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GEOTECHNICAL ENGINEERING REPORT

PROPOSED RESIDENTIAL BUILDING STRUCTURE
MCOSCAR RESIDENCE
40 LEMANS DRIVE
NAPOLEON, OHIO

PSI PROJECT NO. 125-45035

Information To Build On
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June 17, 2004

Mr. Joe McOscar
1307 Mario Drive
Monroe, Michigan 48162

Re: Subsurface Exploration and
Foundation Evaluation
McOscar Residence
Napoleon, Henry County, Ohio
PSI File Number: 125-45035

Dear Mr. McOscar:

In compliance with your instructions, we have conducted a subsurface exploration and foundation evaluation for the above-referenced project. The results of this exploration together with our recommendations, are to be found in the accompanying report, three (3) copies of which is being transmitted herewith

After the plans and specifications are complete, PSI should review the final design and specifications in order to verify that the earthwork and foundation recommendations are properly interpreted and implemented. It is also considered imperative that the geotechnical engineer and/or its representative be present during earthwork operations and foundation installations to observe the field conditions with respect to the design assumptions and specifications. PSI will not be held responsible for interpretations and field quality control observations made by others.

Please advise us of the appropriate time to discuss the field quality control and engineering services, and we will be pleased to meet with you at your convenience.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Craig A. Rex
Staff Engineer

A. Veeramani/os

Alagaiya Veeramani, P.E.
District Manager

GEOTECHNICAL ENGINEERING REPORT

Proposed Residential Building Structure
McOscar Residence
40 Lemans Drive
Napoleon, Henry County, Ohio

PSI Project No.: 125-45035

PREPARED FOR

Mr. Joseph McOscar
1307 Mario Drive
Monroe, Michigan 48162

June 17, 2004

BY

Professional Service Industries, Inc.

3739 Shawnee Road
Lima, Ohio 45806

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McOscar Residence
40 LeMans Drive
Napoleon, Henry County, Ohio
PSI Project No.: 125-45035
June 17, 2004

PROJECT INFORMATION

Project Authorization

This report presents the results of a soils exploration and foundation analysis, conducted for Mr. Joe McOscar for a proposed residential structure located at 40 Lemans Drive in the city of Napoleon, Henry County, Ohio. The services for this project were performed in accordance with PSI Proposal No. 125-104 dated June 8, 2004. The proposal included a proposed scope of services, estimated cost, unit rates and PSI's General Conditions. Authorization to perform this exploration and analysis was in the form of the aforementioned proposal, signed by Mr. Joe McOscar, June 9, 2004.

Project Description

Based upon information provided by Mr. Tim Worline of T.R. Worline & Associates, the proposed structure will be a single-story wood frame residential construction with a gravel covered crawl space, measuring approximately 2,000 square feet in plan area. The proposed structure will include wood flooring over the gravel crawl space. No structural information was provided at the time of this report. However, PSI assumes that maximum column and wall loads will be about twenty (20) kips and two (2) kips per lineal foot, respectively for the proposed structure. Additionally, the project will include an attached wood framed garage structure with a floor slab-on-grade.

During our field investigation, the construction is in progress. Based on our visual observations of the construction areas, the crawl space has been excavated to the apparent design elevation approximately three (3) to three and one-half (3-1/2) feet below the existing surface grades.

If any of the noted information is incorrect or has changed, please inform PSI so that we may amend the recommendations presented in this report, if appropriate.

Purpose and Scope of Services

The purpose of this exploration was to evaluate the soil and groundwater conditions at the site to provide recommendations, from a geotechnical engineering viewpoint, for

foundation design and construction, site preparation and other construction considerations.

The scope of the exploration and analysis included a reconnaissance of the project site, drilling three (3) standard test borings to depths of approximately twenty (20) feet below the existing surface grades within the proposed construction area, a laboratory testing program, and an engineering analysis and evaluation of the subsurface materials.

The scope of services did not include an environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors or unusual or suspicious items or conditions are strictly for the information of the client. Prior to purchase or development of this site, an environmental assessment is advisable.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site area for the proposed residential building structure, upon which this soils exploration has been performed, is located at the southeast corner of the intersection of Duoquesne Drive and LeMans Drive on the west side of the city of Napoleon, Henry County Ohio.

At the time of our field drilling operations, the proposed building structure is under construction with the crawlspace and foundation excavations at or near completion. The surface of the proposed construction site is covered with topsoil, soil stockpiles and trees. No topographical information is available for the site area. However, visual observations indicate that the site area gently slopes away in all directions from the existing excavated area and a maximum of three and one-half (3-1/2) feet cut exists at the crawl space area.

No utility lines were observed in the area of our field operations. However, the exact positions of any potential lines should be determined prior to construction activities.

Subsurface Conditions

The general subsurface conditions at the site were explored with three (3) test borings extended to depths of about twenty (20) feet each below the existing surface grades. Because PSI could not access the actual crawl space, the test borings were located around the perimeter of the crawl space area. The depth and location of the test borings were selected and staked in the field by a representative of PSI. Field and laboratory testing were accomplished in general accordance with ASTM standards.

The types of foundation bearing materials encountered in the test borings have been visually classified. The results of the visual classifications, the Standard Penetration tests and water level observations are presented on the boring logs. Representative samples of the soils were placed in sample jars, and are now stored in the laboratory for further analysis, if requested. Unless notified to the contrary, all samples will be disposed of after three (3) months.

The surface of the proposed construction area surrounding the crawl space is covered with approximately four (4) to five (5) inches in thickness of topsoil. The topsoil thickness should be expected to vary throughout the site.

Beneath the surficial materials, natural soils consisting of silty clay and silty sand, containing variable fractions of gravel were encountered to the boring termination depths. Standard penetration resistance, N-values, in the natural soils ranged from five (5) to twenty-nine (29) blows per foot (bpf), with moisture contents ranging from about nine (9) to twenty-nine (29) percent.

The subsurface description is of a generalized nature provided to highlight the major strata encountered. The boring logs included in the Appendix of this report should be reviewed for specific information at the individual boring locations. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between the boring locations. The stratifications represent the approximate boundary between the subsurface materials, and the transition may be gradual or not clearly defined.

Groundwater Conditions

No groundwater was encountered during or at completion of drilling operations. However, groundwater levels fluctuate seasonally as a function of rainfall. Therefore, at a time of year different from the time of drilling, there is the possibility of a considerable change in the occurrence of water not previously encountered. We recommend that the contractor determine the actual groundwater levels during construction to determine groundwater impact.

EVALUATION AND RECOMMENDATIONS

Site Preparation

Based on our visual observations of the proposed site area, the crawl space area has already been excavated. However, because of recent rainfall, the exposed subgrade soil, exhibit wet and soft soils. Therefore, prior to placing any floor slabs, foundations or structural fill, loose, wet, soft or obviously compressible materials should be completely removed from the construction area. The precise extent of removal should be determined in the field following visual observation of the subgrade by a representative of PSI. The subgrade should then be proofrolled with a loaded tandem-axle dump truck until the grade offers a relatively unyielding surface. Areas of excessive yielding, as observed by a PSI representative, should be excavated and backfilled with compacted engineered fill. After the existing subgrade soils are excavated to design grade, proper control of subgrade compaction and the placement and compaction of new fills should be observed and tested by a representative of PSI.

Any engineered fill materials to be used for this project should be verified by PSI prior to placement. The fill should be placed in layers of not more than eight (8) inches in thickness, with each layer being compacted to a minimum density of ninety-eight (98) percent of the maximum dry density, within plus or minus two (2) percent of the optimum moisture content, as determined by ASTM D 698. Moisture control (increasing or decreasing the natural moisture content of the engineered fill materials) may be necessary for compaction. Pyritic and/or potentially expansive materials, such as mine tailings, shale and slag should not be used as engineered fill materials.

Floor Slab Subgrade Preparation

The near surface soils present at this site are sensitive to softening due to rainfall and traffic. When damp or wet, it is our experience that these soils tend to rut severely under rubber-tired vehicle traffic. Additionally, the operation of heavy rubber tired equipment on these soils will often shear the surficial soils even at optimum moisture. Rigorous maintenance of entrance roads and other areas subjected to construction traffic, such as floor slab areas, is typically required until floor slab construction is completed and may need to be periodically reworked. In some instances it is advantageous to place a working course of compacted graded aggregate base the subgrade area between the time of initial grading and final floor slab construction. The graded aggregate base should be end dumped outside of pavement areas and spread out with lightweight equipment, which will not adversely affect the subgrade soils. The graded aggregate base may need periodic replenishment depending on weather and traffic conditions during construction.

We recommend that the floor slab subgrades be evaluated by a representative of the Geotechnical Engineer immediately prior to placing stone and beginning floor slab construction. If low consistency soils are encountered which cannot be adequately densified in place, such soils should be removed and replaced with well-compacted fill material placed in accordance with the *Structural Fill* section of this report or with well-compacted crushed stone materials.

Excavations

In Federal Register, Volume 54, No. 209 (October, 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P." This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavations or foundation excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced. If they are not followed closely, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as

required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person" as defied in "CFR Part 1926," should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulation.

We are providing this information solely as a service to our client. PSI is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

If the excavations are left open and exposed to the elements for a significant length of time, desiccation of the clays may create minute shrinkage cracks which could allow large pieces of clay to collapse or slide into the excavation.

Materials removed from the excavation should not be stockpiled immediately adjacent to the excavation, inasmuch as this load may cause a sudden collapse of the embankment.

Foundation Recommendations

Considering the subsurface conditions and the proposed construction, the proposed building structure can be founded on conventional spread or continuous wall footing foundations.

Footings placed on the natural soils or compacted engineered fill can be designed for a net allowable soil pressure of 2000 pounds per square foot (psf). All footings should be placed at a minimum depth of forty-two (42) inches below the exterior grade.

Unsuitable bearing materials may be encountered in the foundation excavations. If found, they should be removed and be replaced with compacted engineered fill or the foundation should be extended to bear on the underlying higher strength soils. This decision should be made by PSI at the time of construction.

Extreme care should be taken to prevent weakening of the foundation bearing materials because of prolonged atmospheric exposure, construction activity disturbance or an increase in moisture content. In the event that an overnight delay in concrete placement is anticipated, the foundation excavations should be cut

approximately six (6) inches high and subsequently excavated to final grade immediately before placement of concrete.

In order to reduce the effects of differential movement that may occur due to variations in the character of the supporting soils and any variations in seasonal moisture contents, it is recommended that all continuous footings be reinforced, as per structural considerations.

Foundations supporting individual columns should have a minimum dimension of twenty-four (24) inches, and continuous wall foundations should have a minimum width of eighteen (18) inches, even if that dimension gives a bearing pressure less than the allowable. Footing bearing surfaces are to be critically inspected to verify consistency and compatibility with subsoil exploration data.

Drainage and Groundwater Considerations

Water should not be allowed to collect in the foundation excavation, on floor slab areas, or on prepared subgrades of the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of the structure and beneath the floor slabs. The grades should be sloped away from the structure and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.

Groundwater or perched water was not encountered within the anticipated depth of foundation or detention basin excavations at the time the field exploration was accomplished. However, as discussed in the Subsurface Conditions section of this report, it is possible that seasonal variations will cause fluctuations in groundwater and perched water levels. We anticipate groundwater or perched water seepage and surface drainage can likely be managed by localized dewatering using conventional sump and pump methods.

Weather Considerations

The soils encountered at this site are known to be sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Care should be exercised during the grading operations at the site. Due to the fine-grained nature of the surficial soils, the traffic of heavy equipment, including heavy compaction equipment, may very well create pumping and general deterioration of those soils in the presence of water. Therefore, the grading should, if at all possible, be performed during a dry season. A layer of crushed stone may be required to allow the movement of construction traffic over the site during the rainy season. The contractor should maintain positive site drainage and if wet/pumping conditions occur, the contractor will be responsible to over excavate the wet soils and replace them with a properly compacted structural fill.

Floor Slab Design

An on-grade floor slab supported on compacted fill or natural soils may be used for this structure. We recommend that a subgrade modulus (k), of 100 pci be used in floor slab design calculations.

We recommend that a minimum 6-inch thick, free-draining granular material, such as AASHTO No.57 stone, be placed beneath the floor slab to enhance drainage. The floor slab should be jointed in accordance with ACI specifications to reduce cracking resulting from any differential movement and shrinkage. We also suggest that, where practical, the floor slabs not be rigidly connected to columns, walls, or foundations.

Impermeable vapor barriers under concrete slabs will be required for this structure. The final decision to use a vapor barrier is left to the owner and designers. If used, however, we recommend that a 10-mil thick polyethylene sheeting as recommended by ACI's *Guide for Concrete and Floor Slab Construction*, be utilized as a vapor barrier, and be placed between the soil subgrade and crushed stone materials.

REPORT LIMITATIONS

The recommendations submitted are based on the available surface information obtained by PSI and design details furnished by Mr. Tim Worline of T.R. Worline and Associates for the proposed residential structure. If there are any revisions in the plans for the proposed structure, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be retained to determine if changes in the foundation recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein, have been presented after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

After the plans and specifications are complete, it is recommended that PSI be provided the opportunity to review the final design and specifications, in order to verify that the earthwork and foundation recommendations are properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Mr. & Mrs. McOscar for the specific application to the proposed McOscar residential structure located at 40 Lemans Drive in the city of Napoleon, Henry County, Ohio.

APPENDIX

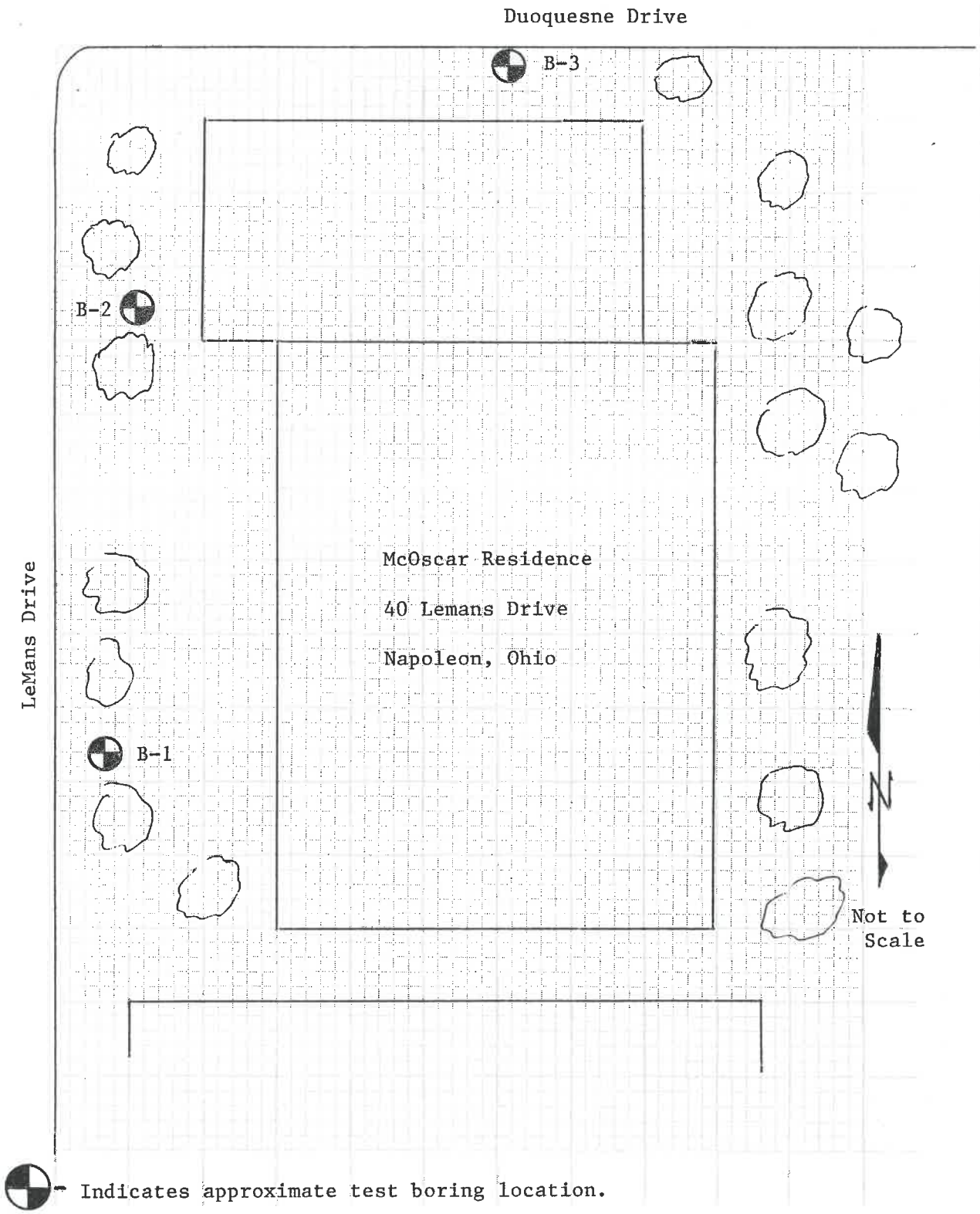
Boring Location Plan

Boring Logs

Report of Soil Analysis

General Notes

Professional Service Industries



- Indicates approximate test boring location.

PROJECT NAME	Soil Boring Location Plan	
McOscar Residence 40 Lemans Drive Napoleon, Henry County, Ohio	PROJECT NO. 125-45035	DATE June 11, 2004

PSI A-700-3

Professional Service Industries, Inc.
RECORD OF SUBSURFACE EXPLORATION

Boring: B-1

Project Name: McOscar Residential Structure — Date of Boring: June 10, 2004

Site: 40 Lemans, Riveria Heights, Napoleon, Ohio — Project No: 125-45035

DESCRIPTION	DEPTH ft.	SAMPLE	N	M_c %	REMARKS
SURFACE					
*		1-SS	7	25	* 4" TOPSOIL.
Firm to stiff, wet, brown mottled with gray, silty CLAY, few to little sand, trace gravel (CH).	5	2-SS	8	21	
		3-SS	18	24	LL-57, PL=26, PI=31
Stiff, moist, brown streaked with gray, silty CLAY, few sands, trace gravel (CL).	10	4-SS	25	15	
	15	5-SS	24	16	
Stiff, moist, gray, silty CLAY, few to trace sands, trace gravel, sand lenses encountered (CL).	20	6-SS	15	13	No water encountered during drilling or at completion.
End of boring, 20'. Caved, 3'.	25				
	30				
	35				
	40				
	45				
	50				

Professional Service Industries, Inc.
RECORD OF SUBSURFACE EXPLORATION

Boring: B-2

Project Name: McOscar Residential Structure

Date of Boring: June 10, 2004

Site: 40 Lemans, Riveria Heights, Napoleon, Ohio

Project No: 125-45035

DESCRIPTION	DEPTH ft.	SAMPLE	N	M_c %	REMARKS
SURFACE					
*		1-SS	6	22	* 4" TOPSOIL.
Firm to stiff, wet, brown mottled with gray, silty CLAY, few sands (CH).	5	2-SS	8	22	
		3-SS	21	24	
Stiff, moist, brown lightly streaked with gray, silty CLAY, little sand, trace gravel (CL).	10	4-SS	20	15	LL=36, PL=18, PI=18
Stiff, moist, gray, silty CLAY, few to trace sand, trace gravel (CL).	15	5-SS	19	14	
	20	6-SS	19	18	No water encountered during drilling or at completion.
Medium dense, moist, gray, silty SAND, few clays (SM).					
End of boring, 20'. Caved, 2'6".	25				
	30				
	35				
	40				
	45				
	50				

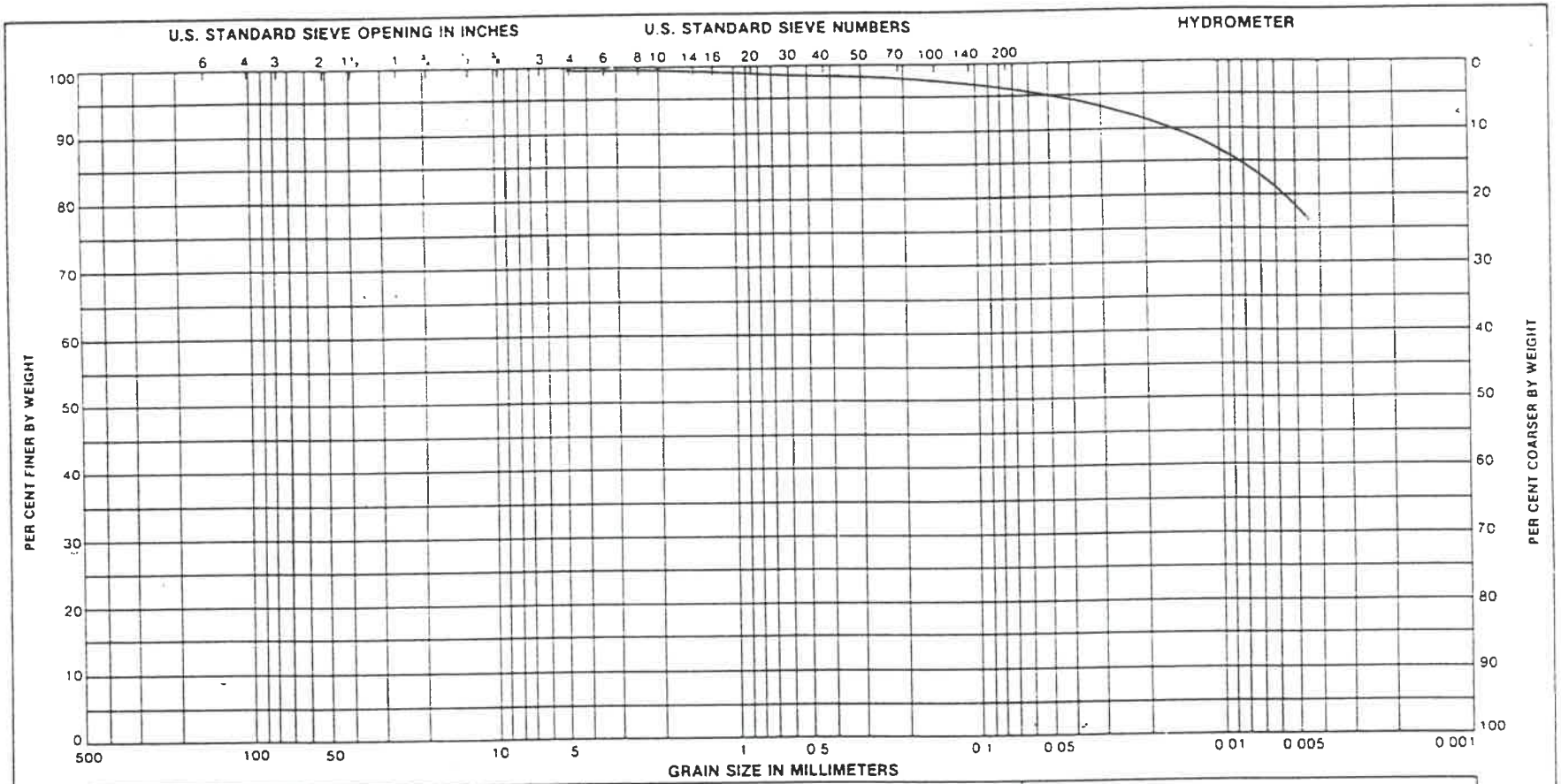
Professional Service Industries, Inc.
RECORD OF SUBSURFACE EXPLORATION

Boring: B-3

Project Name: McOscar Residential Structure — Date of Boring: June 10, 2004

Site: 40 Lemans, Riveria Heights, Napoleon, Ohio — Project No: 125-45035

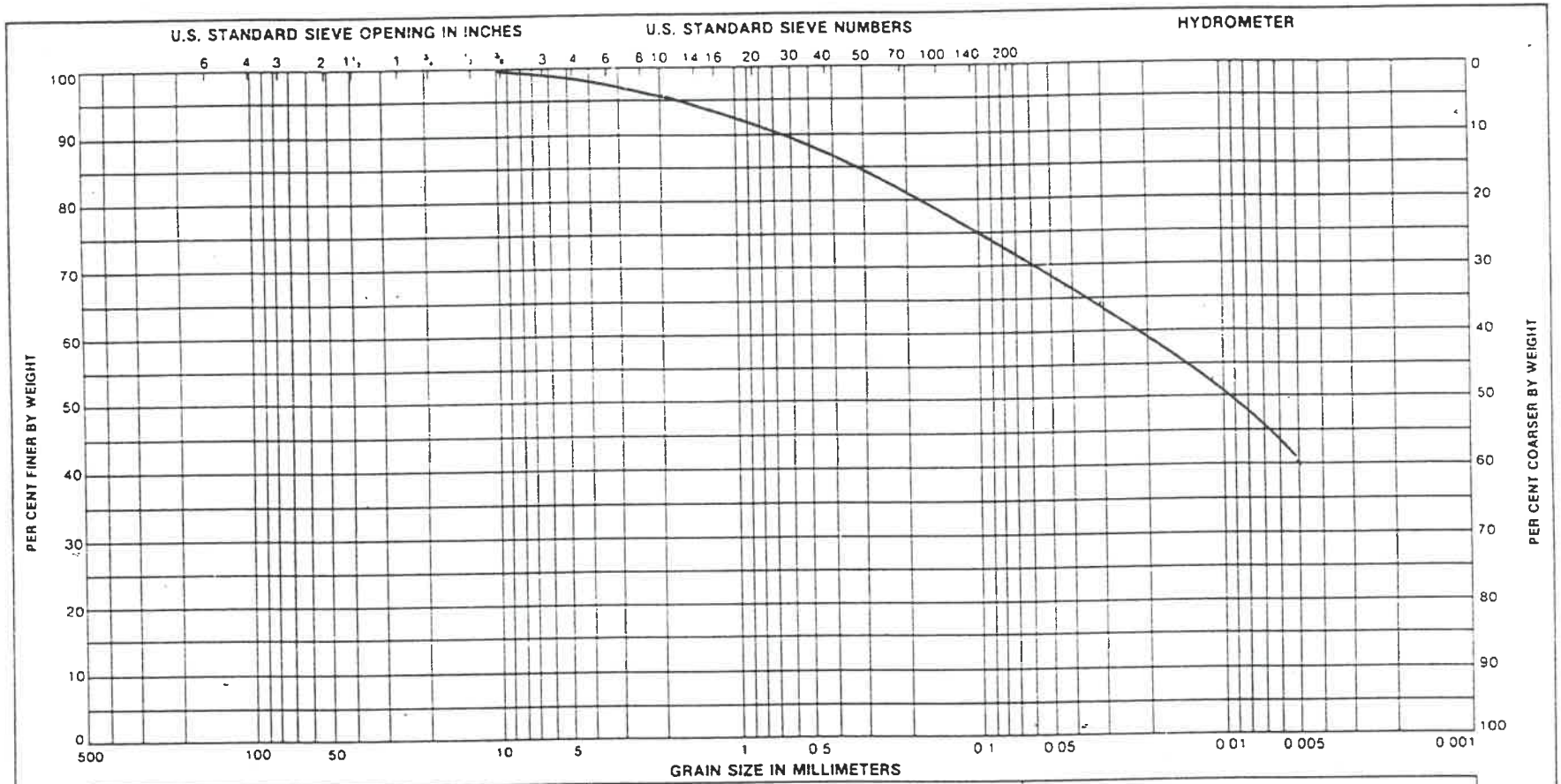
DESCRIPTION	DEPTH ft.	SAMPLE	N	M_c %	REMARKS
SURFACE					
*		1-SS	5	29	* 5" TOPSOIL.
Firm to stiff, wet, brown mottled with gray, silty CLAY, few sands (CH).	5	2-SS	9	20	
		3-SS	22	24	
Stiff, moist, brown streaked with gray, silty CLAY, few sands, trace gravel (CL).	10	4-SS	29	15	
Firm to stiff, moist, gray, silty CLAY, few to trace sand, trace gravel (CL).	15	5-SS	11	16	LL=34, PL=15, PI=19
	20	6-SS	26	9	No water encountered during drilling or at completion.
End of boring, 20'. Caved, 3'.	25				
	30				
	35				
	40				
	45				
	50				



Boring No.	Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI	Project
B-1	3-SS	5-6½'	Brown mottled with gray,	24	57	26	31	McOscar Residential Structure
			silty CLAY, few sands (CH).					40 Lemans
								Riveria Heights
								Napoleon, Ohio

REPORT OF SOIL ANALYSIS

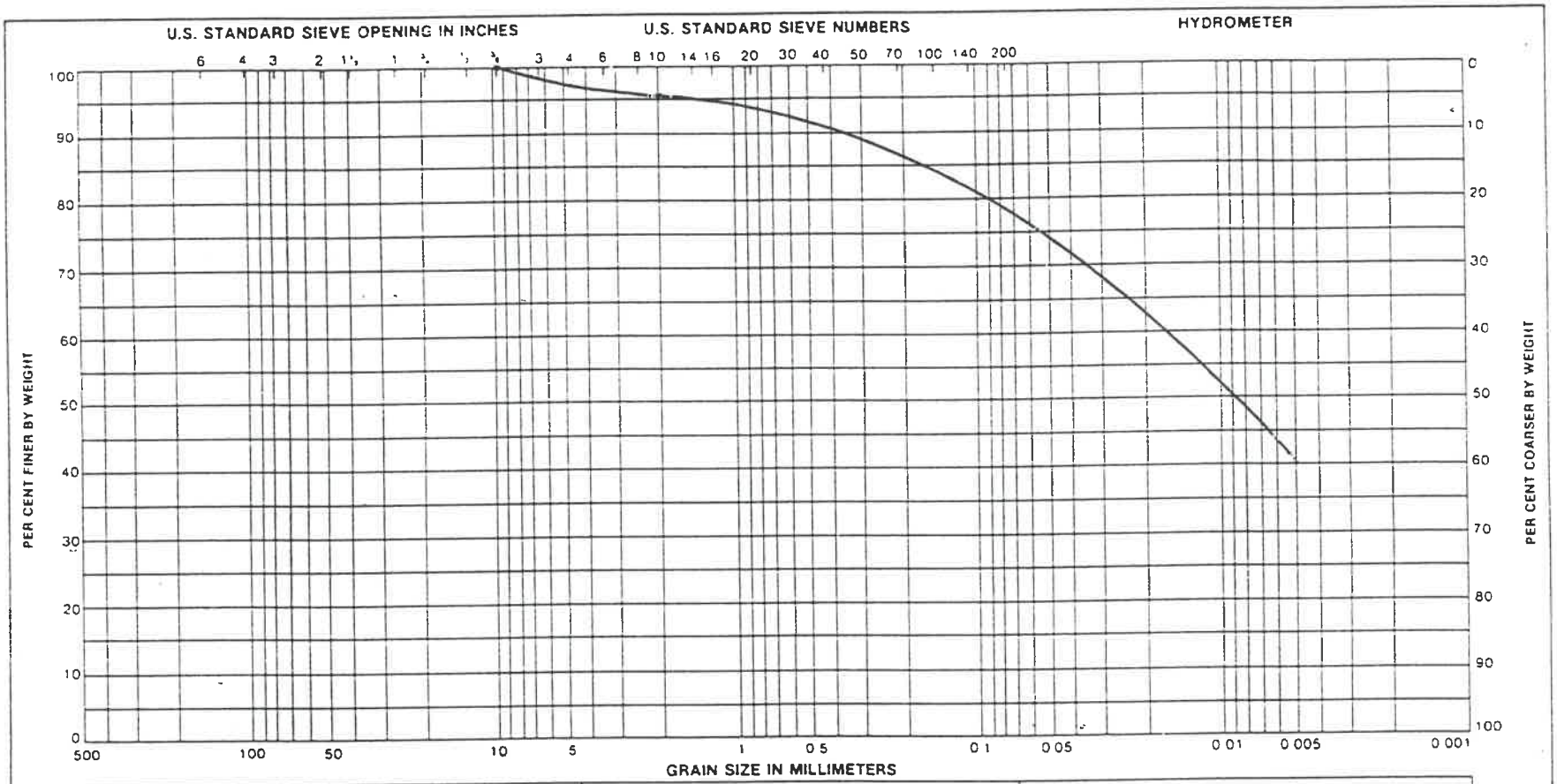
File No 125-45035



Boring No.	Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI	Project
B-2	4-SS	8½-10'	Brown lightly streaked with gray, silty CLAY, little sand (CL).	15	36	18	18	McOscar Residential Structure 40 Lemans Riveria Heights Napoleon, Ohio

REPORT OF SOIL ANALYSIS

File No 125-45035



Boring No.	Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI	Project
B-3	5-SS	13½-15'	Gray, silty CLAY, few sands (CL).	16	34	15	19	McOscar Residential Structure
								40 Lemans
								Riveria Heights
								Napoleon, Ohio

REPORT OF SOIL ANALYSIS

File No 125-45035

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classificaton System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split-spoon.

Qu: Unconfined compressive strength, TSF.

Qp: Penetrometer value, unconfined compressive strength, TSF.

Mc: Water content, %.

LL: Liquid limit, %.

PI: Plasticity index, %.

δd: Natural dry density, PCF.

▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
DB: Diamond Bit.
CB: Carbide Bit.
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

TERM (NON-COHESIVE SOILS)	STANDARD PENETRATION RESISTANCE
Very Loose	0-4
Loose	4-10
Medium	10-30
Dense	30-50
Very Dense	Over 50

TERM (COHESIVE SOILS)	Qu - (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		