



Report by :

**CENGRS GEOTECHNICA PVT. LTD.**  
**SOIL AND FOUNDATION EXPERTS**

## **Final Factual Report on:**

### **Geotechnical Investigation for Exhibition cum Convention Centre Dwarka, New Delhi**

Report Volume	Report Contents	Structures Covered	Number of Boreholes Covered
<b>Volume-2A</b>	<b>Field and Laboratory Test Data of Boreholes</b>	Exhibition Hall 1, Exhibition Hall 5, Convention 7, Retail 10	<b>34</b>

Submitted to:

**M/s. Delhi-Mumbai Industrial Corridor Development Corporation Ltd.**

Room 341-B, 3<sup>rd</sup> Floor, Hotel Ashok, Diplomatic Enclave, 50-B, Chanakyapuri, New Delhi-110021

Project No. 217048

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21<sup>st</sup> July, 2017

Project No. 217048-2A

M/s. Delhi-Mumbai Industrial Corridor Development Corporation Ltd.  
Room 341-B 3<sup>rd</sup> Floor  
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Diplomatic Enclave  
50-B, Chanakyapuri  
New Delhi-110021

**Subject: Geotechnical Investigation for Exhibition cum Convention Centre Dwarka, New Delhi**

We have carried out the captioned study in accordance with your work order dated 31<sup>st</sup> March, 2017. We thank you for your business, and hope that you are satisfied with our services rendered.

This Factual Report presents our findings based on the geotechnical investigations conducted by us at the project site. This report presents the field and laboratory test data based on the investigations completed on site.

We have prepared this report based on our findings on site, as well as our experience gained in over 5000 projects completed over the past 28 years. We are pleased to have been of service to you on this project and will be glad to consult further with you and your design team.

Yours faithfully,  
CENGRS GEOTECHNICA PVT. LTD.

Sanjay Gupta  
Managing Director

Ravi Sundaram  
Director



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## DEFINITION OF ACRONYMS

CENGRS	Cengrs Geotechnica Pvt. Ltd.
UTM	Universal Transverse Mercator coordinates system
NABL	National Accreditation Board for Testing and Calibration Laboratories
ISO	International Standards Organization
BIS	Bureau of Indian Standards
EGL	Existing Ground Level
NGL	Natural Ground Level
RL	Reduced Level
SPT	Standard Penetration Test
DS	Consolidated drained direct shear test

## BIS REFERENCES

- Compendium of Indian Standard on Soil Engineering (***Part-2, Field Testing of Soils for Civil Engineering Purposes***) ***SP36 (Part-2:1988) RA 2006***
- Compendium of Indian Standard on Soil Engineering (***Part-1, Laboratory Testing of Soils for Civil Engineering Purposes***) ***SP36 (Part-1:1987) RA 2006***



## 1.0 INTRODUCTION

### 1.1 Project Description

Government of India (GOI) is planning to develop an Exhibition cum Convention Center at Sector-25, Dwarka, New Delhi. GOI has envisaged M/s. Delhi-Mumbai Industrial Corridor Development Corporation (DMICDC) to establish, promote and facilitate the development of the overall project.

The various agencies involved in the design of the facility are as follows:

- |     |  |                              |
|-----|--|------------------------------|
| (a) | Government of India                                      | : Owner                      |
| (b) | Delhi-Mumbai Industrial Corridor Development Corporation | : Client                     |
| (c) | AECOM India Pvt. Ltd.                                    | : Detailed Design Consultant |
| (d) | Cengrs Geotechnica Pvt. Ltd.                             | : Geotechnical Consultant    |

Delhi-Mumbai Industrial Corridor Development Corporation (DMICDC) has awarded the work of detailed geotechnical investigation at the project site to Cengrs Geotechnica Pvt. Ltd (CENGRS). A layout plan indicating the locations of our field investigation is presented on Plates 1 to 4.

The scope of our investigations includes drilling of about one hundred and sixty two(162) boreholes (including 60 priority boreholes as specified by AECOM), conducting hundred (100) field California bearing ratio (FCBR), ten (10) trial pits, one (1) electrical resistivity test (ERT), ten (10) plate load test and installation of one (1) piezometer at the specified location.

**This report volume (Volume-2A) presents the field and laboratory results of thirty four (34) boreholes drilled at the site.**

### 1.2 Scope of Work

The overall purposes of this study are to investigate the stratigraphy at the site and submission of this factual report. To accomplish these purposes, the study is being conducted in the following phases:

- (a) drilling one hundred and sixty two (162) boreholes to 30 m depth or refusal (N>100), in order to determine the site stratigraphy and to collect soil and groundwater samples;
- (b) conducting hundred (100) field California bearing ratio (FCBR) tests to provide data for the design of internal roads;
- (c) excavating ten (10) trial pits to provide additional information on the stratigraphy at shallow depths;
- (d) conducting one (1) electrical resistivity tests (ERT's) to provide data for the grounding systems;
- (e) performing ten (10) plate load test at specified locations to assess the load-settlement behaviour of soils under loading;
- (f) installing one (1) piezometer for long-term monitoring of ground water level to aid in foundation construction;
- (g) testing selected soil and groundwater samples in the laboratory to determine pertinent index and engineering properties; and
- (h) compiling all field and laboratory data and submission of this factual report

### 1.3 Report Format

Our final report shall be presented in seven (7) volumes. The content of each of these report volumes is summarized below:

Report Volume	Report Content	Structures Covered	Number of Boreholes / Tests Covered
Volume I	Engineering Analysis & Recommendations	All structures	-
<b>Volume 2A</b>	<b>Field and Laboratory Test Data of Boreholes</b>	<b>Exhibition Hall 1, Exhibition Hall 5, Convention 7, Retail 10</b>	<b>34</b>
Volume 2B	Field and Laboratory Test Data of Boreholes	Arena 8, Five Star Hotel 11, Office 13, Office 14, Office 15, Retail 16, Office 17, Office 18, Four Star Hotel 21	35
Volume 2C	Field and Laboratory Test Data of Boreholes	Exhibition Hall 2, Exhibition Hall 3, Exhibition Hall 4	33
Volume 2D	Field and Laboratory Test Data of Boreholes	Five Star Hotel 9, Five Star Hotel 12, Four Star Hotel 19, Four Star Hotel 20, Service Apartment 22	31
Volume 2E	Field and Laboratory Test Data of Boreholes	Office 23, Office 24, Three Star Hotel 25, Office 26	29
Volume 2F	Field test results of FCBR, PLT, ERT, Trial pits etc.	-	-

This report volume (Volume-2A) presents the field and laboratory results of thirty four (34) boreholes drilled at the site.

### 1.4 Scope of Work Covered in this Report Volume

Details of boreholes drilled on site and presented in this report volume are as follows:

S.No.	Structure	Borehole No.	UTM Coordinates (Zone 43 R)		Ground Level (RL), m	Borehole Termination Depth (m)
			Easting	Northing		
1	Exhibition Hall 5	PBH-1	699304	3159908	212.500	30.45
2		PBH-2	699377	3159854	212.022	30.45
3		BH-3	699449	3159801	212.112	30.45
4		PBH-5	699521	3159747	212.104	30.45
5		PBH-6	699346	3159965	211.981	30.45
6		PBH-7	699453	3159884	212.365	30.45
7		BH-9	699564	3159804	213.00	30.45
8		PBH-10	699389	3160022	211.699	30.45
9		PBH-11	699461	3159968	211.516	30.45
10		BH-12	699533	3159915	212.280	30.45
11		BH-14	699606	3159861	212.500	30.45

S.No.	Structure	Borehole No.	UTM Coordinates (Zone 43 R)		Ground Level (RL), m	Borehole Termination Depth (m)
			Easting	Northing		
12	Exhibition Hall 1	PBH-44	699833	3160521	212.614	30.45
13		PBH-45	699889	3160480	212.812	30.45
14		PBH-46	699946	3160438	212.500	30.45
15		PBH-47	700002	3160397	212.550	30.45
16		PBH-48	699875	3160579	212.500	30.45
17		PBH-49	699960	3160516	212.500	30.45
18		PBH-50	700044	3160454	212.848	30.45
19		PBH-51	699918	3160636	212.594	30.45
20		PBH-52	699974	3160594	212.600	30.45
21		PBH-53	700030	3160552	212.700	30.45
22		PBH-54	700086	3160511	212.570	30.45
23	Convention 7	PBH-55	700175	3160446	212.600	30.45
24		PBH-56	700098	3160434	212.850	30.45
25		PBH-57	700142	3160401	212.725	30.45
26		PBH-58	700187	3160368	212.792	30.45
27		PBH-59	700109	3160357	212.786	30.45
28	Retail 10	PBH-61	700078	3160283	212.877	30.45
29		PBH-62	700144	3160235	213.131	30.45
30		PBH-63	700031	3160218	213.159	30.45
31		PBH-64	700072	3160187	213.348	30.45
32		PBH-65	700117	3160155	213.394	30.45
33		PBH-66	699981	3160152	213.243	30.45
34		PBH-67	700084	3160076	213.228	30.45

- A layout plan indicating the test locations of our field investigations is presented on Plates 1 to 4.
- The test locations were marked on the field by us in the presence of a client representative using a hand-held Global Positioning System (GPS). A satellite image indicating the test locations (as recorded by GPS) is presented on Plate 5.
- The reduced levels at the test locations were given to us by the client.



## 2.0 FIELD INVESTIGATION

### 2.1 Exploratory Boreholes

The boreholes were progressed using a mechanized calyx drilling rig to the specified depth. The diameter of the borehole was 150 mm. Where caving of the borehole occurred, casing was used to keep the borehole stable. The work was in general accordance with IS: 1892-1979 RA 2002.

Standard Penetration Tests (SPT) was conducted in the boreholes at specified depth intervals. The test was conducted by connecting a split spoon sampler to 'A' rods and driving it by 45 cm using a 63.5 kg hammer falling freely from a height of 75 cm. The tests were conducted in accordance with IS: 2131-1981 RA 2002. The SPT 'N'-values are described as follows:-

1. The number of blows for each 15 cm of penetration of the split spoon sampler is recorded.
2. The blows required to penetrate the initial 15 cm of the split spoon for seating the sampler is ignored due to the possible presence of loose materials or cuttings from the drilling operation.
3. The cumulative number of blows required to penetrate the balance 30 cm of the 45 cm split spoon sampler is termed the SPT value or the 'N' value. For example, a SPT value reported as "20" means that 20 blows were imparted to penetrate the split spoon sampler by the last 30 cm.
4. Where the number of blows required to penetrate the balance 30 cm of the split spoon sampler exceeds 100, the number of blows is presented along with the corresponding penetration. For example, an SPT value reported as "101 / 5 cm" means that 101 blows were imparted to penetrate the split spoon sampler by 5 cm after the first 15 cm initial (seating) penetration.
5. Where refusal ( $N > 100$ ) to further penetration of the split spoon sampler is encountered in the first 15 cm of seating penetration itself, SPT test could not be completed and "Ref" is indicated in the bore logs, along with the penetration achieved. For example, an SPT value reported as "Ref / 5 cm" means that more than 100 blows were imparted to penetrate the split spoon sampler by a total of 5 cm only, and the 15 cm seating penetration could not be achieved.

Disturbed samples were collected from the split spoon after conducting SPT. Undisturbed soil samples were collected by attaching a thin walled 'Shelby' tubes and driving the sampler by light-hammering using a 63.5 kg hammer in accordance with IS: 2132-1986 RA 2002. The tubes were sealed with wax at both ends. Wherever undisturbed samples were not available due to slippages, disturbed samples were collected. All samples were transported to our NABL-accredited laboratory at Noida for further examination and testing.

### 2.2 Groundwater

Groundwater level is measured in the boreholes after drilling and sampling is completed. The measured water levels are recorded on the individual soil profiles.

## 3.0 LABORATORY TEST

The laboratory testing was carried out in our NABL accredited laboratory. The quality procedure in our laboratory conforms to ISO/IEC-17025-2005.

Laboratory tests were conducted on selected soil and groundwater samples to determine their physical and engineering properties. The testing procedures are in accordance with current applicable IS specifications.

The following tests were conducted on selected soil and groundwater samples recovered from the boreholes:





Laboratory Test		IS Code Referred
Bulk Density		By calculations
Natural moisture content		IS : 2720 (Part-2)-1973, RA-2010
Specific Gravity		IS : 2720 (Part-3)-1980, RA-2007
Grain size analysis		IS : 2720 (Part-4)-1985, RA-2010
Liquid Limit and Plastic Limit		IS : 2720 (Part-5)-1985, RA-2010
Free Swell Index		IS : 2720 (Part-40) -1977, RA-2007
Consolidated drained direct shear test		IS : 2720 (Part-13)-1986, RA-2010
Chemical Analysis of water*	pH value	IS : 3025 (Part-11)-1983, RA-2006
	sulphates	IS : 3025 (Part-24)-1986, RA-2009
	chlorides	IS : 3025 (Part-32)-1988, RA-2009
Chemical Analysis of soil*	pH value	IS : 2720 (Part 26)-1987, RA-2007
	Sulphates	IS : 2720 (Part-27)-1977, RA-2010
	Chlorides	IS : 3025 (Part-32)-1988, RA-2009

\*Outside NABL Scope

Engineering terms used to describe soils are explained on Plate 6. A note on our NABL accreditation together with the uncertainty in laboratory measurements is presented on Plate 7.

#### 4.0 GENERAL SITE CONDITIONS

##### 4.1 Site Description

The site for the proposed Exhibition cum Convention center is located at Sec-25 Dwarka and lies at Latitude 28°33'7.76"N and Longitude 77° 2'35.31"E. The site is situated about 3.0 km west of Terminal-3, IGI Airport and about 1.5 km west of Dwarka Sec-21 Metro Station.

The site is bounded by roads on all the sides and covers about 221 acres on plan. Localized construction debris was observed at the site at the time of our field investigations.

##### 4.2 Regional Geology

The deposits in the project area belong to the "Indo Gangetic Alluvium" and are river deposits of the Yamuna, and its tributaries. The alluvial tract<sup>(1)</sup> is in the nature of a synclinal basin formed concomitantly with the elevation of the Himalayas to its north. It was formed during the later stages of the Himalayan Orogeny by the buckling down of the northern border of the peninsular shield beneath the sediments thrust over it from the north.

The Pleistocene and Recent Deposits of the Indo-Gangetic Basin are composed of gravels, sands, silts and clays with remains of animal and plants. A generalized description of geological formations encountered in Gurgaon and Delhi is as follows:

<sup>(1)</sup> Krishnan, M.S. (1986), "**Geology of India & Burma**", CBS Publishers, New Delhi.



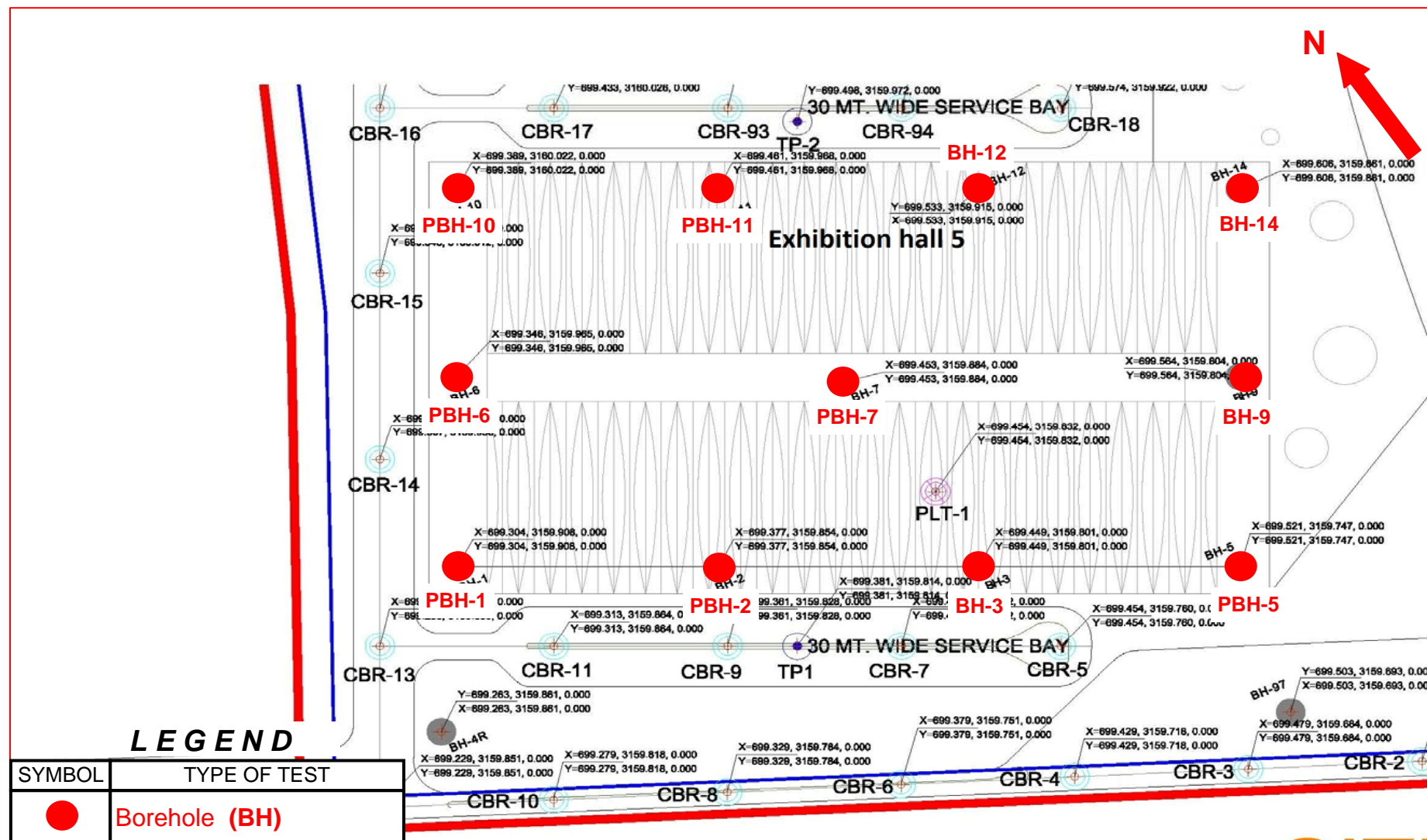
Period	Formation	Description
Recent	Newer Alluvium (Younger alluvium)	Unconsolidated, inter-bedded lenses of sand, silt gravel and clay confined to flood plains of Yamuna river.
Quaternary	Older Alluvium	Unconsolidated inter-bedded, inter-fingering deposit sand, clay and kankar, moderately sorted, thickness variable, at places more than 300 m.
~ ~ ~ ~ ~ Unconformity ~ ~ ~ ~ ~		
Pre-Cambrian	Pegmatite and Quartz Veins Quartzites and minor Schist Bands	Well stratified, thick-bedded brown to buff colour, hard and compact, intruded locally by pegmatite and quartz veins inter-bedded with mica schists.

The older alluvium is rather dark colored (locally called “Bhanger”) and is generally, rich in concretions or nodules of impure calcium carbonate (kankars). The kankars are of all shapes and sizes, varying from small sand sized grains to big grains and big lumps. The age of the “Bhanger” alluvium is Middle to Upper Pleistocene.

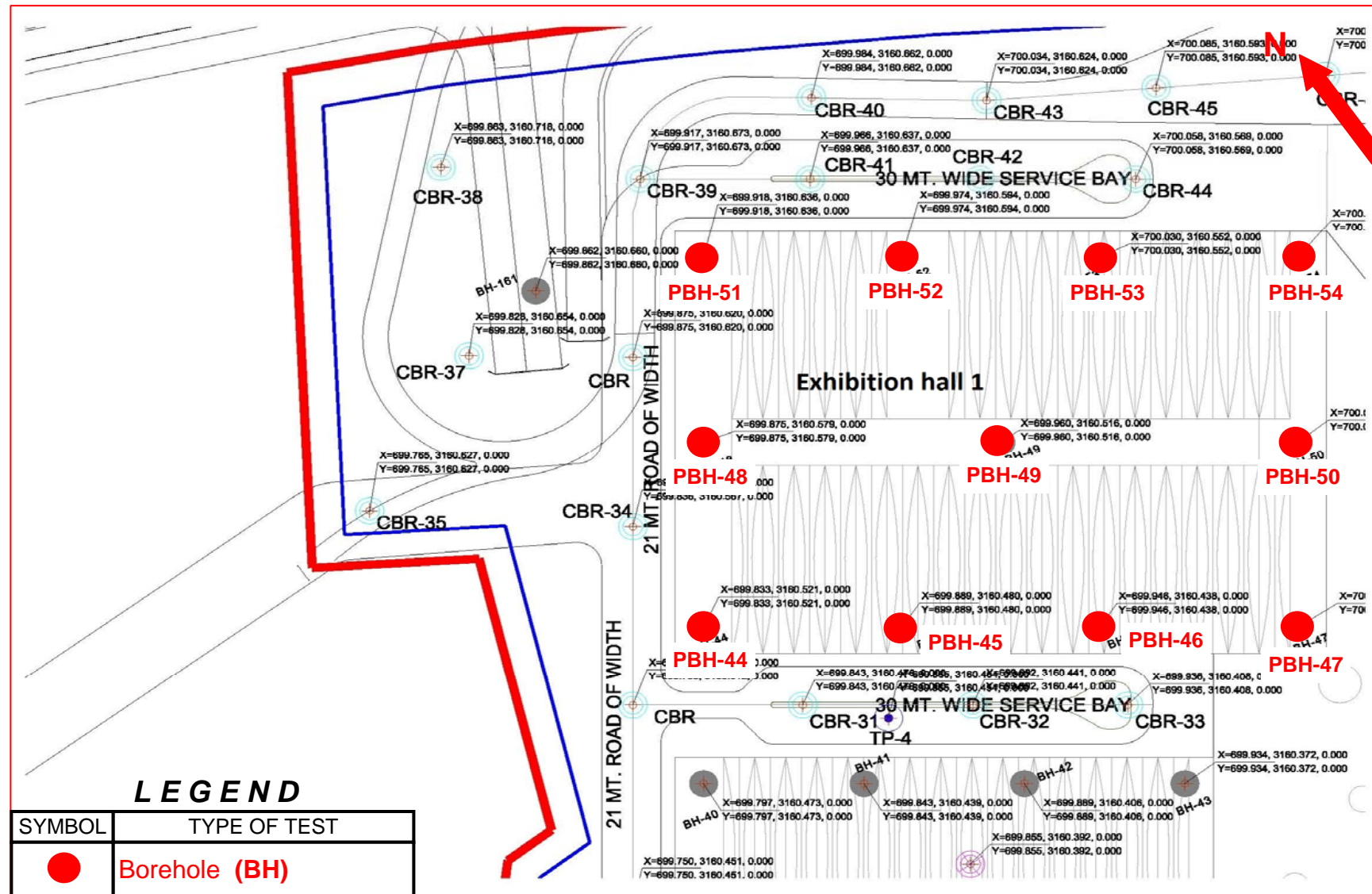
The newer alluvium (locally called “Khadar”) is light colored and poor in concretions. It contains lenticular beds of sand and gravel as well as peat beds. It is merged by insensible gradations into the Recent or deltaic alluvia and its age is Upper Pleistocene to Recent.

## 5.0 VARIABILITY IN SUBSURFACE CONDITIONS

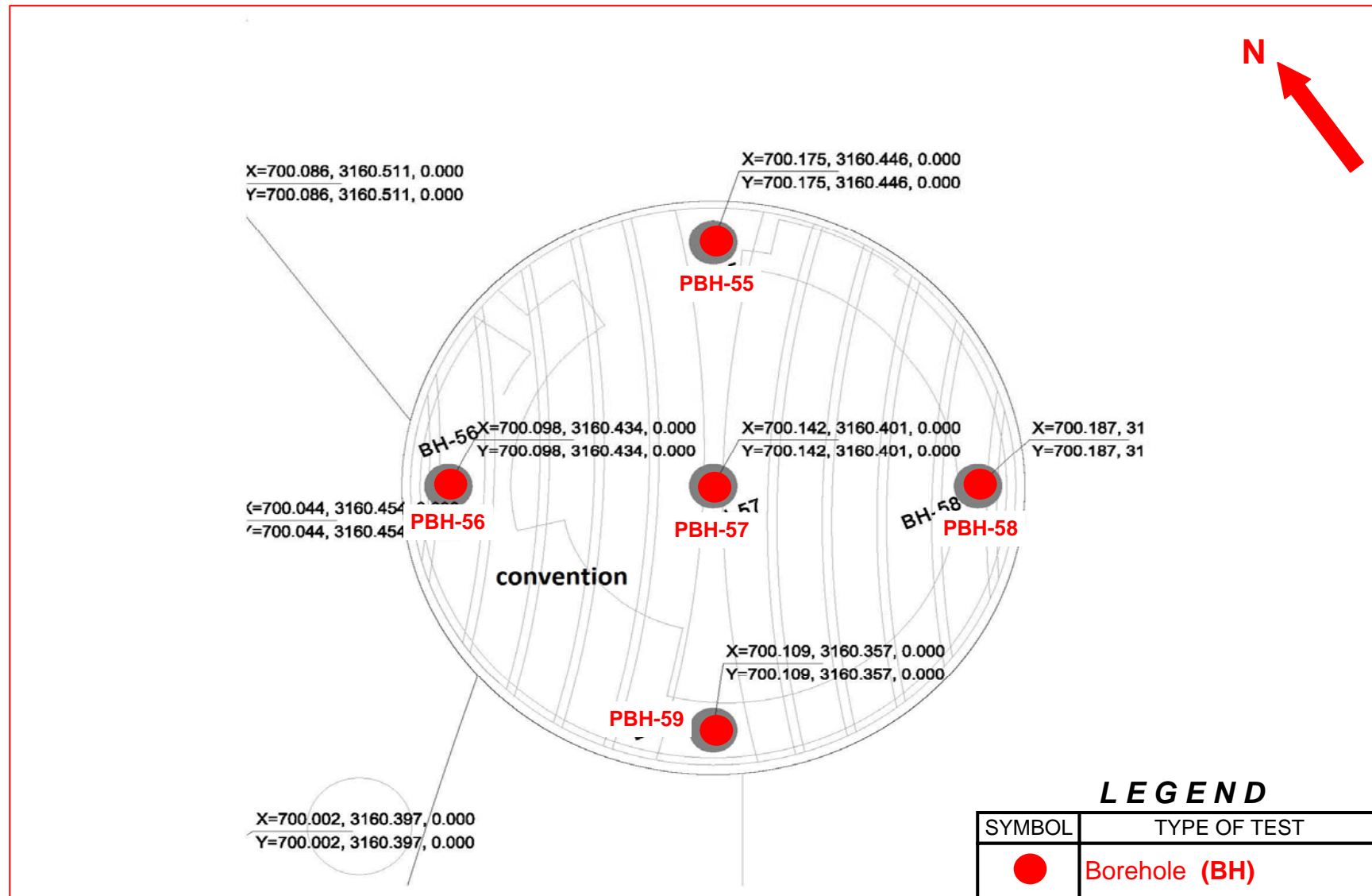
Subsurface conditions encountered during construction may vary somewhat from the conditions encountered during the site investigation. In case significant variations are encountered during construction, we request to be notified so that our engineers may review the recommendations in this report in light of these variations.



Plan of Field Investigations

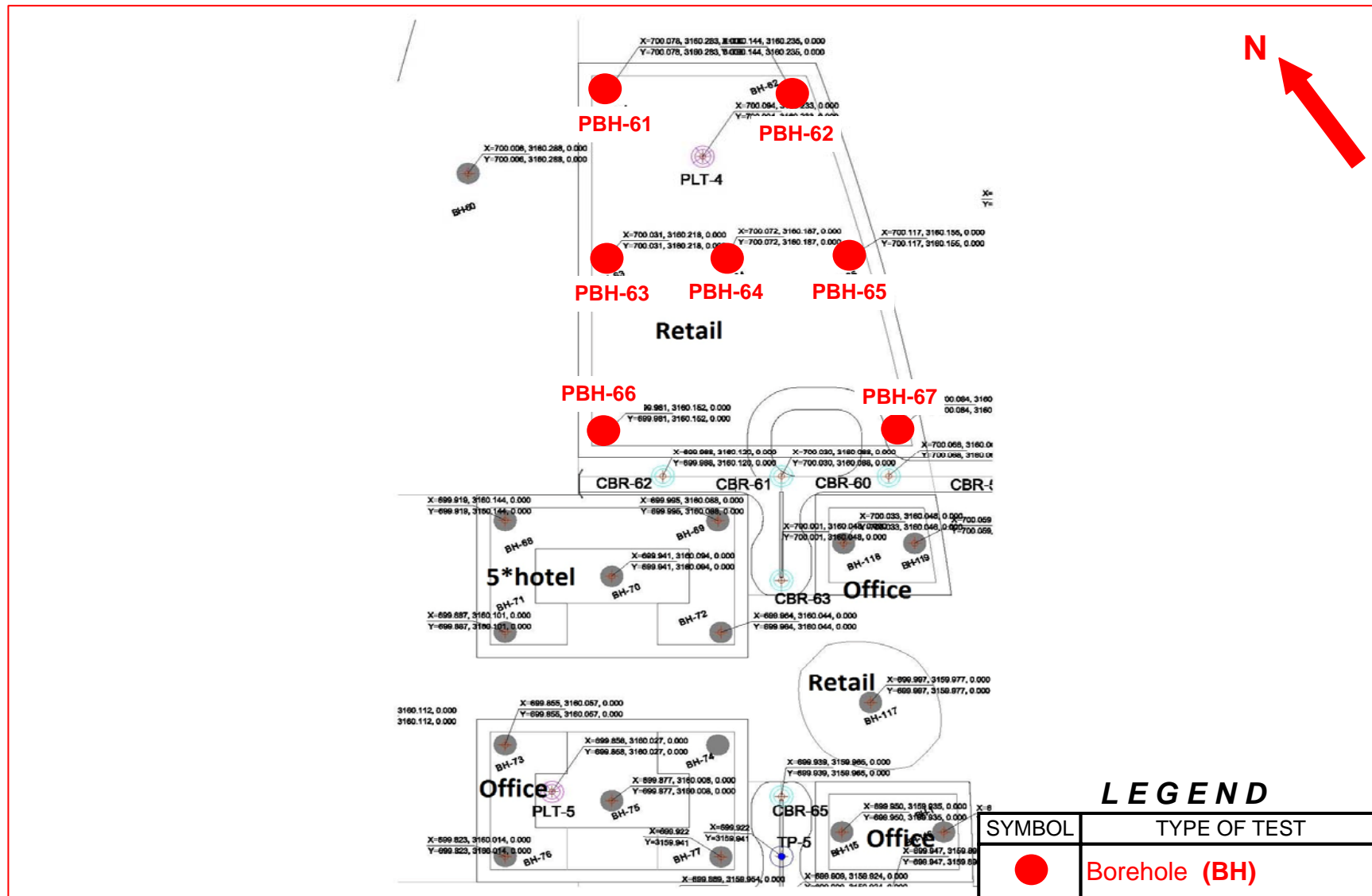


Plan of Field Investigations

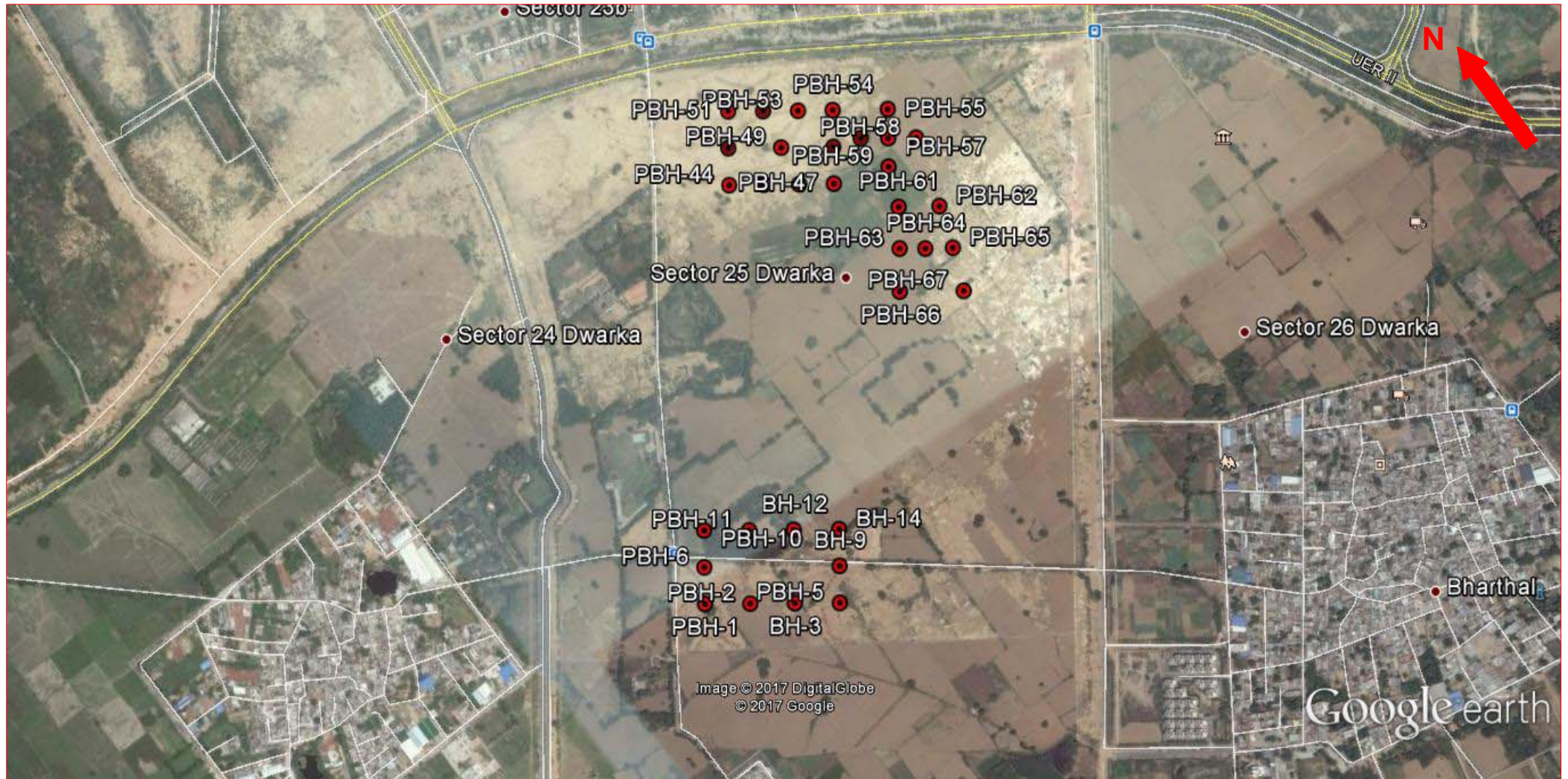


Plan of Field Investigations





Plan of Field Investigations



- Satellite image taken from Google Earth®
- Test Locations marked as per GPS coordinates taken on site using hand-held Garmin® device
- Accuracy of hand-held GPS device generally ranges from 4-6m, and varies depending on the availability of satellite connection at the site

### Satellite Image of Site and Test Locations

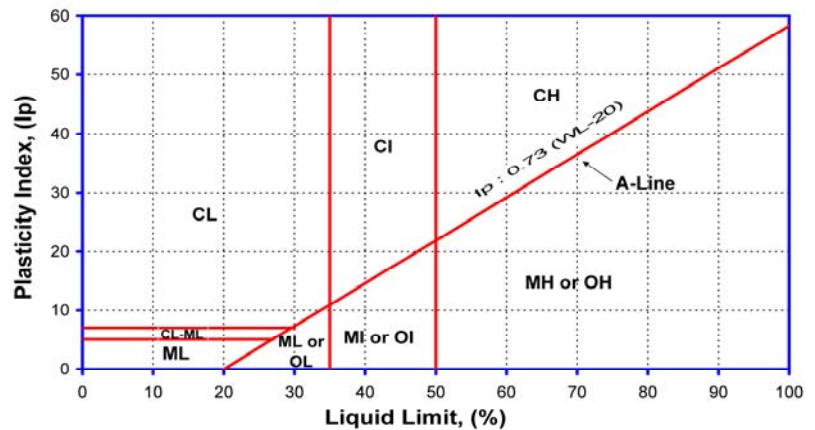




### Plasticity of Clay

Plasticity	Liquid Limit
Low Plastic	< 35
Medium Plastic	35 to 50
High Plastic	> 50

### Plasticity Chart



### Consistency of Cohesive Soils

Consistency	Cohesion Intercept, kg/sq.cm	SPT (N) Value
Very Soft	< 0.1	0 to 2
Soft	0.1 to 0.25	2 to 4
Firm/Medium	0.25 to 0.5	4 to 8
Stiff	0.5 to 1.0	8 to 15
Very Stiff	1.0 to 2.0	15 to 30
Hard	> 2.0	> 30

### Density Condition of Granular Soils

Density Descriptor	SPT (N) Value	Static Cone Tip Resistance kg/sq.cm
Very Loose	0 to 4	< 20
Loose	4 to 10	20 to 40
Medium Dense	10 to 30	40 to 120
Dense	30 to 50	120 to 200
Very dense	> 50	> 200

### Degree of Expansion of Fine Grained Soils

Liquid Limit	Plasticity Index	Shrinkage Index	Free Swell Percent	Degree of Expansion	Degree of Severity
20 - 35	< 12	< 15	< 50	Low	Non-critical
35 - 50	12 - 23	15 - 30	50 - 100	Medium	Marginal
50 - 70	23 - 32	30 - 60	100 - 200	High	Critical
70 - 90	> 32	> 60	> 200	Very High	Severe

## Engineering Description of Soils



### NABL Accredited Laboratory

Our laboratory is accredited to **National Accreditation Board for Testing and Calibration Laboratories (NABL)**, New Delhi. The quality procedures in our laboratory conform to the International Standard **ISO/IEC: 17025-2005**.

The accreditation assures our clients of work quality in conformance with international norms and practices. It authorizes us to use the NABL logo on test results.

To maintain the necessary level of quality and reliability in all measurements on a continual basis, we indulge in the following:

- Use of calibrated equipment, regular maintenance and good housekeeping are a part of our work culture.
- Inter-laboratory comparison, proficiency testing and replicate testing, continuing education - ensure uniform quality of results.
- Internal Audit of quality procedures is done by our qualified ISO 17025 auditors to maintain the requisite standards. NABL conducts external audit.

### Uncertainty

Every measurement entails an uncertainty. It is well known that no measuring instrument can determine the true value of any measurement. The cumulative effect of factors such as sensitivity of equipment, accuracy in calibration, human factors and environmental conditions will determine the overall uncertainty in the parameter determined from these measurements.

As a part of our commitment to our clients, we have worked out the uncertainty in the parameters reported by our laboratory. Although this does not form a part of our contract agreement, we present below our statistical estimate of uncertainty of various parameters based on our most recent evaluation (February, 2016).

Test / Parameter		Uncertainty*	Test / Parameter		Uncertainty*	
Moisture Content		± 0.29%	Free Swell Index, %		± 2.6%	
Bulk & Dry Density		± 0.01 g/cc	Swell Pressure		± 0.43 kg/cm <sup>2</sup>	
Specific Gravity		± 0.01	Consolidation	Pressure	± 0.03 kg/cm <sup>2</sup>	
Liquid Limit		± 0.29%		Void Ratio	±0.01	
Plastic Limit			Density Index (relative density) of cohesionless soils		± 5 %	
Shrinkage Limit						
Unconfined Compression	c	± 0.054 kg/cm <sup>2</sup>	CD Direct Shear Test	φ	± 0.29 degrees	
UU Triaxial Test	c	± 0.01 kg/cm <sup>2</sup>	Soil Gradation		± 0.5% of particle size	
	φ	± 0.48 degree				
Std/Mod Proctor Compaction	MDD	± 0.14 g/cc	Coefficient of Permeability		± 2.7 x 10 <sup>-5</sup> cm/s	
	OMC	± 0.29%	Rock		Crushing Strength	± 3.1 kg/cm <sup>2</sup>
Laboratory CBR		± 0.58%			Point Load Strength Index	± 8.89 kg/cm <sup>2</sup>

\* at 95 percent confidence level for coverage factor of 2

### **Uncertainty in Laboratory Measurements**

ISO/IEC 17025:2005  
Certified Laboratory  
(NABL)  
Certificate No. T-1741



### Soil Profile (PBH-1)

Location : Exhibition hall 5 Termination Depth : 30.45 m (RL 182.05 m) Boring Method : Rotary Drilling  
UTM Coordinates : 699304 E, 3159908 N Ground Water Depth : 16.04 m Casing Depth : -  
Surface Elevation : RL 212.500 m Boring Start : 27-May-17  
Ground Water Level : RL 196.5 m Boring Finish : 29-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)																		8
1.00	1.45	SPT1	10	16		- stiff, 0.0 to 5.0 m		0	22	60	18													9
2.00	2.30	UDS1														1.79	1.60	12.1						20
3.00	3.45	SPT2	11	13								27.0	19.6	7.3										0
4.00	4.30	UDS2														1.80	1.59	13.6						
5.00	5.45	SPT3	16	17		- very stiff, 5.0 to 14.0 m		0	20	65	15													
6.00	6.30	UDS3														1.81	1.57	15.9						
7.00	7.45	SPT4	20	19																				
8.00	8.30	DS2																						
9.50	9.95	SPT5	24	20																				
11.00	11.30	UDS4														1.84	1.58	16.2						
12.50	12.95	SPT6	30	22								27.0	17.3	9.7										

<sup>(1)</sup> SPT is outside NABL scope.





ISO/IEC 17025:2005  
Certified Laboratory  
(NABL)  
Certificate No. T-1741



Location : Exhibition hall 5  
UTM Coordinates : 699304 E, 3159908 N

### Soil Profile (PBH-1)

Termination Depth : 30.45 m (RL 182.05 m) Boring Method : Rotary Drilling  
Ground Water Depth : 16.04 m Casing Depth : -  
Surface Elevation : RL 212.500 m Boring Start : 27-May-17  
Ground Water Level : RL 196.5 m Boring Finish : 29-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5	36	24		Hard brown sandy silt, low plastic  - CL, 14.0 to 30.0 m		0	18	68	14				1.85	1.54	20.0		DS	1 ,2, 3	0.0	31.2		
15.50	15.95	SPT7																						
17.00	17.30	DS3																						
18.50	18.95	SPT8																						
20.00	20.30	UDS6	53	22								27.0	19.1	7.9	1.90	1.56	22.3							
22.00	22.45	SPT9																						
24.00	24.30	DS4																						
26.00	26.45	SPT10																						
28.00	28.30	DS5	57	23																				
30.00	30.45	SPT11																						
			62	23		- CL-ML, 30.0 to 30.45 m	30.45																	

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-2)

Location :	Exhibition hall 5	Termination Depth :	30.45 m (RL 181.572 m)	Boring Method :	Rotary Drilling
UTM Coordinates :	699377 E, 3159854 N	Ground Water Depth :	20.80 m	Casing Depth :	-
		Surface Elevation :	RL 212.022 m	Boring Start :	20-Apr-17
		Ground Water Level :	RL 191.2 m	Boring Finish :	22-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Very stiff to hard brown sandy silt with gravel, low plastic (CL)																		0
1.00	1.45	SPT1	15	23		- very stiff, 0.0 to 12.5 m																		9
2.00	2.30	UDS1														1.81	1.62	11.3						18
3.00	3.45	SPT2	20	24				9	38	44	9													
4.00	4.30	UDS2														1.82	1.61	13.4		DS	0.5, 1, 1.5	0.0	31.8	0
5.00	5.45	SPT3	21	22															2.65					
6.00	6.30	UDS3														1.83	1.61	13.4						
7.00	7.45	SPT4	23	21								25.3	16.1	9.2										
8.00	8.30	UDS4														1.84	1.64	12.0						
9.50	9.95	SPT5	29	24				6	21	59	14													
11.00	11.30	UDS5														1.85	1.67	11.0						
12.50	12.95	SPT6	34	25		- hard, 12.5 to 12.95 m																		

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Exhibition hall 5  
UTM Coordinates : 699377 E, 3159854 N

### Soil Profile (PBH-2)

Termination Depth : 30.45 m (RL 181.572 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.80 m Casing Depth : -  
Surface Elevation : RL 212.022 m Boring Start : 20-Apr-17  
Ground Water Level : RL 191.2 m Boring Finish : 22-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Hard brown sandy silt with traces of gravel, low plastic (CL)										1.86	1.62	14.8		DS	0.5, 1, 1.5	0.0	32.9	
15.50	15.95	SPT7	37	25																				
17.00	17.30	UDS7														1.87	1.59	17.5						
18.50	18.95	SPT8	40	24				1	42	48	9													
20.00	20.30	UDS8														1.89	1.59	19.2						
22.00	22.28	SPT9	102/13cm	102/13cm								24.0	14.5	9.5										
24.00	24.08	UDS9					26.00									1.95	1.75	11.5						
26.00	26.30	SPT10	100/15cm	100/15cm		Hard brown clayey silt with traces of gravel, medium plastic (CI)		2	16	64	18													
28.00	28.10	DS2																						
30.00	30.45	SPT11	50	50			30.45					32.3	18.8	13.5										

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (BH-3)

Location : Exhibition hall 5  
UTM Coordinates : 699449 E, 3159801 N  
Termination Depth : 30.45 m (RL 181.662 m)  
Ground Water Depth : 20.30 m  
Surface Elevation : RL 212.112 m  
Ground Water Level : RL 191.8 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 27-May-17  
Boring Finish : 29-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Loose brown silty fine sand with traces of gravels (SM)																		
1.00	1.45	SPT1	5	8				2	52	39	7													
2.00	2.30	UDS1					3.00									1.78	1.59	12.3						
3.00	3.45	SPT2	7	8		Firm to very stiff brown sandy silt with gravels, low plastic (CL)						31.1	17.5	13.6										
4.00	4.30	UDS2				- firm, 3.0 to 5.0 m										1.79	1.57	14.3		DS	0.5, 1, 1.5	0.0	34.7	
5.00	5.45	SPT3	12	12		- stiff, 5.0 to 9.5 m																		
6.00	6.30	UDS3						14	18	56	12					1.81	1.56	15.8						
7.00	7.45	SPT4	13	12																				
8.00	8.30	DS2																						
9.50	9.95	SPT5	17	14		- very stiff, 9.5 to 14.0 m						26.9	17.9	9.0										
11.00	11.30	UDS4														1.82	1.62	12.0						
12.50	12.95	SPT6	24	18																				





<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (BH-3)

Location : Exhibition hall 5  
UTM Coordinates : 699449 E, 3159801 N  
Termination Depth : 30.45 m (RL 181.662 m)  
Ground Water Depth : 20.30 m  
Surface Elevation : RL 212.112 m  
Ground Water Level : RL 191.8 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 27-May-17  
Boring Finish : 29-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	DS3	27	18		Very stiff to hard brown sandy silt with traces of gravels, low plastic (CL)		2	30	56	12	26.3	17.7	8.5		1.88	1.50	25.2						
15.50	15.95	SPT7				- very stiff, 14.0 to 22.0 m																		
17.00	17.30	DS4																						
18.50	18.95	SPT8	30	18		- hard, 22.0 to 30.45 m	30.45																	
20.00	20.30	UDS5																						
22.00	22.45	SPT9																						
24.00	24.30	DS5																						
26.00	26.45	SPT10																						
28.00	28.30	DS6	41	18																				
30.00	30.45	SPT11	50	20																				

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-5)

Location : Exhibition hall 5  
UTM Coordinates : 699521 E, 3159747 N  
Termination Depth : 30.45 m (RL 181.654 m)  
Ground Water Depth : 20.70 m  
Surface Elevation : RL 212.104 m  
Ground Water Level : RL 191.4 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 20-Apr-17  
Boring Finish : 22-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff brown sandy silt, low plastic (CL)																		0
1.00	1.45	SPT1	12	19																				
2.00	2.30	UDS1					3.00					28.1	16.3	11.8		1.80	1.62	10.9						8
3.00	3.45	SPT2	15	18		Medium dense brown silty fine sand with gravel (SM)		10	74	16	0									DS	0.5, 1, 1.5	0.0	30.6	0
4.00	4.30	UDS2														1.81	1.56	15.5						
5.00	5.45	SPT3	16	17												1.82	1.59	14.3						
6.00	6.30	UDS3														1.83	1.61	13.4						
7.00	7.45	SPT4	21	19																				
8.00	8.30	UDS4														1.84	1.64	12.4						
9.50	9.95	SPT5	23	19																				
11.00	11.30	UDS5					12.50																	
12.50	12.95	SPT6	30	22		Hard brown sandy silt, low plastic (CL)						27.6	17.3	10.3										

<sup>(1)</sup> SPT is outside NABL scope.



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Location : Exhibition hall 5  
UTM Coordinates : 699521 E, 3159747 N

### Soil Profile (PBH-5)

Termination Depth : 30.45 m (RL 181.654 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.70 m Casing Depth : -  
Surface Elevation : RL 212.104 m Boring Start : 20-Apr-17  
Ground Water Level : RL 191.4 m Boring Finish : 22-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.10	UDS6				Hard brown sandy silt, low plastic (CL)	15.50									1.88	1.61	16.4		DS	0.5, 1, 1.5	0.0	33.0	
15.50	15.95	SPT7	55	36		Very dense to dense brown silty fine sand intermixed with gravel (SM)		28	53	19	0													
17.00	17.30	DS2				- very dense, 15.5 to 18.5 m																		
18.50	18.95	SPT8	30	18		- medium dense, 18.5 to 22.0 m																		
20.00	20.30	UDS7					22.00									1.85	1.60	16.2						
22.00	22.45	SPT9	36	18		Hard brown sandy silt, low plastic (CL)		0	41	47	12	25.4	15.4	10.0										
24.00	24.30	UDS8														1.87	1.61	16.2						
26.00	26.45	SPT10	45	19																				
28.00	28.30	UDS9														1.90	1.71	11.5						
30.00	30.45	SPT11	75	26			30.45																	

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-6)

Location : Exhibition hall 5 Termination Depth : 30.45 m (RL 181.531 m) Boring Method : Rotary Drilling  
UTM Coordinates : 699346 E, 3159965 N Ground Water Depth : 20.70 m Casing Depth : -  
Surface Elevation : RL 211.981 m Boring Start : 22-Apr-17  
Ground Water Level : RL 191.3 m Boring Finish : 24-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to hard brown sandy silt, low plastic (CL)																		9
1.00	1.45	SPT1	10	16		- stiff, 0.0 to 5.0 m																		0
2.00	2.30	UDS1														1.80	1.61	12.0						
3.00	3.45	SPT2	14	17				0	42	48	10													0
4.00	4.30	UDS2														1.81	1.57	15.0		DS	0.5, 1, 1.5	0.0	30.5	
5.00	5.45	SPT3	16	17		- very stiff, 5.0 to 12.5 m													2.63					0
6.00	6.30	UDS3														1.81	1.60	13.4						
7.00	7.45	SPT4	20	19																				
8.00	8.30	UDS4														1.83	1.62	13.2						
9.50	9.95	SPT5	26	22																				
11.00	11.30	UDS5						0	43	48	9					1.85	1.63	13.5						
12.50	12.95	SPT6	31	23		- hard, 12.5 to 14.0 m						25.5	16.8	8.6										



<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-6)

Location : Exhibition hall 5  
UTM Coordinates : 699346 E, 3159965 N  
Termination Depth : 30.45 m (RL 181.531 m)  
Ground Water Depth : 20.70 m  
Surface Elevation : RL 211.981 m  
Ground Water Level : RL 191.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 22-Apr-17  
Boring Finish : 24-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)												
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)													
14.00	14.30	UDS6	26	17		Very stiff brown sandy silt, low plastic (CL)	18.50	0	58	36	6				1.84	1.65	11.5																			
15.50	15.95	SPT7																																		
17.00	17.30	UDS7																																		
18.50	18.95	SPT8	36	22		Dense brown silty fine sand (SM)																					1.85	1.65	12.4							
20.00	20.30	UDS8																											1.87	1.62	15.4					
22.00	22.45	SPT9	40	19																																
24.00	24.30	DS2																																		
26.00	26.45	SPT10	46	20																																
28.00	28.30	DS3																																		
30.00	30.45	SPT11	50	20			30.45																													

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-7)

Location : Exhibition hall 5 Termination Depth : 30.45 m (RL 181.915 m) Boring Method : Rotary Drilling  
UTM Coordinates : 699453 E, 3159884 N Ground Water Depth : 20.30 m Casing Depth : -  
Surface Elevation : RL 212.365 m Boring Start : 27-May-17  
Ground Water Level : RL 192.1 m Boring Finish : 29-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	9	14		- stiff, 0.0 to 5.0 m		0	31	56	13													9
2.00	2.30	UDS1														1.80	1.62	11.3						
3.00	3.45	SPT2	15	18																				0
4.00	4.30	UDS2										33.8	18.2	15.6		1.81	1.61	12.5		DS	0.5, 1, 1.5	0.0	35.3	9
5.00	5.45	SPT3	20	21		- very stiff, 5.0 to 9.5 m																		0
6.00	6.30	DS2																						
7.00	7.45	SPT4	22	20		- with traces of gravels, 7.0 to 9.5 m		1	43	46	10													
8.00	8.30	UDS3					9.50									1.84	1.58	16.5						
9.50	9.95	SPT5	26	22		Medium dense brown silty fine sand (SM)																		
11.00	11.30	UDS4														1.85	1.58	16.9						
12.50	12.95	SPT6	29	21																				

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Exhibition hall 5  
UTM Coordinates : 699453 E, 3159884 N

### Soil Profile (PBH-7)

Termination Depth : 30.45 m (RL 181.915 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.30 m Casing Depth : -  
Surface Elevation : RL 212.365 m Boring Start : 27-May-17  
Ground Water Level : RL 192.1 m Boring Finish : 29-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	DS3				Dense brown silty fine sand (SM)		0	51	40	9													
15.50	15.95	SPT7	32	21																				
17.00	17.30	UDS5														1.86	1.56	19.2						
18.50	18.95	SPT8	35	21																				
20.00	20.30	UDS6														1.84	1.60	14.9						
22.00	22.45	SPT9	39	18																				
24.00	24.30	DS4					26.00																	
26.00	26.45	SPT10	46	20		Hard brown sandy silt, low plastic (CL)																		
28.00	28.30	DS5										30.1	17.6	12.5										
30.00	30.45	SPT11	50	20			30.45																	

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (BH-9)

Location : Exhibition hall 5  
UTM Coordinates : 699564 E, 3159804 N

Termination Depth : 30.45 m (RL 182.55 m)  
Ground Water Depth : 20.00 m  
Surface Elevation : RL 213.000 m  
Ground Water Level : RL 193 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 30-May-17  
Boring Finish : 01-Jun-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	11	17		- stiff, 0.0 to 5.0 m		0	25	64	11													
2.00	2.30	UDS1														1.80	1.62	11.3						
3.00	3.45	SPT2	14	17																				
4.00	4.30	UDS2														1.81	1.60	12.6						
5.00	5.45	SPT3	16	17		- very stiff, 5.0 to 14.0 m		0	28	60	12													
6.00	6.30	UDS3														1.81	1.60	13.2						
7.00	7.45	SPT4	18	17																				
8.00	8.30	UDS4						0	30	60	10					1.82	1.59	14.6	2.64	DS	0.5, 1, 1.5	0.0	31.1	
9.50	9.95	SPT5	21	17																				
11.00	11.30	UDS5										26.2	17.4	8.8		1.83	1.61	13.6						
12.50	12.95	SPT6	30	22				0	22	64	14													


<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (BH-9)

Location :	Exhibition hall 5	Termination Depth :	30.45 m (RL 182.55 m)	Boring Method :	Rotary Drilling
UTM Coordinates :	699564 E, 3159804 N	Ground Water Depth :	20.00 m	Casing Depth :	-
		Surface Elevation :	RL 213.000 m	Boring Start :	30-May-17
		Ground Water Level :	RL 193 m	Boring Finish :	01-Jun-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	34	23		Hard brown sandy silt, low plastic (CL)	30.45	0	16	71	13	25.2	17.6	7.6	1.88	1.52	23.2	2.65						
15.00	15.45	SPT7																						
17.00	17.30	DS2																						
18.50	18.95	SPT8																						
20.00	20.30	UDS7																						
22.00	22.45	SPT9																						
24.00	24.30	DS3																						
26.00	26.45	SPT10																						
28.00	28.30	UDS8																						
30.00	30.45	SPT11																						




<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-10)

Location : Exhibition hall 5  
Termination Depth : 30.45 m (RL 181.249 m)  
Boring Method : Rotary Drilling  
UTM Coordinates : 699389 E, 3160022 N  
Ground Water Depth : 20.40 m  
Casing Depth : -  
Surface Elevation : RL 211.699 m  
Boring Start : 22-Apr-17  
Ground Water Level : RL 191.3 m  
Boring Finish : 24-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1	10	16		Stiff brown sandy silt, low plastic (CL)	4.00	0	44	47	9					1.80	1.54	17.1	2.63	DS	0.5 ,1, 1.5	0.0	32.2	0
1.00	1.45	SPT1																						
2.00	2.30	UDS1																						
3.00	3.45	SPT2																						
4.00	4.30	UDS2	20	21		Medium dense to dense brown silty fine sand with traces of gravel (SM)  - medium dense, 4.0 to 9.5 m		1	46	44	9					1.81	1.63	11.3						0
5.00	5.45	SPT3																						
6.00	6.30	UDS3																						
7.00	7.45	SPT4																						
8.00	8.30	UDS4	36	30		- dense, 9.5 to 14.0 m										1.83	1.66	10.5						
9.50	9.95	SPT5																						
11.00	11.30	UDS5																						
12.50	12.95	SPT6																						

<sup>(1)</sup> SPT is outside NABL scope.




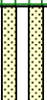

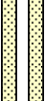





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Location : Exhibition hall 5  
UTM Coordinates : 699389 E, 3160022 N

### Soil Profile (PBH-10)

Termination Depth : 30.45 m (RL 181.249 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.40 m Casing Depth : -  
Surface Elevation : RL 211.699 m Boring Start : 22-Apr-17  
Ground Water Level : RL 191.3 m Boring Finish : 24-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	42	28		Hard brown sandy silt, low plastic (CL)	17.00	0	40	47	13	22.9	15.3	7.6		1.88	1.69	11.3						
15.50	15.95	SPT7																						
17.00	17.30	UDS7				Dense to very dense brown silty fine sand (SM)																		
18.50	18.95	SPT8	45	27		- dense, 17.0 to 22.0 m										1.90	1.71	11.2						
20.00	20.30	UDS8																						
22.00	22.45	SPT9	53	22		- very dense, 22.0 to 26.0 m																		
24.00	24.30	UDS9	48	20		Hard brown sandy silt, low plastic (CL)	26.00	0	42	48	10					1.90	1.66	14.6						
26.00	26.45	SPT10																						
28.00	28.30	UDS10																						
30.00	30.45	SPT11	51	20			30.45																	

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-11)

Location : Exhibition hall 5  
Termination Depth : 30.45 m (RL 181.066 m)  
Boring Method : Rotary Drilling  
UTM Coordinates : 699461 E, 3159968 N  
Ground Water Depth : 20.40 m  
Casing Depth : -  
Surface Elevation : RL 211.52 m  
Boring Start : 27-May-17  
Ground Water Level : RL 191.1 m  
Boring Finish : 29-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	10	16		- stiff, 0.0 to 3.0 m		6	22	52	20													
2.00	2.30	UDS1				- with gravels, 0.0 to 5.0 m									1.80	1.62	11.3							
3.00	3.45	SPT2	16	19		- very stiff, 3.0 to 7.0 m						31.0	18.3	12.8										
4.00	4.30	UDS2													1.81	1.62	12.0							
5.00	5.45	SPT3	22	23		- with traces of gravels, 5.0 to 9.5 m		3	25	58	14													
6.00	6.30	UDS3													1.85	1.60	15.2							
7.00	7.45	SPT4	40	37		- hard, 7.0 to 14.0 m						30.9	18.4	12.5										
8.00	8.30	UDS4													1.88	1.62	16.2	DS	0.5 ,1, 1.5	0.0	33.1			
9.50	9.95	SPT5	44	36		- with gravels, 9.5 to 14.0 m		8	19	56	17													
11.00	11.30	DS2																						
12.50	12.95	SPT6	49	36																				

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Exhibition hall 5  
UTM Coordinates : 699461 E, 3159968 N

### Soil Profile (PBH-11)

Termination Depth : 30.45 m (RL 181.066 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.40 m Casing Depth : -  
Surface Elevation : RL 211.52 m Boring Start : 27-May-17  
Ground Water Level : RL 191.1 m Boring Finish : 29-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5				Hard brown sandy silt, low plastic (CL)						32.8	18.2	14.6		1.91	1.63	16.9						
15.50	15.95	SPT7	54	36		- with gravels, 14.0 to 26.0 m																		
17.00	17.30	DS3																						
18.50	18.95	SPT8	58	35			14	20	49	17														
20.00	20.30	UDS6														1.93	1.58	22.0						
22.00	22.45	SPT9	64	25		- with traces of gravels, 26.0 to 30.45 m						29.0	18.6	10.4										
24.00	24.30	UDS7														1.95	1.59	23.0						
26.00	26.45	SPT10	68	26			2	26	60	12														
28.00	28.30	UDS8														1.97	1.58	25.0						
30.00	30.45	SPT11	79	27			30.45					31.7	19.7	11.9										

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (BH-12)

Location : Exhibition hall 5  
UTM Coordinates : 699533 E, 3159915 N  
Termination Depth : 30.45 m (RL 181.83 m)  
Ground Water Depth : 20.45 m  
Surface Elevation : RL 212.28 m  
Ground Water Level : RL 191.8 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 30-May-17  
Boring Finish : 01-Jun-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	12	19		- stiff, 0.0 to 5.0 m		0	26	55	19													
2.00	2.30	UDS1														1.80	1.61	11.6						
3.00	3.45	SPT2	12	14				0	14	75	11	27.4	17.3	10.1										
4.00	4.30	UDS2														1.81	1.58	14.6		DS	0.5, 1, 1.5	0.0	30.2	
5.00	5.45	SPT3	18	19		- very stiff, 5.0 to 14.0 m						27.3	17.0	10.3										
6.00	6.30	UDS3														1.82	1.57	15.6						
7.00	7.45	SPT4	21	19				0	18	68	14													
8.00	8.30	UDS4														1.83	1.59	15.0						
9.50	9.95	SPT5	23	19								25.3	16.4	8.9										
11.00	11.30	DS2																						
12.50	12.95	SPT6	27	20															2.70					

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (BH-12)

Location : Exhibition hall 5  
UTM Coordinates : 699533 E, 3159915 N  
Termination Depth : 30.45 m (RL 181.83 m)  
Ground Water Depth : 20.45 m  
Surface Elevation : RL 212.28 m  
Ground Water Level : RL 191.8 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 30-May-17  
Boring Finish : 01-Jun-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5				Hard brown sandy silt with traces of gravels, low plastic (CL)		2	23	58	17					1.85	1.62	14.3						
15.50	15.95	SPT7	33	22																				
17.00	17.30	UDS6														1.86	1.57	18.2						
18.50	18.95	SPT8	36	22								26.6	16.0	10.6										
20.00	20.30	DS3																						
22.00	22.45	SPT9	41	19				2	17	66	15													
24.00	24.30	UDS7														1.88	1.53	23.2						
26.00	26.45	SPT10	43	19								31.0	18.7	12.3										
28.00	28.30	DS4																						
30.00	30.45	SPT11	47	19			30.45	3	18	63	16													

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (BH-14)

Location : Exhibition hall 5  
UTM Coordinates : 699606 E, 3159861 N  
Termination Depth : 30.45 m (RL 182.05 m)  
Ground Water Depth : 20.40 m  
Surface Elevation : RL 212.500 m  
Ground Water Level : RL 192.1 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 30-May-17  
Boring Finish : 01-Jun-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Firm to very stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	5	8		- firm, 0.0 to 5.0 m		0	32	53	15													
2.00	2.30	UDS1														1.78	1.60	11.0						
3.00	3.45	SPT2	7	8								25.0	16.5	8.5										
4.00	4.30	UDS2														1.79	1.59	12.3		DS	0.5, 1, 1.5	0.0	29.4	
5.00	5.45	SPT3	10	10		- stiff, 5.0 to 9.5 m		0	32	56	12													
6.00	6.30	UDS3														1.80	1.56	15.2						
7.00	7.45	SPT4	13	12								26.2	17.2	9.0										
8.00	8.30	UDS4														1.81	1.58	14.3	2.73					
9.50	9.95	SPT5	17	14		- very stiff, 9.5 to 14.0 m		0	28	58	14													
11.00	11.30	UDS5														1.82	1.58	15.3						
12.50	12.95	SPT6	24	18								24.1	16.1	8.1										

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (BH-14)

Location : Exhibition hall 5  
UTM Coordinates : 699606 E, 3159861 N  
Termination Depth : 30.45 m (RL 182.05 m)  
Ground Water Depth : 20.40 m  
Surface Elevation : RL 212.500 m  
Ground Water Level : RL 192.1 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 30-May-17  
Boring Finish : 01-Jun-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	DS2				Very stiff to hard brown sandy silt, low plastic (CL)																		
15.50	15.95	SPT7	28	19		- very stiff, 14.0 to 18.5 m		0	24	57	19					1.85	1.56	18.6						
17.00	17.30	UDS6																						
18.50	18.95	SPT8	33	20		- hard, 18.5 to 30.45 m						26.4	17.8	8.6										
20.00	20.30	DS3																						
22.00	22.45	SPT9	39	18		- with traces of gravels, 22.0 to 30.45 m		1	26	58	15					1.89	1.52	24.3						
24.00	24.30	UDS7																						
26.00	26.45	SPT10	48	20								28.0	15.3	12.8										
28.00	28.30	DS4																						
30.00	30.45	SPT11	52	21			30.45																	

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-44)

Location : Exhibition hall 1  
UTM Coordinates : 699833 E, 3160521 N  
Termination Depth : 30.45 m (RL 182.164 m)  
Ground Water Depth : 20.50 m  
Surface Elevation : RL 212.614 m  
Ground Water Level : RL 192.1 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 25-Apr-17  
Boring Finish : 27-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)																	
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)																		
0.00	1.00	DS1	14	22	//////////	Stiff to hard brown sandy silt with gravel, medium plastic (CI)												2.61	DS	0.5 ,1, 1.5	0.0	31.1	0																		
1.00	1.45	SPT1				- stiff, 0.0 to 3.0 m																	0																		
2.00	2.30	UDS1																												1.81	1.55	16.7								0	
3.00	3.45	SPT2	17	20	//////////	- very stiff, 3.0 to 12.5 m		10	36	44	10	40.6	16.4	24.1									0																		
4.00	4.30	UDS2	20	21	//////////																		9																		
5.00	5.45	SPT3																														1.81	1.64	10.4							
6.00	6.30	UDS3																														1.82	1.59	14.8							
7.00	7.45	SPT4	23	21	//////////																																				
8.00	8.30	UDS4																											1.83	1.60	14.3										
9.50	9.95	SPT5	29	24	//////////																			6	26	57	11														
11.00	11.30	UDS5	33	24	//////////																																				
12.50	12.95	SPT6																						- hard, 12.5 to 14.0 m	14.00							1.85	1.65	12.4							

<sup>(1)</sup> SPT is outside NABL scope.




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### Soil Profile (PBH-44)

Location : Exhibition hall 1  
UTM Coordinates : 699833 E, 3160521 N  
Termination Depth : 30.45 m (RL 182.164 m)  
Ground Water Depth : 20.50 m  
Surface Elevation : RL 212.614 m  
Ground Water Level : RL 192.1 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 25-Apr-17  
Boring Finish : 27-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)		
14.00	14.30	UDS6	32	21		Hard brown sandy silt with traces of gravel, low plastic (CL)	30.45	4	31	56	9	26.1	16.7	9.4		1.86	1.60	16.1							
15.50	15.95	SPT7																							
17.00	17.30	UDS7																							
18.50	18.95	SPT8																							
20.00	20.30	UDS8																							
22.00	22.45	SPT9																							
24.00	24.30	UDS9																							
26.00	26.45	SPT10																							
28.00	28.30	UDS10																							
30.00	30.45	SPT11																							





<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-45)

Location : Exhibition hall 1  
UTM Coordinates : 699889 E, 3160480 N  
Termination Depth : 30.45 m (RL 182.362 m)  
Ground Water Depth : 20.20 m  
Surface Elevation : RL 212.812 m  
Ground Water Level : RL 192.6 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 27-Apr-17  
Boring Finish : 28-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1	10	16		Medium dense brown silty fine sand with traces of gravel (SM)	4.00	2	48	40	10				1.80	1.61	11.3	2.67	DS	0.5, 1, 1.5	0.0	31.4	0	
1.00	1.45	SPT1																						
2.00	2.30	UDS1																						
3.00	3.45	SPT2	18	22		Very stiff to hard brown sandy silt with traces of gravel, low plastic (CL)  - very stiff, 4.0 to 9.5 m		3	32	52	13				1.82	1.61	13.0					8		
4.00	4.30	UDS2																						
5.00	5.45	SPT3																						
6.00	6.30	UDS3	20	21											1.82	1.57	16.4					8		
7.00	7.45	SPT4																						
8.00	8.30	UDS4																						
9.50	9.95	SPT5	30	25		- hard, 9.5 to 12.5 m									1.83	1.63	12.2							
11.00	11.30	UDS5																						
12.50	12.95	SPT6																						


<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-45)

Location : Exhibition hall 1  
UTM Coordinates : 699889 E, 3160480 N  
Termination Depth : 30.45 m (RL 182.362 m)  
Ground Water Depth : 20.20 m  
Surface Elevation : RL 212.812 m  
Ground Water Level : RL 192.6 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 27-Apr-17  
Boring Finish : 28-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	41	27		Hard brown sandy silt with traces of gravel, low plastic (CL)		3	32	49	16				1.87	1.63	15.0							
15.50	15.95	SPT7																						
17.00	17.30	UDS7																						
18.50	18.95	SPT8																						
20.00	20.30	UDS8																						
22.00	22.45	SPT9																						
24.00	24.30	DS2																						
26.00	26.45	SPT10																						
28.00	28.30	DS3																						
30.00	30.45	SPT11																						
						30.45																		



<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-46)

Location : Exhibition hall 1  
UTM Coordinates : 699946 E, 3160438 N  
Termination Depth : 30.45 m (RL 182.05 m)  
Ground Water Depth : 20.40 m  
Surface Elevation : RL 212.500 m  
Ground Water Level : RL 192.1 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 05-May-17  
Boring Finish : 06-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1	10	16		Medium dense brown silty fine sand with gravel (SM)	4.00	14	41	36	9				1.80	1.53	17.0		DS	0.5 ,1, 1.5	0.0	29.0		
1.00	1.45	SPT1																						
2.00	2.30	UDS1																						
3.00	3.45	SPT2	12	14		Very stiff to hard brown sandy silt with traces of gravel, low plastic - CL-ML, 4.0 to 9.5 m - very stiff, 4.0 to 12.5 m - CL, 9.5 to 14.0 m - hard, 12.5 to 14.0 m		2	24	58	16		20.7	15.7	5.0	1.82	1.62	12.4						
4.00	4.30	UDS2																						
5.00	5.45	SPT3																						
6.00	6.30	UDS3	20	19				3	35	49	13				1.83	1.56	17.5							
7.00	7.45	SPT4																						
8.00	8.30	UDS4																						
9.50	9.95	SPT5	26	22									30.5	17.0	13.5									
11.00	11.30	UDS5																						
12.50	12.95	SPT6	32	24																				

<sup>(1)</sup> SPT is outside NABL scope.


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Location : Exhibition hall 1  
UTM Coordinates : 699946 E, 3160438 N

### Soil Profile (PBH-46)

Termination Depth : 30.45 m (RL 182.05 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.40 m Casing Depth : -  
Surface Elevation : RL 212.500 m Boring Start : 05-May-17  
Ground Water Level : RL 192.1 m Boring Finish : 06-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	37	25		Hard brown sandy silt, low plastic (CL)	30.45	0	35	50	15	27.8	14.9	12.9		1.87	1.60	16.4						
15.50	15.95	SPT7																						
17.00	17.30	UDS7																						
18.50	18.95	SPT8																						
20.00	20.30	UDS8																						
22.00	22.45	SPT9																						
24.00	24.30	UDS9																						
26.00	26.45	SPT10																						
28.00	28.30	UDS10																						
30.00	30.45	SPT11																						

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-47)

Location : Exhibition hall 1  
UTM Coordinates : 700002 E, 3160397 N  
Termination Depth : 30.45 m (RL 182.1 m)  
Ground Water Depth : 20.20 m  
Surface Elevation : RL 212.550 m  
Ground Water Level : RL 192.4 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 05-May-17  
Boring Finish : 06-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	9	14		- stiff, 0.0 to 7.0 m																		
2.00	2.30	UDS1														1.79	1.52	17.4						
3.00	3.45	SPT2	8	10				0	42	47	11								2.63					
4.00	4.30	UDS2														1.80	1.53	17.8						
5.00	5.45	SPT3	14	15																				
6.00	6.45	UDS3														1.83	1.56	17.4						
7.00	7.45	SPT4	24	22		- very stiff, 7.0 to 9.5 m																		
8.00	8.30	DS2																						
9.50	9.95	SPT5	30	25		- hard, 9.5 to 14.0 m						25.9	15.2	10.7										
11.00	11.30	UDS4														1.85	1.64	13.4		DS	0.5, 1, 1.5	0.0	34.4	
12.50	12.95	SPT6	33	24		- with gravel, 12.5 to 14.0 m		9	22	55	14													


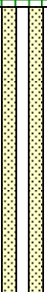

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-47)

Location : Exhibition hall 1  
UTM Coordinates : 700002 E, 3160397 N  
Termination Depth : 30.45 m (RL 182.1 m)  
Ground Water Depth : 20.20 m  
Surface Elevation : RL 212.550 m  
Ground Water Level : RL 192.4 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 05-May-17  
Boring Finish : 06-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)	
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)		
14.00	14.30	UDS5	44	29		Hard brown sandy silt with gravel, low plastic (CL)	22.00	8	39	43	10	29.2	15.9	13.2		1.86	1.59	17.0							
15.50	15.95	SPT7														1.88	1.65	13.9							
17.00	17.30	UDS6														1.87	1.67	12.4							
18.50	18.95	SPT8														40	24						1.88	1.59	18.4
20.00	20.30	UDS7														26.00	26.45	SPT10					43	19	
22.00	22.45	SPT9	38	18		Dense to very dense brown silty fine sand (SM)	30.45	0	70	22	8					1.88	1.59	18.4							
24.00	24.30	UDS8	- dense, 22.0 to 30.0 m	1.89		1.68																	12.8		
26.00	26.45	SPT10	43	19																					
28.00	28.30	UDS9	51	20		- very dense, 30.0 to 30.45 m	30.45	0	55	37	8					1.89	1.68	12.8							
30.00	30.45	SPT11																							

<sup>(1)</sup> SPT is outside NABL scope.



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### Soil Profile (PBH-48)

Location : Exhibition hall 1  
UTM Coordinates : 699875 E, 3160579 N  
Termination Depth : 30.45 m (RL 182.05 m)  
Ground Water Depth : 20.20 m  
Surface Elevation : RL 212.500 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 25-Apr-17  
Boring Finish : 26-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to hard brown sandy silt, low plastic (CL)																		10
1.00	1.45	SPT1	14	22		- stiff, 0.0 to 3.0 m						27.5	16.8	10.8										8
2.00	2.30	UDS1														1.81	1.56	16.5						
3.00	3.45	SPT2	20	24		- very stiff, 3.0 to 9.5 m		0	43	44	13								2.63					10
4.00	4.30	UDS2														1.82	1.62	12.5		DS	0.5, 1, 1.5	0.0	31.1	
5.00	5.45	SPT3	22	23																				0
6.00	6.30	UDS3														1.83	1.63	12.7						
7.00	7.45	SPT4	28	26								27.7	17.1	10.6										
8.00	8.30	UDS4														1.85	1.63	13.5						
9.50	9.95	SPT5	34	28		- hard, 9.5 to 14.0 m		3	21	57	19	28.8	16.6	12.2	18									
11.00	11.30	UDS5				- with traces of gravel, 9.5 to 14.0 m										1.87	1.66	12.7						
12.50	12.95	SPT6	46	34																				


<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-48)

Location : Exhibition hall 1  
UTM Coordinates : 699875 E, 3160579 N  
Termination Depth : 30.45 m (RL 182.05 m)  
Ground Water Depth : 20.20 m  
Surface Elevation : RL 212.500 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 25-Apr-17  
Boring Finish : 26-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	53	35		Hard brown sandy silt with gravel, low plastic (CL)	30.45	9	28	50	13	29.1	16.7	12.5	17	1.90	1.70	12.3						
15.50	15.95	SPT7																						
17.00	17.30	UDS7																						
18.50	18.95	SPT8																						
20.00	20.30	DS2																						
22.00	22.45	SPT9																						
24.00	24.30	UDS8																						
26.00	26.45	SPT10																						
28.00	28.30	UDS9																						
30.00	30.45	SPT11	64	24																				





<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-49)

Location :	Exhibition hall 1	Termination Depth :	30.45 m (RL 182.05 m)	Boring Method :	Rotary Drilling
UTM Coordinates :	699960 E, 3160516 N	Ground Water Depth :	20.40 m	Casing Depth :	-
		Surface Elevation :	RL 212.500 m	Boring Start :	01-May-17
		Ground Water Level :	RL 192.1 m	Boring Finish :	04-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)					
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)							
0.00	1.00	DS1	10	16		Stiff to hard brown sandy silt with gravel, low plastic (CL)								15	1.80	1.61	11.7		DS	0.5 ,1, 1.5	0.0	32.1								
1.00	1.45	SPT1				- stiff, 0.0 to 5.0 m																								
2.00	2.30	UDS1																												
3.00	3.45	SPT2	14	17		- very stiff, 5.0 to 9.5 m																								
4.00	4.30	UDS2																												
5.00	5.45	SPT3	17	18																										
6.00	6.30	UDS3	26	24											1.81	1.60	12.9													
7.00	7.45	SPT4																												
8.00	8.30	UDS4																												
9.50	9.95	SPT5	31	26		- hard, 9.5 to 14.0 m									1.84	1.58	16.2													
11.00	11.30	UDS5																												
12.50	12.95	SPT6	36	26																										

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-49)

Location : Exhibition hall 1  
UTM Coordinates : 699960 E, 3160516 N  
Termination Depth : 30.45 m (RL 182.05 m)  
Ground Water Depth : 20.40 m  
Surface Elevation : RL 212.500 m  
Ground Water Level : RL 192.1 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 01-May-17  
Boring Finish : 04-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6				Hard to very stiff brown sandy silt, low plastic (CL)  - hard, 14.0 to 30.0 m  - with gravel, 14.0 to 26.0 m									1.86	1.57	18.8							
15.50	15.95	SPT7	31	21				8	40	42	10													
17.00	17.30	UDS7														1.86	1.57						18.3	
18.50	18.95	SPT8	35	21																				
20.00	20.30	UDS8														1.90	1.60						18.7	
22.00	22.45	SPT9	52	22		- with traces of gravel, 26.0 to 30.45 m									1.87	1.65	13.5							
24.00	24.30	UDS9																						
26.00	26.45	SPT10	53	22				1	27	57	15	27.3	15.1	12.2	14									
28.00	28.30	UDS10				- very stiff, 30.0 to 30.45 m	30.45								1.86	1.64	13.4							
30.00	30.45	SPT11	18	9																				

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-50)

Location : Exhibition hall 1  
UTM Coordinates : 700044 E, 3160454 N  
Termination Depth : 30.45 m (RL 182.398 m)  
Ground Water Depth : 20.50 m  
Surface Elevation : RL 212.848 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 02-May-17  
Boring Finish : 04-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to hard brown sandy silt with gravel, low plastic (CL)																		
1.00	1.45	SPT1	12	19		- stiff, 0.0 to 3.0 m																		8
2.00	2.30	UDS1														1.80	1.57	14.6						8
3.00	3.45	SPT2	18	22		- very stiff, 3.0 to 12.5 m		4	39	45	12	26.3	16.1	10.2										9
4.00	4.30	UDS2														1.82	1.57	16.1		DS	0.5, 1, 1.5	0.0	31.0	18
5.00	5.45	SPT3	20	21								24.3	15.8	8.6										
6.00	6.30	UDS3														1.83	1.61	13.1						
7.00	7.45	SPT4	24	22																				
8.00	8.30	UDS4														1.83	1.58	15.6						
9.50	9.95	SPT5	22	18				8	33	46	13													
11.00	11.30	UDS5										30.7	16.9	13.8		1.85	1.67	10.7						
12.50	12.95	SPT6	31	23		- hard, 12.5 to 14.0 m																		







<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-50)

Location : Exhibition hall 1  
UTM Coordinates : 700044 E, 3160454 N  
Termination Depth : 30.45 m (RL 182.398 m)  
Ground Water Depth : 20.50 m  
Surface Elevation : RL 212.848 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 02-May-17  
Boring Finish : 04-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)		
14.00	14.30	UDS6	33	22		Hard brown sandy silt with traces of gravel, low plastic (CL)		1	37	46	16				1.85	1.61	15.4								
15.50	15.95	SPT7													1.87	1.68	11.6								
17.00	17.30	UDS7	41	25				4	25	57	14	30.4	19.4	11.0	1.88	1.60	17.8								
18.50	18.95	SPT8													1.90	1.68	13.6								
20.00	20.30	UDS8	47	21											1.92	1.70	13.1								
22.00	22.45	SPT9													29.8	18.2	11.6								
24.00	24.30	UDS9	53	22																					
26.00	26.45	SPT10																					1.92	1.70	13.1
28.00	28.30	UDS10	60	23																					
30.00	30.45	SPT11																					30.45		
																									

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-51)

Location : Exhibition hall 1  
Termination Depth : 30.45 m (RL 182.144 m) Boring Method : Rotary Drilling  
UTM Coordinates : 699918 E, 3160636 N  
Ground Water Depth : 20.70 m Casing Depth : -  
Surface Elevation : RL 212.594 m Boring Start : 27-Apr-17  
Ground Water Level : RL 191.9 m Boring Finish : 28-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to hard brown sandy silt, low plastic (CL)																		8
1.00	1.45	SPT1	13	20		- stiff, 0.0 to 3.0 m																		9
2.00	2.30	UDS1														1.81	1.54	17.0						
3.00	3.45	SPT2	16	19		- very stiff, 3.0 to 9.5 m		15	33	41	11													14
4.00	4.30	UDS2				- with gravel, 0.0 to 7.0 m										1.81	1.63	11.6		DS	0.5, 1, 1.5	0.0	34.9	8
5.00	5.45	SPT3	20	21															2.62					
6.00	6.30	UDS3														1.82	1.57	16.0						
7.00	7.45	SPT4	25	23		- with traces of gravel, 7.0 to 12.5 m		2	24	57	17													
8.00	8.30	UDS4														1.84	1.59	15.8						
9.50	9.95	SPT5	33	27		- hard, 9.5 to 14.0 m						26.2	15.5	10.7										
11.00	11.30	UDS5														1.86	1.57	18.4						
12.50	12.95	SPT6	37	27				0	42	43	15													

<sup>(1)</sup> SPT is outside NABL scope.








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### Soil Profile (PBH-51)

Location : Exhibition hall 1  
Termination Depth : 30.45 m (RL 182.144 m) Boring Method : Rotary Drilling  
UTM Coordinates : 699918 E, 3160636 N  
Ground Water Depth : 20.70 m Casing Depth : -  
Surface Elevation : RL 212.594 m Boring Start : 27-Apr-17  
Ground Water Level : RL 191.9 m Boring Finish : 28-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	43	28		Hard to very stiff brown sandy silt with traces of gravel, low plastic (CL)  - hard, 14.0 to 26.0 m									1.88	1.58	19.0							
15.50	15.95	SPT7																						
17.00	17.30	UDS7																						
18.50	18.95	SPT8																						
20.00	20.30	UDS8																						
22.00	22.45	SPT9	33	17		- very stiff, 26.0 to 30.0 m		2	35	45	18				1.86	1.64	13.9							
24.00	24.30	UDS9																						
26.00	26.45	SPT10	27	14																				
28.00	28.30	UDS10																						
30.00	30.45	SPT11	37	17																				
							30.45																	

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-52)

Location : Exhibition hall 1  
UTM Coordinates : 699974 E, 3160594 N  
Termination Depth : 30.45 m (RL 182.15 m)  
Ground Water Depth : 20.60 m  
Surface Elevation : RL 212.600 m  
Ground Water Level : RL 192 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 29-Apr-17  
Boring Finish : 30-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to hard brown sandy silt, low plastic (CL)																		0
1.00	1.45	SPT1	8	12		- stiff, 0.0 to 7.0 m		2	23	55	20													
2.00	2.30	UDS1				- with traces of gravel, 0.0 to 12.5 m										1.79	1.53	17.5						0
3.00	3.45	SPT2	14	17								32.6	16.9	15.7										10
4.00	4.30	UDS2						1	31	55	13					1.80	1.60	12.8						27
5.00	5.45	SPT3	13	13																				
6.00	6.30	UDS3														1.81	1.59	14.2		DS	0.5, 1, 1.5	0.0	31.4	
7.00	7.45	SPT4	22	20		- very stiff, 7.0 to 12.5 m						25.6	16.7	8.8					2.59					
8.00	8.30	UDS4														1.83	1.56	17.3						
9.50	9.95	SPT5	24	20																				
11.00	11.30	UDS5				- with gravel, 12.5 to 14.0 m										1.85	1.62	13.7						
12.50	12.95	SPT6	39	29		- hard, 12.5 to 14.0 m		5	41	42	12													


<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-52)

Location :	Exhibition hall 1	Termination Depth :	30.45 m (RL 182.15 m)	Boring Method :	Rotary Drilling
UTM Coordinates :	699974 E, 3160594 N	Ground Water Depth :	20.60 m	Casing Depth :	-
		Surface Elevation :	RL 212.600 m	Boring Start :	29-Apr-17
		Ground Water Level :	RL 192 m	Boring Finish :	30-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	72	48		Hard brown sandy silt with traces of gravel, low plastic (CL)		1	29	53	17	31.7	16.7	15.0		1.89	1.60	18.2						
15.50	15.95	SPT7														1.96	1.65	18.6						
17.00	17.30	UDS7														1.98	1.79	10.1						
18.50	18.95	SPT8														1.95	1.76	10.9						
20.00	20.30	UDS8														1.90	1.68	13.3						
22.00	22.45	SPT9																						
24.00	24.30	UDS9																						
26.00	26.45	SPT10																						
28.00	28.30	UDS10																						
30.00	30.45	SPT11																						
						30.45																		

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-53)

Location : Exhibition hall 1  
UTM Coordinates : 700030 E, 3160552 N  
Termination Depth : 30.45 m (RL 182.25 m)  
Ground Water Depth : 20.40 m  
Surface Elevation : RL 212.700 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 01-May-17  
Boring Finish : 03-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to very stiff brown sandy silt with gravel, low plastic (CL)  - stiff, 0.0 to 5.0 m     - very stiff, 5.0 to 9.5 m																		
1.00	1.30	SPT1	13	20																				
2.00	2.30	UDS1											1.80	1.54	17.1									
3.00	3.45	SPT2	15	18							28.2	16.8	11.4											
4.00	4.30	UDS2											1.81	1.54	17.9									
5.00	5.45	SPT3	19	20				5	41	39	15													
6.00	6.30	UDS3											1.83	1.62	13.2									
7.00	7.45	SPT4	27	25															2.68					
8.00	8.30	UDS4					9.50					1.84	1.63	13.0										
9.50	9.95	SPT5	27	22		Very stiff to hard brown clayey silt with gravel, low plastic (CL)		6	11	63	20													
11.00	11.30	UDS5				- very stiff, 9.5 to 12.5 m						1.85	1.60	15.6										
12.50	12.95	SPT6	52	38		- hard, 12.5 to 14.0 m	14.00					29.6	16.2	13.4										











<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-53)

Location : Exhibition hall 1  
UTM Coordinates : 700030 E, 3160552 N  
Termination Depth : 30.45 m (RL 182.25 m)  
Ground Water Depth : 20.40 m  
Surface Elevation : RL 212.700 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 01-May-17  
Boring Finish : 03-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Hard brown clayey silt, medium plastic (CI)	15.50	0	10	66	24					1.88	1.67	13.0						
15.50	15.95	SPT7	49	32		Hard brown sandy silt with gravel, low plastic (CL)																		
17.00	17.30	UDS7														1.89	1.63	15.6		DS	0.5, 1, 1.5	0.0	33.9	
18.50	18.95	SPT8	51	31				10	38	44	8	27.3	17.8	9.5										
20.00	20.30	UDS8														1.90	1.66	14.7						
22.00	22.45	SPT9	60	24																				
24.00	24.30	UDS9														1.93	1.68	14.9						
26.00	26.45	SPT10	51	21																				
28.00	28.30	UDS10														1.92	1.70	12.8						
30.00	30.45	SPT11	50	20			30.45																	

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-54)

Location : Exhibition hall 1  
UTM Coordinates : 700086 E, 3160511 N  
Termination Depth : 30.45 m (RL 182.12 m)  
Ground Water Depth : 20.50 m  
Surface Elevation : RL 212.570 m  
Ground Water Level : RL 192.1 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 29-Apr-17  
Boring Finish : 30-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to hard brown sandy silt, low plastic																		
1.00	1.45	SPT1	10	16		- CL-ML, 0.0 to 9.5 m																		
2.00	2.30	UDS1				- stiff, 0.0 to 5.0 m										1.80	1.53	17.1						
3.00	3.45	SPT2	14	17							20.7	16.1	4.6					2.65						
4.00	4.30	UDS2				- with gravel, 0.0 to 6.0 m		7	55	31	7					1.81	1.56	16.4						
5.00	5.45	SPT3	33	34		- hard, 5.0 to 14.0 m																		
6.00	6.30	UDS3						0	36	49	15					1.85	1.64	12.8		DS	0.5 ,1, 1.5	0.0	35.5	
7.00	7.45	SPT4	55	51																				
8.00	8.30	UDS4														1.92	1.68	14.4						
9.50	9.95	SPT5	59	49		- CL, 9.5 to 14.0 m						24.8	15.5	9.3										
11.00	11.30	UDS5														1.92	1.67	14.6						
12.50	12.95	SPT6	50	37																				


<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-54)

Location : Exhibition hall 1  
UTM Coordinates : 700086 E, 3160511 N  
Termination Depth : 30.45 m (RL 182.12 m)  
Ground Water Depth : 20.50 m  
Surface Elevation : RL 212.570 m  
Ground Water Level : RL 192.1 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 29-Apr-17  
Boring Finish : 30-Apr-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)										
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)												
14.00	14.30	UDS6	47	31		Hard brown sandy silt with traces of gravel, low plastic (CL)	30.45	2	29	52	17	28.6	17.0	11.5		1.90	1.67	13.9																	
15.50	15.95	SPT7																																	
17.00	17.30	UDS7																																	
18.50	18.95	SPT8														55	33																		
20.00	20.30	UDS8																																	
22.00	22.45	SPT9														48	21																		
24.00	24.30	UDS9																																	
26.00	26.45	SPT10														56	22																		
28.00	28.30	UDS10																																	
30.00	30.45	SPT11														66	24																		

<sup>(1)</sup> SPT is outside NABL scope.



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Location : Convention - 07  
UTM Coordinates : 700175 E, 3160446 N

### Soil Profile (PBH-55)

Termination Depth : 30.45 m (RL 182.15 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.50 m Casing Depth : -  
Surface Elevation : RL 212.600 m Boring Start : 08-May-17  
Ground Water Level : RL 192.1 m Boring Finish : 10-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1	6	9		Firm to hard brown sandy silt, low plastic (CL)		0	36	51	13					1.78	1.59	12.3						
1.00	1.45	SPT1				- firm, 0.0 to 3.0 m										22.9	15.5	7.5						
2.00	2.30	UDS1	9	11		- stiff, 3.0 to 7.0 m																		
3.00	3.45	SPT2				- with traces of gravels, 6.0 to 14.0 m																		
4.00	4.30	DS2	14	15		- very stiff, 7.0 to 12.5 m																		
5.00	5.45	SPT3				- hard, 12.5 to 14.0 m																		
6.00	6.30	UDS2	19	18																				
7.00	7.45	SPT4				27.6																		
8.00	8.30	UDS3	24	20																				
9.50	9.95	SPT5				27.6																		
11.00	11.30	UDS4	39	29																				
12.50	12.95	SPT6				27.6																		

<sup>(1)</sup> SPT is outside NABL scope.


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Location : Convention - 07  
UTM Coordinates : 700175 E, 3160446 N

### Soil Profile (PBH-55)

Termination Depth : 30.45 m (RL 182.15 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.50 m Casing Depth : -  
Surface Elevation : RL 212.600 m Boring Start : 08-May-17  
Ground Water Level : RL 192.1 m Boring Finish : 10-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS5	50	33		Hard to very stiff brown sandy silt, low plastic (CL)	30.45	0	35	50	15					1.88	1.61	16.9			1 ,2, 3	0.0	31.1	
15.50	15.95	SPT7				- hard, 14.0 to 18.5 m																		
17.00	17.30	UDS6						0	25	58	17					1.86	1.58	18.2		DS				
18.50	18.95	SPT8	29	17		- very stiff, 18.5 to 22.0 m																		
20.00	20.30	DS3																						
22.00	22.45	SPT9	32	16		- hard, 22.0 to 30.45 m		2	22	64	12													
24.00	24.30	UDS7														1.86	1.51	23.6						
26.00	26.45	SPT10	40	18								25.4	15.8	9.6										
28.00	28.30	UDS8														1.87	1.51	23.9						
30.00	30.45	SPT11	37	17								24.6	16.0	8.6										

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Convention - 07  
UTM Coordinates : 700098 E, 3160434 N

### Soil Profile (PBH-56)

Termination Depth : 30.45 m (RL 182.4 m)  
Ground Water Depth : 20.60 m  
Surface Elevation : RL 212.850 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 04-May-17  
Boring Finish : 05-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Stiff to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	9	14		- stiff, 0.0 to 3.0 m						28.3	15.6	12.7	14									
2.00	2.30	UDS1														1.80	1.60	12.1						
3.00	3.45	SPT2	16	19		- very stiff, 3.0 to 14.0 m		0	36	51	13													
4.00	4.30	UDS2														1.81	1.58	14.8		DS	0.5, 1, 1.5	0.0	35.1	
5.00	5.45	SPT3	16	17																				
6.00	6.30	UDS3														1.81	1.59	14.0						
7.00	7.45	SPT4	18	17		- with gravel, 7.0 to 14.0 m		5	36	47	12													
8.00	8.30	UDS4														1.82	1.59	14.9						
9.50	9.95	SPT5	22	18																				
11.00	11.30	UDS5														1.83	1.53	19.9						
12.50	12.95	SPT6	28	21								28.2	15.3	12.9	10									

<sup>(1)</sup> SPT is outside NABL scope.


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Location : Convention - 07  
UTM Coordinates : 700098 E, 3160434 N

### Soil Profile (PBH-56)

Termination Depth : 30.45 m (RL 182.4 m)  
Ground Water Depth : 20.60 m  
Surface Elevation : RL 212.850 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 04-May-17  
Boring Finish : 05-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	DS2	46	30		Hard brown sandy silt, low plastic (CL)  - with traces of gravel, 14.0 to 22.0 m	30.45	3	42	45	10	23.3	16.1	7.3	12	1.89	1.65	14.5						
15.50	15.95	SPT7																						
17.00	17.30	UDS6																						
18.50	18.95	SPT8																						
20.00	20.30	UDS7																						
22.00	22.45	SPT9																						
24.00	24.30	UDS8																						
26.00	26.45	SPT10																						
28.00	28.30	UDS9																						
30.00	30.45	SPT11																						

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-57)

Location : Convention - 07 Termination Depth : 30.45 m (RL 182.275 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700142 E, 3160401 N Ground Water Depth : 20.50 m Casing Depth : -  
Surface Elevation : RL 212.725 m Boring Start : 06-May-17  
Ground Water Level : RL 192.2 m Boring Finish : 07-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Firm to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	5	8		- firm, 0.0 to 3.0 m																		
2.00	2.30	UDS1										1.79	1.63	10.0										
3.00	3.45	SPT2	10	12		- stiff, 3.0 to 7.0 m		0	38	49	13													
4.00	4.30	UDS2										1.80	1.59	13.0										
5.00	5.45	SPT3	14	15							28.6	16.4	12.2											
6.00	6.30	UDS3										1.82	1.56	16.5		DS	0.5 ,1, 1.5	0.0	32.0					
7.00	7.45	SPT4	21	19		- very stiff, 7.0 to 9.5 m																		
8.00	8.30	UDS4									28.4	18.3	10.1		1.84	1.70	8.3							
9.50	9.95	SPT5	30	25		- hard, 9.5 to 14.0 m																		
11.00	11.30	UDS5										1.86	1.64	13.3										
12.50	12.95	SPT6	39	29		- with traces of gravel, 12.5 to 14.0 m		1	37	44	18													





<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-57)

Location : Convention - 07 Termination Depth : 30.45 m (RL 182.275 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700142 E, 3160401 N Ground Water Depth : 20.50 m Casing Depth : -  
Surface Elevation : RL 212.725 m Boring Start : 06-May-17  
Ground Water Level : RL 192.2 m Boring Finish : 07-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	49	32		Hard brown sandy silt, low plastic (CL)		5	47	41	7	25.3	16.0	9.3		1.89	1.73	8.8						
15.50	15.95	SPT7																						
17.00	17.30	DS2																						
18.50	18.95	SPT8																						
20.00	20.30	UDS7	60	24		Very dense brown silty fine sand with gravel (SM)	22.00									1.92	1.68	14.1						
22.00	22.45	SPT9					24.00																	
24.00	24.30	UDS8																						
26.00	26.45	SPT10	61	24		Hard brown sandy silt, low plastic (CL)										1.93	1.64	17.8						
28.00	28.30	UDS9																						
30.00	30.45	SPT11																						
			59	22			30.45					29.8	16.9	12.9										

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-58)

Location : Convention - 07 Termination Depth : 30.45 m (RL 182.342 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700187 E, 3160368 N Ground Water Depth : 20.60 m Casing Depth : -  
Surface Elevation : RL 212.792 m Boring Start : 08-May-17  
Ground Water Level : RL 192.2 m Boring Finish : 10-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to hard brown sandy silt, low plastic (CL)		0	27	58	15													
1.00	1.45	SPT1	12	19		- stiff, 0.0 to 3.0 m										1.81	1.63	10.7						
2.00	2.30	UDS1																						
3.00	3.45	SPT2	16	19		- very stiff, 3.0 to 12.5 m						27.1	17.1	10.0		1.82	1.66	9.8						
4.00	4.30	UDS2														1.82	1.67	9.5						
5.00	5.45	SPT3	19	20												1.82	1.67	9.5						
6.00	6.30	UDS3														1.82	1.67	9.5						
7.00	7.45	SPT4	22	20		- with traces of gravel, 7.0 to 14.0 m		3	28	57	12					1.83	1.68	8.7		DS	0.5, 1, 1.5	0.0	32.5	
8.00	8.30	UDS4														1.83	1.68	8.7						
9.50	9.95	SPT5	27	22												1.86	1.66	12.2						
11.00	11.30	UDS5														1.86	1.66	12.2						
12.50	12.95	SPT6	42	31		- hard, 12.5 to 14.0 m						26.0	16.5	9.4										

<sup>(1)</sup> SPT is outside NABL scope.









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### Soil Profile (PBH-58)

Location : Convention - 07 Termination Depth : 30.45 m (RL 182.342 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700187 E, 3160368 N Ground Water Depth : 20.60 m Casing Depth : -  
Surface Elevation : RL 212.792 m Boring Start : 08-May-17  
Ground Water Level : RL 192.2 m Boring Finish : 10-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	46	30		Hard brown sandy silt, low plastic (CL)		2	52	35	11				1.89	1.71	10.4							
15.50	15.95	SPT7																						
17.00	17.30	UDS7					18.50								1.88	1.68	11.4							
18.50	18.95	SPT8	34	21		Dense brown silty fine sand with traces of gravel (SM)	20.00																	
20.00	20.30	UDS8				Hard brown sandy silt, low plastic (CL)									1.87	1.66	12.6							
22.00	22.45	SPT9	40	19																				
24.00	24.30	UDS9													1.89	1.67	13.4							
26.00	26.45	SPT10	48	20								31.1	11.7	19.4										
28.00	28.30	UDS10													1.91	1.66	14.8							
30.00	30.45	SPT11	52	21			30.45																	
																								

<sup>(1)</sup> SPT is outside NABL scope.




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Location : Convention - 07  
UTM Coordinates : 700109 E, 3160357 N

### Soil Profile (PBH-59)

Termination Depth : 30.45 m (RL 182.336 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.50 m Casing Depth : -  
Surface Elevation : RL 212.786 m Boring Start : 07-May-17  
Ground Water Level : RL 192.3 m Boring Finish : 08-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1	12	19		Medium dense brown silty fine sand (SM)  - with gravel, 0.0 to 8.0 m		5	77	18	0					1.80	1.61	11.9						
1.00	1.45	SPT1																						
2.00	2.30	UDS1																						
3.00	3.45	SPT2																						
4.00	4.30	UDS2																						
5.00	5.45	SPT3																						
6.00	6.30	DS2																						
7.00	7.45	SPT4																						
8.00	8.30	UDS3																						
9.50	9.95	SPT5																						
11.00	11.30	UDS4																						
12.50	12.95	SPT6																						
			24	20		Very stiff brown sandy silt, low plastic (CL)	9.50					24.1	16.8	7.2				DS	0.5 ,1, 1.5	0.0	33.4			
																								

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Convention - 07  
UTM Coordinates : 700109 E, 3160357 N

### Soil Profile (PBH-59)

Termination Depth : 30.45 m (RL 182.336 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.50 m Casing Depth : -  
Surface Elevation : RL 212.786 m Boring Start : 07-May-17  
Ground Water Level : RL 192.3 m Boring Finish : 08-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5				Hard brown sandy silt, low plastic (CL)		0	29	58	13					1.85	1.67	10.4						
15.50	15.95	SPT7	36	24		- with gravel, 22.0 to 30.45 m						29.8	18.3	11.5										
17.00	17.30	DS3																						
18.50	18.95	SPT8	42	25																				
20.00	20.30	DS4																						
22.00	22.45	SPT9	38	18				9	33	45	13													
24.00	24.30	UDS6														1.88	1.70	10.5						
26.00	26.45	SPT10	42	19								30.7	17.7	13.0										
28.00	28.30	UDS7														1.90	1.72	10.9						
30.00	30.45	SPT11	55	21			30.45																	

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-61)

Location : Retail - 10

Termination Depth : 30.45 m (RL 182.427 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700078 E, 3160283 N

Ground Water Depth : 19.80 m

Casing Depth : -

Surface Elevation : RL 212.877 m

Boring Start : 13-May-17

Ground Water Level : RL 193.1 m

Boring Finish : 15-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
0.00	0.50	DS1				Stiff to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	9	14		- stiff, 0.0 to 7.0 m		0	40	48	12													
2.00	2.30	UDS1														1.79	1.62	10.8						
3.00	3.45	SPT2	10	12																				
4.00	4.30	DS2																						
5.00	5.45	SPT3	9	9																				
6.00	6.30	UDS2														1.80	1.62	11.5		DS	0.5, 1, 1.5	0.0	30.8	
7.00	7.45	SPT4	16	15		- very stiff, 7.0 to 9.5 m		0	40	49	11													
8.00	8.30	UDS3														1.83	1.63	12.4						
9.50	9.95	SPT5	33	27		- hard, 9.5 to 14.0 m																		
11.00	11.30	UDS4														1.88	1.67	12.5						
12.50	12.95	SPT6	44	32																				

<sup>(1)</sup> SPT is outside NABL scope.


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Location : Retail - 10  
UTM Coordinates : 700078 E, 3160283 N

### Soil Profile (PBH-61)

Termination Depth : 30.45 m (RL 182.427 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.80 m Casing Depth : -  
Surface Elevation : RL 212.877 m Boring Start : 13-May-17  
Ground Water Level : RL 193.1 m Boring Finish : 15-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS5	32	21		Hard brown sandy silt, low plastic (CL)  - with gravels, 14.0 to 26.0 m		11	20	55	14					1.89	1.65	14.5	2.63					
15.50	15.95	SPT7																						
17.00	17.30	DS3																						
18.50	18.95	SPT8																						
20.00	20.30	UDS6																						
22.00	22.45	SPT9																						
24.00	24.30	DS4																						
26.00	26.45	SPT10																						
28.00	28.30	UDS7																						
30.00	30.45	SPT11																						
						30.45																		


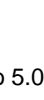




<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-62)

Location : Retail - 10 Termination Depth : 30.45 m (RL 182.681 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700144 E, 3160235 N Ground Water Depth : 19.60 m Casing Depth : -  
Surface Elevation : RL 213.131 m Boring Start : 16-May-17  
Ground Water Level : RL 193.5 m Boring Finish : 18-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>r</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1	6	9		Firm to very stiff brown sandy silt, low plastic (CL)		0	42	46	12					1.79	1.65	8.7	2.70	DS	0.5 ,1, 1.5	0.0	32.4		
1.00	1.45	SPT1																							
2.00	2.30	UDS1																							
3.00	3.45	SPT2	12	14		- stiff, 3.0 to 5.0 m						24.6	16.1	8.5											
4.00	4.30	UDS2	18	19		- very stiff, 5.0 to 14.0 m		0	40	49	11					1.81	1.61	11.9							
5.00	5.45	SPT3																							
6.00	6.30	UDS3																							
7.00	7.45	SPT4	20	19												1.82	1.68	8.0							
8.00	8.30	UDS4	24	20												1.83	1.68	8.5							
9.50	9.95	SPT5																							
11.00	11.30	UDS5																							
12.50	12.95	SPT6	26	19												1.83	1.62	13.0							

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Retail - 10  
UTM Coordinates : 700144 E, 3160235 N

### Soil Profile (PBH-62)

Termination Depth : 30.45 m (RL 182.681 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.60 m Casing Depth : -  
Surface Elevation : RL 213.131 m Boring Start : 16-May-17  
Ground Water Level : RL 193.5 m Boring Finish : 18-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Hard brown sandy silt, low plastic		0	40	51	9	33.2	16.6	16.6		1.85	1.61	14.5						
15.50	15.95	SPT7	34	23		- CL, 14.0 to 30.0 m																		
17.00	17.30	UDS7														1.86	1.65	12.6						
18.50	18.95	SPT8	37	22																				
20.00	20.30	UDS8														1.88	1.63	15.4						
22.00	22.45	SPT9	44	20																				
24.00	24.30	UDS9														1.89	1.62	16.5						
26.00	26.45	SPT10	42	19		- with traces of gravels, 26.0 to 30.45 m		1	46	44	9													
28.00	28.30	DS2																						
30.00	30.45	SPT11	46	19		- CL-ML, 30.0 to 30.45 m	30.45					24.3	20.2	4.1										

<sup>(1)</sup> SPT is outside NABL scope.





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### Soil Profile (PBH-63)

Location : Retail - 10 Termination Depth : 30.45 m (RL 182.709 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700031 E, 3160218 N Ground Water Depth : 19.60 m Casing Depth : -  
Surface Elevation : RL 213.159 m Boring Start : 13-May-17  
Ground Water Level : RL 193.6 m Boring Finish : 14-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Medium dense brown silty fine sand with traces of gravel (SM)																		
1.00	1.45	SPT1	11	17																				
2.00	2.30	UDS1						2	53	38	7						1.80	1.64	9.4		DS	0.5 ,1, 1.5	0.0	31.1
3.00	3.45	SPT2	14	17																				
4.00	4.30	UDS2															1.81	1.63	10.6					
5.00	5.45	SPT3	16	17																				
6.00	6.30	UDS3															1.81	1.62	11.9					
7.00	7.45	SPT4	19	18						1	64	27	8											
8.00	8.30	UDS4															1.82	1.59	14.6					
9.50	9.95	SPT5	23	19																				
11.00	11.30	UDS5								12.50							1.83	1.59	15.5					
12.50	12.95	SPT6	30	22		Hard brown sandy silt with gravels, low plastic (CL)		9	27	54	10													

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-63)

Location : Retail - 10

Termination Depth : 30.45 m (RL 182.709 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700031 E, 3160218 N

Ground Water Depth : 19.60 m


Casing Depth : -

Surface Elevation : RL 213.159 m

Boring Start : 13-May-17

Ground Water Level : RL 193.6 m

Boring Finish : 14-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	35	23		Hard brown sandy silt with gravels, low plastic (CL)		13	30	49	8	25.3	15.8	9.5		1.85	1.59	16.5	2.67					
15.50	15.95	SPT7														1.87	1.59	17.0						
17.00	17.30	UDS7														1.89	1.55	21.6						
18.50	18.95	SPT8														1.90	1.53	23.8						
20.00	20.30	UDS8														1.91	1.52	25.9						
22.00	22.45	SPT9																						
24.00	24.30	UDS9																						
26.00	26.45	SPT10																						
28.00	28.30	UDS10																						
30.00	30.45	SPT11																						

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-64)

Location : Retail - 10

Termination Depth : 30.45 m (RL 182.898 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700072 E, 3160187 N

Ground Water Depth : 19.70 m

Casing Depth : -

Surface Elevation : RL 213.348 m

Boring Start : 15-May-17

Ground Water Level : RL 193.6 m

Boring Finish : 17-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt with traces of gravels, low plastic (CL)  - stiff, 0.0 to 7.0 m												2.76	DS	0.5, 1, 1.5	0.0	31.8		
1.00	1.45	SPT1	12	19																				
2.00	2.30	UDS1						1	23	62	14			1.80	1.59	12.9								
3.00	3.45	SPT2	10	12		- very stiff, 7.0 to 14.0 m																		
4.00	4.30	UDS2										33.8	18.0	15.8	1.80	1.60	12.4							
5.00	5.45	SPT3	14	15																				
6.00	6.30	UDS3												1.81	1.59	13.5								
7.00	7.45	SPT4	20	19																				
8.00	8.30	UDS4												1.83	1.59	14.5								
9.50	9.95	SPT5	25	21								29.7	16.8	12.9										
11.00	11.30	UDS5												1.84	1.58	16.5								
12.50	12.95	SPT6	29	21																				

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-64)

Location : Retail - 10

Termination Depth : 30.45 m (RL 182.898 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700072 E, 3160187 N

Ground Water Depth : 19.70 m


Casing Depth : -

Surface Elevation : RL 213.348 m

Boring Start : 15-May-17

Ground Water Level : RL 193.6 m

Boring Finish : 17-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	33	22		Hard brown sandy silt, low plastic (CL)		0	45	47	8		28.2	15.5	12.7	1.85	1.58	16.9						
15.50	15.95	SPT7																						
17.00	17.30	UDS7																						
18.50	18.95	SPT8																						
20.00	20.30	UDS8																						
22.00	22.45	SPT9																						
24.00	24.30	UDS9																						
26.00	26.45	SPT10																						
28.00	28.30	UDS10																						
30.00	30.45	SPT11																						
			50	20		- with traces of gravels, 28.0 to 30.45 m	30.45	1	35	44	20				1.91	1.66	14.8							

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Retail - 10  
UTM Coordinates : 700117 E, 3160155 N

### Soil Profile (PBH-65)

Termination Depth : 30.45 m (RL 182.944 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.50 m Casing Depth : -  
Surface Elevation : RL 213.394 m Boring Start : 18-May-17  
Ground Water Level : RL 193.9 m Boring Finish : 20-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)		0	26	56	18													
1.00	1.45	SPT1	8	12		- stiff, 0.0 to 5.0 m																		
2.00	2.30	UDS1														1.79	1.61	11.0						
3.00	3.45	SPT2	12	14								30.9	17.5	13.4										
4.00	4.30	UDS2														1.80	1.61	12.1		DS	0.5, 1, 1.5	0.0	32.0	
5.00	5.45	SPT3	16	17		- very stiff, 5.0 to 14.0 m																		
6.00	6.30	UDS3						0	15	70	15					1.82	1.61	12.6						
7.00	7.45	SPT4	22	20																				
8.00	8.30	UDS4														1.83	1.61	13.5						
9.50	9.95	SPT5	27	22								28.3	18.0	10.3										
11.00	11.30	UDS5														1.84	1.61	14.5						
12.50	12.95	SPT6	30	22																				

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Retail - 10  
UTM Coordinates : 700117 E, 3160155 N

### Soil Profile (PBH-65)

Termination Depth : 30.45 m (RL 182.944 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.50 m Casing Depth : -  
Surface Elevation : RL 213.394 m Boring Start : 18-May-17  
Ground Water Level : RL 193.9 m Boring Finish : 20-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Hard brown sandy silt, low plastic (CL)		0	24	55	21					1.86	1.62	15.2						
15.50	15.95	SPT7	42	28																				
17.00	17.30	UDS7														1.88	1.59	18.6						
18.50	18.95	SPT8	42	25								32.9	20.5	12.4					2.64					
20.00	20.30	UDS8														1.88	1.55	21.2						
22.00	22.45	SPT9	45	20																				
24.00	24.30	UDS9														1.90	1.53	23.6						
26.00	26.45	SPT10	50	21				0	23	65	12													
28.00	28.30	UDS10														1.91	1.54	24.1						
30.00	30.45	SPT11	55	22			30.45					29.5	17.9	11.6										

<sup>(1)</sup> SPT is outside NABL scope.

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### Soil Profile (PBH-66)

Location : Retail - 10

Termination Depth : 30.45 m (RL 182.793 m)

Boring Method : Rotary Drilling

UTM Coordinates : 699981 E, 3160152 N

Ground Water Depth : 19.20 m



Casing Depth : -

Surface Elevation : RL 213.243 m

Boring Start : 11-May-17

Ground Water Level : RL 194 m

Boring Finish : 12-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1	6	9		Loose brown silty fine sand with traces of gravels (SM)	5.00	1	52	39	8					1.78	1.58	13.2						
1.00	1.45	SPT1																						
2.00	2.30	UDS1																						
3.00	3.45	SPT2																						
4.00	4.30	UDS2	11	11		Stiff to hard brown sandy silt, low plastic (CL)  - stiff, 5.0 to 7.0 m  - very stiff, 7.0 to 9.5 m  - hard, 9.5 to 14.0 m  - with gravels, 9.5 to 14.0 m		0	44	47	9					1.79	1.57	14.2						
5.00	5.45	SPT3																						
6.00	6.30	UDS3																						
7.00	7.45	SPT4																						
8.00	8.30	UDS4																						
9.50	9.95	SPT5																						
11.00	11.30	UDS5																						
12.50	12.95	SPT6																						

<sup>(1)</sup> SPT is outside NABL scope.



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### Soil Profile (PBH-66)

Location : Retail - 10

Termination Depth : 30.45 m (RL 182.793 m)

Boring Method : Rotary Drilling

UTM Coordinates : 699981 E, 3160152 N

Ground Water Depth : 19.20 m


Casing Depth : -

Surface Elevation : RL 213.243 m

Boring Start : 11-May-17

Ground Water Level : RL 194 m

Boring Finish : 12-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	DS2	36	24		Hard brown sandy silt with gravels, low plastic (CL)		7	30	43	20	31.6	18.1	13.6		1.87	1.57	18.9	2.65	DS	1, 2, 3	0.0	32.5	
15.50	15.95	SPT7																						
17.00	17.30	UDS6																						
18.50	18.95	SPT8																						
20.00	20.30	UDS7																						
22.00	22.45	SPT9																						
24.00	24.30	UDS8																						
26.00	26.45	SPT10																						
28.00	28.30	DS3																						
30.00	30.45	SPT11	53	21		30.45																		

<sup>(1)</sup> SPT is outside NABL scope.

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Location : Retail - 10  
UTM Coordinates : 700084 E, 3160076 N

### Soil Profile (PBH-67)

Termination Depth : 30.45 m (RL 182.778 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.10 m Casing Depth : -  
Surface Elevation : RL 213.228 m Boring Start : 17-May-17  
Ground Water Level : RL 193.1 m Boring Finish : 19-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>r</sub>	Corrected Value, N <sub>r</sub> <sup>1</sup>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to hard brown sandy silt, low plastic (CL)						25.8	16.9	9.0										
1.00	1.45	SPT1	11	17		- stiff, 0.0 to 5.0 m		0	30	57	13													
2.00	2.30	UDS1														1.80	1.62	11.0						
3.00	3.45	SPT2	13	16															2.65					
4.00	4.30	UDS2										28.8	17.0	11.8		1.81	1.61	12.3		DS	0.5, 1, 1.5	0.0	35.4	
5.00	5.45	SPT3	16	17		- very stiff, 5.0 to 12.5 m																		
6.00	6.30	UDS3														1.81	1.60	13.4						
7.00	7.45	SPT4	19	18				0	38	47	15													
8.00	8.30	UDS4														1.82	1.59	14.3						
9.50	9.95	SPT5	21	17																				
11.00	11.30	UDS5										26.8	16.8	10.0		1.84	1.61	14.2						
12.50	12.95	SPT6	33	24		- hard, 12.5 to 14.0 m																		

<sup>(1)</sup> SPT is outside NABL scope.






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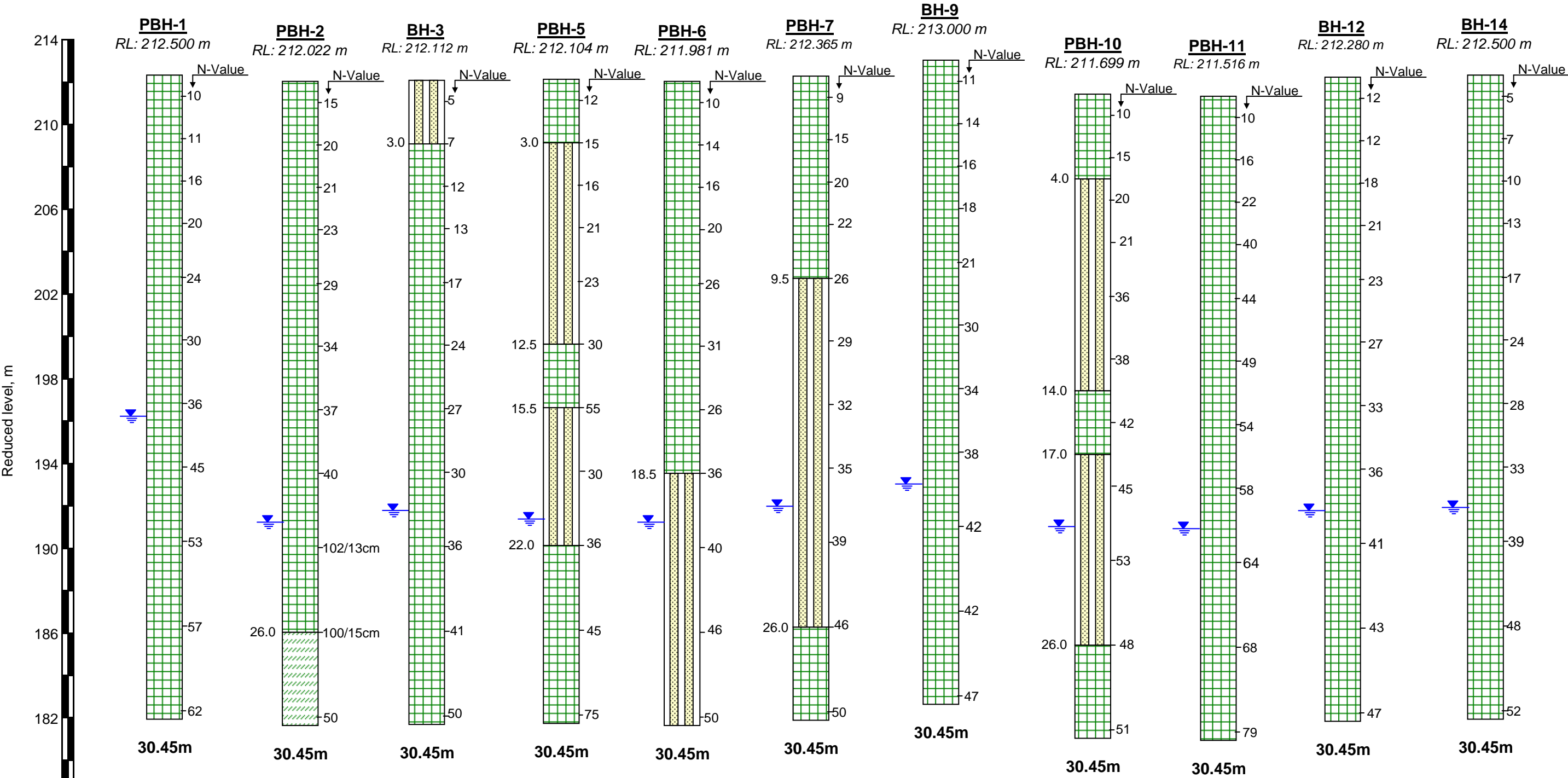
Location : Retail - 10  
UTM Coordinates : 700084 E, 3160076 N

### Soil Profile (PBH-67)

Termination Depth : 30.45 m (RL 182.778 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.10 m Casing Depth : -  
Surface Elevation : RL 213.228 m Boring Start : 17-May-17  
Ground Water Level : RL 193.1 m Boring Finish : 19-May-17

Depth, m		Sample No.	SPT <sup>(1)</sup>		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N <sub>f</sub>	Corrected Value, N <sub>c</sub>				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm <sup>3</sup> )	Dry Density (gms/cm <sup>3</sup> )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm <sup>2</sup> )	Cohesion Intercept, 'c' (kg/cm <sup>2</sup> )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	39	26		Hard brown sandy silt, low plastic (CL)		1	14	73	12			29.6	17.1	12.6	1.86	1.62	15.2					
15.50	15.95	SPT7				- with traces of gravels, 14.0 to 28.0 m																		
17.00	17.30	DS2																						
18.50	18.95	SPT8																						
20.00	20.30	UDS7	39	24													1.88	1.55	21.3					
22.00	22.45	SPT9																						
24.00	24.30	UDS8																						
26.00	26.45	SPT10																						
28.00	28.30	UDS9	48	20													1.89	1.53	23.0					
30.00	30.45	SPT11																						
			57	22		- with gravels, 28.0 to 30.45 m	30.45										1.91	1.52	25.6					
																								

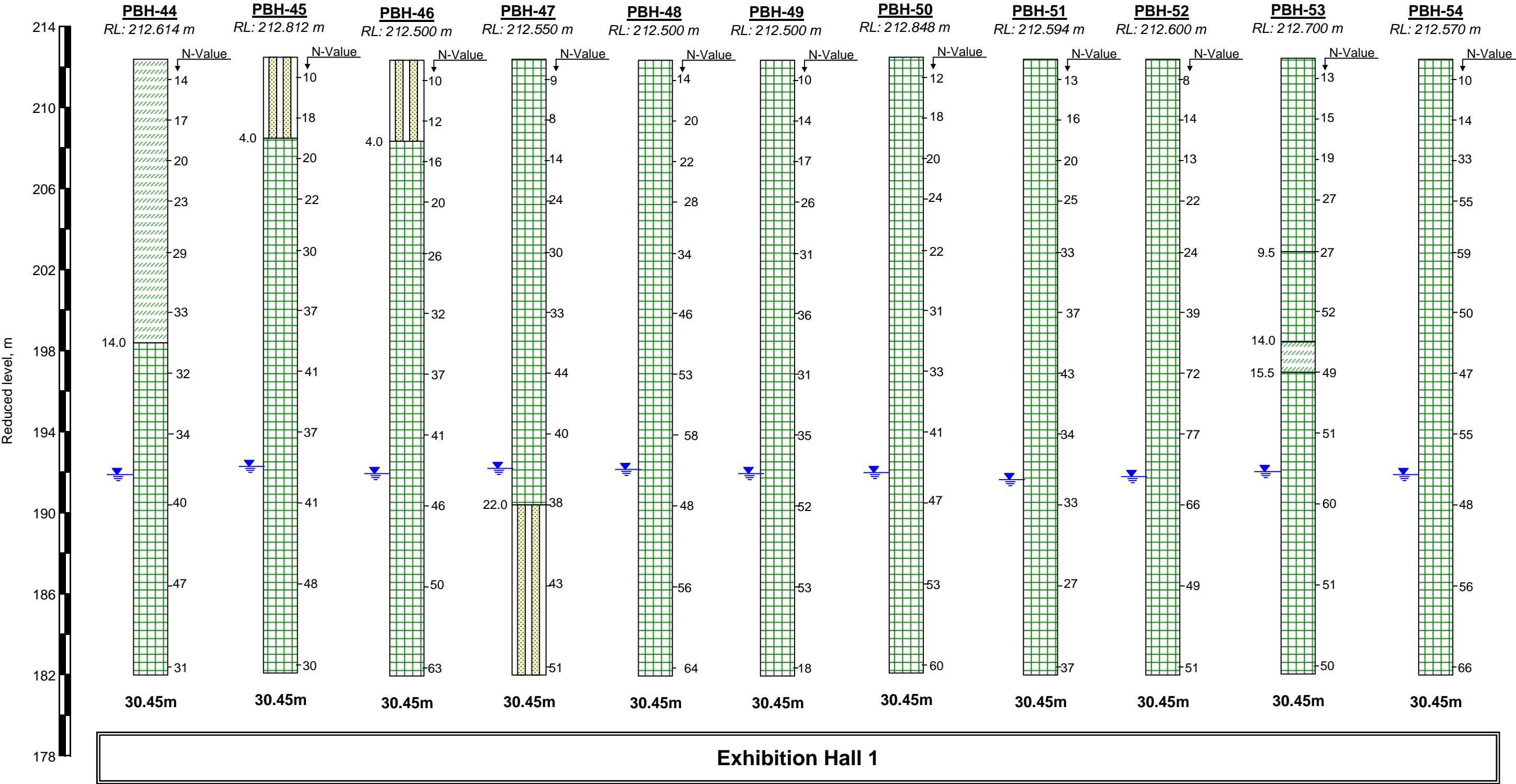
<sup>(1)</sup> SPT is outside NABL scope.



Exhibition Hall 5

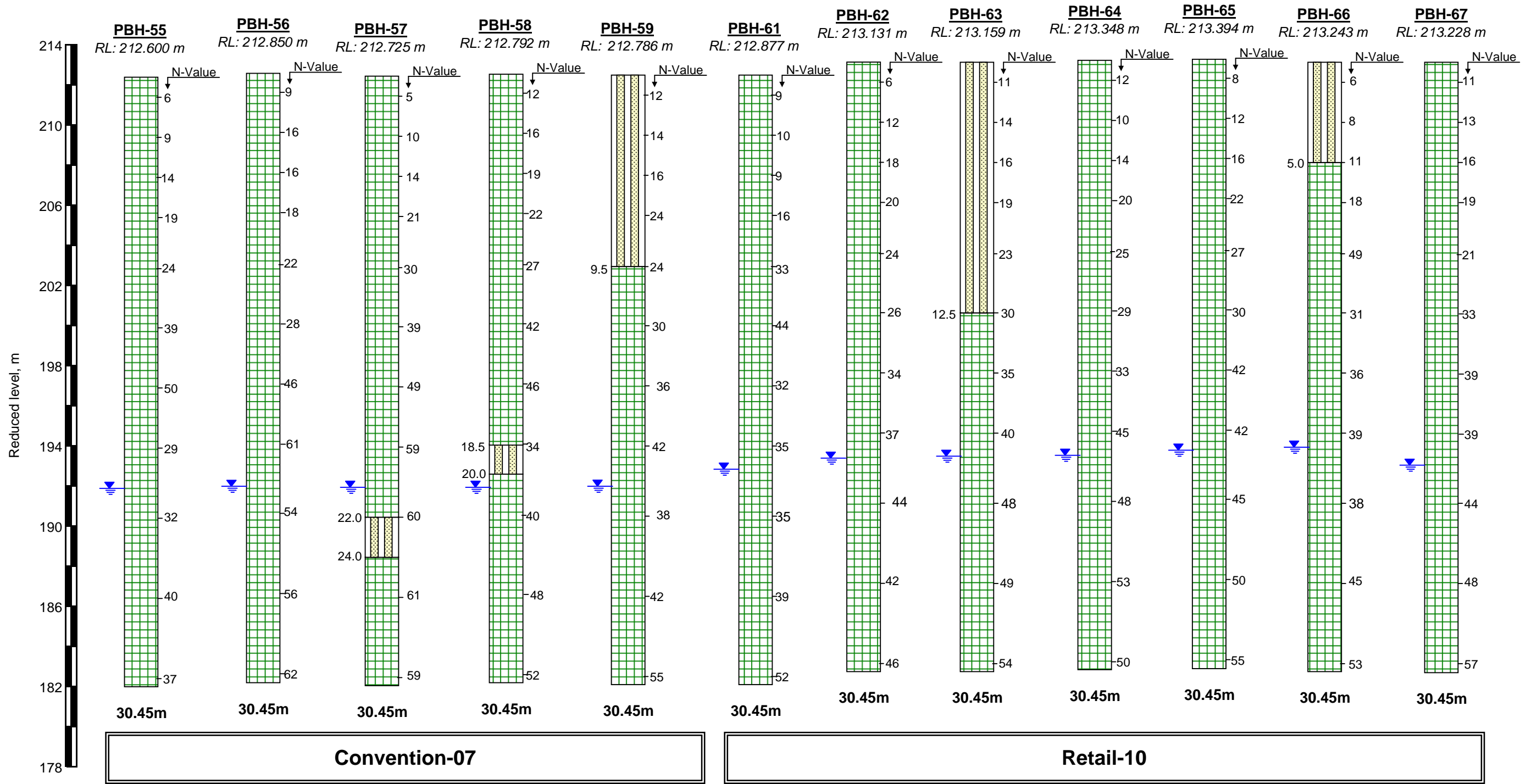
LEGEND	
SYMBOL	DESCRIPTION
	Sandy silt (CL)
	Clayey silt (CI)
	Silty fine sand (SM)
	Water table

Summary of Borehole Profiles



LEGEND	
SYMBOL	DESCRIPTION
	Sandy silt (CL)
	Clayey silt (CI)
	Silty fine sand (SM)
	Water table

Summary of Borehole Profiles



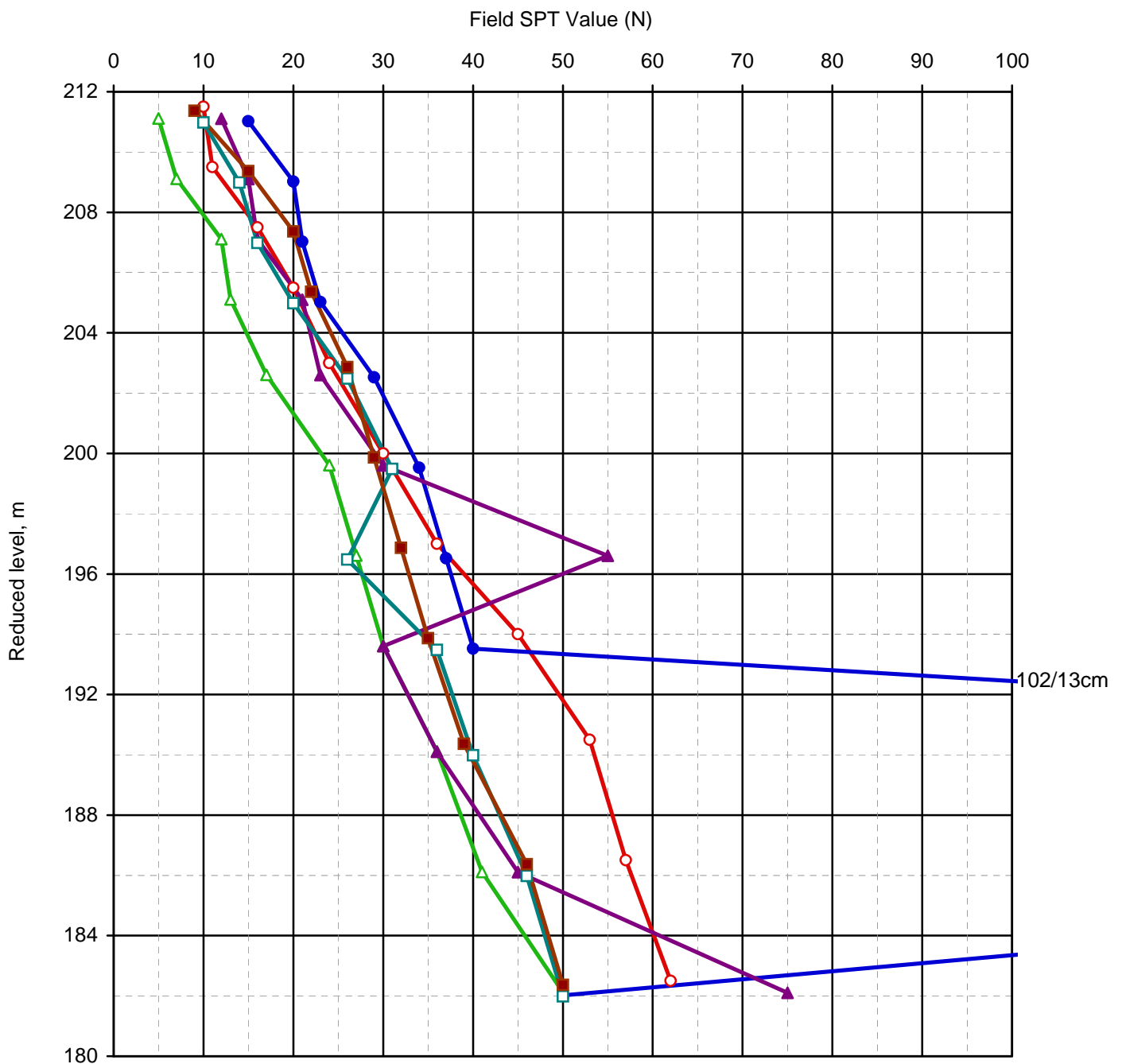
Summary of Borehole Profiles



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-1	212.500	Exhibition Hall 5
	PBH-2	212.022	
	BH-3	212.112	
	PBH-5	212.104	
	PBH-6	211.981	
	PBH-7	212.365	



Field SPT Values vs. Reduced level

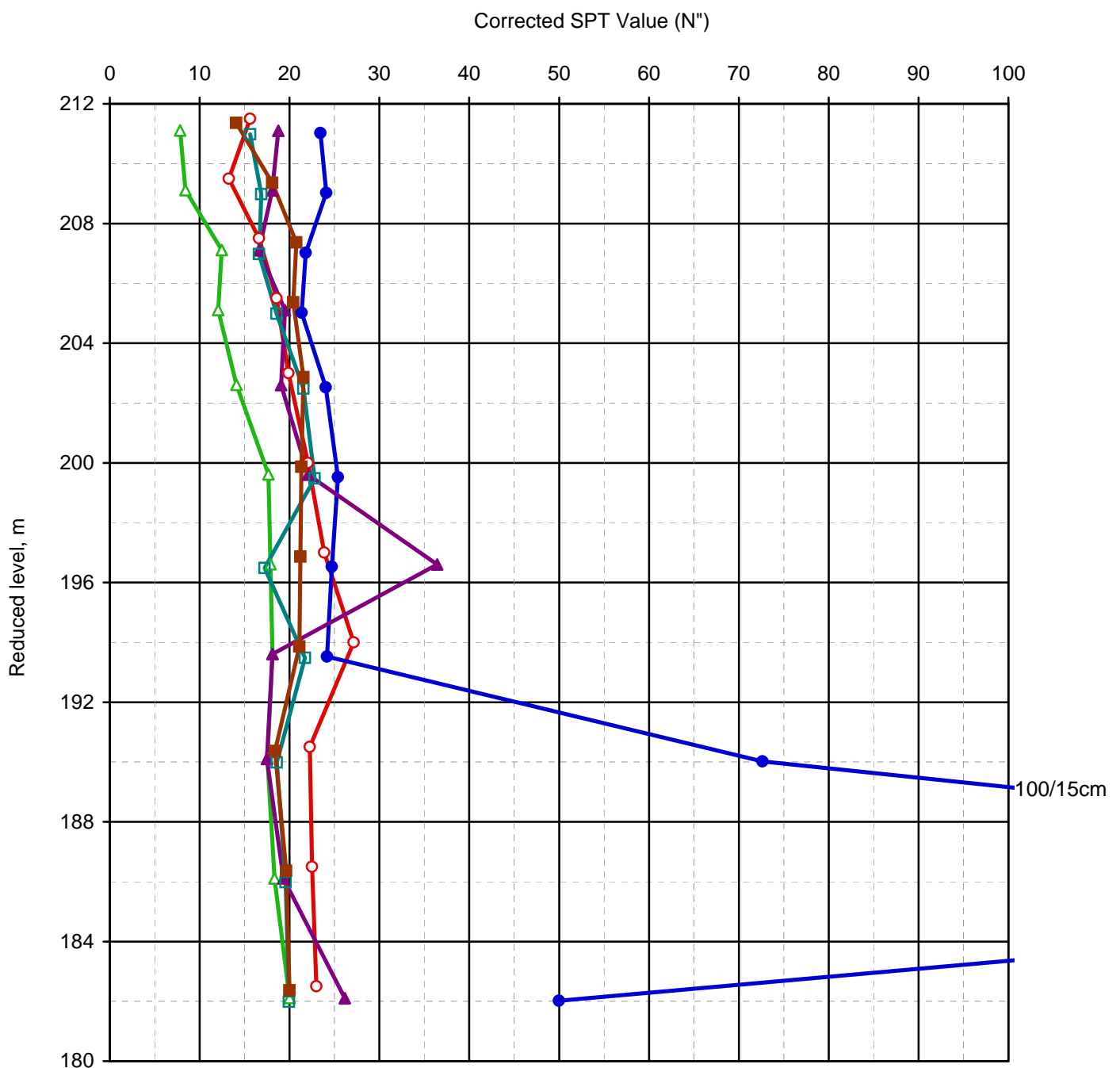




## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-1	212.500	Exhibition Hall 5
	PBH-2	212.022	
	BH-3	212.112	
	PBH-5	212.104	
	PBH-6	211.981	
	PBH-7	212.365	

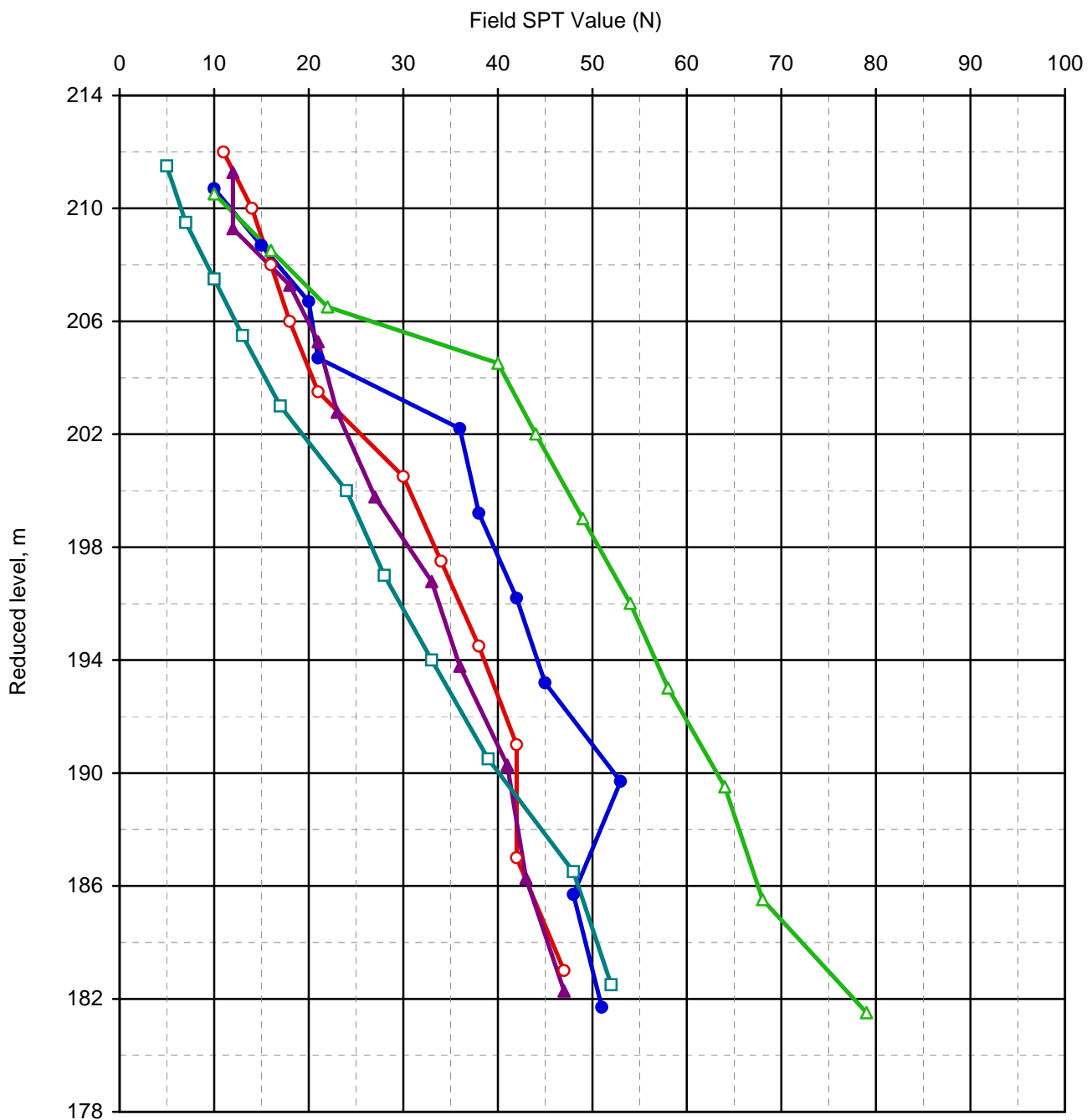




## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	BH-9	213.000	Exhibition Hall 5
●	PBH-10	211.699	
△	PBH-11	211.516	
▲	BH-12	212.280	
□	BH-14	212.500	



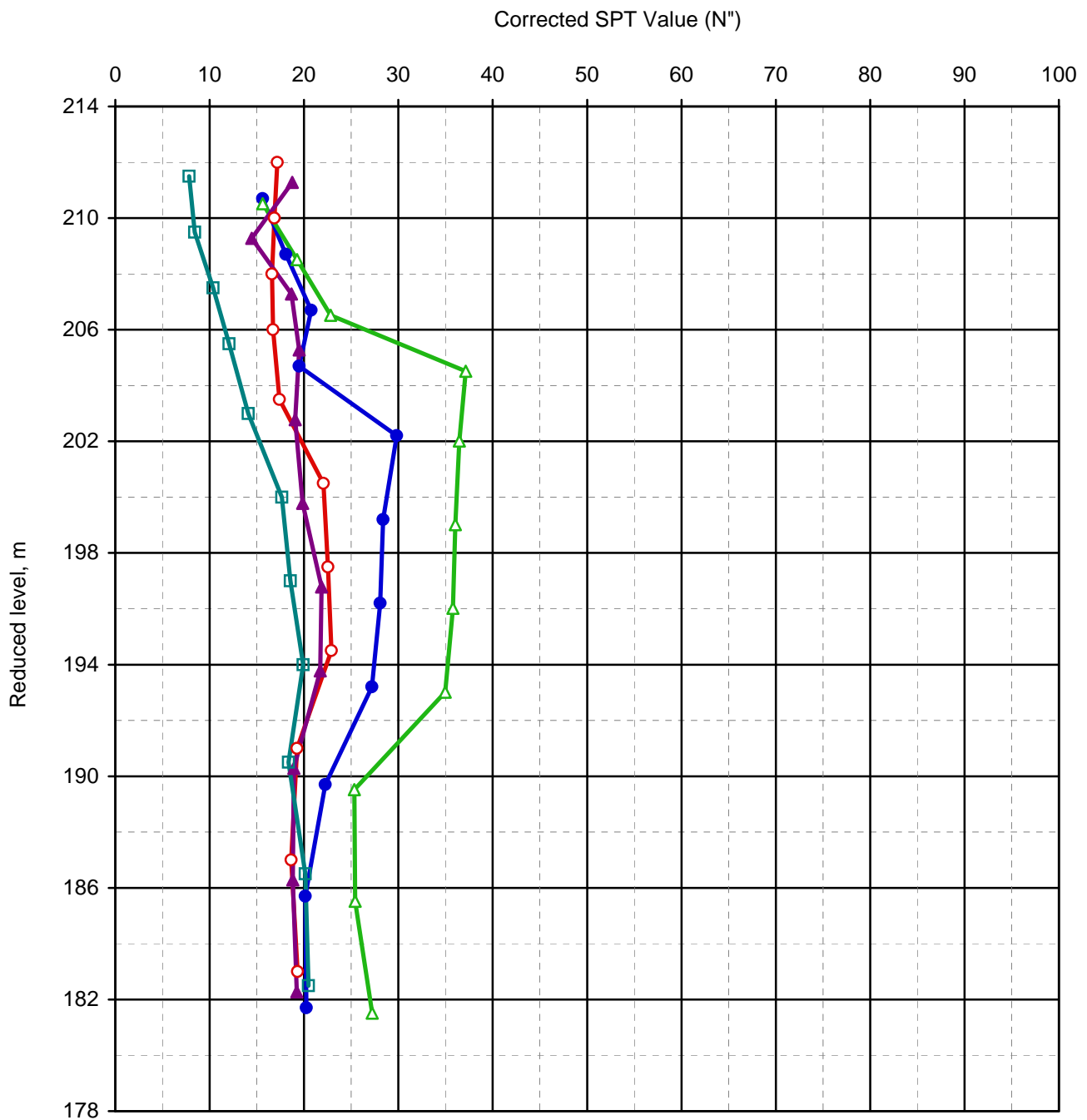
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	BH-9	213.000	Exhibition Hall 5
●	PBH-10	211.699	
△	PBH-11	211.516	
▲	BH-12	212.280	
□	BH-14	212.500	

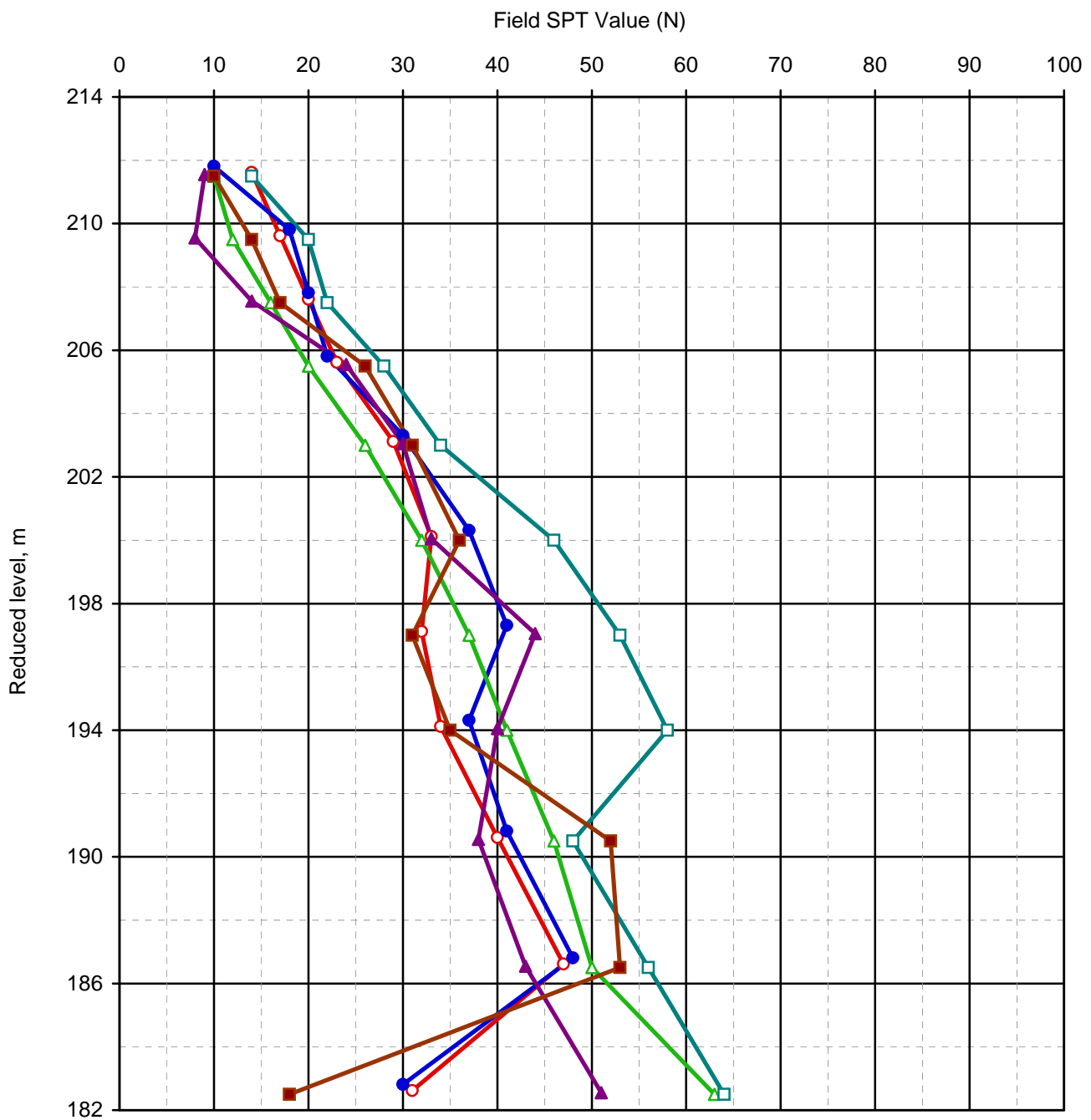




## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-44	212.614	Exhibition Hall 1
●	PBH-45	212.812	
△	PBH-46	212.500	
▲	PBH-47	212.550	
□	PBH-48	212.500	
■	PBH-49	212.500	



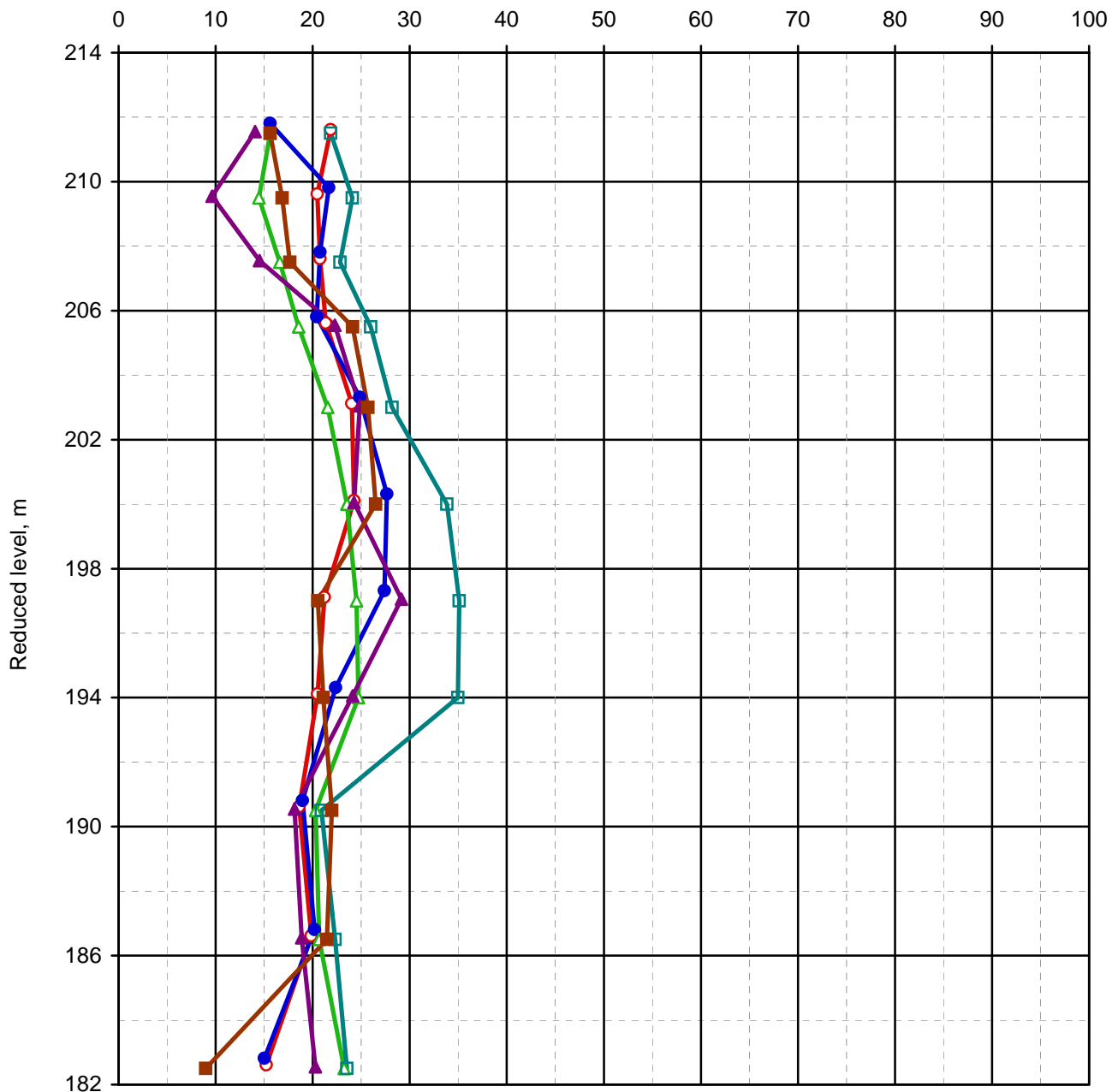


## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-44	212.614	Exhibition Hall 1
●	PBH-45	212.812	
△	PBH-46	212.500	
▲	PBH-47	212.550	
□	PBH-48	212.500	
■	PBH-49	212.500	

Corrected SPT Value (N")



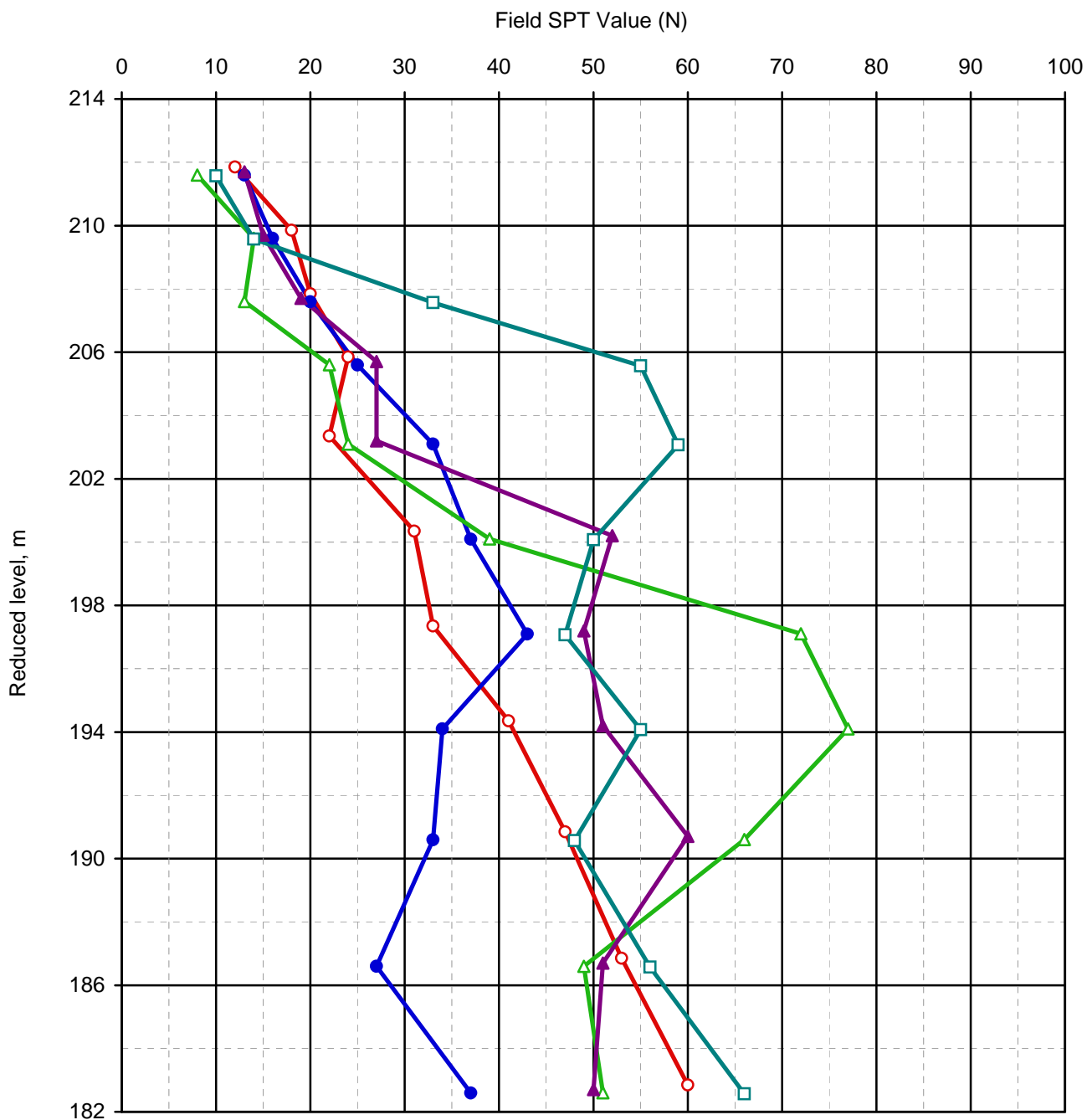
Corrected SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-50	212.848	Exhibition Hall 1
	PBH-51	212.594	
	PBH-52	212.600	
	PBH-53	212.700	
	PBH-54	212.570	



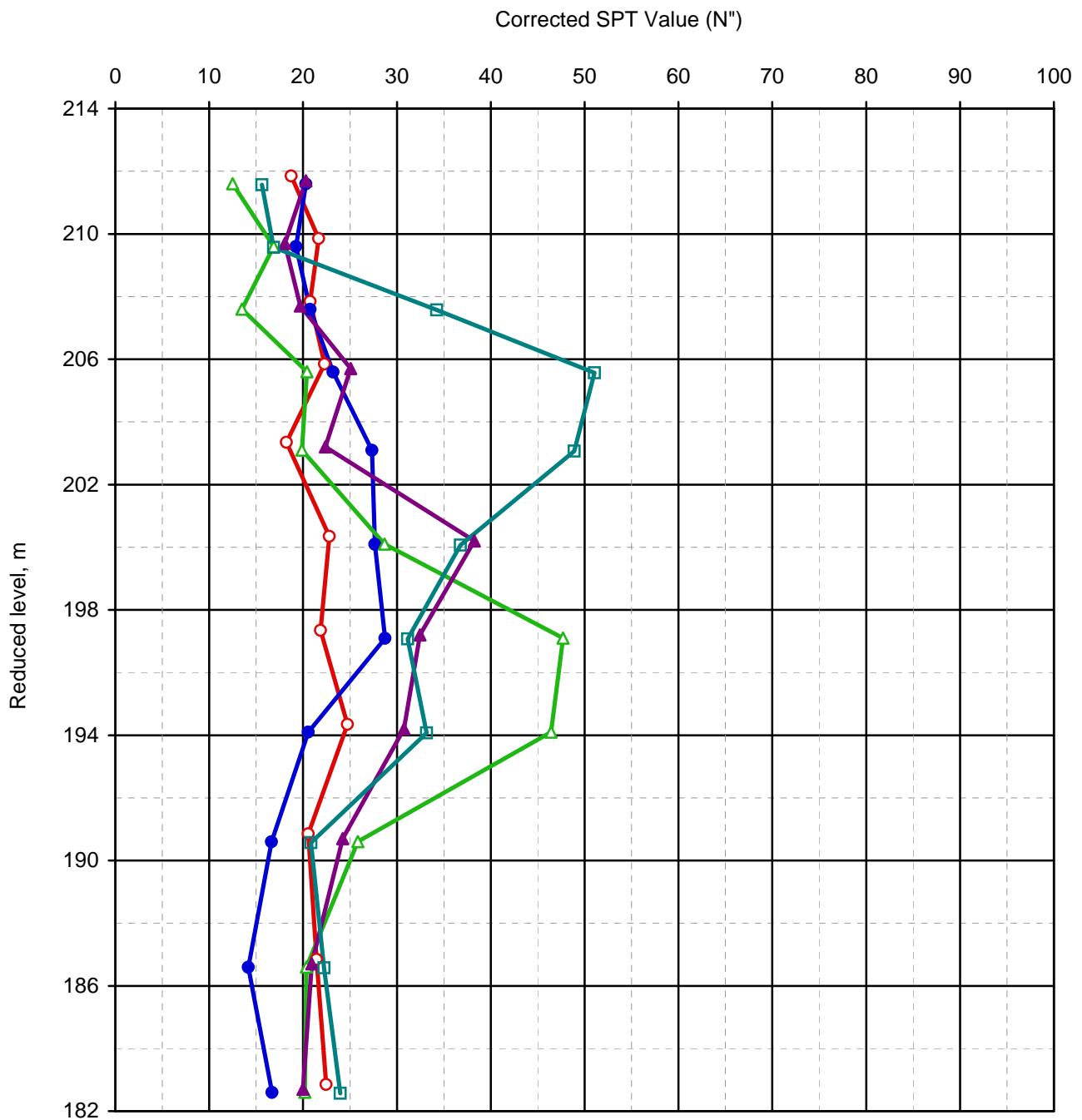
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-50	212.848	Exhibition Hall 1
	PBH-51	212.594	
	PBH-52	212.600	
	PBH-53	212.700	
	PBH-54	212.570	



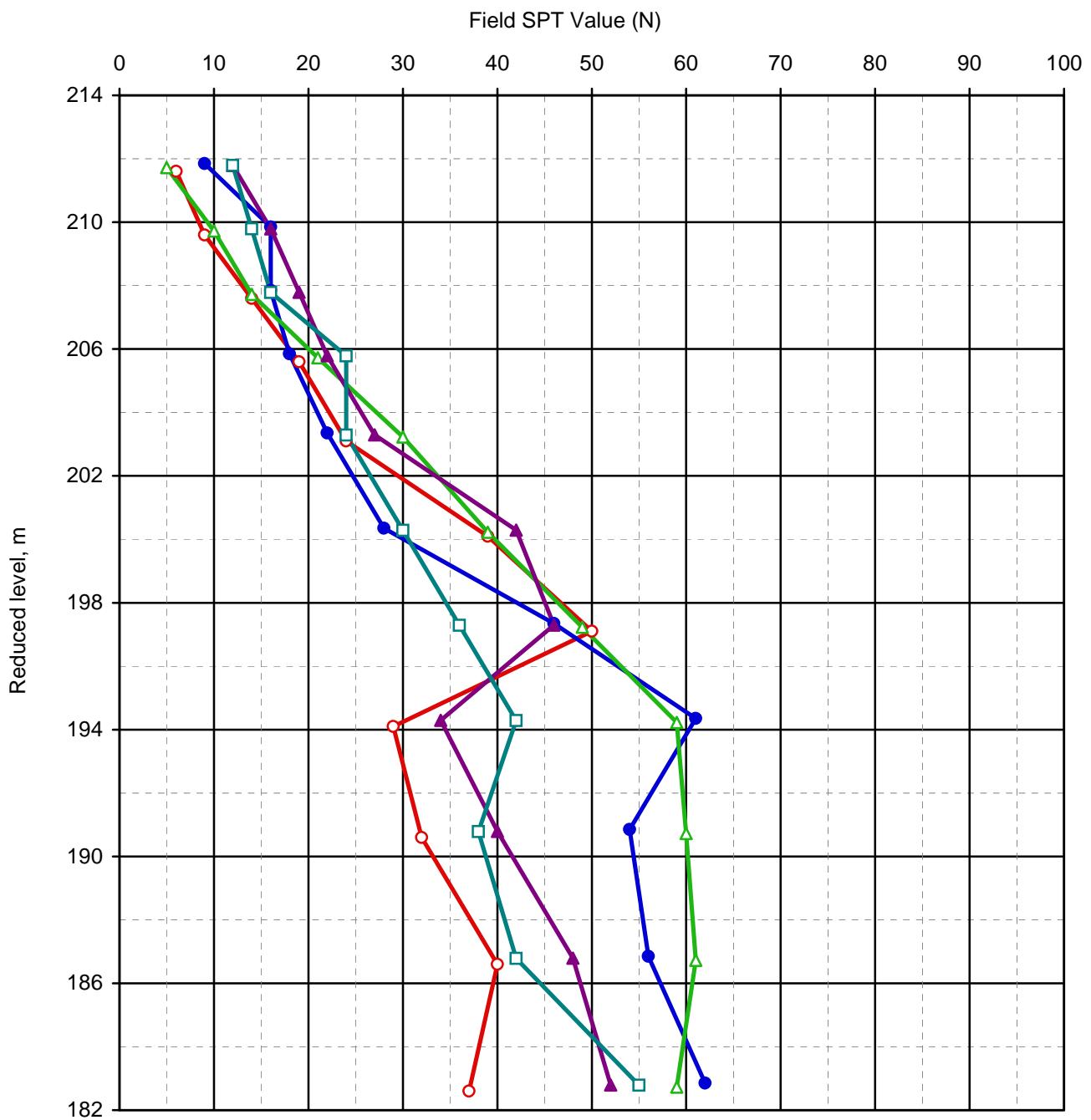




## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-55	212.600	Convention-07
●	PBH-56	212.850	
△	PBH-57	212.725	
▲	PBH-58	212.792	
□	PBH-59	212.786	



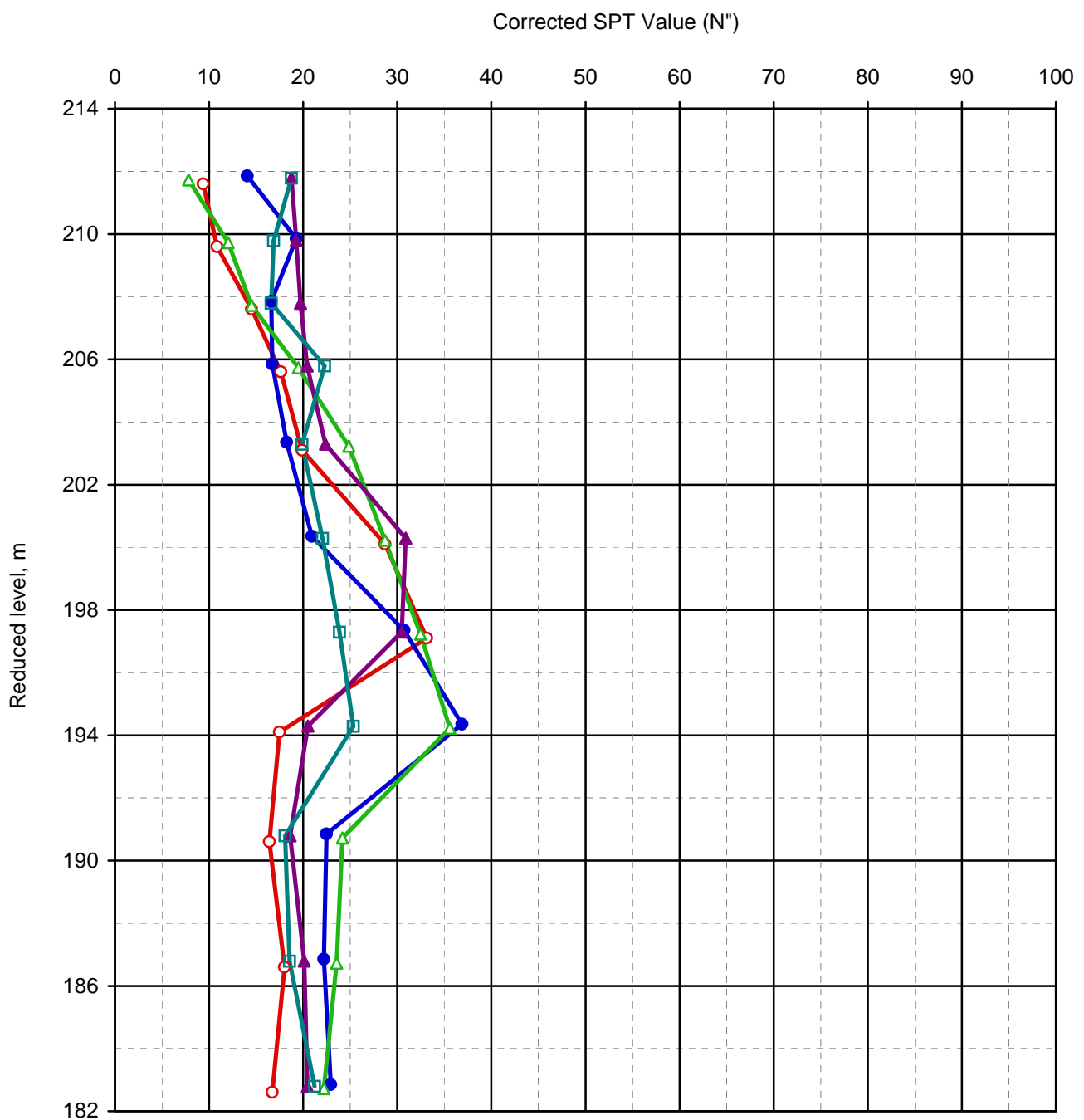
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-55	212.600	Convention-07
●	PBH-56	212.850	
△	PBH-57	212.725	
▲	PBH-58	212.792	
□	PBH-59	212.786	



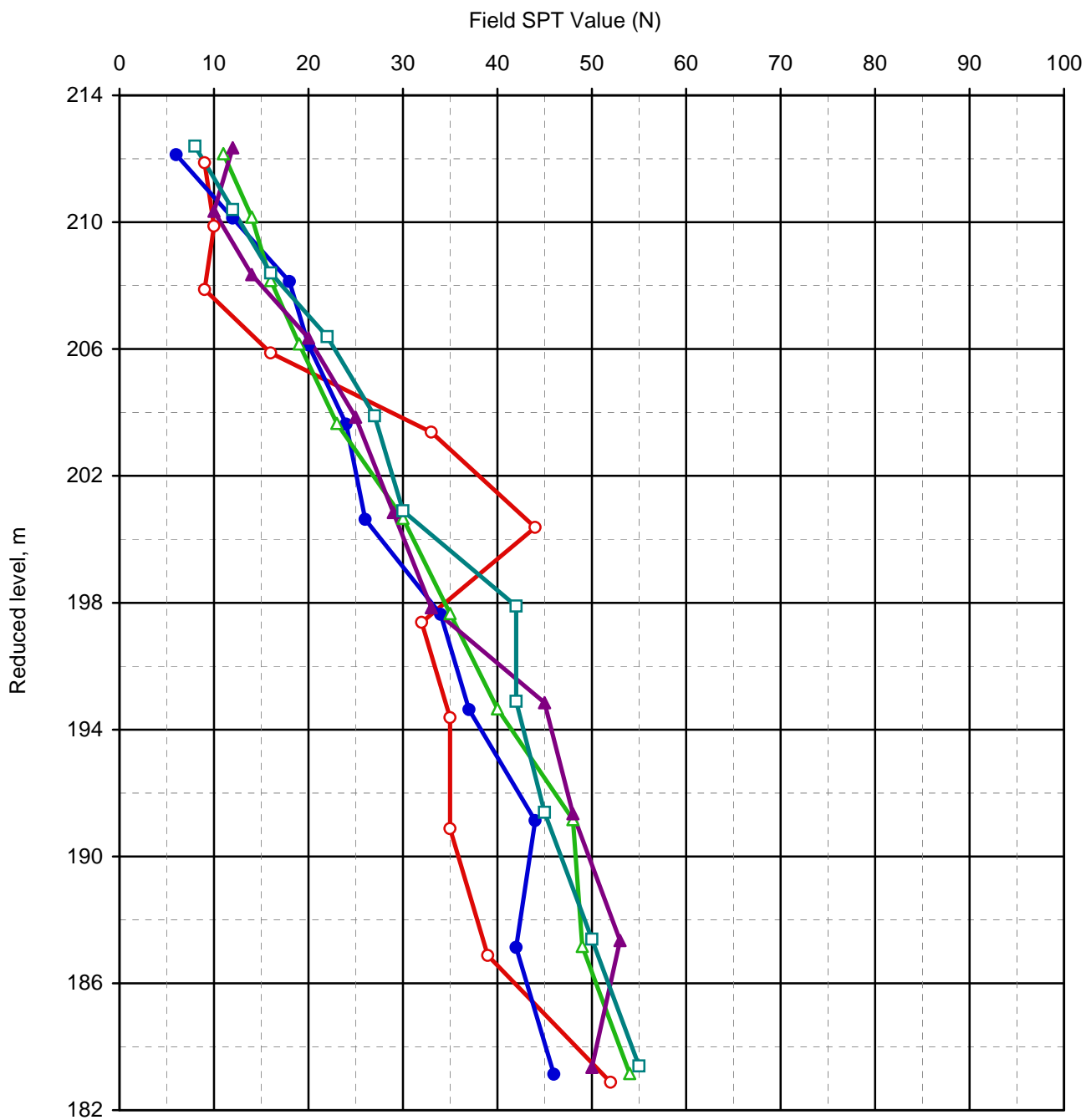
Corrected SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-61	212.877	Retail-10
●	PBH-62	213.131	
△	PBH-63	213.159	
▲	PBH-64	213.348	
□	PBH-65	213.394	



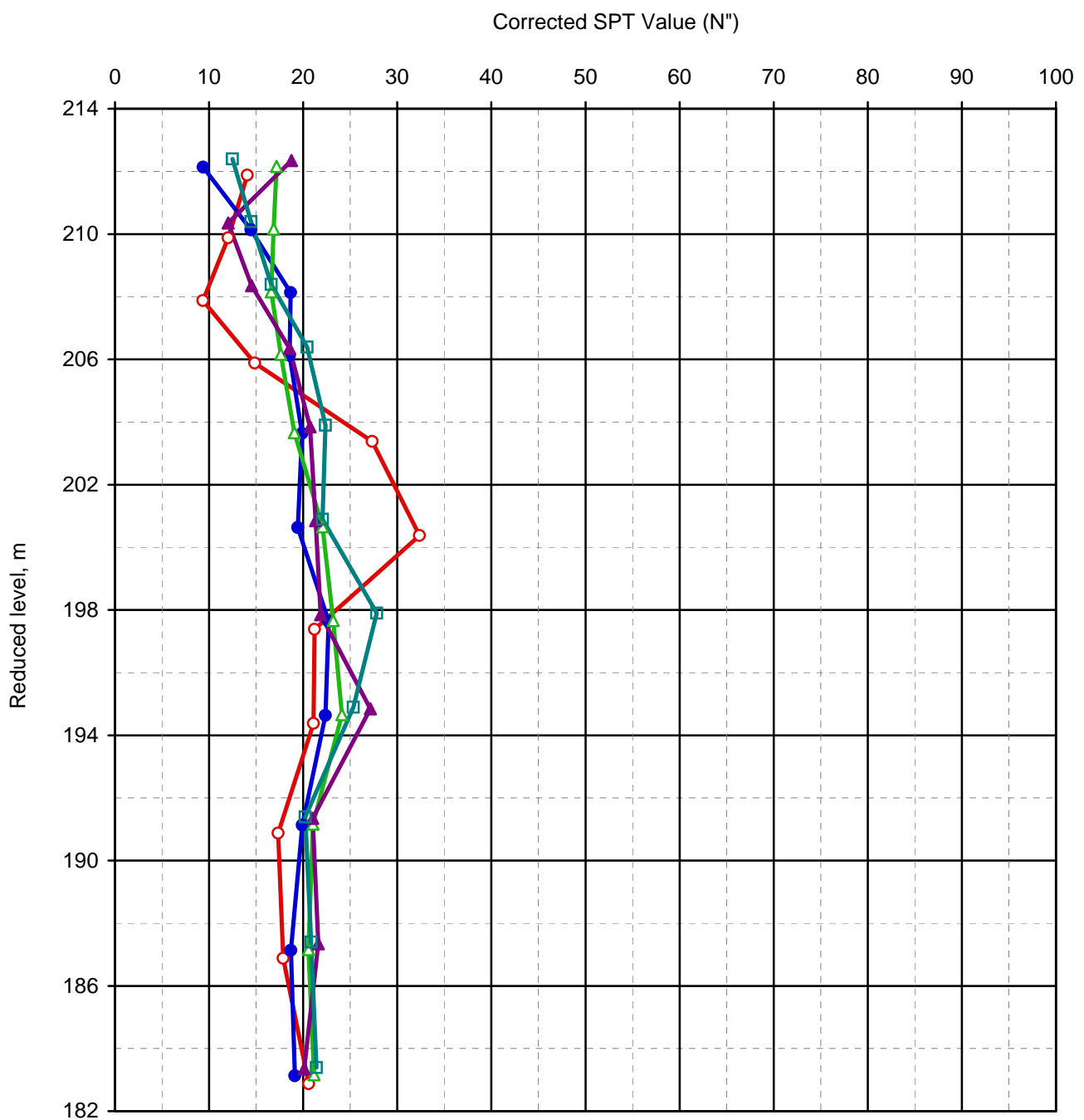
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-61	212.877	Retail-10
●	PBH-62	213.131	
△	PBH-63	213.159	
▲	PBH-64	213.348	
□	PBH-65	213.394	



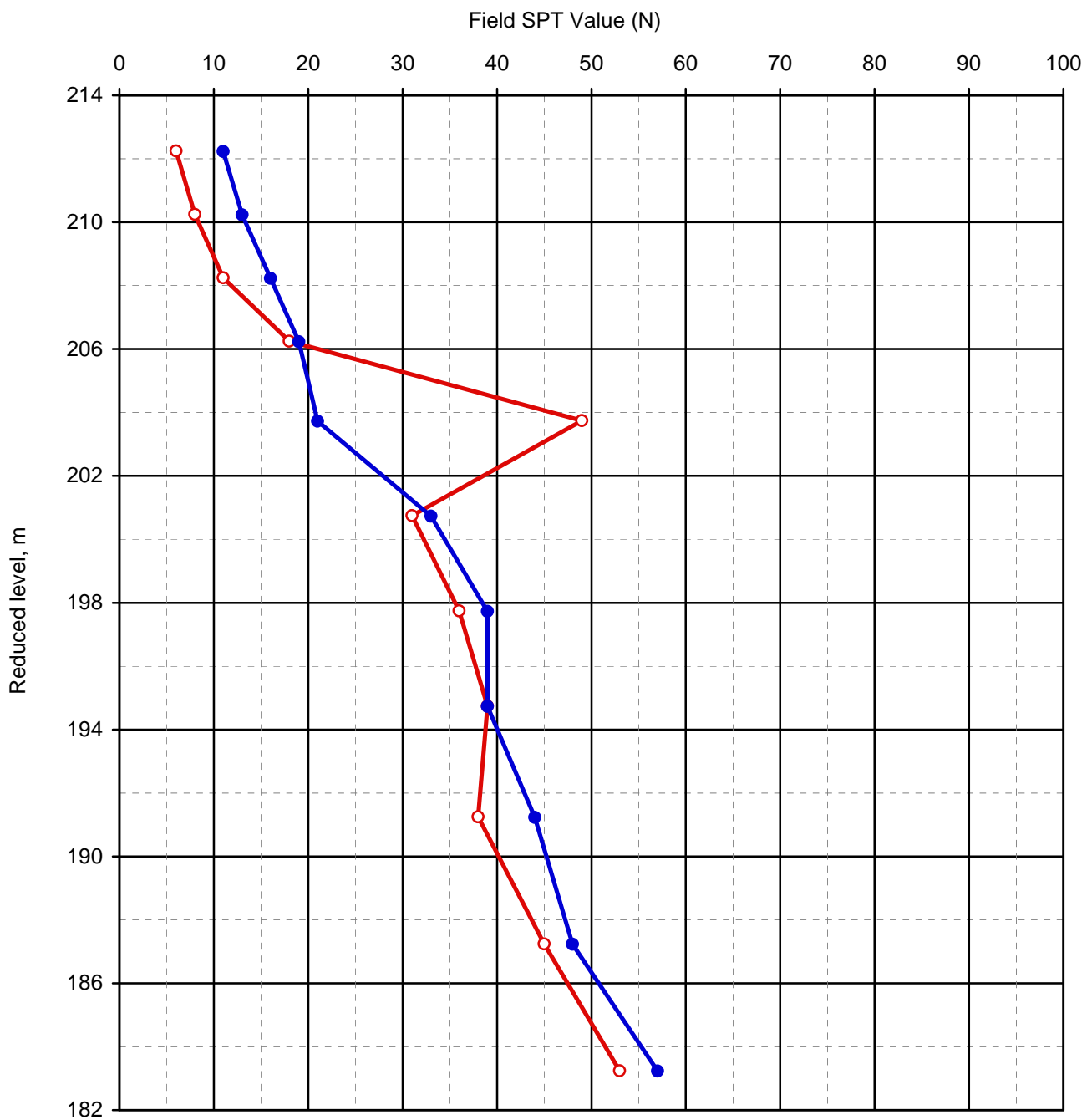
Corrected SPT Values vs. Reduced level



### Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○—	PBH-66	213.243	Retail-10
●—	PBH-67	213.228	



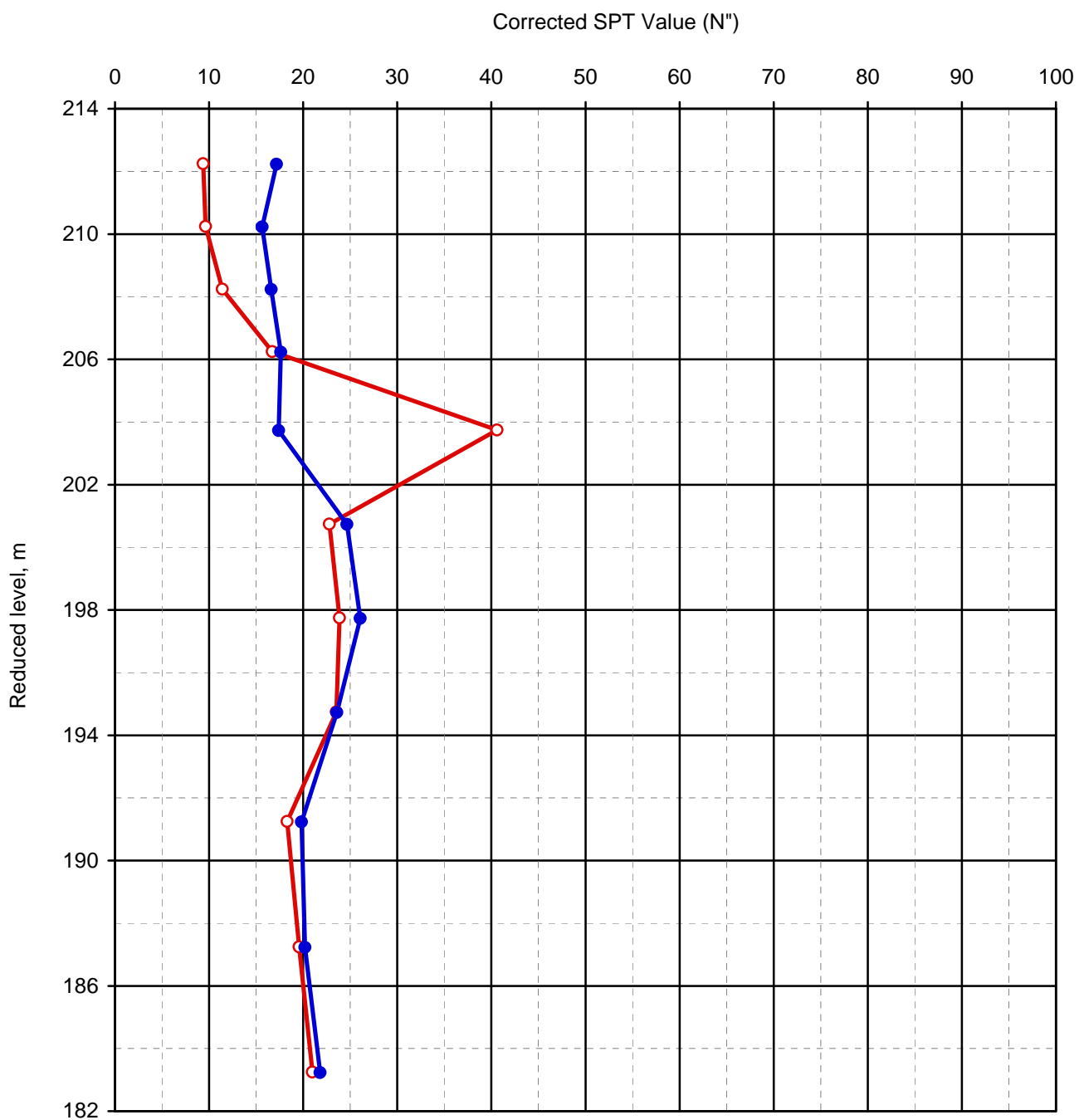
Field SPT Values vs. Reduced level



## Standard Penetration Test

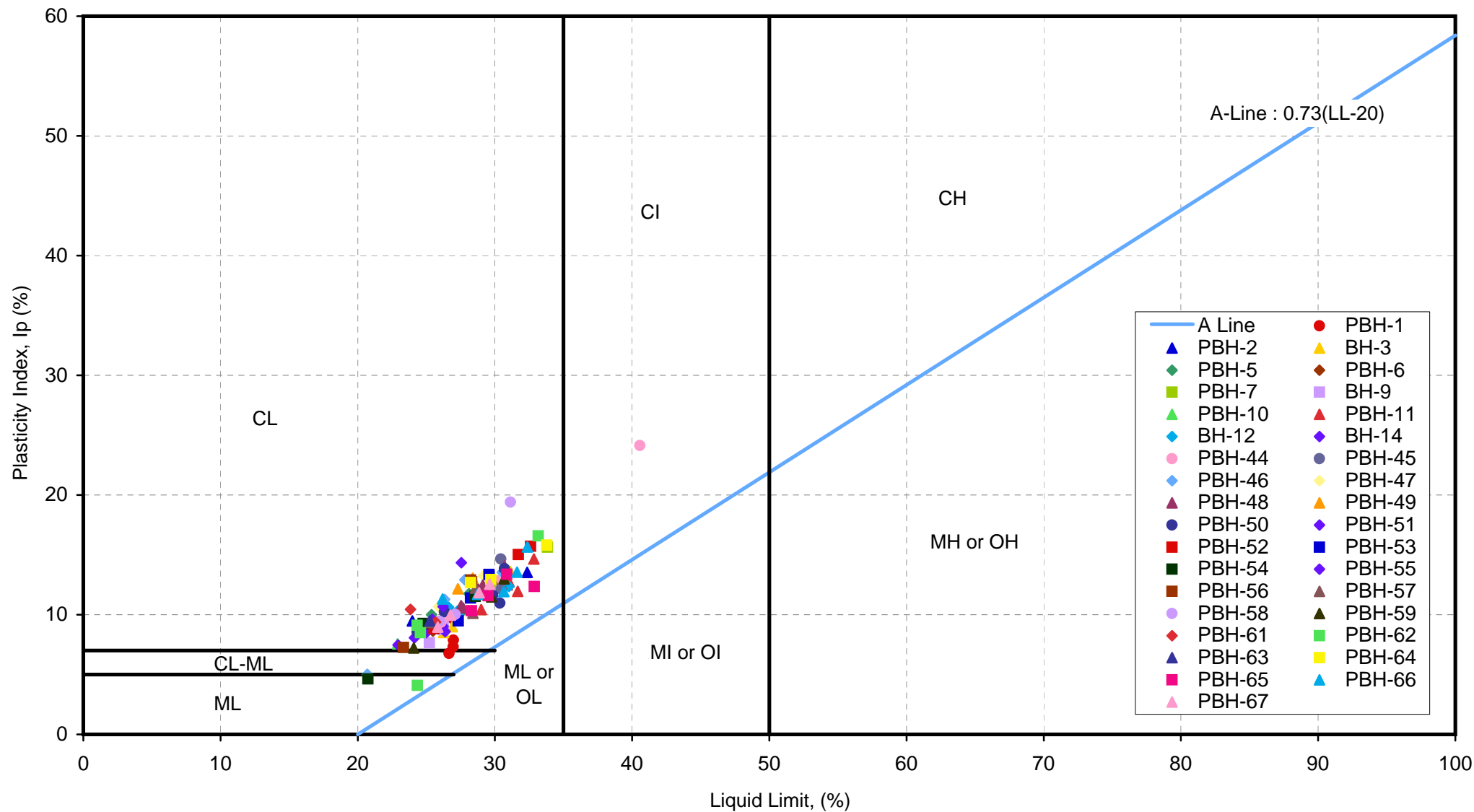
IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○—○	PBH-66	213.243	Retail-10
●—●	PBH-67	213.228	



Corrected SPT Values vs. Reduced level

# **Atterberg Test** IS : 2720 (Part-5)-1985, RA-2010

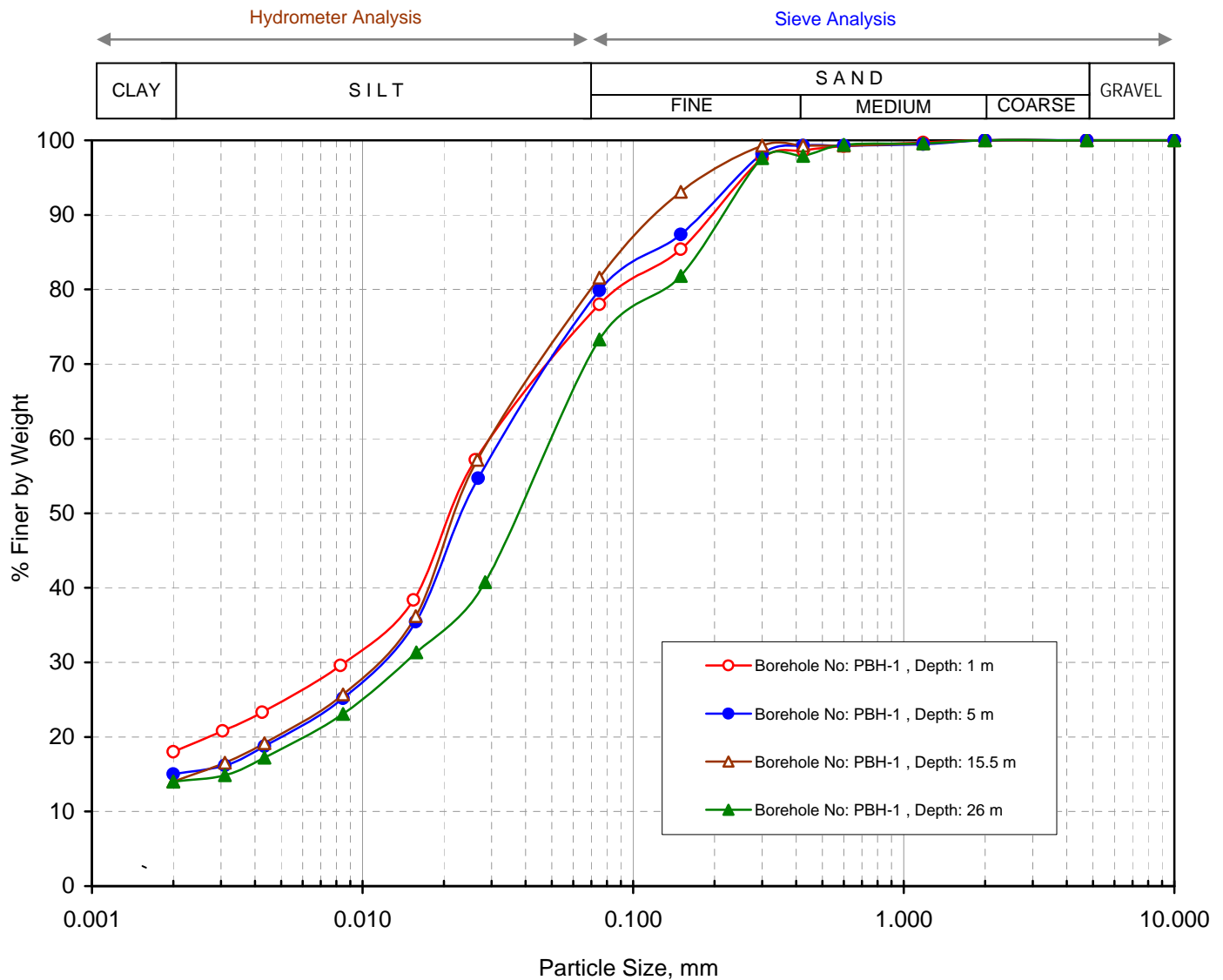




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-1	1.00	Sandy silt (CL)	0	22	60	18	0.033	0.009			
PBH-1	5.00	Sandy silt (CL)	0	20	65	15	0.037	0.012			
PBH-1	15.50	Sandy silt (CL)	0	18	68	14	0.032	0.011			
PBH-1	26.00	Sandy silt (CL)	0	26	60	14	0.056	0.015			



## Grain Size Distribution Curve

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## Grain Size Analysis

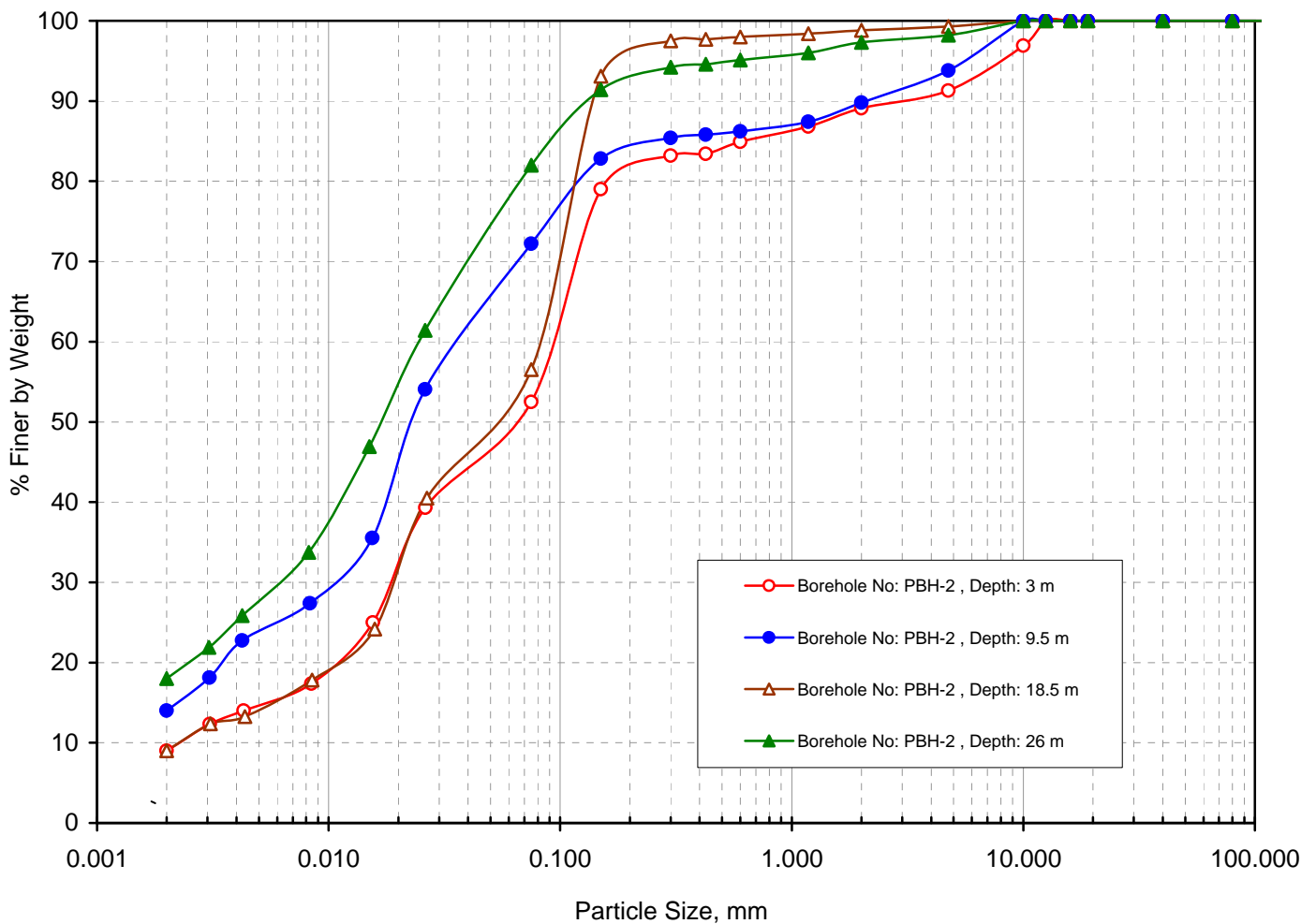
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-2	3.00	Sandy silt with gravels (CL)	9	38	44	9	0.096	0.019	0.002	48.0	1.88
PBH-2	9.50	Sandy silt with gravels (CL)	6	21	59	14	0.042	0.011			
PBH-2	18.50	Sandy silt with traces of gravels (CL)	1	42	48	9	0.082	0.020	0.002	41.0	2.44
PBH-2	26.00	Clayey silt with traces of gravels (CI)	2	16	64	18	0.025	0.006			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



## Grain Size Distribution Curve

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## Grain Size Analysis

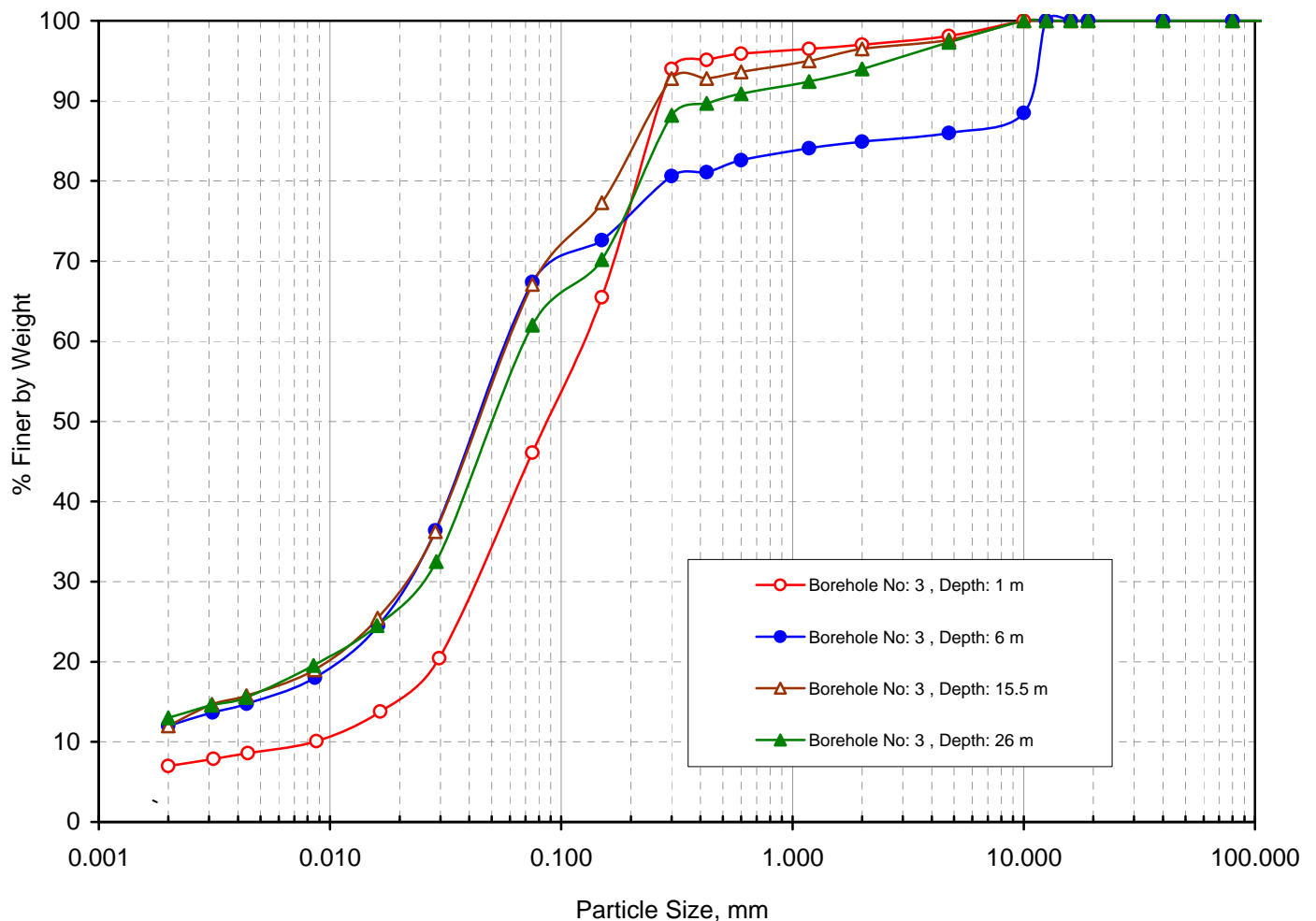
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
BH-3	1.00	Silty fine sand with traces of gravels (SM)	2	52	39	7	0.129	0.047	0.008	16.1	2.14
BH-3	6.00	Sandy silt with gravels (CL)	14	18	56	12	0.064	0.022			
BH-3	15.50	Sandy silt with traces of gravels (CL)	2	30	56	12	0.064	0.021			
BH-3	26.00	Sandy silt with traces of gravels (CL)	3	35	49	13	0.072	0.025			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve





## Grain Size Analysis

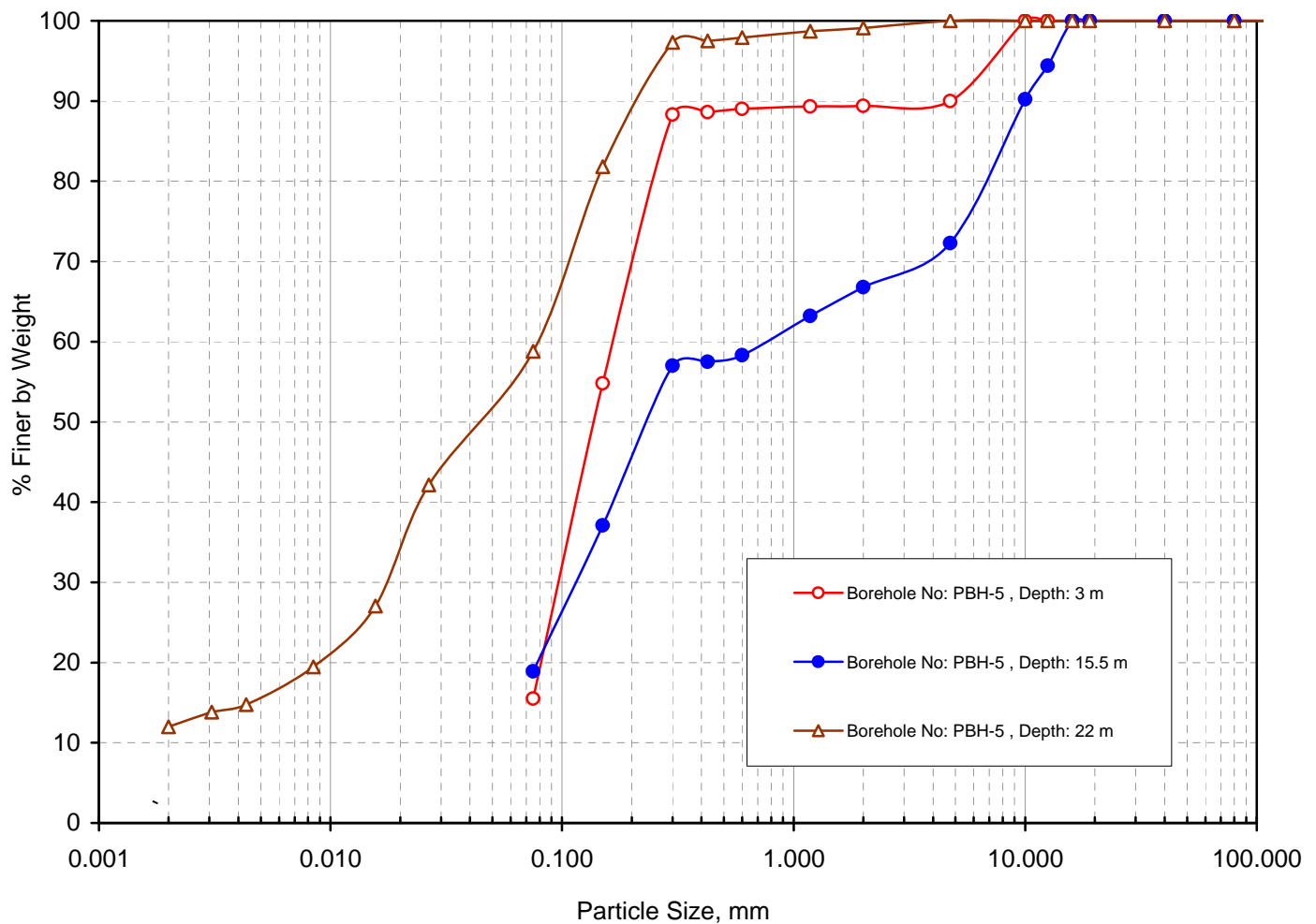
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-5	3.00	Silty fine sand with gravels (SM)	10	74	16	0	0.173	0.103			
PBH-5	15.50	Silty fine sand intermixed with gravels (SM)	28	53	19	0	0.801	0.121			
PBH-5	22.00	Sandy silt (CL)	0	41	47	12	0.079	0.018			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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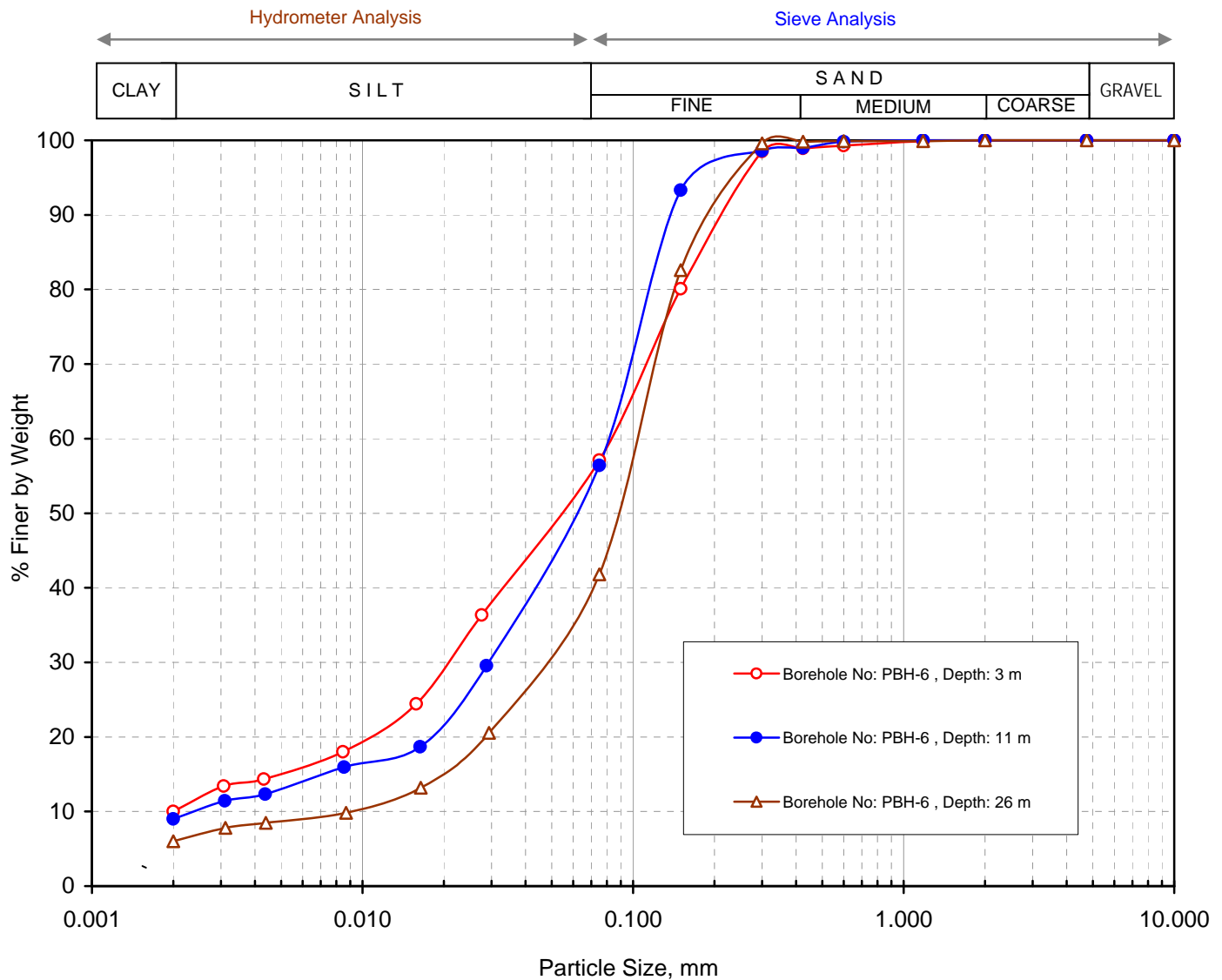




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-6	3.00	Sandy silt (CL)	0	42	48	10	0.084	0.021	0.002	42.0	2.63
PBH-6	11.00	Sandy silt (CL)	0	43	48	9	0.082	0.029	0.002	41.0	5.13
PBH-6	26.00	Silty fine sand (SM)	0	58	36	6	0.108	0.050	0.009	12.0	2.57



Grain Size Distribution Curve

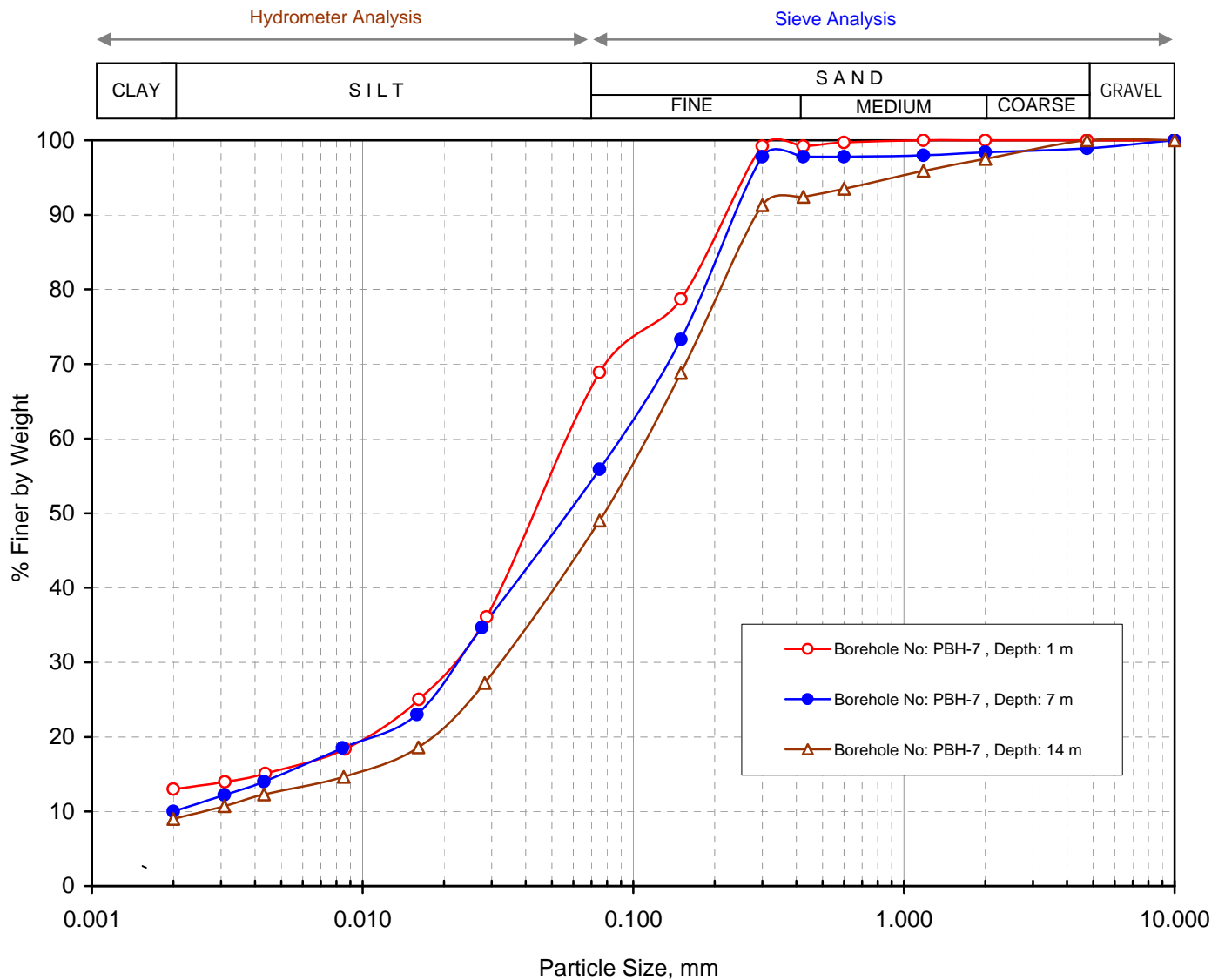




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-7	1.00	Sandy silt (CL)	0	31	56	13	0.062	0.022			
PBH-7	7.00	Sandy silt with traces of gravels (CL)	1	43	46	10	0.093	0.023	0.002	46.5	2.84
PBH-7	14.00	Silty fine sand (SM)	0	51	40	9	0.117	0.034	0.003	39.0	3.29



Grain Size Distribution Curve

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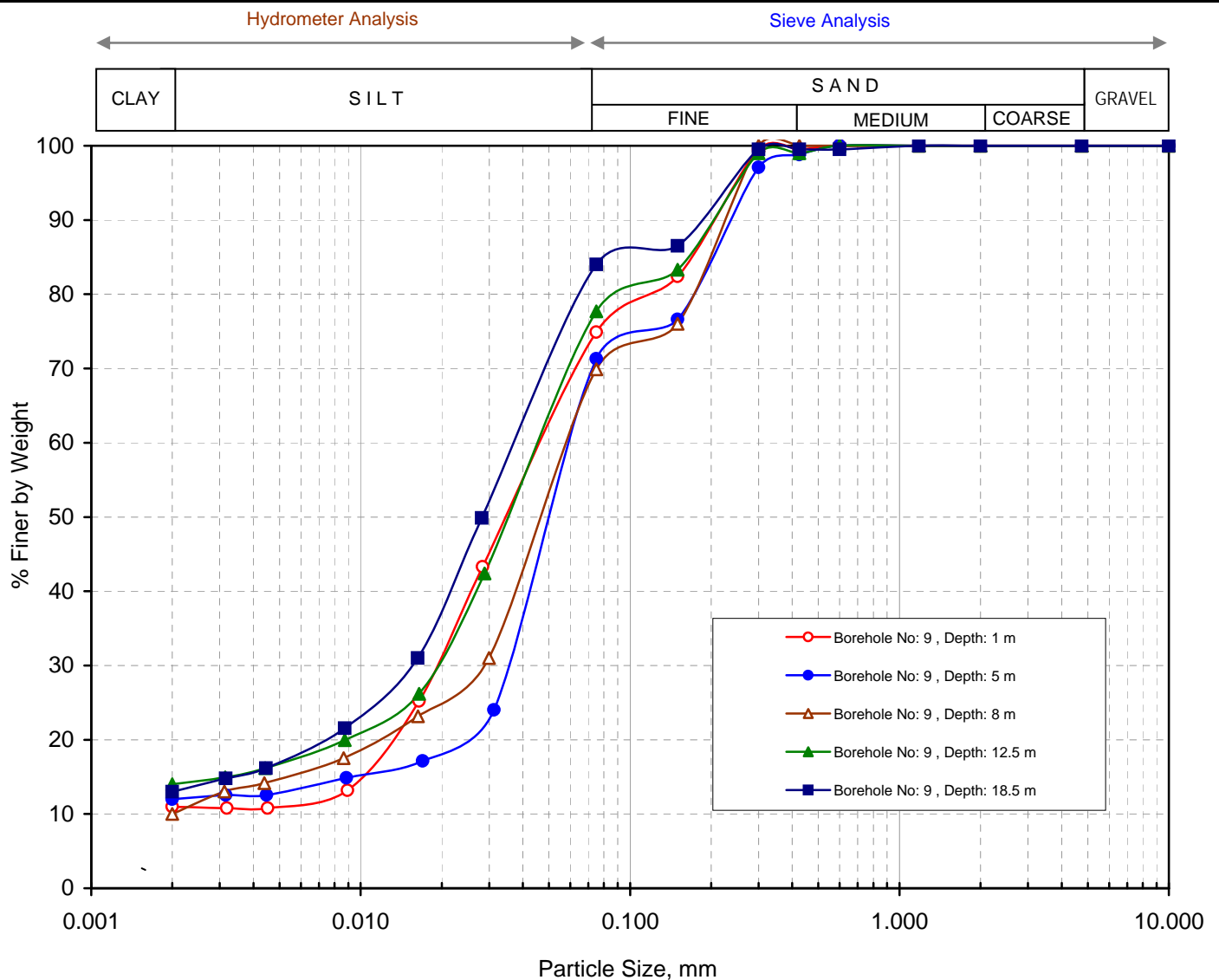




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
BH-9	1.00	Sandy silt (CL)	0	25	64	11	0.053	0.020			
BH-9	5.00	Sandy silt (CL)	0	28	60	12	0.065	0.037			
BH-9	8.00	Sandy silt (CL)	0	30	60	10	0.064	0.028	0.002	32.0	6.13
BH-9	12.50	Sandy silt (CL)	0	22	64	14	0.052	0.019			
BH-9	18.50	Sandy silt (CL)	0	16	71	13	0.042	0.015			



Grain Size Distribution Curve

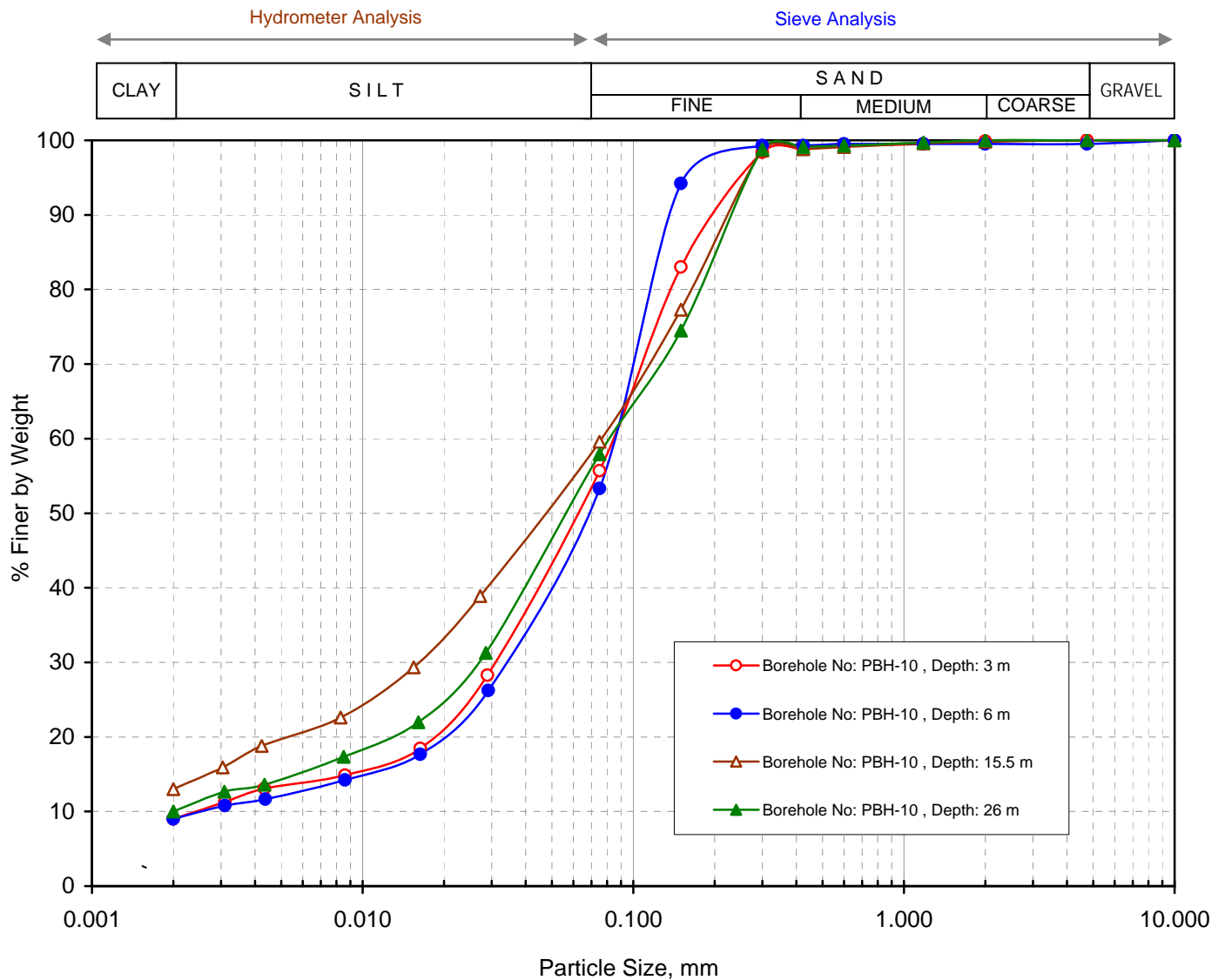




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-10	3.00	Sandy silt (CL)	0	44	47	9	0.087	0.032	0.002	43.5	5.89
PBH-10	6.00	Silty fine sand with traces of gravels (SM)	1	46	44	9	0.087	0.036	0.003	29.0	4.97
PBH-10	15.50	Sandy silt (CL)	0	40	47	13	0.077	0.016			
PBH-10	26.00	Sandy silt (CL)	0	42	48	10	0.084	0.027	0.002	42.0	4.34



## Grain Size Distribution Curve



## Grain Size Analysis

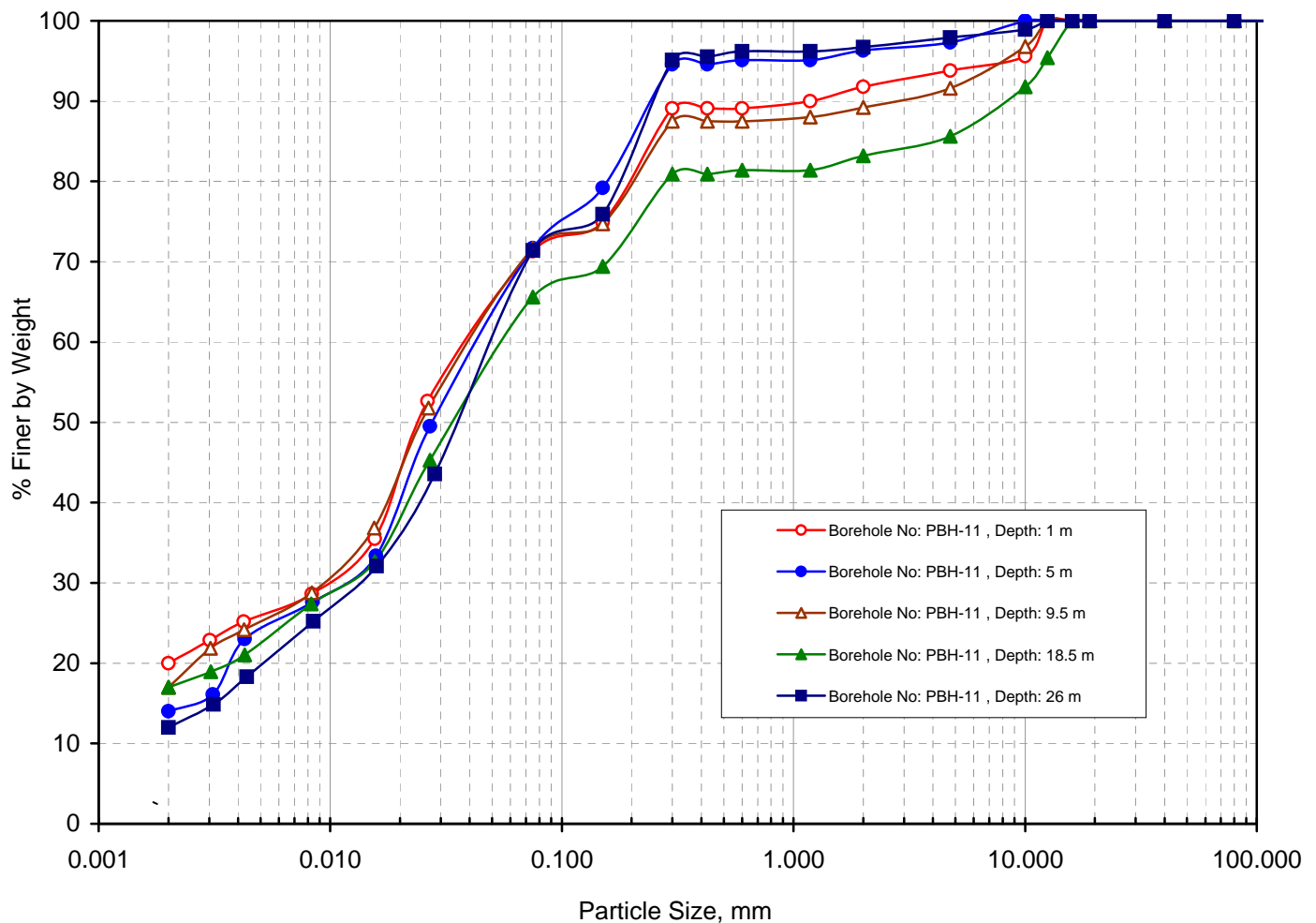
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-11	1.00	Sandy silt with gravels (CL)	6	22	52	20	0.046	0.010			
PBH-11	5.00	Sandy silt with traces of gravels (CL)	3	25	58	14	0.050	0.011			
PBH-11	9.50	Sandy silt with gravels (CL)	8	19	56	17	0.047	0.009			
PBH-11	18.50	Sandy silt with gravels (CL)	14	20	49	17	0.062	0.012			
PBH-11	26.00	Sandy silt with traces of gravels (CL)	2	26	60	12	0.056	0.014			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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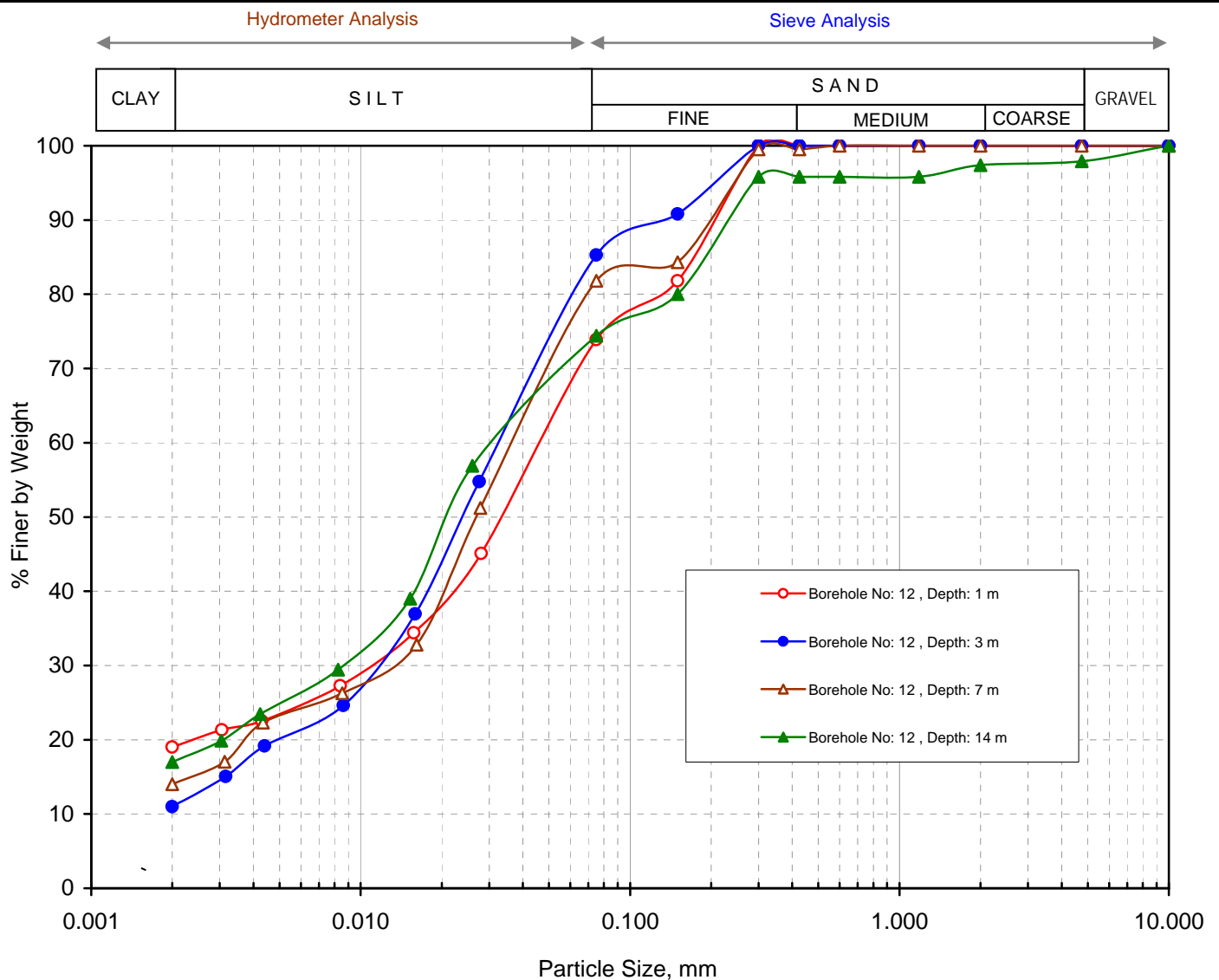




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
BH-12	1.00	Sandy silt (CL)	0	26	55	19	0.052	0.011			
BH-12	3.00	Sandy silt (CL)	0	14	75	11	0.036	0.012			
BH-12	7.00	Sandy silt (CL)	0	18	68	14	0.041	0.013			
BH-12	14.00	Sandy silt with traces of gravels (CL)	2	23	58	17	0.035	0.009			



Grain Size Distribution Curve





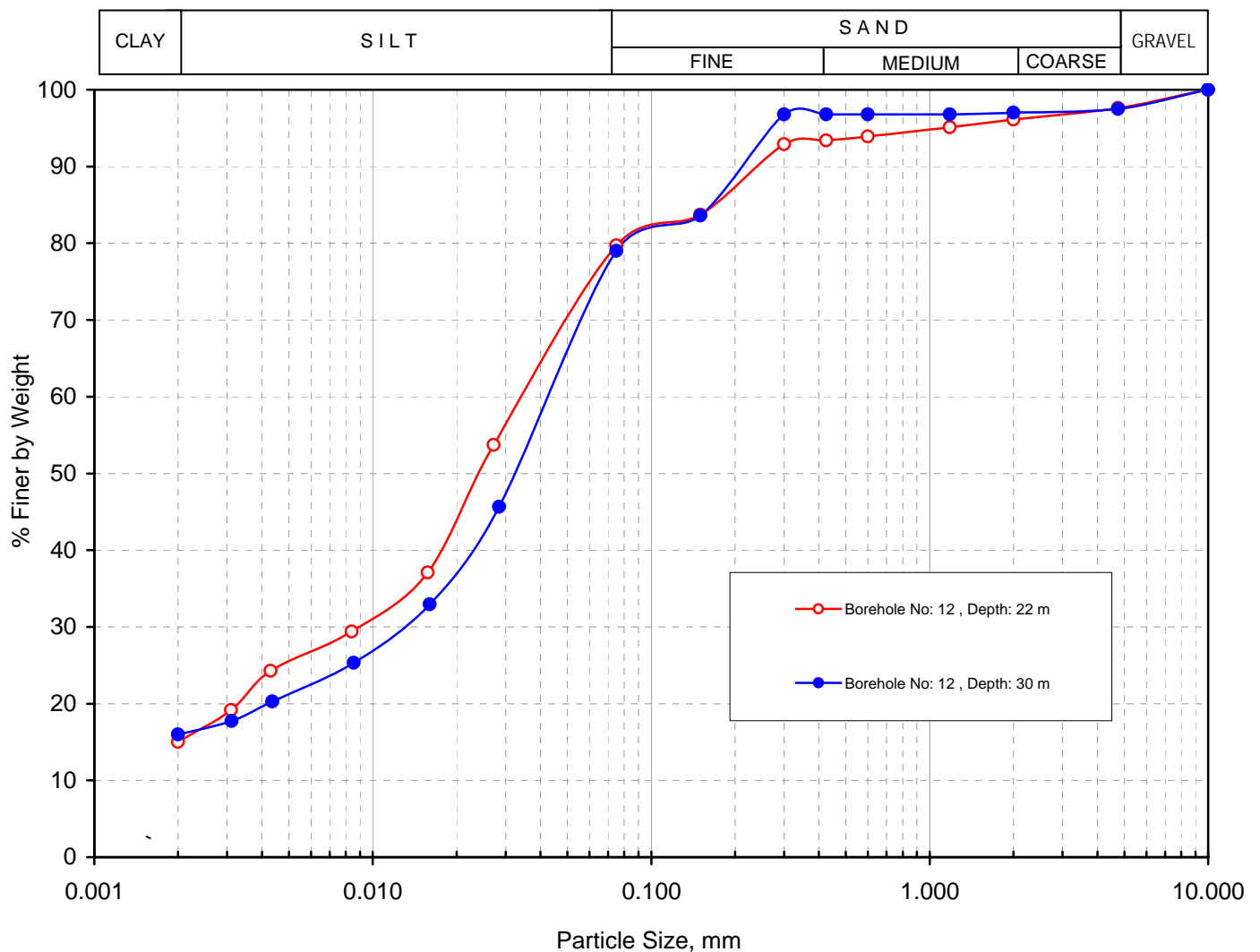
## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
BH-12	22.00	Sandy silt with traces of gravels (CL)	2	17	66	15	0.039	0.009			
BH-12	30.00	Sandy silt with traces of gravels (CL)	3	18	63	16	0.048	0.013			

Hydrometer Analysis

Sieve Analysis



Grain Size Distribution Curve

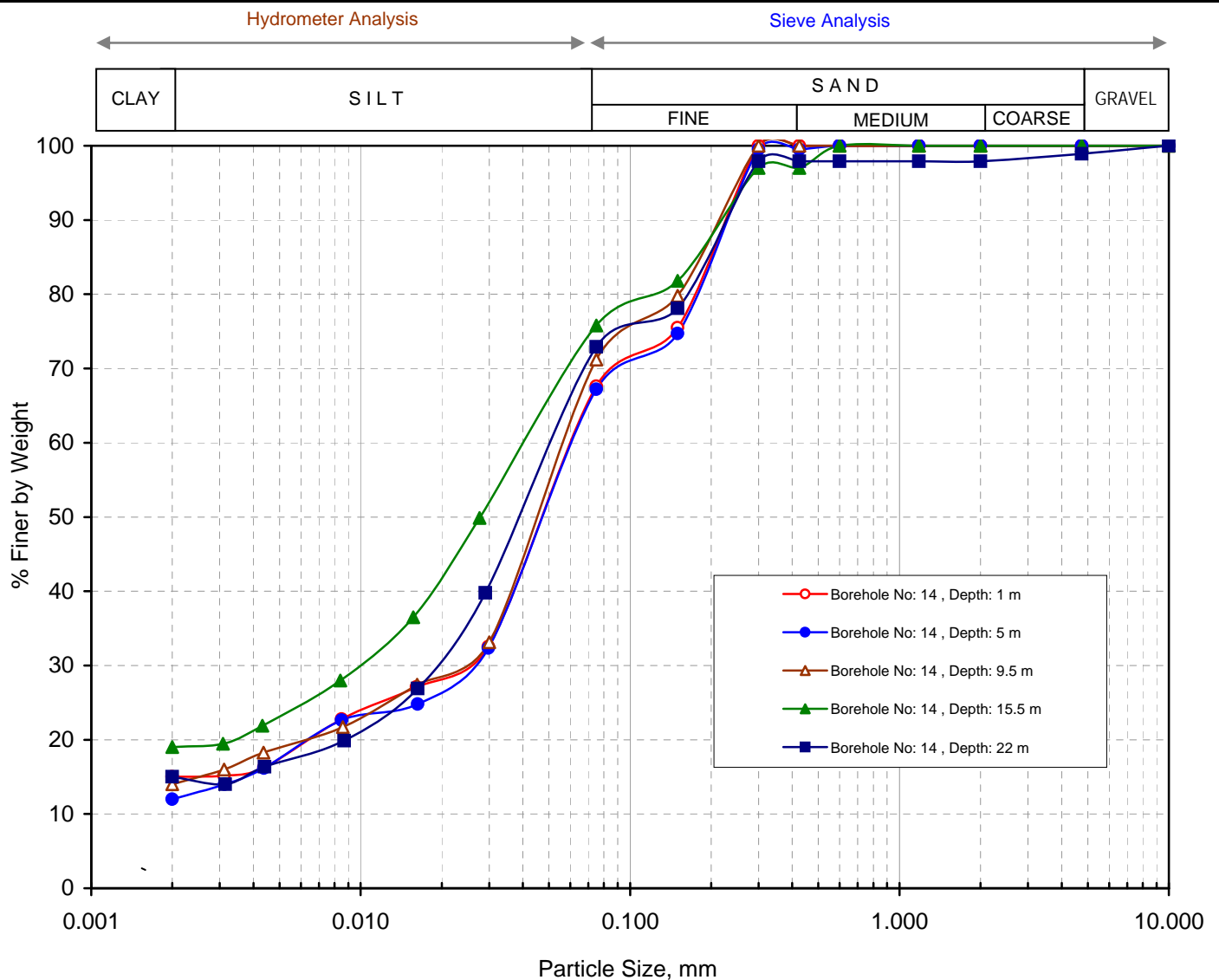




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
BH-14	1.00	Sandy silt (CL)	0	32	53	15	0.065	0.023			
BH-14	5.00	Sandy silt (CL)	0	32	56	12	0.066	0.026			
BH-14	9.50	Sandy silt (CL)	0	28	58	14	0.062	0.022			
BH-14	15.50	Sandy silt (CL)	0	24	57	19	0.046	0.010			
BH-14	22.00	Sandy silt with traces of gravels (CL)	1	26	58	15	0.057	0.019			





## Grain Size Analysis

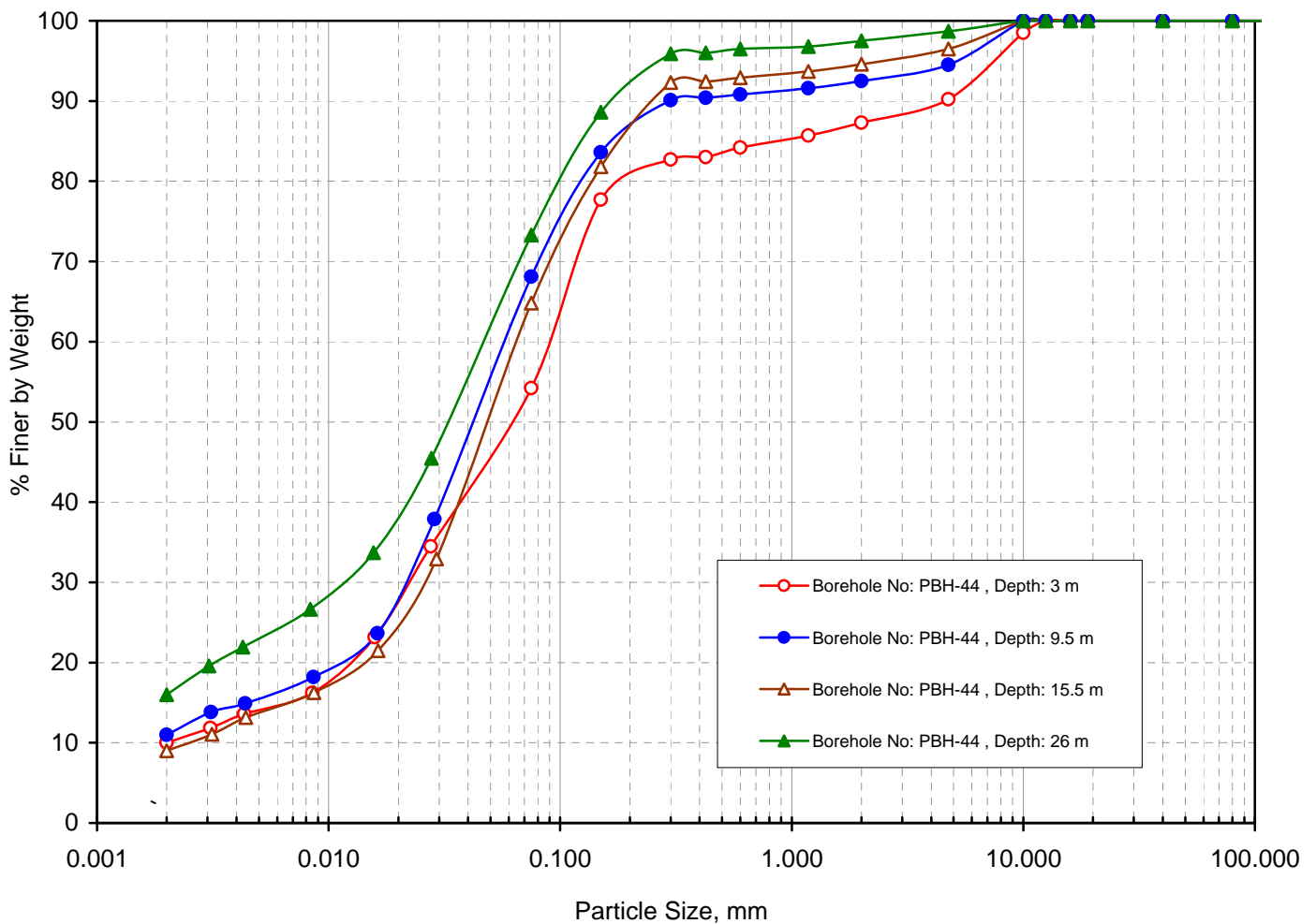
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-44	3.00	Sandy silt with gravels (CI)	10	36	44	10	0.094	0.023	0.002	47.0	2.81
PBH-44	9.50	Sandy silt with gravels (CI)	6	26	57	11	0.063	0.022			
PBH-44	15.50	Sandy silt with traces of gravels (CL)	4	31	56	9	0.068	0.026	0.003	22.7	3.31
PBH-44	26.00	Sandy silt with traces of gravels (CL)	1	25	58	16	0.052	0.012			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

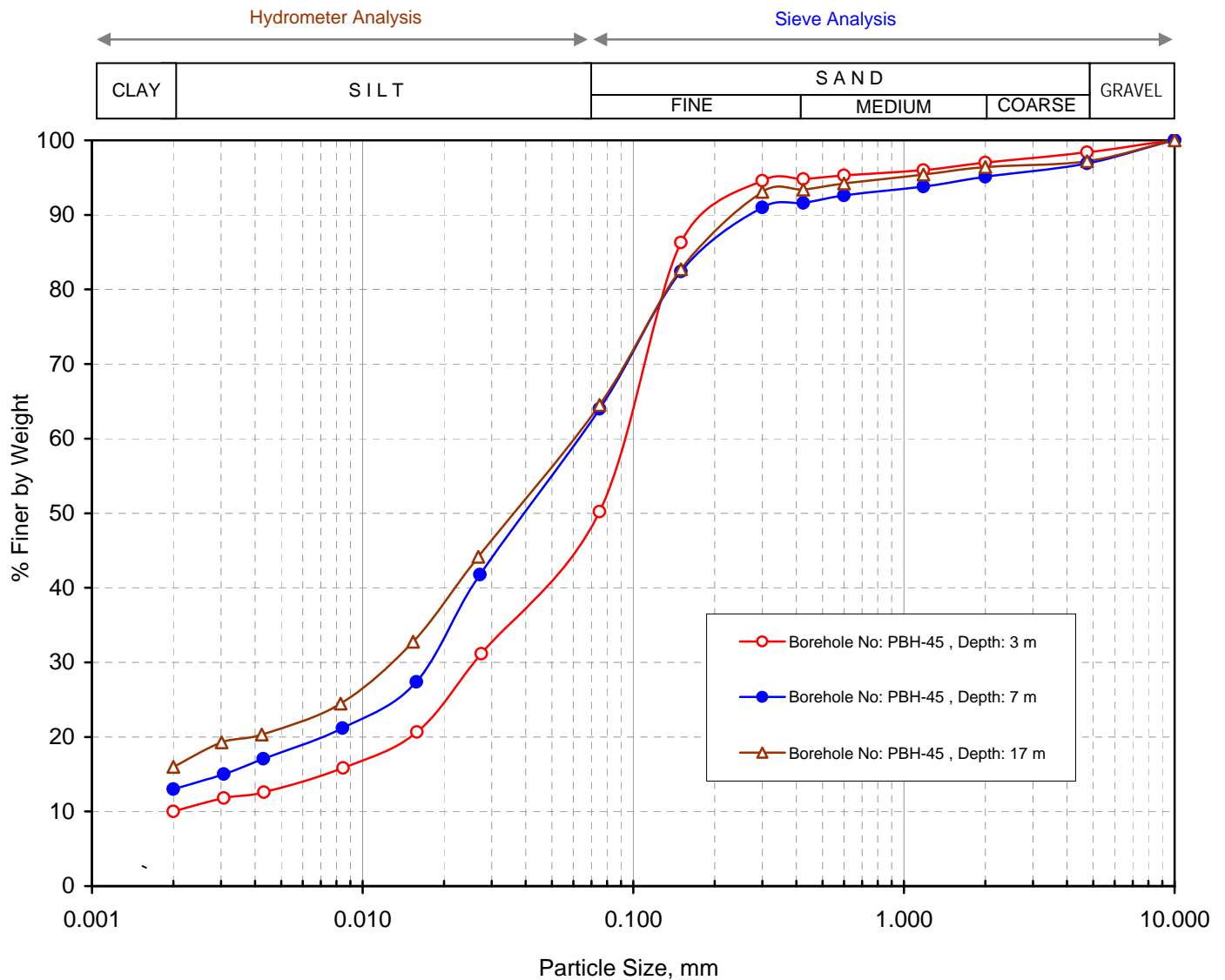




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-45	3.00	Silty fine sand (SM)	2	48	40	10	0.095	0.026	0.002	47.5	3.56
PBH-45	7.00	Sandy silt with traces of gravels (CL)	3	32	52	13	0.066	0.018			
PBH-45	17.00	Sandy silt with traces of gravels (CL)	3	32	49	16	0.064	0.013			



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## Grain Size Distribution Curve



## Grain Size Analysis

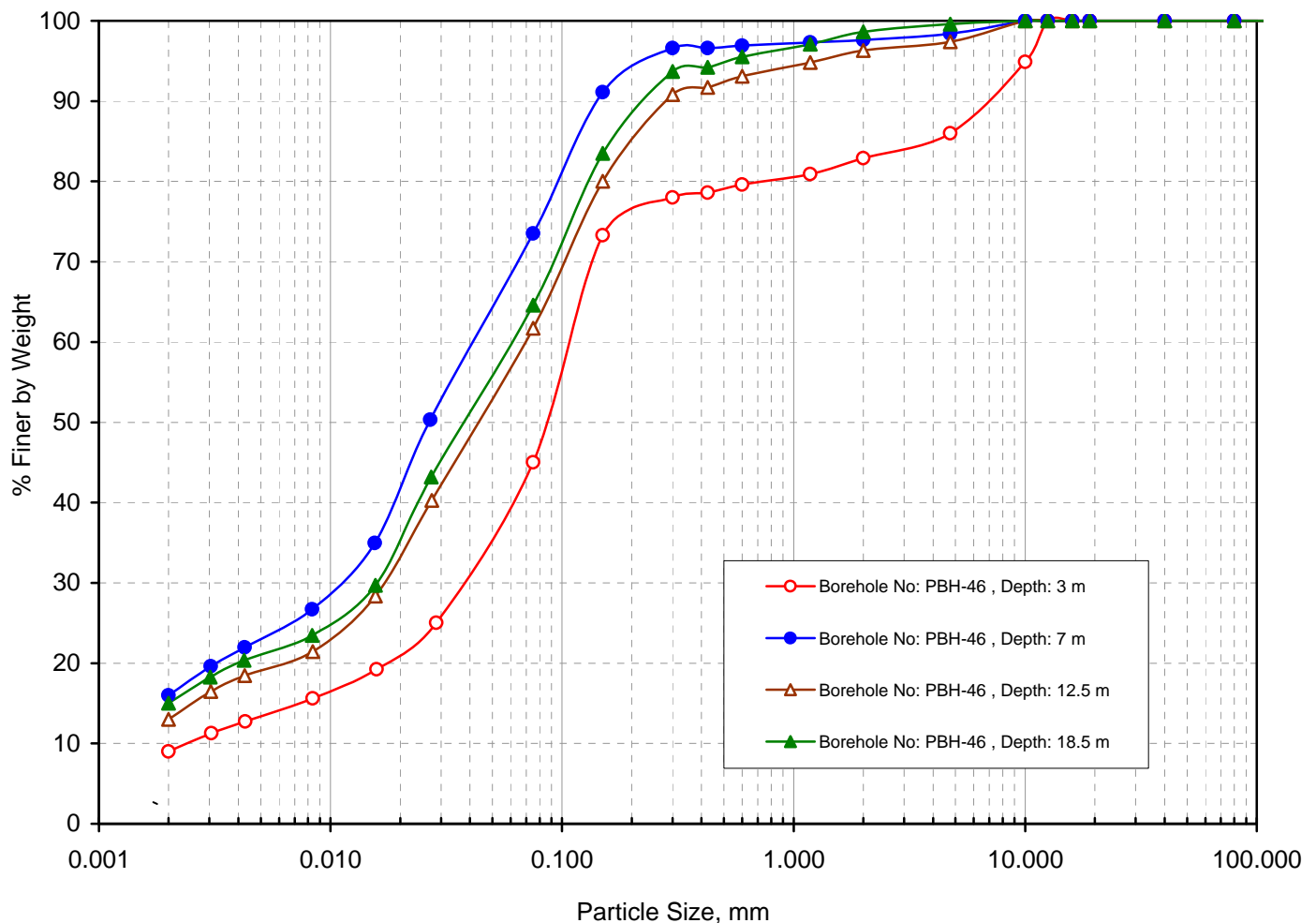
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-46	3.00	Silty fine sand with gravels (SM)	14	41	36	9	0.115	0.040	0.002	57.5	6.96
PBH-46	7.00	Sandy silt with traces of gravels (CL-ML)	2	24	58	16	0.047	0.011			
PBH-46	12.50	Sandy silt with traces of gravels (CL)	3	35	49	13	0.071	0.017			
PBH-46	18.50	Sandy silt (CL)	0	35	50	15	0.065	0.016			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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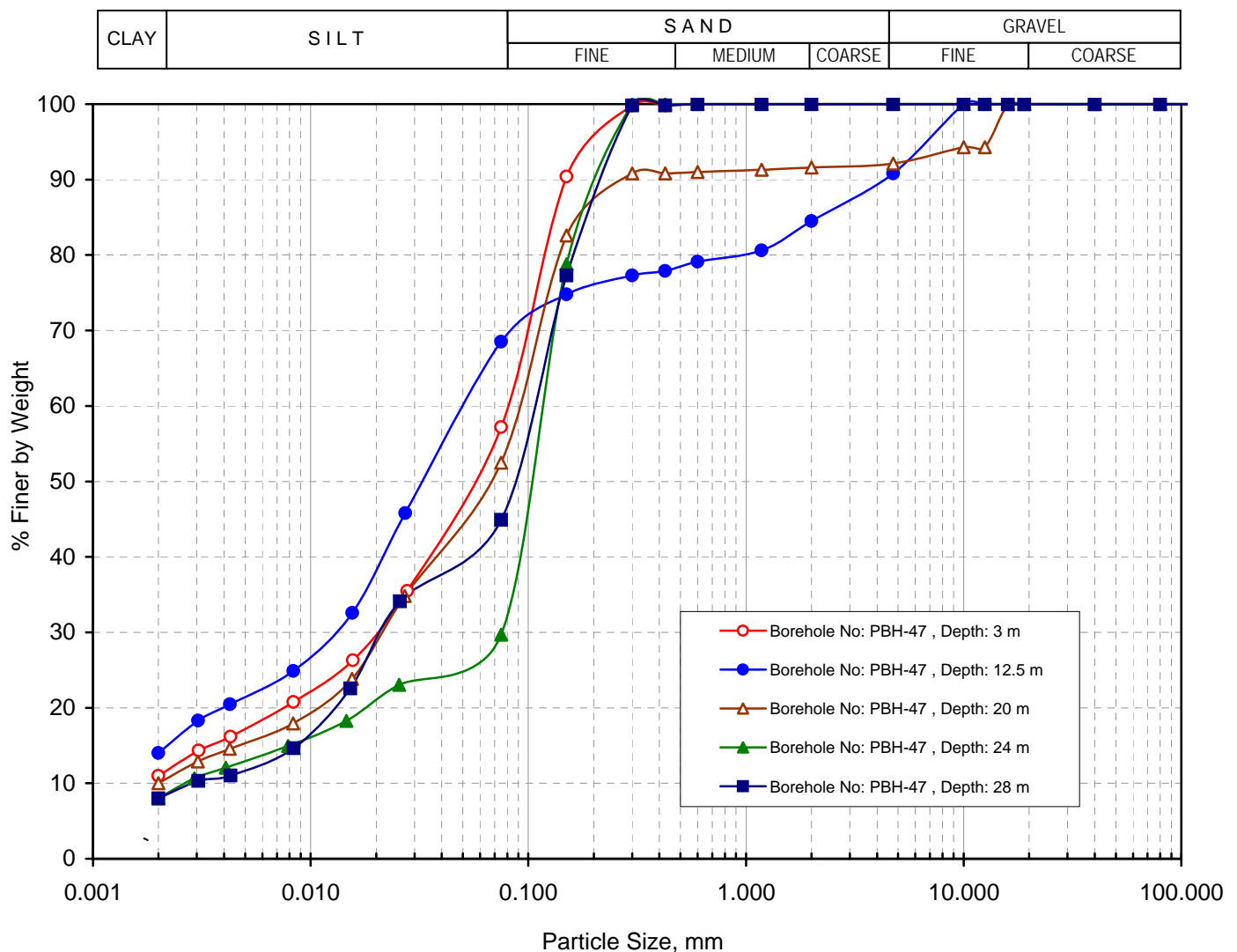
## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-47	3.00	Sandy silt (CL)	0	42	47	11	0.081	0.021			
PBH-47	12.50	Sandy silt with gravels (CL)	9	22	55	14	0.057	0.013			
PBH-47	20.00	Sandy silt with gravels (CL)	8	39	43	10	0.094	0.022	0.002	47.0	2.57
PBH-47	24.00	Silty fine sand (SM)	0	70	22	8	0.121	0.075	0.003	40.3	15.5
PBH-47	28.00	Silty fine sand (SM)	0	55	37	8	0.110	0.022	0.003	36.7	1.47

Hydrometer Analysis

Sieve Analysis



Grain Size Distribution Curve





## Grain Size Analysis

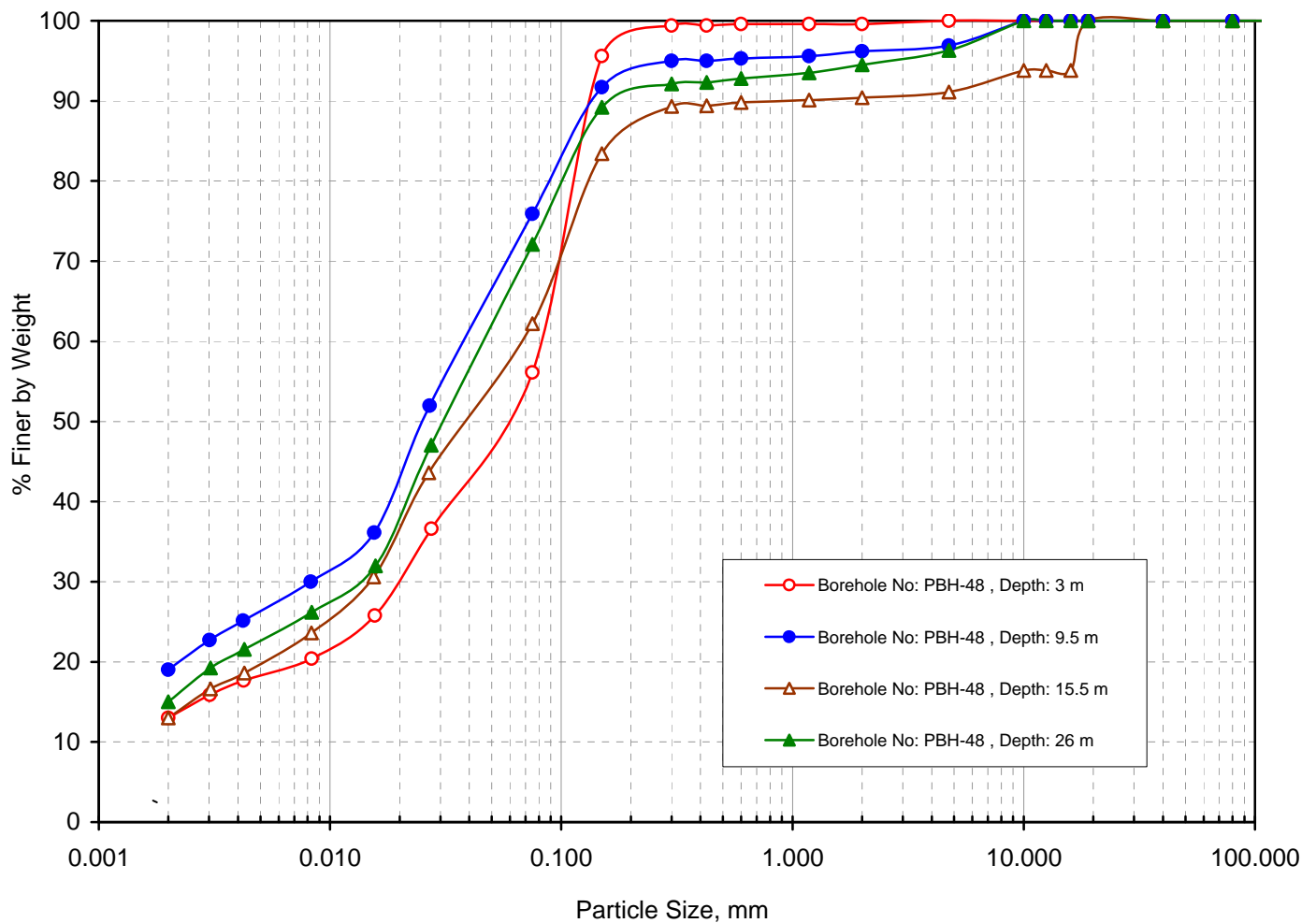
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-48	3.00	Sandy silt (CL)	0	43	44	13	0.082	0.020			
PBH-48	9.50	Sandy silt with traces of gravels (CL)	3	21	57	19	0.043	0.008			
PBH-48	15.50	Sandy silt with gravels (CL)	9	28	50	13	0.069	0.015			
PBH-48	26.00	Sandy silt with gravels (CL)	4	24	57	15	0.052	0.013			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



## Grain Size Distribution Curve

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## Grain Size Analysis

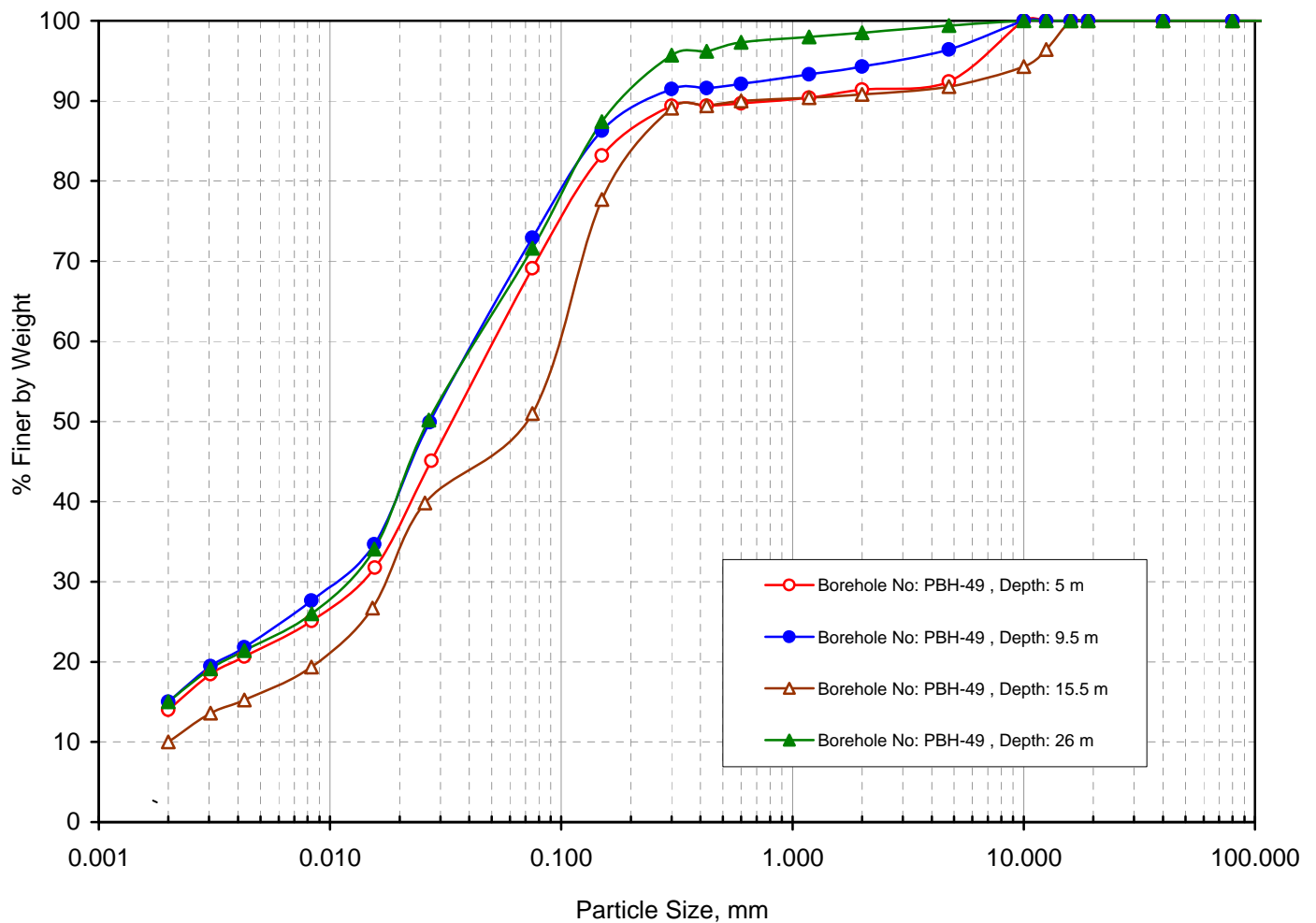
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-49	5.00	Sandy silt with gravels (CL)	8	23	55	14	0.057	0.014			
PBH-49	9.50	Sandy silt with gravels (CL)	4	23	58	15	0.048	0.011			
PBH-49	15.50	Sandy silt with gravels (CL)	8	40	42	10	0.100	0.018	0.002	50.0	1.62
PBH-49	26.00	Sandy silt with traces of gravels (CL)	1	27	57	15	0.049	0.012			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve





## Grain Size Analysis

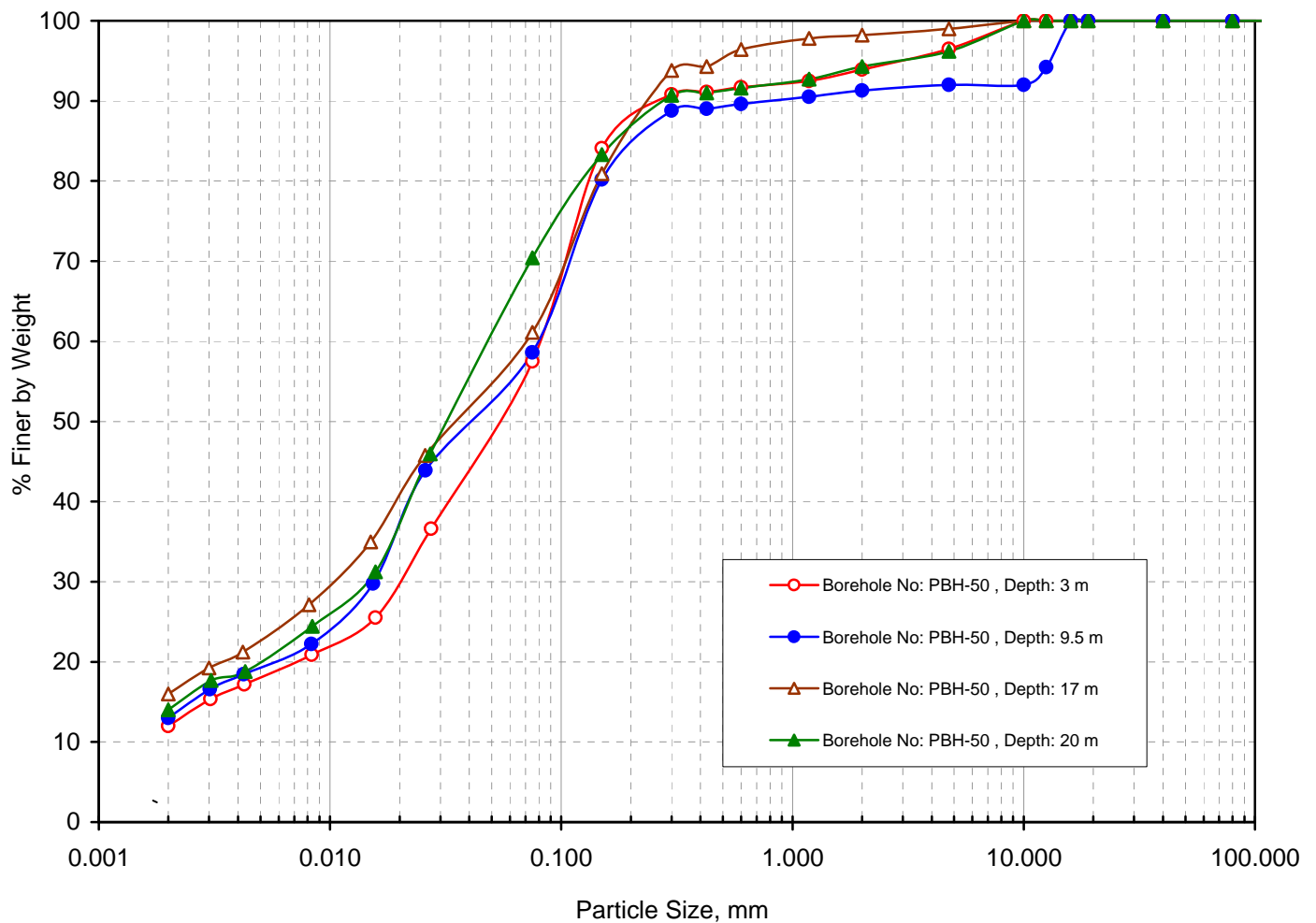
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-50	3.00	Sandy silt with gravels (CL)	4	39	45	12	0.082	0.020			
PBH-50	9.50	Sandy silt with gravels (CL)	8	33	46	13	0.080	0.016			
PBH-50	17.00	Sandy silt with traces of gravels (CL)	1	37	46	16	0.071	0.011			
PBH-50	20.00	Sandy silt with traces of gravels (CL)	4	25	57	14	0.055	0.014			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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## Grain Size Analysis

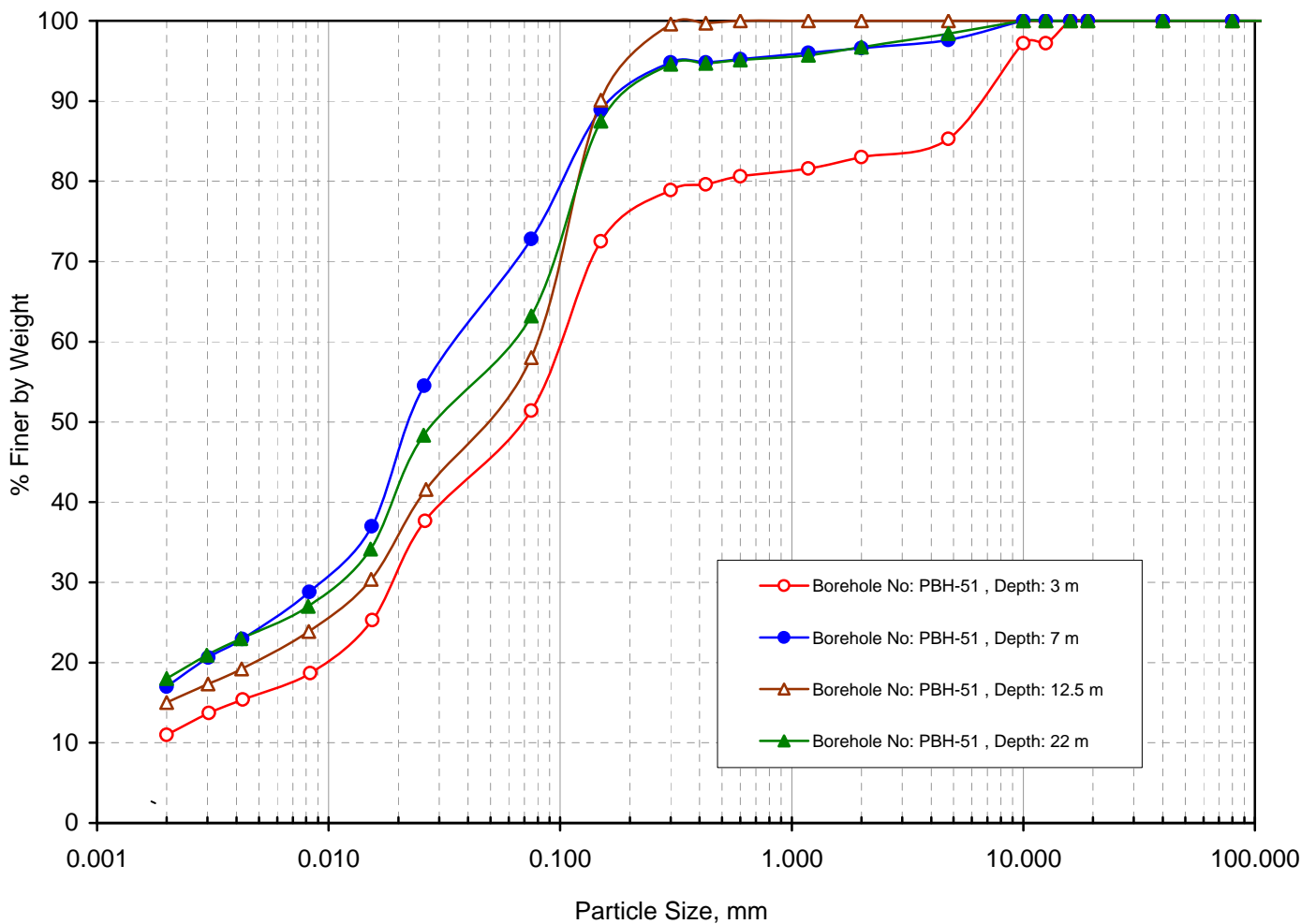
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-51	3.00	Sandy silt with gravels (CL)	15	33	41	11	0.106	0.020			
PBH-51	7.00	Sandy silt with traces of gravels (CL)	2	24	57	17	0.041	0.009			
PBH-51	12.50	Sandy silt (CL)	0	42	43	15	0.080	0.015			
PBH-51	22.00	Sandy silt with traces of gravels (CL)	2	35	45	18	0.064	0.011			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



## Grain Size Distribution Curve

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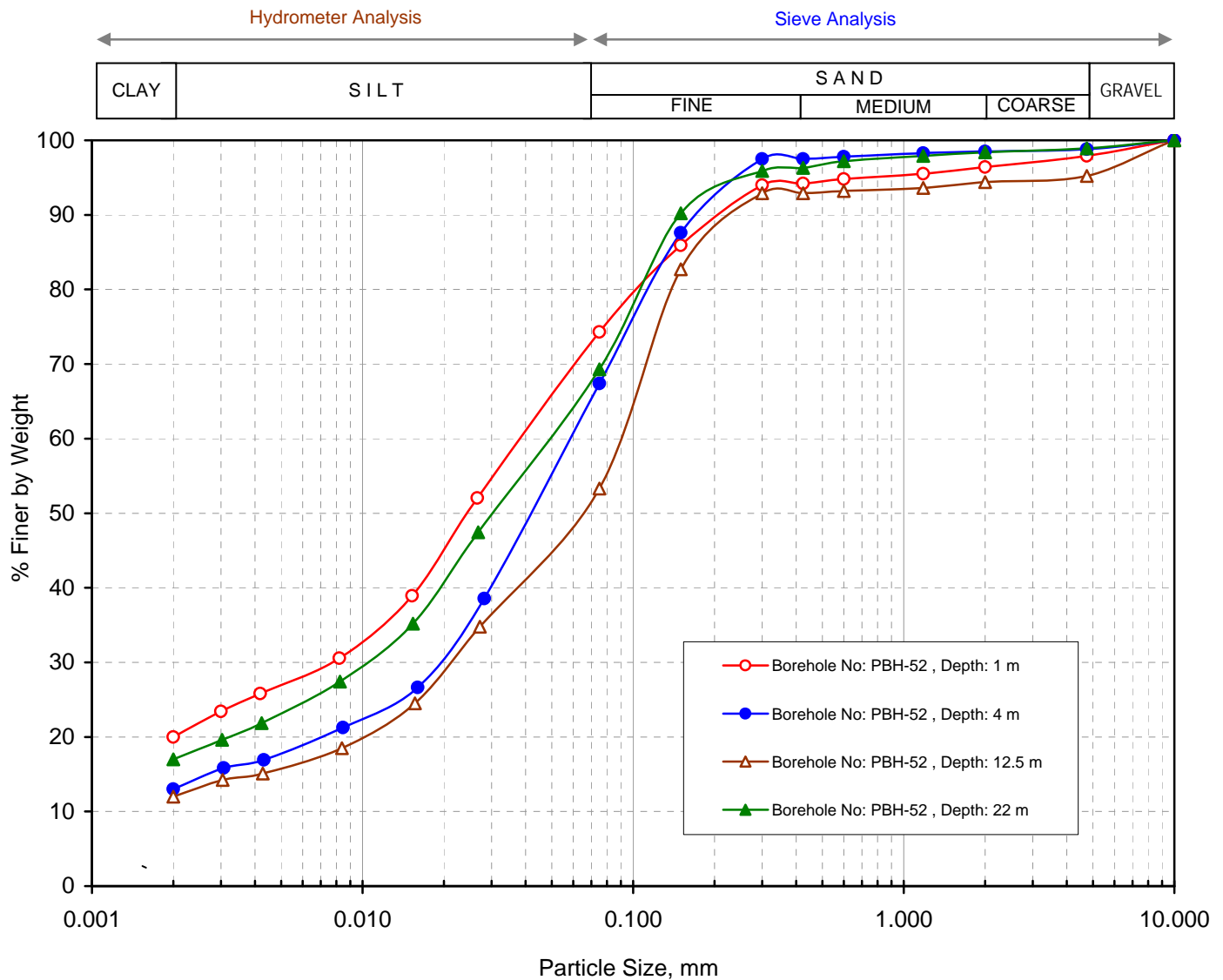




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-52	1.00	Sandy silt with traces of gravels (CL)	2	23	55	20	0.044	0.008			
PBH-52	4.00	Sandy silt with traces of gravels (CL)	1	31	55	13	0.063	0.019			
PBH-52	12.50	Sandy silt with gravels (CL)	5	41	42	12	0.092	0.022			
PBH-52	22.00	Sandy silt with traces of gravels (CL)	1	29	53	17	0.054	0.011			



Grain Size Distribution Curve





## Grain Size Analysis

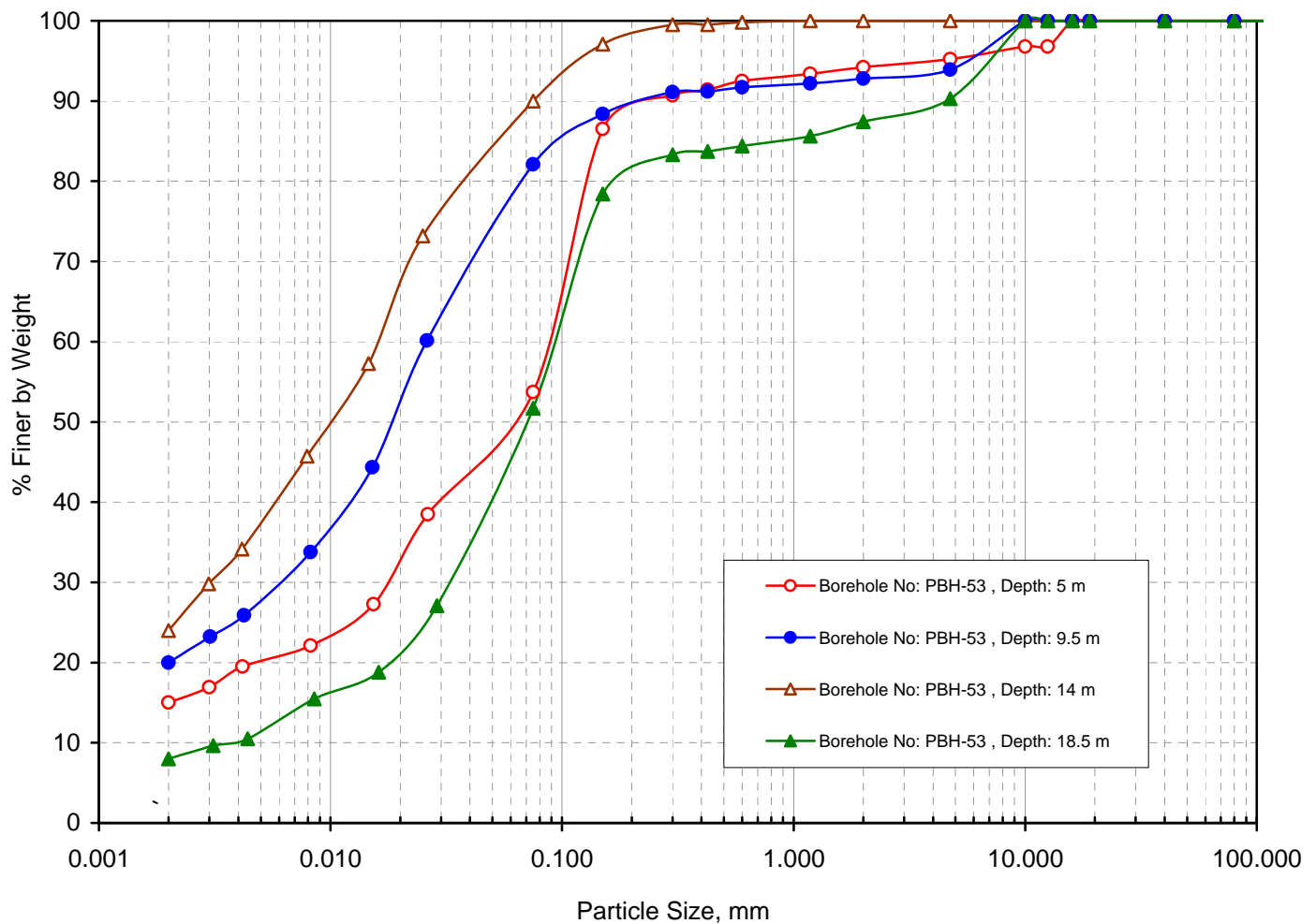
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-53	5.00	Sandy silt (CL)	5	41	39	15	0.089	0.018			
PBH-53	9.50	Clayey silt with gravels (CL)	6	11	63	20	0.026	0.006			
PBH-53	14.00	Clayey silt (CI)	0	10	66	24	0.016	0.003			
PBH-53	18.50	Sandy silt with gravels (CL)	10	38	44	8	0.098	0.034	0.004	24.5	2.95

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve





## Grain Size Analysis

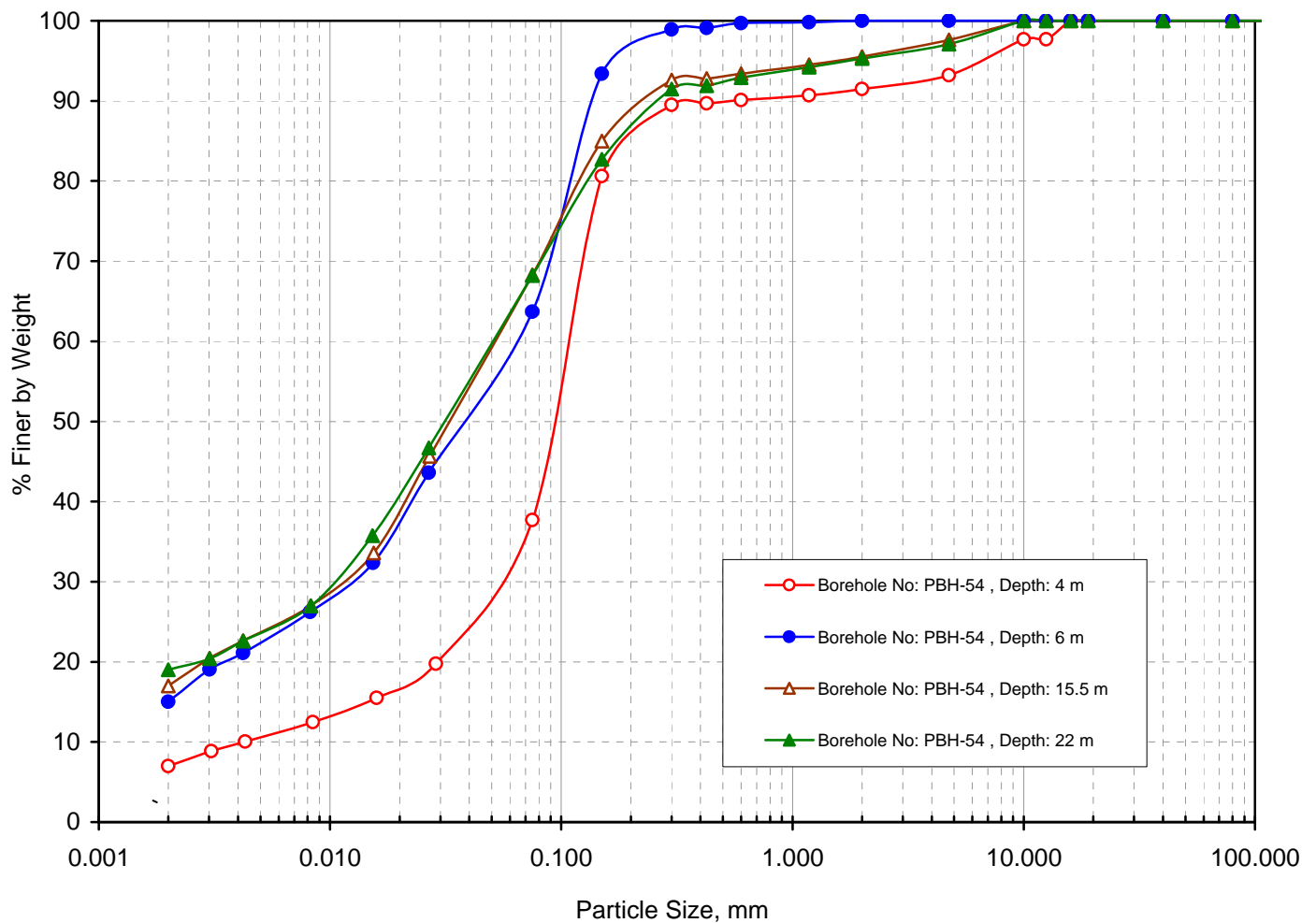
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-54	4.00	Sandy silt with gravels (CL-ML)	7	55	31	7	0.114	0.055	0.004	28.5	6.63
PBH-54	6.00	Sandy silt (CL-ML)	0	36	49	15	0.066	0.013			
PBH-54	15.50	Sandy silt with traces of gravels (CL)	2	29	52	17	0.057	0.012			
PBH-54	22.00	Sandy silt with traces of gravels (CL)	3	28	50	19	0.057	0.011			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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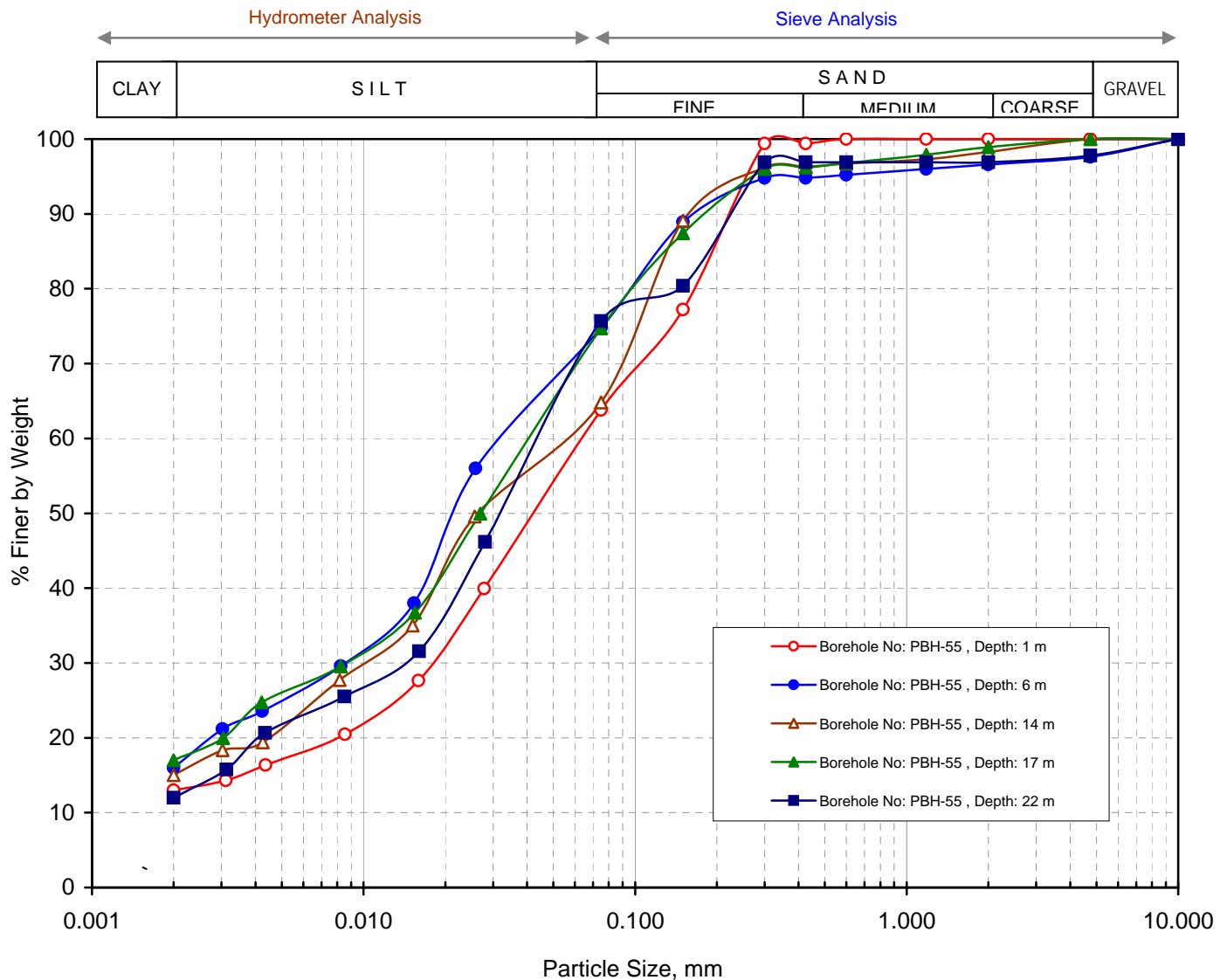




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-55	1.00	Sandy silt (CL)	0	36	51	13	0.067	0.018			
PBH-55	6.00	Sandy silt with traces of gravels (CL)	2	22	60	16	0.036	0.009			
PBH-55	14.00	Sandy silt (CL)	0	35	50	15	0.059	0.010			
PBH-55	17.00	Sandy silt (CL)	0	25	58	17	0.046	0.009			
PBH-55	22.00	Sandy silt with traces of gravels (CL)	2	22	64	12	0.050	0.014			



Grain Size Distribution Curve





## Grain Size Analysis

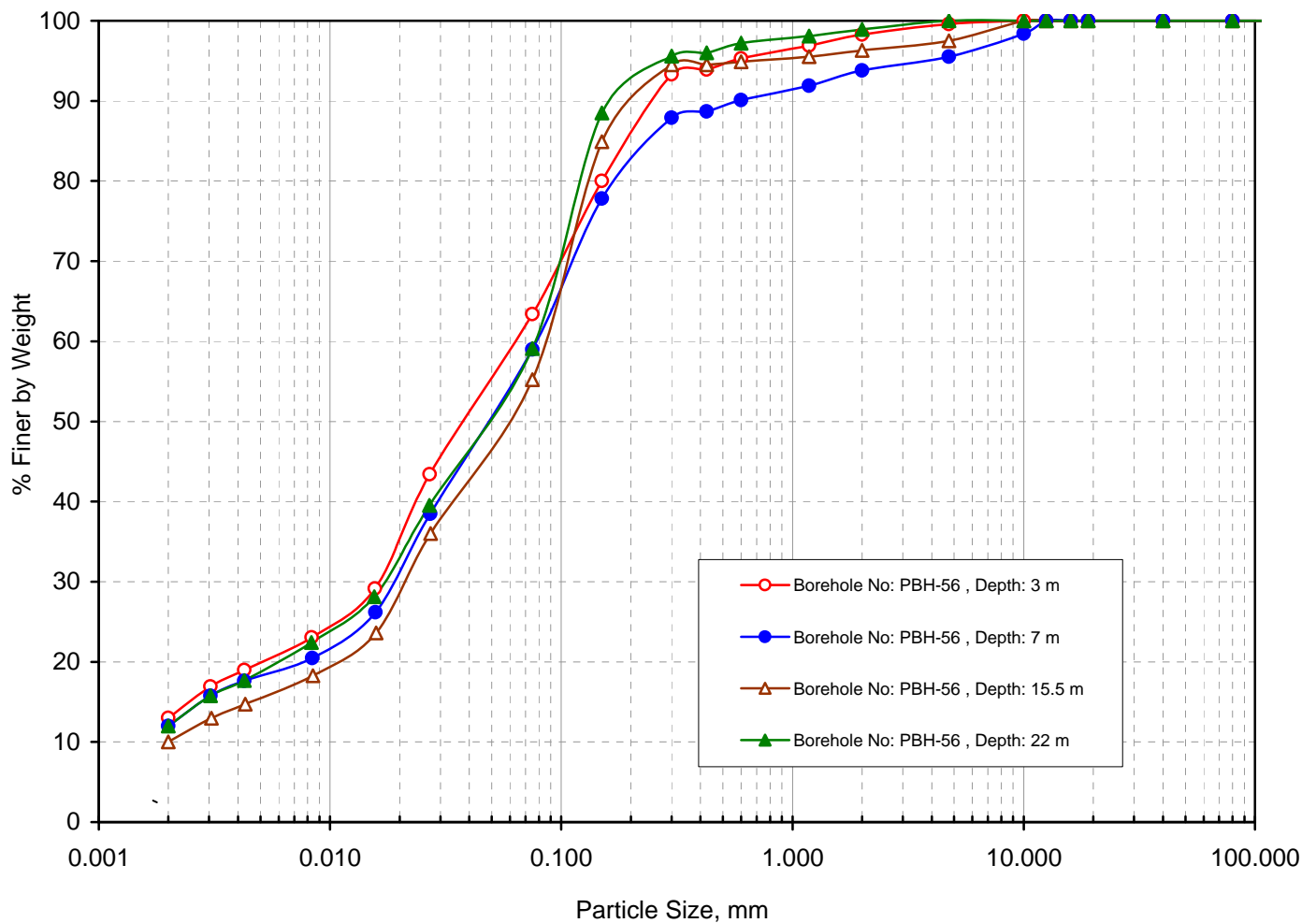
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-56	3.00	Sandy silt (CL)	0	36	51	13	0.067	0.016			
PBH-56	7.00	Sandy silt with gravels (CL)	5	36	47	12	0.079	0.019			
PBH-56	15.50	Sandy silt with traces of gravels (CL)	3	42	45	10	0.087	0.022	0.002	43.5	2.78
PBH-56	22.00	Sandy silt (CL)	0	40	48	12	0.077	0.017			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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## Grain Size Distribution Curve

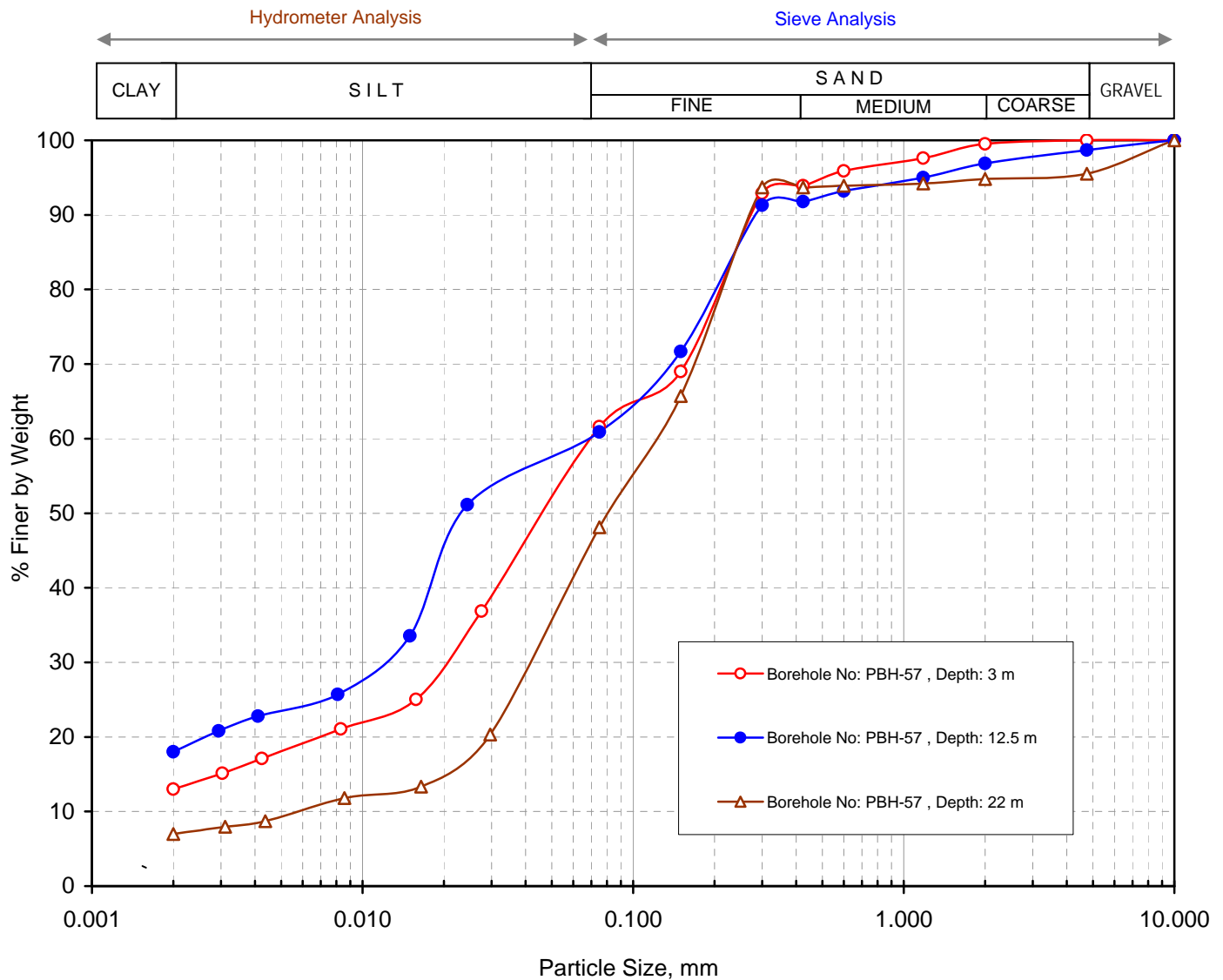




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-57	3.00	Sandy silt (CL)	0	38	49	13	0.072	0.021			
PBH-57	12.50	Sandy silt with traces of gravels (CL)	1	37	44	18	0.070	0.012			
PBH-57	22.00	Silty fine sand with gravels (SM)	5	47	41	7	0.126	0.045	0.006	21.0	2.68



Grain Size Distribution Curve

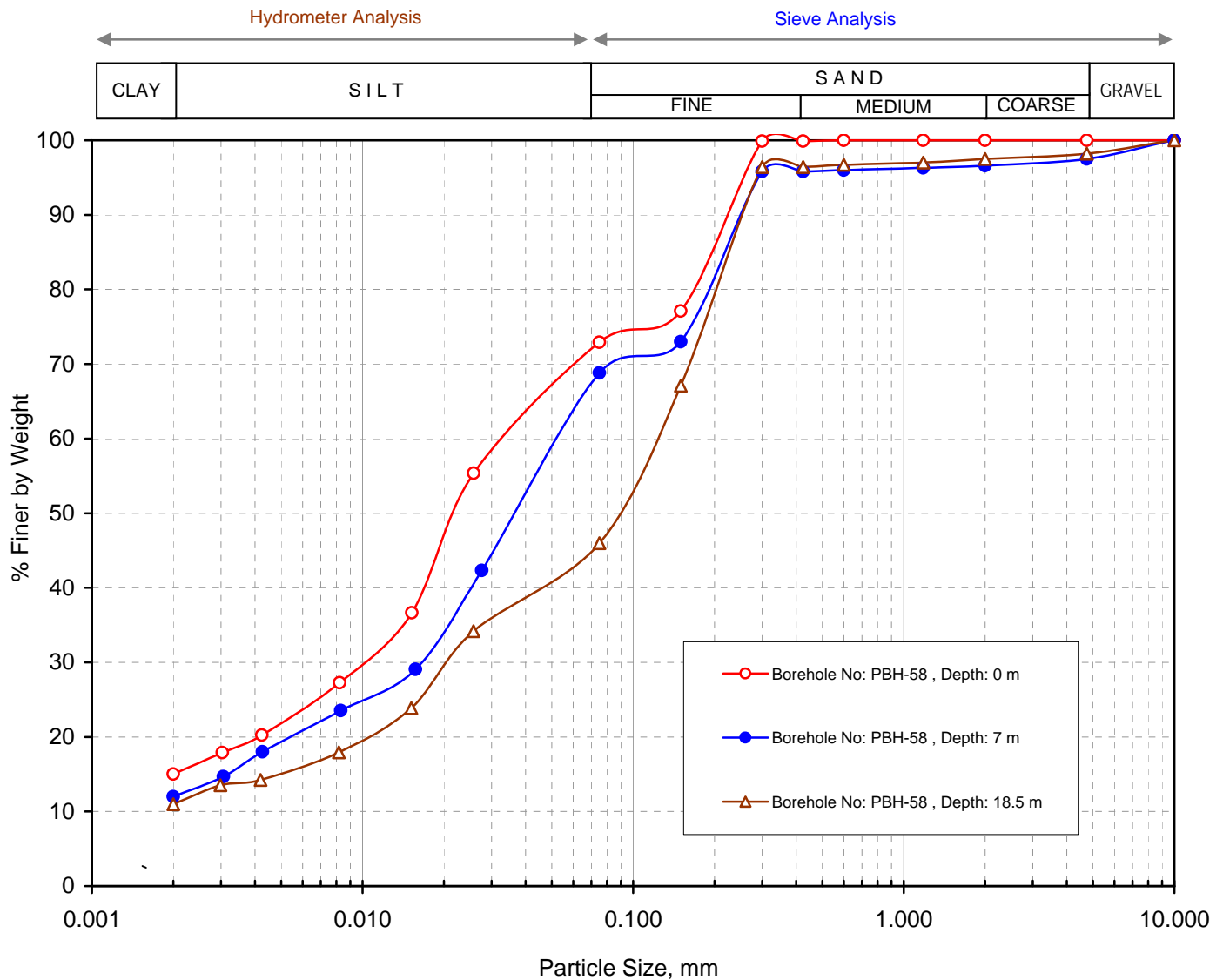




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-58	0.00	Sandy silt (CL)	0	27	58	15	0.039	0.010			
PBH-58	7.00	Sandy silt with traces of gravels (CL)	3	28	57	12	0.059	0.017			
PBH-58	18.50	Silty fine sand with traces of gravels (SM)	2	52	35	11	0.125	0.021			



Grain Size Distribution Curve





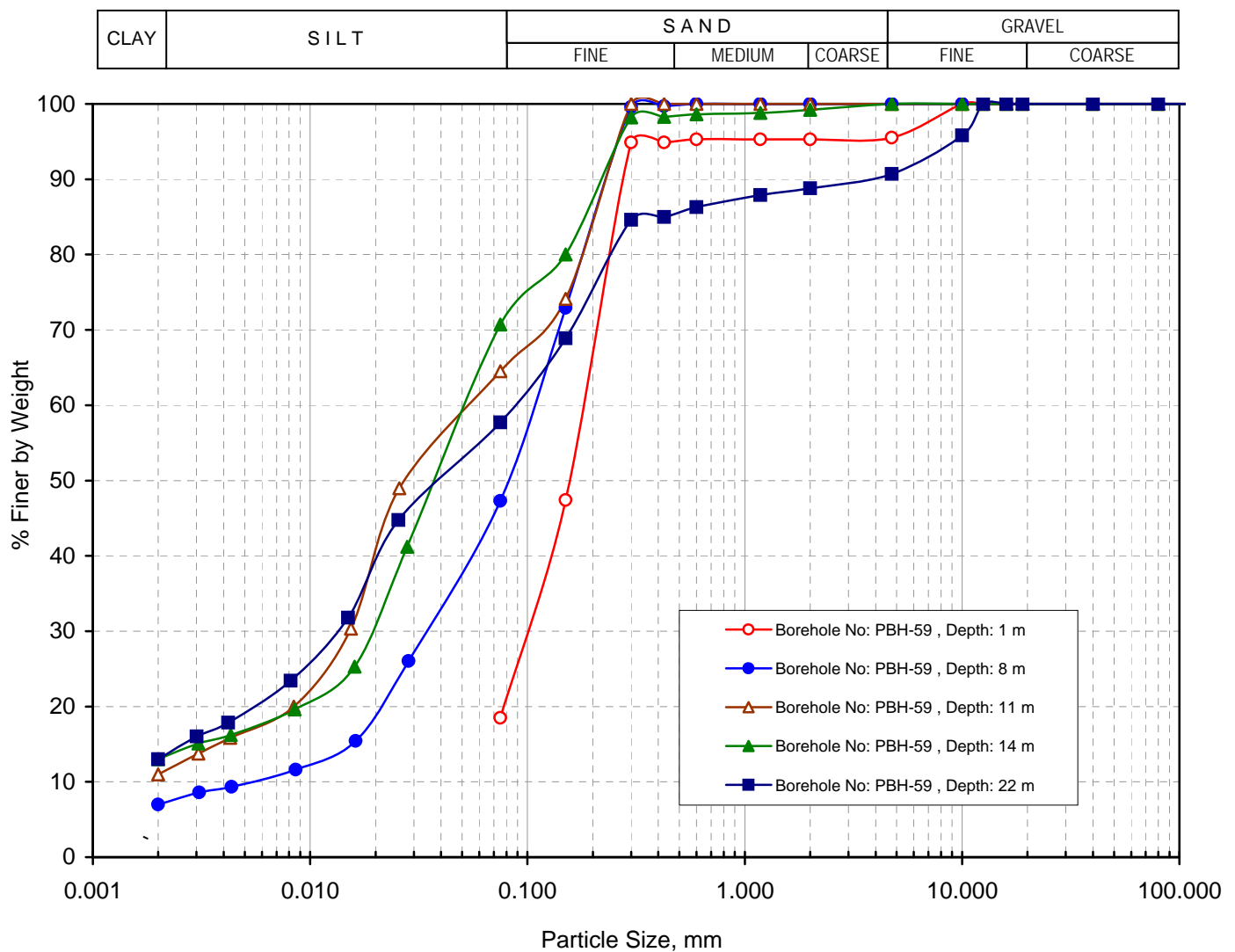
## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-59	1.00	Silty fine sand with gravels (SM)	5	77	18	0	0.190	0.105			
PBH-59	8.00	Silty fine sand (SM)	0	52	41	7	0.112	0.037	0.006	18.7	2.04
PBH-59	11.00	Sandy silt (CL)	0	35	54	11	0.061	0.015			
PBH-59	14.00	Sandy silt (CL)	0	29	58	13	0.058	0.020			
PBH-59	22.00	Sandy silt with gravels (CL)	9	33	45	13	0.090	0.014			

Hydrometer Analysis

Sieve Analysis



Grain Size Distribution Curve





## Grain Size Analysis

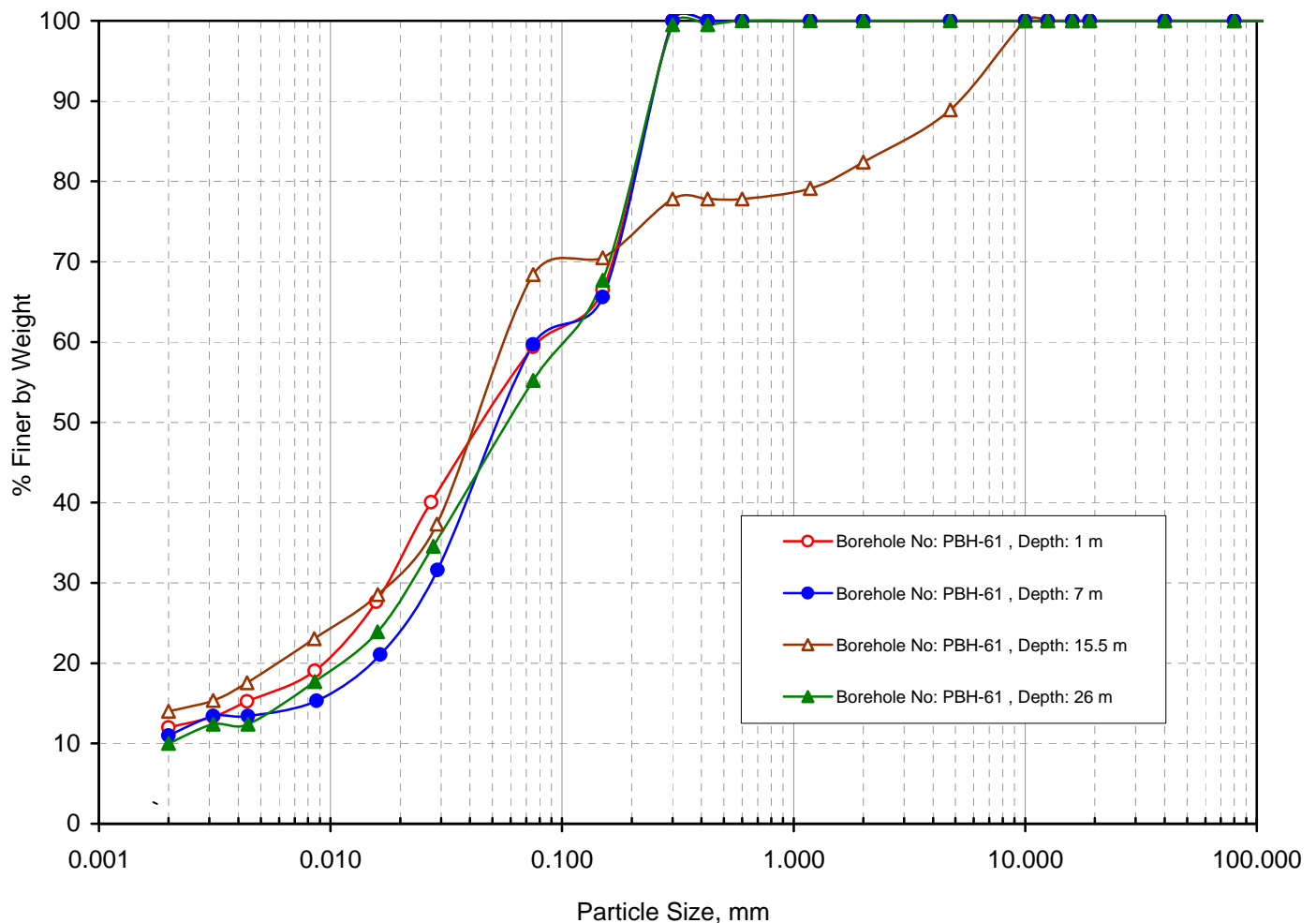
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-61	1.00	Sandy silt (CL)	0	40	48	12	0.081	0.018			
PBH-61	7.00	Sandy silt (CL)	0	40	49	11	0.079	0.027			
PBH-61	15.50	Sandy silt with gravels (CL)	11	20	55	14	0.063	0.018			
PBH-61	26.00	Sandy silt (CL)	0	44	46	10	0.104	0.023	0.002	52.0	2.54

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

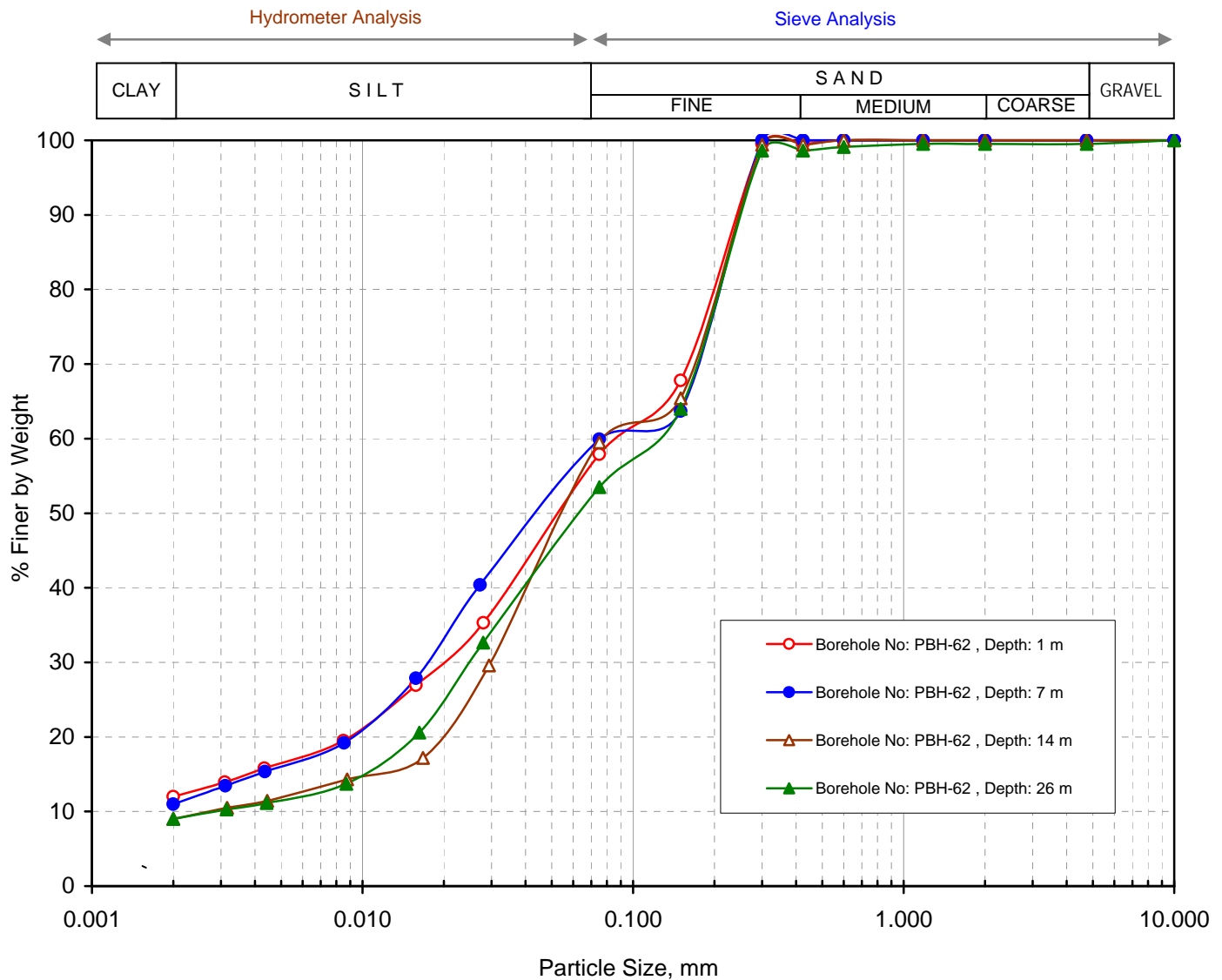




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-62	1.00	Sandy silt (CL)	0	42	46	12	0.091	0.020			
PBH-62	7.00	Sandy silt (CL)	0	40	49	11	0.077	0.018			
PBH-62	14.00	Sandy silt (CL)	0	40	51	9	0.081	0.030	0.003	27.0	3.70
PBH-62	26.00	Sandy silt with traces of gravels (CL)	1	46	44	9	0.121	0.025	0.003	40.3	1.72



Grain Size Distribution Curve

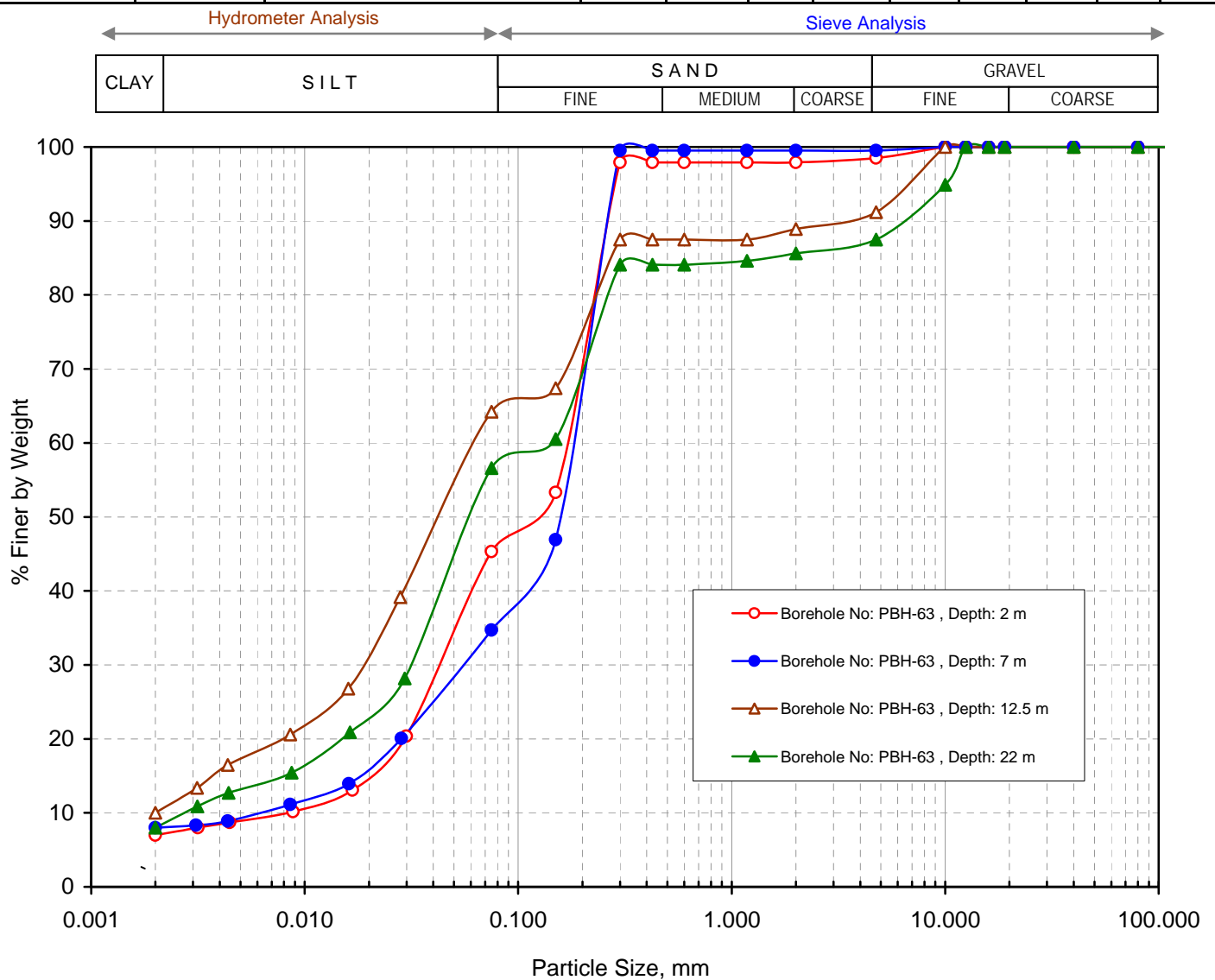




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-63	2.00	Silty fine sand with traces of gravels (SM)	2	53	38	7	0.173	0.047	0.008	21.6	1.60
PBH-63	7.00	Silty fine sand with traces of gravels (SM)	1	64	27	8	0.187	0.060	0.006	31.2	3.21
PBH-63	12.50	Sandy silt with gravels (CL)	9	27	54	10	0.067	0.019	0.002	33.5	2.69
PBH-63	22.00	Sandy silt with gravels (CL)	13	30	49	8	0.140	0.032	0.003	46.7	2.44



Grain Size Distribution Curve

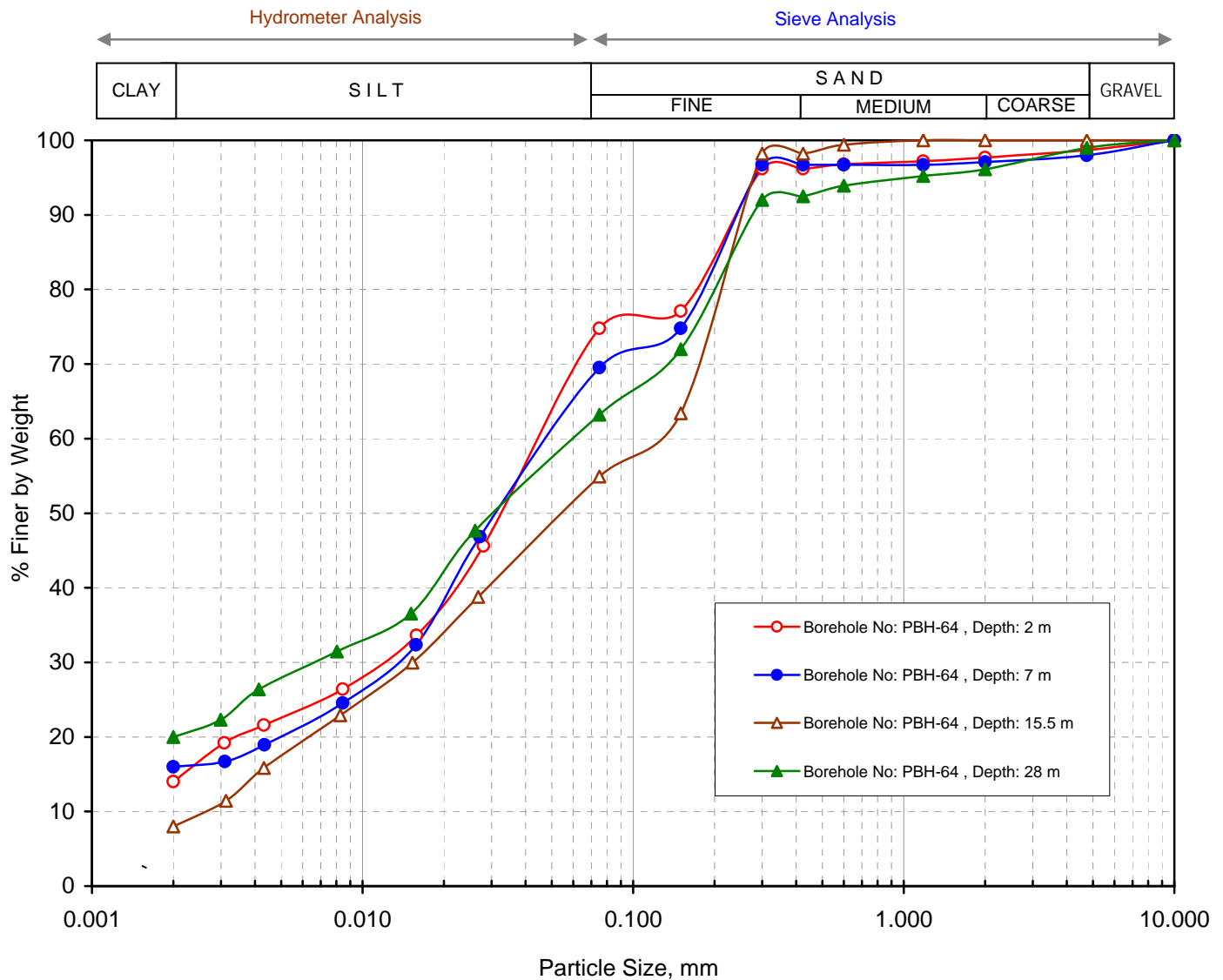




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-64	2.00	Sandy silt with traces of gravels (CL)	1	23	62	14	0.051	0.012			
PBH-64	7.00	Sandy silt with traces of gravels (CL)	2	28	54	16	0.055	0.014			
PBH-64	15.50	Sandy silt (CL)	0	45	47	8	0.120	0.015	0.003	40.0	0.63
PBH-64	28.00	Sandy silt with traces of gravels (CL)	1	35	44	20	0.065	0.007			

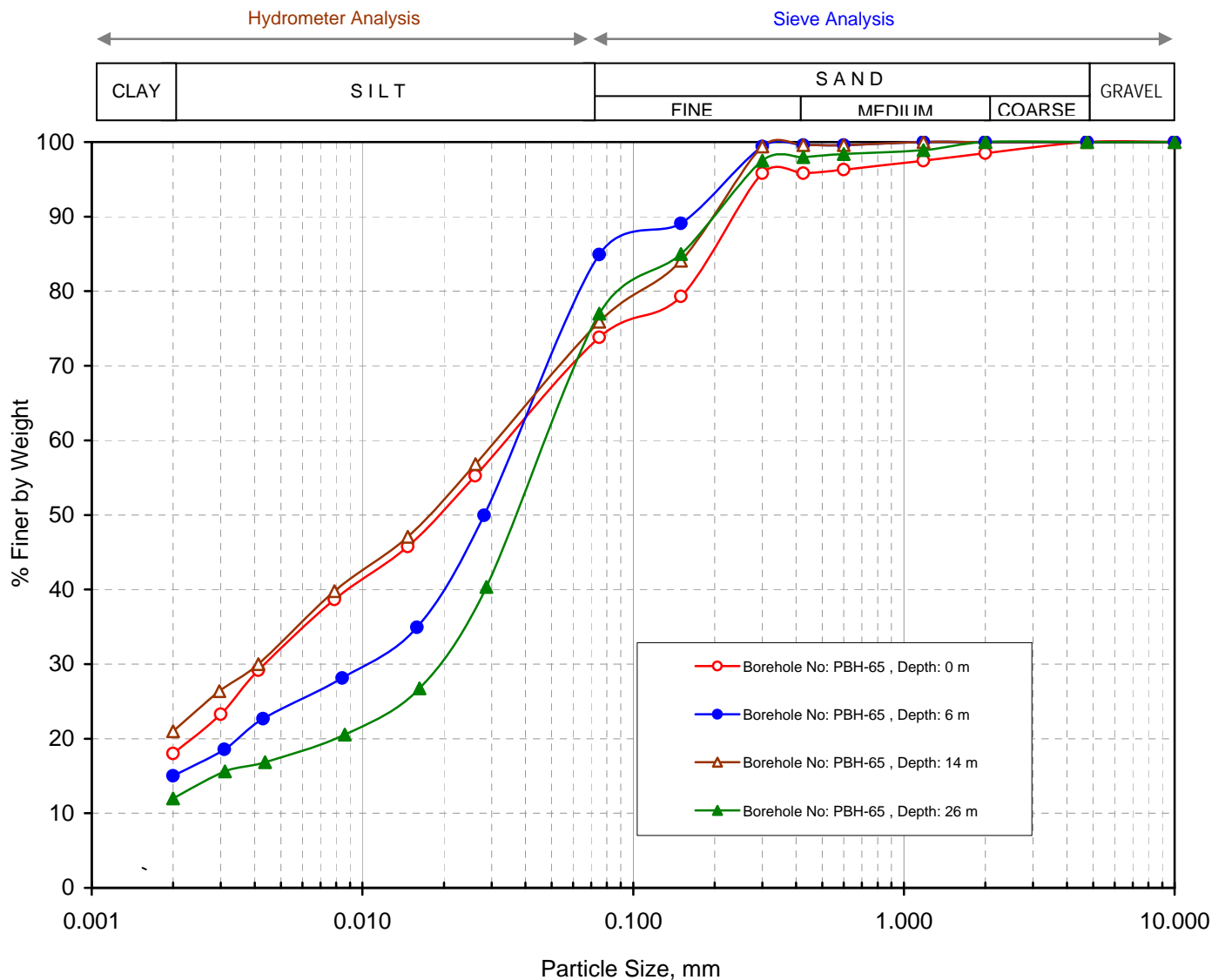




## Grain Size Analysis

IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-65	0.00	Sandy silt (CL)	0	26	56	18	0.039	0.004			
PBH-65	6.00	Sandy silt (CL)	0	15	70	15	0.042	0.010			
PBH-65	14.00	Sandy silt (CL)	0	24	55	21	0.034	0.004			
PBH-65	26.00	Sandy silt (CL)	0	23	65	12	0.054	0.019			



Grain Size Distribution Curve







## Grain Size Analysis

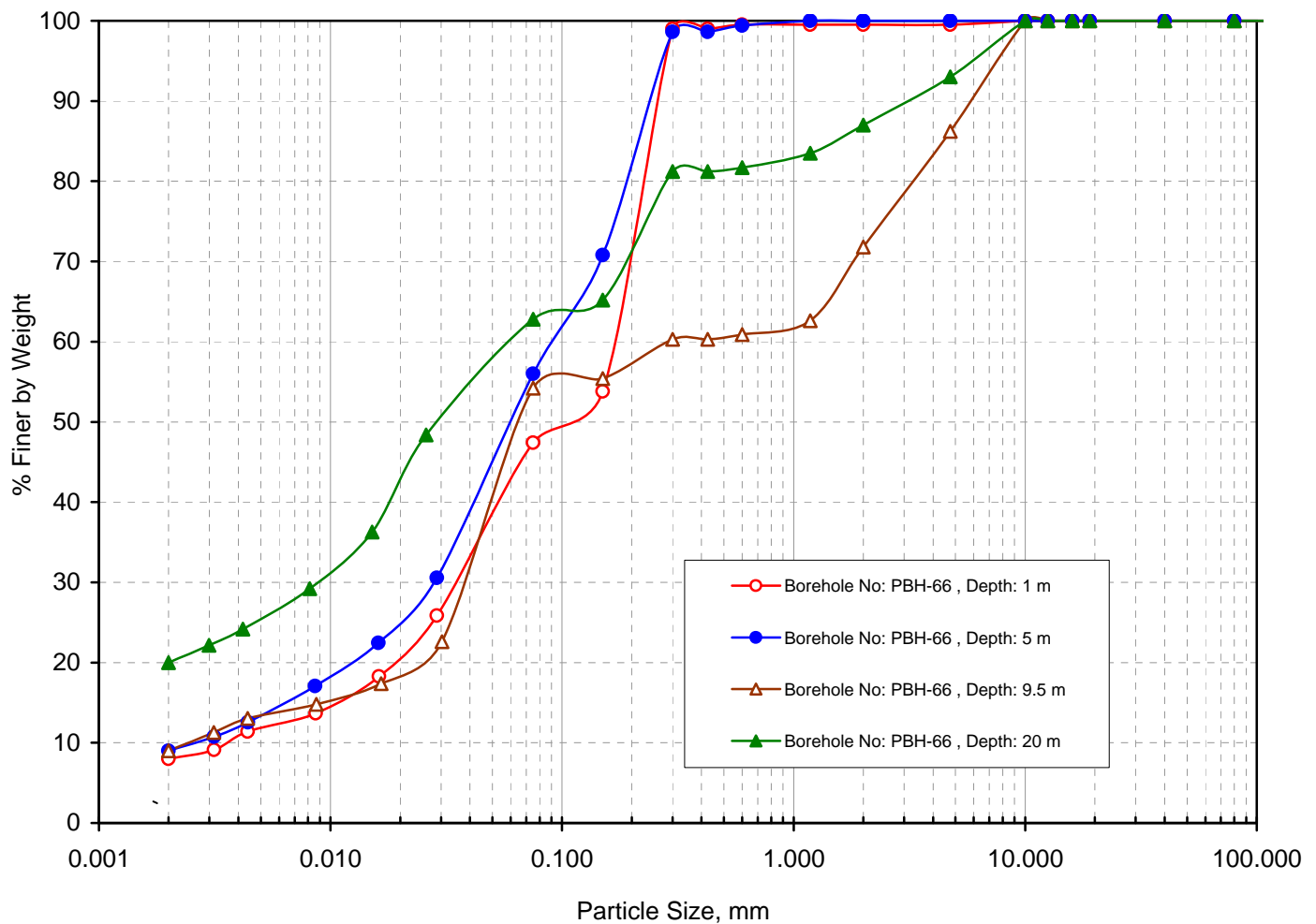
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-66	1.00	Silty fine sand with traces of gravels (SM)	1	52	39	8	0.171	0.038	0.004	42.8	2.11
PBH-66	5.00	Sandy silt (CL)	0	44	47	9	0.095	0.028	0.003	31.7	2.75
PBH-66	9.50	Sandy silt with gravels (CL)	14	32	45	9	0.291	0.041	0.002	146	2.89
PBH-66	20.00	Sandy silt with gravels (CL)	7	30	43	20	0.065	0.009			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve





## Grain Size Analysis

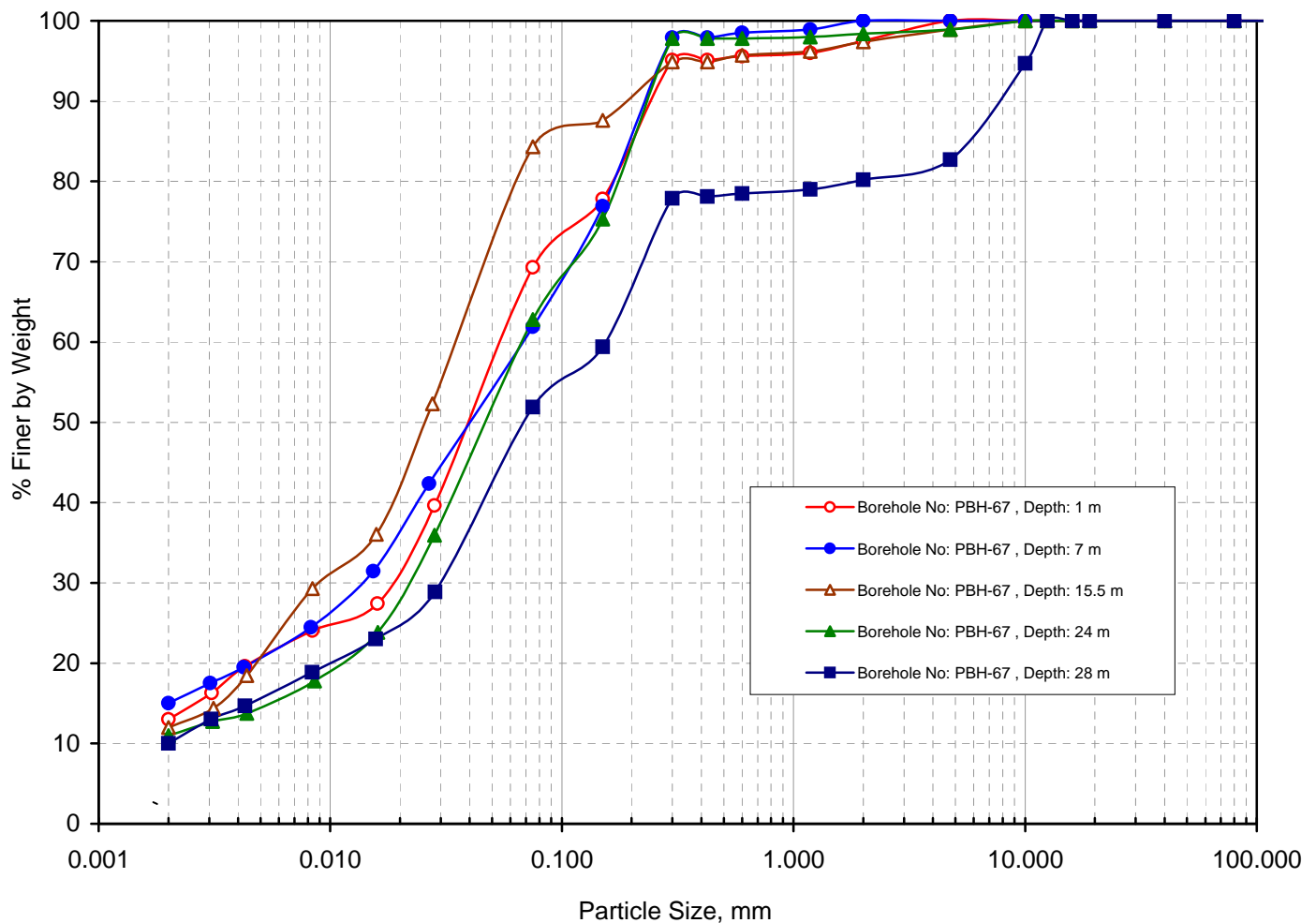
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
PBH-67	1.00	Sandy silt (CL)	0	30	57	13	0.060	0.019			
PBH-67	7.00	Sandy silt (CL)	0	38	47	15	0.070	0.014			
PBH-67	15.50	Sandy silt with traces of gravels (CL)	1	14	73	12	0.039	0.009			
PBH-67	24.00	Sandy silt with traces of gravels (CL)	1	36	52	11	0.070	0.022			
PBH-67	28.00	Sandy silt with gravels (CL)	17	30	43	10	0.155	0.031	0.002	77.5	3.10

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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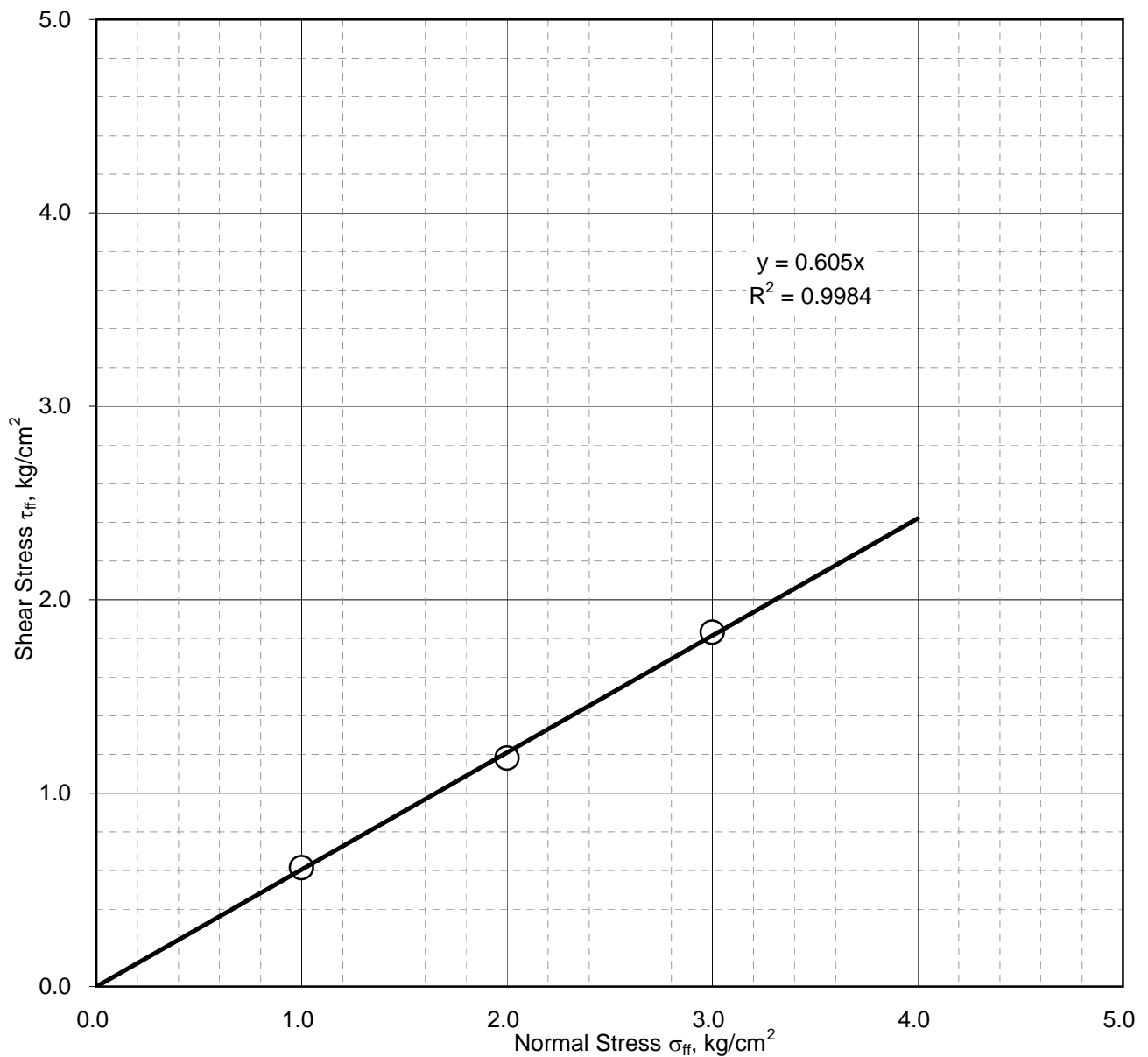




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-1	Sample Depth: 20 m
	Sample No.: UDS-6	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.56
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.2 degrees



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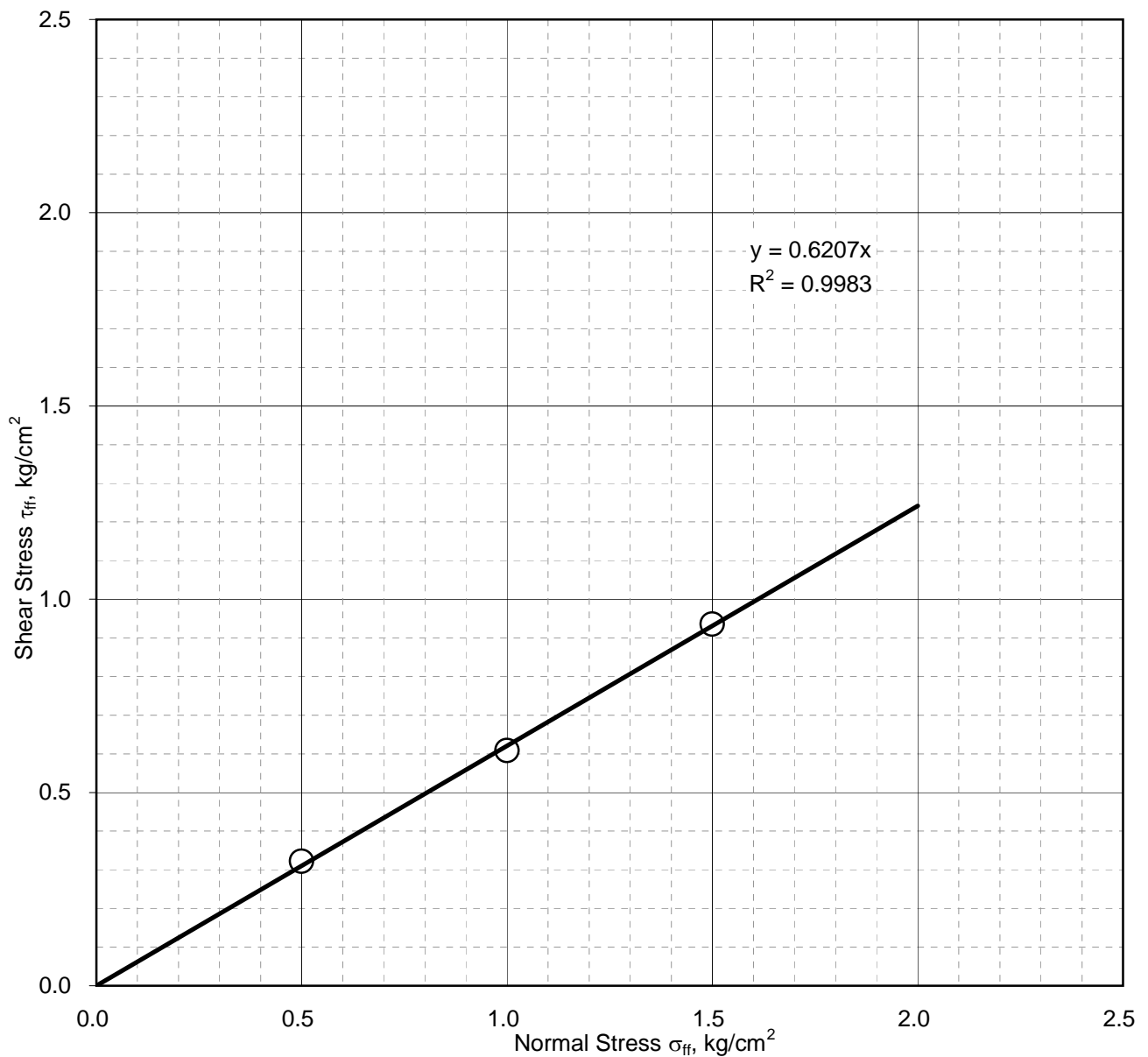




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-2	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.61
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.8 degrees



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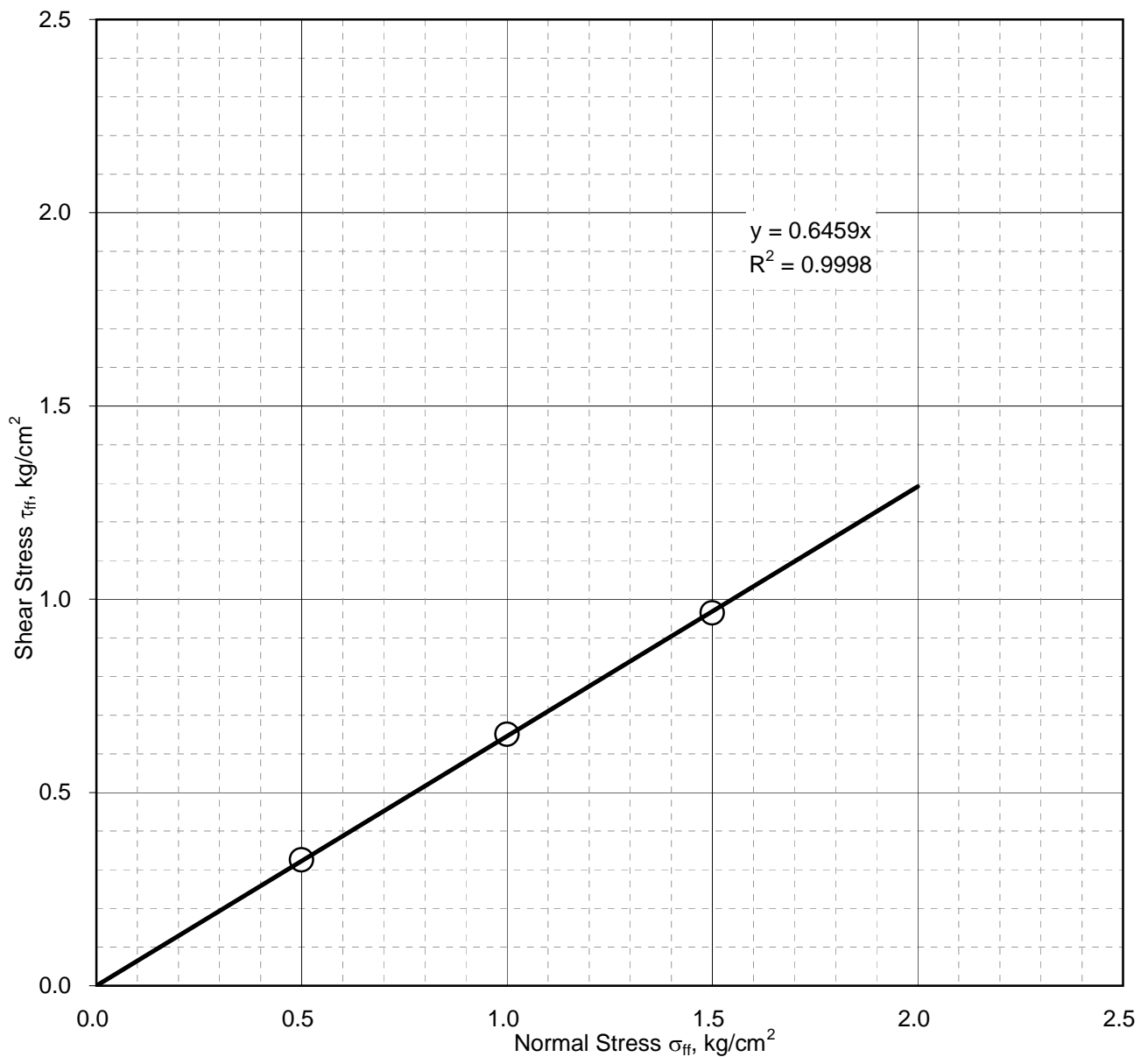




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-2	Sample Depth: 14 m
	Sample No.: UDS-6	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.62
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	32.9 degrees



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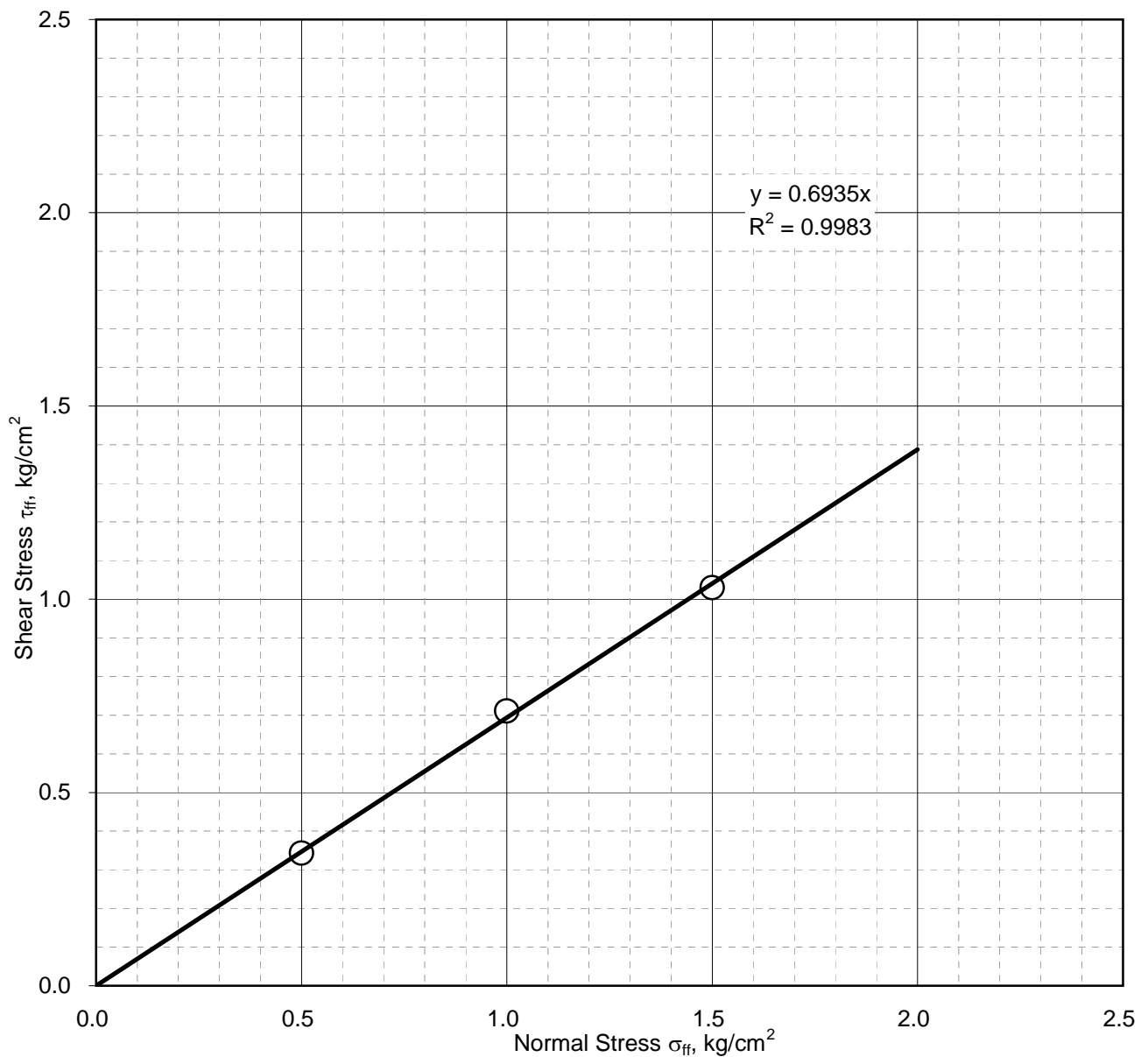




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: BH-3	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.57
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	34.7 degrees



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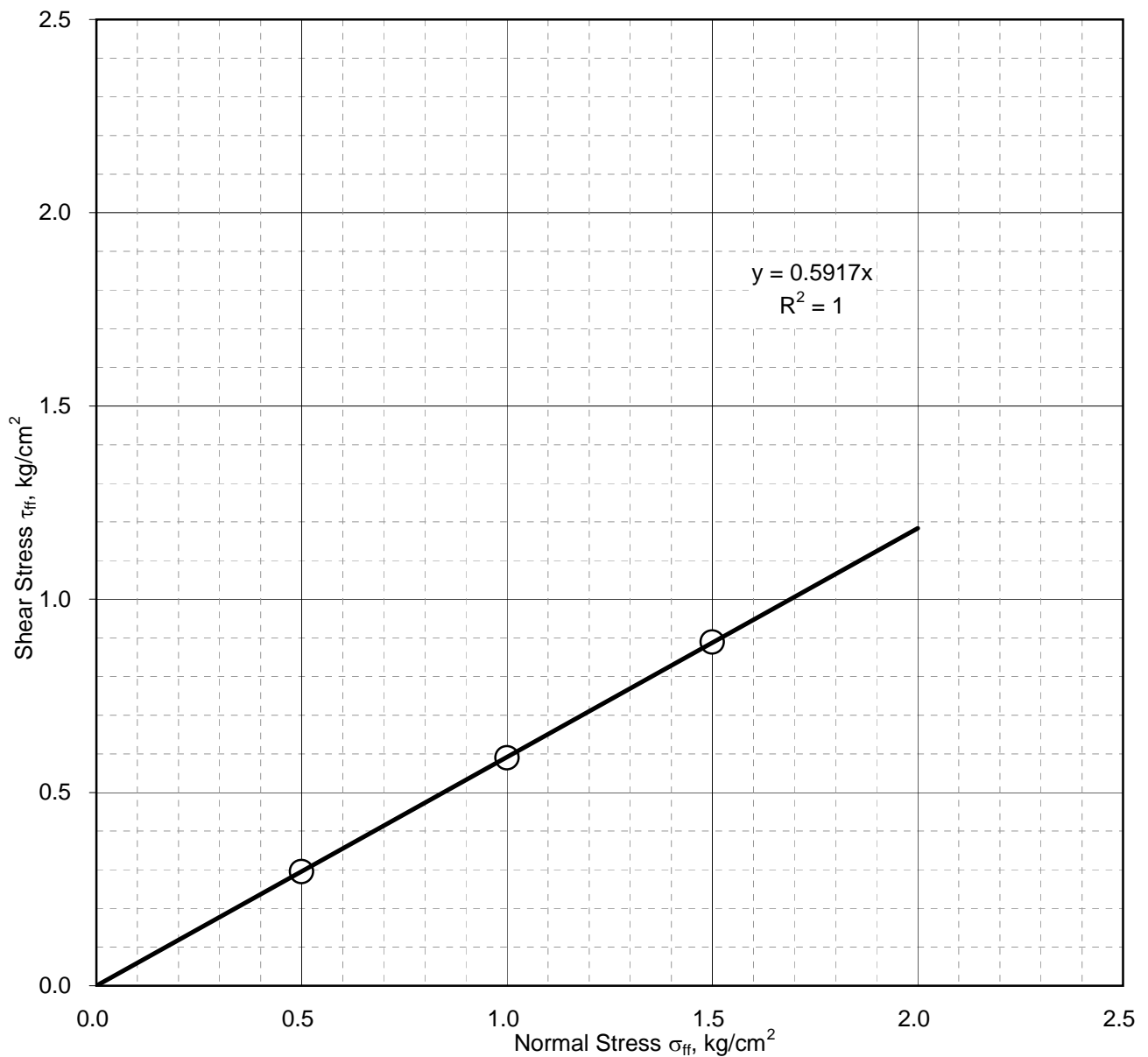




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-5	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Silty fine sand
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.56
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	30.6 degrees



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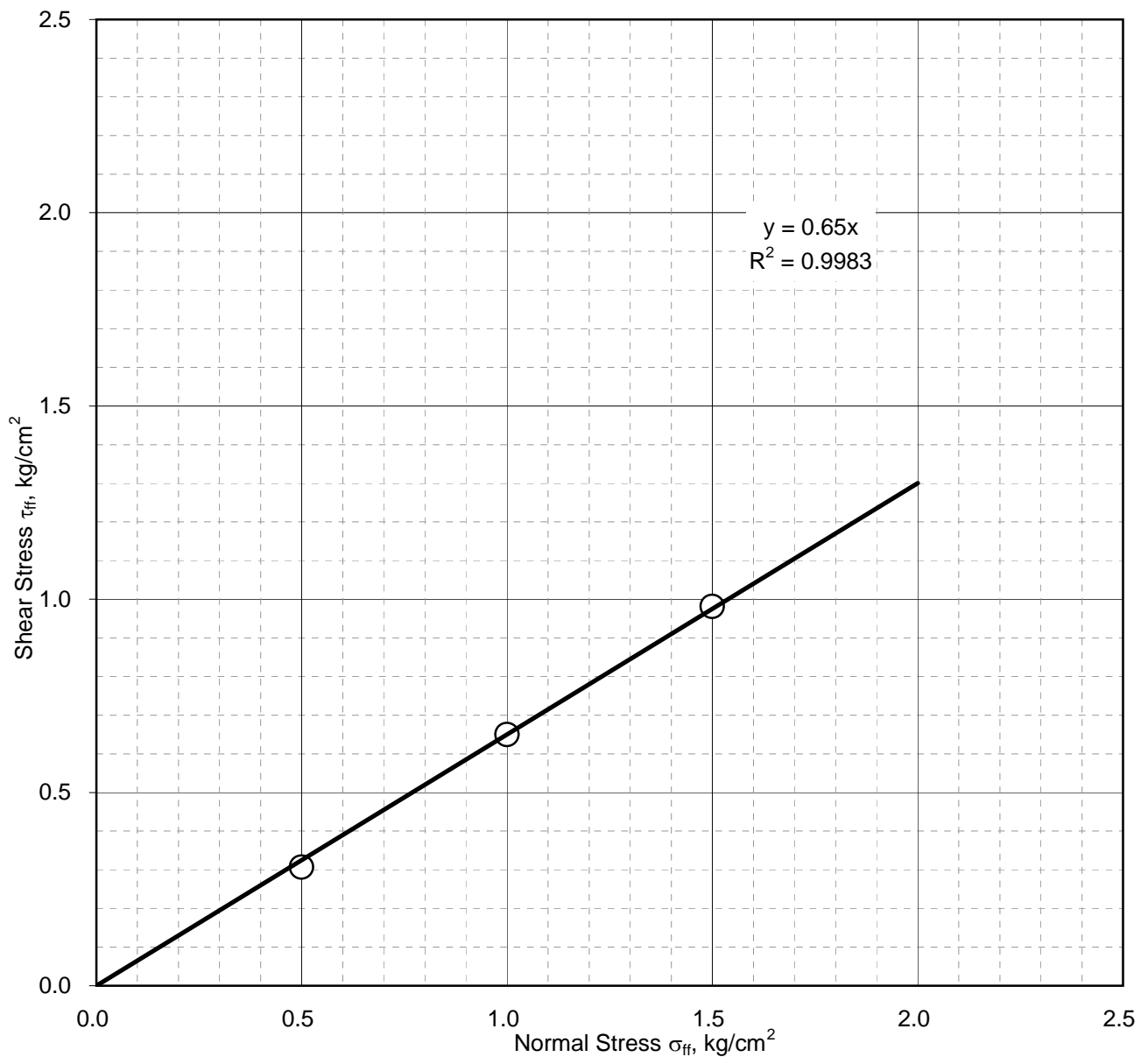




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-5	Sample Depth: 14 m
	Sample No.: UDS-6	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.61
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	33.0 degrees



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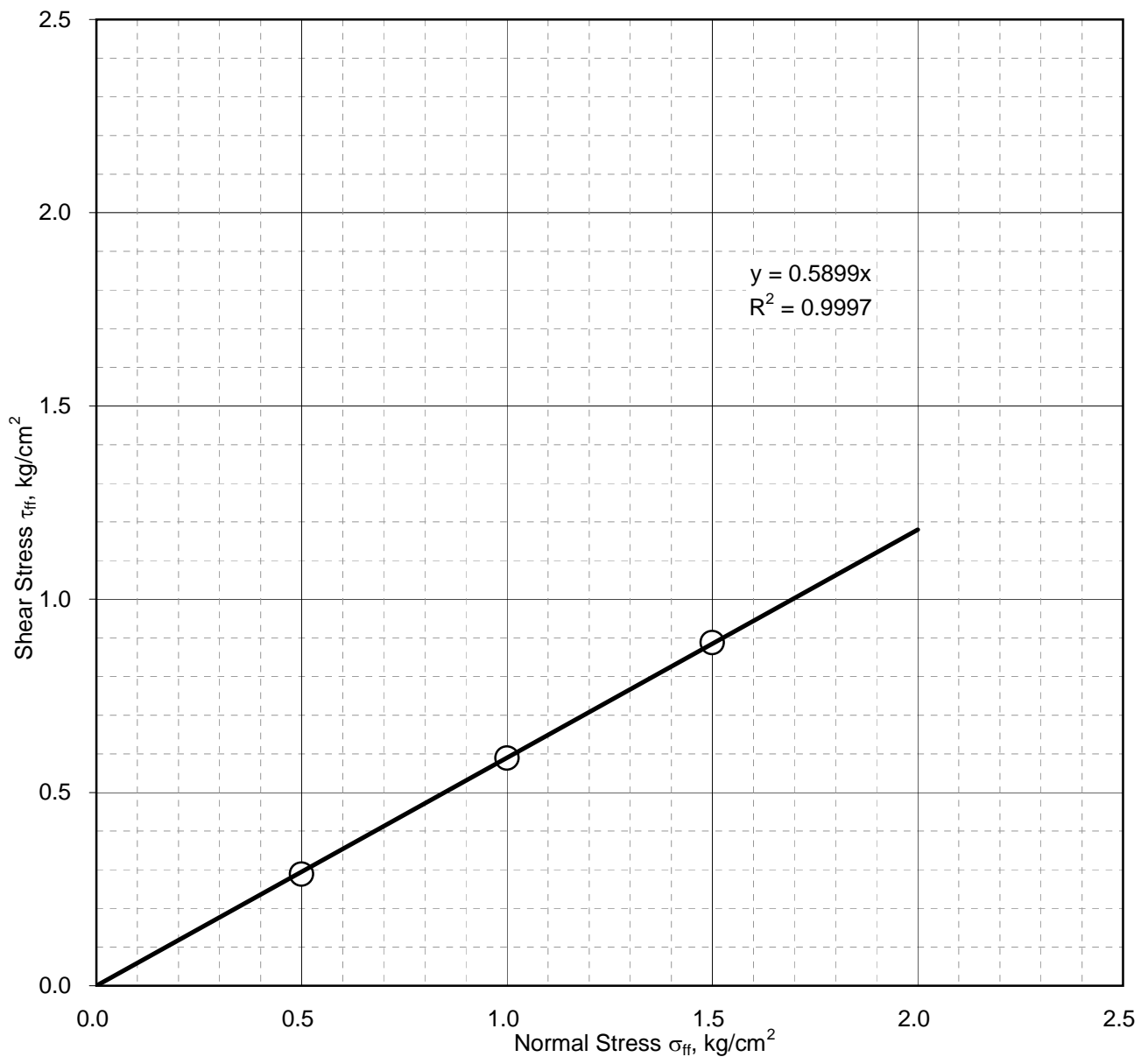




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Test Results	Borehole No.: PBH-6		Sample Depth: 4 m	
	Sample No.: UDS-2		Sample Description: Sandy silt	
	Dry Density of Soil ( $\text{g/cm}^3$ ):		1.57	
	Moisture Content (%):		Saturated	
	Cohesion Intercept, $c$ :		0.00	$\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :		30.5	degrees



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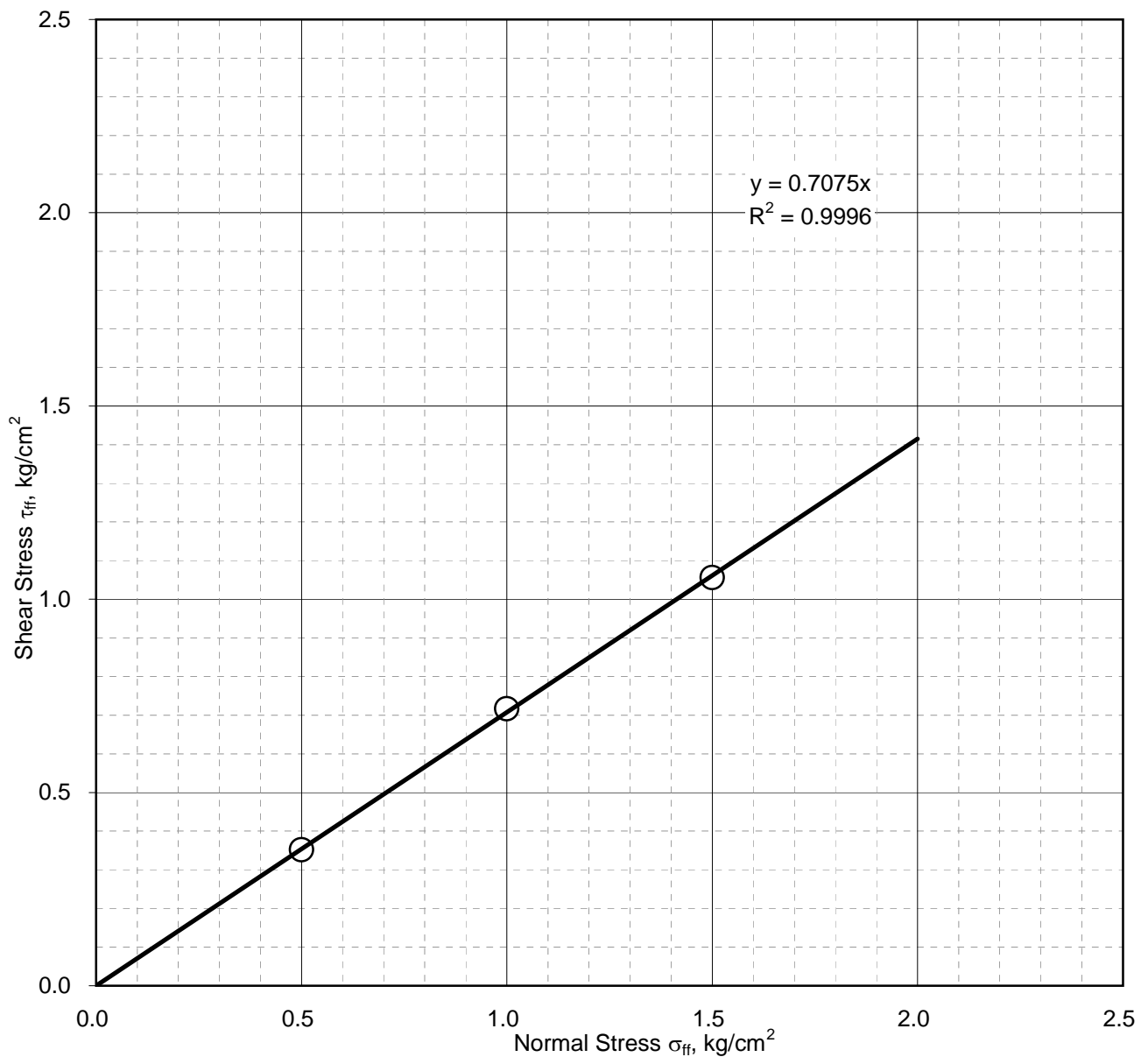




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-7	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.61
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	35.3 degrees



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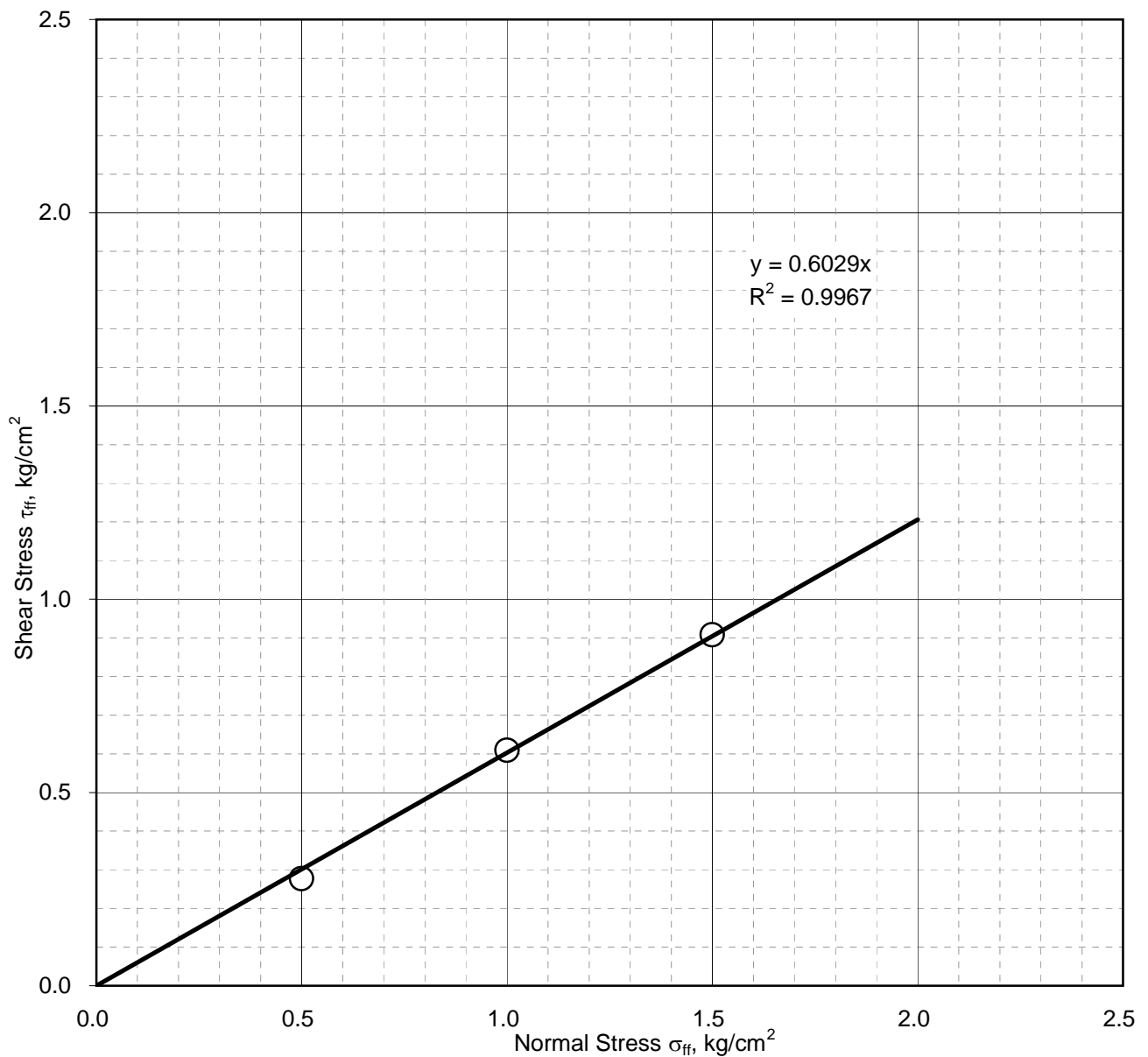




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: BH-9	Sample Depth: 8 m
	Sample No.: UDS-4	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.60
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.1 degrees



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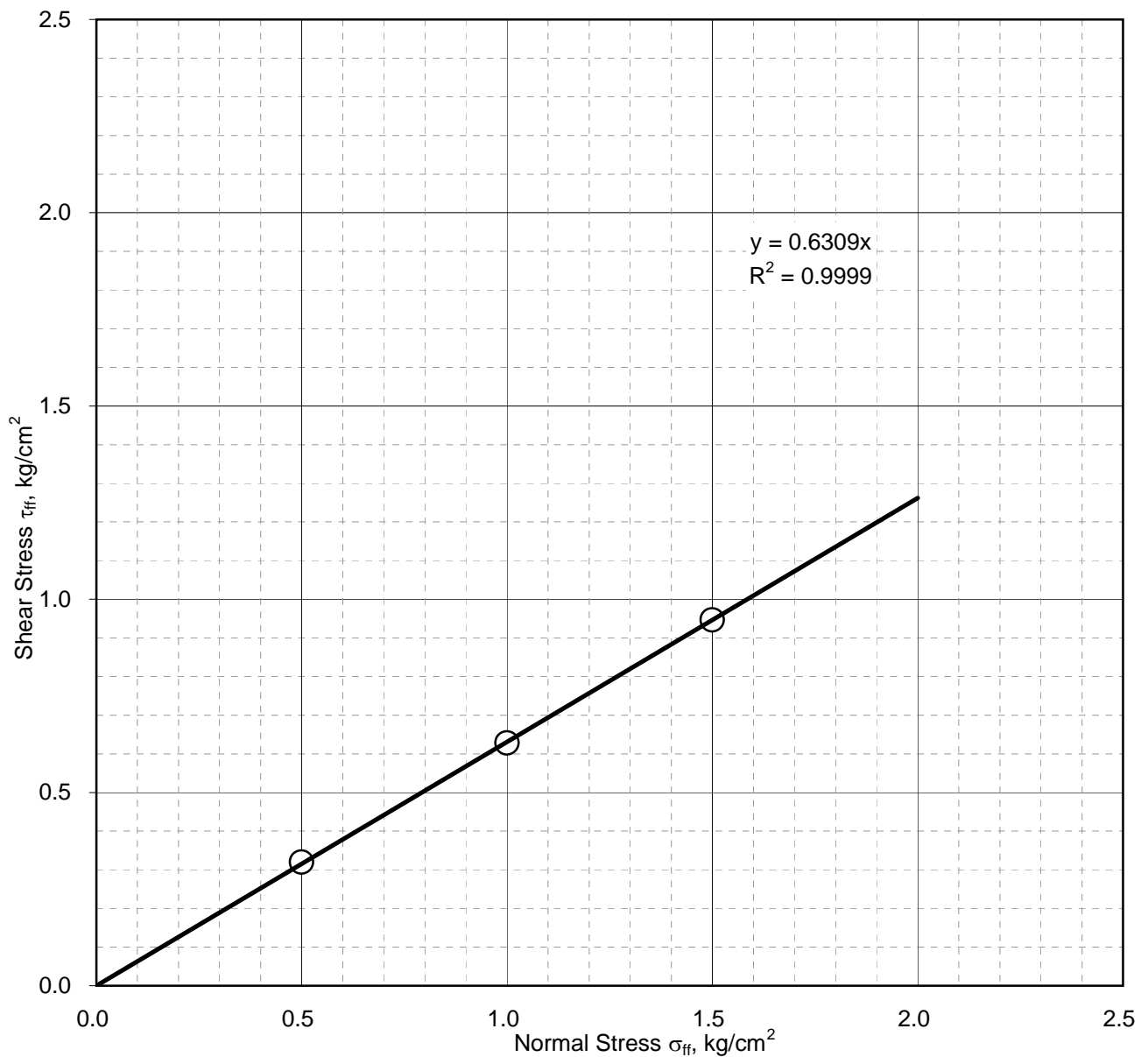




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Test Results	Borehole No.: PBH-10		Sample Depth: 4 m	
	Sample No.: UDS-2		Sample Description: Silty fine sand	
	Dry Density of Soil ( $\text{g/cm}^3$ ):		1.63	
	Moisture Content (%):		Saturated	
	Cohesion Intercept, $c$ :		0.00	$\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :		32.2	degrees



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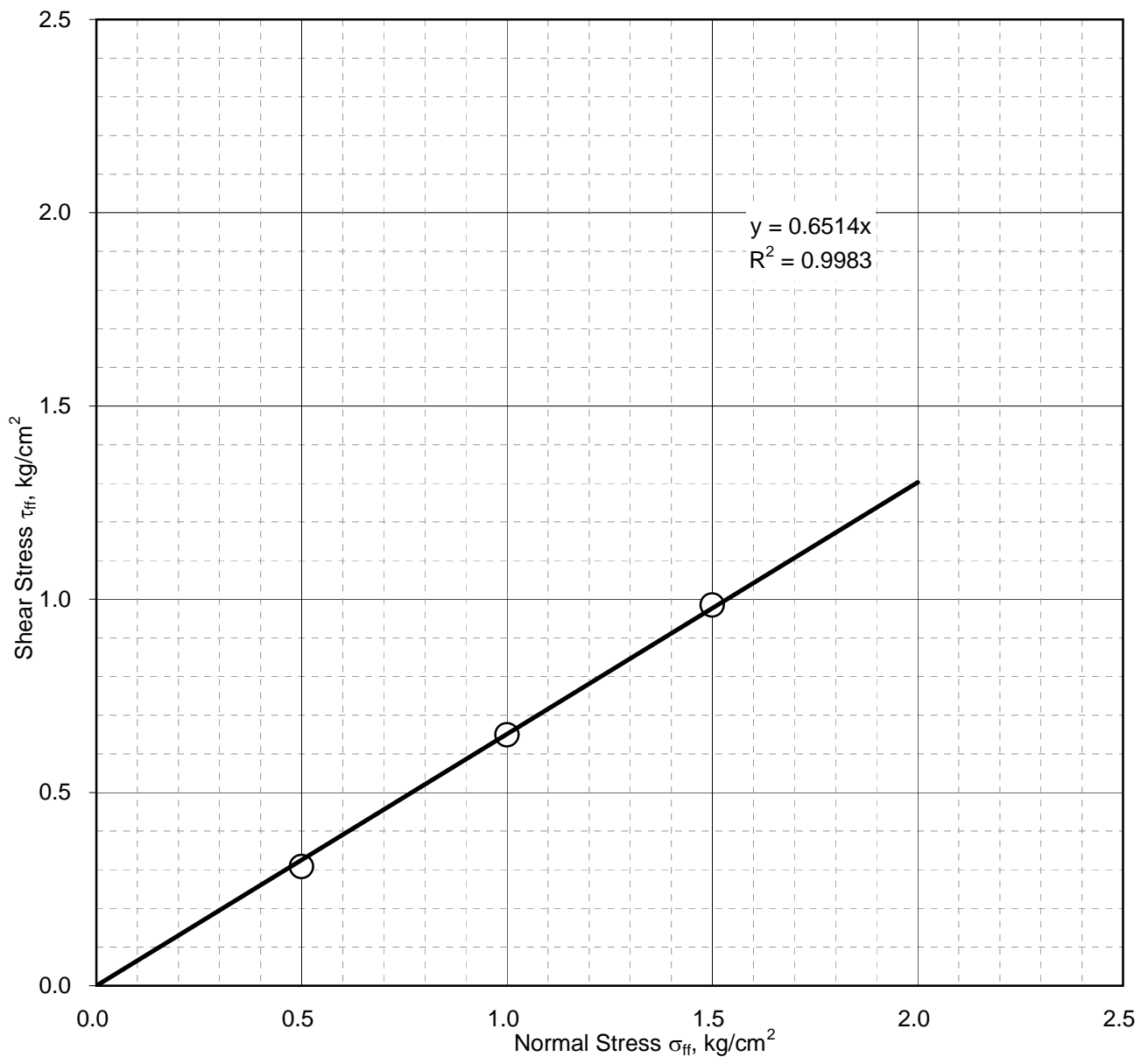




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-11	Sample Depth: 8 m
	Sample No.: UDS-4	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.62
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	33.1 degrees



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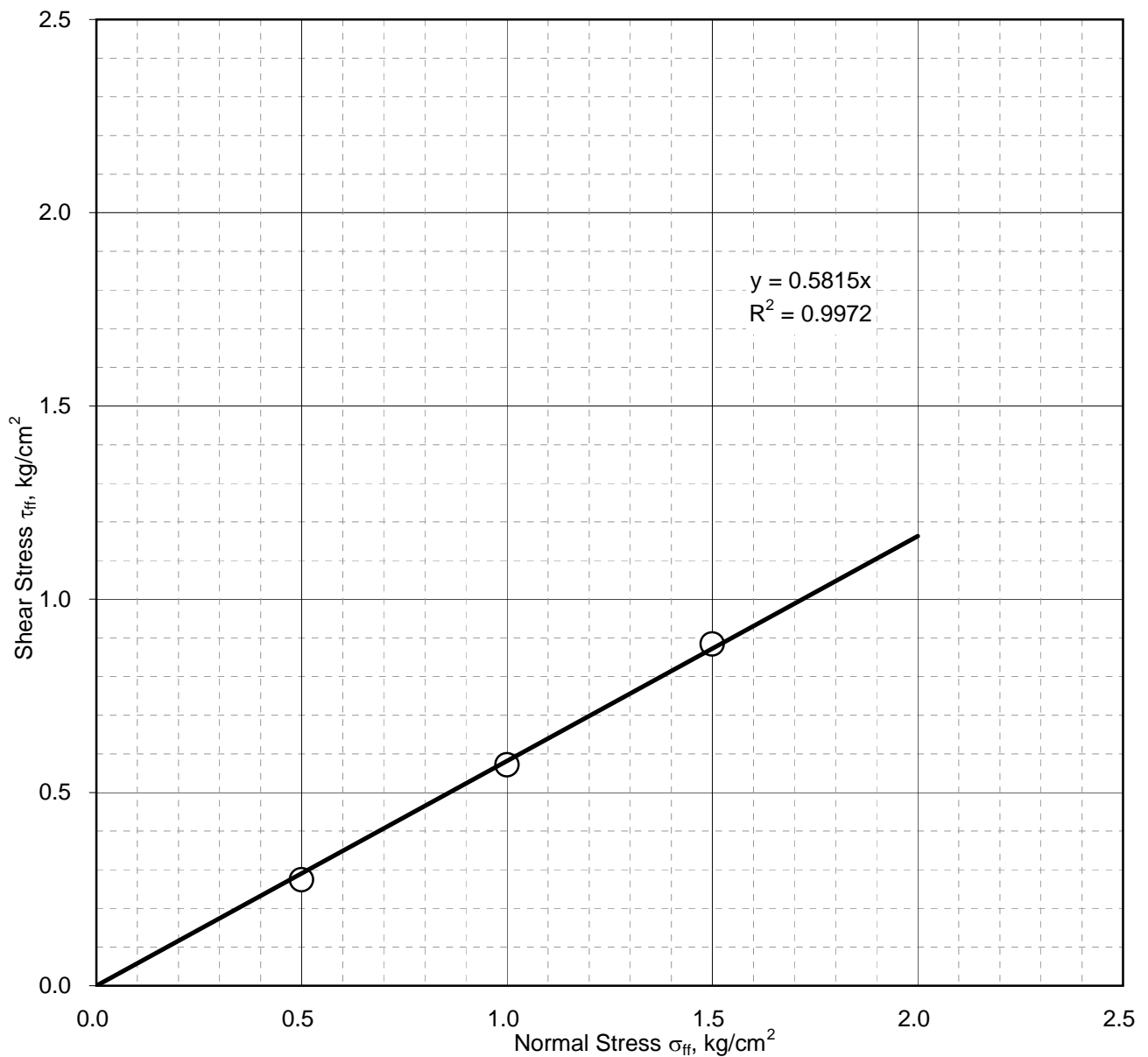




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Test Results	Borehole No.: BH-12		Sample Depth: 4 m	
	Sample No.: UDS-2		Sample Description: Sandy silt	
	Dry Density of Soil ( $\text{g/cm}^3$ ):		1.58	
	Moisture Content (%):		Saturated	
	Cohesion Intercept, $c$ :		0.00	$\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :		30.2	degrees



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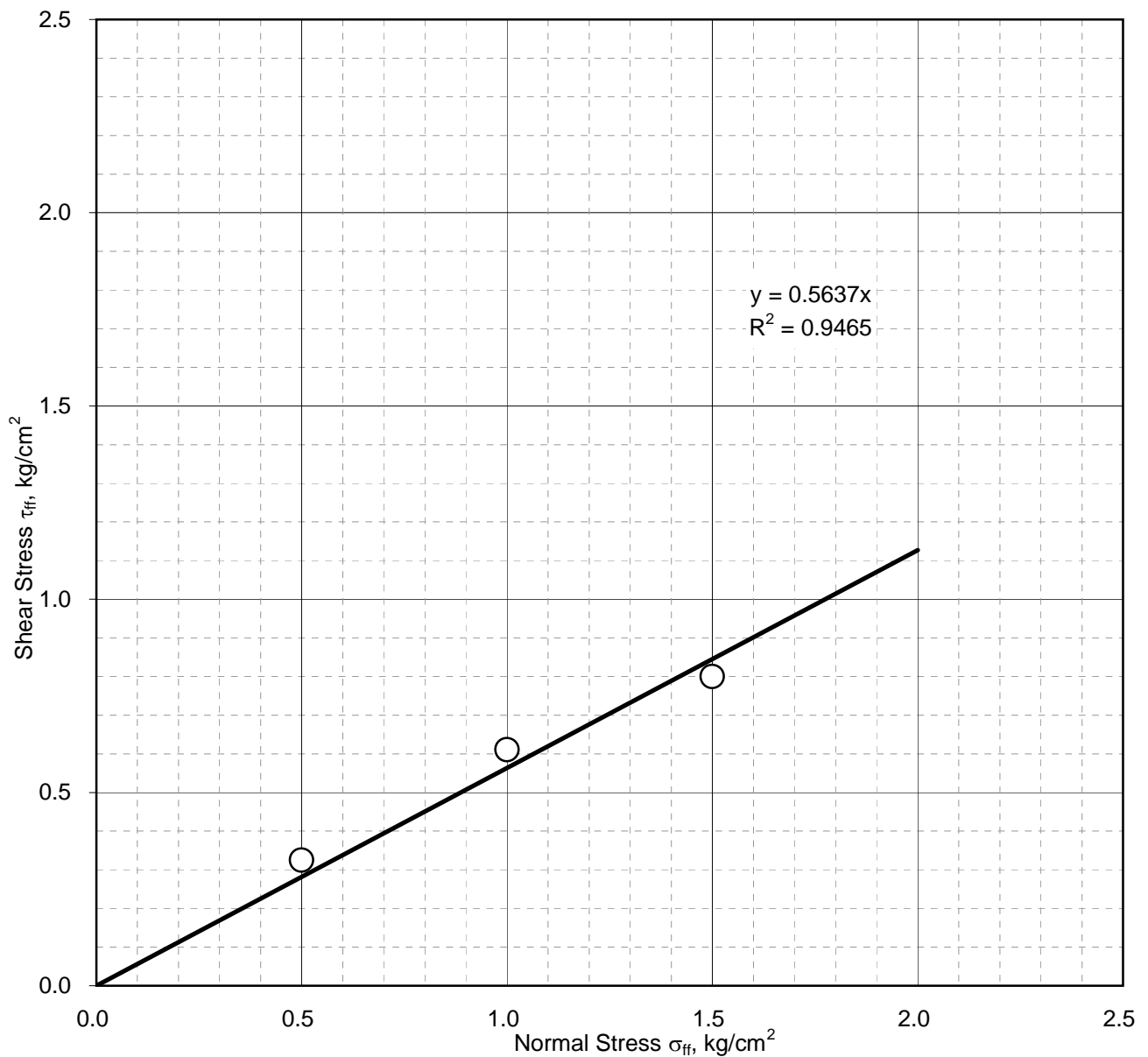




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: BH-14	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.59
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	29.4 degrees



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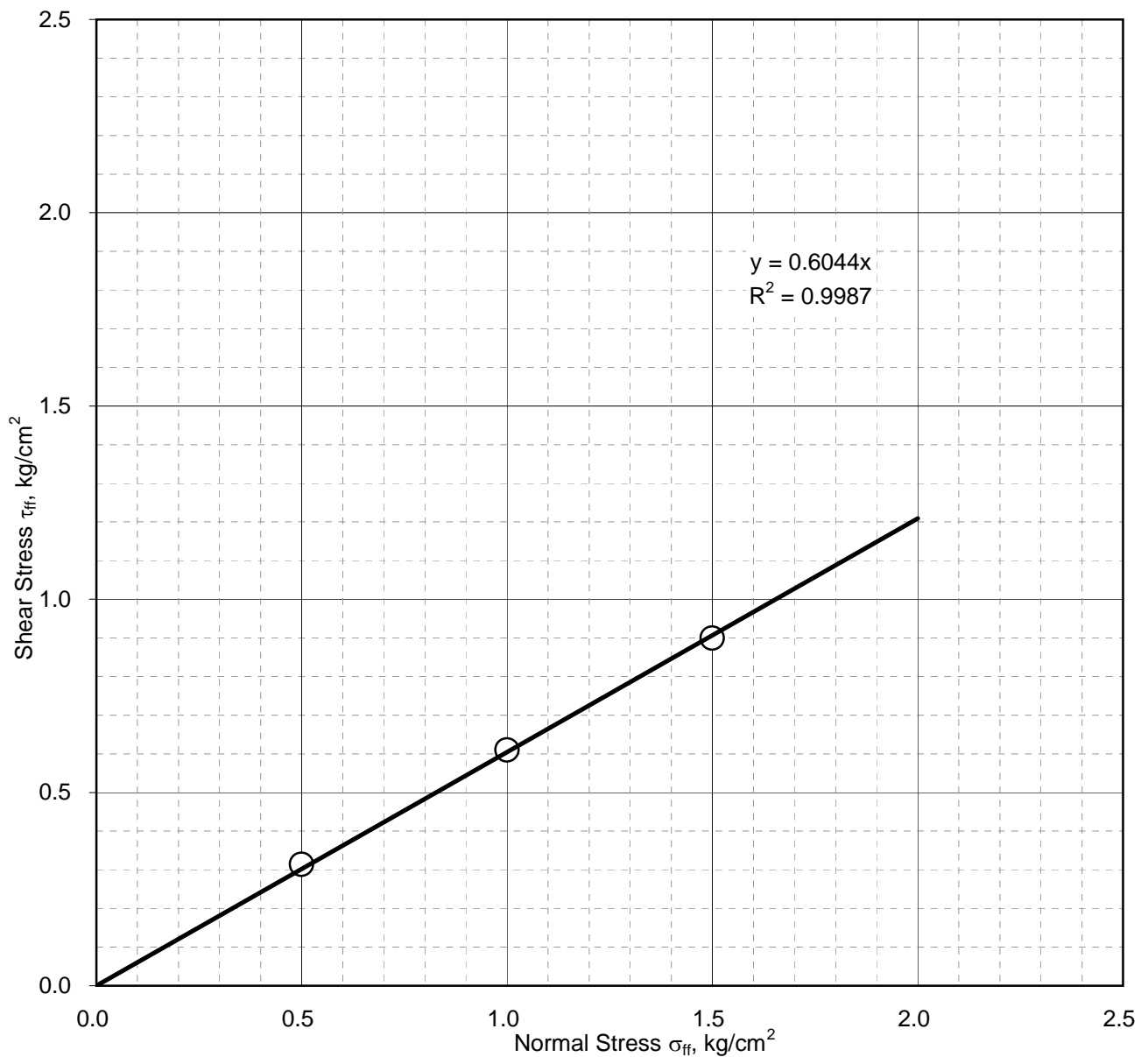




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-44	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.64
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.1 degrees



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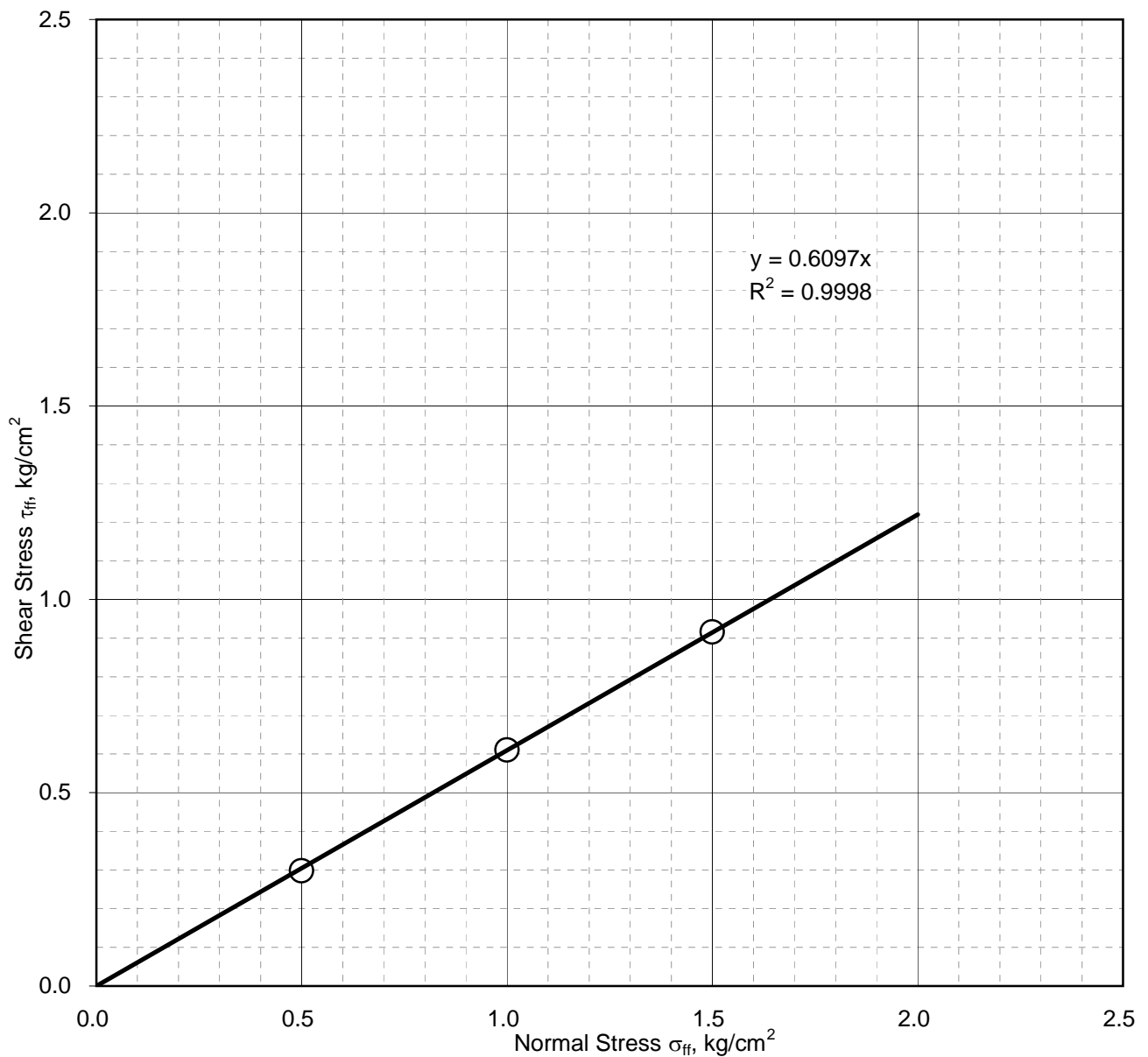




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-45	Sample Depth: 2 m
	Sample No.: UDS-1	Sample Description: Silty fine sand
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.61
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.4 degrees



### Mohr-Coulomb Failure Envelope

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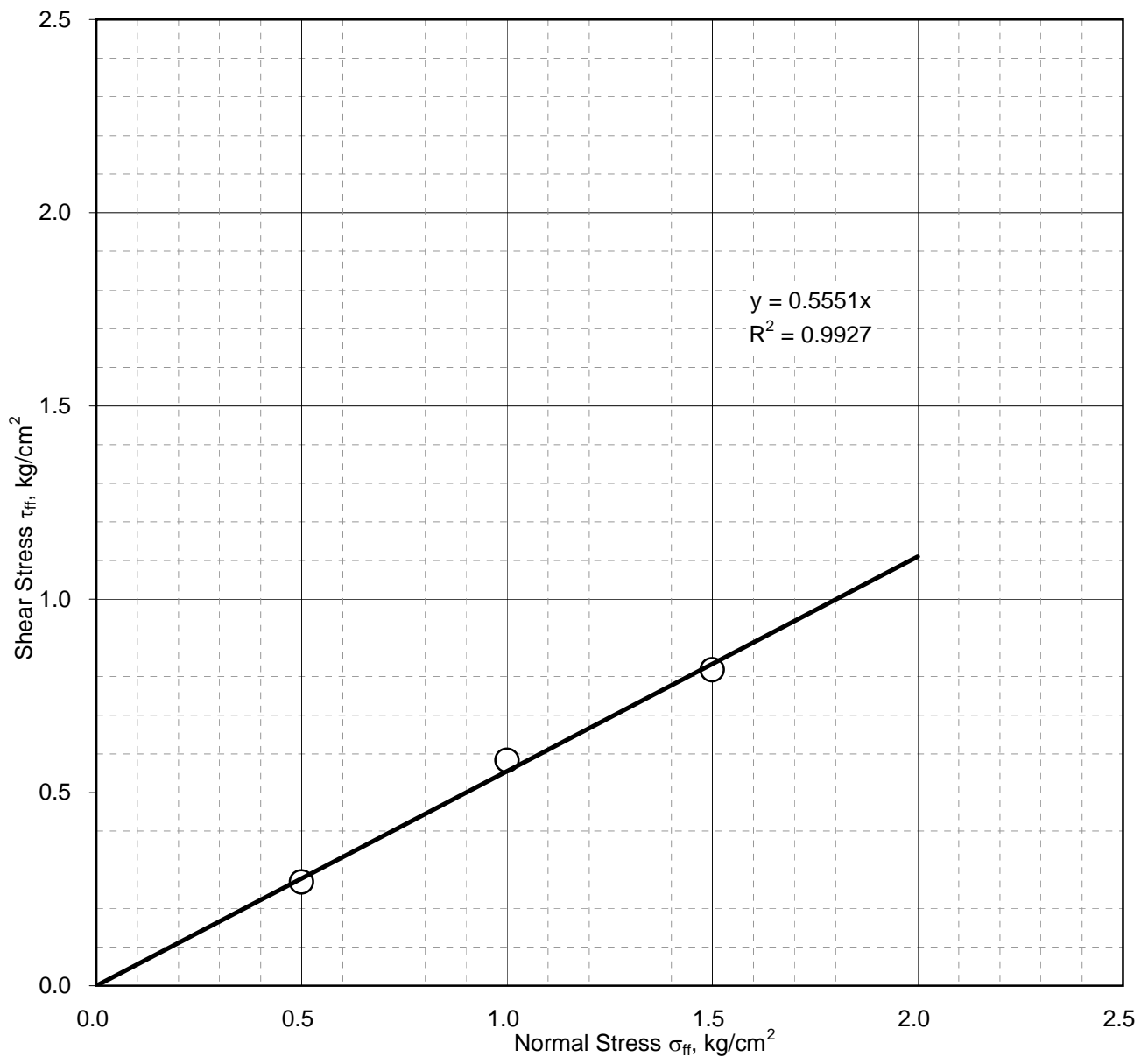




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-46	Sample Depth: 8 m
	Sample No.: UDS-4	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.56
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	29.0 degrees



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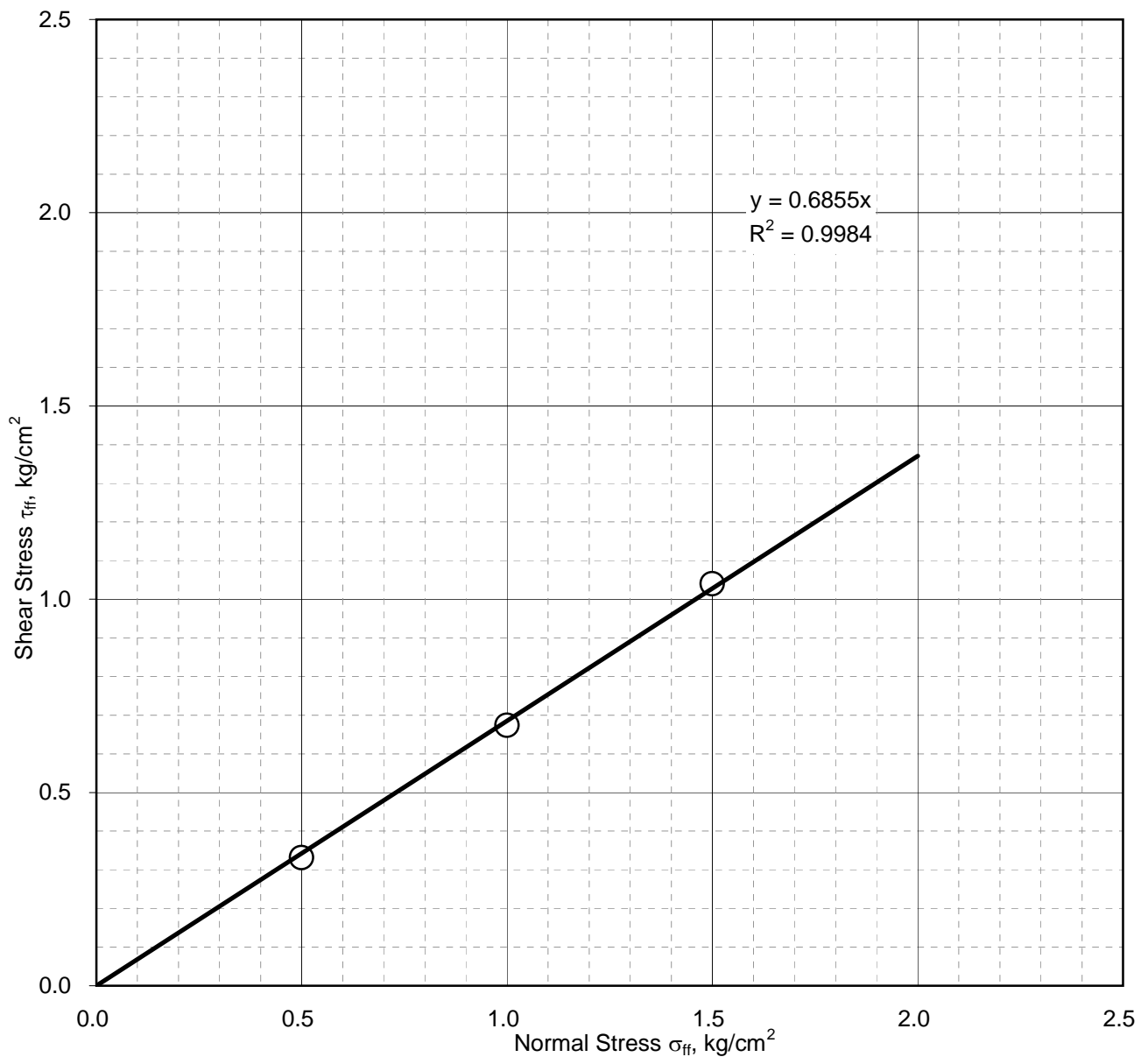




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-47	Sample Depth: 11 m
	Sample No.: UDS-4	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.64
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	34.4 degrees



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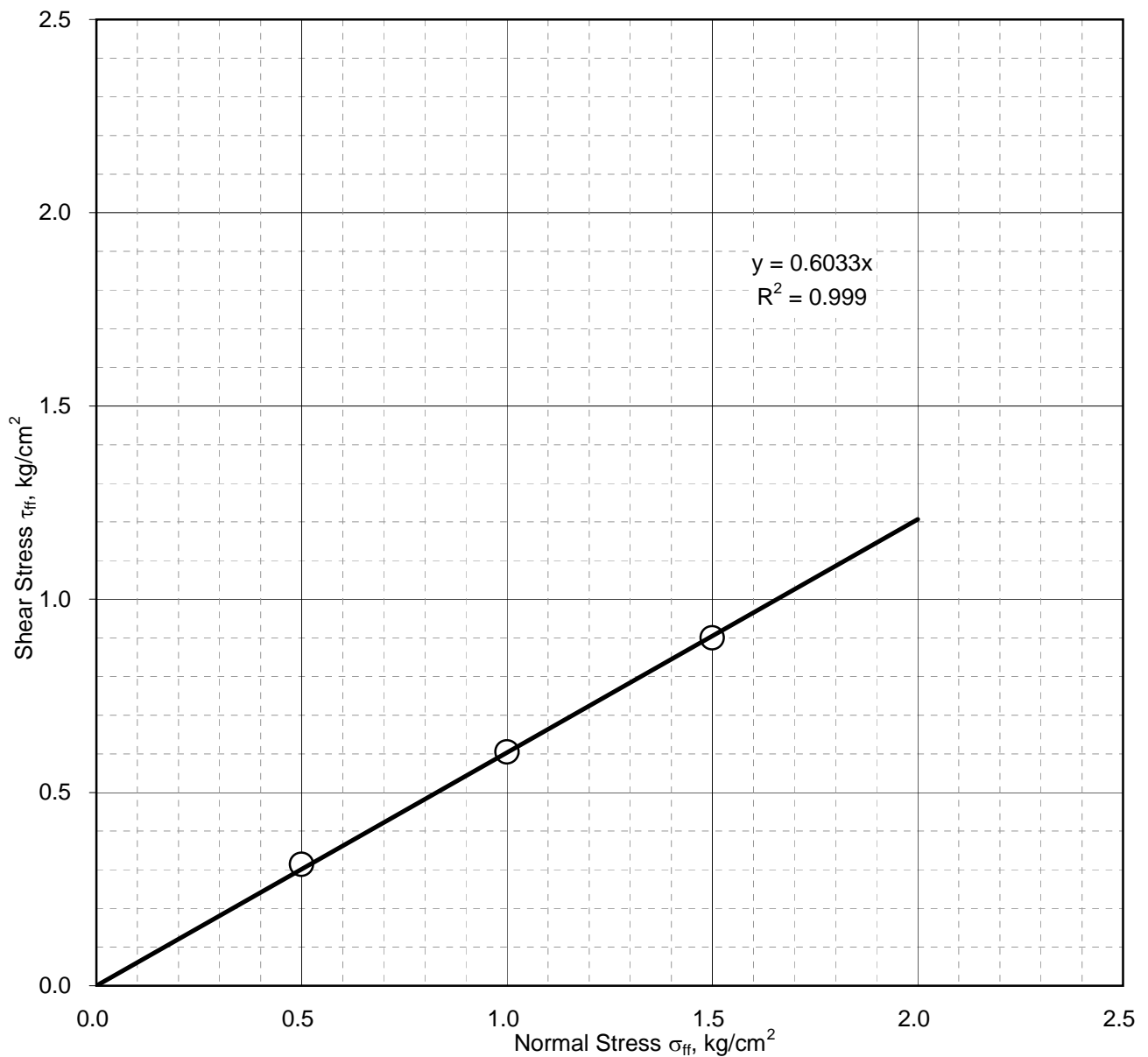




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-48	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.62
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.1 degrees



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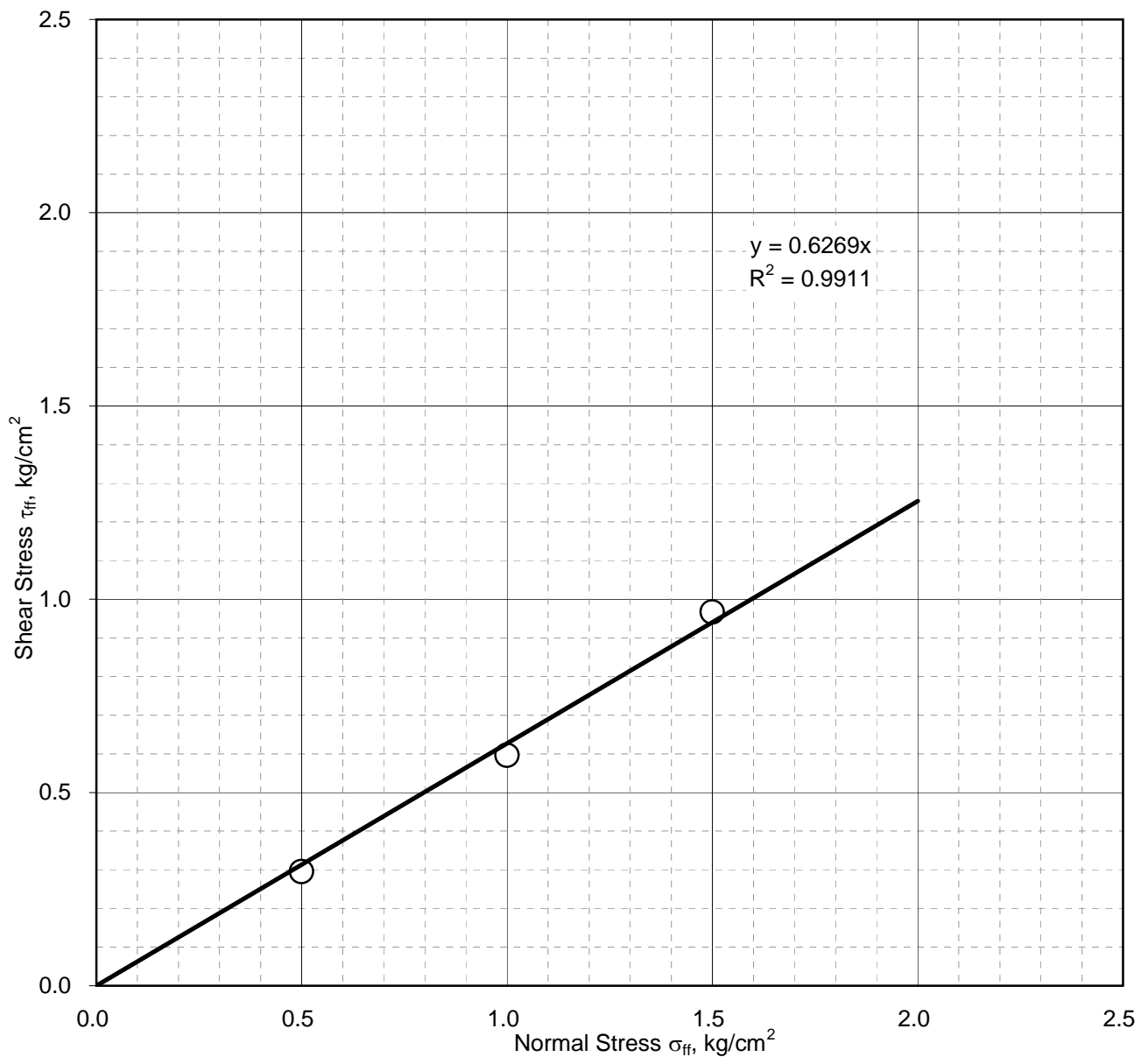




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Test Results	Borehole No.: PBH-49		Sample Depth: 8 m	
	Sample No.: UDS-4		Sample Description: Sandy silt	
	Dry Density of Soil ( $\text{g/cm}^3$ ):		1.58	
	Moisture Content (%):		Saturated	
	Cohesion Intercept, $c$ :		0.00	$\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :		32.1	degrees



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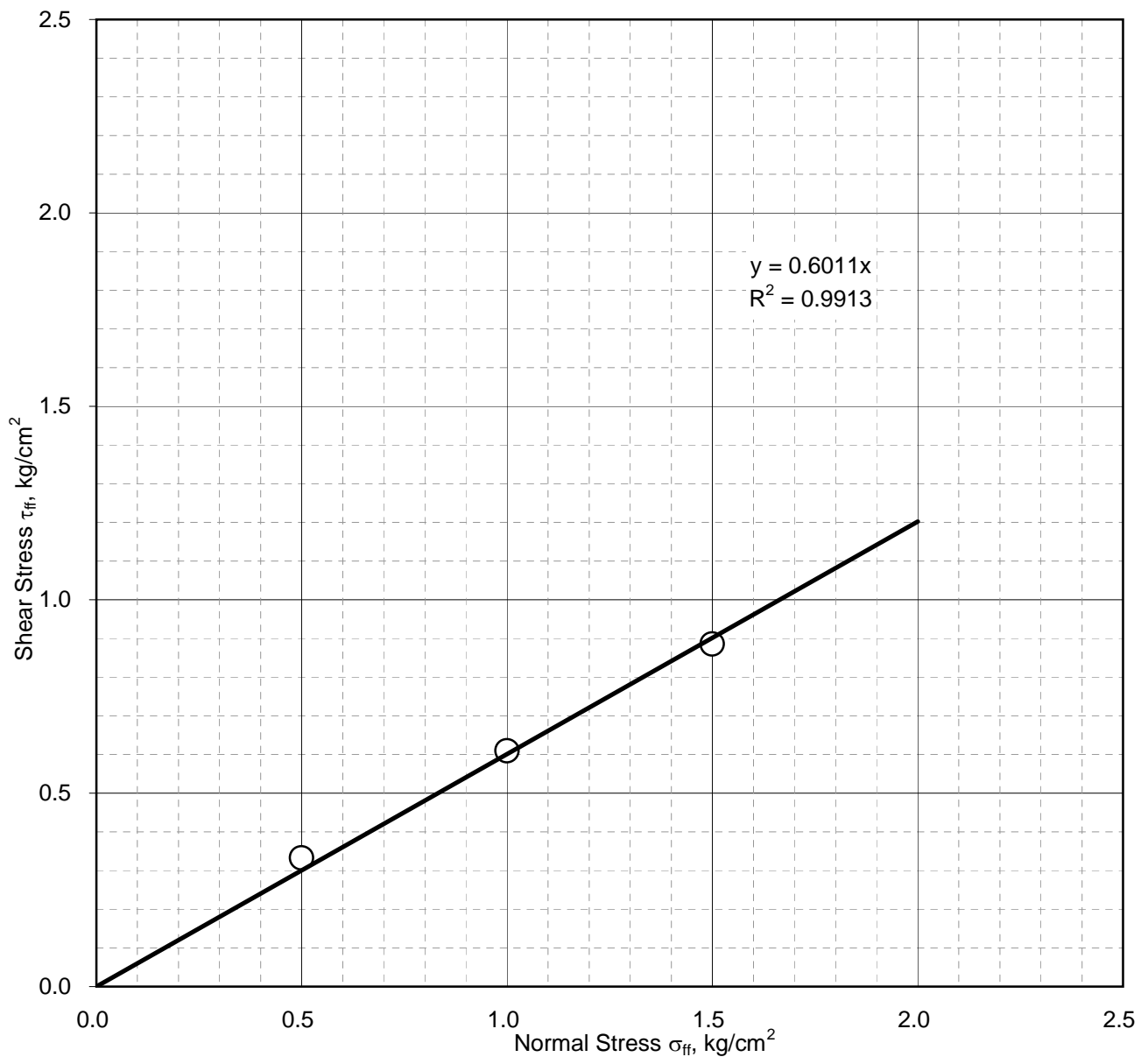




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-50	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.57
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.0 degrees



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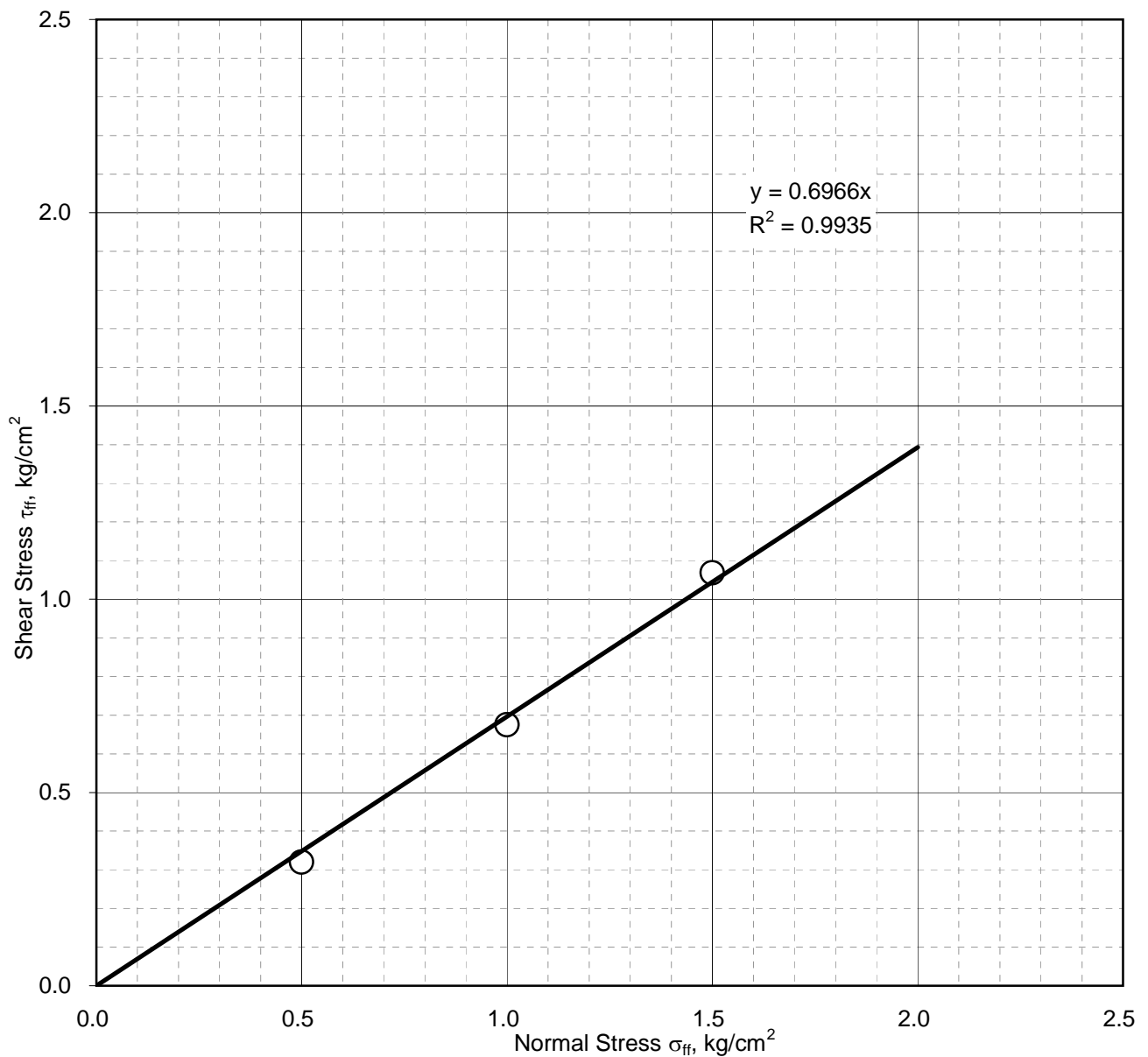




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-51	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.63
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	34.9 degrees



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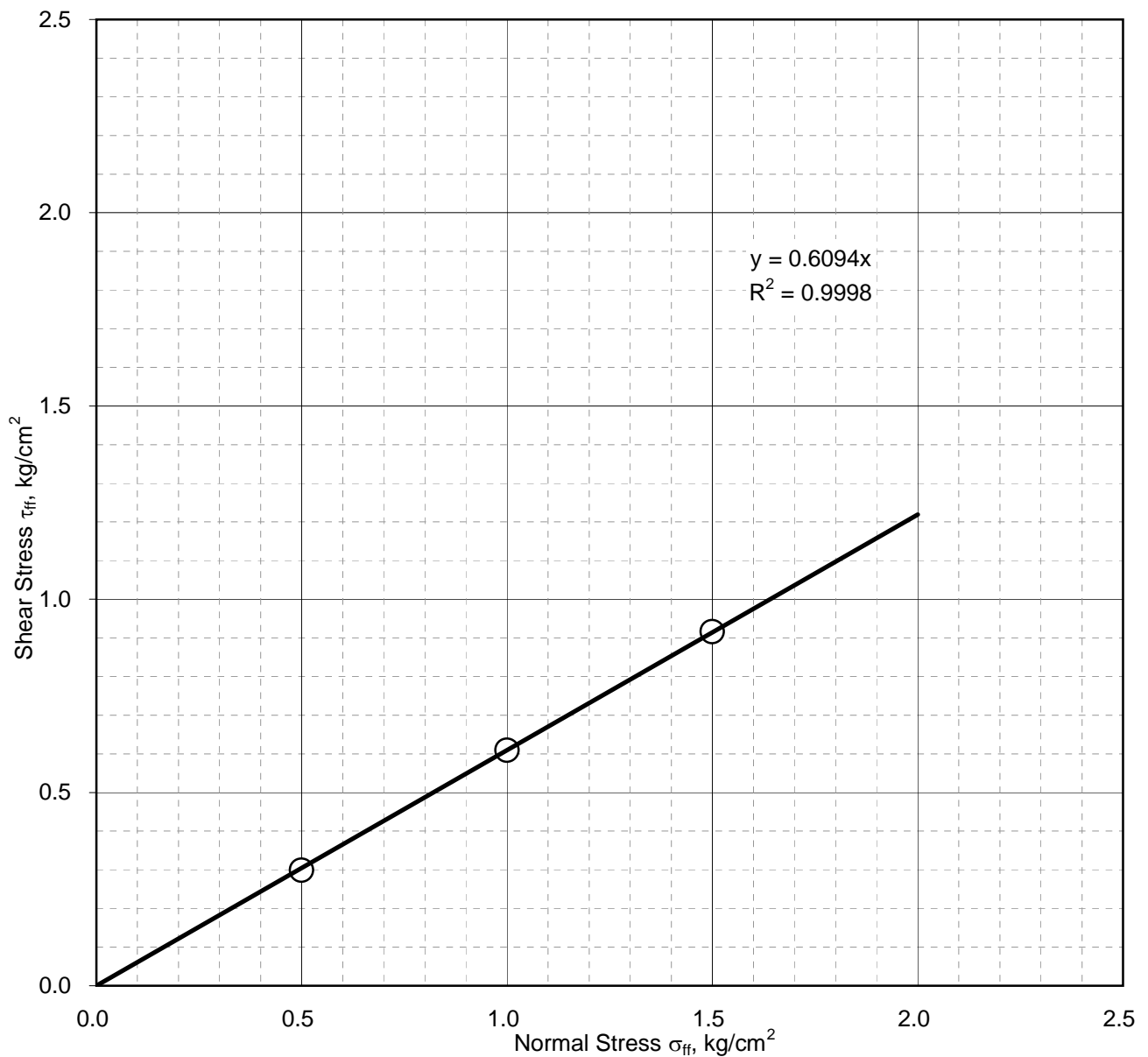




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-52	Sample Depth: 6 m
	Sample No.: UDS-3	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.59
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.4 degrees



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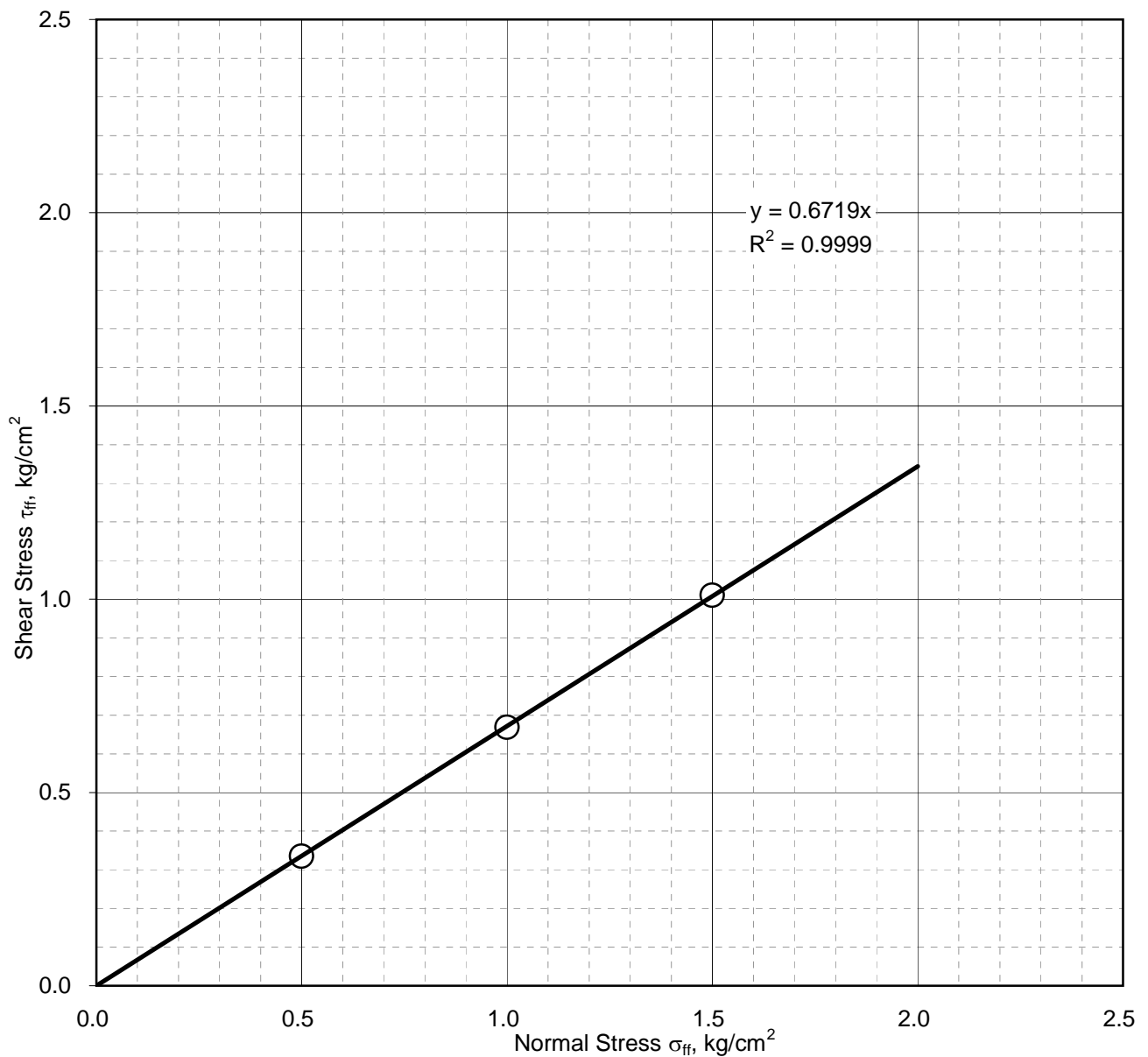




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-53	Sample Depth: 17 m
	Sample No.: UDS-7	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.63
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	33.9 degrees



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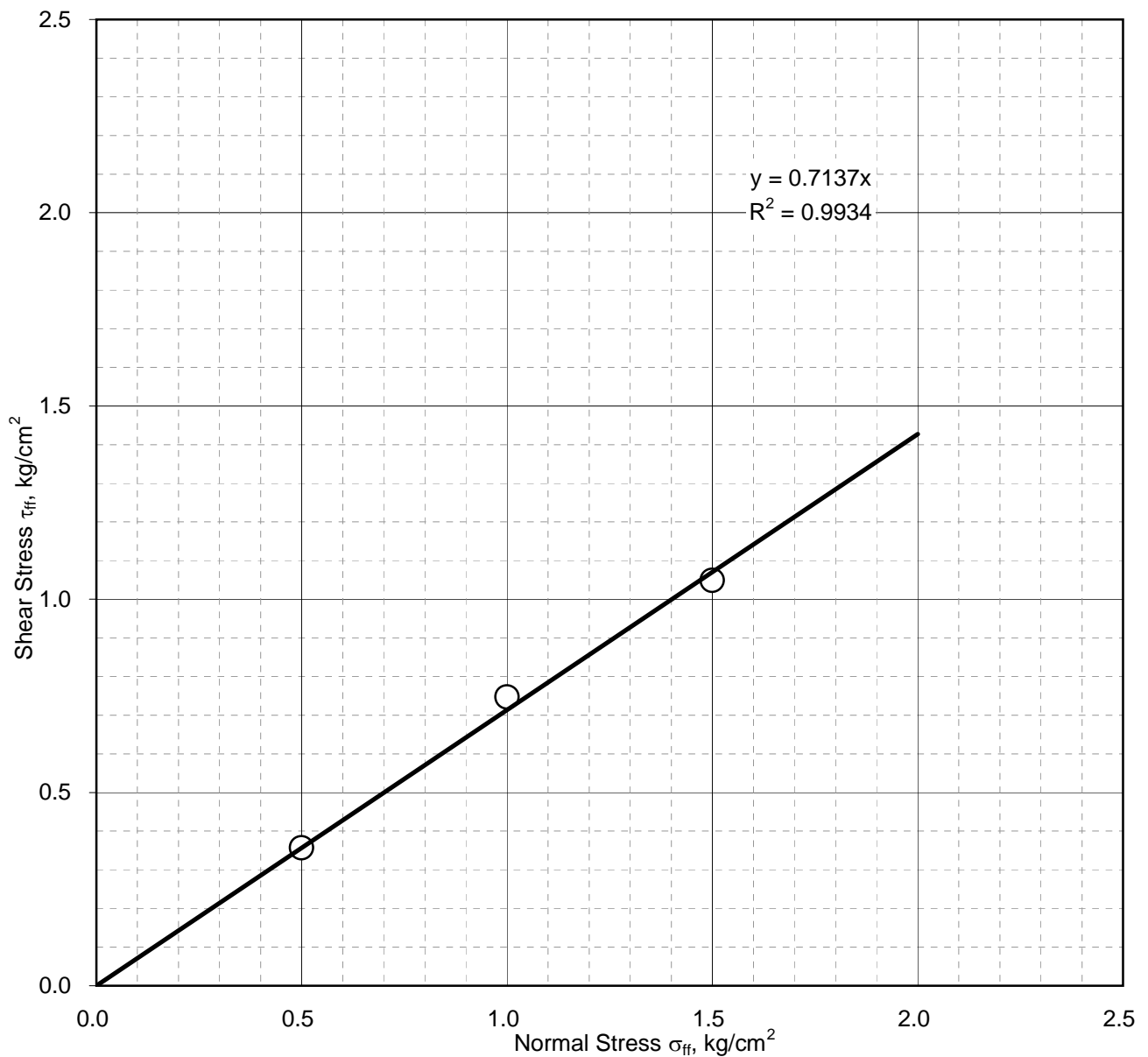




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-54	Sample Depth: 6 m
	Sample No.: UDS-3	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.64
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	35.5 degrees



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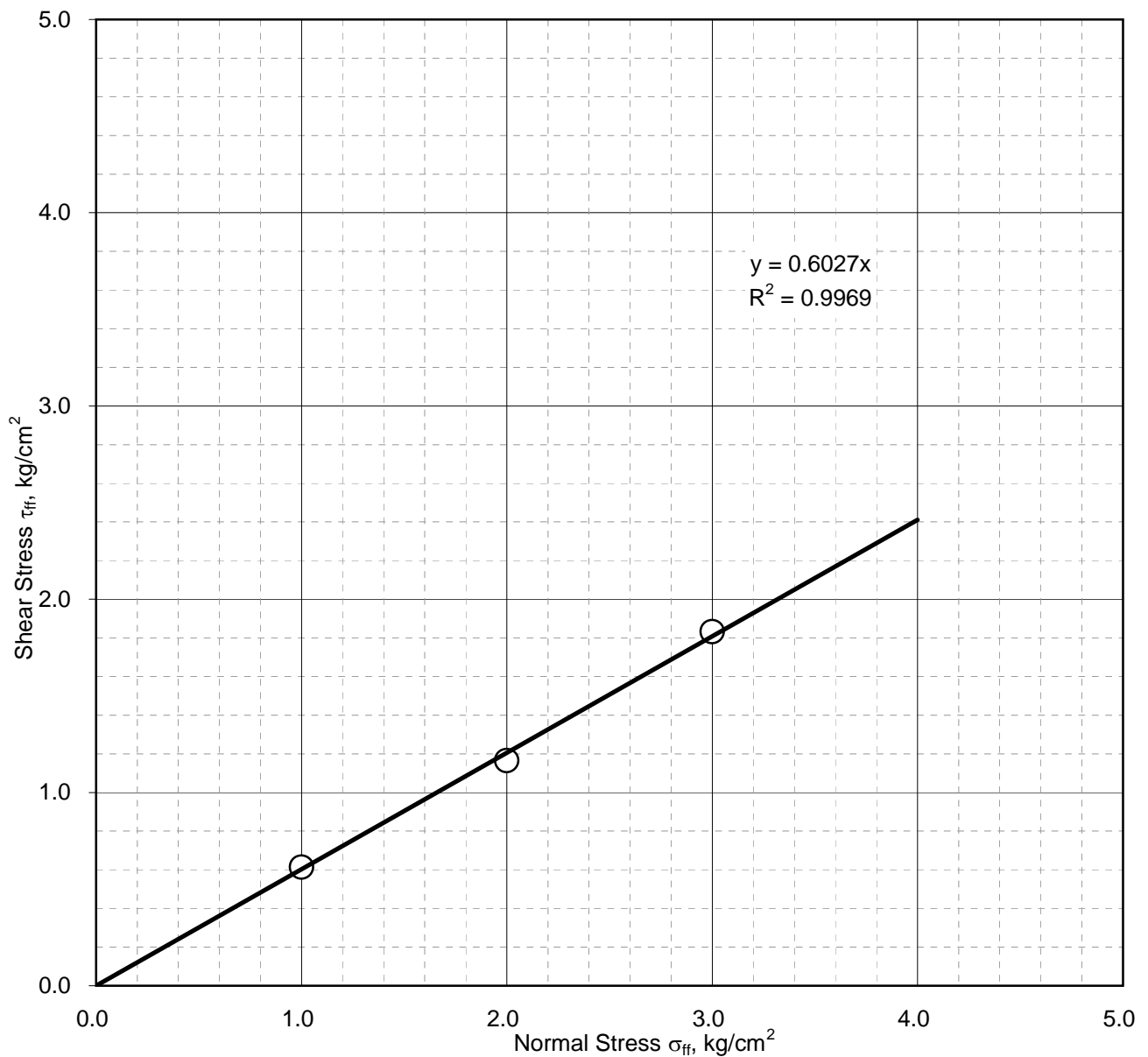




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-55	Sample Depth: 17 m
	Sample No.: UDS-6	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.58
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.1 degrees



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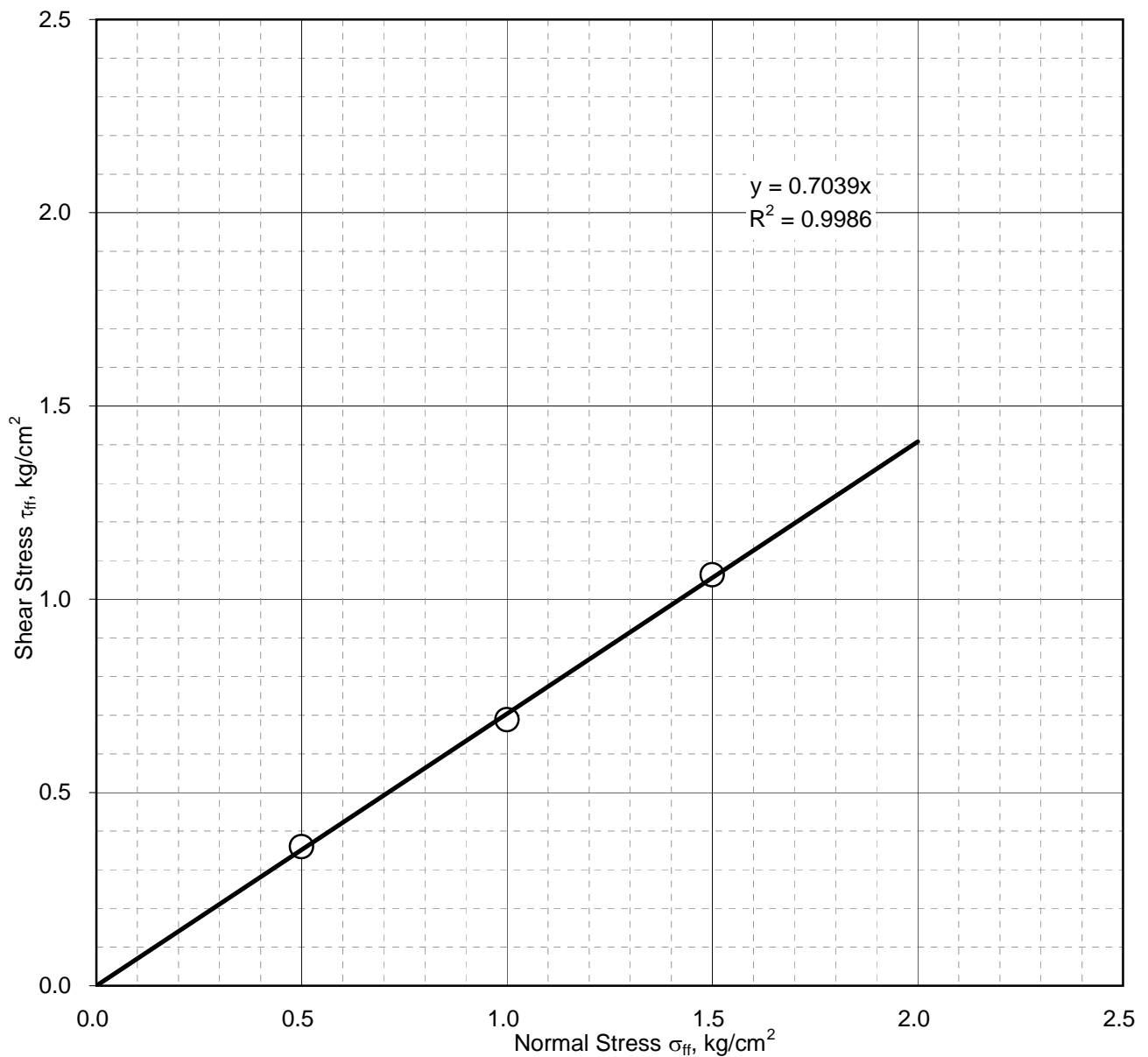




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-56	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.58
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	35.1 degrees



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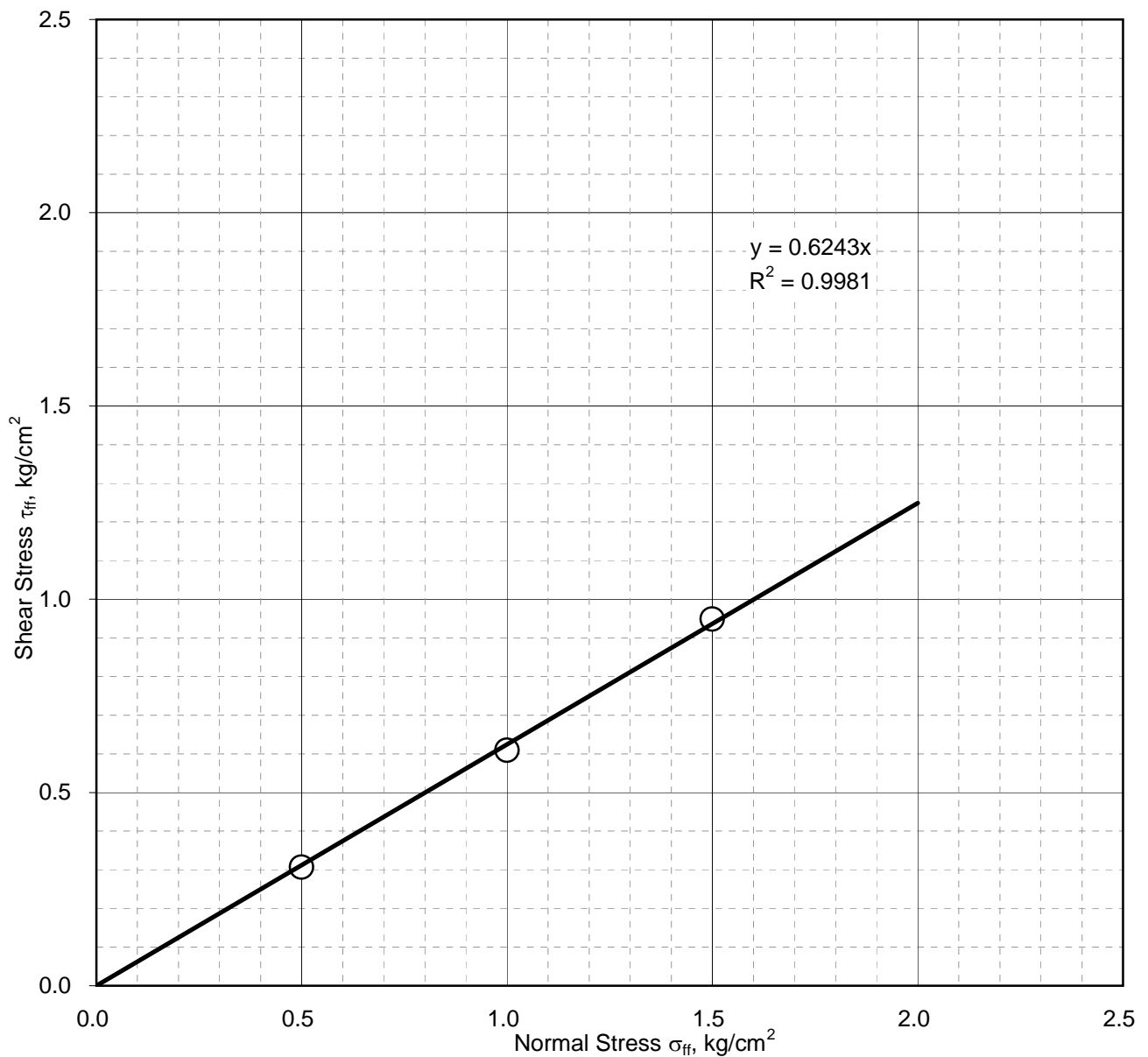




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Test Results	Borehole No.: PBH-57		Sample Depth: 6 m	
	Sample No.: UDS-3		Sample Description: Sandy silt	
	Dry Density of Soil ( $\text{g/cm}^3$ ):		1.56	
	Moisture Content (%):		Saturated	
	Cohesion Intercept, $c$ :		0.00	$\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :		32.0	degrees



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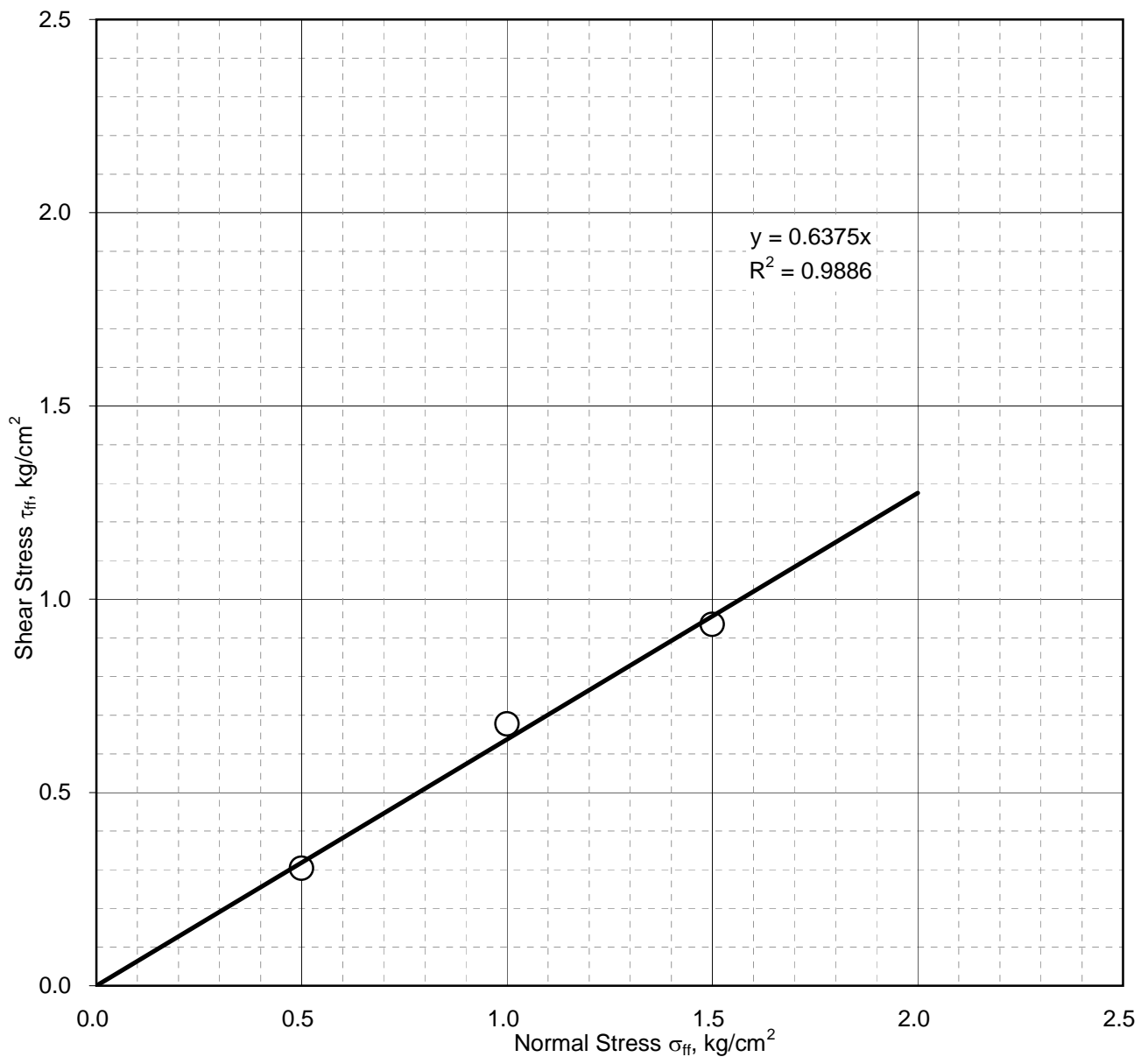




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-58	Sample Depth: 8 m
	Sample No.: UDS-4	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.68
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	32.5 degrees



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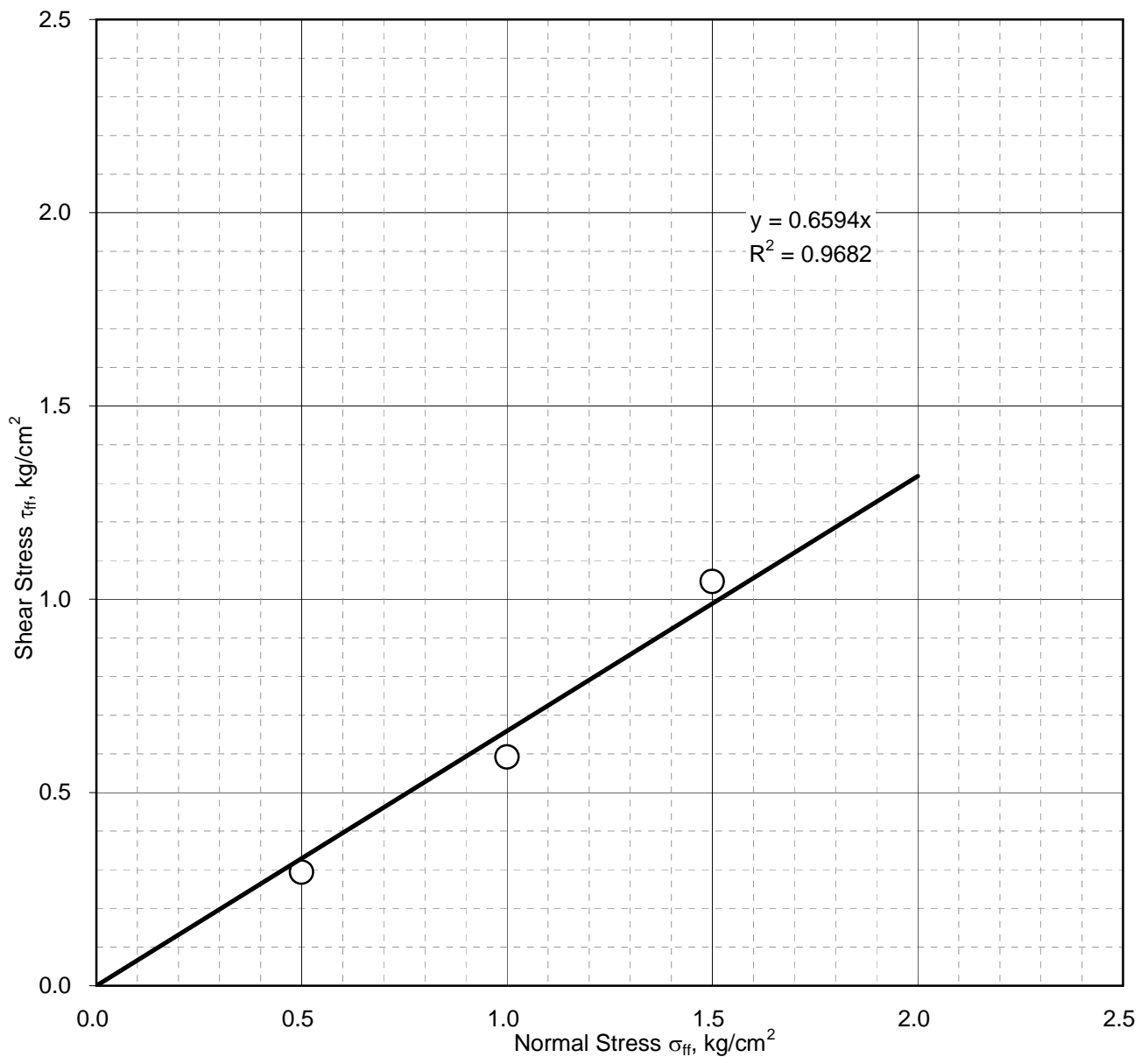




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-59	Sample Depth: 8 m
	Sample No.: UDS-3	Sample Description: Silty fine sand
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.62
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	33.4 degrees



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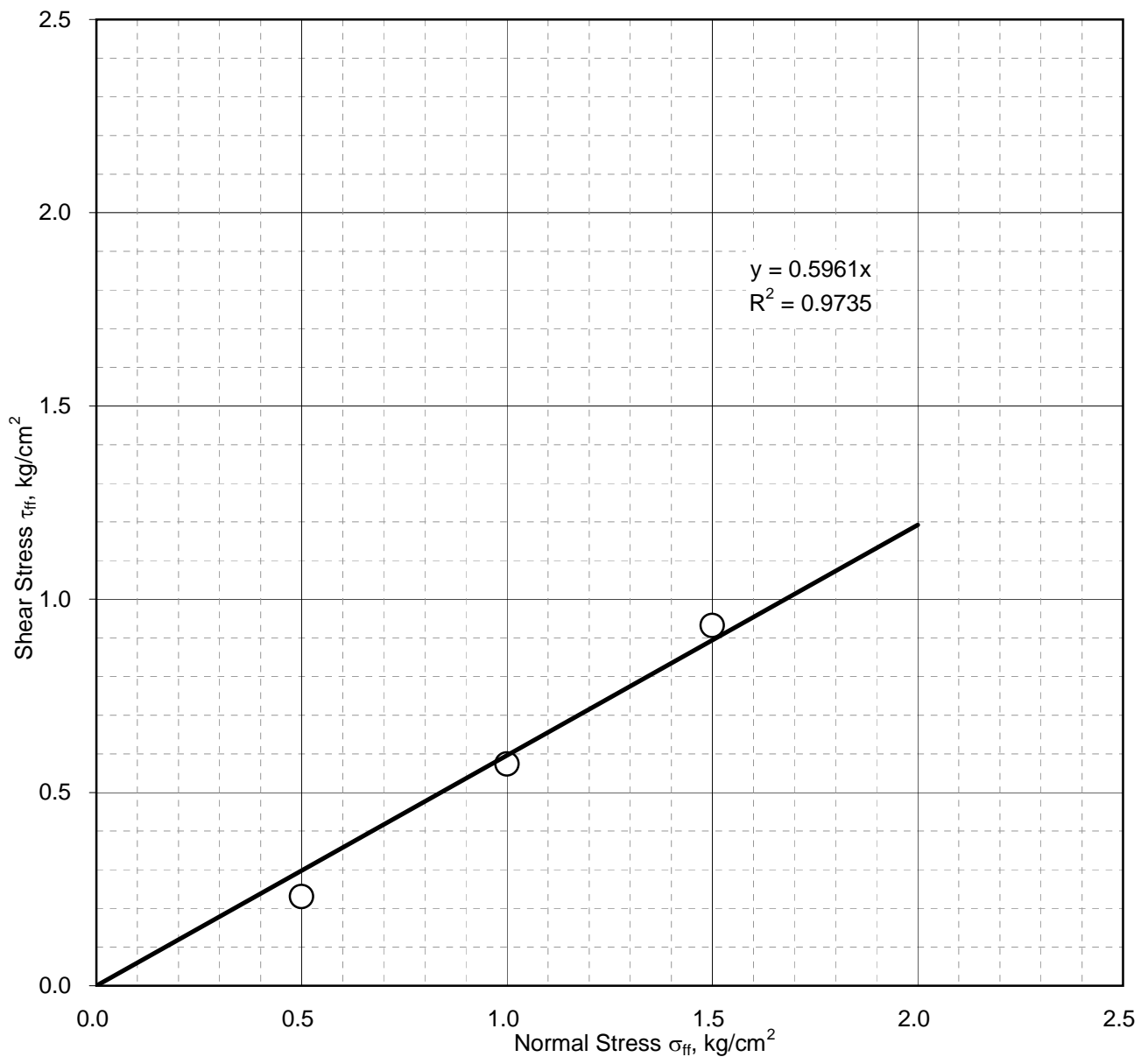




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-61	Sample Depth: 6 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.62
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	30.8 degrees



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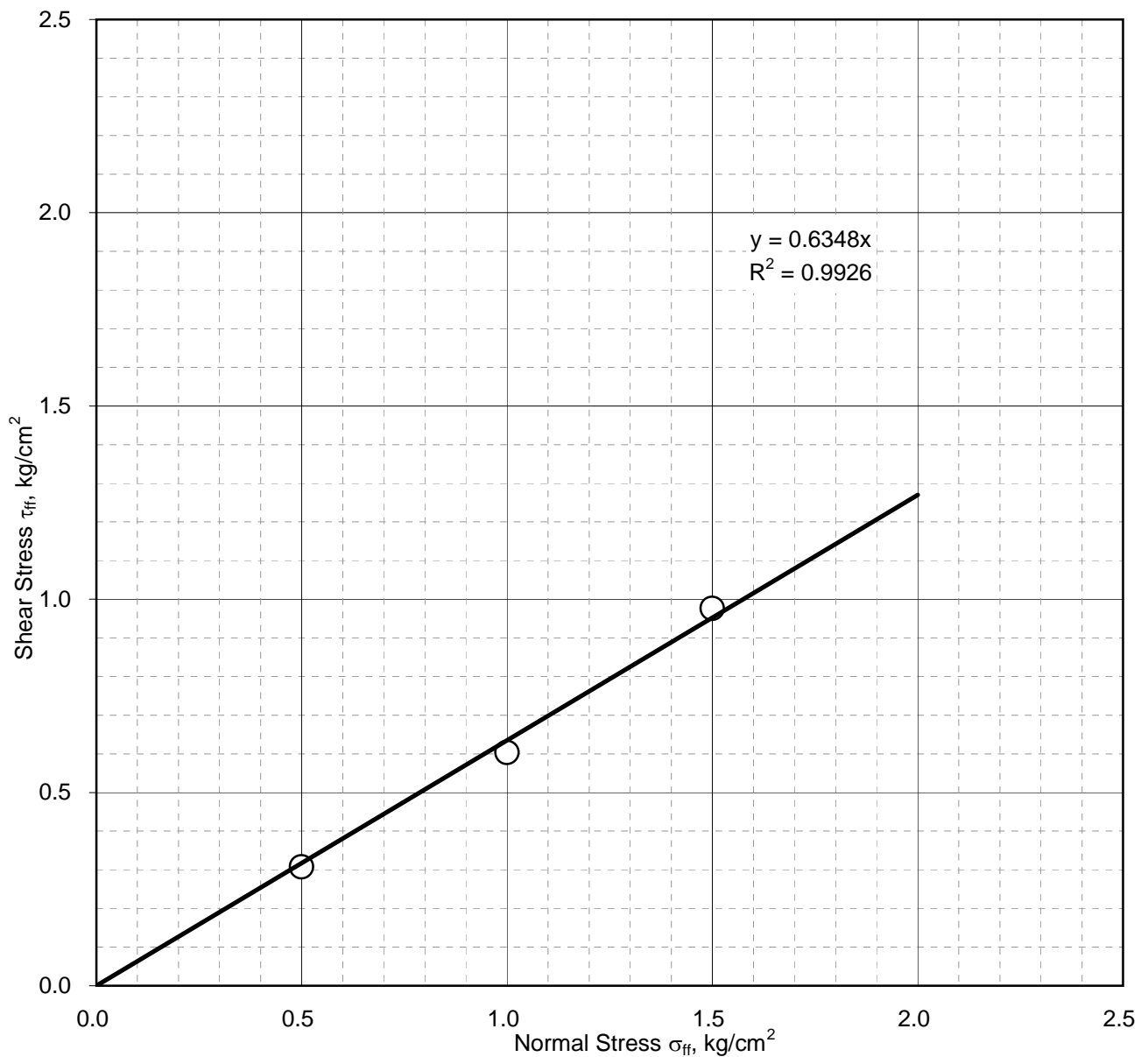




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-62	Sample Depth: 2 m
	Sample No.: UDS-1	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.65
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	32.4 degrees



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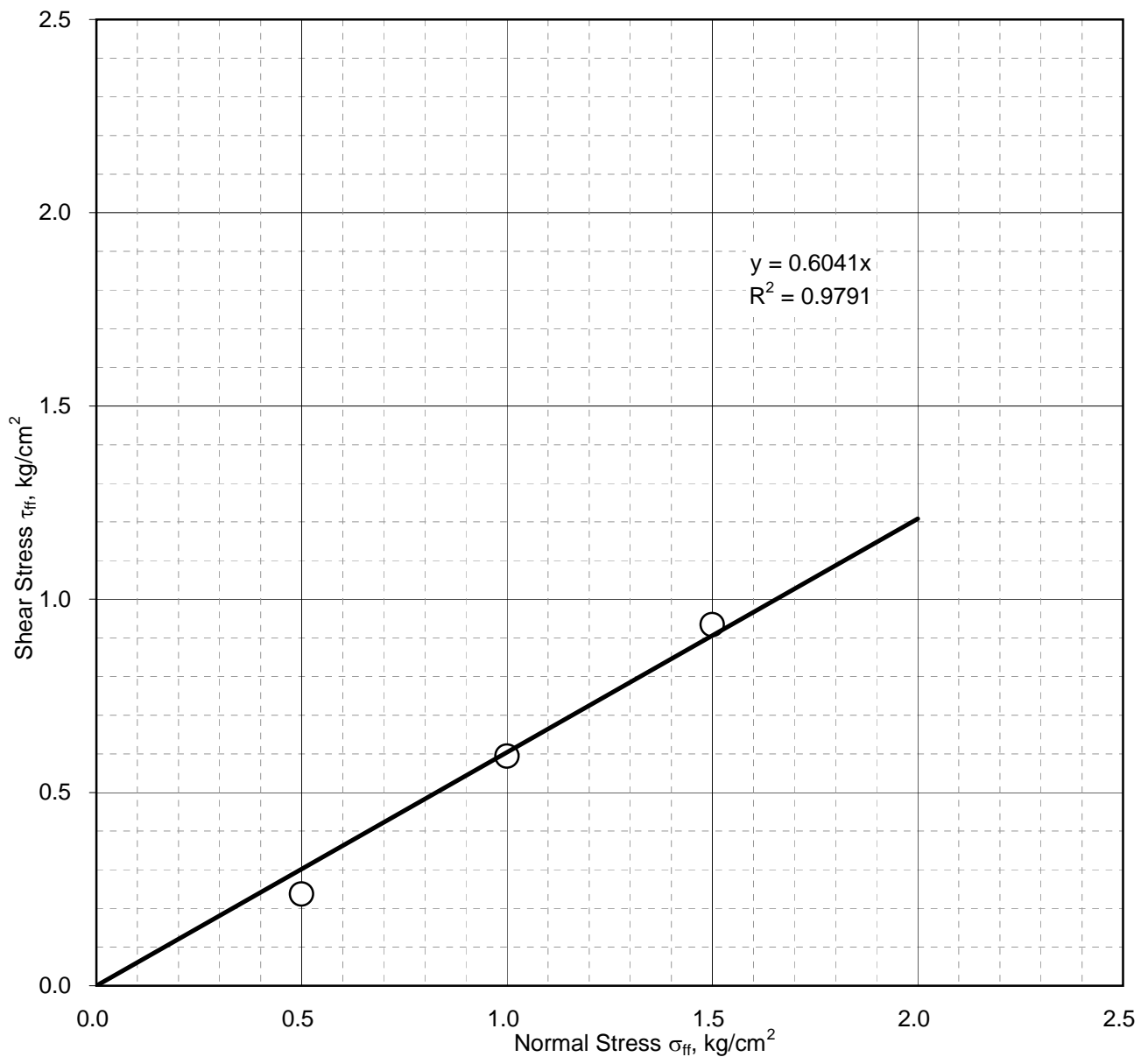




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-63	Sample Depth: 2 m
	Sample No.: UDS-1	Sample Description: Silty fine sand
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.64
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.1 degrees



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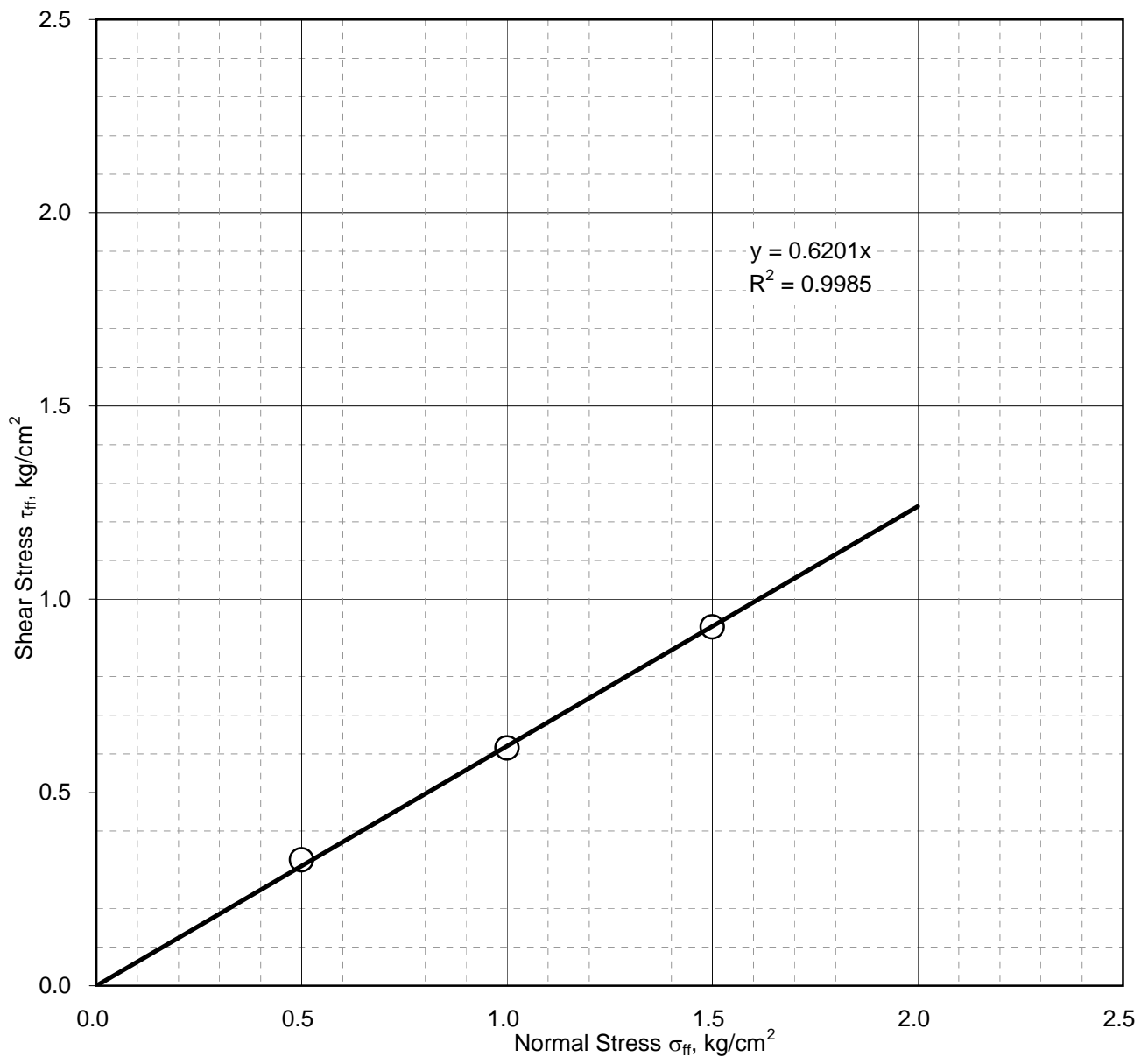




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-64	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.60
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.8 degrees



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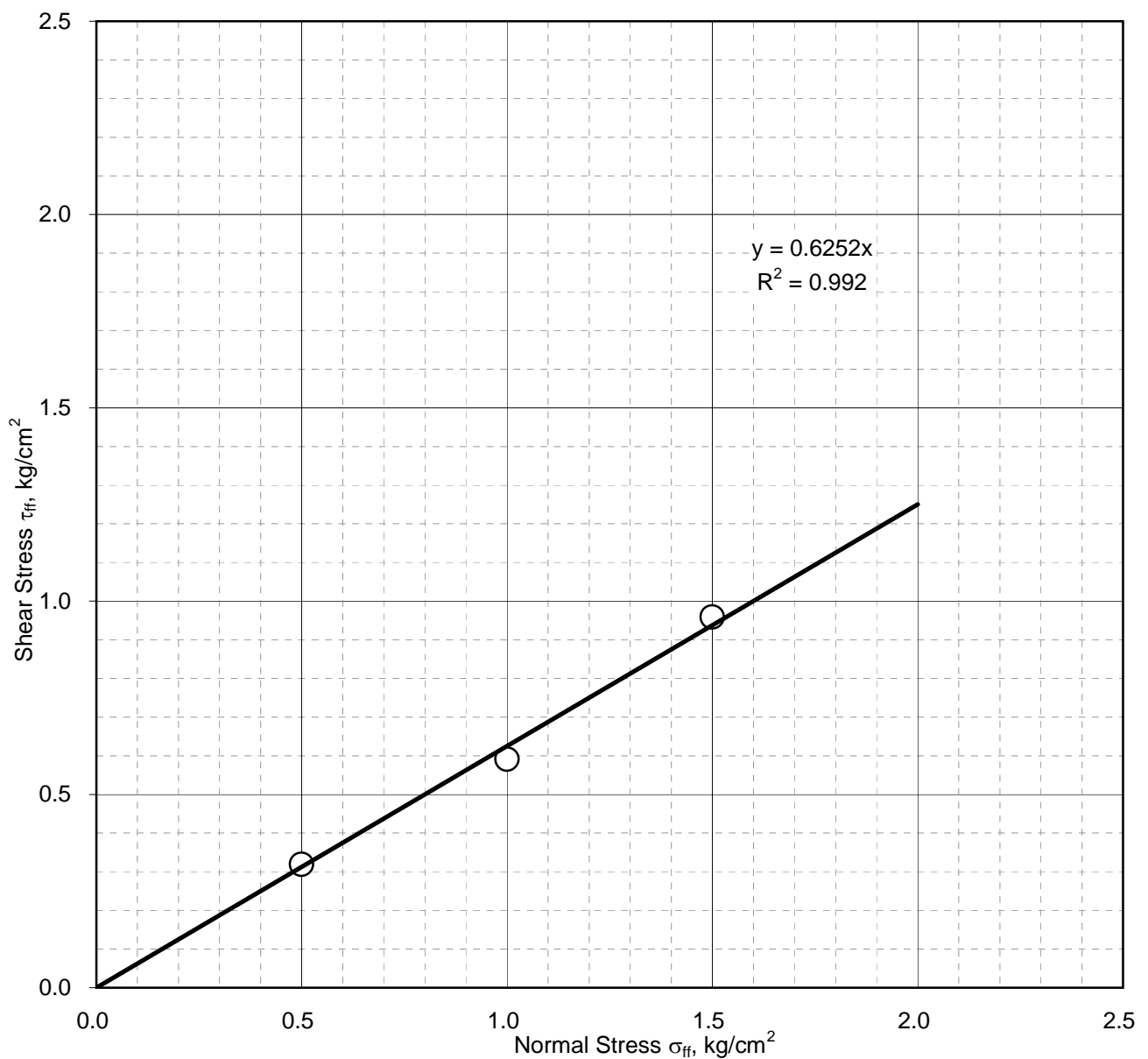




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-65	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.61
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	32.0 degrees



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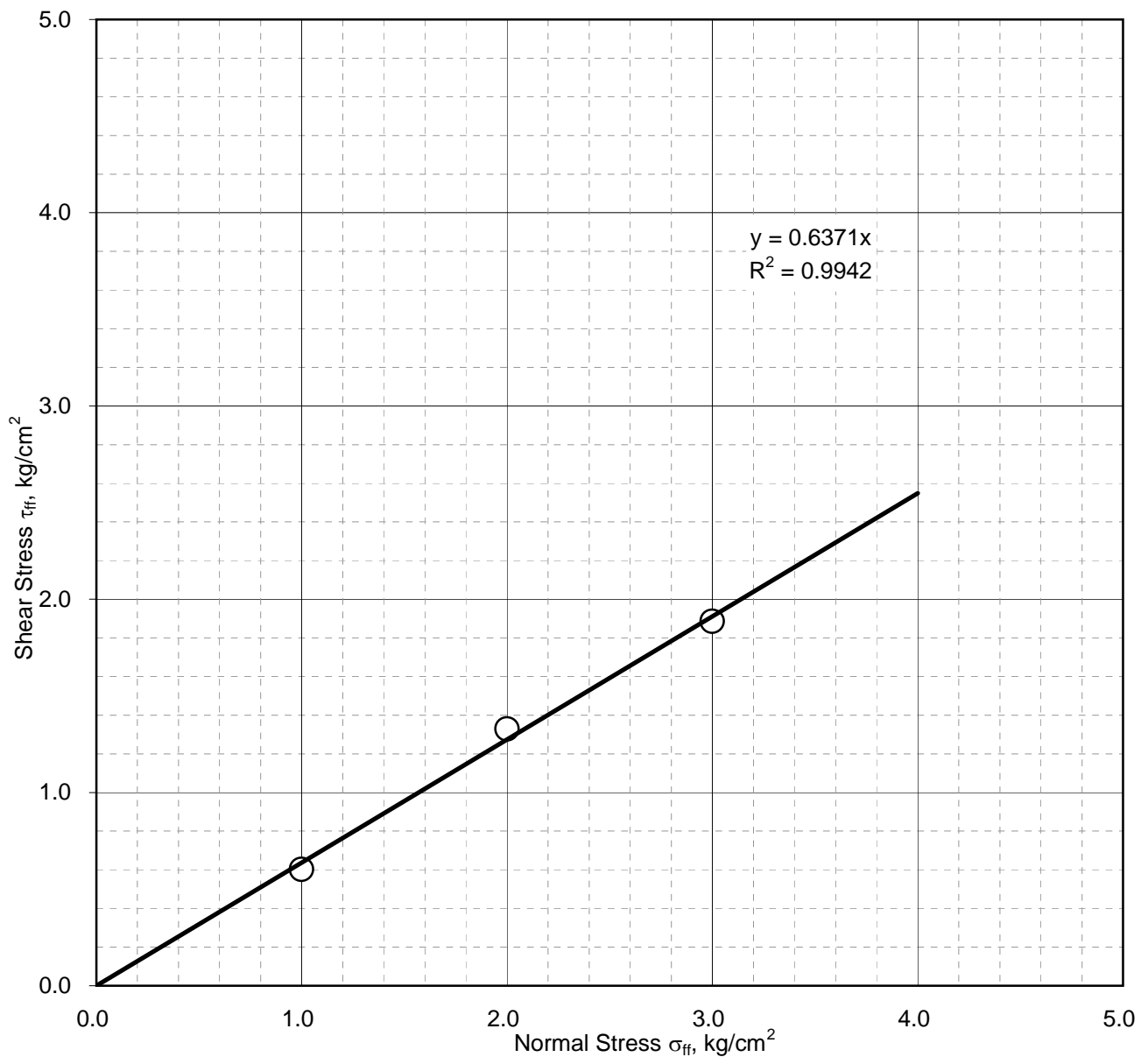




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Sample Details	Borehole No.: PBH-66	Sample Depth: 20 m
	Sample No.: UDS-7	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.59
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	32.5 degrees



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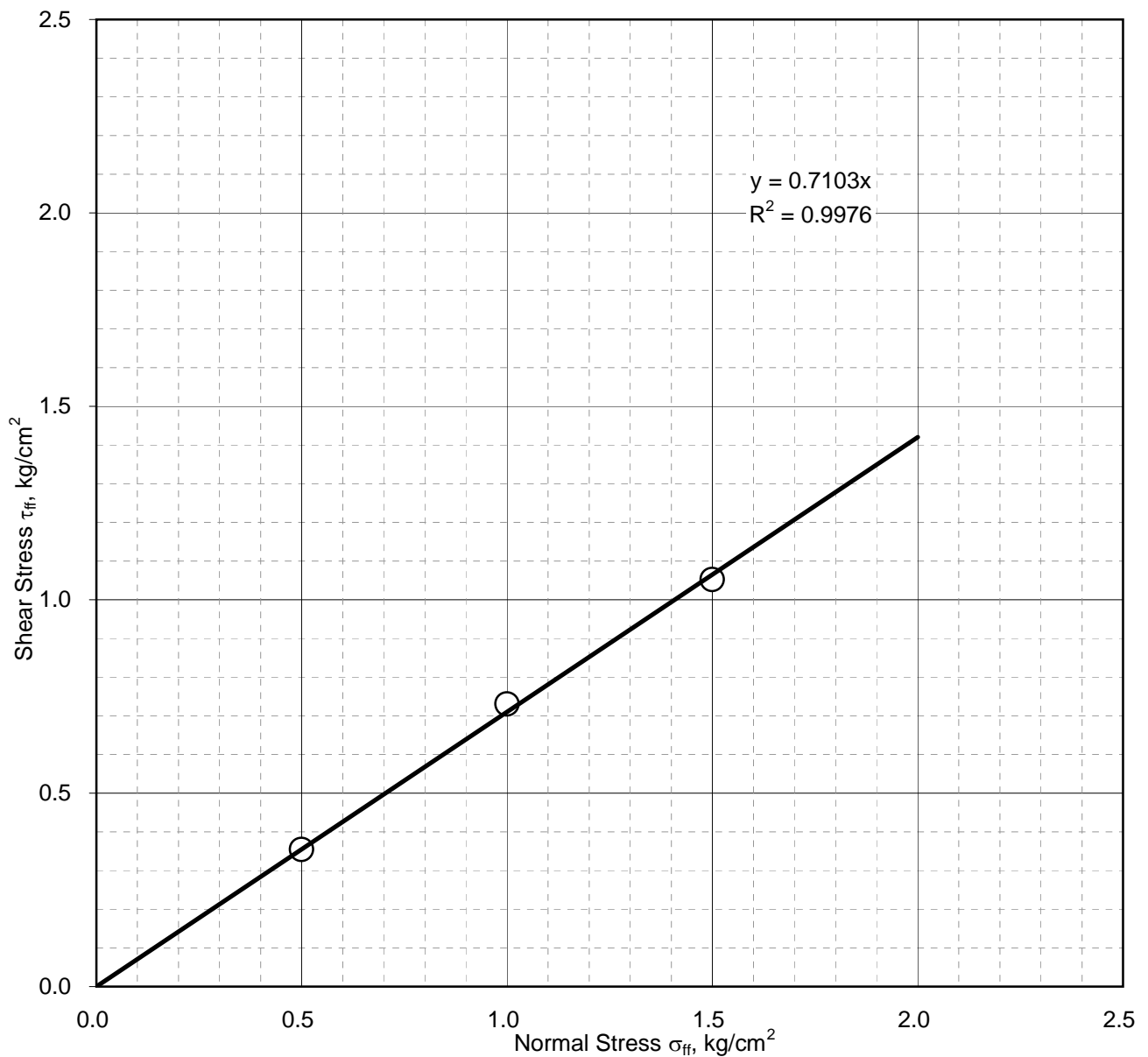




### Drained Direct Shear Test

IS : 2720 (Part-13)-1986, RA-2010

Test Results	Borehole No.: PBH-67		Sample Depth: 4 m	
	Sample No.: UDS-2		Sample Description: Sandy silt	
	Dry Density of Soil ( $\text{g/cm}^3$ ):		1.59	
	Moisture Content (%):		Saturated	
	Cohesion Intercept, $c$ :		0.00	$\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :		35.4	degrees



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### TEST RESULTS

Soil-Water Extract Test Results				
Borehole No.	Depth, (m)	Sulphate Content (SO <sub>3</sub> ), %	Chloride Content (Cl), %	pH Value
PBH-11	4.0	0.10	0.02	7.9
PBH-58	5.0	0.08	below detectable limit	8.3
PBH-59	7.0	0.08	below detectable limit	7.9

Groundwater Test Results			
Borehole No.	Sulphate Content (SO <sub>3</sub> ), mg/l	Chloride Content (Cl), mg/l	pH Value
PBH-2	320	200	7.7
PBH-57	335	240	7.9

### IS : 456-2000, SPECIFICATIONS

Requirements for Concrete Exposed to Sulphate Attack as per IS : 456-2000, Clauses 8.2.2.4 and 9.1.2, Table 4, Page-19

Class	Concentration of Sulphates, expressed as SO <sub>3</sub> In- Soil-Water Extract (Total) Percent	In Groundwater (mg/l)
1	Traces (<0.2)	Less than 300
2	0.2 to 0.5	300-1200
3	0.5 to 1.0	1200-2500
4	1.0 to 2.0	2500-5000
5	> 2.0	> 5000

#### Classification of Chloride Conditions in Groundwater\*

Classification	Chloride Limits	
	Temperate Climate	Tropical Climate
Negligible	0-2000 ppm	Not Applicable
Moderate	2000-10,000 ppm	0-2000 ppm
High	More than 10,000 ppm	2000-20,000 ppm
Very High	Generally not applicable	Only if considerably in excess of 20,000 ppm

\*Source : Institution of Civil Engineers, London (1979)

### **Chemical Test Results**

**APPENDIX-A**  
**SITE PHOTOGRAPHS**





Borehole No. PBH-1



Borehole No. PBH-2



Borehole No. PBH-5



Borehole No. PBH-6

### Site Photographs



Borehole No. PBH-7



Borehole No. PBH-44

### Site Photographs