



North Carolina Department of Natural Resources & Community Development

James B. Hunt, Jr., Governor

Joseph W. Grimsley, Secretary

DIVISION OF
LAND RESOURCES

Stephen G. Conrad, Director

Telephone 919 733-3833

Dear Mr McLeod :

The North Carolina Geological Survey Section, Department of Natural Resources and Community Development is drilling a number of shallow auger holes in order to gather information about geologic structure and rock type. This information will be used to construct a new State Geologic Map. One or more desirable sites for auger holes are located either within the highway easement across your property or on your property as indicated on the attached sketch map.

Geological Survey personnel would be drilling 6-inch diameter auger holes not more than 105 feet deep with a truck mounted auger rig and accompanying service truck. In some instances geophysical equipment would be lowered down the hole to gather part of the necessary information. When finished all equipment, material, and structures will be removed, cuttings scattered, and the holes permanently plugged in accordance with state regulations. All work will take from less than one day to not more than one or two days, depending on how many holes we are requesting to drill on your right-of-way on your property.

Please indicate your permission for us to do this work by signing and returning this letter to us.

Respectfully,

Bill Hoffman
Driller-in-Charge

Medway Lin Co.
Dennis McLeod
Land Owner (or)
Person in charge of the land

Aug 18, 1983
Date

drilled 8/23/83

50'

RO-A-3-83



SOIL & MATERIAL ENGINEERS INC.

3109 Spring Forest Road, Box 58069, Raleigh, NC 27658-8069, Phone (919) 872-2660

June 17, 1983

Midway Gin Company
Route 1, Box 140-A
Maxton, North Carolina 28364

Attention: Mr. Henry Cloud

Reference: Report of Subsurface Investigation
Proposed Fixed Box Press
Midway Gin Company
Maxton, North Carolina
S&ME Job No. 051-83-136-A

Gentlemen:

Soil and Material Engineers, Inc. has completed the authorized subsurface investigation to evaluate construction and foundation support considerations for a press proposed for installation at the Midway Gin Company in Maxton, North Carolina. Subsurface conditions at the site were investigated with a single test boring drilled to a depth of 40 feet at approximately the center of the proposed press location. This boring was advanced by wash boring techniques and samples were obtained at selected intervals by the standard penetration test method to evaluate the consistency and density of the subsurface soils. This report presents the findings of this investigation and our recommendations for foundation support based on the findings.

PROPOSED CONSTRUCTION

The Midway Gin Company will install a press at its Maxton facilities for the purpose of gining cotton. The new press will be installed adjacent to an existing structure and it is our understanding that two different designs are being considered. A high capacity Continental Gin press with a 16 foot deep box and 12 foot deep (28 foot total depth) ram casing is the first alternative. A second alternative is a Murry or Lumus press with a 10 foot deep box and a 10 foot deep (20 foot total depth) ram casing. The final selection of the preferred design will be made based on the requirements of the operation and the cost of the alternatives.

SUBSURFACE CONDITIONS

A generalized subsurface profile has been prepared from the test boring data and is attached as Figure 1 to this report. A more detailed

description of the conditions encountered at the soil test boring location is presented on the attached Test Boring Record.

A firm to dense silty sand exhibiting penetration resistances in the range of 9 to 44 blows per foot (bpf) is present from the surface to a depth of 11 feet. A firm to dense clean sand with penetration resistances of 11 to 37 bpf is then present to a depth of about 22 feet. Based on the attached grain size data, this clean sand stratum contains less than 5 percent fines. A very loose silty to clayey sand is then present from 22 to 31 feet and is underlain to the 40 foot termination depth of the boring by a very stiff to hard silty clay. Penetration resistances in the loose sands are 1 to 2 bpf while penetration resistances in the clays range from 19 to 33 bpf.

Groundwater was present at a depth of approximately 11 feet at the time of boring. However, groundwater levels typically fluctuate with seasonal and climatic changes and may be higher at other times of the year.

RECOMMENDATIONS

The following recommendations are made based on a review of the attached data, our understanding of the proposed construction, and past experience with similar projects and subsurface conditions. We would appreciate the opportunity to review and comment upon installation and foundation considerations for the alternate selected for installation.

Comparison of Alternatives. Due to the highly permeable soils encountered between the depths of 11 and 22 feet, groundwater control will be an important consideration for both alternatives. If the shallower gin press is constructed, groundwater control will be necessary only for the ram casing. If the deeper alternative is selected, groundwater control will be necessary for the installation of the box and the ram casing.

Groundwater control is particularly critical at this site since poor technique during excavation of the clean sands below a depth of 11 feet could result in undermining of the existing structure. Based upon these considerations, it is our opinion that steel sheet piling should be driven around the perimeter of the excavation to control groundwater if the deeper alternative is used.

The sheet piling should be driven into the clays below a depth of 31 feet and may be used as the the outside form for the box walls. The sheet pile section necessary to resist the anticipated lateral loads will cost approximately \$15 per square foot and will add an additional \$50,000 to the installation cost of the gin press. Internal bracing will be necessary and the permanent wall will have to be stronger than the wall needed for the shallower pit. Additionally, an underdrain will have to be installed beneath the floor slab to provide protection against hydrostatic uplift or the structure will have to be designed to resist the potential uplift. These items will increase the construction cost of the deeper alternative, relative to the



shallow alternative, by \$50,000 to \$70,000 excluding the actual gin press cost difference.

Installation Alternatives for Presses. It is our understanding that based on the preceding considerations, the shallower alternative will be installed. If the base of the box is installed at a depth of 10 feet or shallower, a permanent underdrain will not be necessary providing the slab is properly water-proofed. However, an inexpensive underdrain can be installed at relatively low cost to permit relatively inexpensive installation of a sump pump at a future date if the waterproofing fails and dampness in the bottom of the pit is a problem. Another alternative for providing additional protection would be to install the base slab with a finished floor elevation approximately 8 feet below existing site grade (3 feet above the water table).

Open cut excavation can be used for installation of the pit provided the box is installed a sufficient distance from the existing structure to permit stable side slopes. This can be achieved by detailing 1H:1V slopes between the proposed bottom of the outside excavation and existing grades as shown in Figure 2. The excavation can then be open cut taking care not to undermine the existing structure, the base slab and walls can be constructed, and the outside perimeter can be backfilled.

The most difficult construction procedure for the shallower alternative will be installation of the ram casing. Since the ram casing must be installed below the water table in clean sands, good technique is mandatory to prevent undermining of the existing structure. This can be accomplished either by dewatering with 6 inch gravel pack wells or by using mud drilling techniques to install the casing in a wet condition. If the excavation is dewatered, the difficulty of groundwater control can be decreased by raising the bottom elevation of the ram casing if possible. Assuming, the ram casing is set at a depth of 20 feet, we estimate that 2 wells will be necessary to adequately lower the water table.

We recommend providing this report to a competent well driller and soliciting a proposed cost for lowering the water table a minimum of two feet below the proposed bottom of the ram casing. Typically, the result to be achieved is specified and the methods are left to the discretion of the contractor. However, a piezometer or observation well should be required in addition to the dewatering wells to demonstrate prior to the start of casing installation that the result has been achieved. Once the water level is lowered, the casing should be installed by working the casing into the ground by excavating from inside the casing. Under no circumstance should an attempt be made to excavate the entire depth prior to setting the shell.

The other alternative would be to use mud drilling techniques. In this procedure, a large diameter hole would be drilled into the clay stratum at a depth of 31 feet using a heavy drilling mud to prevent the hole from caving. A heavy wall steel casing would then be set into the clay to cut-off water inflow and to permit the hole to be cleaned so that a ram casing shell could be set. We understand that corrugated metal or reinforced concrete pipe is typically used for an outer casing and that an inner casing



is then provided for the actual ram casing. As in the case of the dewatering wells, we recommend submitting this report to a qualified caisson contractor and requesting a cost proposal for achieving the desired results. The caisson installation has the advantage that installation of the ram casing could conceivably be accomplished prior to the start of excavation.

Design Parameters. Structural design of the walls should be based on a triangular distribution of stress computed assuming the soil to act as an equivalent fluid weighing 60 pounds per cubic foot (pcf). The soils exposed at the base of the proposed box will provide adequate support for a bearing pressure of 2000 pounds per square foot (psf). Providing the base of the slab is set at a depth of 10 feet or less, adequate subgrade support can be obtained by installing sumps (if necessary for control of groundwater) and compacting the subgrade to a minimum of 95 percent of standard Proctor (ASTM D-698). Alternatively, a clean sand or stone can be used to prepare a stable subgrade if the soils exposed in the bottom of the excavation are too wet to effectively work.

Assuming the ram casing will weigh less than the hydrostatic uplift caused by the high groundwater level, the connection between the slab and casing will have to be designed to provide the additional uplift capacity. The necessary safety factor then results from skin friction on the side of the casing.

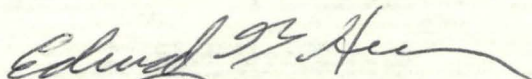
Summary. In summary, the shallow gin press alternative appears to be the most cost effective solution relative to installation considerations. Provided care is exercised in installation, we do not foresee any major construction difficulties. However, whenever excavations are made adjacent to existing structures to the depths necessary at this location, some minor settlement and cracking often occurs in the adjoining structure. This damage will be limited to only superficial cracking provided care is exercised in installation of the press. As a precautionary measure, the contractor should be required to establish a bench mark on the existing structure and to monitor settlements daily.



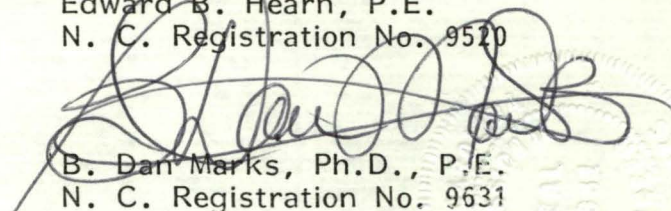
We appreciate the opportunity to have provided you with our services during this phase of the project. Please contact us as questions arise regarding this report or if we can be of further service. Additionally, we would appreciate the opportunity to review and comment on the final plans for installation of the press.

Very truly yours,

SOIL & MATERIAL ENGINEERS, INC.



Edward B. Hearn, P.E.
N. C. Registration No. 9520

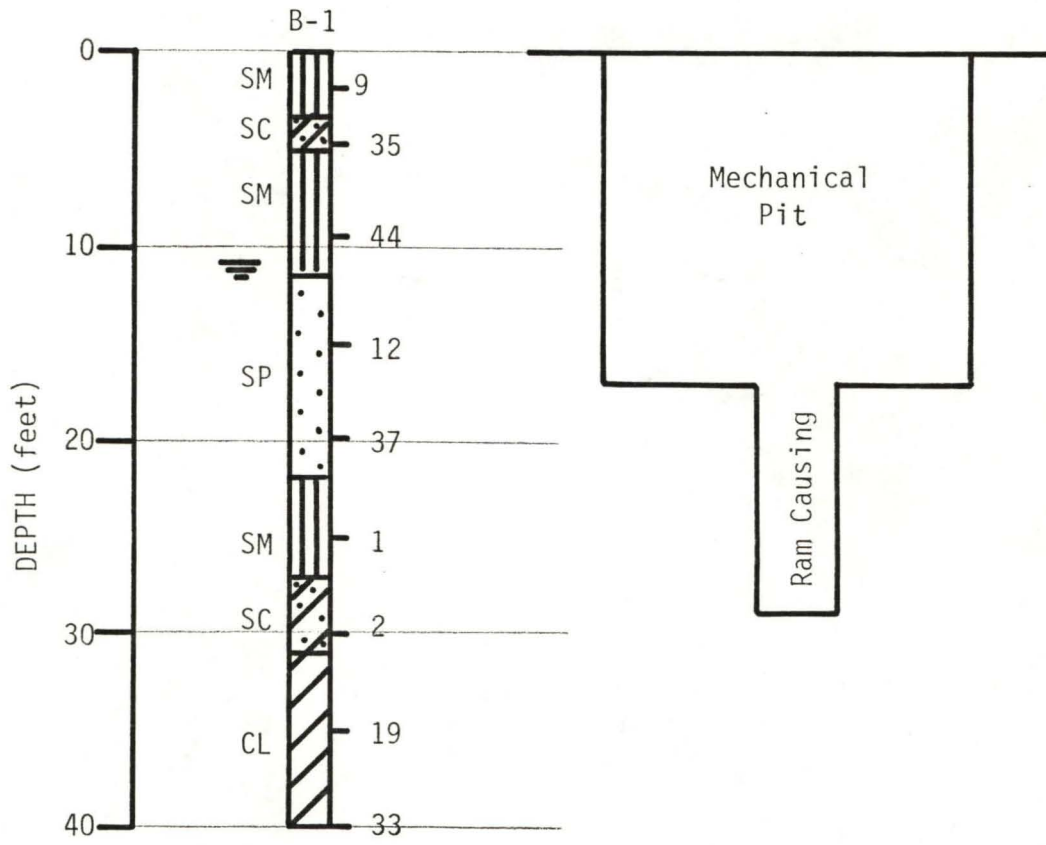


B. Dan Marks, Ph.D., P.E.
N. C. Registration No. 9631

EBH/BDM/bsp



GENERALIZED SUBSURFACE PROFILE
 FIXED BOX PRESS FOR MIDWAY GIN COMPANY

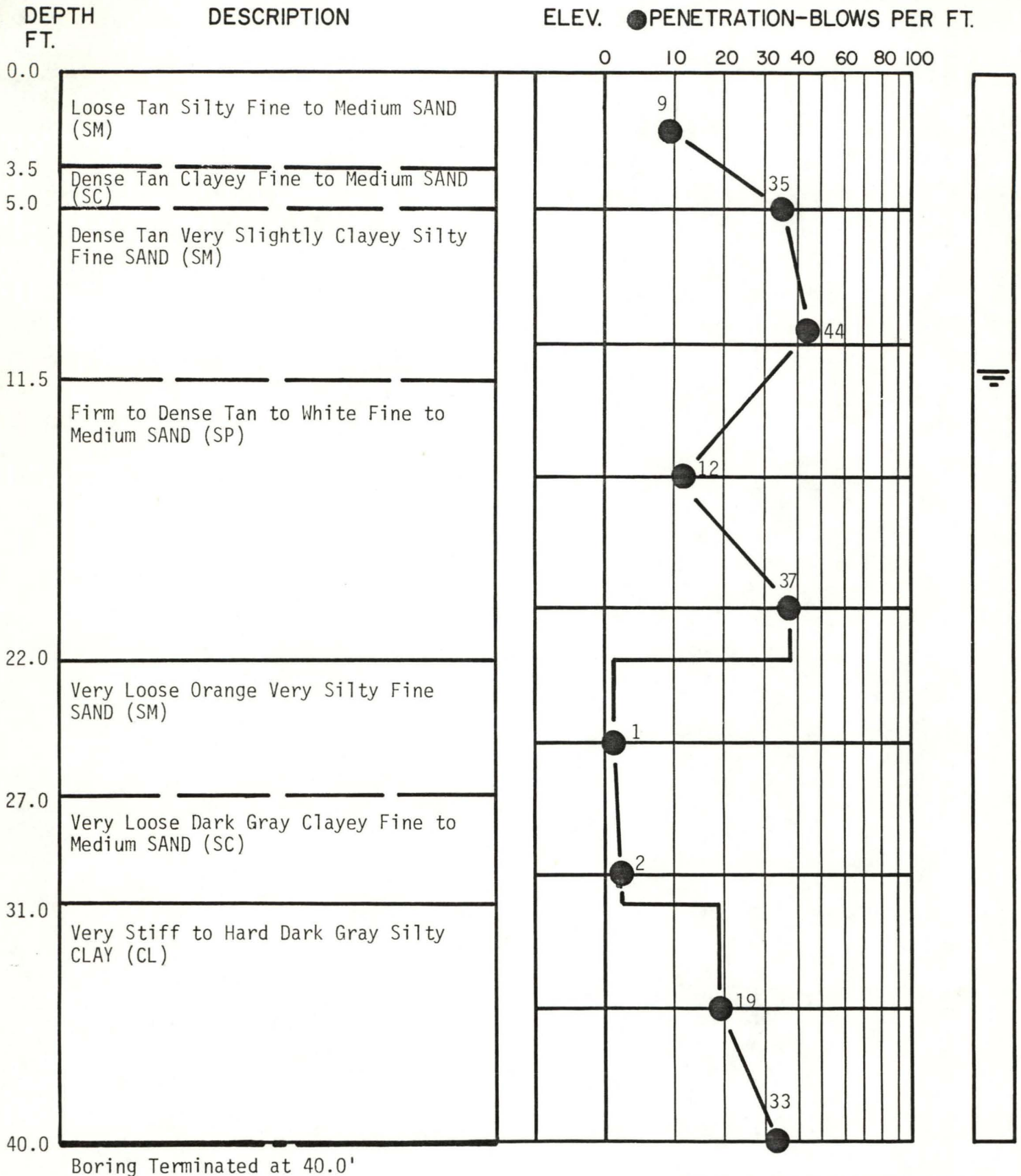


PROJECT

Midway Gin Company
 Maxton, North Carolina

SOIL & MATERIAL ENGINEERS, INC
RALEIGH, NORTH CAROLINA

SCALE: As Shown
JOB NO: 051-83-136-A
FIG. NO: 1



Boring Terminated at 40.0'

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

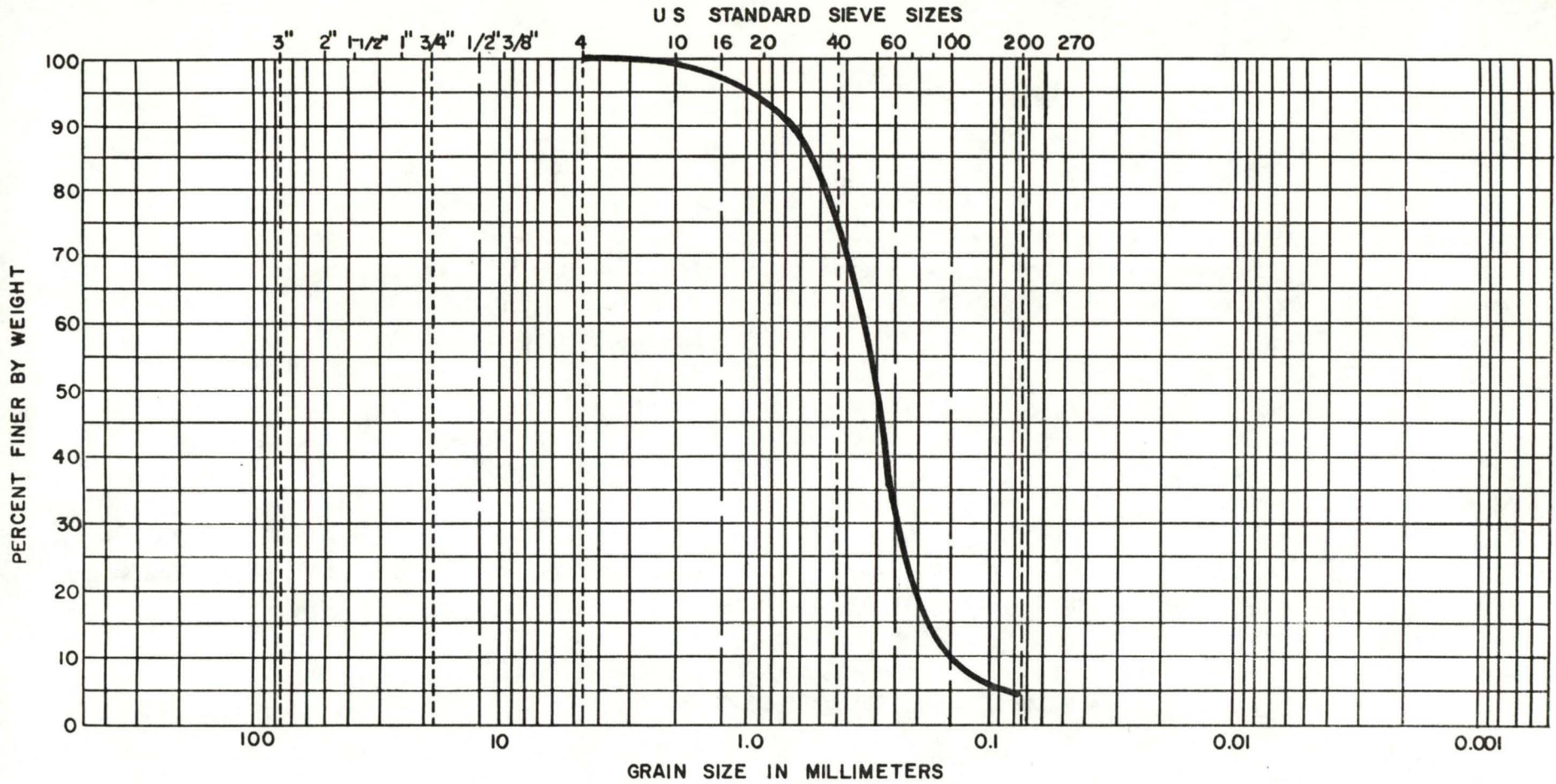
■ UNDISTURBED SAMPLE
50% ROCK CORE RECOVERY
◀ LOSS OF DRILLING WATER

≡ WATER TABLE-24HR.
≡ WATER TABLE-1HR.

TEST BORING RECORD

BORING NO. B-1
DATE DRILLED 5-18-83
JOB NO. 83-136-A

SOIL & MATERIAL ENGINEERS, INC.



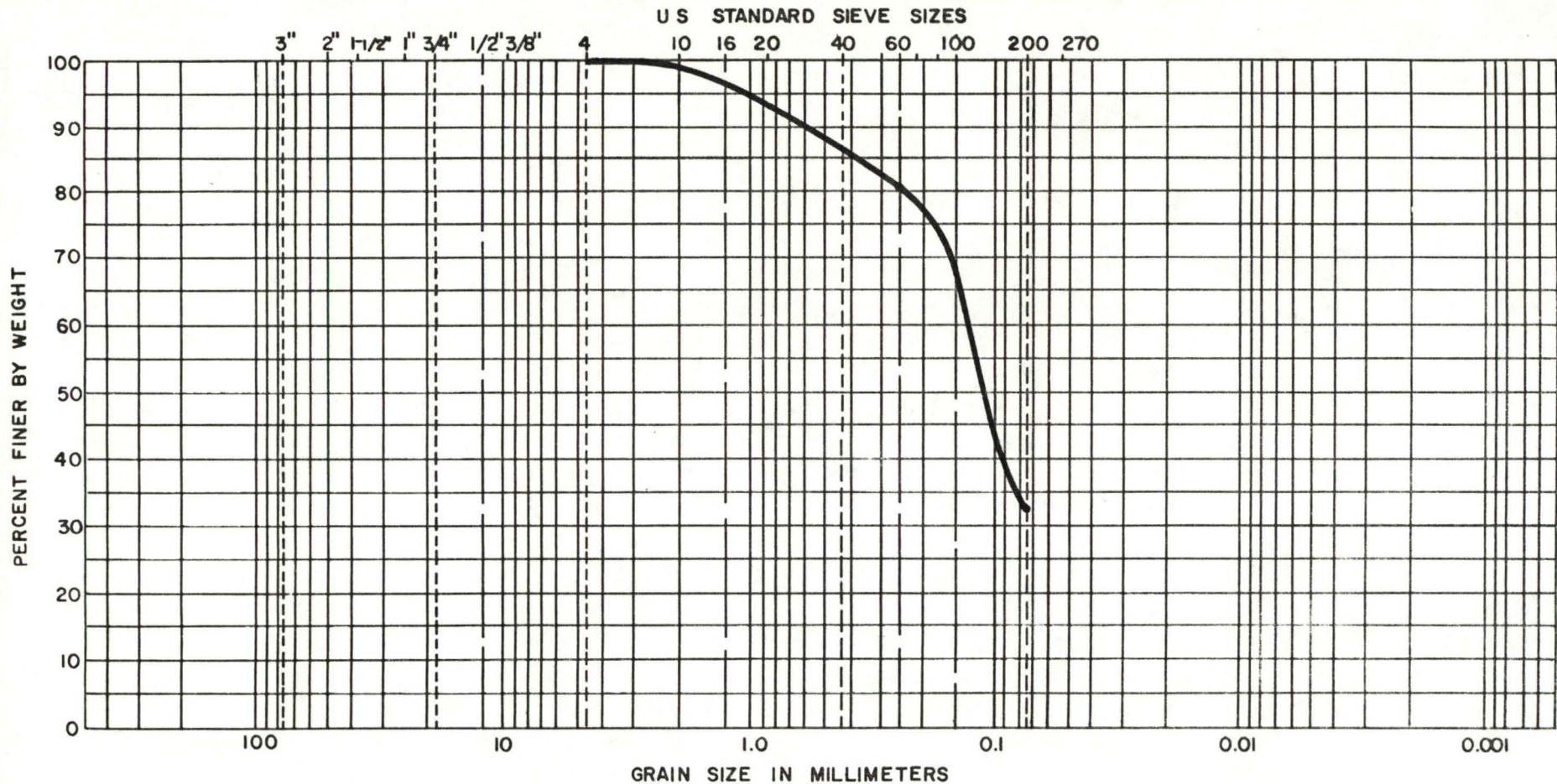
BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV./ DEPTH	NAT. WC	L.L.	PL	PI	DESCRIPTION OR CLASSIFICATION
B-1	19.0'-20.5'					Tan Fine to Medium SAND (SP)

GRAIN SIZE DISTRIBUTION

JOB NO. 051-83-136-A

SOIL & MATERIAL ENGINEERS, INC.



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV./DEPTH	NAT. WC	L.L.	PL	PI	DESCRIPTION OR CLASSIFICATION
B-1	24.0'-25.5'					Orange Very Silty Fine SAND (SM)

GRAIN SIZE DISTRIBUTION

JOB NO. 051-83-136-A

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