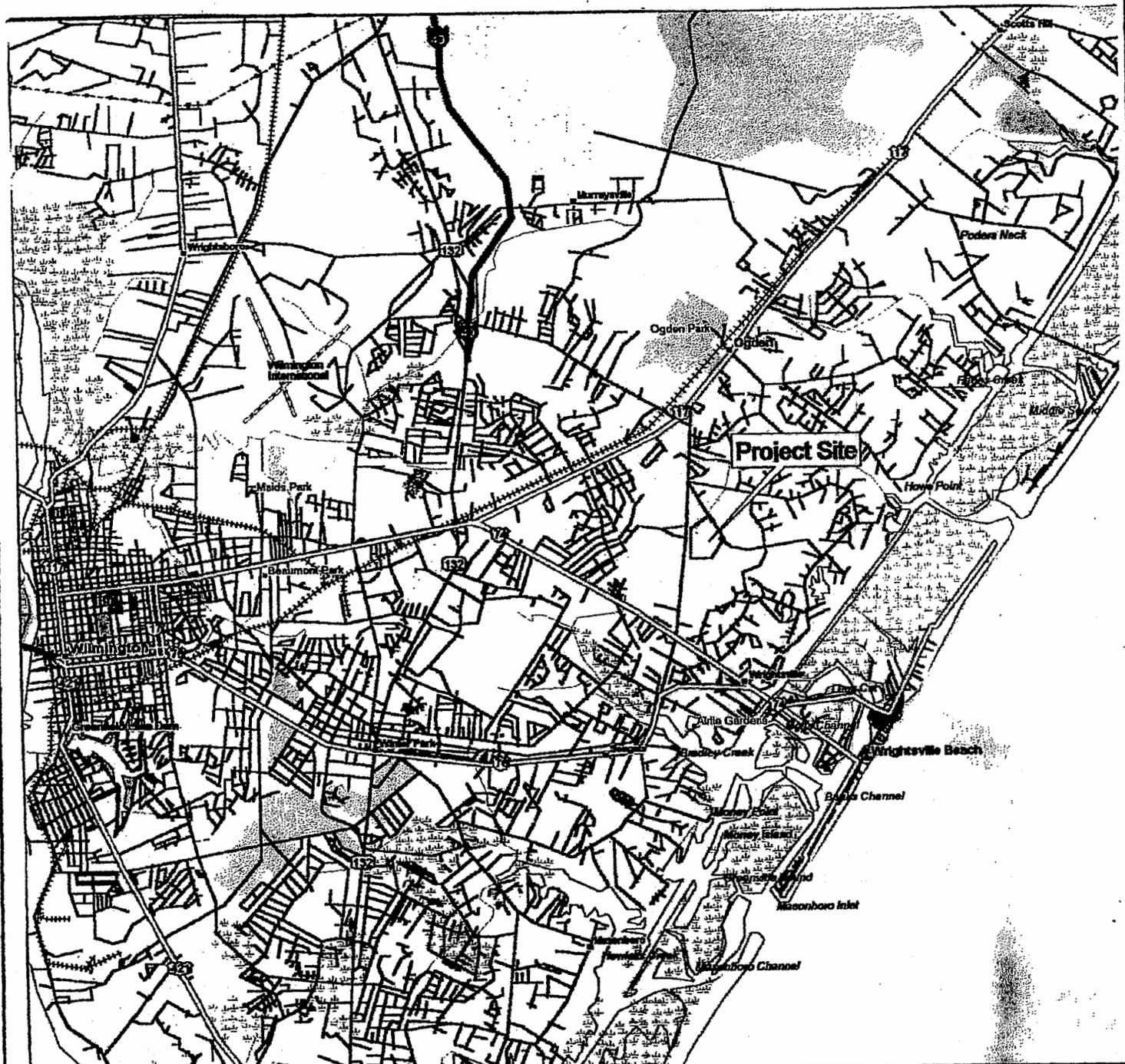
Appendix C - Hydric soil information

Johnston series – This soil type is generally described as nearly level, very poorly drained soils in flood plains of major streams. Areas are commonly long and narrow. The organic matter content of the surface layer is high, permeability is moderately rapid, available water capacity is high, and shrink swell potential is low. The seasonal high water table is at or near the surface, and these soils are frequently flooded. The surface layer is typically 42 inches thick with black loam in the upper part and black sandy loam in the lower part.

Murville series – This soil type is generally described as nearly level, very poorly drained in flat or slightly depressional areas, which are irregular in shape and vary in size. The organic content of the surface layer is low, permeability is rapid in the surface layer and moderately rapid in the subsoil, available water capacity is low, and shrink-swell potential is low. The seasonal high water table is at or near the surface, and the soil is frequently flooded. The surface layer is black fine sand 8 inches thick, and the subsoil is black fine sand 37 inches thick.

Leon series – This soil type is generally described as nearly level, poorly drained soils on rims of depressions, on smooth flats, and in indefinite patterns on the uplands and stream terraces. The organic matter content of the surface soil is very low, permeability is rapid in the surface layer, moderate to moderately rapid in the subsoil, and very rapid in the underlying layer. Available water capacity is low, and the shrink-swell potential is very low. The seasonal high water table is at or near the surface. Typically, the surface layer is very dark gray sand 3 inches thick, the subsurface layer is light gray sand 13 inches thick, and the subsoil is dark reddish brown sand 24 inches thick.

Rains series – This soil type is generally described as nearly level, poorly drained soils on broad smooth flats and in slight depressions on the uplands. Areas are irregular in shape and small in size. The organic matter content of the surface layer is low, permeability is moderate, available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is at or near the surface, and this soil is frequently flooded for brief periods. Typically, the surface layer is black fine sandy loam 5 inches thick, the subsoil is 59 inches thick and is gray fine sandy clay loam in the upper part, mottled gray clay loam in the middle part, and mottled light gray clay in the lower part.



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10/18/04
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 J. Walden
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Research Park at Westfall
General Location Map
Wilmington, North Carolina

404/401 Permit Application
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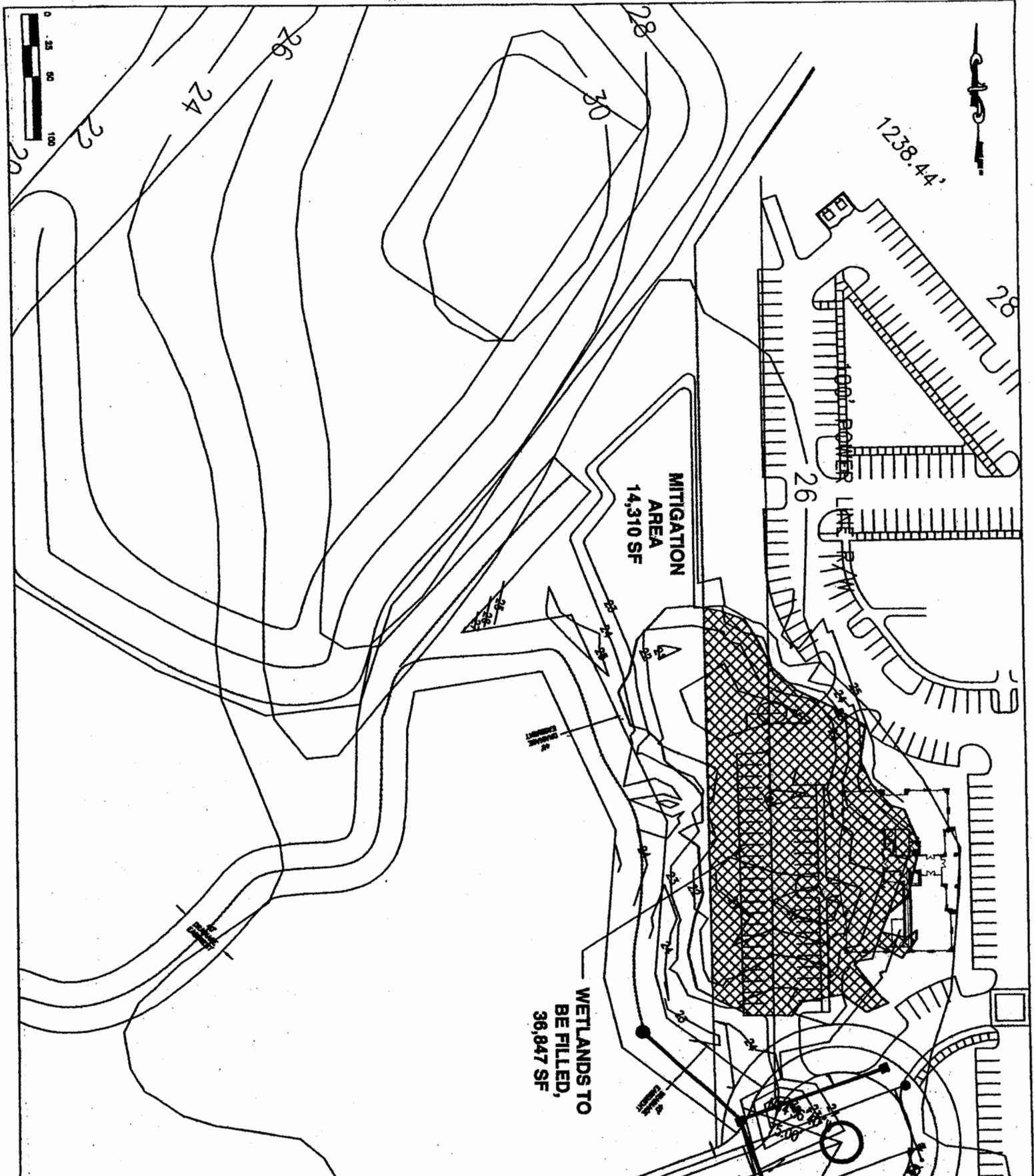
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Research Park at Westfall
 New Hanover County Soil Survey
 Wilmington, North Carolina

Mitigation Plan
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10/20/04
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Mitigation Area - General Location
 Research Park Permit
 Wilmington, NC

Mitigation Plan

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