

WYNG Co.

2001

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North Carolina  
Department of Environment and Natural Resources



Division of Waste Management

Michael F. Easley, Governor  
William G. Ross Jr., Secretary  
Dexter R. Matthews, Interim Director

October 30, 2001

Mr. Lloyd Cook, Director  
Wayne County Solid Waste Management  
P.O. Box 227  
Goldsboro, North Carolina 27533-0227

Subject: Wayne County MSWLF Facility Transition Plan Modification for Permit # 96-01.  
Modification #5: C&D on closed MSWLF Unit, Phase I, additional capacity to reach  
5 year operational window beginning 30 December 1997 and ending 30 December  
2002.

Dear Mr. Cook:

The Solid Waste Section hereby approves the modification of the referenced MSWLF Facility permit to allow for additional operating capacity, to reach the five year operating window, of the CONSTRUCTION & DEMOLITION LANDFILL UNIT, Phase I (see sheets 1 of 2 and 2 of 2/E1) drawings dated 23 August 2001, received 28 August 2001 for the Wayne County landfill. The revised operations of Phase I, based on the 23 August 2001 plans, is approved until 30 December 2002. If waste volumes increase or estimated in-place densities are not achieved; amendment of the facility plans may be necessary prior to the end of the operating window of five years, ending 30 December 2002. The facility permit will be reviewed every five years, on or before 30 December 2002 (see Condition Number 2, Page 1).

Please note operational conditions outlined on pages one thru five for the facility. The Waste Management Specialist for this facility is Mr. Bobby Nelms and he can be reached in our Washington Regional Office at (919) 946-6481.

If you have any questions about this approval letter, please contact me at (910) 486-1541 or (919) 733-0692 EXT: 344 or James C. Coffey at (919) 733-0692 Ext. 255.

Sincerely,

Jim Barber  
Eastern Area Engineer  
Solid Waste Section

cc: Jim Coffey  
Mark Fry  
Bobby Nelms

Raleigh Central Office: Wayne County MSW Facility Transition Plan Permit #96-01.

1646 Mail Service Center, Raleigh, North Carolina 27699-1646

Phone: 919-733-0692 \ FAX: 919-733-4810 \ Internet: [www.enr.state.nc.us/](http://www.enr.state.nc.us/)

PERMIT NUMBER: 96-01  
MODIFICATION #5 (PTO) DATED: 10/30/01

STATE OF NORTH CAROLINA

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

DIVISION OF WASTE MANAGEMENT

1646 MAIL SERVICE CENTER; RALEIGH, NC 27699-1646

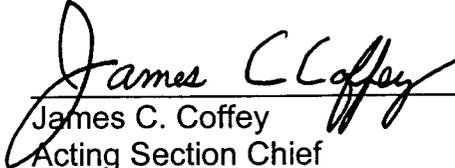
SOLID WASTE PERMIT

COUNTY OF WAYNE

is hereby issued a permit to operate PHASE I of a

Construction and Demolition Landfill Unit

located on S.R. 1129, at the Wayne County Landfill, Dudley, Wayne County in accordance with Article 9, Chapter 130A, of the General Statutes of North Carolina and all rules promulgated thereunder and subject to the conditions set forth in this permit.

  
James C. Coffey  
Acting Section Chief  
Solid Waste Section  
Division of Waste Management

PERMIT NUMBER: 96-01  
MODIFICATION #5(PTO) DATED: 10/30/01

## SOLID WASTE PERMIT

Permit to Operate

Wayne County Landfill

Construction and Demolition Debris Landfill Unit - PHASE I

### CONDITIONS OF PERMIT:

#### GENERAL

1. When this property is sold, leased, conveyed or transferred, the deed or other instrument of transfer shall contain in the description section in no smaller type than that used in the body of the deed or instrument, a statement that the property has been used as a sanitary landfill.
2. This permit will be subject to review every five years, on or before 30 December 2002, as per 15A NCAC 13B .0201(c) or sooner, according to the issuance date of this permit. Modifications to the facility may be required in accordance with rules in effect at the time of review.
3. The approved plan is described by Attachment 1, "List of Documents for Approved Plan". Where discrepancies may exist, the most recent submittal and the Conditions of Permit shall govern. Some components of the approved plan are reiterated in the Conditions of Permit.
4. This permit is not transferable.
5. The Financial Assurance Instrument (FAI) for this facility shall be amended when Closure Certification has been complete and the Closure/Post-Closure Care portion of the instrument is amended. The FAI shall be reviewed and updated annually for this facility once closure of the MSW unit is complete.
6. If during the operational life of the C&D unit it becomes apparent that the operations at the facility are impacting ground water adversely; the Solid Waste Section will require landfilling activities to cease and closure of the operating unit.

#### CONSTRUCTION AND OPERATION

7. This permit is for development of the Wayne County Landfill Construction and Demolition Unit, Phase I in accordance with the revised approved plans (sheets 1 of 2 and 2 of 2/E1 dated 23 August 2001 and received 28 August 2001). Additional disposal capacity may be approved for future phases based on operational requirements, amended calculations indicating need for additional capacity and or Solid Waste Section policy on future disposal operations at closed MSWLF units disposing of C&D waste.

8. This solid waste management facility is permitted to receive the following waste types:
- a. Land-clearing debris as defined in G.S. 130A-290, specifically, solid waste which is generated solely from land-clearing activities, such as stumps, trees, etc.;
  - b. Inert debris defined as solid waste which consists solely of material that is virtually inert, such as brick, concrete, rock and clean soil; and
  - c. Asphalt in accordance with G.S. 130-294(m).
  - d. Construction and demolition debris defined as solid waste resulting solely from construction, remodeling, repair or demolition operations on pavement, buildings, or other structures.
  - e. C&D like waste that are similar to wastes typically found in the land clearing-inert debris and C&D waste streams consisting of wastes at this time: roofing shingle waste from the manufacturer, waste building materials from mobile home/modular home manufacturer and wooden pallets. Other wastes **MAY** be approved by the Division upon receipt of a written request with the specific waste type, how its generated, how much is generated; along with any additional information the Division may request to render a final decision on the disposal options for the waste.

Yard trash as defined in G.S. 130A-290, shall not be disposed in the landfill area. However, yard trash, along with land-clearing debris, may be accepted for processing in the Yard Waste Composting Area.

9. All sedimentation/erosion control activities will be conducted in accordance with the Sedimentation Control Act codified at 15 NCAC 4. Native vegetation shall be established on the completed landfill.
10. The following requirements shall be met prior to operation of Phase 1 at this facility:
- a. Site preparation and or closure of that area of the MSW unit shall be in accordance with the construction plans(dated 12/10/97).
  - b. Signs shall be posted at the facility in accordance with the Access and Safety Requirements under Operation Condition No. 5 listed below.
  - c. The existing groundwater monitoring system will be utilized for ground water monitoring for the C&D unit(s) in accordance with .1630 thru .1633. Assessment monitoring shall continue in accordance with Solid Waste Management Rules and any additional requirements set forth by Solid Waste Section Hydrogeologist.
  - d. Closure certification and documentation shall be submitted to the Solid Waste Section and a approved by the Section prior to receiving C&D waste in the proposed unit(s).Partial closure of units will be accepted with certification and documentation of partial unit closure submitted for approval. Seeding and stabilization of cover soils shall be performed prior to receiving C&D waste.

11. Operation of the C&D landfill units shall conform to the operating procedures described in the approved plan, in accordance with Section .1626 of the Solid Waste Management Rules, and in accordance with the following requirements:

#### Waste Acceptance and Disposal

- a. The facility shall accept only those solid wastes which it is permitted to receive.
- b. No municipal solid waste, hazardous waste, industrial waste, liquid waste or waste not characterize as LCID or C&D shall be accepted for disposal.
- c. The permittee shall implement a program at the facility for detecting and preventing the disposal wastes listed in item "b" of this section. The program shall include, at a minimum:
  - (i) Random inspections of incoming loads or other comparable procedures;
  - (ii) Records of any inspections;
  - (iii) Training of personnel to recognize hazardous and liquid wastes;
  - (iv) Development of a contingency plan to properly manage any identified wastes listed in item "b" of this section; the plan must address identification, removal, storage, and final disposition of waste.

#### Cover Material Requirements

12. a. Operational soil cover of at least six inches shall be placed at least once per week or when the active area reaches ½ acre in size or more often as necessitated by the nature of the waste so as to prevent the site from becoming a visual nuisance and to prevent fire, windblown materials, vectors or water infiltration.
- b. Areas which will not have additional waste placed on them for 12 months or more, but where final termination of operations has not occurred, shall be covered with a minimum of one foot of soil cover.
- c. After final termination of disposal operations at the site or major part thereof, or upon revocation of a permit, the fill areas shall be covered with a cap in accordance with .1627(c) or in accordance with the rules at the time of closure.

#### Access and Safety

13. a. The facility shall be adequately secured by means of gates, chains, berms, fences, or other security measures approved by the DWM to prevent unauthorized entry.
- b. An attendant shall be on duty at the site at all times while it is open for public use to ensure compliance with operational requirements.
- c. The access road to the site shall be of all-weather construction and maintained in good condition.
- d. Dust control measures shall be implemented when necessary.

- e. Signs providing information on dumping procedures, the hours of operation, the permit number, and other pertinent information shall be posted at the site entrance.
- f. Signs shall be posted stating that no MSW, hazardous waste or liquid waste can be received.
- g. Traffic signs or markers shall be provided as necessary to promote an orderly traffic pattern to and from the discharge area and to maintain efficient operating conditions.
- h. The removal of solid waste from the facility is prohibited unless the owner/operator approves and the removal is not performed on the working face.
- i. Barrels and drums shall not be disposed of unless they are empty and perforated sufficiently to ensure that no liquid or hazardous waste is contained therein, except fiber drums containing asbestos.
- j. Open burning of solid waste is prohibited.
- k. The concentration of explosive gases generated at the facility shall not exceed:
  - i. twenty-five percent of the limit for gases in site structures (excluding gas control or recovery system components; and
  - ii. the lower explosive limit for gases at the facility boundary.

#### Erosion and Sedimentation Control

- 14. a. Adequate sedimentation and erosion control measures shall be practiced to prevent silt from leaving the site.
- b. Adequate sedimentation and erosion control measures shall be practiced to prevent excessive on-site erosion.
- c. Provisions for a vegetative ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days upon completion of any phase of C&D landfill development.

#### Drainage Control and Water Protection Requirements

- 15. a. Surface water shall be diverted from the operational area.
  - b. Surface water shall not be impounded over or in waste.
  - c. A separation distance of at least four feet shall be maintained between waste and the ground-water table.
  - d. Solid waste shall not be disposed of in water.
  - e. Leachate shall be contained on site or properly treated prior to discharge. An NPDES permit may be required prior to discharge of leachate to surface waters.
- 16. All pertinent landfill operating personnel will receive training and supervision necessary to properly operate this landfill.
  - 17. Ground water quality at this facility is subject to the classification and remedial action provisions referenced in Rule .1634 thru .1637 of 15A NCAC 13B.

18. A closure and post-closure plan must be submitted for approval at least 90 days prior to closure or partial closure of any landfill unit. The plan must include all steps and measures necessary to close and maintain the facility in accordance with all rules in effect at that time. At a minimum, the plan shall address the following:
  - a. Design of a final cover system; using the cap requirements outlined in Rule .1627
  - b. Construction and maintenance/operation of the final cover system and erosion control structures;
  - c. Surface water, ground water, and explosive gas monitoring.

#### MONITORING AND REPORTING REQUIREMENTS

19. Ground-water monitoring wells and monitoring requirements for the C&D landfill units shall be in accordance with the monitoring system approved in the TRANSITION PLAN for the facility and these additional conditions:
  - a. Monitoring well design and construction shall conform to the specifications outlined in Attachment 2, "North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities".
  - b. A geologist shall be in the field to supervise well installation, if necessary. The exact locations, screened intervals, and nesting of the wells shall be established after consultation with the SWS Hydrogeologist at the time of well installation for new monitoring wells.
  - c. For each new monitoring well constructed, a well completion record shall be submitted to DWM within 30 days upon completion.
  - d. Sampling equipment, procedures, and parameters shall conform to specifications outlined in the above-referenced guidance document, (Attachment 2), or the current guidelines established by DWM at the time of sampling and in accordance with the approved TRANSITION PLAN OR ASSESSMENT AND REMEDIATION PLAN.
  - e. In order to determine ground-water flow directions and rates, each monitoring well shall be surveyed, and hydraulic conductivity values and effective porosity values shall be established for the screened intervals for each new monitoring well.
  - f. The permittee shall sample the monitoring wells semi-annually or as directed by the SWS Hydrogeologist.
  - g. A readily accessible unobstructed path shall be initially cleared and maintained so that four-wheel drive vehicles may access the monitoring wells at all times.
20. The permittee shall maintain a record of all monitoring events and analytical data. Reports of the analytical data for each water quality monitoring sampling event shall be submitted to DWM in a timely manner.

21. The permittee shall maintain a record of the amount of solid waste received at the facility, compiled on a monthly basis. Scales shall be used to weigh the amount of waste received.
22. On or before 01 August 2001 ( or an earlier date as requested by the Solid Waste Section), and each year thereafter, the permittee shall report the amount of waste received (in tons) at this facility and disposed of in the landfill to the Solid Waste Section and to all counties from which waste was accepted, on forms prescribed by the Section. This report shall include the following information:
  - a. The reporting period shall be for the previous year, beginning 01 July and ending on 30 June;
  - b. The amount of waste received and landfilled in tons, compiled on a monthly basis, according to Condition 6 described above; and
  - c. Documentation that a copy of the report has been forwarded to all counties from which waste was accepted.
23. All records shall be maintained on-site and made available to the SWS upon request.
24. The Post-Closure plan approved in the TRANSITION PLAN shall be implemented and followed upon capping and closing the operating unit(s).
25. All pertinent landfill operating personnel will receive training and supervision necessary to properly operate this C&D landfill unit in accordance with G.S. 130A-309.25 and addressed by memorandum dated 29 November 2000(enclosed).

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**LIFE EXPECTANCY CALCULATIONS**  
**WAYNE COUNTY C & D**  
**LANDFILL EXPANSION**

**Given:**

Based on the survey data for August 28, 2000 Wayne County averages approximately 43,858 yd<sup>3</sup> per year therefore:

\*Landfill Volume Available Phase 1:                   = 20,833 cubic yards  
\*Landfill Volume Available Phase 2:                   = 144,197 cubic yards

**Total Site Volume:**

Life Expectancy Phase 1 = 20,833 cubic yards ÷ 43,858 cubic yards  
= 0.47 years

Life Expectancy Phase 2 = 144,197 cubic yards ÷ 43,858 cubic yards  
= 3.29 years

Total Expansion                   = 3.76 years

\*Determined by Autodesk 14 computer program.

**APPROVED**  
DIVISION OF SOLID WASTE MANAGEMENT  
DATE 10/30/01 BY DJB

*MOD. #5: ADDITIONAL CAPACITY  
UNTIL 30 DEC. 2002 ONLY (PHASE 1)  
CENTRAL FILE COPY*

OPERATION/CONSTRUCTION MANAGERS

CIVIL/SANITARY ENGINEERS

# Municipal Services



# Engineering Company, P.A.

PO Box 97, Garner, North Carolina 27529 (919) 772-5393

PO Box 349, Boone, North Carolina 28607 (828) 262-1767

August 27, 2001

Mr. Jim Barber, *Regional Engineer*  
Fayetteville Regional Office  
Solid Waste Section  
225 Green Street, Ste. 714  
Fayetteville, NC 28301



**Re: Wayne County Construction and Demolition Landfill**

Dear Mr. Barber:

Please find enclosed three (3) copies of a revision to the above referenced landfill. The revision is being requested for two reasons. The first is to be able to better handle surface water flow that has and will become a problem if the landfill is completed as per our latest revision. The second reason is due to an increase in the waste stream because of the additional houses, damaged by hurricanes Fran and Floyd, which are being demolished. The City of Goldsboro and the County in combination have several hundred houses that are expected to be disposed in the landfill.

Phase 1 of this revision will allow the County to better handle the surface water that is collected on top of the closed MSW Landfill. Phase 2 is a vertical expansion of the footprint that includes the past construction and demolition disposal areas and Phase 1 of this revision.

Enclosed is a life expectancy calculation of the air space available in this revision. The calculation is based on a survey that was completed August 28, 2000. This survey was done to determine the amount of air space that had been used since the C & D landfill opened January 1, 1998. The air space that was used in this period of time did include waste that was generated from flooding due to Hurricane Floyd; however, it did not include many demolished houses that may have been demolished due to flooding damage experienced from Hurricane Fran.

Consequently, the County is requesting the additional space to accommodate the demolished houses that have been and will be disposed in the landfill. The total air space that may be required to accommodate this volume is unknown at this time. We are requesting time until the first of 2004. However, this space may be used at a much faster rate than what was used in the first 2.5 years between the opening of the landfill and the survey. If required by regulations to close the landfill by January 2003, the County can prepare to do so if they are not going to use the space by that time.

The County would like to begin the disposal in Phase 1 of this revision as soon as possible due to the control of storm water. If you have any questions or need additional information, please do not hesitate to call.

Sincerely yours,  
Municipal Engineering Services Co., PA

D. Wayne Sullivan

cc: Lloyd Cook



# SOIL TESTING SERVICES

August 18, 1980

P. O. BOX 12015  
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709  
TELEPHONE 919-544-1735

L. E. Wooten & Company  
P. O. Box 2984  
Raleigh, North Carolina 27602

Attention: Mr. Arthur L. Kennedy

RE: Report of Subsurface Exploration and Engineering Analysis,  
Proposed Wayne County Southern Landfill Expansion,  
Wayne County, North Carolina  
STS Job No. 80-141-AA

Gentlemen:

On the basis of an authorization by Mr. Arthur L. Kennedy of L. E. Wooten & Company, dated March 21, 1980, Soil Testing Services of Carolina, Inc., has completed a site exploration and analysis for the proposed Wayne County Southern Landfill Expansion to be located at a site near Dudley, North Carolina. The attached report includes the results of the exploration and our recommendations. Since a considerable amount of detailed information is presented in the body of the report, the following brief abstract is given here for your convenience.

## ABSTRACT OF THE REPORT

The site of the proposed Wayne County Southern Landfill Expansion has subsurface conditions that are reasonably typical of the Coastal Plains physiographic province in North Carolina. The soils at this site generally consist of poorly to well graded sands, interbedded sands and clays, and clays deposited in a complex manner across the sites. The lower elevations of this site are covered by dense vegetation and organic stream deposits, and typically provide drainage for the surrounding area. On the basis of our exploration, it appears that portions of the southern site are marginally acceptable for expansion due to a lack of sufficient clayey material for a liner and cover. Compacted cover fill should be provided for use as a sealant to retard infiltration of surface runoff. Specific fill areas should be graded to promote the proper runoff of any surficial water. It appears that a method of trench or area filling can be used at the southern site if a suitable borrow material can be obtained.

Henry L. Lucas, P.E.  
T. Danny Tai, Ph. D., P.E.  
Ernest F. Parker, Jr., P.E.  
John P. Gnaedinger, P.E.  
John M. Riley, P.E.  
Robert E. Blackley

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WISCONSIN • KARACHI, PAKISTAN • MADRID, SPAIN • JEDDAH, SAUDI ARABIA

• Engineering Analysis/Reports  
• Construction Materials Testing  
• Foundation Borings and Testing

L. E. Wooten & Company  
Attn: Mr. Arthur L. Kennedy  
August 18, 1980  
Page 2

Selection of the appropriate landfill method in each particular area may be made on the basis of the local groundwater table elevation, quantity of appropriate liner and cover material, existing surface grades, economy, construction procedures, and other design criteria.

Select groundwater monitoring wells, installed during our field exploration, were sampled for the purpose of providing background water samples to the State of North Carolina for testing and determination of the dissolved or suspended solid constituents. The specific results of these tests may be obtained from Mr. Gordon Layton, of the North Carolina Division of Health Services, Solid and Hazardous Waste Management Branch in Raleigh, North Carolina. It is recommended that additional monitoring be made of these wells for the purpose of evaluating the performance of the landfilling methods.

If we can be of further assistance during the construction phase of this project, please contact us at your convenience.

Sincerely yours,

SOIL TESTING SERVICES OF CAROLINA, INC.



Jeffrey L. Blackford  
Assistant Project Engineer



T. Danny Tai, Ph.D., P.E.  
Chief Engineer

JLB/TDT:1bh

**SUBSURFACE EXPLORATION  
AND  
ENGINEERING ANALYSIS**

**PROPOSED WAYNE COUNTY SOUTHERN LANDFILL EXPANSION  
Wayne County, North Carolina**

**STS JOB NO. 80-141-AA**

**AUGUST 18, 1980**

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## APPENDIX INDEX

Wayne County Southern Landfill Expansion  
August 18, 1980

Soil Testing Services  
Subsurface Exploration  
and Engineering  
Analysis. Proposed  
Wayne County Southern  
Landfill Expansion  
Wayne County, NC  
Aug 18, 1980

1. INTRODUCTION

On the basis of an authorization by Mr. Arthur L. Kennedy, with L. E. Wooten & Company, Soil Testing Services of Carolina, Inc., has performed a site exploration and analysis for the proposed Wayne County Southern Landfill Expansion to be located at a site near Dudley, North Carolina. The purpose of this report is to describe the subsurface soil and ground-water conditions encountered in the borings, to present the results of our analysis, and submit recommendations in light of these apparent conditions regarding the landfill design and utilization.

We understand that the proposed southern landfill expansion near Dudley, North Carolina, is to be located adjacent and to the north of NC SR 1129 approximately 0.5 miles east of the intersection of NC SR 1127 and NC SR 1129. The existing site consists of an approximately 112 acre southern land tract of which approximately 30% has already been utilized. Also, an additional 50 acre northern land tract, to the north of the existing site, has been purchased for future expansion, thus yielding a total study area of approximately 125 acres. A 100 foot buffer will be required around the perimeter of the property with the exception of the property adjacent to NC SR 1129, where a total buffer of 250 feet will be required from that right-of-way. In addition, a small triangular shaped portion of land on the southeastern corner of the project, bordered by a power line easement and NC SR 1129, will be excluded from this study.

2. FIELD EXPLORATION PROCEDURES

The boring locations were selected by representatives of Soil Testing Services of Carolina, Inc., and representatives of L. E. Wooten & Company. The borings were approximtely located in the field by representatives of Soil Testing Services by visual estimation based on the

Wayne County Southern Landfill Expansion  
August 18, 1980

aerial photographs of the specific sites provided by L. E. Wooten & Company and by taping from the existing stream to locate the extent of the buffer zone. Following the field exploration by Soil Testing Services, all holes were located vertically and horizontally by representatives of L. E. Wooten & Company's survey team and supplied to us. All groundwater or substrata elevations indicated in this report were derived from our field measurements and the top of hole boring elevations provided us by L. E. Wooten & Company.

The field exploration program consisted of the drilling of eleven soil borings at the southern site drilled to a maximum depth of 26 feet. Groundwater monitoring wells were then installed in seven (7) of the soil borings. In addition, groundwater observations were made in the boreholes at the times noted on the boring logs and during site visits made by members of our Soil Testing Services engineering staff. These measured depths are indicated on the attached boring logs.

All soil borings were performed by a "wood tiger" track mounted Simco drill rig which utilized continuous flight hollow stem augers to advance the boreholes. Representative soil samples were obtained by means of the split barrel sampling procedure in accordance with ASTM Specification D-1586. In the split-barrel sampling procedure, a 2 inch O.D., 1-3/8 inch I.D. split-barrel sampler is driven into the soil by means of a 140 pound hammer with a free fall of 30 inches and the number of blows of the hammer, required to drive the sampler 1 foot (after 6 inches of initial penetration), is recorded. This number is termed the Standard Penetration Resistance and provides a measure of the relative density of granular soil, in-situ. In a less reliable manner, it is also indicative of the consistency of cohesive soils and is useful in locating hard or soft strata. Split-spoon samples were taken at 2.5 foot intervals in the top 15 feet of the soil borings for the purpose of providing

better coverage of the shallow subsurface materials and at 5 foot intervals in the remaining depths of the borings. In addition, 3 inch diameter Shelby Tubes were hydraulically pushed in select boring locations and at specific depths in order to obtain relatively undisturbed soil samples for additional testing.

A field log of soils encountered in the borings was maintained by the drill crew. All soil samples obtained from the drilling operation were sealed immediately in the field and brought to our Raleigh laboratory for visual examination and testing. The drill crew maintained regular contact with the office engineering personnel so that evaluation of soil conditions could be maintained throughout the exploration program.

### 3. LABORATORY TESTING PROGRAM

The laboratory testing program was designed to aid in the evaluation of the subsurface materials for use as trench bottom materials, liner materials, or compacted cover materials. This program consisted of visual classification of all samples on the basis of texture and plasticity, and certain intrinsic index property tests on select samples. The soil engineer grouped the various soil types into the major zones indicated on the boring logs. The estimated group symbol for each soil unit, according to the Unified Soil Classification System, is shown in parentheses following the soil description on the boring logs. A brief explanation of the Unified System is appended to this report. Laboratory test results are also attached to this report.

The stratification lines between the zones indicated on the boring logs are approximate; in-situ, the transition between soil types may be gradual. The procedures utilized in preparing the final boring logs are

described in the Sheet entitled "Procedures Regarding Field Logs, Laboratory Data Sheets and Samples", which is appended to this report.

Based on the results of the laboratory testing program, most soil samples have very low permeabilities and are suitable for both seal and cover materials associated with the landfill operations.

The soil samples will be retained in our laboratory for a period of 120 days unless specific instructions as to their disposition are received.

#### 4. SITE CONDITIONS

In order to assess the existing site conditions, one of our Soil Testing Services engineers visited this site and noted the major existing conditions which might influence the proposed landfill expansions. These conditions were observed during the months of May, June and July of 1980.

This site is subdivided into northern and southern sections which are connected by a narrow tract of land. This narrow land tract is currently wooded and somewhat swampy in places. The northern tract of land is currently approximately 50% wooded. The cleared areas of this section are used for agricultural purposes. At the time of our last site visit, it appeared that these cleared fields, which were predominately loamy sands, were planted with soybeans. The wooded areas consisted primarily of medium pines with sparse undergrowth in the higher elevations and dense undergrowth in the lower elevations. Due to the granular nature of the surficial soils, it appears that a majority of the surface water infiltrates into the substrata rather than leaving the site as surface runoff.

Wayne County Southern Landfill Expansion  
August 18, 1980

Based on our site reconnaissances and the aerial photographs provided by L. E. Wooten & Company, it appears that approximately 60% of the southern land tract has been cleared for landfill operations. The wooded areas are generally found adjacent to the drainage system along the Edwards Branch property line and in the undeveloped southeast corner of the site adjacent to NC SR 1129. The wooded areas adjacent to the stream are generally very swampy with tall pines and dense undergrowth. The wooded area adjacent to NC SR 1129 is covered by short pines with sparse undergrowth growing in sandy surficial soils. Due to the flat grades in this location, it is believed that the surface water infiltrates to the substrata rather than leaving the site as surface runoff.

The existing landfill is fenced along NC SR 1129 and an overnight dumping station is provided with access to that road. At the existing site, the only major structure observed was the office and equipment repair shop located near the center of the southern land tract. From a visual reconnaissance made by one of our staff engineers, the completed landfill area is bordered on the north and west sides by a dike of approximately 20 feet in height above the original ground surface. Based on this observation, it appears that a method of area or ramp and dike landfilling has been used in the past. In the northwest corner of this tract of land, a dry run ditch, probably used to route surface runoff, was observed to have significant amounts of dark leachate discoloring the streambed. In other areas north of the dike, swampy collection ponds and some major erosion patterns were observed. At the time of our site reconnaissances, it appeared that the current method of landfilling involved a system of ramps and dikes. No significantly deep trenches for disposal of sanitary wastes were observed during the site reconnaissances.

5. SUBSURFACE CONDITIONS

The southern landfill site lies in the Coastal Plains physiographic province of North Carolina. In general, subsurface materials in this area consist of alluvial deposits of sheet and lenticular sands and interbedded sands and clays. Due to the proximity of this site to drainage streams, organic loams may also exist.

The logs of the exploratory borings are appended to this report. We have analyzed these logs in light of the geologic data available to us and the generalized soil profile at each site can be described in the following manner:

Both land tracts are located in the Black Creek Formation which consists in general of interbedded sands, clays, and marls which were probably deposited in the Cretaceous.

A. Northern Tract:

- (1) The first unit of material in the northern tract of land is a deposit of sandy soils ranging from 8 to 12 feet thick in the eastern side of the site to 20 to 26 feet or more deep in the western side of the site. The permeability of this deposit is estimated to be high to very high.
- (2) Underlying this first unit of sandy material is a clayey deposit of approximately 4 to 8 feet in thickness and terminating at approximate site Elevation 150 in the eastern side of the site to Elevation 120 in the western side of the site. The permeability of this deposit is estimated to be very low to impermeable. This clay unit was not encountered in soil boring P-2S.

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- (3) The third unit is a deposit of sand extending to beyond the boring termination depth, with an estimated high permeability.

B. Southern Tract:

- (1) The first unit of material in the southern tract of land, in the vicinity of the existing or proposed landfill areas, appears to be a layer of sandy soils of from 4 to 7 feet in thickness with high permeabilities.
- (2) Underlying this first unit of sandy material is a clay deposit ranging from 2 to 5 feet in thickness with permeabilities of very low to impermeable.
- (3) Underlying this second unit of clay material, sands or clayey sands were encountered in our borings. The permeabilities of these materials are estimated to be from moderate to high.
- (4) The fourth unit in three of the soil borings was found to be a unit of clay ranging from 2 to 10 or more feet in thickness. In borings P-6S and B-2S, this clay layer continued to the boring termination depth. The permeabilities of these materials are estimated to be from very low to impermeable.
- (5) In boring P-5S, an additional unit of sandy soils was encountered underlying the fourth unit of clay to the boring termination depth of 26 feet. The permeabilities of these materials are estimated to be high.

The subsurface materials encountered are plotted and shown in the "SUBSURFACE MATERIAL - SOUTH SITE" diagram attached to this report.

With the exception of the existing landfill area, the distribution of soil units is typical of shallow marine deposits of the Coastal Plains area.

6. GROUNDWATER OBSERVATIONS AND COMMENTS

Seven groundwater monitoring wells were installed for the purpose of evaluating the groundwater elevations across the site and for monitoring of the groundwater quality during the operational period of the landfill. These monitoring wells were constructed of 1.66 inch O.D., 1.38 inches I.D. diameter PVC tubing. Approximately 1 foot of sand was placed in the bottom of the borehole prior to installation of the PVC tubing. In order to collect the groundwater in the PVC tubing, a 5 foot section of slotted PVC tubing attached to an approximately 21 to 24 foot length of PVC riser tubing was then placed in the borehole. Well graded filter sand was then placed around the slotted tubing and approximately 1 foot above the connector joint. In order to retard the entrance of surface water from the monitoring well, very low permeability grouts and backfill soils were then placed in the remainder of the borehole.

Groundwater level observations were made at the times and under the conditions noted on the boring logs. The 2 foot interval groundwater contour drawings, titled "GROUNDWATER CONTOURS - SOUTHERN SITE", attached to this report were estimated based on the water level elevations measured in the monitoring wells installed during the field exploration and, to a lesser extent, in the uncased soil borings, and based on our knowledge of groundwater behavior.

During our final site visit, groundwater samples were obtained from select wells for the purpose of evaluating the dissolved or suspended

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solid constituents. These samples were sent to Mr. Gordon Layton, of the North Carolina Division of Health Services, Solid and Hazardous Waste Management Branch in Raleigh, North Carolina. The specific results of these tests may be obtained from Mr. Layton. These initial groundwater samples will be used to establish background water quality standards for comparison throughout the landfill duration.

Based on the measurements in the groundwater monitoring wells at the times indicated on the attached boring logs, it appears that the groundwater flow approximately follows the ground surface and is high in the eastern portions of the site and decreases in elevation towards the natural drainage systems between the two land tracts and to the east. In general, the groundwater tables at this site tend to be fairly shallow in the southern tract of land with typical depths ranging from 5 to 6 feet at the eastern side of the site to approximately 16 feet deep at the central portion of the site. In the northern tract of land, the groundwater appears to be slightly deeper with the apparent groundwater depths ranging from 10 feet deep at the eastern portion of the site to approximately 15 to 24 feet deep at the western portion of the site.

Due to the nature of the drainage patterns in this site, the Edwards Branch and Mill-run drainage systems tend to be fairly swampy. Rather than a well defined stream system, these drainage systems at this site appear to be fairly broad and shallow with a dense stand of trees and undergrowth.

It should be noted that fluctuations in the location of the long-term static groundwater table may occur depending on variations in rainfall, infiltration, evaporation, surface runoff, and other factors that may not have been evident at the time of our readings. Due to the relatively

high permeability surficial substrata and the relatively flat slopes at these sites, it is expected that the majority of the surface water produced by precipitation or surface drainage from adjacent areas would infiltrate into the higher permeability surficial sandy material. The water levels measured in the groundwater monitoring wells and indicated on the attached boring logs tend to vary slightly with time. We would like to evaluate the long-term groundwater elevation throughout the duration of this project. It appears that fluctuations in the groundwater table may have an impact on the landfill operation in the southern site.

## 7. GEOLOGIC CONDITIONS

During the field reconnaissances by a geologist of Soil Testing Services of Carolina, Inc., the geologic conditions of this site were evaluated. These conditions were noted upon completion of the field investigation and are noted in this report for the purpose of providing specific information regarding these items.

A geologic survey was made of this site following completion of the field investigation. Based on the geologic survey and from the results of our soil borings, there are no major solution features including cavernous limestone or fractured rock at this site. In addition, a visual inspection of this site indicated that there are no major rock outcroppings in the vicinity of the proposed landfill expansion. No major rock pinnacles, tables, or boulders were encountered in our soil borings. At the time of our visual inspection, and based on an inspection of the aerial photographs provided by L. E. Wooten & Company, there appears to have been no major landslides at this site in the recent

past. Due to the relatively flat terrain at this site, it is believed that the potential for naturally occurring landslides is very small. In addition, due to the relatively stiff nature of the subsurface soils encountered in our soil borings, it appears that the potential for subsurface creep as a result of soft or loose subsoils flowing plastically down a slope to a lower elevation is very small. However, the possibility of a slope instability always exists during construction if a deep excavation, with inappropriate side slopes, is made. As such, any excavation should be made by an experienced grading contractor or equipment operator in order to construct a stable side slope. Additional recommendations regarding side slope stability of trenches for the proposed landfill expansion are presented in the "CONSTRUCTION/OPERATION RECOMMENDATIONS" section of this report.

#### 8. EXISTING LANDFILL

A field reconnaissance, by a staff engineer with Soil Testing Services of Carolina, Inc., of the existing landfill areas which have already been filled was made to determine potential drainage problems, gas problems, and groundwater problems. In order to estimate the groundwater elevations and evaluate potential groundwater problems, two soil borings were accomplished at or adjacent to each existing landfill site. The estimated groundwater elevations are indicated for each site on the attached groundwater contour diagrams.

From the field reconnaissance, and the soil borings, it appears that the existing topography of the cover material at the completed landfill may be sufficient to provide rapid drainage of surface water due to precipitation and to retard infiltration of that surface water.

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In order to evaluate the groundwater levels in the area of the existing landfill, water level readings were made in the adjacent soil borings. Due to the presence of a large perimeter dike at the existing landfill, it is believed that a method of area filling, including ramping and diking, was utilized for the landfill area. Water samples were obtained from the groundwater monitoring wells located at a lower piezometric elevation than the landfill. These samples were sent to Mr. Gordon Layton for analysis of the dissolved or suspended solids. If these samples contain a significant quantity of deleterious materials as a result of leachate contamination, it is recommended that additional soil borings be performed in the existing landfill and dike to aid in the formulation of recommendations for appropriate and economic remedial measures.

In addition, it is recommended that gas monitoring wells be installed at the perimeter of the existing landfill in order to determine the quantity and type of gases being generated by the decomposing fill. If a significant quantity of explosive or toxic gas is being emitted and allowed to escape through permeable subsurface materials, it is recommended that an appropriate perimeter ventilation system be installed within 300 feet of the landfill or in the buffer zone in order to vent these gases. In addition, it is recommended that entrance to the existing completed landfill be restricted only to authorized personnel.

In the area near boring P-1S, we noted that some leachate was escaping into one of the surface drainage ditches at the northwestern corner of the existing landfill. If it is determined that this leachate is a by-product of decomposition of the wood and asphalt being deposited in this area, it is recommended that this material be appropriately sealed from the environment in an approved trench or waste disposal "cell". If this

leachate is draining from the existing covered landfill, it is recommended that the cover material permeability, subgrade permeability, and dike material permeability be evaluated in order to determine the suitability of the materials used in this capacity.

According to a meeting with the appointed Wayne County representatives on January 7, 1980, the existing landfill will not be used for future fill areas.

9. CONSTRUCTION/OPERATION RECOMMENDATIONS

In order to aid in the construction and operation of the proposed southern landfill expansion, a list of recommendations and discussions is included in this report. It should be noted that these recommendations are based on the results of our soil borings, field exploration, and site reconnaissances by members of our Soil Testing Services staff. These recommendations are intended as an aid and may not cover each specific problem encountered during operation of the proposed landfill expansion. If conditions other than those described on our boring logs, Subsurface Materials Diagrams, or subsurface descriptions are encountered, it is recommended that we be contacted in order to assess our recommendations in light of these new conditions. If major differences are encountered in the field, proper notification is necessary so that we may make suitable recommendations with regard to construction, operation and the use of proper and adequate methods of disposal of the sanitary waste.

A. General Recommendations

The proper construction and operation of the proposed southern landfill expansion will require careful consideration of the many factors which could potentially impede the successful use of these

sites as sanitary landfills. The following general recommendations are provided based on our experience and understanding of sanitary landfills. Much of the information provided herein may be found in "Handbook of Solid Waste Management", David Gordon Wilson, Editor; Van Nostrand Rhienholt, copyright 1977, pp. 239-243 and 604-613.

- (1) Open burning prohibited: In order to reduce the possibility of odors, fire and safety hazards, and air pollution being created by the burning of the solid waste, it is recommended that no solid waste be burned at the location of the proposed sanitary landfill expansions.
- (2) Access limited: In order to reduce the possibility of scavenging, burning, and indiscriminate dumping occurring during periods when no authorized attendants are at the sites, it is recommended that access to the proposed sanitary landfill expansion locations be limited to only those times when an authorized attendant is present and supervising the disposal.
- (3) Excavation for Trenches: If trenches are recommended in subsequent sections of this report, it is recommended that a test pit be excavated by a bulldozer with an experienced and authorized operator in order to evaluate the actual groundwater conditions at that particular trench site. If sandy clay or silty clay material is found to be overlying the existing groundwater elevation at that site, and if there is approximately 3 feet of this material for migration retardation of leachate, the bottom depth of the landfill should be set at approximately 5 feet above the existing groundwater table. If an insufficient quantity of clayey material is

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found within the 5 foot zone above the groundwater table, additional clayey material may be brought in from other areas of the site and compacted after the required overexcavation, to provide the required 3 feet of leachate migration retarding material. If no clay is encountered within 5 feet of the groundwater table, the trench should be overexcavated approximately 3 feet to within 2 feet of the groundwater table, and a suitable silty clay or sandy clay material should be compacted to a thickness of 3 feet to the proper density by approved compaction equipment. In addition, a silty clay or sandy clay material should comprise the walls of the excavated trench in order to retard the lateral migration of the leachate material. Where necessary, the side slopes of the trench excavation may be cut so that an approximately 6 inch layer of clayey material can be compacted for the walls, or so that the clay material may be backfilled adjacent to the fill material as fill is placed. This method is indicated in the appendix and titled "Trench Wall Preparation".

During the process of trench excavation, it is anticipated that the material removed in this process will be stockpiled and, if suitable, used as daily and final cover, or wall sealing material. In this operation, the edge of the stockpile closest to the excavation should be no closer than the depth of the final excavation. This method should aid in reducing the possibility of a slope instability during excavation or filling of the trench.

- (4) Area filling method: Where it is determined that a method of area filling is required or recommended in subsequent sections

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of this report, similar test excavations as in the trench method, should be made to evaluate the specific subsurface materials and the elevation of the existing groundwater table. Where there are sandy materials overlying clayey materials, the sandy materials should be removed and stock-piled. Again, the bottom of the proposed fill area should be approximately 5 feet above the existing groundwater table, and approximately 3 feet of low to impermeable clayey materials should underlie the proposed landfill in order to retard leachate migration. Where necessary, overexcavation, as in the trench method, may be necessary and additional clayey materials may be required to provide the required 3 feet of low permeability material and 5 feet above the existing groundwater table.

- (5) Spreading and compacting: In order to reduce excessive and uneven settlements of the final landfill surface, to reduce the invasion into the settled landfill by insects and rodents, and to aid in protection of the final graded surface for aesthetic and usefulness of the finished area following completion of the landfill, it is recommended that the solid waste be spread in uniform layers not exceeding 2 feet in loose thickness prior to compaction. Compaction should then be accomplished with approximately 2 to 5 passes of an approved and appropriate mobile trash compactor. It has been found that spreading and compaction is usually best achieved by inclined working faces sloped at approximately 20 to 30 degrees. All collection vehicles should deposit their solid waste at the top or the toe of the working face. No collection vehicles should be allowed to travel in or on the uncompacted waste.

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Similarly, no unauthorized persons should be allowed to walk on the uncompacted or compacted solid waste unless an appropriate cover has been placed.

- (6) Daily cover: In order to prevent insect and rodent infestation, fire hazards, blowing litter, to control gas and water movement, and to reduce the possibility of disease vectors being produced, it is recommended that a uniformly compacted layer of low to impermeable clay material be used as a cover and placed to a minimum depth of 6 inches over the compacted solid waste at the end of each working day. In addition, this working cover should aid in reduction of scavenging and the occurrence of windblown litter. The 6 inch cover material should be placed in such a manner to produce daily disposal "cells" isolated from the environment by low to impermeable clayey material.
- (7) Final cover: In order to prevent emergence of insects from the compacted solid waste, to minimize the escape of odors, to prevent rodents from burrowing, to provide for control of gas and water movement, to support plant growth, to reduce the amount of surface water infiltrating into the completed landfill and producing unnecessary quantities of leachate, and to provide an aesthetically acceptable finished site, it is recommended that a uniform layer of earth cover compacted to a minimum depth of 2 feet shall be placed over the entire covered surface of each portion of the final lift. It is recommended that the final cover material, or any other material placed as a sealant, be free of organic matter and debris and should be placed in lifts not exceeding 9 inches in loose thickness and

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compacted to a minimum of 90% of the maximum dry density as determined by the Standard Proctor Test (ASTM D-698). It is recommended that this final 2 foot cover be placed within one week following the final placement of solid waste within that portion. The material used for the final cover should be either a clayey or silty sand or a silt material. It has been found that use of pure clays for the final cover provides excellent resistance from emergence of flies, minimization of moisture entering the fill, minimization of landfill gas venting through the cover and provides pleasing appearance and control against windborne litter. However, due to the surface cracks which occur upon drying of the clay cover, rodents and burrowing animals and, occasionally, the venting of decomposition gas are improperly controlled by the use of this type of cover material. In addition, pure clay materials are generally not as conducive to growth of vegetation as silts or clayey or silty sands. Due to the poor erosion resistance of silty covers, however, it is recommended that a clayey or silty sand cover material be used if available.

It is recommended that, as a minimum, the final cover material be sloped to not less than a 2% grade. Grades lower than 2% would not allow the rapid runoff of surface water and, as such, would produce either infiltration of a large percentage of the surface water or soft spots in the cover material. In addition, trees and some large bushes generally require more than 2 feet of suitable material for proper root growth. If these plants are anticipated to be planted following completion of the landfill, it is recommended that in those areas where deep root growth is expected, greater thickness of cover

material be placed. In general, most grasses root poorly in clayey surficial materials. For this reason, it is recommended that a suitable topsoil material be placed over the final landfill cover and seeded with the desired type of grass followed with an appropriate cover of pinestraw.

- (8) Landfill border or dike slopes: In order to form stable earth slopes during the landfill operation, or at the completion of the landfill operation, it is recommended that rough earthen slopes should not exceed 3 horizontal to 1 vertical unless it can be determined by a suitable test excavation that the local subsurface material can support steeper slopes. In certain locations, and during rainy times of the year, it may be necessary to cut flatter slopes in order to avoid a slope failure. It is recommended that, during the test excavation in the particular trench site area, that all personnel remain away from the excavation except the equipment operator. The equipment operator should remain in his covered cab unless it is necessary to quickly vacate in event of slope failure. We do not foresee any potential loss of life or limb due to a possible slope failure during the test excavation if the excavation is made no deeper than 15 to 18 feet and in accordance with the recommendations presented in this report. Deeper excavations than this should be made in the presence of an experienced geotechnical engineer.

The face of the final fill border should be cut at an approximate slope of 3 horizontal to 1 vertical with 8 foot wide benches located at 20 foot vertical increments to control drainage and provide access for maintenance vehicles.

- (9) Environmental protection: In order to maintain proper monitoring and control of the landfill during its operation, the location and the operation must have the approval of the appropriate governmental agency including the State Department of Health and the Environmental Protection Agency. Any potential contamination of ground or surface waters by deposited solid waste or their products of decomposition, gases, or other products generated by the biologically or chemically active wastes should be prevented at all costs. Windblown litter should be controlled in order to reduce the possibility of the creation of disease vectors, fire hazards, nuisances, and unsightliness. It is recommended that the use of appropriate fencing, earth banks, or natural barriers be utilized in order to accomplish this. In addition, it is recommended that the entire site be policed daily and any windblown materials that are encountered be removed and subsequently placed in the proper disposal area. Also, it is recommended that any unloading be performed in such a manner to reduce the scattering of the solid waste.
- (10) Salvage prohibited: In order to reduce the possibility of interference of the prompt disposal of the sanitary solid waste, and to reduce the possibility of disease vectors leaving the site or contaminating personnel, it is recommended that no salvaging be permitted at the working face of the sanitary landfill. Any salvaging should be done in an appropriate reclamation center at another site specifically set aside for this activity. These reclamation activities should not be considered part of the sanitary landfill operation.

(11) Special waste handling: The clayey subsurface materials encountered in our borings appear to be satisfactory for use as liners and cover material for a sanitary solid waste landfill if properly placed and compacted. However, they may not be satisfactory in the retardation of the migration of leachates produced by toxic, pathogenic, corrosive, flammable, explosive, or other hazardous wastes. Therefore, it is recommended that no special waste handling be provided at this site unless specific testing and recommendations are made for a separate area of the site to handle these materials. In addition, the proper handling of these materials may require additional equipment and personnel beyond the scope of the proposal sanitary landfill expansions.

B. Southern Site - Specific Recommendations

Based on our soil borings, field exploration, and site reconnoissances, it appears that portions of the northern tract of this site may be marginally suitable for landfilling operations. If landfilling is determined to be necessary at the northern tract at this site, we believe that it will be necessary to locate another borrow site in order to obtain sufficient quantities of low to impermeable clayey soils for use as liner and cover material.

According to the groundwater tables estimated at this site, and as shown on the attached "GROUNDWATER CONTOUR - SOUTH SITE" diagram, it is estimated that the following depths of excavation may be made:

- (1) In areas represented by boring P-4S, the groundwater table is approximately 4 feet below the surface and, as such, no subsurface disposal will be possible. However, if suitable clayey

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materials are obtained from other sources, the surficial materials may be excavated 3 feet and a clayey liner material may be placed. In the location of this boring area, filling with sanitary solid waste may be possible if a retention dike system is constructed.

- (2) In areas represented by boring B-1S, the groundwater is located such that excavation may be made to a depth of 5 feet. However, the subsoils beneath this depth are somewhat permeable and, as such, it would be necessary to overexcavate another 3 feet and compact a low to impermeable clay liner.
- (3) In areas represented by boring P-3S, the water table is located such that excavation may be made to approximately 11.5 feet beneath the existing ground surface. During this excavation, a unit of silty clays from 7 to 12 feet may be encountered. This clay should be stockpiled and, upon reaching the excavated depth of 11.5 feet, an additional 3 feet should be overexcavated and the stockpiled silty clay compacted to form a low to impermeable liner.
- (4) In areas represented by boring P-2S, the water table is located such that excavation for sanitary solid waste disposal may be made to a depth of approximately 4.5 feet. However, at this depth, the underlying subsoils are fairly permeable and, as such, it will be necessary to overexcavate an additional 3 feet and compact a clay borrow material in this overexcavation for use as a liner.

The northern land tract may require the location of a clay borrow area in order to obtain a sufficient quantity of materials for use

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as liner and final cover. Some clays were encountered in our borings at this site; however, it is estimated that this quantity of clay will not be sufficient to fully utilize this site without obtaining additional clay materials from another borrow area. If sufficient volumes of clay are obtained, it appears that a method of area filling may be utilized in this area.

In the southern tract of the southern site near Dudley, North Carolina, our borings indicate that some excavation may be made in the areas adjacent to borings B-3S, P-6S, and B-4S. Some land-filling may be accomplished in an area represented by boring P-7S if the existing surficial material is excavated approximately 3 feet and a clay liner is compacted. In an area represented by this boring, it appears that a retention dike, similar to that currently being utilized at the site, would be necessary. In boring B-3S, it is estimated that excavation for landfill purposes may be made to approximately 12 feet below the existing ground surface. Beneath this depth somewhat permeable soils were encountered. During excavation to a depth of 12 feet, a silty clay deposit may be encountered between 4 and 7 feet. This material should be stock-piled and used later as a compacted liner from 12 to 15 feet. Adjacent to boring P-6S excavation may be made to approximately 9 feet where a somewhat low to impermeable deposit was encountered.

It is understood that no additional filling will be made in the areas adjacent to the completed landfill. For this reason, no recommendations will be provided for the areas adjacent to P-1S and P-5S. If additional information is required regarding this area, we would be pleased to make these recommendations at your request.

10. GENERAL COMMENTS

This report has been prepared for the purpose of determining subsurface information and soil parameters for the proposed Wayne County Southern Landfill to be located at a site near Dudley, North Carolina. The information and recommendations reported herein are presented to assist the architect/engineer in the design of this project. In the event there are any significant changes in the design or location of this landfill or other construction from the concepts previously outlined or of the design parameters stated in this report, the conclusions and recommendations contained in this report shall not be considered valid unless these changes have been reviewed and our conclusions and recommendations reaffirmed or appropriately modified, in writing, by the writer or other authorized representative of this firm. The General Conditions included in the appendix are an integral part of this report.

There is a possibility that variations in soil conditions may be encountered during construction. Proper evaluation of these soil conditions is critical to adequate landfill performance. In order to permit correlation between the widely spaced soil boring data and the actual soil conditions encountered during excavation, and to ensure conformance with the plans and specifications as originally contemplated, it is recommended that this firm be retained to perform periodic visits and review during the landfill operation phase of the project. We can assume no responsibility for construction compliance with the design concepts, specifications, and recommendations unless we have been authorized to perform a periodic review during the course of construction.

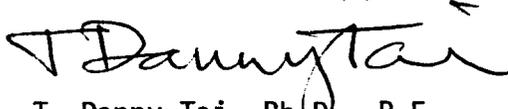
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The foregoing report has been prepared under the supervision of and is  
submitted by

SOIL TESTING SERVICES OF CAROLINA, INC.



Jeffrey L. Blackford  
Assistant Project Engineer



T. Danny Tai, Ph.D., P.E.  
Chief Engineer

JLB/TDT:1bh

## APPENDIX INDEX

- Appendix A - General Conditions (Revised)
- Appendix B - Unified Soil Classification System
- Appendix C - Procedures Regarding Field Logs,  
Laboratory Data Sheets and Samples
- Appendix D - Laboratory Test Results
- Appendix E - Trench Wall Preparation
- Appendix F - Boring Logs
- Appendix G - Drawings (under separate cover)

## GENERAL CONDITIONS

The analysis, conclusions, and recommendations submitted in this report are based on the exploration previously outlined and the data collected at the points shown on the attached location plan. This report does not reflect specific variations that may occur between test boring locations. The borings were located where site conditions permitted and where it is believed that representative conditions occur but the full nature and extent of variations between borings and of subsurface conditions not encountered by any boring may not become evident until revealed by construction. If variations become evident at any time before or during the course of construction it will be necessary to make a re-evaluation of the conclusions and recommendations of this report and further exploration, observation, and/or testing may be required.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and makes no other warranties, either expressed or implied, as to the professional advice under the terms of our agreement and included in this report. The recommendations contained herein are made with the understanding that the contract documents between the owner or earthwork contractor, or between the owner and the contractor, if any, shall require that the contractor certify that all work in connection with trench construction, fill placement, fill cover, ditch construction, and other elements of the landfill operation are in accordance with the plans and specifications for this project. Further, that the contractor shall certify that the materials and equipment used are of the types, quantity and quality required by the plans and specifications for the project.

Additionally, it is understood that the contract documents will specify that the contractor will, upon becoming aware of apparent or latent subsurface conditions differing from those disclosed by the original soil investigation work, promptly notify the owner, both verbally to permit immediate

verification of the change and in writing, as to the nature and extent of the differing conditions and that no claim by the contractor for any conditions differing from those anticipated in the plans and specifications and disclosed by the soil studies will be allowed under the contract unless the contractor has so notified the owner both verbally and in writing, as required above, of such changed conditions. The owner will, in turn, promptly notify this firm of the existence of such unanticipated, conditions and will authorize such further investigation as may be required to properly evaluate these conditions.

Further, it is understood that any specific recommendations made in this report as to on-site construction review by this firm will be authorized and funds and facilities for such review will be provided at the times recommended if we are to be held responsible for the design recommendations.

# UNIFIED SOIL CLASSIFICATION SYSTEM

Major divisions		Group symbols	Typical names	Laboratory classification criteria			
<b>Coarse-grained soils</b> (More than half of material is larger than No. 200 sieve size)	<b>Gravels</b> (More than half of coarse fraction larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		
		Gravels with fines (Appreciable amount of fines)	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		<b>Sands</b> (More than half of coarse fraction is smaller than No. 4 sieve size)	Gravelly silts (Appreciable amount of fines)	GM	d	Silty gravels, gravel-sand-silt mixtures	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 per cent . . . . . GW, GP, SW, SP More than 12 per cent . . . . . GM, GC, SM, SC 5 to 12 per cent . . . . . Borderline cases requiring dual symbols
				GC	Clayey gravels, gravel-sand-clay mixtures		
			Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
				SP	Poorly graded sands, gravelly sands, little or no fines		
	Silty sands (Appreciable amount of fines)	SM	d	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4  Atterberg limits above "A" line with P.I. greater than 7		
		SC	Clayey sands, sand-clay mixtures			Limits plotting in hatched zone with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols.	
	<b>Fine-grained soils</b> (More than half of material is smaller than No. 200 sieve)	Silts and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	<p style="text-align: center;">Plasticity Index</p> <p style="text-align: center;">Liquid Limit</p> <p style="text-align: center;">Plasticity Chart</p>		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
OL			Organic silts and organic silty clays of low plasticity				
Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts				
		CH	Inorganic clays of high plasticity, fat clays				
		OH	Organic clays of medium to high plasticity, organic silts				
Highly organic soils		Pt	Peat and other highly organic soils				

PROCEDURES REGARDING FIELD LOGS,  
LABORATORY DATA SHEETS AND SAMPLES

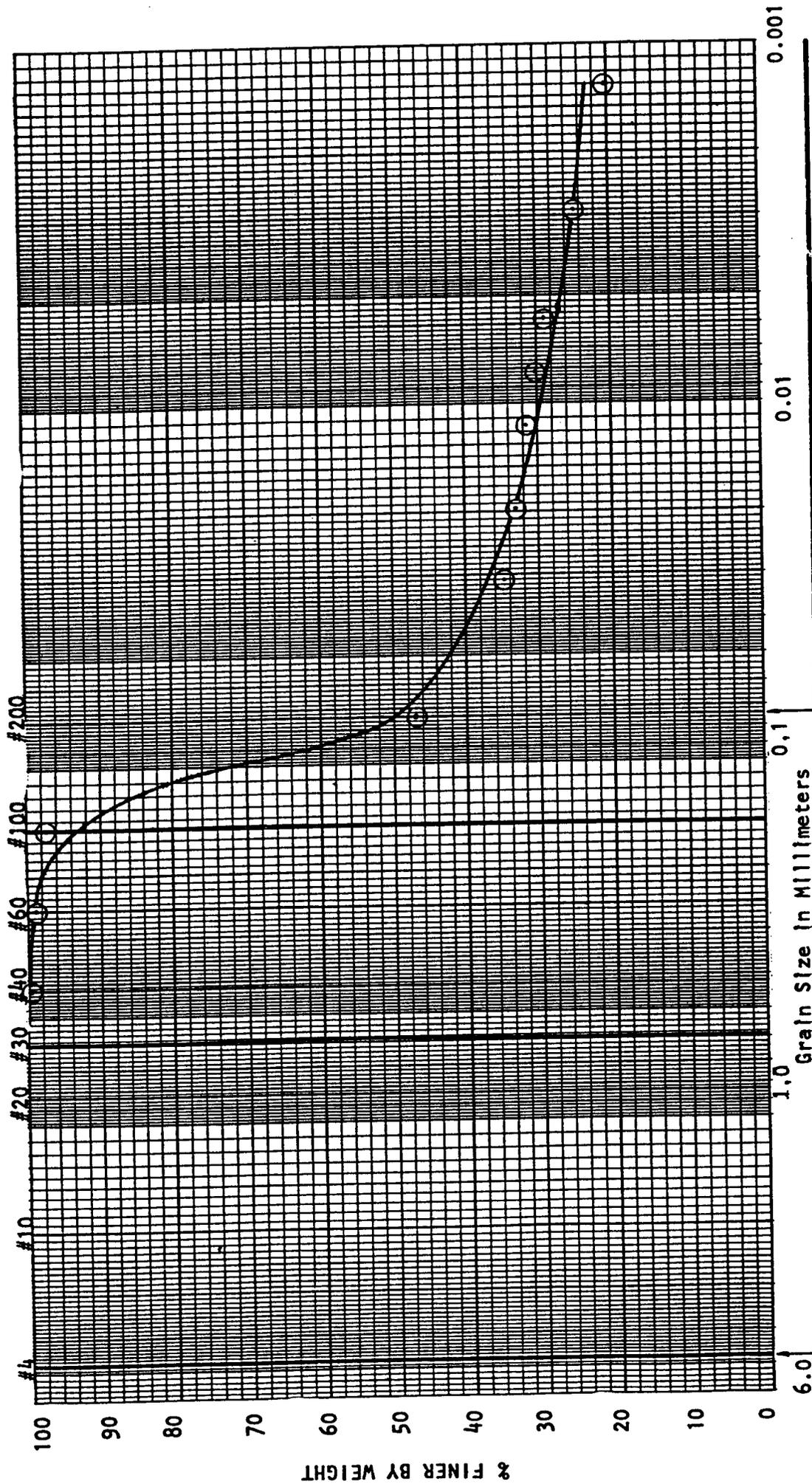
In the process of obtaining and testing samples and preparing this report, procedures are followed that represent reasonable and accepted practice in the field of geotechnical engineering.

Specifically, field logs are prepared during performance of the drilling and sampling operations which are intended to portray essentially field occurrences, sampling locations and other information. Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by more experienced soil engineers, and differences between the field logs and the final logs exist. The engineer preparing the report reviews the field and laboratory logs, classifications and test data, and in his judgement in interpreting this data, may make further changes.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then destroyed unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, an inspection of these samples should recognize this factor.

It is common practice in the soil and foundation engineering profession that field logs and laboratory data sheets not be included in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. On the other hand, we are aware that perhaps certain contractors and subcontractors submitting bids or proposals on work might have an interest in studying these documents before submitting a bid or proposal. For this reason, the field logs will be retained in our office for inspection by all contractors submitting a bid or proposal. We would welcome the opportunity to explain any changes that have and typically are made in the preparation of our final reports, to the contractor or subcontractors, before the firm submits its bid or proposal, and to describe how the information was obtained to the extent the contractor or subcontractor wishes. Results of laboratory tests are generally shown on the boring logs or are described in the test of the report as appropriate.

U. S. STANDARD SIEVE NUMBERS

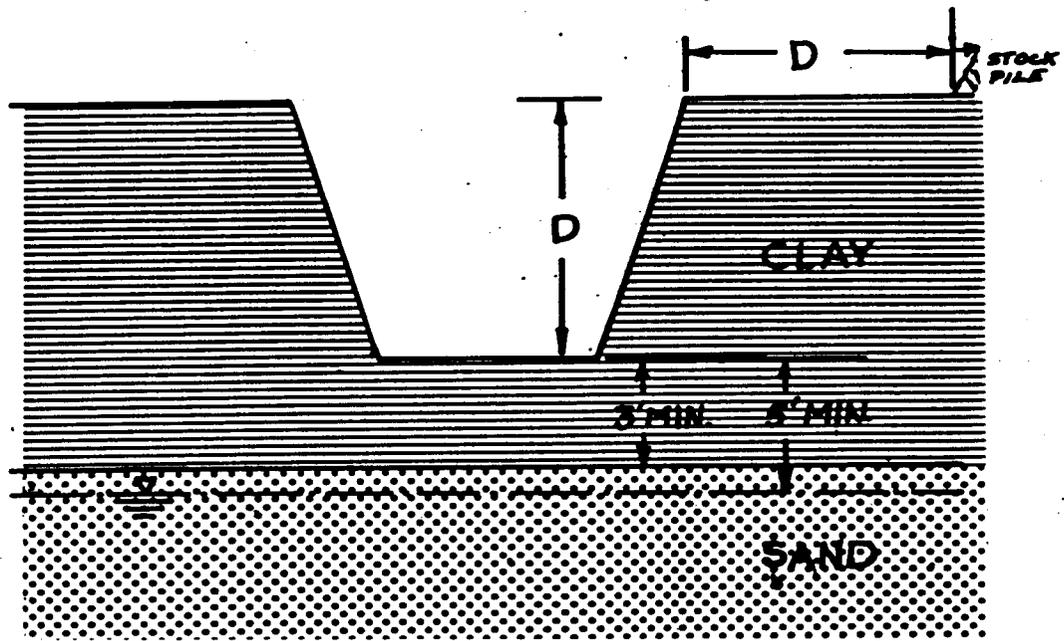


Grain Size in Millimeters

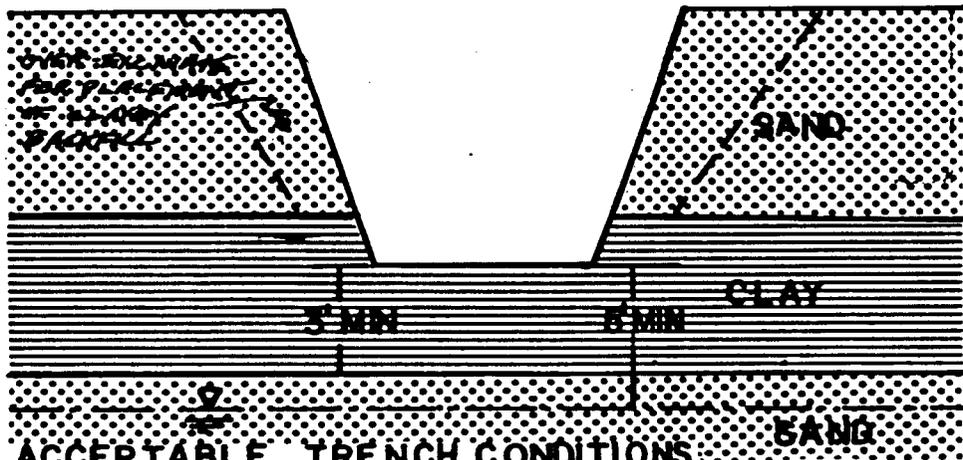
Coarse	Medium	Fine
Sands (50.0%)		
Sills & Clays (50.0%)		

GRAIN SIZE DISTRIBUTION:

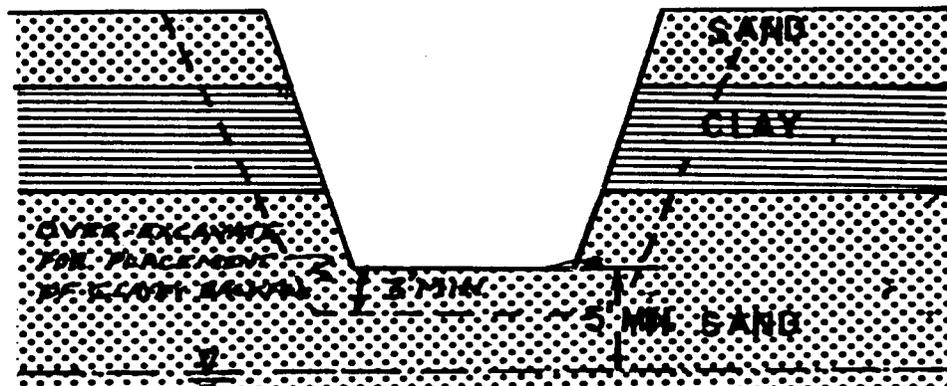
Project Name: Wayne County Landfills-Southern Site Project No. 80-141-AA Date: \_\_\_\_\_  
 Boring No. P-3S Sample No. S-5 Depth 12.5' to 13.5' Unified Soil Classification SC-SM  
 Soil Description Light grey, white, and tan clayey very fine to fine sand with some silt.



**PREFERRED TRENCH CONDITIONS**



**ACCEPTABLE TRENCH CONDITIONS  
(REQUIRES SOME IMPROVEMENT)**



**DIFFICULT TRENCH CONSTRUCTION  
(REQUIRES EXTENSIVE IMPROVEMENT)**

<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> B-1S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>			PLASTIC LIMIT %      WATER CONTENT %      LIQUID LIMIT %			STANDARD PENETRATION      BLOWS/FT.			
						1	2	3	4	5	10	20	30	40	50
				<b>SURFACE ELEVATION</b> 170.0											
				ROOTMAT and TOPSOIL. (Driller's Description)											
	1	SS		CLAYEY FINE SAND, stiff, brown. (SC)		9									
5	2	SS				12.0									
	3	SS		FINE SAND, medium to dense, orange and tan. (SP)		10.0								34	
10	4	SS				11.7									
	5	SS		SILTY CLAY, trace very fine sand stiff, light grey. (CL)		13								23.8	
15	6	SS		Note: Local fine sand lenses.		11								15.1	
20	7	SS		VERY FINE to FINE SAND, little to trace silt, loose, saturated, white and light grey. (SM)		6								29.2	
25	8	SS				7								27.7	
30				BORING TERMINATED 26.0'.											

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

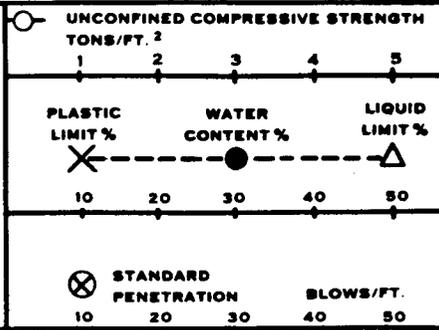
WL 10.0' @ T.O.BWS OR WD	BORING STARTED 4/11/80	SOIL TEST SERVICES P.O. BOX 12015 RESEARCH TRIANGLE PARK NORTH CAROLINA 27709
WL BCR      ACR	BORING COMPLETED 4/11/80	
WL	RIG SIMCO      FOREMAN Fetty	APP'D BY JLB      STS JOB NO 80-141-AA



<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> B-2S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>
					<b>SURFACE ELEVATION</b> 144.5	
					ROOTMAT and TOPSOIL (Driller's Description)	
	1	SS			VERY FINE to FINE SAND, trace roots, loose, wet, tannish-brown. (SP)	5
5	2	SS			SILTY CLAY, trace very fine sand, stiff, light grey. (CL)	15
	3	SS			VERY FINE SAND, trace silt, medium, saturated, white and light greenish grey. (SP)	11
10	4	SS			VERY FINE to MEDIUM SAND, trace silt, loose, wet, orange. (SW)	4
	5	SS				5
15	6	SS			VERY FINE SANDY CLAY, soft to medium, light grey and orange. (CL)	4
20	7	SS			FINE SANDY CLAY, soft to medium light grey and tan. (CL)	4
25	8	SS			VERY FINE to FINE SAND, very loose, tannish-orange. (SP)	2
30					BORING TERMINATED 26.0'.	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL 3.0' @ T.O.B. WS OR WD	BORING STARTED 4/6/80	<b>SOIL TEST SERVICES</b> P.O. BOX 12015 RESEARCH TRIANGLE PARK NORTH CAROLINA 27709
WL BCR ACR	BORING COMPLETED 4/6/80	
WL	RIG SIMCO FOREMAN Fetty	
APP'D BY JLB		STS JOB NO. 80-141-AA

BL:I

<b>OWNER</b> Wayne County, North Carolina				<b>LOG OF BORING NUMBER</b> B-2S*																															
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan				<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company																															
<b>SITE LOCATION</b> Southern Site Near Dudley, Wayne County, N. C.				<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:10%; text-align: center;">○</td> <td style="width:40%;">UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup></td> <td style="width:10%; text-align: center;">1</td> <td style="width:10%; text-align: center;">2</td> <td style="width:10%; text-align: center;">3</td> <td style="width:10%; text-align: center;">4</td> <td style="width:10%; text-align: center;">5</td> </tr> <tr> <td></td> <td>PLASTIC LIMIT %</td> <td style="text-align: center;">×</td> <td></td> <td>WATER CONTENT %</td> <td style="text-align: center;">●</td> <td></td> </tr> <tr> <td></td> <td>LIQUID LIMIT %</td> <td></td> <td></td> <td></td> <td style="text-align: center;">△</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">10</td> <td style="text-align: center;">20</td> <td style="text-align: center;">30</td> <td style="text-align: center;">40</td> <td style="text-align: center;">50</td> </tr> </table>				○	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>	1	2	3	4	5		PLASTIC LIMIT %	×		WATER CONTENT %	●			LIQUID LIMIT %				△				10	20	30	40	50
○	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>	1	2					3	4	5																									
	PLASTIC LIMIT %	×		WATER CONTENT %	●																														
	LIQUID LIMIT %				△																														
		10	20	30	40	50																													
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>	<b>RECOVERY</b>	<b>DESCRIPTION OF MATERIAL</b>																													
X						SURFACE ELEVATION 144.5 ±																													
5		2A	3" ST			Unclassified Probe.																													
10						BORING TERMINATED @ 7.0'.																													
15						*Offset approximately 5.0' from B-2S to obtain undisturbed sample.																													
20																																			
25																																			
30																																			
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU THE TRANSITION MAY BE GRADUAL																																			
WL		WS OR WD		BORING STARTED 4-18-80		<b>SOIL TEST SERVICES</b> P.O. BOX 12015 RESEARCH TRIANGLE PARK NORTH CAROLINA 27709																													
WL		BCR ACR		BORING COMPLETED 4-18-80																															
WL				RIG Simco FOREMAN Fetty		APP'D BY JLB STS JOB NO80-141-AA																													

<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> B-3S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>									
							1	2	3	4	5					
							PLASTIC LIMIT %			WATER CONTENT %		LIQUID LIMIT %				
							X			●		△				
							10 20 30			40 50						
							⊗			STANDARD PENETRATION		BLOWS/FT.				
							10 20 30			40 50						
					<b>SURFACE ELEVATION</b> 161.6											
	1	SS			VERY FINE to FINE SAND, loose, tannish-brown. (SP)	5	⊗	●			14.4					
5	2	SS			SILTY CLAY, trace very fine sand, stiff, light grey. (CL)	12	⊗	●			22.1					
	3	SS			FINE SAND, trace clay, moist, grey and reddish-brown. (SP)	14	⊗	●			17.7					
10	4	SS			Note: 10' to 15' - loose 7' to 10' - medium dense	9	⊗	●			20.6					
	5	SS				5	⊗	●			22.5					
15	6	SS			VERY FINE to FINE SAND, trace silt, loose, wet, tan and brown. (SP)	6	⊗	●			20.2					
20	7	SS			FINE SAND, loose, white. (SP)	6	⊗	●			27.2					
25	8	SS			FINE SAND, loose, light tannish orange. (SP)	5	⊗	●			16.3					
30					BORING TERMINATED 26.0'											

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL 11.4' @ T.O.BWS OR WD	BORING STARTED 4/10/80	SOIL TEST SERVICES P.O. BOX 12015 RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
WL BCR ACR	BORING COMPLETED 4/10/80		
WL	RIG SIMCO FOREMAN Fetty	APP'D BY JLB	STS JOB NO80-141-AA

<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> B-4S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>			PLASTIC LIMIT %      WATER CONTENT %      LIQUID LIMIT %			STANDARD PENETRATION      BLOWS/FT.					
						1	2	3	10	20	30	40	50	10	20	30	40
				<b>SURFACE ELEVATION</b> 165 <sup>+</sup>													
	1	SS		VERY FINE to FINE SAND, trace clay, tannish-brown. (SP) Note: 0' to 3.5' - very loose 3.5' to 7.0' - medium dense	3												
5	2	SS															
	3	SS		SILTY CLAY, trace very fine sand, stiff, light grey. (CL) Note: Sandy at 10.0'.	15												
10	4	SS															
	5	SS		VERY FINE to FINE SAND, loose, wet, tan and light grey. (SP)	5												
15	6	SS															
20	7	SS		FINE SAND, loose, wet, light grey. (SP)	8												
25	8	SS															
30				BORING TERMINATED 26.0'.													

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES; IN-SITU. THE TRANSITION MAY BE GRADUAL.

WL 9.0' @ T.O.B. WS OR WD	BORING STARTED 4/10/80	SOIL TEST SERVICES P.O. BOX 12015 RESEARCH TRIANGLE PARK      NORTH CAROLINA 27709	
WL            BCR            ACR	BORING COMPLETED 4/10/80		
WL	RIG SIMCO FOREMAN Fetty	APP'D BY JLB	STS JOB NO. 80-141-A

<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> P-1S
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<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company
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<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.	
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ELEVATION	DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION	BLOWS/FT.
						SURFACE ELEVATION 134.9							
						COMPRESSED LEAVES and TWIGS.	2						
		1	SS			SILTY ORGANIC VERY FINE SAND, very loose, wet, dark brown. (SM) *	6						
	5	2	SS			CLAYEY FINE SAND, loose, light grey. (SC)	6			19.2			
		3	SS			FINE to MEDIUM SAND, loose, light grey and tan. (SW) Note: Local clay pockets.	8			19.4			
	10	4	SS			VERY FINE to FINE SAND, little clay, very loose, light grey and tan. (SC) Note: Clayey at 13.0'.	3			28.3			
		5	SS				3			26.2			
	15	6	SS				3			30.7			
	20	7	SS			VERY FINE to MEDIUM SAND, loose, tan. (SW)	5			19.9			
	25	8	SS			BORING TERMINATED 26.0'.	9			20.5			
	30					* Semi-fibrous with twigs and roots.							

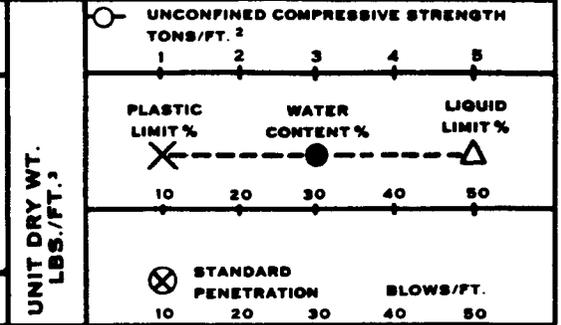
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES; IN-SITU. THE TRANSITION MAY BE GRADUAL

WL 8.3' @ T.O.B. WS or WD	BORING STARTED 4/17/80	<b>SOIL TEST SERVICES</b>	
WL BCR ACR	BORING COMPLETED 4/17/80	P.O. BOX 12015	
WL 8.1' @ 93 days	RIG SIMCO FOREMAN Fetty	RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
		APP'D BY JLB	STS JOB NO. 80.141-AA

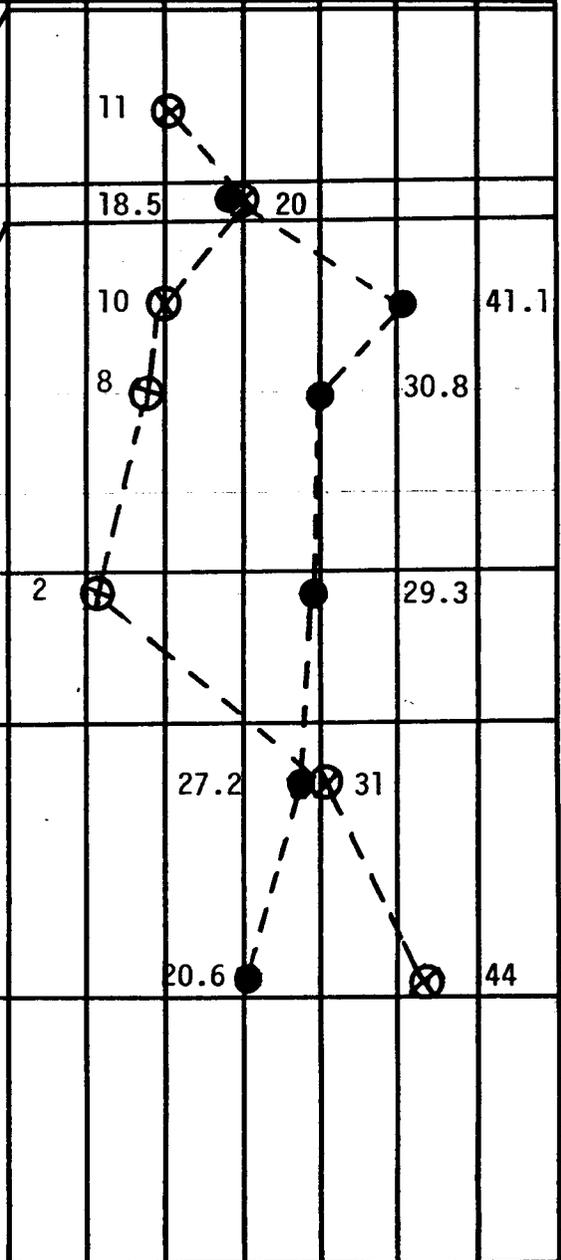
<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> P-2S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL
					<b>SURFACE ELEVATION 134.7</b>



					ROOTMAT and TOPSOIL. *
5	1	ss			VERY FINE to FINE SAND, trace roots, medium dense, tan and brown. (SP)
	2	ss			VERY FINE to FINE SAND, little to trace clay, medium dense, tan. (SC)
10	3	ss			FINE SAND, little clay, trace pea gravel, medium dense, brown. (SC) Note: Local tan clay pockets.
	4	ss			
	5	ss			
15	6	ss			CLAYEY FINE to MEDIUM SAND, very loose, tan and light grey. (SC)
20	7	ss			SILTY FINE SAND, little organics and wood chips, dense, black. (SM)
25	8	ss			
30					BORING TERMINATED 26.0'. * (Driller's Description)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES; IN-SITU. THE TRANSITION MAY BE GRADUAL

WL 10.0' @ T.O.B.WS OR WD	BORING STARTED 4/15/80	<b>SOIL TEST SERVICES</b>	
WL BCR ACR	BORING COMPLETED 4/15/80	P.O. BOX 12015	
WL 9.9' @ 95 days	RIG SIMCO FOREMAN Fetty	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
		APP'D BY JLB	STS JOB NO 80-141-AA

<b>OWNER</b> Wayne County, North Carolina					<b>LOG OF BORING NUMBER</b> P-2S*				
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan					<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company				
<b>SITE LOCATION</b> Southern Site Near Dudley, Wayne County, N. C.									
ELEVATION DEPTH	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY					
X					SURFACE ELEVATION 134.7 ±				
5					Unclassified Probe.				
	3A	3" ST							
10					BORING TERMINATED @ 9.0'.  *Offset approximately 5.0' from B-2S to obtain undisturbed sample.				
15									
20									
25									
30									

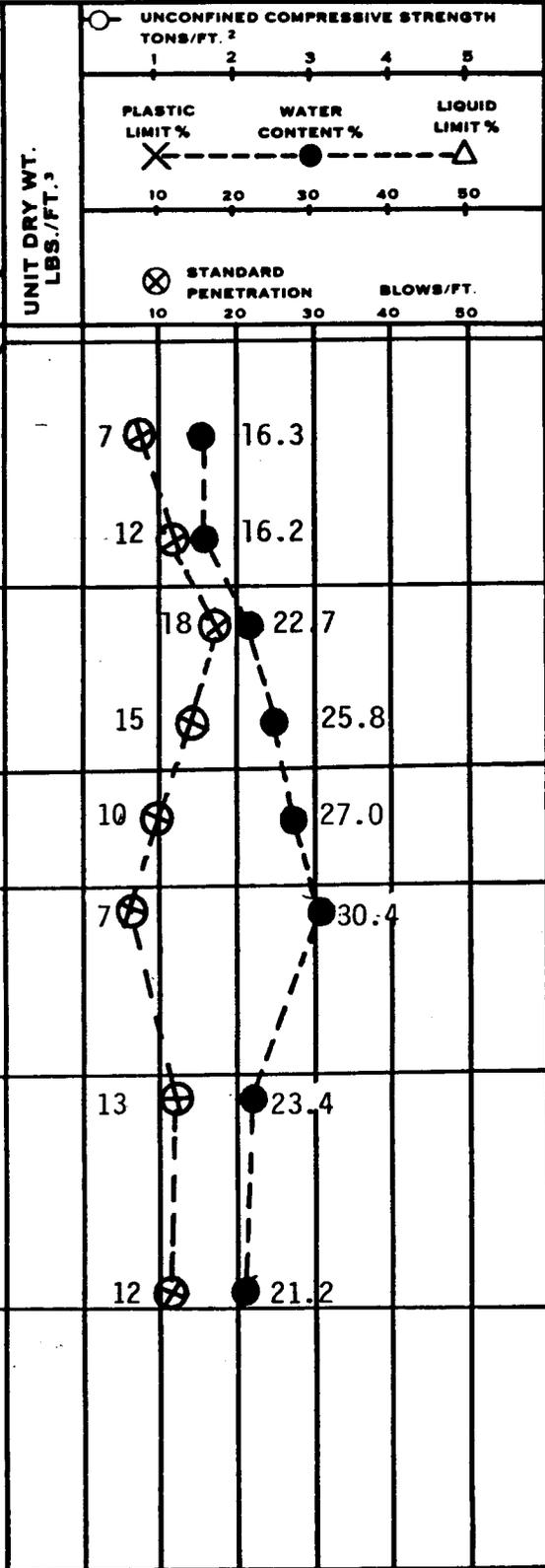
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL	WS OR WD	BORING STARTED 4-18-80	<b>SOIL TEST SERVICES</b>	
WL	BCR	ACR	P.O. BOX 12015	
		BORING COMPLETED 4-18-80	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
WL		RIG Simco FOREMAN Fetty	APP'D BY JLB	STS JOB NO 80-141-AA

<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> P-3S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL
					<b>SURFACE ELEVATION</b> 164.6
					ROOTMAT and TOPSOIL. (Driller's Description)
5	1	SS			VERY FINE to FINE SAND, little to trace clay, loose to medium dense, tannish-brown. (SC)
	2	SS			
10	3	SS			SILTY CLAY, little to trace very fine sand, stiff, light grey and reddish-brown. (CL)
	4	SS			
15	5	SS			CLAYEY VERY FINE SAND, medium dense, light grey, white, and tan. (SC)
	6	SS			VERY FINE to FINE SAND, loose, white and light grey. (SP)
20					
	7	SS			VERY FINE to MEDIUM SAND, trace clay, orangish-tan. (SW)
25					
	8	SS			
30					BORING TERMINATED 26.0'.



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL.

<b>WL</b>	<b>WS OR WD</b>	<b>BORING STARTED 4/15/80</b>	<b>SOIL TEST SERVICES</b>	
<b>WL</b>	<b>BCR</b>	<b>ACR</b>	<b>BORING COMPLETED 4/16/80</b>	P.O. BOX 12015
<b>WL 15.7' @ 94 days</b>	<b>RIG SIMCO</b>	<b>FOREMAN Fetty</b>	<b>APP'D BY JLB</b>	<b>RESEARCH TRIANGLE PARK NORTH CAROLINA 27709</b>
				<b>STS JOB NO. 80-141-AA</b>

<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> P-4S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.	

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>			PLASTIC LIMIT %      WATER CONTENT %      LIQUID LIMIT %			STANDARD PENETRATION      BLOWS/FT.			
						1	2	3	4	5	10	20	30	40	50
				<b>SURFACE ELEVATION</b> 143.4											
				ROOTMAT and TOPSOIL. (Driller's Description)											
5	1	SS		CLAYEY VERY FINE to FINE SAND, very loose to loose, tannish-brown. (SC)	4										19.2
	2	SS		*											23.4
	3	SS		FINE SAND, loose, white. (SP)	5										26.1
10	4	SS													20.3
	5	SS		FINE to MEDIUM SAND, medium dense, tan. (SW)											20.8
15	6	SS		Note: Local clay pockets.											24
20	7	SS		VERY FINE to FINE SANDY CLAY, soft, tannish-brown and light grey. (CL)	2										26.0
25	8	SS		FINE SAND, trace clay, trace pea gravel, grey. (SP)	0										26.1
30				BORING TERMINATED 26.0'.  * FINE SAND, little clay, medium dense, tannish-orange. (SC) Note: Interbedded sand and clay.											

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL.

WL 3.0' @ T.O.B. WS OR WD	BORING STARTED 4/15/80	<b>SOIL TEST SERVICES</b>	
WL BCR	ACR	P.O. BOX 12015	
WL 4.0' @ 94 days	RIG SIMCO FOREMAN Fetty	RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
		APP'D BY JLB	STS JOB NO. 80-141-AA

<b>OWNER</b> Wayne County, North Carolina				<b>LOG OF BORING NUMBER</b> P-5S														
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan				<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company														
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.																		
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>	<b>RECOVERY</b>	<b>DESCRIPTION OF MATERIAL</b>	<b>UNIT DRY WT. LBS./FT.<sup>3</sup></b>											
								<p><b>SURFACE ELEVATION</b> 135.1</p>										
						SILTY ORGANIC VERY FINE SAND, very loose, moist, black. (SM) Note: Semi-fibrous	3										41.0	
		1	SS			* See Sheet 2 of 2												
	5																	
		2	SS			FINE SANDY CLAY, soft, wet, dark and light grey. (CL)	2										14.7	
		3	SS			VERY FINE to FINE SAND, loose, wet, tannish-orange. (SP) Note: Large wood fibers in sample.	8										23.2	
	10																	
		4	SS			CLAY, trace fine sand, soft, tan and orange. (CL) **See Sheet 2 of 2	2										24.0	
		5	SS			FINE to MEDIUM SAND, little clay, very loose, tan, light grey and pink. (SC)	1										24.3	
	15																	
		6	SS				2										23.7	
						FINE to MEDIUM SAND, trace clay, medium dense, grey. (SW) Note: Wood chips and organics from 20.0' to 25.0'.												
	20																	
		7	SS														18	22.5
	25																	
		8	SS			*** See Sheet 2 of 2											27	35.7
	30					BORING TERMINATED 26.0'.												

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL.

WL 2.5' above surface TOB	BORING STARTED 4/16/80	<b>SOIL TEST SERVICES</b> P.O. BOX 12015 RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
WL 0.8' above surface 81	BORING COMPLETED 4/17/80		
WL	RIG SIMCO FOREMAN Fetty	APP'D BY JLB	STS JOB NO 80-141-AA

BL: 1.0' above surface @ 93 days

<b>OWNER</b> Wayne County, North Carolina					<b>LOG OF BORING NUMBER</b> P-5S					
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan					<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company					
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.					<p>UNCONFINED COMPRESSIVE STRENGTH TONS/FT.<sup>2</sup></p> <p>PLASTIC LIMIT %      WATER CONTENT %      LIQUID LIMIT %</p> <p>STANDARD PENETRATION BLOWS/FT.</p>					
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>						<b>RECOVERY</b>
<b>SURFACE ELEVATION</b>						<b>UNIT DRY WT. LBS./FT.<sup>3</sup></b>				
<p>* VERY FINE to MEDIUM SAND, trace silt, trace wood chips and roots, very loose, moist, dark grey. (SW)</p> <p>** Note: Interbedded sand and clay.</p> <p>*** VERY FINE SANDY ORGANIC SILT, trace wood chips, very stiff, dark brown and black. (OL) Note: Semi-fibrous</p>										

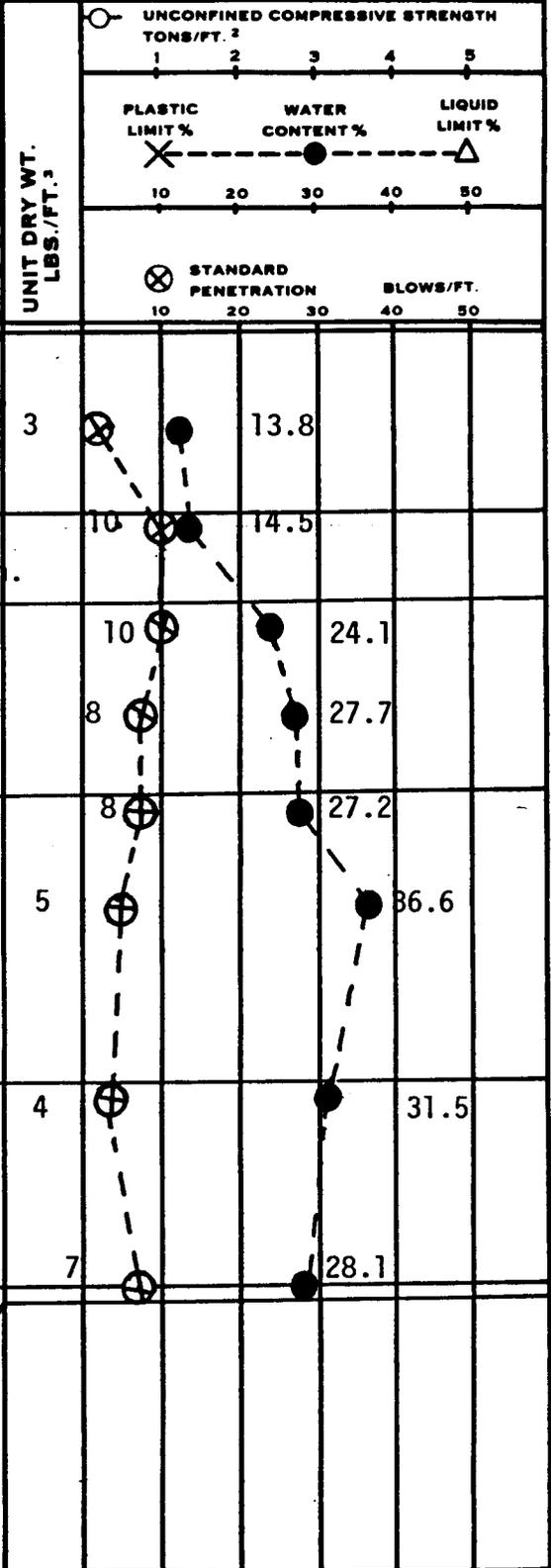
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES; IN-SITU. THE TRANSITION MAY BE GRADUAL

WL	WS or WD	BORING STARTED	4/16/80	<b>SOIL TEST SERVICES</b> P.O. BOX 12015 RESEARCH TRIANGLE PARK      NORTH CAROLINA 27709	
WL	BCR	ACR	BORING COMPLETED		
WL	RIG Simco		FOREMAN	Fetty	APP'D BY JLB      STS JOB NO 80-141-M

<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> P-6S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL
				<b>SURFACE ELEVATION</b> 159.1
				ROOTMAT and TOPSOIL. *
5	1	SS		FINE SAND, trace roots, very loose moist, tan. (SP)
	2	SS		FINE SAND, trace clay, loose to medium dense, moist, orangish-brown. (SP)
10	3	SS		SILTY CLAY, trace very fine sand, loose to medium dense, wet, light grey and reddish-brown. (CL)
	4	SS		
	5	SS		
15	6	SS		CLAYEY VERY FINE SAND, loose, wet, tan and light grey. (SC) Note: Interbedded clay and sand.
20	7	SS		VERY FINE SANDY CLAY, soft to medium, wet, light grey. (CL) Note: Very finely laminated.
25	8	SS		FINE to MEDIUM SAND, very loose to loose, wet, tan. (SW)
30				BORING TERMINATED 26.0'. *(Driller's Description)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL.

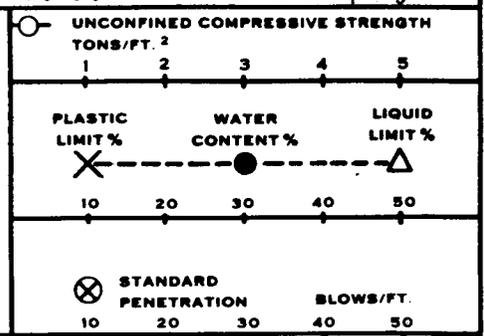
WL 8.0' @ T.O.B.	BORING STARTED 4/17/80	SOIL TEST SERVICES P.O. BOX 12015 RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
WL 13.7' @ 81 days	BORING COMPLETED 4/17/80		
WL	RIG SIMCO FOREMAN Fetty	APP'D BY JLB	STS JOB NO 80-141-AA

BL: 14.2' @ 93 days

**OWNER** Wayne County, North Carolina **LOG OF BORING NUMBER** P-6S\*

**PROJECT NAME** Landfill Evaluation and Operational Plan **ARCHITECT-ENGINEER** L. E. Wooten and Company

**SITE LOCATION** Southern Site Near Dudley, Wayne County, N. C.



**DESCRIPTION OF MATERIAL**

**SURFACE ELEVATION** 159.1 ±

Unclassified Probe.

BORING TERMINATED @ 12.0'.

\*Offset approximately 5.0' from P-6S to obtain undisturbed sample.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL	WS OR WD	BORING STARTED 4-18-80	<b>SOIL TEST SERVICES</b> P.O. BOX 12015 RESEARCH TRIANGLE PARK      NORTH CAROLINA 27709
WL	BCR      ACR	BORING COMPLETED 4-18-80	
WL		RIG Simco FOREMAN Fetty	
			APP'D BY JLB      STS JOB NO. 80-141-AA

<b>OWNER</b> Wayne County, North Carolina	<b>LOG OF BORING NUMBER</b> P-7S
<b>PROJECT NAME</b> Landfill Evaluation and Operational Plan	<b>ARCHITECT-ENGINEER</b> L. E. Wooten and Company

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH, FT.	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>			PLASTIC LIMIT %      WATER CONTENT %      LIQUID LIMIT %			STANDARD PENETRATION      BLOWS/FT.			
						1	2	3	4	5	10	20	30	40	50
				<b>SURFACE ELEVATION</b> 152.8											
				SAND, tan and brown. *											
	1	SS		CLAYEY FINE SAND, medium dense, moist, orangish-brown. (SC)	12							15.6			
5	2	SS		VERY FINE to FINE SAND, little to trace clay, loose, wet, tan. (SC)	5							16.7			
	3	SS			2							17.8			
10	4	SS		CLAYEY VERY FINE SAND, very loose, wet, light grey and orangish-tan. (SC)	2							27.6			
	5	SS		Note: Finely laminated sand and clay.	2								31.2		
15	6	SS			4							24.9			
20	7	SS		FINE to MEDIUM SAND, very loose, wet, tan. (SW)	3							25.8			
25	8	SS			3							25.4			
30				BORING TERMINATED 26.0'.  *(Driller's description)											

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES; IN-SITU. THE TRANSITION MAY BE GRADUAL

WL 7.5' @ T.O.B. WS OR WD	BORING STARTED 4/16/80	<b>SOIL TEST SERVICES</b>	
WL BCR ACR	BORING COMPLETED 4/16/80	P.O. BOX 12015	
WL 7.8' @ 80 days	RIG SIMCO FOREMAN Fetty	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
BL: 8.3' @ 94 days		APP'D BY JLB	STS JOB NO. 80-141-AA



## SOIL TESTING SERVICES

February 19, 1981

P. O. BOX 12015  
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709  
TELEPHONE 919-544-1735

L. E. Wooten & Company, Inc.  
P. O. Box 2984  
Raleigh, North Carolina 27602

Attention: Mr. Arthur L. Kennedy

RE: Report of Subsurface Exploration and Engineering Analysis  
Wayne County Southern Landfill Borrow Investigations,  
Wayne County, North Carolina  
Supplementary Report to STS Southern Landfill Report dated August 18, 1980  
STS Job No. 80-141-AC

Gentlemen:

On the basis of an authorization by Mr. Arthur L. Kennedy of L. E. Wooten & Company, we have completed our site exploration and engineering analysis for the proposed Wayne County Southern Landfill Borrow areas located adjacent to the existing and proposed Wayne County Southern Landfill Expansion area near Dudley, North Carolina. The specific areas investigated in this project are the Vester Whitley property located between the existing Wayne County Southern Landfill and the proposed northern addition to the Southern Landfill, and the Weaver property also located adjacent to the proposed northern addition to the Southern Landfill.

The purpose of this report, which is a supplement to our original report dated August 18, 1980, is to describe the subsurface soil and ground-water conditions encountered in the borings and to present the results of our analysis regarding the location of suitable clayey materials at those specific locations. These borrow materials will be utilized for trench liner and/or cover material for the proposed Wayne County Southern Landfill expansion areas. In addition, an additional soil boring was performed near the center

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Robert E. Blackley

CHICAGO, PEORIA, ROCKFORD, ILLINOIS • LAFAYETTE, INDIANA • WASHINGTON, D. C.  
CEDAR RAPIDS, DAVENPORT, DES MOINES, IOWA • KANSAS CITY, WICHITA,  
KANSAS • LANSING, MARQUETTE, MICHIGAN • MINNEAPOLIS, VIRGINIA,  
MINNESOTA • RALEIGH, WINSTON-SALEM, NORTH CAROLINA • BISMARCK, NORTH DAKOTA,  
FAIRFAX, VIRGINIA • GREEN BAY, MILWAUKEE, OSHKOSH, SUPERIOR, WAUSAU,  
WISCONSIN • KARACHI, PAKISTAN • MADRID, SPAIN • JEDDAH, SAUDI ARABIA

• Engineering Analysis/Reports  
• Construction Materials Testing  
• Foundation Borings and Testing

L. E. Wooten & Company, Inc.  
Attn: Mr. Arthur L. Kennedy  
February 19, 1981

of the existing cultivated fields located in the area of the proposed northern addition to the existing Southern Landfill. This boring was performed to provide additional information in the design of this landfill area.

#### FIELD EXPLORATION

Ten soil borings were performed in the two proposed borrow areas at the locations indicated on the attached Boring Location Diagram. The boring locations were selected, by engineers with Soil Testing Services, to provide subsurface information regarding these sites. In addition, one soil boring was performed near the center of the cultivated field, located in the northern addition to the Southern Landfill, and extended to a depth of 26.5 feet below the existing ground surface.

All soil borings were performed and field logs prepared in a similar manner to the procedures outlined in our first report dated August 18, 1981.

#### LABORATORY TESTING

An experienced soil engineer classified each soil sample on the basis of texture and plasticity in accordance with the Unified Soil Classification System. The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring logs. A brief explanation of the Unified Soil Classification System is included with this report. A soil engineer grouped the various types into the major zones noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate; in-situ, the transitions may be gradual.

The soil samples will be retained in our Raleigh laboratory for a period of 60 days, after which they will be discarded unless specific instructions as to their disposition have been received.

L. E. Wooten & Company, Inc.  
Attn: Mr. Arthur L. Kennedy  
February 19, 1981

### SITE AND SOIL CONDITIONS

The proposed borrow areas investigated are located adjacent to the existing Wayne County Southern Landfill and Northern Landfill Addition and as indicated on our attached Boring Location Diagram. The Vester Whitley property is presently approximately 50% wooded with the remaining areas generally consisting of cultivated fields and homesteads. The property is gently rolling to flat with apparent sandy surficial soils. The Weaver property is presently approximately 80% wooded with a minor portion being used as a cultivated field. Small tractor trails are located on both sites and are primarily used for access between cultivated fields.

The results of the soil borings performed at the Vester Whitley property appears to indicate that portions of the site consists of clayey materials. However, in the vicinity of soil boring C-1, C-2, C-3, and C-4, clayey deposits were encountered at depth. These deposits which appear to be suitable for use as clayey borrow, occurred at depths of 9 to 12 feet in soil boring C-1, 2.5 to 5 feet in soil boring C-2, 2 to 5 feet in boring C-3, and 4 to 9 feet in soil boring C-4. Three of the previously indicated borings were dry after the completion of the boring at each specific boring location. Boring C-1 had water at a depth of 10 feet following completion.

The results of the soil borings performed at the Weaver property indicate that the majority of the site is underlain by a complex of sandy soils. The only deposit of clayey materials encountered at this site was in soil boring C-9 where sandy clay was encountered from depths of 21.5 to 26.5 feet below the existing ground surface. Cave-in was observed in this boring at 11.0 feet following removal of the hollow stem auger.

The results of the one soil boring performed near the center of the cultivated field in the northern addition to the Southern Landfill indicate

L. E. Wooten & Company, Inc.  
Attn: Mr. Arthur L. Kennedy  
February 19, 1981

that the subsurface in that specific location consists of very fine to fine sands to the boring termination depth of 26.5 feet. No clayey material was observed in this borehole. No water was observed in this borehole following completion of the boring; however, cave-in was noted at 10.5 feet immediately following removal of the hollow stem auger.

#### WATER TABLE OBSERVATIONS

All groundwater measurements made at this site, and not previously discussed, are indicated on the respective boring logs. These groundwater measurements were made at the times and locations indicated on the boring logs and are based on measurements in uncased soil borings. If specific groundwater tables are required, we recommend that groundwater level piezometers be installed in the locations where excavations will be necessary in order to further define the location of the long-term hydrostatic groundwater table.

It should be noted that fluctuations in the location of the long-term hydrostatic groundwater table may occur depending on variations in precipitation, evaporation, surface runoff, temperature, and other factors that may not have been evident at the time of our measurements.

#### ANALYSIS AND RECOMMENDATIONS

On the basis of our soil borings in the proposed borrow areas, it appears that only a certain section of the Vester Whitley property contains sufficient clayey soils for use as borrow materials. This area is generally outlined by soil borings C-1, C-2, C-3, and C-4. In general, the suitable soils encountered in these borings occurred at depths less than 12 feet below the existing ground surface. For the purpose of this investigation and analysis, we have assumed a maximum desirable depth for borrow of 12 feet.

L. E. Wooten & Company, Inc.  
Attn: Mr. Arthur L. Kennedy  
February 19, 1981

If it is determined that cut depths greater than 12 feet below the existing ground surface are economically feasible, additional soil borings to greater depths will be necessary. However, there is a possibility that groundwater levels at greater depths may create significant excavation difficulties.

Due to the sandy nature of the subsoils in the Weaver property site, and the extreme depth in boring C-10 of the only clay deposit observed in the borings at this site, it appears that utilization of this site for clayey borrow material may not be feasible.

On the basis of the results of our soil borings at the two sites investigated during this project, it appears that the small portion of the Vester Whitley property which has been determined to contain surficial clayey deposits is the only suitable borrow area investigated. In addition, the water levels observed in the borings in this area should allow economical excavation of these clayey materials. If additional design parameters regarding their suitability as compacted liner or cover material is required, we recommend that a Registered Engineer knowledgeable in the areas of soil mechanics and foundations be contacted and supplied with sufficient representative samples of these clayey materials for additional laboratory testing and recommendations.

#### GENERAL COMMENTS

This report has been prepared for the purpose of providing preliminary information regarding potential sites for the location of suitable borrow material to be used in the Southern Landfill Expansion of the Wayne County Southern Landfill near Dudley, North Carolina. The information and recommendations reported herein are presented to assist the architect/engineer in the design of this project. In the event there are any significant changes

L. E. Wooten & Company, Inc.  
Attn: Mr. Arthur L. Kennedy  
February 19, 1981

in the desired use of these sites for other capacities, or of the materials for construction other than those previously outlined, the conclusions and recommendations contained in this report shall not be considered valid unless these changes have been reviewed and our conclusions and recommendations reaffirmed or appropriately modified, in writing, by the writer or other authorized representative of this firm.

There is a possibility that variations in soil conditions may be encountered during excavation of the observed borrow materials. Proper evaluation of these soil conditions and the suitability of any materials removed from these areas for use as compacted trench liners or cover may be critical to the desired performance. In order to permit correlation between the preliminary soil data and the actual soil conditions and groundwater elevations encountered during excavation of the referenced borrow material and to ensure conformance with the plans and specifications as determined by the architect/engineer, it is recommended that this firm be retained to perform periodic on-site material checks and associated laboratory testing during the excavation of this proposed borrow material. We can assume no responsibility for the performance of a compacted liner or cover constructed of the materials encountered in our soil borings unless we have been authorized to perform additional laboratory testing for suitability of this material in this capacity and spot checks and testing of the material excavated for use in this capacity.

L. E. Wooten & Company, Inc.  
Attn: Mr. Arthur L. Kennedy  
February 19, 1981

The foregoing report has been prepared under the supervision of and  
is submitted by

SOIL TESTING SERVICES OF CAROLINA, INC.



Jeffrey L. Blackford  
Assistant Project Engineer



T. Danny Tai, Ph.D., P.E.  
Chief Engineer

JLB/TDT:1bh

## APPENDIX INDEX

Appendix A - General Conditions (Revised)

Appendix B - ASTM Specification D-1586, Penetration  
Test and Split-Barrel Sampling of Soils

Appendix C - Procedures Regarding Field Logs,  
Laboratory Data Sheets and Samples

Appendix D - Unified Soil Classification System

Appendix E - Boring Logs

Appendix F - Boring Location Plan

## GENERAL CONDITIONS

The analysis, conclusions, and recommendations submitted in this report are based on the exploration previously outlined and the data collected at the points shown on the attached location plan. This report does not reflect specific variations that may occur between test boring locations. The borings were located where site conditions permitted and where it is believed that representative conditions occur but the full nature and extent of variations between borings and of subsurface conditions not encountered by any boring may not become evident until revealed by construction. If variations become evident at any time before or during the course of construction it will be necessary to make a re-evaluation of the conclusions and recommendations of this report and further exploration, observation, and/or testing may be required.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and makes no other warranties, either expressed or implied, as to the professional advice under the terms of our agreement and included in this report. The recommendations contained herein are made with the understanding that the contract documents between the owner or earthwork contractor, or between the owner and the contractor, if any, shall require that the contractor certify that all work in connection with trench construction, fill placement, fill cover, ditch construction, and other elements of the landfill operation are in accordance with the plans and specifications for this project. Further, that the contractor shall certify that the materials and equipment used are of the types, quantity and quality required by the plans and specifications for the project.

Additionally, it is understood that the contract documents will specify that the contractor will, upon becoming aware of apparent or latent subsurface conditions differing from those disclosed by the original soil investigation work, promptly notify the owner, both verbally to permit immediate

verification of the change and in writing, as to the nature and extent of the differing conditions and that no claim by the contractor for any conditions differing from those anticipated in the plans and specifications and disclosed by the soil studies will be allowed under the contract unless the contractor has so notified the owner both verbally and in writing, as required above, of such changed conditions. The owner will, in turn, promptly notify this firm of the existence of such unanticipated, conditions and will authorize such further investigation as may be required to properly evaluate these conditions.

Further, it is understood that any specific recommendations made in this report as to on-site construction review by this firm will be authorized and funds and facilities for such review will be provided at the times recommended if we are to be held responsible for the design recommendations.

# AMERICAN SOCIETY FOR TESTING AND MATERIALS

1916 Race St., Philadelphia, Pa. 19103

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## Standard Method for PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOILS<sup>1</sup>



ASTM Designation: D 1586 - 67

This Standard of the American Society for Testing and Materials is issued under the fixed designation D 1586; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

### 1. Scope

1.1 This method describes a procedure for using a split-barrel sampler to obtain representative samples of soil for identification purposes and other laboratory tests, and to obtain a measure of the resistance of the soil to penetration of the sampler.

### 2. Apparatus

2.1 *Drilling Equipment*—Any drilling equipment shall be acceptable that provides a reasonably clean hole before insertion of the sampler to ensure that the penetration test is performed on undisturbed soil, and that will permit the driving of the sampler to obtain the sample and penetration record in accordance with the procedure described in 3. Procedure. To avoid “whips” under the blows of the hammer, it is recommended that the drill rod have a stiffness equal to or greater than the A-rod. An “A” rod is a hollow drill rod or “steel” having an outside diameter of  $1\frac{1}{8}$  in. or 41.2 mm and an inside diameter of  $1\frac{1}{4}$  in. or 28.5 mm, through which the rotary motion of drilling is transferred

from the drilling motor to the cutting bit. A stiffer drill rod is suggested for holes deeper than 50 ft (15 m). The hole shall be limited in diameter to between  $2\frac{1}{4}$  and 6 in. (57.2 and 152 mm).<sup>2</sup>

2.2 *Split-Barrel Sampler*—The sampler shall be constructed with the dimensions indicated in Fig. 1. The drive shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The coupling head shall have four  $\frac{1}{2}$ -in. (12.7-mm) (minimum diameter) vent ports and shall contain a ball check valve. If sizes other than the 2-in. (50.8-mm) sampler are permitted, the size shall be conspicuously noted on all penetration records.

2.3 *Drive Weight Assembly*—The assembly shall consist of a 140-lb (63.5-kg) weight, a driving head, and a guide permitting a free fall of 30 in. (0.76 m). Special precautions shall be taken to ensure that the energy of the falling weight is not reduced by friction between the drive weight and the guides.

2.4 *Accessory Equipment*—Labels, data sheets, sample jars, paraffin, and other necessary supplies should accompany the sampling equipment.

### 3. Procedure

3.1 Clear out the hole to sampling elevation using equipment that will ensure that the material to be sampled is not disturbed by the operation. In saturated sands and silts withdraw the drill bit slowly to prevent loosening of the soil around the hole. Maintain the water

level in the hole at or above ground water level.

3.2 In no case shall a bottom-discharge bit be permitted. (Side-discharge bits are permissible.) The process of jetting through an open-tube sampler and then sampling when the desired depth is reached shall not be permitted. Where casing is used, it may not be driven below sampling elevation. Record any loss of circulation or excess pressure in drilling fluid during advancing of holes.

3.3 With the sampler resting on the bottom of the hole, drive the sampler with blows from the 140-lb (63.5-kg) hammer falling 30 in. (0.76 m) until either 18 in. (0.45 m) have been penetrated or 100 blows have been applied.

3.4 Repeat this operation at intervals not longer than 5 ft (1.5 m) in homogeneous strata and at every change of strata.

3.5 Record the number of blows required to effect each 6 in. (0.15 m) of penetration or fractions thereof. The first 6 in. (0.15 m) is considered to be a seating drive. The number of blows required for the second and third 6 in. (0.15 m) of penetration added is termed the penetration resistance, *N*. If the sampler is driven less than 18 in. (0.45 m), the penetration resistance is that for the last 1 ft (0.30 m) of penetration (if less than 1 ft (0.30 m) is penetrated, the logs shall state the number of blows and the fraction of 1 ft (0.30 m) penetrated).

3.6 Bring the sampler to the surface and open. Describe carefully typical

<sup>1</sup> Under the standardization procedure of the Society, this method is under the jurisdiction of the ASTM Committee D-18 on Soil and Rock for Engineering Purposes. A list of members may be found in the ASTM Year Book.

Current edition accepted Oct. 20, 1967. Originally issued 1958. Replaces D 1586 - 64 T.

<sup>2</sup> Hvorelev, M. J., *Surface Exploration and Sampling of Soils for Civil Engineering Purposes*, The Engineering Foundation, 345 East 47th St., New York, N. Y. 10017.

PROCEDURES REGARDING FIELD LOGS,  
LABORATORY DATA SHEETS AND SAMPLES

In the process of obtaining and testing samples and preparing this report, procedures are followed that represent reasonable and accepted practice in the field of geotechnical engineering.

Specifically, field logs are prepared during performance of the drilling and sampling operations which are intended to portray essentially field occurrences, sampling locations and other information. Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by more experienced soil engineers, and differences between the field logs and the final logs exist. The engineer preparing the report reviews the field and laboratory logs, classifications and test data, and in his judgement in interpreting this data, may make further changes.

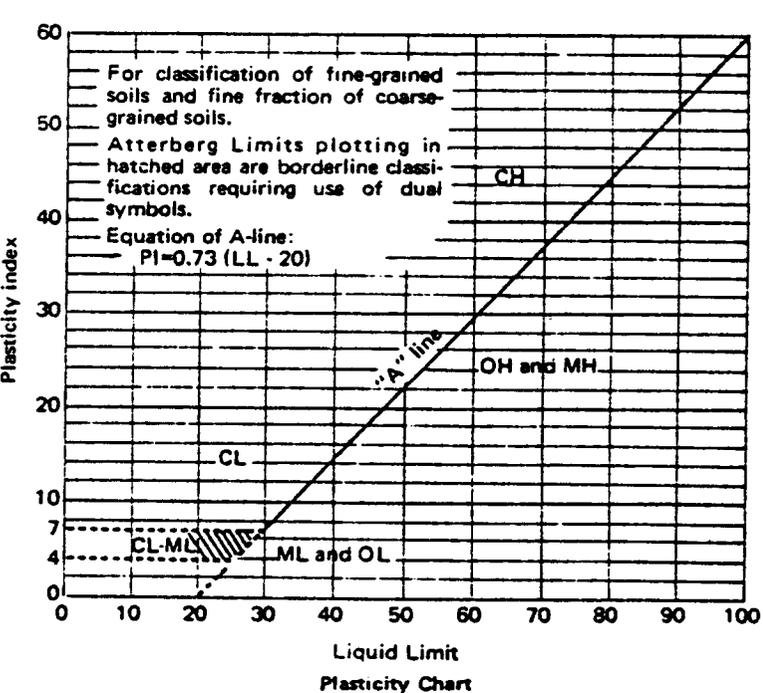
Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then destroyed unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, an inspection of these samples should recognize this factor.

It is common practice in the soil and foundation engineering profession that field logs and laboratory data sheets not be included in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. On the other hand, we are aware that perhaps certain contractors and subcontractors submitting bids or proposals on work might have an interest in studying these documents before submitting a bid or proposal. For this reason, the field logs will be retained in our office for inspection by all contractors submitting a bid or proposal. We would welcome the opportunity to explain any changes that have and typically are made in the preparation of our final reports, to the contractor or subcontractors, before the firm submits its bid or proposal, and to describe how the information was obtained to the extent the contractor or subcontractor wishes. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report as appropriate.

# UNIFIED SOIL CLASSIFICATION SYSTEM

Major divisions		Group symbols	Typical names	Laboratory classification criteria		
<b>Coarse-grained soils</b> (More than half of material is larger than No. 200 sieve size)	<b>Gravels</b> (More than half of coarse fraction larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3  Not meeting all gradation requirements for GW  Atterberg limits below "A" line or P.I. less than 4  Atterberg limits above "A" line with P.I. greater than 7  Above "A" line with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols	
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (Appreciable amount of fines)	GM	d		Silty gravels, gravel-sand-silt mixtures
				c		
		GC	Clayey gravels, gravel-sand-clay mixtures			
		<b>Sands</b> (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines
	SP			Poorly graded sands, gravelly sands, little or no fines		
	Sands with fines (Appreciable amount of fines)		SM	d	Silty sands, sand-silt mixtures	
				c		
	SC	Clayey sands, sand-clay mixtures				
<b>Fine-grained soils</b> (More than half of material is smaller than No. 200 sieve)	Silts and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	<p style="text-align: center;">Plasticity Index</p> <p style="text-align: center;">Liquid Limit</p> <p style="text-align: center;">Plasticity Chart</p>		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
		OL	Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
		CH	Inorganic clays of high plasticity, fat clays			
		OH	Organic clays of medium to high plasticity, organic silts			
	Pt	Peat and other highly organic soils				

Determine percentages of sand and gravel from grain-size curve.  
 Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:  
 Less than 5 per cent . . . . . GW, GP, SW, SP  
 More than 12 per cent . . . . . GM, GC, SM, SC  
 5 to 12 per cent . . . . . *borderline* cases requiring dual symbols



<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> B-5S*						
<b>PROJECT NAME</b> Borrow Site Investigations					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.						
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.											
<b>ELEVATION</b> <b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>	<b>RECOVERY</b>	<b>DESCRIPTION OF MATERIAL</b>	<b>UNIT DRY WT.</b> <b>LBS./FT.<sup>3</sup></b>					
							<b>SURFACE ELEVATION</b>				
					TOPSOIL. (Driller's description)						
5	S-1	ss			CLAYEY VERY FINE TO FINE SAND, brown, red, and light grey. (SC)					21	
10	S-2	ss			VERY FINE TO FINE SAND, trace clay, tan. (SP)					15	
15	S-3	ss			VERY FINE TO FINE SAND, white. (SP)					5	
20	S-4	ss									5
25	S-5	ss			VERY FINE SAND, tan. (SP)					4	
30					BORING TERMINATED 26.5'						
*Additional boring for evaluation and design of northern tract of Wayne County Southern Landfill.											

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL Cave-in, 10.5' @ TOB		BORING STARTED 12-24-80		SOIL TESTING SERVICES	
WL BCR ACR		BORING COMPLETED 12-24-80		P.O. BOX 12015	
WL		RIG ATV 550 FOREMAN Kolb		RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
		APP'D BY JLB		STS JOB NO. 80-141-A	

<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> C-1										
<b>PROJECT NAME</b> Borrow Site Investigation					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.										
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.															
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>	<b>RECOVERY</b>	<b>DESCRIPTION OF MATERIAL</b>	<b>UNIT DRY WT. LBS./FT.<sup>3</sup></b>	<b>UNCONFINED COMPRESSIVE STRENGTH TONS/FT.<sup>2</sup></b>		<b>PLASTIC LIMIT %</b>		<b>WATER CONTENT %</b>		<b>LIQUID LIMIT %</b>	
								1	2	3	4	5	10	20	30
						<b>SURFACE ELEVATION</b>		<b>STANDARD PENETRATION BLOWS/FT.</b>							
						FINE TO MEDIUM SAND, some to trace clay, light grey. (SC)									
	5					FINE TO MEDIUM SAND, tan. (SW)									
						CLAYEY FINE TO MEDIUM SAND, tan and white. (SC)									
	10					MOTTLED CLAY, some silt, trace very fine sand, light grey and tan. (CH)									
						FINE SANDY CLAY, some silt, grey (CH)									
						BORING TERMINATED 12.0'									
	15														
	20														
	25														
	30														

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL 10.0' at TOB	WS OR WD	BORING STARTED 12-22-80	<b>SOIL TESTING SERVICES</b>		
WL	BCR	ACR	P.O. BOX 12015		
		BORING COMPLETED 12-22-80	RESEARCH TRIANGLE PARK NORTH CAROLINA 27709		
WL		RIG ATV 550 FOREMAN Ko1b	APP'D BY JLB	STS JOB NO. 80-141-A	

<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> C-2				
<b>PROJECT NAME</b> Borrow Site Investigation					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.				
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.									
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>					
						<b>SURFACE ELEVATION</b>			
						TOPSOIL. (Driller's description)			
						FINE SAND, some clay, brown. (SC)			
	5					SILTY CLAY, some very fine sand, brown, red, and light grey. (CH)			
	10					VERY FINE SAND, some clay, tan and light grey. (SC) Note: Clayey from 7.0' to 9.0'.			
	15					BORING TERMINATED 12.0'			
	20								
	25								
	30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL 10.0' at TOB	WS OR WD	BORING STARTED 12-22-80	<b>SOIL TESTING SERVICES</b> P.O. BOX 12015 RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
WL	BCR	ACR		
WL		RIGATV 550 FOREMAN Ko1b	APP'D BY JLB	STS JOB NO. 80-141-A0

<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> C-3				
<b>PROJECT NAME</b> Borrow Site Investigation					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.				
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.									
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>					
	X					SURFACE ELEVATION			
						SANDY TOPSOIL.			
						FINE SANDY CLAY, tan. (CL)			
	5					SILTY CLAY, trace very fine sand, brown, red, and light grey. (CH)			
						VERY FINE SAND, some silt, trace clay, light brown. (SM)			
	10					FINE SAND, white. (SP)			
						BORING TERMINATED 12.0'			
	15								
	20								
	25								
	30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU THE TRANSITION MAY BE GRADUAL

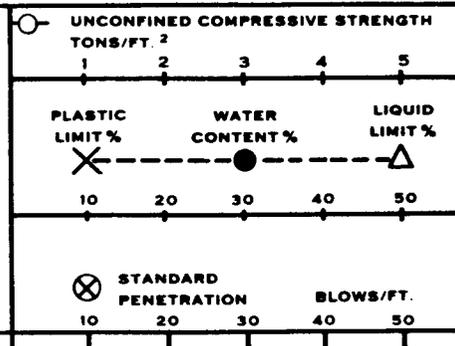
WL Dry at TOB	WS or WD	BORING STARTED 12-24-80	<b>SOIL TESTING SERVICES</b>	
WL BCR	ACR	BORING COMPLETED 12-24-80	P.O. BOX 12015	
WL		RIG ATV 550 FOREMAN Ko1b	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
			APP'D BY JLB	STS JOB NO. 80-141-A0

<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> C-4				
<b>PROJECT NAME</b> Borrow Site Investigation					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.				
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.									
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>					
	X					<b>SURFACE ELEVATION</b>			
						FINE SANDY TOPSOIL.			
	5					FINE SANDY CLAY, tan and light grey. (CL-CH)			
	10					CLAYEY VERY FINE SAND, light grey. (SC)			
	15					VERY FINE SAND, some silt, trace clay, white. (SM)			
	20					BORING TERMINATED 20.0'			
	25								
	30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL Cave-in and dry,	<b>BORING STARTED 12-24-80</b>	<b>SOIL TESTING SERVICES</b>	
WL 10.5' at TOB	<b>BORING COMPLETED 12-24-80</b>	P.O. BOX 12015	
WL	<b>RIG ATV 550 FOREMAN K01b</b>	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
		<b>APP'D BY JLB</b>	<b>STS JOB NO 80-141-AC</b>

<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> C-5					
<b>PROJECT NAME</b> Borrow Site Investigation					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.					
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.										
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>	<b>RECOVERY</b>	<b>DESCRIPTION OF MATERIAL</b>				<b>UNIT DRY WT. LBS./FT.<sup>3</sup></b>
						<b>SURFACE ELEVATION</b>				
	X									
						FINE SANDY TOPSOIL.				
	5					CLAYEY VERY FINE SAND, brown, red, and light grey. (SC)				
	10					FINE SAND, some clay, brown. (SC)				
	15					FINE SAND, yellowish-tan. (SP)				
	20					BORING TERMINATED 12.0'				
	25									
	30									



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL Dry at TOB	WS OR WD	BORING STARTED 12-24-80	<b>SOIL TESTING SERVICES</b>	
WL	BCR	ACR	P.O. BOX 12015	
		BORING COMPLETED 12-24-80	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
WL		RIG ATV 550 FOREMAN K01b	APP'D BY JLB	STS JOB NO 80-141-AC

<b>OWNER</b> Wayne County, North Carolina	<b>BORING NUMBER</b> C-6
<b>PROJECT NAME</b> Borrow Site Investigation	<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.

**SITE LOCATION**  
Southern Site near Dudley, Wayne County, N. C.

ELEVATION DEPTH	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>									
							1	2	3	4	5					
							PLASTIC LIMIT %			WATER CONTENT %		LIQUID LIMIT %				
							10	20	30	40	50					
							STANDARD PENETRATION		BLOWS/FT.							
							10	20	30	40	50					
5					FINE SANDY TOPSOIL.											
10					FINE SAND, some clay, brown. (SC)											
15					FINE TO MEDIUM SAND, light brown. (SW)											
20					BORING TERMINATED 12.0'											
25																
30																

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL Cave-in and dry,	BORING STARTED 12-24-80	SOIL TESTING SERVICES	
WL 10.75' at TOB	BORING COMPLETED 12-24-80	P.O. BOX 12015	
WL	RIG ATV 550 FOREMAN Ko1b	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
		APP'D BY JLB	STS JOB NO 80-141-AC

<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> C-7																																																										
<b>PROJECT NAME</b> Borrow Site Investigation					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.																																																										
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.					<table style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">○</td> <td colspan="5"><b>UNCONFINED COMPRESSIVE STRENGTH</b> TONS/FT.<sup>2</sup></td> </tr> <tr> <td></td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> </tr> <tr> <td></td> <td colspan="5" style="text-align: center;">-----</td> </tr> <tr> <td style="text-align: center;">×</td> <td colspan="3" style="text-align: center;">-----</td> <td style="text-align: center;">●</td> <td style="text-align: center;">△</td> </tr> <tr> <td></td> <td style="text-align: center;">10</td> <td style="text-align: center;">20</td> <td style="text-align: center;">30</td> <td style="text-align: center;">40</td> <td style="text-align: center;">50</td> </tr> <tr> <td></td> <td colspan="5"> </td> </tr> <tr> <td style="text-align: center;">⊗</td> <td colspan="3" style="text-align: center;">-----</td> <td colspan="2"></td> </tr> <tr> <td></td> <td colspan="3" style="text-align: center;"><b>STANDARD PENETRATION</b></td> <td colspan="2" style="text-align: center;"><b>BLOWS/FT.</b></td> </tr> <tr> <td></td> <td style="text-align: center;">10</td> <td style="text-align: center;">20</td> <td style="text-align: center;">30</td> <td style="text-align: center;">40</td> <td style="text-align: center;">50</td> </tr> </table>					○	<b>UNCONFINED COMPRESSIVE STRENGTH</b> TONS/FT. <sup>2</sup>						1	2	3	4	5		-----					×	-----			●	△		10	20	30	40	50							⊗	-----						<b>STANDARD PENETRATION</b>			<b>BLOWS/FT.</b>			10	20	30	40	50
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	10	20	30	40	50																																																										
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>	<b>RECOVERY</b>	<b>DESCRIPTION OF MATERIAL</b>				<b>UNIT DRY WT.</b> <b>LBS./FT.<sup>3</sup></b>																																																					
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	5					FINE SAND, trace clay, brown. (SP)																																																									
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	15					BORING TERMINATED 12.0'																																																									
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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL Dry at TOB	WS OR WD	BORING STARTED 12-22-80	<b>SOIL TESTING SERVICES</b>	
WL BCR	ACR	BORING COMPLETED 12-22-80	P.O. BOX 12015	
WL		RIG ATV 550 FOREMAN Kolb	RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
			APP'D BY JLB	STS JOB NO80-141-AC

<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> C-8								
<b>PROJECT NAME</b> Borrow Site Investigation					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.								
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.					<p>UNCONFINED COMPRESSIVE STRENGTH TONS/FT.<sup>2</sup> 1 2 3 4 5</p> <p>PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X ● ▲ 10 20 30 40 50</p> <p>STANDARD PENETRATION BLOWS/FT. ⊗ 10 20 30 40 50</p>								
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>						<b>RECOVERY</b>	<b>DESCRIPTION OF MATERIAL</b>	<b>UNIT DRY WT. LBS./FT.<sup>3</sup></b>	
	X					<b>SURFACE ELEVATION</b>							
						FINE SANDY TOPSOIL.							
	5					FINE SAND, trace to some clay, brown. (SC)							
	10					FINE SAND, yellowish-tan. (SP)							
	15					BORING TERMINATED 12.0'							
	20												
	25												
	30												

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU THE TRANSITION MAY BE GRADUAL

WL Dry at TOB	WS OR WD	BORING STARTED 12-22-80	<b>SOIL TESTING SERVICES</b>	
WL BCR	ACR	BORING COMPLETED 12-22-80	P.O. BOX 12015	
WL		RIG ATV 550 FOREMAN K61b	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
			APP'D BY JLB	STS JOB NO. 80-141-A0

<b>OWNER</b> Wayne County, North Carolina				<b>BORING NUMBER</b> C-9			
<b>PROJECT NAME</b> Borrow Site Investigation				<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.			
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.							
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>				
	X					<b>SURFACE ELEVATION</b>	
						TOPSOIL. (Driller's description)	
5		S-1	ss			FINE SAND, trace to some clay, brown, red, and light grey. (SC)	37
10		S-2	ss			VERY FINE TO FINE SAND, orange. (SP)	24
15		S-3	ss			FINE SAND, tan. (SP)	9
20		S-4	ss				12
25		S-5	ss			VERY FINE SANDY CLAY, some silt, tan and light grey. (CL-CH)	8
30						BORING TERMINATED 26.5'	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL Cave-in, 11.0' at TOB	BORING STARTED 12-22-80	<b>SOIL TESTING SERVICES</b>	
WL	BORING COMPLETED 12-22-80	P. O. BOX 12015	
WL	RIGATV 550 FOREMAN Kolb	RESEARCH TRIANGLE PARK	NORTH CAROLINA 27709
		APP'D BY JLB	STS JOB NO 80-141-AC

<b>OWNER</b> Wayne County, North Carolina					<b>BORING NUMBER</b> C-10									
<b>PROJECT NAME</b> Borrow Site Investigation					<b>ARCHITECT-ENGINEER</b> L. E. Wooten & Company, Inc.									
<b>SITE LOCATION</b> Southern Site near Dudley, Wayne County, N. C.														
<b>ELEVATION</b>	<b>DEPTH</b>	<b>SAMPLE NO.</b>	<b>SAMPLE TYPE</b>	<b>SAMPLE DISTANCE</b>	<b>RECOVERY</b>	<b>DESCRIPTION OF MATERIAL</b>	<b>UNIT DRY WT.</b> <b>LBS./FT.<sup>3</sup></b>							
						<b>SURFACE ELEVATION</b>								
						FINE SANDY TOPSOIL.								
	5					FINE SAND, trace clay, brown. (SP)								
	10													
	15					BORING TERMINATED 12.0'								
	20													
	25													
	30													

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL Dry at TOB	WS OR WD	BORING STARTED 12-24-80	<b>SOIL TESTING SERVICES</b> P.O. BOX 12015 RESEARCH TRIANGLE PARK NORTH CAROLINA 27709	
WL BCR	ACR	BORING COMPLETED 12-24-80		
WL		RIGATV 550 FOREMAN Ko1b	APP'D BY JLB	STS JOB NO. 80-141-A0



North Carolina  
Department of Environment and Natural Resources

Division of Waste Management

Michael F. Easley, Governor  
William G. Ross Jr., Secretary  
Dexter R. Matthews, Interim Director



August 7, 2001

Mr. Lloyd Cook  
Wayne County Solid Waste Director  
P.O. Box 227  
Goldsboro, N.C. 27533-0227

Re: Approval of Proposed Groundwater Monitoring Revisions at the Closed Wayne County Municipal Solid Waste Landfill Facility at Dudley (Permit #96-01).

Mr. Cook,

The Solid Waste Section (Section) has reviewed the request to revise the list of analytical parameters for monitoring well MW-7. Presently MW-7 is in the assessment monitoring program at the Wayne County closed municipal solid waste landfill near the town of Dudley. The request, dated July 26, 2001, was submitted on behalf of the County by Municipal Engineering Services Company. Specifically, Wayne County has requested that monitoring well MW-7 be excluded from the Appendix II sampling requirements.

As allowed by 15A NCAC 13B .1634 (b) the Section conditionally approves the removal of MW-7 from current sampling requirements for the Appendix II list of parameters. However, MW-7 must be sampled semi-annually for the Appendix I list. If future sampling and analysis detects Appendix I constituents in MW-7 that are statistically significant over background or in violation of groundwater quality standards, MW-7 must revert to Appendix II list of constituents without notification from the Section. The modified requirements at MW-7 or other wells does not absolve the County landfill from any water quality monitoring requirements specified in 15A NCAC 13B Solid Waste Management Rules.

1646 Mail Service Center, Raleigh, North Carolina 27699-1646  
Phone: 919-733-0692 \ FAX: 919-733-4810 \ Internet: [www.enr.state.nc.us/](http://www.enr.state.nc.us/)

North Carolina  
Department of Environment and Natural Resources

Division of Waste Management

Michael F. Easley, Governor  
William G. Ross Jr., Secretary  
William L. Meyer, Director

January 23, 2001



Mr. Lloyd Cook, Director  
Wayne County Solid Waste Management  
P.O. Box 227  
Goldsboro, North Carolina 27533-0227

Subject: Wayne County MSWLF Facility Transition Plan Modification  
for Permit #96-01  
Modification #4

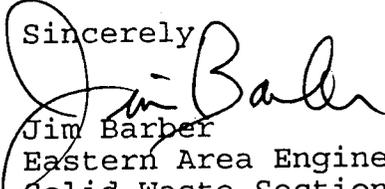
Dear Mr. Cook:

The Solid Waste Section hereby approves the modification of the referenced MSWLF Facility permit to allow the construction and operation of a CONSTRUCTION & DEMOLITION LANDFILL UNIT, Phase I (see sheets 3 of 6, 4 of 6 and 6 of 6) drawings dated 24 October 2000 for the Wayne County landfill. The revised operations of Phase I, based on the 24 October 2000 plans, is for a approximate two year effective phase. If waste volumes increase or estimated in-place densities are not achieved; amendment of the facility plans may be necessary prior to the end of the two year time frame. The facility permit will be reviewed every five years, on or before 30 December 2002 (see Condition Number 2, Page 1).

Please note operational conditions outlined on pages 1 thru five for the facility. The Waste Management Specialist for this facility is Mr. Bobby Nelms and he can be reached in our Washington Regional Office at (919) 946-6481.

If you have any questions about this approval letter, please contact me at (910) 486-1541 or James C. Coffey at (919) 733-0692 Ext. 255.

Sincerely

  
Jim Barber  
Eastern Area Engineer  
Solid Waste Section

cc: Jim Coffey

Mark Fry

Bobby Nelms

✓ Raleigh Central Office: Wayne County MSW Facility Transition  
Plan Permit #96-01.

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PERMIT NO. 96-01  
Modification #4 dated: 01/23/2001

STATE OF NORTH CAROLINA

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

DIVISION OF WASTE MANAGEMENT

1646 MAIL SERVICE CENTER; RALEIGH, NC 27699-1646

SOLID WASTE PERMIT

COUNTY OF WAYNE

is hereby issued a permit to operate PHASE I of a  
Construction and Demolition Landfill Unit

located on S.R. 1129, at the Wayne County Landfill, Dudley, Wayne  
County in accordance with Article 9, Chapter 130A, of the General  
Statutes of North Carolina and all rules promulgated thereunder and  
subject to the conditions set forth in this permit.

  
James C. Coffey, Supervisor  
Permitting Branch  
Solid Waste Section

SOLID WASTE PERMIT  
Permit to Operate  
Wayne County Landfill  
Construction and Demolition Debris Landfill Unit

**CONDITIONS OF PERMIT:**

GENERAL

1. When this property is sold, leased, conveyed or transferred, the deed or other instrument of transfer shall contain in the description section in no smaller type than that used in the body of the deed or instrument, a statement that the property has been used as a sanitary landfill.
2. This permit will be subject to review every five years, on or before 30 December 2002, as per 15A NCAC 13B .0201(c) or sooner, according to the issuance date of this permit. Modifications to the facility may be required in accordance with rules in effect at the time of review.
3. The approved plan is described by Attachment 1, "List of Documents for Approved Plan". Where discrepancies may exist, the most recent submittal and the Conditions of Permit shall govern. Some components of the approved plan are reiterated in the Conditions of Permit.
4. This permit is not transferable.
5. The Financial Assurance Instrument (FAI) for this facility shall be amended when Closure Certification has been complete and the Closure/Post-Closure Care portion of the instrument is amended. The FAI shall be reviewed and updated annually for this facility once closure of the MSW unit is complete.
6. If during the operational life of the C&D unit it becomes apparent that the operations at the facility are impacting ground water adversely; the Solid Waste Section will require landfilling activities to cease and closure of the operating unit.

CONSTRUCTION AND OPERATION

7. This permit is for development of the Wayne County Landfill Construction and Demolition Unit, Phase I in accordance with the approved plans (sheets 3 of 6, 4 of 6 and 6 of 6: Construction & Demolition landfill Amendment Document) dated 24 October 2000 and received 31 October 2000. Additional disposal capacity will be approved for future phases based on operational requirements and amended calculations indicating need for additional capacity
8. This solid waste management facility is permitted to receive the following waste types:

- a. Land-clearing debris as defined in G.S. 130A-290, specifically, solid waste which is generated solely from land-clearing activities, such as stumps, trees, etc.;
  - b. Inert debris defined as solid waste which consists solely of material that is virtually inert, such as brick, concrete, rock and clean soil; and
  - c. Asphalt in accordance with G.S. 130-294(m).
  - d. Construction and demolition debris defined as solid waste resulting solely from construction, remodeling, repair or demolition operations on pavement, buildings, or other structures.
  - e. C&D like waste that are similar to wastes typically found in the land clearing-inert debris and C&D waste streams consisting of wastes at this time: roofing shingle waste from the manufacturer, waste building materials from mobile home/modular home manufacturer and wooden pallets. Other wastes **MAY** be approved by the Division upon receipt of a written request with the specific waste type, how its generated, how much is generated; along with any additional information the Division may request to render a final decision on the disposal options for the waste.
- Yard trash as defined in G.S. 130A-290, shall not be disposed in the landfill area. However, yard trash, along with land-clearing debris, may be accepted for processing in the Yard Waste Composting Area.

9. All sedimentation/erosion control activities will be conducted in accordance with the Sedimentation Control Act codified at 15 NCAC 4. Native vegetation shall be established on the completed landfill.
10. The following requirements shall be met prior to operation of Phase 1 at this facility:
  - a. Site preparation and or closure of that area of the MSW unit shall be in accordance with the construction plans(dated 12/10/97).
  - b. Signs shall be posted at the facility in accordance with the Access and Safety Requirements under Operation Condition No. 5 listed below.
  - c. The existing groundwater monitoring system will be utilized for ground water monitoring for the C&D unit(s) in accordance with .1630 thru .1633. Assessment monitoring shall continue in accordance with Solid Waste Management Rules and any additional requirements set forth by Solid Waste Section Hydrogeologist.
  - d. Closure certification and documentation shall be submitted to the Solid Waste Section and a approved by the Section prior to receiving C&D waste in the proposed unit(s).Partial closure of units will be accepted with certification and documentation of partial unit closure submitted for approval. Seeding and stabilization of cover soils shall be performed prior to receiving C&D waste.

11. Operation of the C&D landfill units shall conform to the operating procedures described in the approved plan, in accordance with Section .1626 of the Solid Waste Management Rules, and in accordance with the following requirements:

#### Waste Acceptance and Disposal

- a. The facility shall accept only those solid wastes which it is permitted to receive.
- b. No municipal solid waste, hazardous waste, industrial waste, liquid waste or waste not characterized as LCID or C&D shall be accepted for disposal.
- c. The permittee shall implement a program at the facility for detecting and preventing the disposal wastes listed in item "b" of this section. The program shall include, at a minimum:
  - (i) Random inspections of incoming loads or other comparable procedures;
  - (ii) Records of any inspections;
  - (iii) Training of personnel to recognize hazardous and liquid wastes;
  - (iv) Development of a contingency plan to properly manage any identified wastes listed in item "b" of this section; the plan must address identification, removal, storage, and final disposition of waste.

#### Cover Material Requirements

12. a. Operational soil cover of at least six inches shall be placed at least once per week or when the active area reaches 1/2 acre in size or more often as necessitated by the nature of the waste so as to prevent the site from becoming a visual nuisance and to prevent fire, windblown materials, vectors or water infiltration.
- b. Areas which will not have additional waste placed on them for 12 months or more, but where final termination of operations has not occurred, shall be covered with a minimum of one foot of soil cover.
- c. After final termination of disposal operations at the site or major part thereof, or upon revocation of a permit, the fill areas shall be covered with a cap in accordance with .1627(c) or in accordance with the rules at the time of closure.

#### Access and Safety

13. a. The facility shall be adequately secured by means of gates, chains, berms, fences, or other security measures approved by the DWM to prevent unauthorized entry.
- b. An attendant shall be on duty at the site at all times while it is open for public use to ensure compliance with operational requirements.
- c. The access road to the site shall be of all-weather construction and maintained in good condition.
- d. Dust control measures shall be implemented when necessary.

- e. Signs providing information on dumping procedures, the hours of operation, the permit number, and other pertinent information shall be posted at the site entrance.
- f. Signs shall be posted stating that no MSW, hazardous waste or liquid waste can be received.
- g. Traffic signs or markers shall be provided as necessary to promote an orderly traffic pattern to and from the discharge area and to maintain efficient operating conditions.
- h. The removal of solid waste from the facility is prohibited unless the owner/operator approves and the removal is not performed on the working face.
- i. Barrels and drums shall not be disposed of unless they are empty and perforated sufficiently to ensure that no liquid or hazardous waste is contained therein, except fiber drums containing asbestos.
- j. Open burning of solid waste is prohibited.
- k. The concentration of explosive gases generated at the facility shall not exceed:
  - i. twenty-five percent of the limit for gases in site structures (excluding gas control or recovery system components; and
  - ii. the lower explosive limit for gases at the facility boundary.

#### Erosion and Sedimentation Control

- 14. a. Adequate sedimentation and erosion control measures shall be practiced to prevent silt from leaving the site.
- b. Adequate sedimentation and erosion control measures shall be practiced to prevent excessive on-site erosion.
- c. Provisions for a vegetative ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days upon completion of any phase of C&D landfill development.

#### Drainage Control and Water Protection Requirements

- 15. a. Surface water shall be diverted from the operational area.
  - b. Surface water shall not be impounded over or in waste.
  - c. A separation distance of at least four feet shall be maintained between waste and the ground-water table.
  - d. Solid waste shall not be disposed of in water.
  - e. Leachate shall be contained on site or properly treated prior to discharge. An NPDES permit may be required prior to discharge of leachate to surface waters.
- 16. All pertinent landfill operating personnel will receive training and supervision necessary to properly operate this landfill.
  - 17. Ground water quality at this facility is subject to the classification and remedial action provisions referenced in Rule .1634 thru .1637 of 15A NCAC 13B.

18. A closure and post-closure plan must be submitted for approval at least 90 days prior to closure or partial closure of any landfill unit. The plan must include all steps and measures necessary to close and maintain the facility in accordance with all rules in effect at that time. At a minimum, the plan shall address the following:
  - a. Design of a final cover system; using the cap requirements outlined in Rule .1627
  - b. Construction and maintenance/operation of the final cover system and erosion control structures;
  - c. Surface water, ground water, and explosive gas monitoring.

#### MONITORING AND REPORTING REQUIREMENTS

19. Ground-water monitoring wells and monitoring requirements for the C&D landfill units shall be in accordance with the monitoring system approved in the TRANSITION PLAN for the facility and these additional conditions:
  - a. Monitoring well design and construction shall conform to the specifications outlined in Attachment 2, "North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities".
  - b. A geologist shall be in the field to supervise well installation, if necessary. The exact locations, screened intervals, and nesting of the wells shall be established after consultation with the SWS Hydrogeologist at the time of well installation for new monitoring wells.
  - c. For each new monitoring well constructed, a well completion record shall be submitted to DWM within 30 days upon completion.
  - d. Sampling equipment, procedures, and parameters shall conform to specifications outlined in the above-referenced guidance document, (Attachment 2), or the current guidelines established by DWM at the time of sampling and in accordance with the approved TRANSITION PLAN OR ASSESSMENT AND REMEDIATION PLAN.
  - e. In order to determine ground-water flow directions and rates, each monitoring well shall be surveyed, and hydraulic conductivity values and effective porosity values shall be established for the screened intervals for each new monitoring well.
  - f. The permittee shall sample the monitoring wells semi-annually or as directed by the SWS Hydrogeologist.
  - g. A readily accessible unobstructed path shall be initially cleared and maintained so that four-wheel drive vehicles may access the monitoring wells at all times.
20. The permittee shall maintain a record of all monitoring events and analytical data. Reports of the analytical data for each water quality monitoring sampling event shall be submitted to DWM in a timely manner.

21. The permittee shall maintain a record of the amount of solid waste received at the facility, compiled on a monthly basis. Scales shall be used to weigh the amount of waste received.
22. On or before 01 August 98 ( or an earlier date as requested by the Solid Waste Section), and each year thereafter, the permittee shall report the amount of waste received (in tons) at this facility and disposed of in the landfill to the Solid Waste Section and to all counties from which waste was accepted, on forms prescribed by the Section. This report shall include the following information:
  - a. The reporting period shall be for the previous year, beginning 01 July and ending on 30 June;
  - b. The amount of waste received and landfilled in tons, compiled on a monthly basis, according to Condition 6 described above; and
  - c. Documentation that a copy of the report has been forwarded to all counties from which waste was accepted.
23. All records shall be maintained on-site and made available to the SWS upon request.
24. The Post-Closure plan approved in the TRANSITION PLAN shall be implemented and followed upon capping and closing the operating unit(s).

ATTACHMENT 1

List of Additional Documents for the Approved Transition Plan

1. Site and Construction Transition Plan modification application for the Wayne County, Permit # 96-01. Document titled "Construction and Demolition Landfill for Wayne County North Carolina", dated 2 December 1997 and received 12 December 1997.
2. Revised C&D landfill operations plan dated July 1999; received 5 October 1999. This amendment addresses the need for additional disposal capacity in phase II due to hurricane relate waste volumes.
3. Revised C&D landfill drawings dated 24 October 2000 and received 31 October 2000.

OPERATION/CONSTRUCTION MANAGERS

CIVIL/SANITARY ENGINEERS

**Municipal  
Services**



**Engineering  
Company, P.A.**

PO Box 97, Garner, North Carolina 27529 (919) 772-5393

PO Box 349, Boone, North Carolina 28607 (828) 262-1767

October 31, 2000

**APPROVED**  
DIVISION OF SOLID WASTE MANAGEMENT  
DATE 01/23/01 BY DHB  
MODIFICATION # 4  
96-01

Mr. Jim Barber, Regional Engineer  
Solid Waste Section, NC DENR  
225 Green Street, Suite 601  
Fayetteville, N.C. 28301

Re: Revisions to Wayne County Construction and Demolition Landfill.

Dear Mr. Barber,

Please find enclosed five (5) copies of the revisions to Wayne County Construction and Demolition Landfill. These revisions show our latest layout of Phases 1 and 2, which allow the Landfill access in reaching all Phases without any difficulty.

As of August 28, 2000, we had completed our survey of existing conditions at the landfill to determine how much air space has been used since the landfill opened it on January 1, 1998. According to our survey, 118,417 yd<sup>3</sup> of air space has been consumed. This averages to approximately 43,858 yd<sup>3</sup> of air space each year. Our latest revision to the Wayne County Construction and Demolition Landfill projects Phase 1 and 2 to still have approximately 95,117 yd<sup>3</sup> of total air space available. This equates to a remaining life expectancy of approximately 2.2 years. These calculations have taken into account some extra debris received from hurricanes Floyd and Fran. We do expect some additional debris associated from the hurricanes within the next year as well.

We appreciate all the consideration that you can give to this matter. If you need additional information or have any comments, please do not hesitate to call.

Very truly yours,  
Municipal Engineering Services CO., PA

Bryan M. Badey

Copy: Mr. Lloyd Cook, Director of Solid Waste

