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69-F-233M

Our Ref. No: 9-1-5
May 1969.

SEWER TUNNELS AT HIGHWAYS #27 & 5

TORONTO, ONTARIO



DOMINION SOIL INVESTIGATION LIMITED
CONSULTING SOIL & FOUNDATION ENGINEERS

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ASSOCIATED COMPANY

SOIL TESTING AND ENGINEERING LTD.
39 BRENTFORD ROAD
KINGSTON 5, JAMAICA
WEST INDIES

Our Ref. No: 9-1-5

12th May 1969.

Keystone Contractors Limited,
2490 McDougall Street,
P.O. Box 128,
Windsor, Ontario.

Re: Sewer Tunnels at Highways #27 & 5
Toronto, Ontario.

Dear Sirs,

This letter reports the observations of soil conditions at the faces of tunnels of the above project made during regular visits between the 21st January and 14th March 1969. The 6 ft. diameter tunnel was inspected weekly during this period and a special inspection of the 10 ft. diameter tunnel was made when difficulties were encountered on about 9th March 1969.

General visual descriptions of the working face are listed below. Soil samples were taken at each visit and laboratory tests were made on some samples to determine the grading of the soils and their uniformity. Grading curves for those samples tested are enclosed.

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Date 1969	Tunnel	Estimated Station	Description of Face and Conditions	Test Results
21st Jan.	6'dia.	119 + 20	Excavation under air pressure. Fairly uniform soil conditions at face. Soil a partly cemented well-graded till (silty sand with traces of clay and gravel). Occasional larger gravel dispersed through the till.	Grain size Enclosure No. 1 *N.M.C. 5%
31st Jan.	6'dia.	119 + 55	Excavation under pressure. Soil a silty sand generally with a trace of clay but with areas more clayey than others. Slight cementing in some areas. Little gravel but the odd boulder of 12 to 18-inch size occurring and one 3-inch thick slab of shale noted.	N.M.C. 4% and 7% (Note:- Sample with higher water content had higher clay content).
7th Feb.	6'dia.	120 + 20	Excavation under pressure. Soil fairly uniform and a weakly cemented well-graded till (silty sand with trace of clay and gravel) with occasional gravel to 3-inch size.	N.M.C. 5%
14th Feb.	6'dia.	120 + 65	No air pressure and face quite dry. Soil uniform and hard. A well graded till (almost identical with that tested on 21st January) with occasional large gravel.	N.M.C. 5% Grain Size Enclosure No. 2 (c.f. Enclosure No. 1)

* N.M.C. = Natural Moisture Content

Date 1969	Tunnel	Estimated Station	Description of Face and Conditions	Test Results
21st Feb.	6'dia.	121 + 00	No air pressure and little water collecting. Well-graded sandy silt till with some fine gravel and occasional coarse gravel to 3-inch size.	N.M.C. 6%
28th Feb.	6'dia.	121 + 40	Air pressure just restarted. Heterogeneous soil conditions at face. Indications of near vertical silty sand seam penetrated. Also a large pocket of wet medium sand with silt, fine gravel and occasional cobbles to 6-inch size at about mid-height of tunnel (sample F2). Majority of face consisting of silt with some sand and clay (sample F1).	N.M.C. 7% sample F1 Grain Size sample F2 Enclosure No. 3
7th Mar.	6'dia.	121 + 80	No air pressure. Soil predominantly hard well-graded till with occasional gravel to 2-inch size and random cobbles to 9-inch size. An area at mid tunnel height composed of fine to medium sand with some silt and showing slow seepage.	
10th Mar.	10'dia.	-	Air pressure 15 p.s.i. At face visible above lower bulk-head the soil was predominantly dense fine sand with lenses of silt, occasional medium sized sand and random gravel. At crown of tunnel hard well-graded till visible. Upper portion of face dry but base seeping steadily.	Grain Size Enclosure No. 4
14th Mar.	6'dia.	122 + 20	No air pressure. Uppermost 2 ft. of face plastic grey brown clay till. Rest of face hard clayey silt till with occasional fine gravel.	

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We trust that this report contains the required information.
Should you wish to discuss the contents please do not hesitate to call
on us.



GAP/me

Yours very truly,

DOMINION SOIL INVESTIGATION LIMITED

G. A. Pickens

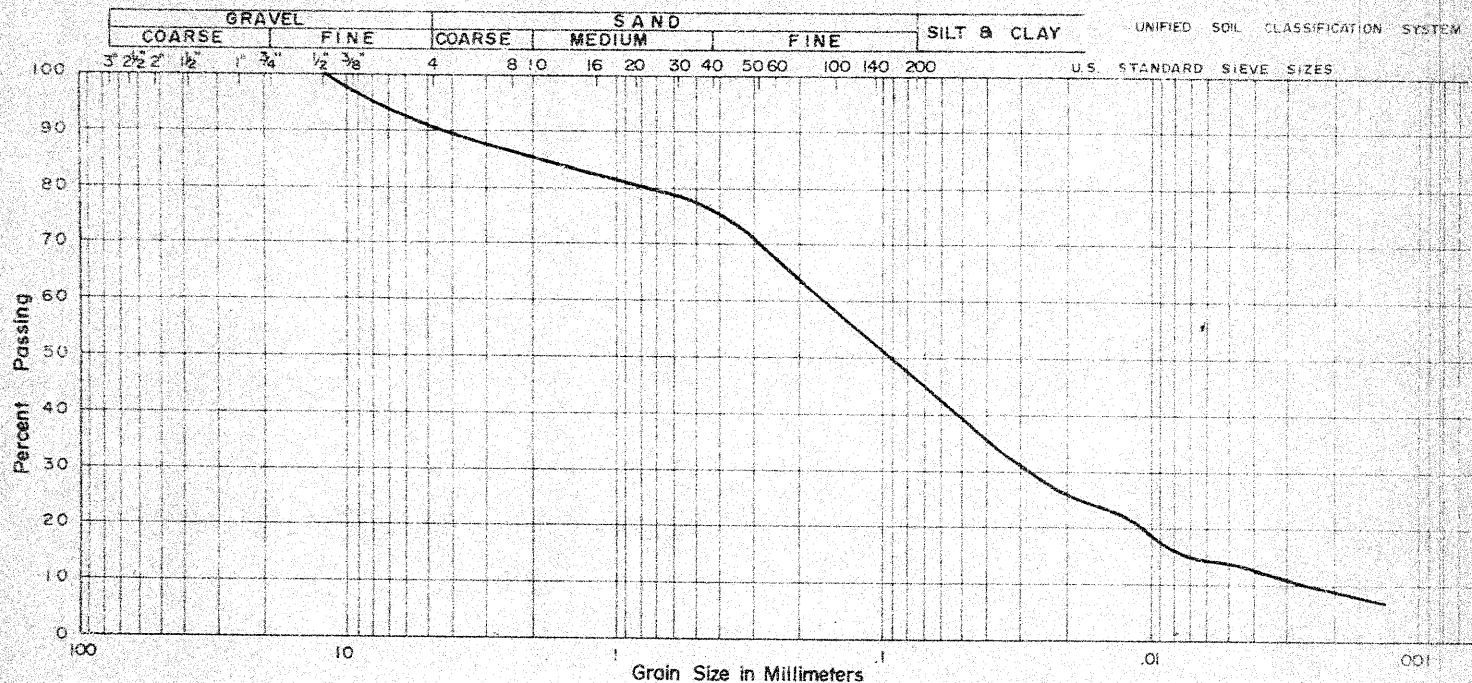
G.A. Pickens, P.Eng.

E n c l o s u r e s

DOMINION SOIL INVESTIGATION LIMITED

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No 9-1-5



PROJECT: 6' DIA. TUNNEL
 LOCATION: HWYS 27 & 5, TORONTO.
 BOREHOLE No:
 SAMPLE No: A. (visit 21-1-69)
 DEPTH:
 ELEVATION:

COEFFICIENT OF UNIFORMITY:
 COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:

SILTY SAND WITH TRACE CLAY
AND GRAVEL (TILL)

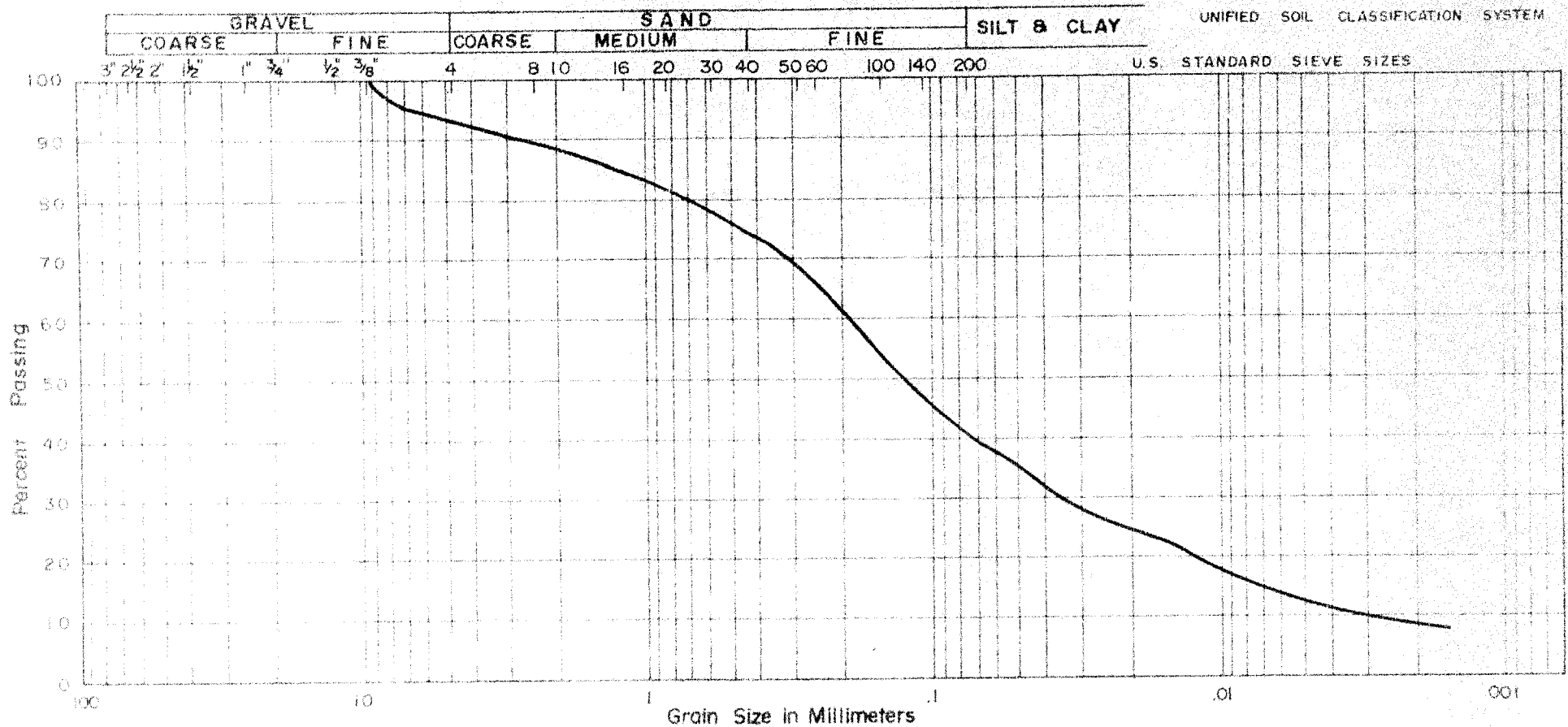
PLASTIC PROPERTIES

LIQUID LIMIT % =
 PLASTIC LIMIT % =
 PLASTICITY INDEX % =
 MOISTURE CONTENT % = 5

DOMINION SOIL INVESTIGATION LIMITED

GRAIN SIZE DISTRIBUTION

OUR REFERENCE NO 9-1-5



PROJECT: 6" DIA TUNNEL
 LOCATION: HWYS. 27 & 5 TORONTO
 BOREHOLE NO:
 SAMPLE NO: D. (Visit 14-2-69)
 DEPTH:
 ELEVATION:

COEFFICIENT OF UNIFORMITY:
 COEFFICIENT OF CURVATURE:

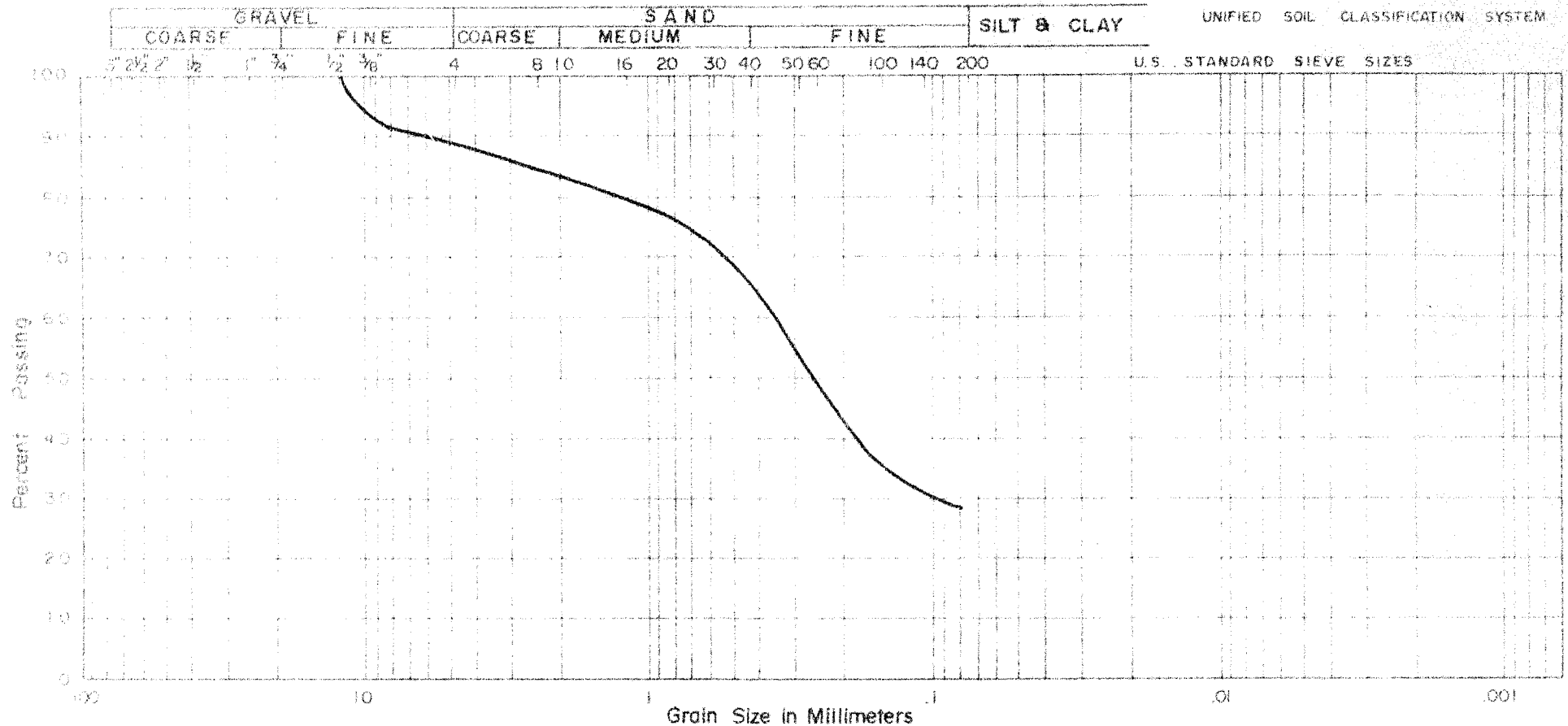
Classification of Sample and Group Symbol:
SILTY SAND WITH TRACE CLAY & GRAVEL (TILL)

PLASTIC PROPERTIES

LIQUID LIMIT	% =
PLASTIC LIMIT	% =
PLASTICITY INDEX	% =
MOISTURE CONTENT	% = 5

ENCLOSURE NO 2

OUR REFERENCE NO 9-1-5



PROJECT: 6' DIA. TUNNEL
LOCATION: HWYS. 27 & 5, TORONTO
BOREHOLE NO: F2 (Visit 2P/1/69)
SAMPLE NO:
DEPTH:
ELEVATION:

COEFFICIENT OF UNIFORMITY :
COEFFICIENT OF CURVATURE :

PLASTIC PROPERTIES	
LIQUID LIMIT	% =
PLASTIC LIMIT	% =
PLASTICITY INDEX	% =
MOISTURE CONTENT	% =

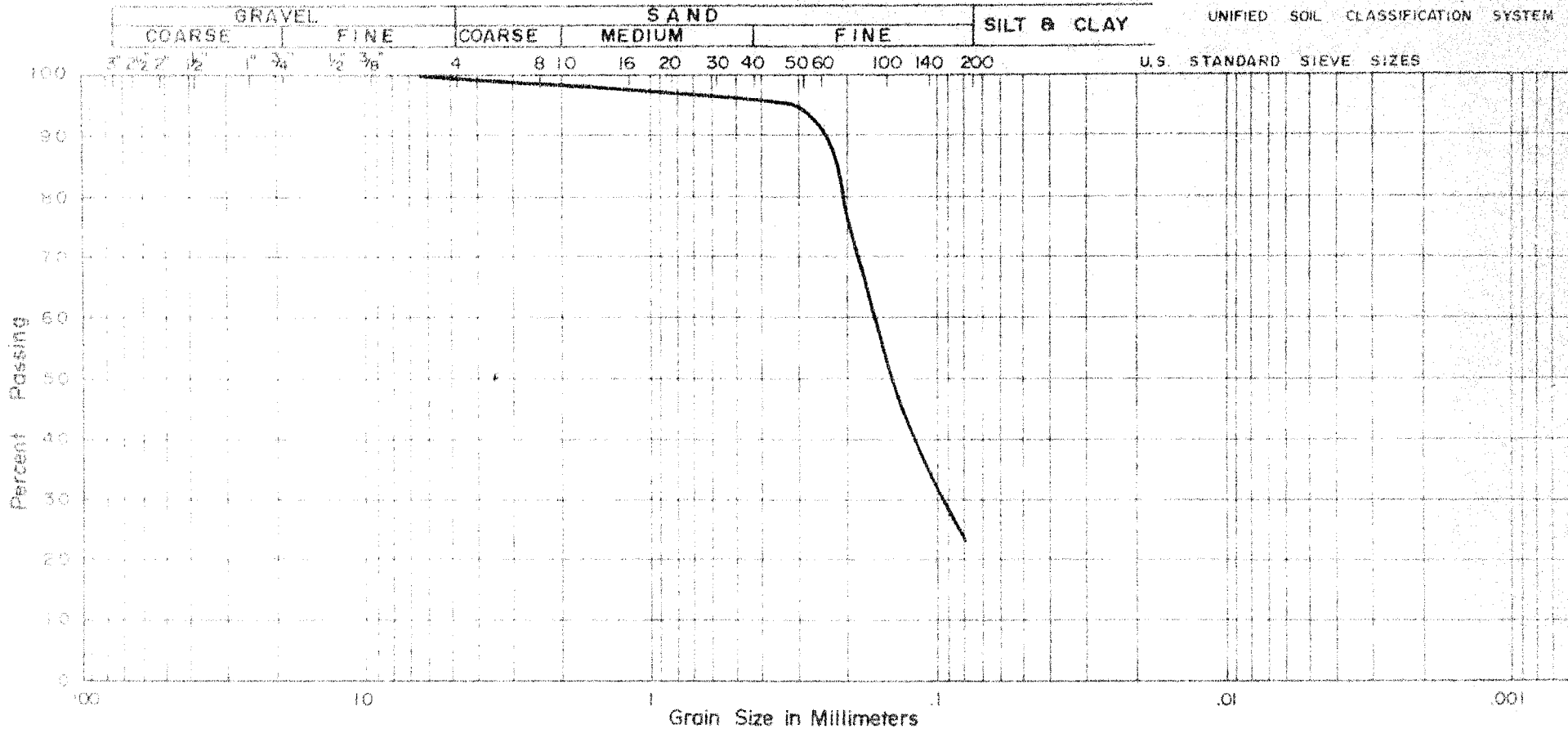
Classification of Sample and Group Symbol:
SAND WITH SILT AND TRACE GRAVEL

ENCLOSURE N° 3

DOMINION SOIL INVESTIGATION LIMITED

GRAIN SIZE DISTRIBUTION

OUR REFERENCE NO 9-1-5



PROJECT: 10' DIA. TUNNEL
 LOCATION: HWYS. 27 & 5 TORONTO
 BOREHOLE NO: (visit 10/3/69)
 SAMPLE NO:
 DEPTH:
 ELEVATION:

COEFFICIENT OF UNIFORMITY:
 COEFFICIENT OF CURVATURE:

PLASTIC PROPERTIES
 LIQUID LIMIT % =
 PLASTIC LIMIT % =
 PLASTICITY INDEX % =
 MOISTURE CONTENT % =

Classification of Sample and Group Symbol:

FINE SAND WITH SOME SILT

ENCLOSURE NO 4