



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
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

Submitted to:

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

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

Project No. 217048

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Revision: 0



21st July, 2017

Project No. 217048-2B

M/s. Delhi-Mumbai Industrial Corridor Development Corporation Ltd.
Room 341-B 3rd Floor
Hotel Ashok
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 31st 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-2B) presents the field and laboratory results of thirty five (35) 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	-
Volume 2A	Field and Laboratory Test Data of Boreholes	Exhibition Hall 1, Exhibition Hall 5, Convention 7, Retail 10	34
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-2B) presents the field and laboratory results of thirty five (35) 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	Office 15	PBH-73	699855	3160057	213.000	30.45
2		PBH-74	699932	3160001	212.560	30.45
3		PBH-75	699877	3160008	211.538	30.45
4		PBH-76	699823	3160014	212.076	30.45
5		PBH-77	699922	3159941	212.860	30.45
6	Office 17	PBH-115	699950	3159935	213.500	30.45
7		PBH-116	699986	3159908	213.554	30.45
8	Retail 16	PBH-117	699997	3159977	212.500	30.45
9	Office 13	PBH-118	700033	3160046	213.442	30.45
10		PBH-119	700059	3160027	213.450	30.45

S.No.	Structure	Borehole No.	UTM Coordinates (Zone 43 R)		Ground Level (RL), m	Borehole Termination Depth (m)
			Easting	Northing		
11	Arena 8	BH-120	700332	3160354	213.000	30.45
12		BH-121	700276	3160361	213.000	30.45
13		BH-122	700360	3160298	214.870	30.45
14		BH-123	700228	3160339	213.500	30.45
15		BH-124	700287	3160294	213.670	30.45
16		BH-125	700347	3160250	213.790	30.45
17		BH-126	700215	3160281	213.061	30.45
18		BH-127	700302	3160228	213.222	30.45
19		BH-128	700243	3160235	213.151	30.45
20	Five Star Hotel 11	PBH-133	700204	3160116	213.286	30.45
21		PBH-134	700263	3160073	213.385	30.45
22		PBH-135	700203	3160051	213.500	30.45
23		PBH-136	700142	3160033	213.595	30.45
24		PBH-137	700204	3159988	213.522	30.45
25	Office 14	PBH-138	700160	3159965	213.500	30.45
26		PBH-139	700109	3159986	213.282	30.45
27		PBH-140	700140	3159937	213.615	30.45
28	-	PBH-141	700154	3159882	213.723	30.45
29	Office 18	PBH-142	700086	3159864	213.679	30.45
30		PBH-143	700029	3159878	213.575	30.45
31		PBH-144	700065	3159836	213.594	30.45
32	Four Star Hotel 21	PBH-145	699979	3159813	213.671	30.45
33		PBH-146	700054	3159790	213.588	30.45
34		PBH-147	700008	3159790	213.500	30.45
35		PBH-149	700018	3159742	213.681	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⁽¹⁾ 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:

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



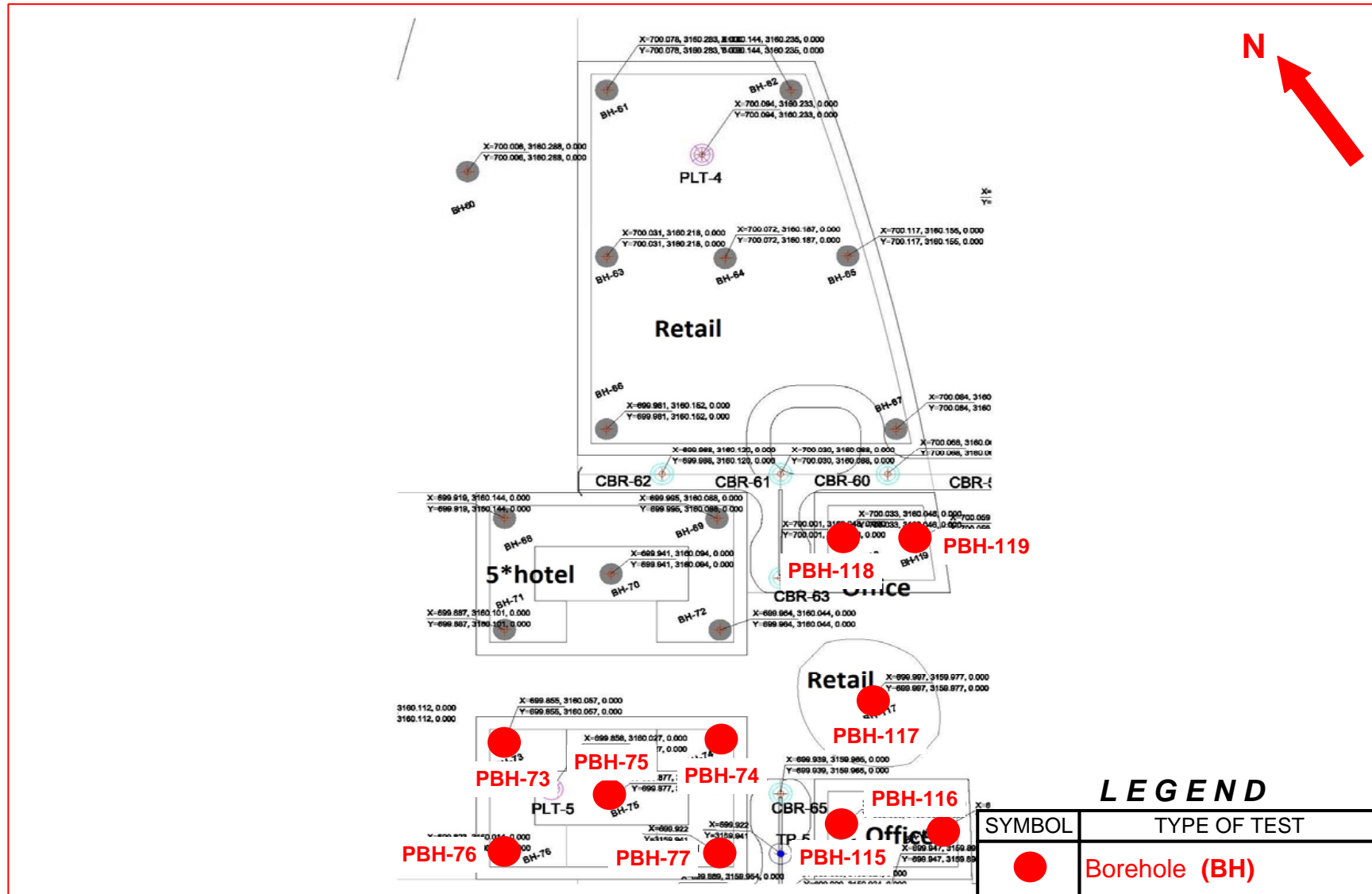
Period	Formation	Description
Recent	Newer Alluvium (Younger alluvium)	Unconsolidated, inter-bedded lenses of sand, silt gravel and clay confined to flood plains of Yamuna river.
Quaternary	Older Alluvium	Unconsolidated inter-bedded, inter-fingering deposit sand, clay and kankar, moderately sorted, thickness 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.

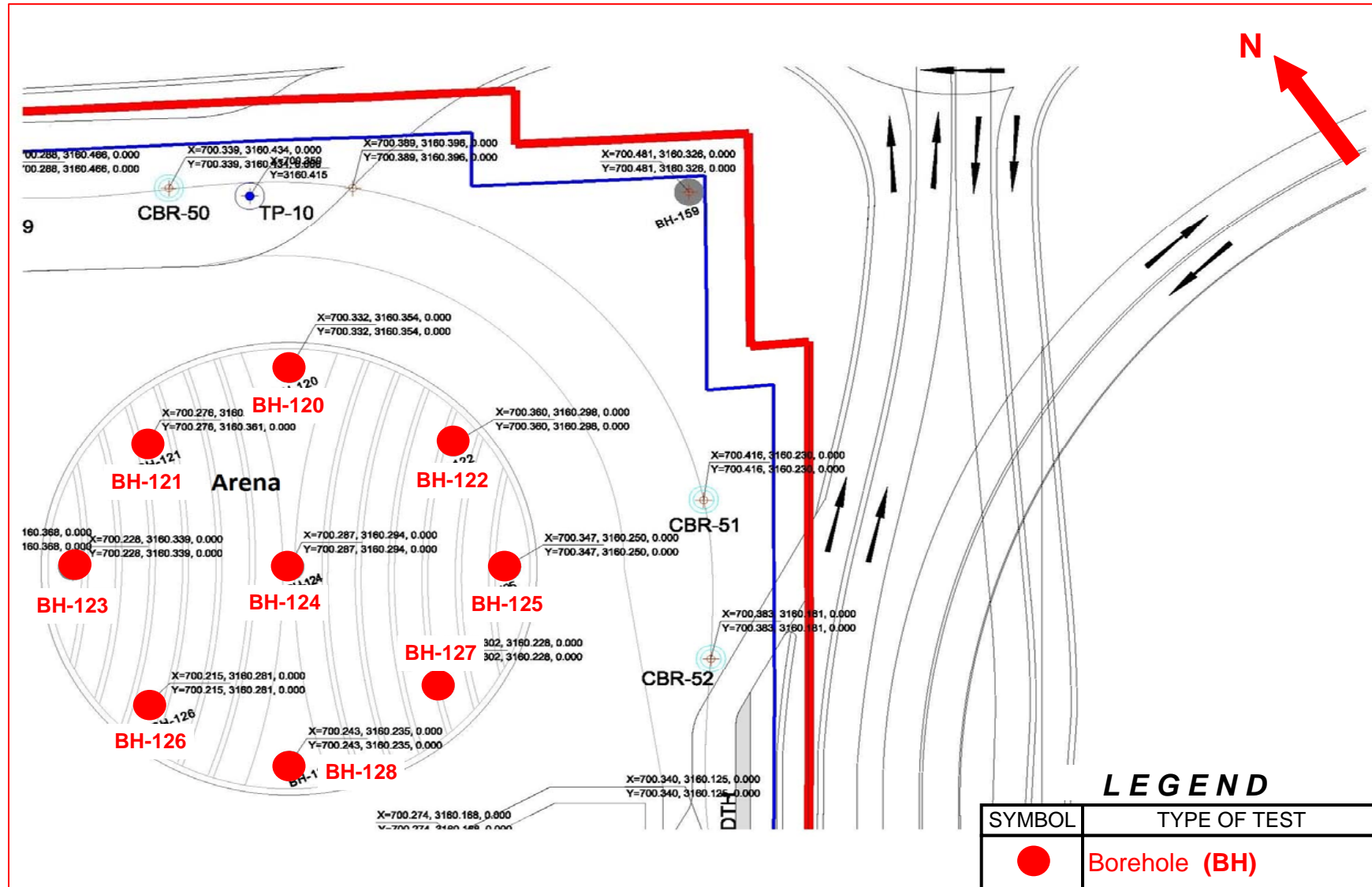
The newer alluvium (locally called “Khadar”) is light colored and poor in concretions. It contains lenticular beds of sand and gravel as well as peat beds. It is merged by insensible gradations into the Recent or deltaic alluvia and its age is Upper Pleistocene to Recent.

## 5.0 VARIABILITY IN SUBSURFACE CONDITIONS

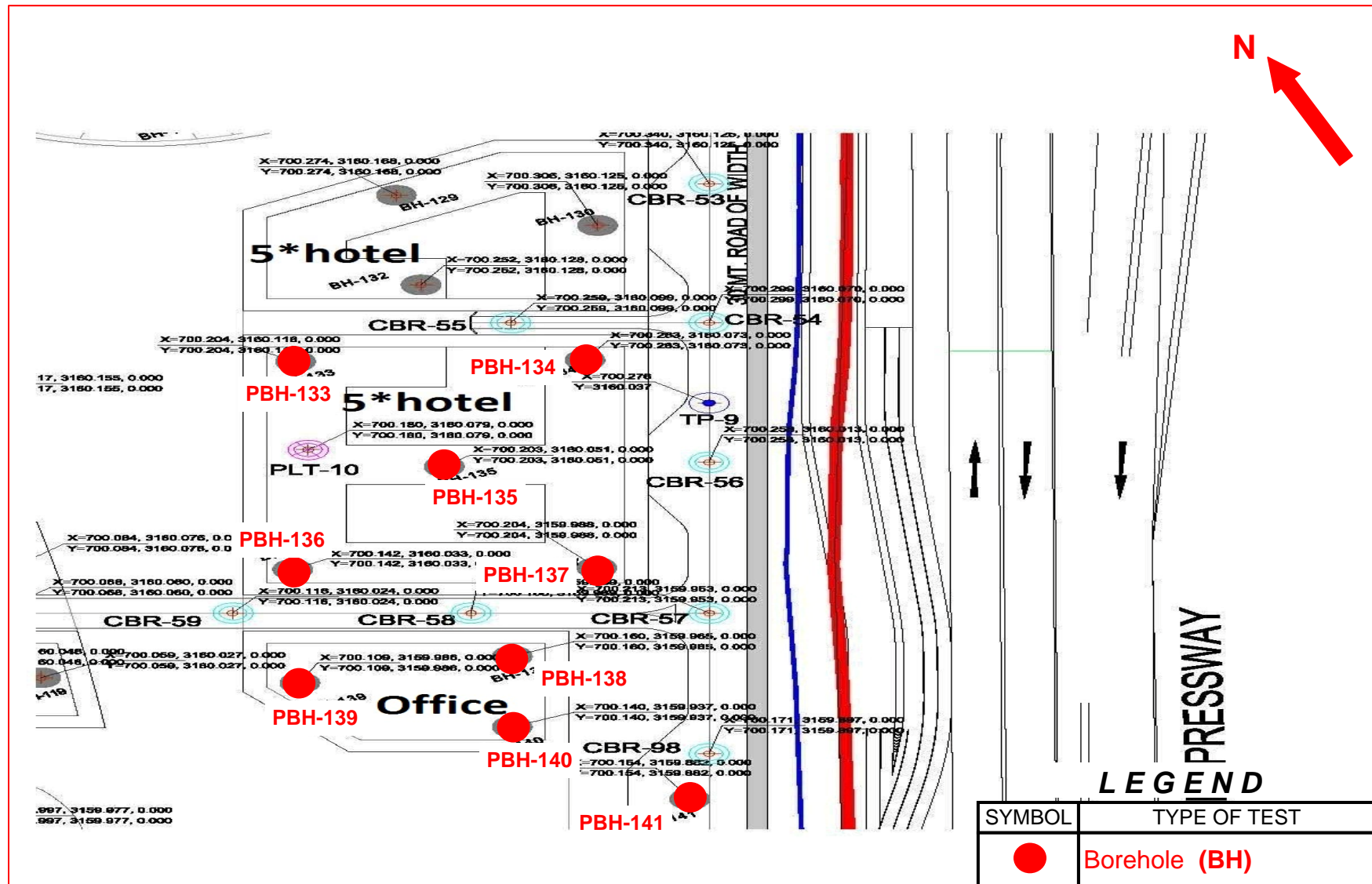
Subsurface conditions encountered during construction may vary somewhat from the conditions encountered during the site investigation. In case significant variations are encountered during construction, we request to be notified so that our engineers may review the recommendations in this report in light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



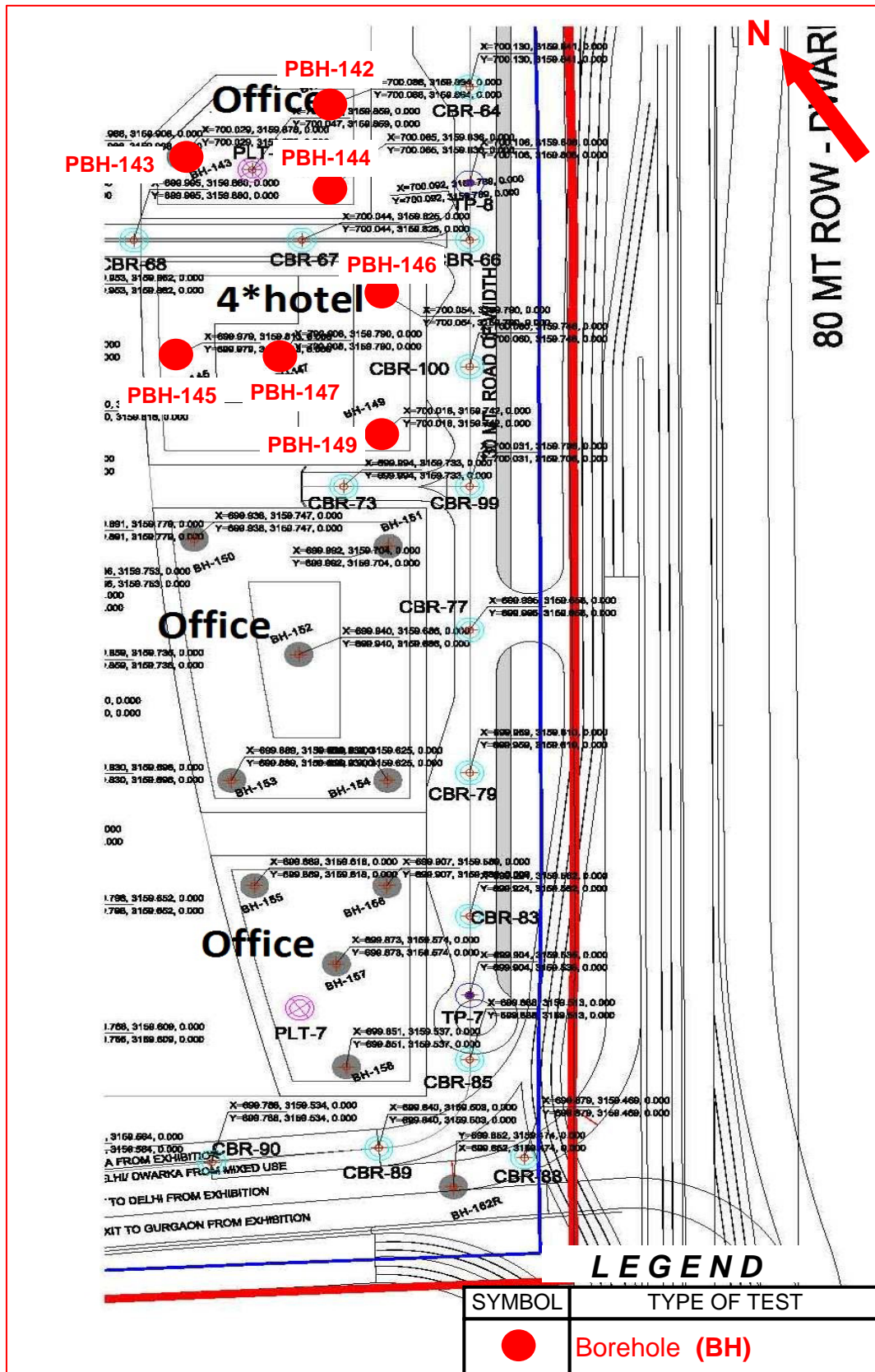
Plan of Field Investigations



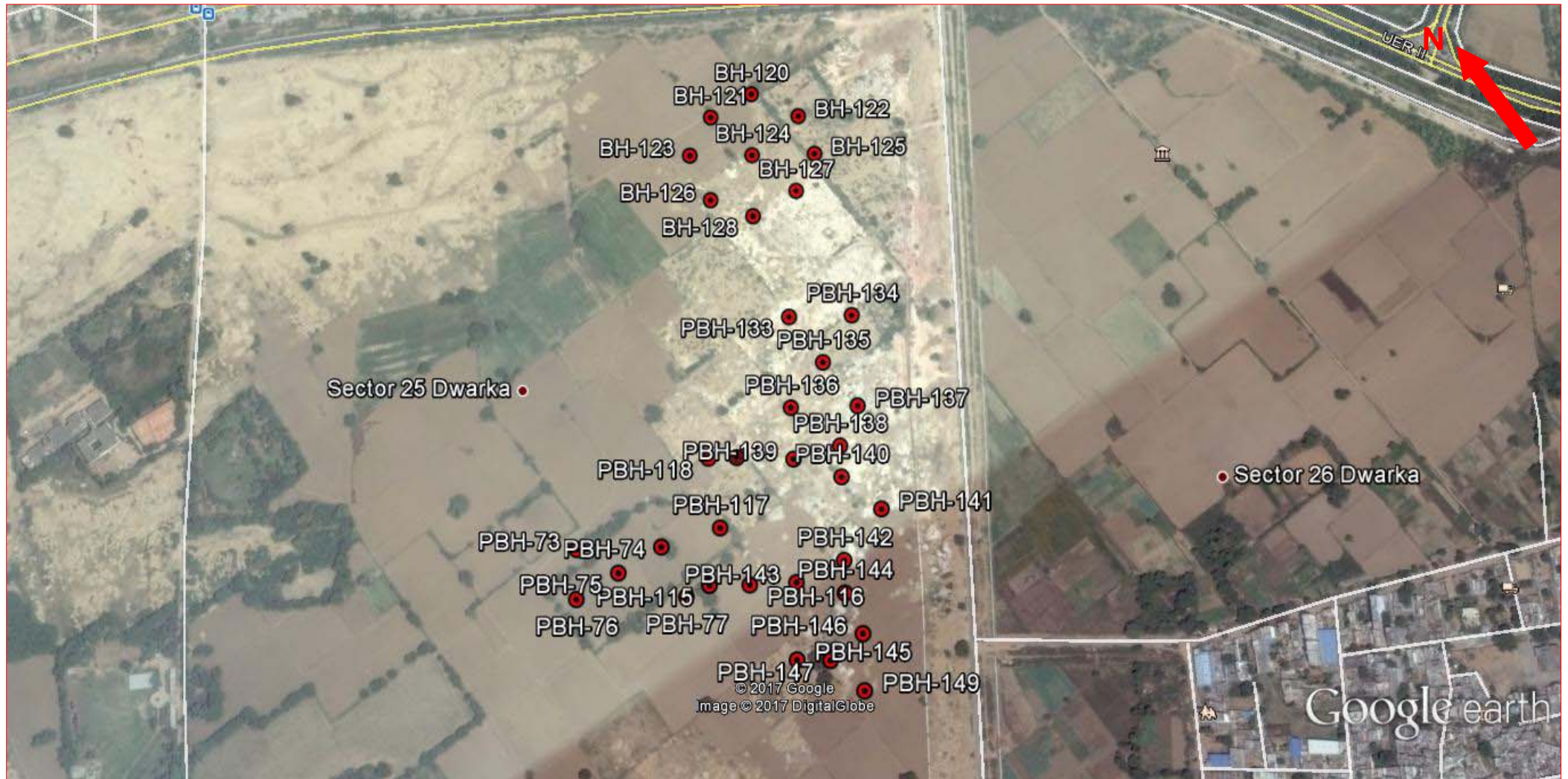
Plan of Field Investigations







Plan of Field Investigations



- 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

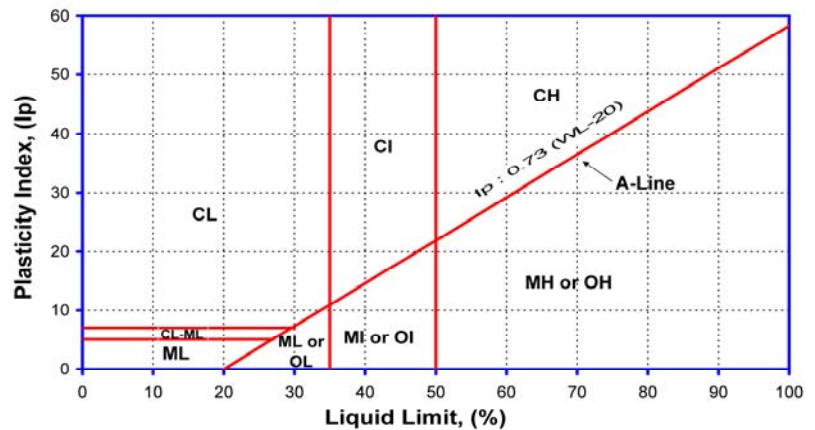




### Plasticity of Clay

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 ²	
Specific Gravity		± 0.01	Consolidation	Pressure	± 0.03 kg/cm ²	
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 ²	CD Direct Shear Test	φ	± 0.29 degrees	
UU Triaxial Test	c	± 0.01 kg/cm ²	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 ⁻⁵ cm/s	
	OMC	± 0.29%	Rock		Crushing Strength	± 3.1 kg/cm ²
Laboratory CBR		± 0.58%			Point Load Strength Index	± 8.89 kg/cm ²

* 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



Location : Office - 15  
UTM Coordinates : 699855 E, 3160057 N

### Soil Profile (PBH-73)

Termination Depth : 30.45 m (RL 182.55 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.50 m Casing Depth : -  
Surface Elevation : RL 213.000 m Boring Start : 07-May-17  
Ground Water Level : RL 193.5 m Boring Finish : 08-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Loose to medium dense brown silty fine sand (SM)																		
1.00	1.45	SPT1	8	12		- loose, 0.0 to 3.0 m		0	47	44	9													0
2.00	2.30	UDS1														1.79	1.62	10.8						0
3.00	3.45	SPT2	11	13		- medium dense, 3.0 to 7.0 m																		0
4.00	4.30	UDS2														1.80	1.60	12.8		DS	0.5, 1, 1.5	0.0	30.3	0
5.00	5.45	SPT3	16	17																				
6.00	6.30	DS2					7.00																	
7.00	7.45	SPT4	25	23		Very stiff to hard brown sandy silt, low plastic (CL)		0	17	68	15													
8.00	8.30	UDS3				- very stiff, 7.0 to 12.5 m		0	41	47	12	25.3	16.6	8.6		1.84	1.60	14.8						
9.50	9.95	SPT5	28	23																				
11.00	11.30	UDS4														1.85	1.66	11.5						
12.50	12.95	SPT6	32	24		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.




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



Location : Office - 15  
UTM Coordinates : 699855 E, 3160057 N

### Soil Profile (PBH-73)

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Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5	41	27		Hard brown sandy silt, low plastic (CL)		2	34	50	14			7.9		1.86	1.66	11.7						
15.50	15.95	SPT7				- with traces of gravel, 14.0 to 26.0 m																		
17.00	17.30	UDS6																						
18.50	18.95	SPT8																						
20.00	20.30	UDS7																						
22.00	22.45	SPT9	58	23		- with gravels, 26.0 to 30.45 m		9	23	56	12					1.88	1.67	12.5						
24.00	24.30	DS3																						
26.00	26.45	SPT10																						
28.00	28.30	UDS8																						
30.00	30.45	SPT11																						
			54	21			30.45					25.3	16.2	9.1										

⁽¹⁾ SPT is outside NABL scope.

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



### Soil Profile (PBH-74)

Location : Office - 15

UTM Coordinates : 699932 E, 3160001 N

Termination Depth : 30.45 m (RL 182.11 m)

Ground Water Depth : 19.50 m

Surface Elevation : RL 212.560 m

Ground Water Level : RL 193.1 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 08-May-17

Boring Finish : 10-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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	11	17		- stiff, 0.0 to 3.0 m		0	32	52	16													3
2.00	2.30	UDS1														1.80	1.65	9.6						7
3.00	3.45	SPT2	16	19		- very stiff, 3.0 to 12.5 m																		11
4.00	4.30	UDS2														1.81	1.62	12.2						8
5.00	5.45	SPT3	20	21								25.6	17.0	8.7										
6.00	6.30	UDS3														1.82	1.55	17.6		DS	0.5, 1, 1.5	0.0	31.9	
7.00	7.45	SPT4	22	20				0	28	42	30													
8.00	8.30	UDS4														1.83	1.56	17.4						
9.50	9.95	SPT5	25	21								31.5	16.6	14.9										
11.00	11.30	UDS5														1.84	1.61	14.6						
12.50	12.95	SPT6	33	24		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.

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Location : Office - 15  
UTM Coordinates : 699932 E, 3160001 N

### Soil Profile (PBH-74)

Termination Depth : 30.45 m (RL 182.11 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.50 m Casing Depth : -  
Surface Elevation : RL 212.560 m Boring Start : 08-May-17  
Ground Water Level : RL 193.1 m Boring Finish : 10-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	DS2				Hard brown sandy silt, low plastic (CL)																		
15.50	15.95	SPT7	37	25				0	32	48	20													
17.00	17.30	UDS6										1.87	1.59	17.8										
18.00	18.45	SPT8	40	24							30.4	16.0	14.4											
20.00	20.30	UDS7										1.88	1.63	15.6										
22.00	22.45	SPT9	43	20																				
24.00	24.30	UDS8				- with traces of gravel, 26.0 to 30.45 m										1.89	1.62	17.0						
26.00	26.45	SPT10	49	21			1	38	43	18														
28.00	28.30	UDS9										1.91	1.70	12.6										
30.00	30.45	SPT11	53	21			30.45					33.7	17.2	16.6										

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-75)

Location : Office - 15

Termination Depth : 30.45 m (RL 181.088 m)

Boring Method : Rotary Drilling

UTM Coordinates : 699877 E, 3160008 N

Ground Water Depth : 19.40 m

Casing Depth : -

Surface Elevation : RL 211.538 m

Boring Start : 22-May-17

Ground Water Level : RL 192.1 m

Boring Finish : 24-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)		0	21	61	18													
1.00	1.45	SPT1	9	14		- stiff, 0.0 to 5.0 m																		9
2.00	2.30	UDS1										32.5	11.2	21.3		1.79	1.60	12.2						11
3.00	3.45	SPT2	12	14																				6
4.00	4.30	UDS2										32.7	18.5	14.1		1.80	1.59	13.5						2
5.00	5.45	SPT3	16	17		- very stiff, 5.0 to 14.0 m																		
6.00	6.30	UDS3				- with traces of gravels, 6.0 to 12.5 m		1	18	64	17					1.81	1.57	15.6		DS	0.5, 1, 1.5	0.0	38.9	
7.00	7.45	SPT4	18	17																				
8.00	8.30	UDS4														1.82	1.59	14.6						
9.50	9.95	SPT5	20	17								31.0	17.6	13.5										
11.00	11.30	DS2																						
12.50	12.95	SPT6	26	19				0	21	60	19													

⁽¹⁾ SPT is outside NABL scope.

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Location : Office - 15  
UTM Coordinates : 699877 E, 3160008 N

### Soil Profile (PBH-75)

Termination Depth : 30.45 m (RL 181.088 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.40 m Casing Depth : -  
Surface Elevation : RL 211.538 m Boring Start : 22-May-17  
Ground Water Level : RL 192.1 m Boring Finish : 24-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ⁽¹⁾				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5				Hard brown sandy silt, low plastic (CL)										1.85	1.59	16.2	2.62					
15.50	15.95	SPT7	33	22																				
17.00	17.30	UDS6										34.1	18.9	15.2		1.86	1.58	18.2						
18.50	18.95	SPT8	37	22																				
20.00	20.30	DS3																						
22.00	22.45	SPT9	31	16				0	41	46	13													
24.00	24.30	UDS7														1.88	1.52	23.6						
26.00	26.45	SPT10	48	20																				
28.00	28.30	DS4																						
30.00	30.45	SPT11	45	19			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-76)

Location : Office - 15  
UTM Coordinates : 699823 E, 3160014 N  
Termination Depth : 30.45 m (RL 181.626 m)  
Ground Water Depth : 19.80 m  
Surface Elevation : RL 212.08 m  
Ground Water Level : RL 192.3 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 24-May-17  
Boring Finish : 26-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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	10	16		- stiff, 0.0 to 5.0 m																		5
2.00	2.30	UDS1				- with traces of gravels, 0.0 to 8.0 m		2	29	56	13	28.7	16.8	11.9		1.80	1.62	11.0						4
3.00	3.45	SPT2	13	16								33.5	17.5	16.0										8
4.00	4.30	UDS2														1.80	1.60	13.0		DS	0.5, 1, 1.5	0.0	30.2	7
5.00	5.45	SPT3	17	18		- very stiff, 5.0 to 14.0 m						22.1	15.9	6.2										
6.00	6.30	DS2																						
7.00	7.45	SPT4	18	17																				
8.00	8.30	UDS3						0	25	56	19	27.3	18.6	8.7		1.82	1.62	12.0	2.61					
9.50	9.95	SPT5	20	17																				
11.00	11.30	DS3																						
12.50	12.95	SPT6	24	18				0	25	60	15													

⁽¹⁾ SPT is outside NABL scope.









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Location : Office - 15  
UTM Coordinates : 699823 E, 3160014 N

### Soil Profile (PBH-76)

Termination Depth : 30.45 m (RL 181.626 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.80 m Casing Depth : -  
Surface Elevation : RL 212.08 m Boring Start : 24-May-17  
Ground Water Level : RL 192.3 m Boring Finish : 26-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS4	26	17		Very stiff to hard brown sandy silt, low plastic (CL)									1.83	1.58	16.2							
15.50	15.95	SPT7				- very stiff, 14.0 to 22.0 m																		
17.00	17.30	UDS5																						
18.50	18.95	SPT8	30	18		- with traces of gravels, 14.0 to 24.0 m																		
20.00	20.30	DS4																						
22.00	22.45	SPT9	34	17		- hard, 22.0 to 30.45 m																		
24.00	24.30	UDS6	37	17			0	27	49	24					1.86	1.53	22.0							
26.00	26.45	SPT10					0	23	64	13														
28.00	28.30	UDS7											24.7	16.1	8.7		1.87	1.52	23.0					
30.00	30.45	SPT11	41	18			30.45	0	27	58	15													
																								

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-77)

Location : Office - 15

Termination Depth : 30.45 m (RL 182.41 m)

Boring Method : Rotary Drilling

UTM Coordinates : 699922 E, 3159941 N

Ground Water Depth : 19.40 m

Casing Depth : -

Surface Elevation : RL 212.860 m

Boring Start : 24-May-17

Ground Water Level : RL 193.5 m

Boring Finish : 26-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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	25	61	14													8
2.00	2.30	UDS1														1.80	1.60	12.2						0
3.00	3.45	SPT2	12	14								27.3	18.5	8.8										10
4.00	4.30	UDS2														1.80	1.58	14.3						0
5.00	5.45	SPT3	17	18		- very stiff, 5.0 to 14.0 m																		
6.00	6.30	UDS3														1.82	1.57	15.9						
7.00	7.45	SPT4	21	19				0	33	55	12													
8.00	8.30	DS2																						
9.50	9.95	SPT5	23	19								25.5	16.7	8.8										
11.00	11.30	UDS4														1.83	1.58	15.8		DS	0.5, 1, 1.5	0.0	35.3	
12.50	12.95	SPT6	26	19																				

⁽¹⁾ SPT is outside NABL scope.

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Location : Office - 15  
UTM Coordinates : 699922 E, 3159941 N

### Soil Profile (PBH-77)

Termination Depth : 30.45 m (RL 182.41 m) Boring Method : Rotary Drilling  
Ground Water Depth : 19.40 m Casing Depth : -  
Surface Elevation : RL 212.860 m Boring Start : 24-May-17  
Ground Water Level : RL 193.5 m Boring Finish : 26-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N ["]				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	DS3				Hard brown sandy silt, low plastic (CL)																		
15.50	15.95	SPT7	31	21				0	33	56	11													
17.00	17.30	UDS5														1.86	1.54	20.6						
18.50	18.95	SPT8	37	22								25.8	17.5	8.2										
20.00	20.30	UDS6														1.88	1.52	23.5						
22.00	22.45	SPT9	41	19																				
24.00	24.30	DS4																						
26.00	26.45	SPT10	46	20		- with gravels, 26.0 to 30.45 m		10	16	58	16													
28.00	28.30	DS5																						
30.00	30.45	SPT11	50	20				30.45					30.6	17.7	13.0									

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-115)

Location : Office - 17

UTM Coordinates : 699950 E, 3159935 N

Termination Depth : 30.45 m (RL 183.05 m)

Ground Water Depth : 21.40 m

Surface Elevation : RL 213.500 m

Ground Water Level : RL 192.1 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 18-May-17

Boring Finish : 20-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff brown sandy silt, low plastic (CL)	1.00					23.9	14.7	9.1										
1.00	1.45	SPT1	8	12		Loose to medium dense brown silty fine sand with traces of gravels (SM)		1	59	34	6													7
2.00	2.30	UDS1				- loose, 1.0 to 5.0 m										1.79	1.57	13.5						0
3.00	3.45	SPT2	9	11																				0
4.00	4.30	UDS2														1.80	1.57	14.6						0
5.00	5.45	SPT3	14	15		- medium dense, 5.0 to 7.0 m													2.66					
6.00	6.30	UDS3					7.00									1.81	1.63	10.5		DS	0.5, 1, 1.5	0.0	33.0	
7.00	7.45	SPT4	17	16		Very stiff brown sandy silt with traces of gravels, low plastic (CL)		2	41	46	11													
8.00	8.30	UDS4														1.81	1.57	15.8						
9.50	9.95	SPT5	19	16																				
11.00	11.30	UDS5														1.82	1.57	16.2						
12.50	12.95	SPT6	23	17				2	46	42	10													

⁽¹⁾ SPT is outside NABL scope.


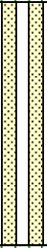
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Location : Office - 17  
UTM Coordinates : 699950 E, 3159935 N

### Soil Profile (PBH-115)

Termination Depth : 30.45 m (RL 183.05 m) Boring Method : Rotary Drilling  
Ground Water Depth : 21.40 m Casing Depth : -  
Surface Elevation : RL 213.500 m Boring Start : 18-May-17  
Ground Water Level : RL 192.1 m Boring Finish : 20-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)								
14.00	14.30	UDS6	40	27		Hard brown sandy silt, low plastic (CL)	22.00	0	62	33	5	24.4	15.4	9.0		1.86	1.59	16.8													
15.50	15.95	SPT7														1.87	1.58	18.6													
17.00	17.30	UDS7														1.87	1.54	21.3													
18.50	18.95	SPT8														1.88	1.52	23.5													
20.00	20.30	UDS8														1.89	1.51	25.6													
22.00	22.45	SPT9	43	19		Dense brown silty fine sand (SM)	30.00					30.4	20.7	9.7																	
24.00	24.30	UDS9																													
26.00	26.45	SPT10																													
28.00	28.30	UDS10																													
30.00	30.45	SPT11																													

⁽¹⁾ SPT is outside NABL scope.

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Location : Office - 17  
UTM Coordinates : 699986 E, 3159908 N

### Soil Profile (PBH-116)

Termination Depth : 30.45 m (RL 183.104 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.90 m Casing Depth : -  
Surface Elevation : RL 213.554 m Boring Start : 18-May-17  
Ground Water Level : RL 192.7 m Boring Finish : 20-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)		0	25	62	13													
1.00	1.45	SPT1	8	12		- stiff, 0.0 to 9.5 m																		5
2.00	2.30	UDS1														1.79	1.59	12.6						4
3.00	3.45	SPT2	10	12								33.7	17.4	16.3										8
4.00	4.30	UDS2														1.80	1.55	15.6						7
5.00	5.45	SPT3	12	12																				
6.00	6.30	DS2																						
7.00	7.45	SPT4	15	14		- with traces of gravels, 7.0 to 14.0 m		4	25	56	15													
8.00	8.30	UDS3														1.81	1.58	14.6						
9.50	9.95	SPT5	16	13		- very stiff, 9.5 to 14.0 m						29.6	17.4	12.2										
11.00	11.30	UDS4														1.81	1.56	16.1		DS	0.5, 1, 1.5	0.0	30.6	
12.50	12.95	SPT6	19	14																				

⁽¹⁾ SPT is outside NABL scope.

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Location : Office - 17  
UTM Coordinates : 699986 E, 3159908 N

### Soil Profile (PBH-116)

Termination Depth : 30.45 m (RL 183.104 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.90 m Casing Depth : -  
Surface Elevation : RL 213.554 m Boring Start : 18-May-17  
Ground Water Level : RL 192.7 m Boring Finish : 20-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	DS3				Very stiff to hard brown sandy silt, low plastic (CL)						29.3	16.6	12.7										
15.50	15.95	SPT7	27	18		- very stiff, 14.0 to 18.5 m																		
17.00	17.30	UDS5					0	29	58	13						1.85	1.55	19.2						
18.50	18.95	SPT8	31	19		- hard, 18.5 to 30.45 m																		
20.00	20.30	UDS6														1.85	1.51	22.6						
22.00	22.45	SPT9	32	16								31.3	15.6	15.7										
24.00	24.30	DS4																						
26.00	26.45	SPT10	35	17																				
28.00	28.30	DS5																						
30.00	30.45	SPT11	40	17		- with traces of gravels, 30.0 to 30.45 m	30.45	2	23	61	14								2.66					

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-117)

Location : Retail - 16

UTM Coordinates : 699997 E, 3159977 N

Termination Depth : 30.45 m (RL 182.05 m)

Ground Water Depth : 21.20 m

Surface Elevation : RL 212.500 m

Ground Water Level : RL 191.3 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 09-May-17

Boring Finish : 11-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Loose to medium dense brown silty fine sand (SM)																		
1.00	1.45	SPT1	9	14		- loose, 0.0 to 3.0 m		0	48	44	8									DS	0.5, 1, 1.5	0.0	35.6	0
2.00	2.30	UDS1														1.80	1.66	8.6						0
3.00	3.45	SPT2	14	17		- medium dense, 3.0 to 14.0 m																		0
4.00	4.30	UDS2														1.80	1.62	11.4						0
5.00	5.45	SPT3	15	16																				
6.00	6.30	UDS3				- with traces of gravel, 6.0 to 12.5 m		2	51	40	7					1.81	1.65	9.4						
7.00	7.45	SPT4	15	14																				
8.00	8.30	UDS4														1.81	1.67	8.5						
9.50	9.95	SPT5	20	17																				
11.00	11.30	UDS5														1.82	1.65	10.3	2.65					
12.50	12.95	SPT6	24	18				0	57	37	6													

⁽¹⁾ SPT is outside NABL scope.



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### Soil Profile (PBH-117)

Location : Retail - 16

Termination Depth : 30.45 m (RL 182.05 m)

Boring Method : Rotary Drilling

UTM Coordinates : 699997 E, 3159977 N

Ground Water Depth : 21.20 m



Casing Depth : -

Surface Elevation : RL 212.500 m

Boring Start : 09-May-17

Ground Water Level : RL 191.3 m

Boring Finish : 11-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	28	19		Medium dense to dense brown silty fine sand (SM)		0	48	45	7				1.83	1.63	12.6							
15.50	15.95	SPT7				- medium dense, 15.5 to 18.5 m																		
17.00	17.30	UDS7																						
18.50	18.95	SPT8				- dense, 18.5 to 28.0 m																		
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				40									17		Hard brown sandy silt, low plastic (CL)						30.00	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-118)

Location : Office - 13

UTM Coordinates : 700033 E, 3160046 N

Termination Depth : 30.45 m (RL 182.992 m)

Ground Water Depth : 21.10 m

Surface Elevation : RL 213.442 m

Ground Water Level : RL 192.3 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 28-May-17

Boring Finish : 29-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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	7	11		- firm, 0.0 to 3.0 m																		20
2.00	2.30	UDS1														1.79	1.58	13.2						0
3.00	3.45	SPT2	9	11		- stiff, 3.0 to 7.0 m		0	39	49	12													
4.00	4.30	UDS2														1.80	1.57	14.2		DS	0.5, 1, 1.5	0.0	34.3	0
5.00	5.45	SPT3	14	15																				8
6.00	6.30	UDS3														1.81	1.57	15.6						
7.00	7.45	SPT4	18	17		- very stiff, 7.0 to 9.5 m						26.3	17.7	8.5										
8.00	8.30	UDS4					9.50									1.82	1.57	16.0						
9.50	9.95	SPT5	21	17		Medium dense brown silty fine sand (SM)		0	57	37	6													
11.00	11.30	UDS5														1.83	1.55	17.5						
12.50	12.95	SPT6	23	17																				

⁽¹⁾ SPT is outside NABL scope.



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Location : Office - 13  
UTM Coordinates : 700033 E, 3160046 N

### Soil Profile (PBH-118)

Termination Depth : 30.45 m (RL 182.992 m) Boring Method : Rotary Drilling  
Ground Water Depth : 21.10 m Casing Depth : -  
Surface Elevation : RL 213.442 m Boring Start : 28-May-17  
Ground Water Level : RL 192.3 m Boring Finish : 29-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)											
14.00	14.30	UDS6	28	19		Medium dense brown silty fine sand (SM)	18.50	0	53	40	7			8.8		1.83	1.57	16.9																
15.50	15.95	SPT7																																
17.00	17.30	UDS7																																
18.50	18.95	SPT8	32	19		Hard brown sandy silt with traces of gravels, low plastic (CL)		1	37	50	12					1.85	1.54	19.6																
20.00	20.30	UDS8																																
22.00	22.45	SPT9	38	18																														
24.00	24.30	UDS9																																
26.00	26.45	SPT10	40	18																														
28.00	28.30	UDS10																																
30.00	30.45	SPT11	51	20			30.45									1.86	1.51	23.2																
																1.87	1.52	23.5																
																1.89	1.51	24.5																

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-119)

Location : Office - 13

Termination Depth : 30.45 m (RL 183 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700059 E, 3160027 N

Ground Water Depth : 21.30 m

Casing Depth : -

Surface Elevation : RL 213.450 m

Boring Start : 27-May-17

Ground Water Level : RL 192.2 m

Boring Finish : 29-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	8	12		- stiff, 0.0 to 7.0 m																		6
2.00	2.30	UDS1														1.79	1.59	12.6						8
3.00	3.45	SPT2	10	12				0	44	46	10													13
4.00	4.30	DS2										30.5	16.8	13.7										0
5.00	5.45	SPT3	14	15																				
6.00	6.30	UDS2														1.81	1.60	13.5		DS	0.5, 1, 1.5	0.0	29.0	
7.00	7.45	SPT4	20	19		- very stiff, 7.0 to 14.0 m		1	23	59	17													
8.00	8.30	UDS3				- with traces of gravels, 7.0 to 14.0 m										1.82	1.57	16.4						
9.50	9.95	SPT5	22	18								31.1	18.4	12.7										
11.00	11.30	UDS4														1.83	1.56	16.9						
12.50	12.95	SPT6	26	19				3	25	56	16													

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-119)

Location : Office - 13

Termination Depth : 30.45 m (RL 183 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700059 E, 3160027 N

Ground Water Depth : 21.30 m

Casing Depth : -

Surface Elevation : RL 213.450 m

Boring Start : 27-May-17

Ground Water Level : RL 192.2 m

Boring Finish : 29-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	DS3				Very stiff to hard brown sandy silt, low plastic (CL)																		
15.50	15.95	SPT7	29	19		- very stiff, 14.0 to 18.5 m						34.5	21.4	13.1										
17.00	17.30	UDS5														1.87	1.55	20.2						
18.50	18.95	SPT8	42	25		- hard, 18.5 to 30.45 m		1	24	58	17													
20.00	20.30	UDS6				- with traces of gravels, 18.5 to 26.0 m										1.88	1.52	23.5						
22.00	22.45	SPT9	38	18								31.2	17.8	13.4										
24.00	24.30	UDS7														1.89	1.52	24.6						
26.00	26.45	SPT10	48	20		- with gravels, 26.0 to 30.45 m		8	21	56	15													
28.00	28.30	DS4																						
30.00	30.45	SPT11	60	22			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-120)

Location : Arena - 08

Termination Depth : 30.45 m (RL 182.55 m)

Boring Method : Shell & Auger

UTM Coordinates : 700332 E, 3160354 N

Ground Water Depth : 21.20 m

Casing Depth : -

Surface Elevation : RL 213.00 m

Boring Start : 06-Jun-17

Ground Water Level : RL 191.8 m

Boring Finish : 07-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Hard to very stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	31	48		- hard, 0.0 to 12.5 m																		5
2.00	2.30	UDS1										30.2	17.3	12.9		1.85	1.63	13.9						7
3.00	3.45	SPT2	32	39		- with gravels, 0.0 to 7.0 m		10	22	54	14													5
4.00	4.30	UDS2														1.85	1.65	12.1		DS	0.5, 1, 1.5	0.0	31.5	6
5.00	5.45	SPT3	32	33																				
6.00	6.30	DS2																						
7.00	7.45	SPT4	33	31		- with traces of gravels, 7.0 to 14.0 m		3	16	67	14													
8.00	8.30	UDS3										24.7	17.6	7.2		1.85	1.74	6.3						
9.50	9.95	SPT5	31	26																				
11.00	11.30	UDS4														1.85	1.61	15.0	2.65					
12.50	12.95	SPT6	27	20		- very stiff, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.

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Location : Arena - 08  
UTM Coordinates : 700332 E, 3160354 N

### Soil Profile (BH-120)

Termination Depth : 30.45 m (RL 182.55 m) Boring Method : Shell & Auger  
Ground Water Depth : 21.20 m Casing Depth : -  
Surface Elevation : RL 213.00 m Boring Start : 06-Jun-17  
Ground Water Level : RL 191.8 m Boring Finish : 07-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	DS3				Hard brown sandy silt with gravels, low plastic (CL)																		
15.50	15.95	SPT7	44	29			5	18	61	16														
17.00	17.30	UDS5									26.6	16.3	10.3		1.90	1.68	12.8							
18.50	18.95	SPT8	50	30																				
20.00	20.30	DS4																						
22.00	22.45	SPT9	55	23																				
24.00	24.30	UDS6													1.91	1.65	15.9							
26.00	26.45	SPT10	62	24				7	22	57	14													
28.00	28.30	UDS7										28.7	16.0	12.6		1.92	1.68	14.5						
30.00	30.45	SPT11	77	27			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-121)

Location : Arena - 08

Termination Depth : 30.45 m (RL 182.55 m)

Boring Method : Shell & Auger

UTM Coordinates : 700276 E, 3160361 N

Ground Water Depth : 21.30 m

Casing Depth : 12.5 m

Surface Elevation : RL 213.00 m

Boring Start : 05-Jun-17

Ground Water Level : RL 191.7 m

Boring Finish : 06-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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	13	20		- stiff, 0.0 to 7.0 m		0	16	71	13													5
2.00	2.30	UDS1										23.7	15.2	8.5		1.80	1.62	11.4						4
3.00	3.45	SPT2	15	18																				7
4.00	4.30	UDS2														1.80	1.61	11.5		DS	0.5, 1, 1.5	0.0	31.1	5
5.00	5.45	SPT3	11	11																				
6.00	6.30	UDS3														1.80	1.60	12.8						
7.00	7.45	SPT4	20	19		- very stiff, 7.0 to 12.5 m																		
8.00	8.30	UDS4						0	26	62	12					1.83	1.62	13.2						
9.50	9.95	SPT5	26	22								25.4	17.3	8.1										
11.00	11.30	DS2																	2.68					
12.50	12.95	SPT6	33	24		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.



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### Soil Profile (BH-121)

Location : Arena - 08

Termination Depth : 30.45 m (RL 182.55 m)

Boring Method : Shell & Auger

UTM Coordinates : 700276 E, 3160361 N

Ground Water Depth : 21.30 m

Casing Depth : 12.5 m

Surface Elevation : RL 213.00 m

Boring Start : 05-Jun-17

Ground Water Level : RL 191.7 m

Boring Finish : 06-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5				Hard brown sandy silt, low plastic (CL)										1.87	1.60	16.5						
15.50	15.95	SPT7	44	29		- with gravels, 14.0 to 22.0 m		18	32	40	10													
17.00	17.30	UDS6										24.4	15.8	8.6		1.89	1.59	19.2						
18.50	18.95	SPT8	49	30																				
20.00	20.30	UDS7														1.90	1.58	20.3						
22.00	22.45	SPT9	50	50		- with traces of gravels, 22.0 to 30.45 m		3	17	65	15													
24.00	24.30	UDS8										29.3	9.9	19.4		1.92	1.57	22.3						
26.00	26.45	SPT10	62	62																				
28.00	28.30	DS3																						
30.00	30.45	SPT11	78	78			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-122)

Location : Arena - 08

Termination Depth : 30.45 m (RL 184.42 m)

Boring Method : Shell & Auger

UTM Coordinates : 700360 E, 3160298 N

Ground Water Depth : 22.30 m

Casing Depth : -

Surface Elevation : RL 214.87 m

Boring Start : 06-Jun-17

Ground Water Level : RL 192.6 m

Boring Finish : 07-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very stiff to stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	17	27		- very stiff, 0.0 to 3.0 m		0	27	58	15													6
2.00	2.30	UDS1										32.4	15.3	17.1		1.81	1.62	11.2						5
3.00	3.45	SPT2	12	14		- stiff, 3.0 to 5.0 m																		3
4.00	4.30	UDS2				- with traces of gravels, 4.0 to 14.0 m		4	26	53	17					1.81	1.61	12.5		DS	0.5, 1, 1.5	0.0	31.5	4
5.00	5.45	SPT3	24	25		- very stiff, 5.0 to 14.0 m						23.2	15.4	7.8										
6.00	6.30	UDS3														1.82	1.62	12.6						
7.00	7.45	SPT4	27	25																				
8.00	8.30	UDS4														1.83	1.61	13.6						
9.50	9.95	SPT5	20	17				3	19	61	17													
11.00	11.30	UDS5										30.2	16.9	13.3		1.83	1.60	14.2	2.64					
12.50	12.95	SPT6	29	21																				

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-122)

Location : Arena - 08

Termination Depth : 30.45 m (RL 184.42 m)

Boring Method : Shell & Auger

UTM Coordinates : 700360 E, 3160298 N

Ground Water Depth : 22.30 m






Casing Depth : -

Surface Elevation : RL 214.87 m

Boring Start : 06-Jun-17

Ground Water Level : RL 192.6 m

Boring Finish : 07-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	17	11		Very stiff to hard brown sandy silt with gravels, low plastic (CL)									1.83	1.59	15.2							
15.50	15.95	SPT7				- very stiff, 14.0 to 18.5 m																		
17.00	17.30	UDS7	69	42		- hard, 18.5 to 30.45 m									1.86	1.60	16.5							
18.50	18.95	SPT8																						
20.00	20.30	UDS8	86	31											1.96	1.65	18.5							
22.00	22.45	SPT9																						
24.00	24.30	UDS9	58	22											1.93	1.58	22.3							
26.00	26.45	SPT10																						
28.00	28.30	DS2	77	26																				
30.00	30.45	SPT11																						
							30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-123)

Location : Arena - 08

Termination Depth : 30.45 m (RL 183.05 m)

Boring Method : Shell & Auger

UTM Coordinates : 700228 E, 3160339 N

Ground Water Depth : 20.90 m

Casing Depth : 10.0 m

Surface Elevation : RL 213.50 m

Boring Start : 06-Jun-17

Ground Water Level : RL 192.6 m

Boring Finish : 08-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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	27	42		- very stiff, 0.0 to 3.0 m		0	32	53	15													8
2.00	2.30	UDS1										30.2	17.4	12.8		1.81	1.63	11.5						11
3.00	3.45	SPT2	10	12		- stiff, 3.0 to 7.0 m																		5
4.00	4.30	UDS2														1.80	1.61	11.9		DS	0.5, 1, 1.5	0.0	29.3	7
5.00	5.45	SPT3	13	13																				
6.00	6.30	UDS3														1.82	1.61	12.9						
7.00	7.45	SPT4	25	23		- very stiff, 7.0 to 12.5 m																		
8.00	8.30	UDS4				- with traces of gravels, 8.0 to 14.0 m		1	34	47	18					1.83	1.59	14.6						
9.50	9.95	SPT5	27	22								24.0	14.9	9.1										
11.00	11.30	UDS5														1.85	1.63	13.6	2.70					
12.50	12.95	SPT6	32	24		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.

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Location : Arena - 08  
UTM Coordinates : 700228 E, 3160339 N

### Soil Profile (BH-123)

Termination Depth : 30.45 m (RL 183.05 m) Boring Method : Shell & Auger  
Ground Water Depth : 20.90 m Casing Depth : 10.0 m  
Surface Elevation : RL 213.50 m Boring Start : 06-Jun-17  
Ground Water Level : RL 192.6 m Boring Finish : 08-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Hard brown sandy silt, low plastic (CL)		0	40	44	16					1.86	1.60	16.5						
15.50	15.95	SPT7	49	32		- with traces of gravels, 24.0 to 30.45 m						29.5	16.8	12.7										
17.00	17.30	UDS7														1.91	1.61	18.6						
18.50	18.95	SPT8	56	34																				
20.00	20.30	DS2																						
22.00	22.45	SPT9	57	23																				
24.00	24.30	DS3																						
26.00	26.45	SPT10	60	23																				
28.00	28.30	DS4																						
30.00	30.45	SPT11	78	27			30.45	1	39	43	17	29.8	17.7	12.2										

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-124)

Location : Arena - 08

Termination Depth : 30.45 m (RL 183.22 m)

Boring Method : Shell & Auger

UTM Coordinates : 700287 E, 3160294 N

Ground Water Depth : 20.95 m

Casing Depth : -

Surface Elevation : RL 213.67 m

Boring Start : 08-Jun-17

Ground Water Level : RL 192.7 m

Boring Finish : 09-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very stiff to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	17	27		- very stiff, 0.0 to 12.5 m		0	23	65	12													5
2.00	2.30	UDS1										31.6	15.0	16.6		1.81	1.63	11.2						7
3.00	3.45	SPT2	26	31																				5
4.00	4.30	UDS2														1.84	1.69	8.7		DS	0.5, 1, 1.5	0.0	32.4	9
5.00	5.45	SPT3	30	31																				
6.00	6.30	UDS3				- with traces of gravels, 6.0 to 14.0 m		3	18	63	16					1.85	1.64	12.5						
7.00	7.45	SPT4	26	24																				
8.00	8.30	UDS4														1.84	1.61	13.8						
9.50	9.95	SPT5	27	22																				
11.00	11.30	UDS5						3	26	60	11					1.86	1.48	25.4	2.69					
12.50	12.95	SPT6	33	24		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.


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Location : Arena - 08  
UTM Coordinates : 700287 E, 3160294 N

### Soil Profile (BH-124)

Termination Depth : 30.45 m (RL 183.22 m) Boring Method : Shell & Auger  
Ground Water Depth : 20.95 m Casing Depth : -  
Surface Elevation : RL 213.67 m Boring Start : 08-Jun-17  
Ground Water Level : RL 192.7 m Boring Finish : 09-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	35	23		Hard brown sandy silt, low plastic (CL)	30.45	0	39	46	15				1.86	1.65	12.6							
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	DS2																						
30.00	30.45	SPT11	40	17																				

⁽¹⁾ SPT is outside NABL scope.



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### Soil Profile (BH-125)

Location : Arena - 08  
UTM Coordinates : 700347 E, 3160250 N  
Termination Depth : 30.45 m (RL 183.34 m)  
Ground Water Depth : 22.40 m  
Surface Elevation : RL 213.79 m  
Ground Water Level : RL 191.4 m  
Boring Method : Shell & Auger  
Casing Depth : -  
Boring Start : 08-Jun-17  
Boring Finish : 09-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very stiff to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	15	23		- very stiff, 0.0 to 5.0 m		1	32	57	10													5
2.00	2.30	UDS1				- with traces of gravels, 0.0 to 7.0 m						24.1	16.5	7.6		1.81	1.63	11.4						3
3.00	3.45	SPT2	19	23																				8
4.00	4.30	UDS2														1.82	1.62	12.5		DS	0.5, 1, 1.5	0.0	31.2	12
5.00	5.45	SPT3	35	36		- hard, 5.0 to 12.5 m																		
6.00	6.30	UDS3														1.85	1.65	12.2						
7.00	7.45	SPT4	33	31		- with gravels, 7.0 to 12.5 m		9	28	47	16													
8.00	8.30	DS2										28.1	18.0	10.1										
9.50	9.95	SPT5	35	29																				
11.00	11.30	UDS4				- very stiff, 12.5 to 14.0 m										1.85	1.62	13.9	2.66					
12.50	12.95	SPT6	28	21		- with traces of gravels, 12.5 to 14.0 m		2	31	49	18													

⁽¹⁾ SPT is outside NABL scope.


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Location : Arena - 08  
UTM Coordinates : 700347 E, 3160250 N

### Soil Profile (BH-125)

Termination Depth : 30.45 m (RL 183.34 m) Boring Method : Shell & Auger  
Ground Water Depth : 22.40 m Casing Depth : -  
Surface Elevation : RL 213.79 m Boring Start : 08-Jun-17  
Ground Water Level : RL 191.4 m Boring Finish : 09-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)				
14.00	14.30	UDS5	32	21		Hard brown sandy silt with gravels, low plastic (CL)	30.45	13	18	58	11	27.2	17.3	9.9		1.89	1.64	15.6									
15.50	15.95	SPT7																									
17.00	17.30	UDS6																							1.90	1.64	16.5
18.50	18.95	SPT8						86	52																		
20.00	20.30	UDS7																							2.01	1.67	20.5
22.00	22.45	SPT9						96	34							26.5	16.3	10.2									
24.00	24.30	UDS8																							2.02	1.68	20.2
26.00	26.45	SPT10						92	31																		
28.00	28.30	UDS9																							2.01	1.63	23.5
30.00	30.45	SPT11						86	28																		

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-126)

Location : Arena - 08

Termination Depth : 30.45 m (RL 182.611 m)

Boring Method : Shell & Auger

UTM Coordinates : 700215 E, 3160281 N

Ground Water Depth : 21.10 m

Casing Depth : -

Surface Elevation : RL 213.06 m

Boring Start : 08-Jun-17

Ground Water Level : RL 192 m

Boring Finish : 09-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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	11	17		- stiff, 0.0 to 3.0 m		4	13	73	10													6
2.00	2.30	UDS1				- with traces of gravels, 0.0 to 12.5 m						29.0	16.7	12.3		1.81	1.62	11.8						4
3.00	3.45	SPT2	15	18		- very stiff, 3.0 to 9.5 m																		2
4.00	4.30	UDS2														1.81	1.61	12.5		DS	0.5, 1, 1.5	0.0	30.2	5
5.00	5.45	SPT3	16	17																				
6.00	6.30	UDS3						3	16	68	13					1.81	1.59	13.5						
7.00	7.45	SPT4	25	23								28.4	20.7	7.6										
8.00	8.30	UDS4														1.84	1.61	14.2						
9.50	9.95	SPT5	31	26		- hard, 9.5 to 14.0 m																		
11.00	11.30	UDS5														1.85	1.60	15.6	2.65					
12.50	12.95	SPT6	34	25		- with gravels, 12.5 to 14.0 m		11	20	52	17													

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-126)

Location : Arena - 08

Termination Depth : 30.45 m (RL 182.611 m)

Boring Method : Shell & Auger

UTM Coordinates : 700215 E, 3160281 N

Ground Water Depth : 21.10 m

Casing Depth : -

Surface Elevation : RL 213.06 m

Boring Start : 08-Jun-17

Ground Water Level : RL 192 m

Boring Finish : 09-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Hard brown sandy silt with traces of gravels, low plastic (CL)						30.6	21.3	9.3		1.86	1.60	16.7						
15.50	15.95	SPT7	43	28																				
17.00	17.30	UDS7														1.89	1.59	18.9						
18.50	18.95	SPT8	48	29																				
20.00	20.30	DS2					1	18	65	16														
22.00	22.45	SPT9	56	23								26.2	16.3	9.9										
24.00	24.30	UDS8														1.93	1.57	22.5						
26.00	26.45	SPT10	63	24																				
28.00	28.30	DS3																						
30.00	30.45	SPT11	45	19			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-127)

Location : Arena - 08

Termination Depth : 30.45 m (RL 182.772 m)

Boring Method : Shell & Auger

UTM Coordinates : 700302 E, 3160228 N

Ground Water Depth : 20.80 m

Casing Depth : 13.0 m

Surface Elevation : RL 213.22 m

Boring Start : 10-Jun-17

Ground Water Level : RL 192.4 m

Boring Finish : 11-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very stiff to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	18	28		- very stiff, 0.0 to 3.0 m		0	24	57	19													3
2.00	2.30	UDS1										24.8	17.8	7.0		1.83	1.65	11.3						4
3.00	3.45	SPT2	33	40		- hard, 3.0 to 14.0 m																		6
4.00	4.30	UDS2														1.88	1.67	12.6		DS	0.5, 1, 1.5	0.0	33.4	4
5.00	5.45	SPT3	51	53																				
6.00	6.30	UDS3						0	37	53	10					1.91	1.67	14.1						
7.00	7.45	SPT4	46	43		- with gravels, 7.0 to 12.5 m		5	23	53	19													
8.00	8.30	UDS4										28.6	17.0	11.6		1.89	1.64	15.2						
9.50	9.95	SPT5	52	43																				
11.00	11.30	DS2																	2.67					
12.50	12.95	SPT6	40	29		- with traces of gravels, 12.5 to 14.0 m		3	16	67	14													

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-127)

Location : Arena - 08

UTM Coordinates : 700302 E, 3160228 N

Termination Depth : 30.45 m (RL 182.772 m)

Ground Water Depth : 20.80 m

Surface Elevation : RL 213.22 m

Ground Water Level : RL 192.4 m

Boring Method : Shell & Auger

Casing Depth : 13.0 m

Boring Start : 10-Jun-17

Boring Finish : 11-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5				Hard brown sandy silt intermixed with gravels, low plastic (CL)						25.2	15.7	9.5		1.92	1.65	16.5						
15.50	15.95	SPT7	71	47																				
17.00	17.30	UDS6														1.95	1.66	17.6						
18.50	18.95	SPT8	62	37																				
20.00	20.30	DS3					28	17	45	10														
22.00	22.45	SPT9	73	28								30.0	19.5	10.5										
24.00	24.30	UDS7														1.93	1.61	20.2						
26.00	26.45	SPT10	57	23																				
28.00	28.30	DS4																						
30.00	30.45	SPT11	75	26			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (BH-128)

Location : Arena - 08

Termination Depth : 30.45 m (RL 182.701 m)

Boring Method : Shell & Auger

UTM Coordinates : 700243 E, 3160235 N

Ground Water Depth : 21.40 m

Casing Depth : 12.5 m

Surface Elevation : RL 213.15 m

Boring Start : 10-Jun-17

Ground Water Level : RL 191.8 m

Boring Finish : 11-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very stiff to hard brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	25	39		- very stiff, 0.0 to 12.5 m		0	27	50	23													7
2.00	2.30	UDS1										25.9	15.6	10.3		1.81	1.63	11.5						6
3.00	3.45	SPT2	15	18																				4
4.00	4.30	UDS2														1.81	1.61	12.4		DS	0.5, 1, 1.5	0.0	30.9	6
5.00	5.45	SPT3	18	19																				
6.00	6.30	UDS3														1.82	1.59	14.2						
7.00	7.45	SPT4	21	19																				
8.00	8.30	UDS4														1.83	1.58	15.6						
9.50	9.95	SPT5	27	22		- with gravels, 9.5 to 14.0 m		10	22	48	20													
11.00	11.30	DS2										29.3	16.3	13.0					2.68					
12.50	12.95	SPT6	53	39		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.



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### Soil Profile (BH-128)

Location : Arena - 08

Termination Depth : 30.45 m (RL 182.701 m)

Boring Method : Shell & Auger

UTM Coordinates : 700243 E, 3160235 N

Ground Water Depth : 21.40 m






Casing Depth : 12.5 m

Surface Elevation : RL 213.15 m

Boring Start : 10-Jun-17

Ground Water Level : RL 191.8 m

Boring Finish : 11-Jun-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5	42	28		Hard to very stiff brown sandy silt, low plastic (CL)		2	21	58	19	30.0	16.2	13.7		1.90	1.63	16.8						
15.50	15.95	SPT7				- hard, 14.0 to 22.0 m																		
17.00	17.30	UDS6	76	46		- with traces of gravels, 14.0 to 22.0 m										1.93	1.62	19.5						
18.50	18.95	SPT8																						
20.00	20.30	UDS7	25	14		- very stiff, 22.0 to 26.0 m		0	24	54	22					1.89	1.57	20.6						
22.00	22.45	SPT9																						
24.00	24.30	DS3	46	20		- hard, 26.0 to 30.45 m																		
26.00	26.45	SPT10																						
28.00	28.30	DS4	58	22			30.45																	
30.00	30.45	SPT11																						

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-133)

Location : 5*hotel - 11  
UTM Coordinates : 700204 E, 3160116 N  
Termination Depth : 30.45 m (RL 182.836 m)  
Ground Water Depth : 21.50 m  
Surface Elevation : RL 213.286 m  
Ground Water Level : RL 191.8 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 20-May-17  
Boring Finish : 22-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Firm to hard brown sandy silt, low plastic (CL)		1	20	65	14													
1.00	1.45	SPT1	6	9		- firm, 0.0 to 3.0 m																		5
2.00	2.30	UDS1				- with traces of gravels, 0.0 to 11.0 m						30.9	18.9	11.9		1.79	1.58	13.2						8
3.00	3.45	SPT2	10	12		- stiff, 3.0 to 7.0 m																		7
4.00	4.30	UDS2														1.80	1.57	14.6						5
5.00	5.45	SPT3	15	16				2	21	61	16													
6.00	6.30	DS2																						
7.00	7.45	SPT4	22	20		- very stiff, 7.0 to 12.5 m						31.5	18.9	12.6										
8.00	8.30	UDS3														1.83	1.59	15.2						
9.50	9.95	SPT5	27	22																				
11.00	11.30	UDS4				- with gravels, 11.0 to 14.0 m		7	20	57	16					1.85	1.59	15.9						
12.50	12.95	SPT6	32	24		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-133)

Location : 5*hotel - 11

Termination Depth : 30.45 m (RL 182.836 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700204 E, 3160116 N

Ground Water Depth : 21.50 m

Casing Depth : -

Surface Elevation : RL 213.286 m

Boring Start : 20-May-17

Ground Water Level : RL 191.8 m

Boring Finish : 22-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5				Hard brown sandy silt with traces of gravels, low plastic (CL)						32.2	18.9	13.3		1.86	1.60	16.1						
15.50	15.95	SPT7	41	27																				
17.00	17.30	UDS6														1.88	1.57	19.7		DS	0.5, 1, 1.5	0.0	32.2	
18.50	18.95	SPT8	42	25																				
20.00	20.30	DS3						3	35	48	14													
22.00	22.45	SPT9	48	21																				
24.00	24.30	UDS7														1.90	1.56	21.6						
26.00	26.45	SPT10	50	21																				
28.00	28.30	DS4										26.8	17.5	9.2										
30.00	30.45	SPT11	74	26			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-134)

Location : 5*hotel - 11  
UTM Coordinates : 700263 E, 3160073 N  
Termination Depth : 30.45 m (RL 182.935 m)  
Ground Water Depth : 21.63 m  
Surface Elevation : RL 213.385 m  
Ground Water Level : RL 191.8 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 22-May-17  
Boring Finish : 24-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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)						29.3	17.8	11.5										
1.00	1.45	SPT1	10	16		- stiff, 0.0 to 5.0 m																		4
2.00	2.30	UDS1						1	24	62	13					1.80	1.61	11.6						8
3.00	3.45	SPT2	12	14																				4
4.00	4.30	DS2																						6
5.00	5.45	SPT3	16	17		- very stiff, 5.0 to 14.0 m						32.1	19.3	12.8					2.64					
6.00	6.30	UDS2														1.81	1.61	12.6		DS	0.5, 1, 1.5	0.0	31.6	
7.00	7.45	SPT4	18	17																				
8.00	8.30	UDS3														1.82	1.62	12.3						
9.50	9.95	SPT5	21	17				2	20	70	8													
11.00	11.30	UDS4														1.83	1.61	13.5						
12.50	12.95	SPT6	26	19																				

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-134)

Location : 5*hotel - 11

Termination Depth : 30.45 m (RL 182.935 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700263 E, 3160073 N

Ground Water Depth : 21.63 m

Casing Depth : -

Surface Elevation : RL 213.385 m

Boring Start : 22-May-17

Ground Water Level : RL 191.8 m

Boring Finish : 24-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	DS3				Hard brown sandy silt with traces of gravels, low plastic (CL)						32.1	16.7	15.5										
15.50	15.95	SPT7	46	30																				
17.00	17.30	UDS5														1.88	1.58	19.0						
18.50	18.95	SPT8	38	23				1	24	58	17													
20.00	20.30	UDS6														1.87	1.54	21.3						
22.00	22.45	SPT9	41	19																				
24.00	24.30	DS4										28.1	16.8	11.3										
26.00	26.45	SPT10	55	22																				
28.00	28.30	UDS7														1.92	1.55	23.6						
30.00	30.45	SPT11	55	21			30.45	3	20	59	18													

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-135)

Location : 5*hotel - 11 Termination Depth : 30.45 m (RL 183.05 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700203 E, 3160051 N Ground Water Depth : 21.20 m Casing Depth : -  
Surface Elevation : RL 213.500 m Boring Start : 20-May-17  
Ground Water Level : RL 192.3 m Boring Finish : 22-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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		10	26	49	15													9
2.00	2.30	UDS1				- with gravels, 0.0 to 9.5 m										1.80	1.62	11.2		DS	0.5, 1, 1.5	0.0	30.7	7
3.00	3.45	SPT2	14	17								28.5	17.0	11.5										5
4.00	4.30	UDS2														1.81	1.56	15.6						3
5.00	5.45	SPT3	17	18		- very stiff, 5.0 to 14.0 m																		
6.00	6.30	UDS3										28.0	15.9	12.1		1.82	1.59	14.6						
7.00	7.45	SPT4	21	19																				
8.00	8.30	UDS4														1.83	1.61	13.5						
9.50	9.95	SPT5	25	21		- with traces of gravels, 9.5 to 14.0 m		1	20	63	16													
11.00	11.30	UDS5														1.84	1.62	13.5						
12.50	12.95	SPT6	27	20								32.8	17.1	15.7										

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-135)

Location : 5*hotel - 11

Termination Depth : 30.45 m (RL 183.05 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700203 E, 3160051 N

Ground Water Depth : 21.20 m

Casing Depth : -

Surface Elevation : RL 213.500 m

Boring Start : 20-May-17

Ground Water Level : RL 192.3 m

Boring Finish : 22-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Hard brown sandy silt with traces of gravels, low plastic (CL)										1.85	1.60	15.6	2.62					
15.50	15.95	SPT7	36	24																				
17.00	17.30	UDS7										31.5	17.6	13.9		1.87	1.57	19.2						
18.50	18.95	SPT8	43	26																				
20.00	20.30	UDS8						3	24	55	18					1.89	1.52	24.2						
22.00	22.45	SPT9	47	21																				
24.00	24.30	DS2										34.3	17.8	16.5										
26.00	26.45	SPT10	50	21																				
28.00	28.30	UDS9														1.91	1.57	21.6						
30.00	30.45	SPT11	53	21			30.45	1	22	60	17													

⁽¹⁾ SPT is outside NABL scope.



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### Soil Profile (PBH-136)

Location : 5*hotel - 11

Termination Depth : 30.45 m (RL 183.145 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700142 E, 3160033 N

Ground Water Depth : 21.54 m

Casing Depth : -

Surface Elevation : RL 213.595 m

Boring Start : 22-May-17

Ground Water Level : RL 192.1 m

Boring Finish : 24-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)		3	30	52	15													
1.00	1.45	SPT1	14	22		- stiff, 0.0 to 3.0 m																		6
2.00	2.30	UDS1				- with traces of gravels, 0.0 to 6.0 m										1.81	1.62	11.6						8
3.00	3.45	SPT2	16	19		- very stiff, 3.0 to 14.0 m						30.5	19.4	11.2										12
4.00	4.30	UDS2														1.81	1.61	12.6						8
5.00	5.45	SPT3	16	17																				
6.00	6.30	UDS3						0	21	61	18					1.81	1.61	12.6						
7.00	7.45	SPT4	21	19															2.61					
8.00	8.30	UDS4														1.83	1.61	13.5		DS	0.5, 1, 1.5	0.0	29.1	
9.50	9.95	SPT5	24	20								28.9	18.6	10.2										
11.00	11.30	UDS5														1.84	1.62	13.5						
12.50	12.95	SPT6	30	22																				

⁽¹⁾ SPT is outside NABL scope.

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Location : 5*hotel - 11  
UTM Coordinates : 700142 E, 3160033 N

### Soil Profile (PBH-136)

Termination Depth : 30.45 m (RL 183.145 m) Boring Method : Rotary Drilling  
Ground Water Depth : 21.54 m Casing Depth : -  
Surface Elevation : RL 213.595 m Boring Start : 22-May-17  
Ground Water Level : RL 192.1 m Boring Finish : 24-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Hard brown sandy silt, low plastic (CL)		2	24	54	20					1.86	1.62	15.0						
15.50	15.95	SPT7	39	26		- with traces of gravels, 14.0 to 28.0 m																		
17.00	17.30	UDS7										29.6	17.1	12.5		1.88	1.59	18.6						
18.50	18.95	SPT8	44	27																				
20.00	20.30	UDS8														1.89	1.56	21.6						
22.00	22.45	SPT9	50	21																				
24.00	24.30	DS2										26.0	17.4	8.6										
26.00	26.45	SPT10	52	21																				
28.00	28.30	UDS9						0	22	63	15					1.91	1.55	23.6						
30.00	30.45	SPT11	59	22			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-137)

Location : 5*hotel - 11 Termination Depth : 30.45 m (RL 183.072 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700204 E, 3159988 N Ground Water Depth : 21.60 m Casing Depth : -  
Surface Elevation : RL 213.522 m Boring Start : 24-May-17  
Ground Water Level : RL 191.9 m Boring Finish : 26-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to hard brown sandy silt with traces of gravels, low plastic (CL)																		
1.00	1.45	SPT1	12	19		- stiff, 0.0 to 5.0 m																		0
2.00	2.30	UDS1														1.80	1.61	11.4						10
3.00	3.45	SPT2	13	16								27.8	18.2	9.7										9
4.00	4.30	UDS2														1.81	1.60	12.6						0
5.00	5.45	SPT3	18	19		- very stiff, 5.0 to 12.5 m																		
6.00	6.30	UDS3														1.81	1.62	12.3						
7.00	7.45	SPT4	19	18								26.1	18.3	7.8										
8.00	8.30	UDS4														1.83	1.59	14.9						
9.50	9.95	SPT5	25	21				1	34	52	13													
11.00	11.30	UDS5														1.85	1.60	15.2		DS	0.5, 1, 1.5	0.0	41.4	
12.50	12.95	SPT6	31	23		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-137)

Location : 5*hotel - 11

UTM Coordinates : 700204 E, 3159988 N

Termination Depth : 30.45 m (RL 183.072 m)

Ground Water Depth : 21.60 m

Surface Elevation : RL 213.522 m


Ground Water Level : RL 191.9 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 24-May-17

Boring Finish : 26-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6	32	21		Hard brown sandy silt with traces of gravels, low plastic (CL)	30.45	4	20	59	17	28.8	18.1	10.7		1.85	1.60	16.2						
15.50	15.95	SPT7														1.87	1.58	18.6						
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	DS3																						
30.00	30.45	SPT11																						

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-138)

Location : Office - 14

UTM Coordinates : 700160 E, 3159965 N

Termination Depth : 30.45 m (RL 183.05 m)

Ground Water Depth : 21.52 m

Surface Elevation : RL 213.500 m

Ground Water Level : RL 192 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 25-May-17

Boring Finish : 27-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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)																		10
1.00	1.45	SPT1	11	17		- stiff, 0.0 to 5.0 m		0	15	70	15													
2.00	2.30	UDS1														1.80	1.60	12.3						0
3.00	3.45	SPT2	13	16								34.1	19.5	14.6										0
4.00	4.30	UDS2														1.80	1.59	13.6		DS	0.5, 1, 1.5	0.0	31.1	9
5.00	5.45	SPT3	16	17		- very stiff, 5.0 to 14.0 m						28.8	19.8	9.0										
6.00	6.30	DS2																						
7.00	7.45	SPT4	20	19				1	16	68	15													
8.00	8.30	UDS3														1.82	1.60	14.3						
9.50	9.95	SPT5	23	19																				
11.00	11.30	DS3																						
12.50	12.95	SPT6	28	21								29.5	17.8	11.7										

⁽¹⁾ SPT is outside NABL scope.


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Location : Office - 14  
UTM Coordinates : 700160 E, 3159965 N

### Soil Profile (PBH-138)

Termination Depth : 30.45 m (RL 183.05 m) Boring Method : Rotary Drilling  
Ground Water Depth : 21.52 m Casing Depth : -  
Surface Elevation : RL 213.500 m Boring Start : 25-May-17  
Ground Water Level : RL 192 m Boring Finish : 27-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)																
14.00	14.30	UDS4	31	21		Hard brown sandy silt, low plastic (CL)	30.45	0	14	74	12	29.4	19.1	10.3		1.85	1.60	15.6																					
15.50	15.95	SPT7																																					
17.00	17.30	UDS5																																					
18.50	18.95	SPT8														35	21																						
20.00	20.30	DS4																																					
22.00	22.45	SPT9														44	20																						
24.00	24.30	UDS6																																					
26.00	26.45	SPT10														43	19																						
28.00	28.30	UDS7																																					
30.00	30.45	SPT11														59	22																						

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-139)

Location : Office - 14

UTM Coordinates : 700109 E, 3159986 N

Termination Depth : 30.45 m (RL 182.832 m)

Ground Water Depth : 21.10 m

Surface Elevation : RL 213.282 m




Ground Water Level : RL 192.2 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 11-May-17

Boring Finish : 13-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Medium dense brown silty fine sand (SM)																		
1.00	1.45	SPT1	10	16				0	49	43	8											0		
2.00	2.30	UDS1											1.80	1.64	9.2	2.70						0		
3.00	3.45	SPT2	12	14																		0		
4.00	4.30	UDS2											1.80	1.62	11.5		DS	0.5, 1, 1.5	0.0	32.5		0		
5.00	5.45	SPT3	16	17		Very stiff to hard brown sandy silt, low plastic (CL)	6.00																	
6.00	6.30	UDS3										28.5	16.0	12.5		1.81	1.61	12.8						
7.00	7.45	SPT4	19	18			- very stiff, 6.0 to 9.5 m		0	36	54	10												
8.00	8.30	UDS4											1.85	1.67	11.1									
9.50	9.95	SPT5	43	36			- hard, 9.5 to 12.5 m						33.4	15.7	17.7									
11.00	11.30	UDS5					12.50									1.88	1.73	8.5						
12.50	12.95	SPT6	42	31		Dense brown silty fine sand (SM)		0	45	44	11													

⁽¹⁾ SPT is outside NABL scope.



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Location : Office - 14  
UTM Coordinates : 700109 E, 3159986 N

### Soil Profile (PBH-139)

Termination Depth : 30.45 m (RL 182.832 m) Boring Method : Rotary Drilling  
Ground Water Depth : 21.10 m Casing Depth : -  
Surface Elevation : RL 213.282 m Boring Start : 11-May-17  
Ground Water Level : RL 192.2 m Boring Finish : 13-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Dense brown silty fine sand (SM)	15.50									1.89	1.66	13.5						
15.50	15.95	SPT7	45	30		Hard brown sandy silt, low plastic (CL)						27.7	17.4	10.4										
17.00	17.30	UDS7														1.90	1.69	12.5						
18.50	18.95	SPT8	45	27																				
20.00	20.30	UDS8						0	29	59	12					1.90	1.66	14.5						
22.00	22.45	SPT9	46	20																				
24.00	24.30	UDS9														1.91	1.65	15.5						
26.00	26.45	SPT10	52	21								30.5	15.9	14.5										
28.00	28.30	DS2																						
30.00	30.45	SPT11	50	20			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-140)

Location : Office - 14

Termination Depth : 30.45 m (RL 183.165 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700140 E, 3159937 N

Ground Water Depth : 20.90 m

Casing Depth : -

Surface Elevation : RL 213.615 m

Boring Start : 12-May-17

Ground Water Level : RL 192.7 m

Boring Finish : 13-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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	9	14		- stiff, 0.0 to 3.0 m		2	39	50	9													5
2.00	2.30	UDS1				- with traces of gravels, 0.0 to 5.0 m										1.80	1.60	12.2						3
3.00	3.45	SPT2	15	18		- very stiff, 3.0 to 14.0 m																		6
4.00	4.30	UDS2														1.81	1.67	8.1		DS	0.5, 1, 1.5	0.0	37.2	8
5.00	5.45	SPT3	16	17				0	38	52	10													
6.00	6.30	UDS3														1.81	1.66	9.4						
7.00	7.45	SPT4	20	19																				
8.00	8.30	UDS4														1.82	1.66	9.8						
9.50	9.95	SPT5	23	19																				
11.00	11.30	UDS5														1.83	1.57	16.5						
12.50	12.95	SPT6	25	18		- with traces of gravels, 12.5 to 14.0 m		3	40	47	10													

⁽¹⁾ SPT is outside NABL scope.

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Location : Office - 14  
UTM Coordinates : 700140 E, 3159937 N

### Soil Profile (PBH-140)

Termination Depth : 30.45 m (RL 183.165 m) Boring Method : Rotary Drilling  
Ground Water Depth : 20.90 m Casing Depth : -  
Surface Elevation : RL 213.615 m Boring Start : 12-May-17  
Ground Water Level : RL 192.7 m Boring Finish : 13-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS6				Very stiff to hard brown sandy silt with traces of gravels, low plastic (CL)										1.84	1.62	13.4	2.68					
15.50	15.95	SPT7	28	19		- very stiff, 14.0 to 18.5 m		4	27	54	15													
17.00	17.30	UDS7														1.85	1.68	10.1						
18.50	18.95	SPT8	32	19		- hard, 18.5 to 30.45 m																		
20.00	20.30	UDS8										25.6	16.4	9.2		1.87	1.67	12.4						
22.00	22.45	SPT9	41	19																				
24.00	24.30	DS2																						
26.00	26.45	SPT10	38	18																				
28.00	28.30	UDS9														1.88	1.65	14.4						
30.00	30.45	SPT11	43	18			30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-141)

Location : - Termination Depth : 30.45 m (RL 183.273 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700154 E, 3159882 N Ground Water Depth : 21.96 m Casing Depth : -  
Surface Elevation : RL 213.723 m Boring Start : 14-May-17  
Ground Water Level : RL 191.8 m Boring Finish : 15-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Medium dense brown silty fine sand with traces of gravels (SM)																		
1.00	1.45	SPT1	10	16																		0		
2.00	2.30	UDS1					1	48	44	7					1.79	1.59	12.4					8		
3.00	3.45	SPT2	12	14																		0		
4.00	4.30	UDS2													1.80	1.60	12.5					0		
5.00	5.45	SPT3	14	15																				
6.00	6.30	UDS3													1.80	1.55	16.0							
7.00	7.45	SPT4	14	13																				
8.00	8.30	UDS4				9.50								1.81	1.67	8.8	2.68							
9.50	9.95	SPT5	18	15		Very stiff brown sandy silt with traces of gravels, low plastic (CL)		1	27	56	16													
11.00	11.30	UDS5													1.82	1.60	13.4		DS	0.5 ,1, 1.5	0.0	30.8		
12.50	12.95	SPT6	20	15																				

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-141)

Location : - Termination Depth : 30.45 m (RL 183.273 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700154 E, 3159882 N Ground Water Depth : 21.96 m Casing Depth : -  
Surface Elevation : RL 213.723 m Boring Start : 14-May-17  
Ground Water Level : RL 191.8 m Boring Finish : 15-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	DS2				Very stiff to hard brown sandy silt, low plastic (CL)						31.8	18.3	13.5										
15.50	15.95	SPT7	28	19		- very stiff, 14.0 to 18.5 m																		
17.00	17.30	UDS6														1.86	1.67	11.5						
18.50	18.95	SPT8	38	23		- hard, 18.5 to 30.45 m		0	40	51	9													
20.00	20.30	DS3																						
22.00	22.45	SPT9	41	19																				
24.00	24.30	UDS7														1.88	1.66	12.8						
26.00	26.45	SPT10	51	21				0	34	51	15													
28.00	28.30	UDS8														1.91	1.66	14.8						
30.00	30.45	SPT11	54	21			30.45					33.3	16.3	17.1										

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-142)

Location : Office - 18  
UTM Coordinates : 700086 E, 3159864 N  
Termination Depth : 30.45 m (RL 183.229 m)  
Ground Water Depth : 21.10 m  
Surface Elevation : RL 213.679 m  
Ground Water Level : RL 192.6 m  
Boring Method : Rotary Drilling  
Casing Depth : -  
Boring Start : 13-May-17  
Boring Finish : 15-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	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 3.0 m		0	34	56	10													3
2.00	2.30	UDS1														1.80	1.60	12.5						2
3.00	3.45	SPT2	18	22		- very stiff, 3.0 to 14.0 m																		5
4.00	4.30	UDS2														1.82	1.64	10.9						6
5.00	5.45	SPT3	17	18																				
6.00	6.30	UDS3				- with traces of gravels, 6.0 to 14.0 m		1	42	48	9					1.82	1.67	8.9	2.69					
7.00	7.45	SPT4	22	20																				
8.00	8.30	UDS4										26.2	17.6	8.6		1.83	1.62	12.9		DS	0.5, 1, 1.5	0.0	27.4	
9.50	9.95	SPT5	24	20				4	18	64	14													
11.00	11.30	UDS5														1.83	1.60	14.8						
12.50	12.95	SPT6	24	18			14.00	2	24	61	13													

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-142)

Location : Office - 18

Termination Depth : 30.45 m (RL 183.229 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700086 E, 3159864 N

Ground Water Depth : 21.10 m

Casing Depth : -

Surface Elevation : RL 213.679 m

Boring Start : 13-May-17

Ground Water Level : RL 192.6 m

Boring Finish : 15-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS6				Medium dense to very dense brown silty fine sand with traces of gravel (SM)									1.84	1.63	12.8							
15.50	15.95	SPT7	29	19		- medium dense, 14.0 to 18.5 m																		
17.00	17.30	UDS7																						
18.50	18.95	SPT8	41	25	- dense, 18.5 to 26.0 m																			
20.00	20.30	UDS8																						
22.00	22.45	SPT9	45	20																				
24.00	24.30	UDS9																						
26.00	26.45	SPT10	50	21	- very dense, 26.0 to 30.45 m																			
28.00	28.30	DS2																						
30.00	30.45	SPT11	56	21																				
							30.45																	

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-143)

Location : Office - 18

Termination Depth : 30.45 m (RL 183.125 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700029 E, 3159878 N

Ground Water Depth : 21.60 m

Casing Depth : -

Surface Elevation : RL 213.575 m

Boring Start : 16-May-17

Ground Water Level : RL 192 m

Boring Finish : 18-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	SPT1	10	16		- stiff, 0.0 to 5.0 m						25.8	14.8	11.1										9
2.00	2.30	UDS1														1.80	1.65	8.9						7
3.00	3.45	SPT2	12	14				0	43	45	12													11
4.00	4.30	UDS2														1.81	1.64	10.3						14
5.00	5.45	SPT3	19	20		- very stiff, 5.0 to 14.0 m																		
6.00	6.30	UDS3														1.82	1.64	11.1		DS	0.5, 1, 1.5	0.0	33.1	
7.00	7.45	SPT4	20	19		- with gravels, 7.0 to 14.0 m		12	34	46	8								2.65					
8.00	8.30	UDS4														1.83	1.69	8.8						
9.50	9.95	SPT5	30	25								28.4	19.2	9.2										
11.00	11.30	UDS5														1.87	1.61	16.6						
12.50	12.95	SPT6	28	21																				

⁽¹⁾ SPT is outside NABL scope.




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Location : Office - 18  
UTM Coordinates : 700029 E, 3159878 N

### Soil Profile (PBH-143)

Termination Depth : 30.45 m (RL 183.125 m) Boring Method : Rotary Drilling  
Ground Water Depth : 21.60 m Casing Depth : -  
Surface Elevation : RL 213.575 m Boring Start : 16-May-17  
Ground Water Level : RL 192 m Boring Finish : 18-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)		Plasticity Index (%)	Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )		Moisture Content (%)	Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	
14.00	14.30	DS2	32	21		Hard brown sandy silt with traces of gravels, low plastic (CL)		2	32	51	15					1.86	1.65	12.8					
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	DS3																					
26.00	26.45	SPT10																					
28.00	28.30	UDS8																					
30.00	30.45	SPT11					48	19		30.45	1	29	54	16									

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-144)

Location : Office - 18

UTM Coordinates : 700065 E, 3159836 N

Termination Depth : 30.45 m (RL 183.144 m)

Ground Water Depth : 21.40 m

Surface Elevation : RL 213.594 m

Ground Water Level : RL 192.2 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 16-May-17

Boring Finish : 18-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic																		
1.00	1.45	SPT1	10	16		- CL, 0.0 to 9.5 m																		7
2.00	2.30	UDS1				- stiff, 0.0 to 9.5 m		0	31	58	11					1.80	1.60	12.1						9
3.00	3.45	SPT2	14	17																				12
4.00	4.30	UDS2										25.0	16.6	8.4		1.80	1.63	10.5						15
5.00	5.45	SPT3	15	16																				
6.00	6.30	UDS3														1.81	1.62	11.5						
7.00	7.45	SPT4	14	13		- with gravels, 7.0 to 14.0 m		7	21	53	19													
8.00	8.30	DS2																						
9.50	9.95	SPT5	17	14		- CL-ML, 9.5 to 14.0 m						23.6	17.3	6.3					2.67					
11.00	11.30	UDS4				- very stiff, 9.5 to 14.0 m										1.82	1.65	10.1		DS	0.5, 1, 1.5	0.0	27.9	
12.50	12.95	SPT6	20	15																				

⁽¹⁾ SPT is outside NABL scope.

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Location : Office - 18  
UTM Coordinates : 700065 E, 3159836 N

### Soil Profile (PBH-144)

Termination Depth : 30.45 m (RL 183.144 m) Boring Method : Rotary Drilling  
Ground Water Depth : 21.40 m Casing Depth : -  
Surface Elevation : RL 213.594 m Boring Start : 16-May-17  
Ground Water Level : RL 192.2 m Boring Finish : 18-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	DS3				Very stiff to hard brown sandy silt, low plastic  - CL-ML, 14.0 to 28.0 m  - very stiff, 14.0 to 22.0 m    - hard, 22.0 to 30.45 m  - with traces of gravels, 26.0 to 30.45 m  - CL, 28.0 to 30.45 m																		
15.50	15.95	SPT7	21	14			0	38	50	12														
17.00	17.30	UDS5											1.82	1.56	16.6									
18.50	18.95	SPT8	23	14							23.0	16.3	6.6											
20.00	20.30	UDS6											1.85	1.61	14.5									
22.00	22.45	SPT9	34	17																				
24.00	24.30	UDS7											1.86	1.59	17.5									
26.00	26.45	SPT10	41	18				2	31	54	13													
28.00	28.30	DS4										23.9	16.2	7.7										
30.00	30.45	SPT11	51	20				30.45																

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-145)

Location : 4*hotel - 21 Termination Depth : 30.45 m (RL 183.221 m) Boring Method : Rotary Drilling  
UTM Coordinates : 699979 E, 3159813 N Ground Water Depth : 21.40 m Casing Depth : -  
Surface Elevation : RL 213.671 m Boring Start : 20-May-17  
Ground Water Level : RL 192.3 m Boring Finish : 22-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt, low plastic (CL)						33.9	16.9	17.0										
1.00	1.45	SPT1	8	12		- stiff, 0.0 to 9.5 m		0	25	64	11													6
2.00	2.30	UDS1														1.79	1.61	11.3						8
3.00	3.45	SPT2	11	13															2.68					12
4.00	4.30	UDS2										24.2	16.3	7.9		1.80	1.60	12.3		DS	0.5, 1, 1.5	0.0	32.4	15
5.00	5.45	SPT3	14	15		- very stiff, 9.5 to 14.0 m																		
6.00	6.30	UDS3														1.80	1.60	12.6						
7.00	7.45	SPT4	15	14				0	23	64	13													
8.00	8.30	DS2																						
9.50	9.95	SPT5	16	13																				
11.00	11.30	UDS4										25.8	16.8	9.0		1.85	1.59	16.2						
12.50	12.95	SPT6	23	17																				

⁽¹⁾ SPT is outside NABL scope.




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Location : 4*hotel - 21  
UTM Coordinates : 699979 E, 3159813 N

### Soil Profile (PBH-145)

Termination Depth : 30.45 m (RL 183.221 m) Boring Method : Rotary Drilling  
Ground Water Depth : 21.40 m Casing Depth : -  
Surface Elevation : RL 213.671 m Boring Start : 20-May-17  
Ground Water Level : RL 192.3 m Boring Finish : 22-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS5	20	13		Very stiff brown sandy silt with gravels, low plastic (CL)	26.00	5	22	54	19	31.9	16.6	15.3	1.83	1.60	14.6							
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	30	16		Dense brown silty fine sand (SM)		0	54	40	6				1.85	1.53	20.3							
24.00	24.30	UDS7																						
26.00	26.45	SPT10	41	18																				
28.00	28.30	UDS8	46	19			30.45								1.87	1.52	22.6							
30.00	30.45	SPT11																						

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-146)

Location : 4*hotel - 21

Termination Depth : 30.45 m (RL 183.138 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700054 E, 3159790 N

Ground Water Depth : 21.41 m

Casing Depth : -

Surface Elevation : RL 213.588 m

Boring Start : 21-May-17

Ground Water Level : RL 192.2 m

Boring Finish : 23-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown sandy silt with traces of gravels, low plastic (CL)																		
1.00	1.45	SPT1	9	14		- stiff, 0.0 to 5.0 m		2	40	49	9													6
2.00	2.30	UDS1														1.79	1.59	12.3						9
3.00	3.45	SPT2	10	12				3	26	56	15													10
4.00	4.30	UDS2														1.80	1.61	12.1						15
5.00	5.45	SPT3	18	19		- very stiff, 5.0 to 14.0 m																		
6.00	6.30	DS2										26.5	17.6	8.9										
7.00	7.45	SPT4	20	19																				
8.00	8.30	UDS3														1.83	1.61	13.1		DS	0.5, 1, 1.5	0.0	30.5	
9.50	9.95	SPT5	25	21				1	30	55	14													
11.00	11.30	DS3																						
12.50	12.95	SPT6	30	22								28.7	18.1	10.6										

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-146)

Location : 4*hotel - 21

UTM Coordinates : 700054 E, 3159790 N

Termination Depth : 30.45 m (RL 183.138 m)

Ground Water Depth : 21.41 m

Surface Elevation : RL 213.588 m


Ground Water Level : RL 192.2 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 21-May-17

Boring Finish : 23-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS4	34	23		Hard brown sandy silt with traces of gravels, low plastic (CL)		1	28	55	16	30.3	18.6	11.7		1.85	1.62	14.6	2.65					
15.50	15.95	SPT7																						
17.00	17.30	DS4																						
18.50	18.95	SPT8																						
20.00	20.30	UDS5																						
22.00	22.45	SPT9																						
24.00	24.30	DS5																						
26.00	26.45	SPT10																						
28.00	28.30	UDS6																						
30.00	30.45	SPT11	54	21		30.45																		

⁽¹⁾ SPT is outside NABL scope.

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### Soil Profile (PBH-147)

Location : 4*hotel - 21 Termination Depth : 30.45 m (RL 183.05 m) Boring Method : Rotary Drilling  
UTM Coordinates : 700008 E, 3159790 N Ground Water Depth : 21.50 m Casing Depth : -  
Surface Elevation : RL 213.500 m Boring Start : 20-May-17  
Ground Water Level : RL 192 m Boring Finish : 22-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Firm to hard brown sandy silt, low plastic (CL)		0	28	62	10													
1.00	1.45	SPT1	7	11		- firm, 0.0 to 3.0 m													2.65					7
2.00	2.30	UDS1														1.79	1.61	11.2		DS	0.5, 1, 1.5	0.0	31.3	10
3.00	3.45	SPT2	9	11		- stiff, 3.0 to 9.5 m						26.2	17.3	8.8										12
4.00	4.30	UDS2														1.80	1.58	13.5						15
5.00	5.45	SPT3	12	12																				
6.00	6.30	UDS3						0	31	57	12					1.80	1.57	14.6						
7.00	7.45	SPT4	14	13																				
8.00	8.30	DS2																						
9.50	9.95	SPT5	19	16		- very stiff, 9.5 to 12.5 m						25.8	17.2	8.6										
11.00	11.30	UDS4														1.84	1.59	15.6						
12.50	12.95	SPT6	43	32		- hard, 12.5 to 14.0 m																		

⁽¹⁾ SPT is outside NABL scope.



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### Soil Profile (PBH-147)

Location : 4*hotel - 21

UTM Coordinates : 700008 E, 3159790 N

Termination Depth : 30.45 m (RL 183.05 m)

Ground Water Depth : 21.50 m

Surface Elevation : RL 213.500 m

Ground Water Level : RL 192 m

Boring Method : Rotary Drilling

Casing Depth : -

Boring Start : 20-May-17

Boring Finish : 22-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, $\phi$ (degrees)	
14.00	14.30	UDS5				Hard brown sandy silt, low plastic (CL)		0	26	63	11					1.88	1.61	16.9						
15.50	15.95	SPT7	42	28																				
17.00	17.30	DS3																						
18.50	18.95	SPT8	40	24								32.7	19.2	13.5										
20.00	20.30	UDS6														1.87	1.56	20.1						
22.00	22.45	SPT9	39	18																				
24.00	24.30	UDS7														1.88	1.52	23.5						
26.00	26.45	SPT10	41	18				0	26	58	16													
28.00	28.30	DS4																						
30.00	30.45	SPT11	42	18			30.45					26.0	17.2	8.7										

⁽¹⁾ SPT is outside NABL scope.

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(NABL)  
Certificate No. T-1741



### Soil Profile (PBH-149)

Location : 4*hotel - 21

Termination Depth : 30.45 m (RL 183.231 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700018 E, 3159742 N

Ground Water Depth : 21.40 m

Casing Depth : -

Surface Elevation : RL 213.681 m

Boring Start : 22-May-17

Ground Water Level : RL 192.3 m

Boring Finish : 23-May-17

Depth, m		Sample No.	SPT ⁽¹⁾		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 _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff brown sandy silt, low plastic (CL)	1.00					28.9	18.6	10.3										
1.00	1.45	SPT1	12	19		Medium dense brown silty fine sand (SM)		0	45	45	10						1.80	1.60	12.6				5	
2.00	2.30	UDS1																1.81	1.62	11.6				0
3.00	3.45	SPT2	16	19																				0
4.00	4.30	UDS2					5.00											1.82	1.59	14.0				0
5.00	5.45	SPT3	18	19		Very stiff to hard brown sandy silt, low plastic (CL)  - very stiff, 5.0 to 9.5 m		0	30	55	15													
6.00	6.30	UDS3																1.84	1.63	12.4				
7.00	7.45	SPT4	20	19				0	38	51	11													
8.00	8.30	UDS4																						
9.50	9.95	SPT5	31	26		- hard, 9.5 to 14.0 m																		
11.00	11.30	DS2																						
12.50	12.95	SPT6	32	24																				

⁽¹⁾ SPT is outside NABL scope.

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



### Soil Profile (PBH-149)

Location : 4*hotel - 21

Termination Depth : 30.45 m (RL 183.231 m)

Boring Method : Rotary Drilling

UTM Coordinates : 700018 E, 3159742 N

Ground Water Depth : 21.40 m

Casing Depth : -

Surface Elevation : RL 213.681 m

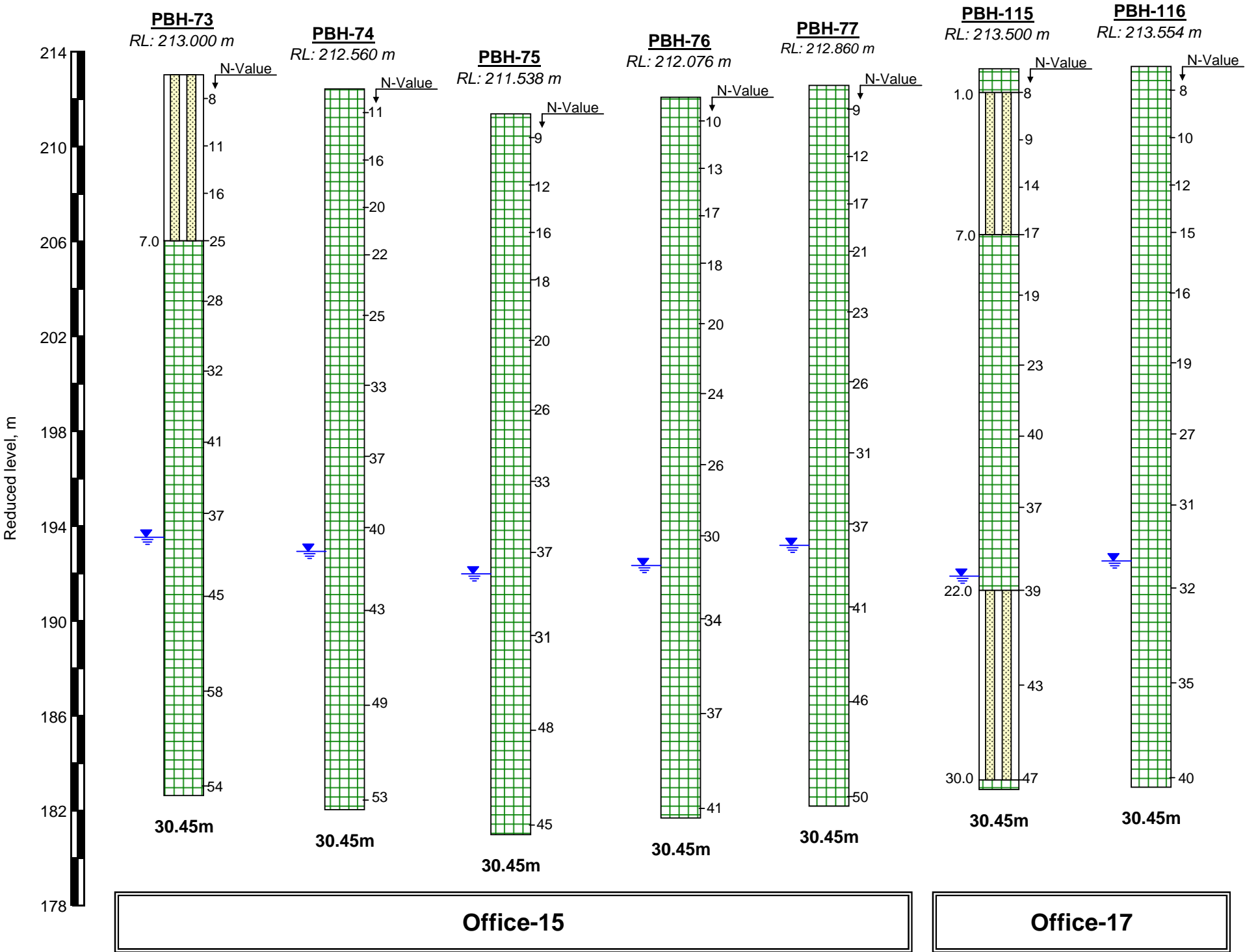
Boring Start : 22-May-17

Ground Water Level : RL 192.3 m

Boring Finish : 23-May-17

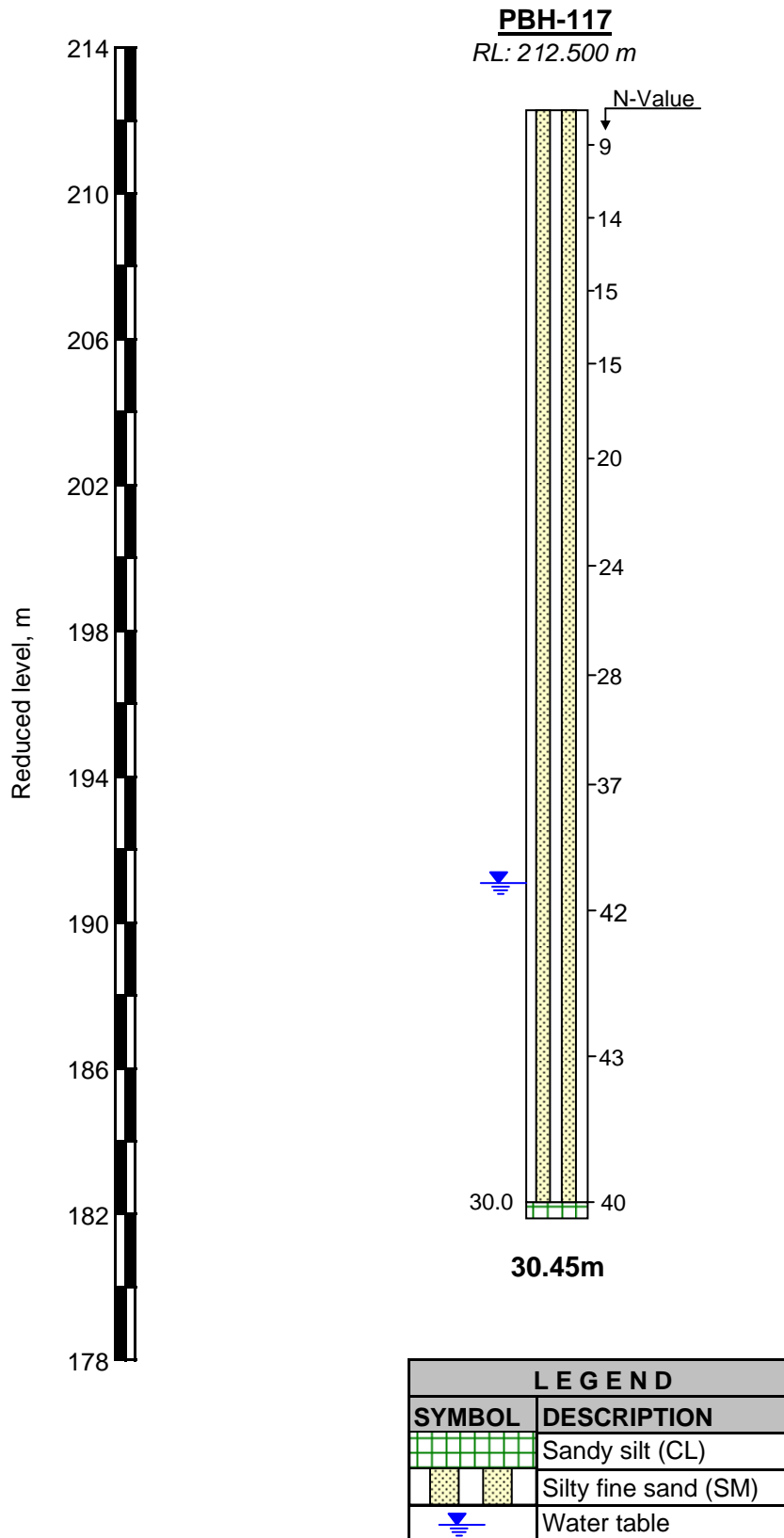
Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³ )	Dry Density (gms/cm ³ )	Moisture Content (%)		Type of Test	Confining Pressures (kg/cm ² )	Cohesion Intercept, 'c' (kg/cm ² )	Angle of Internal Friction, φ (degrees)	
14.00	14.30	UDS5				Hard to very stiff brown sandy silt, low plastic (CL)										1.86	1.59	16.5		DS	0.5, 1, 1.5	0.0	31.8	
15.50	15.95	SPT7	34	23		- hard, 14.0 to 18.5 m																		
17.00	17.30	UDS6										27.6	16.5	11.2		1.85	1.55	19.5						
18.50	18.95	SPT8	28	17		- very stiff, 18.5 to 22.0 m		0	41	49	10													
20.00	20.30	DS3																						
22.00	22.45	SPT9	33	17		- hard, 22.0 to 30.45 m						32.8	18.7	14.1										
24.00	24.30	UDS7				- with traces of gravels, 24.0 to 30.45 m		1	42	47	10					1.86	1.52	22.5						
26.00	26.45	SPT10	32	16																				
28.00	28.30	DS4																						
30.00	30.45	SPT11	39	17			30.45					29.5	20.4	9.1										

⁽¹⁾ SPT is outside NABL scope.

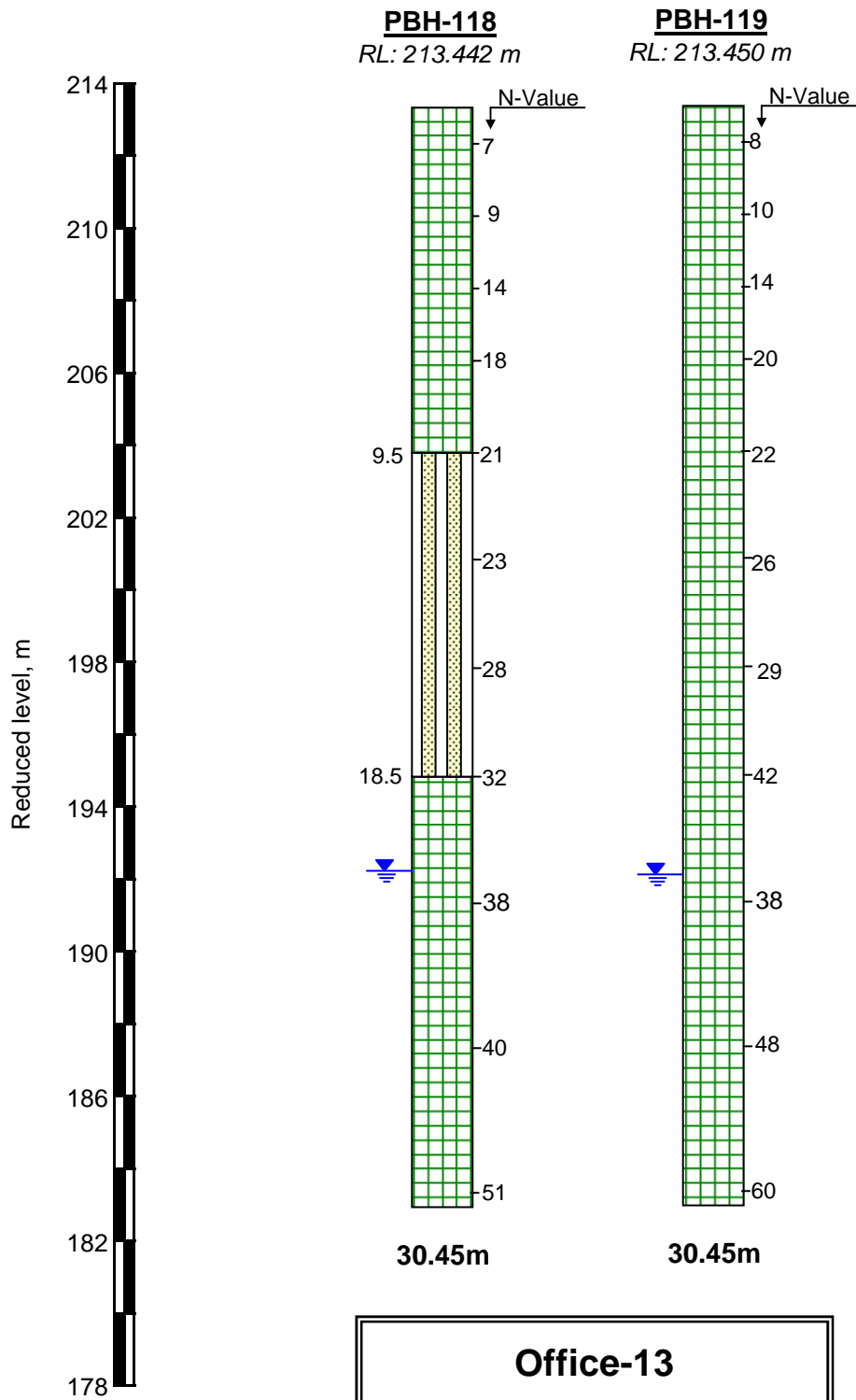


LEGEND	
SYMBOL	DESCRIPTION
	Sandy silt (CL)
	Silty fine sand (SM)
	Water table

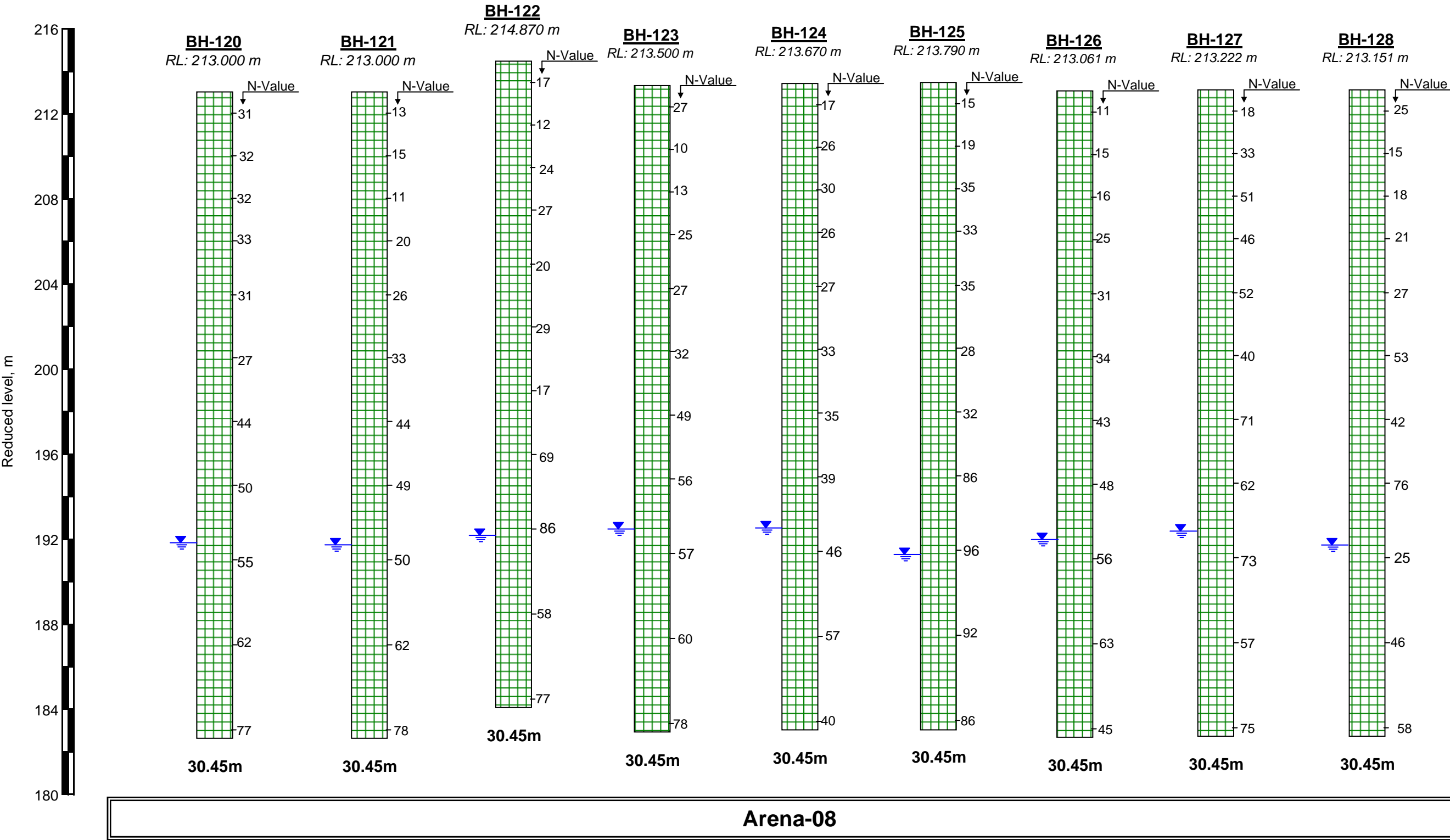
Summary of Borehole Profiles



### Summary of Borehole Profiles

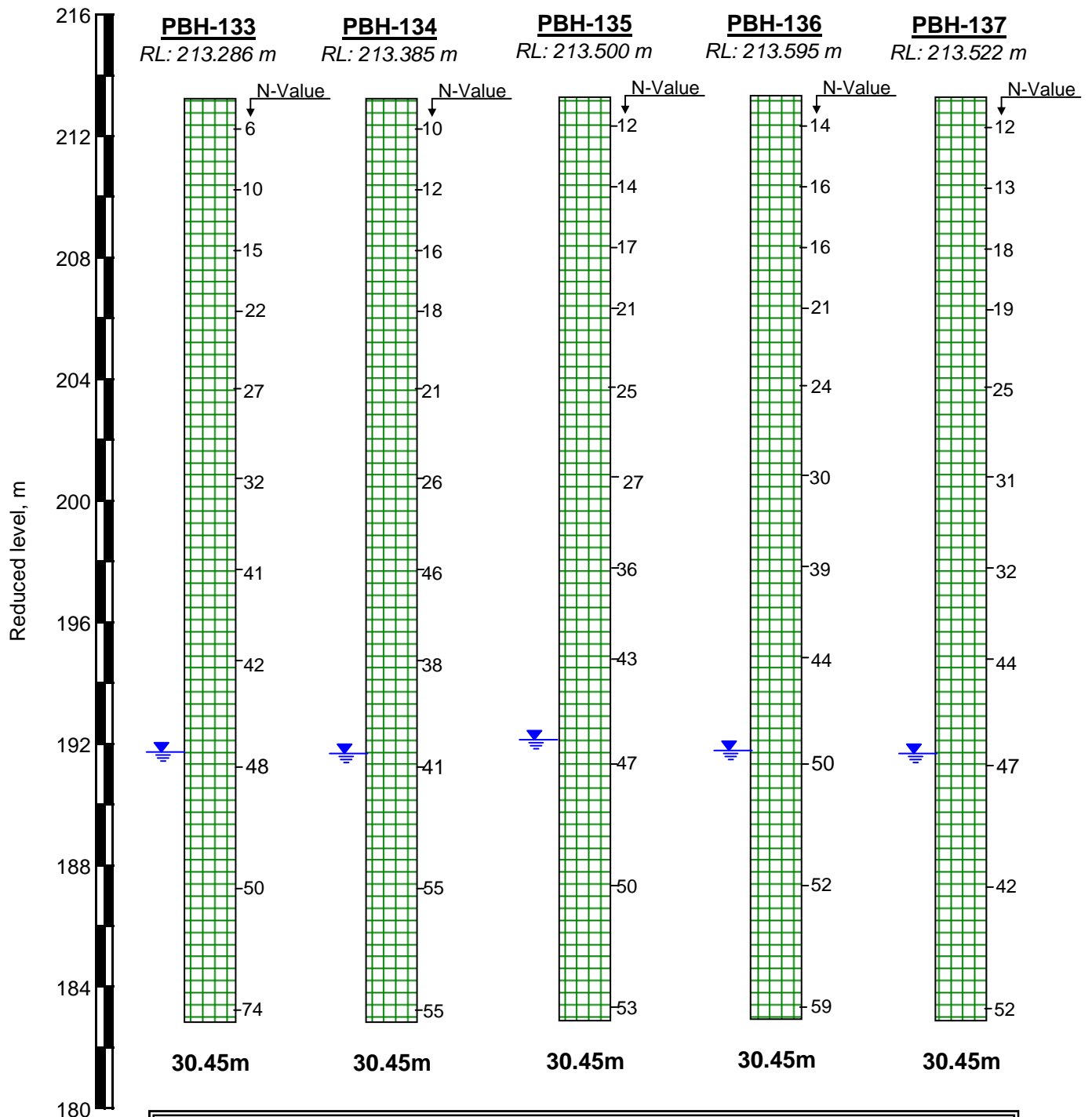


Summary of Borehole Profiles



Summary of Borehole Profiles

LEGEND	
SYMBOL	DESCRIPTION
	Sandy silt (CL)
	Water table

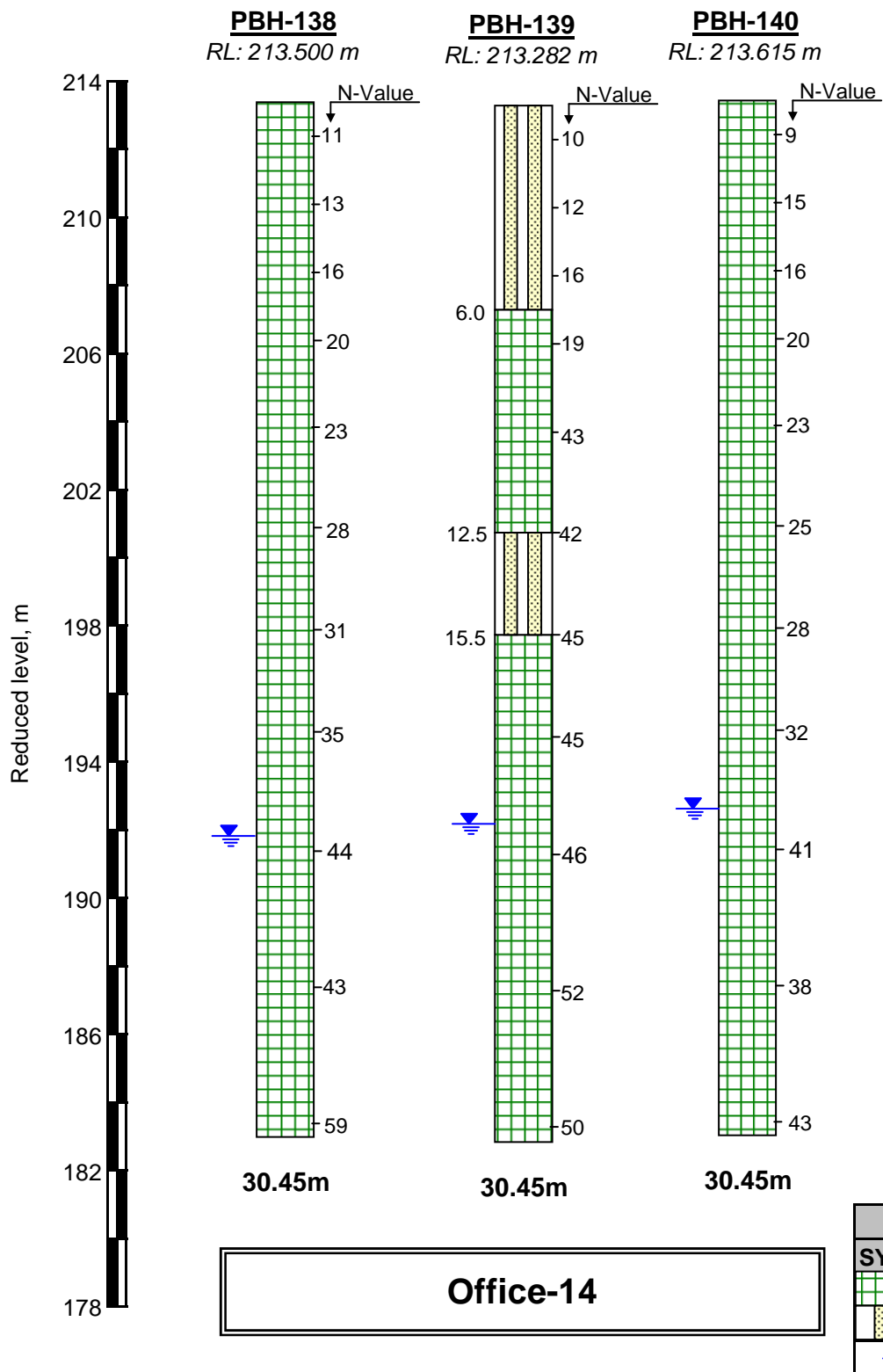


### 5*Hotel-11

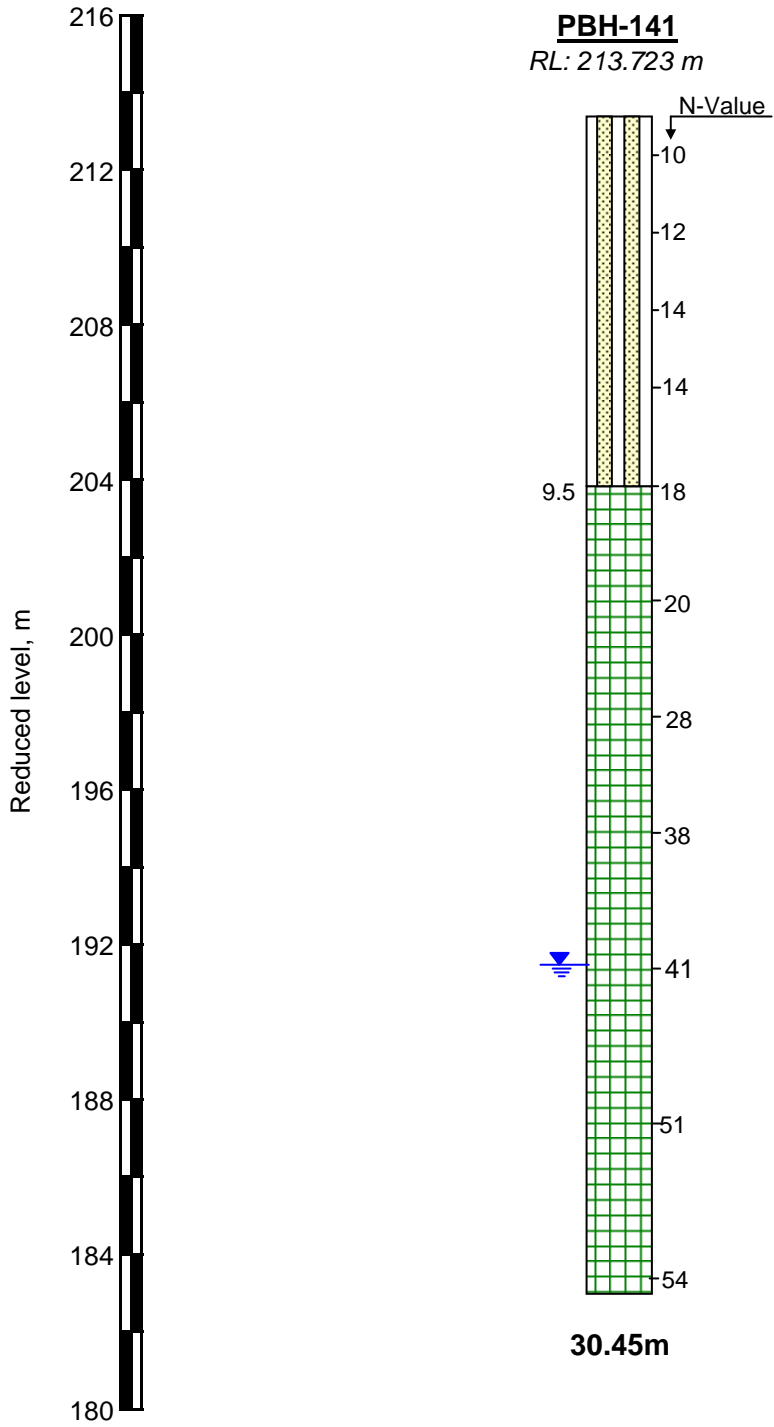
LEGEND	
SYMBOL	DESCRIPTION
	Sandy silt (CL)
	Water table

### Summary of Borehole Profiles



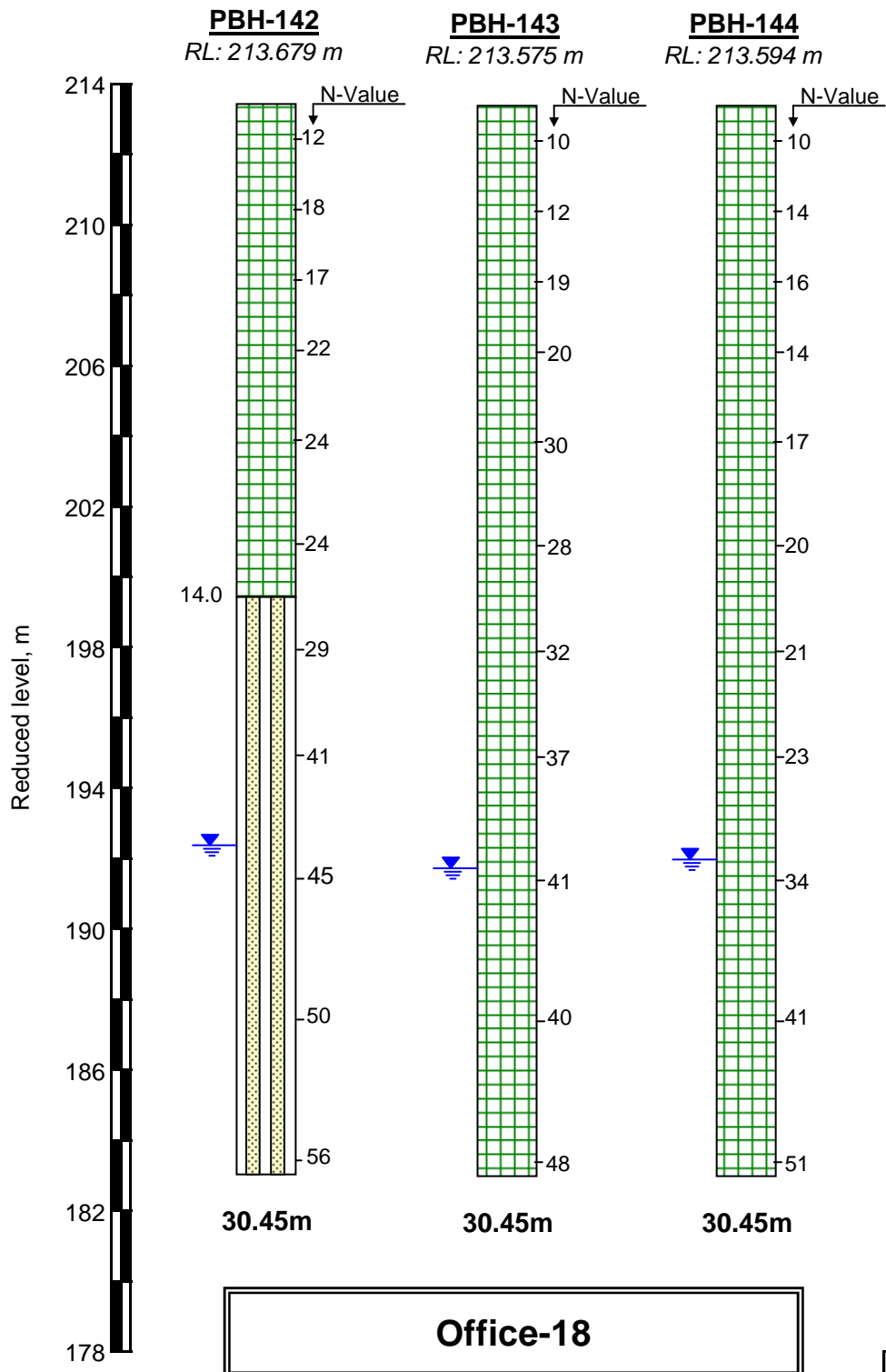


Summary of Borehole Profiles



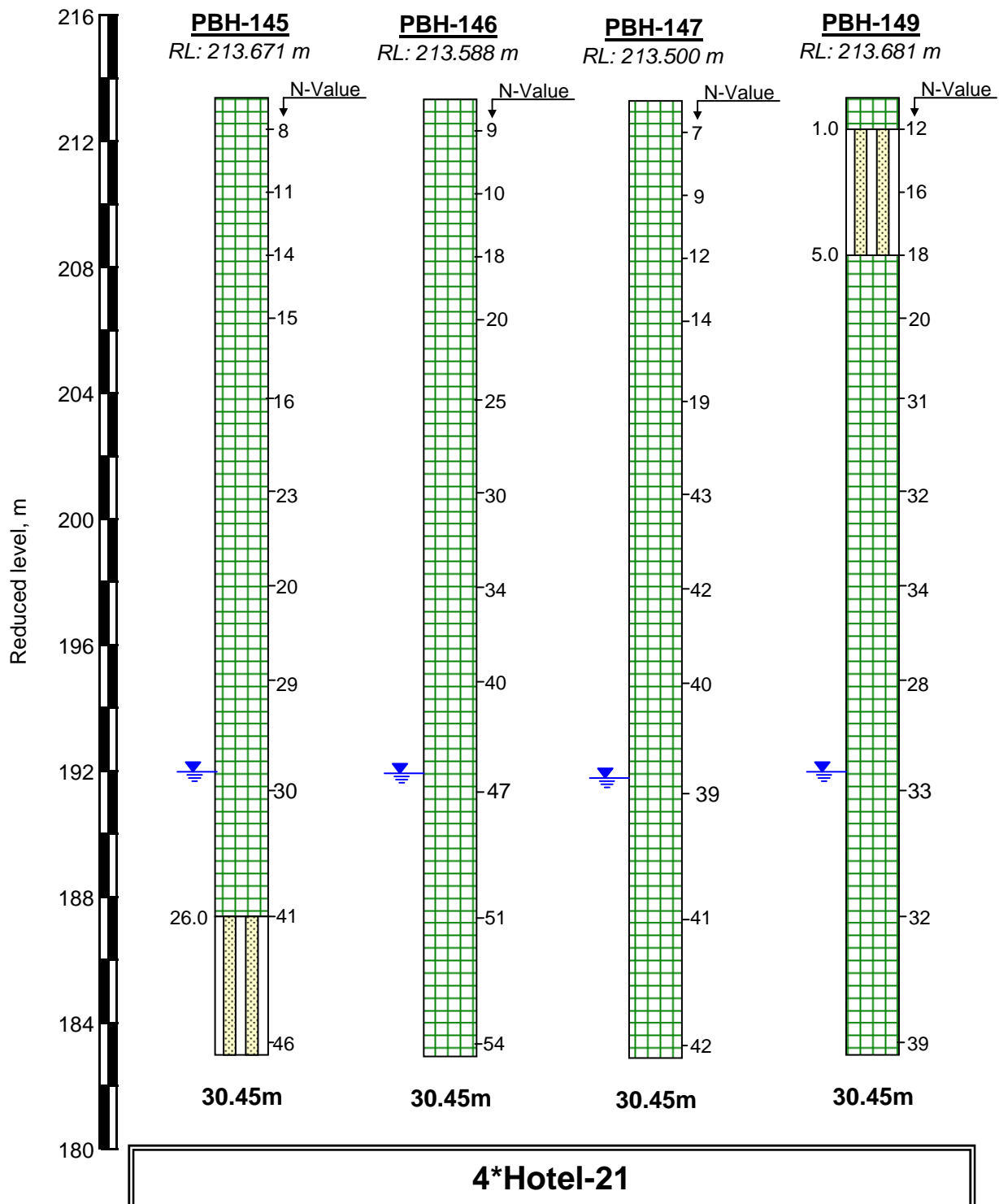
LEGEND	
SYMBOL	DESCRIPTION
	Sandy silt (CL)
	Silty fine sand (SM)
	Water table

### Summary of Borehole Profiles



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

### Summary of Borehole Profiles



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

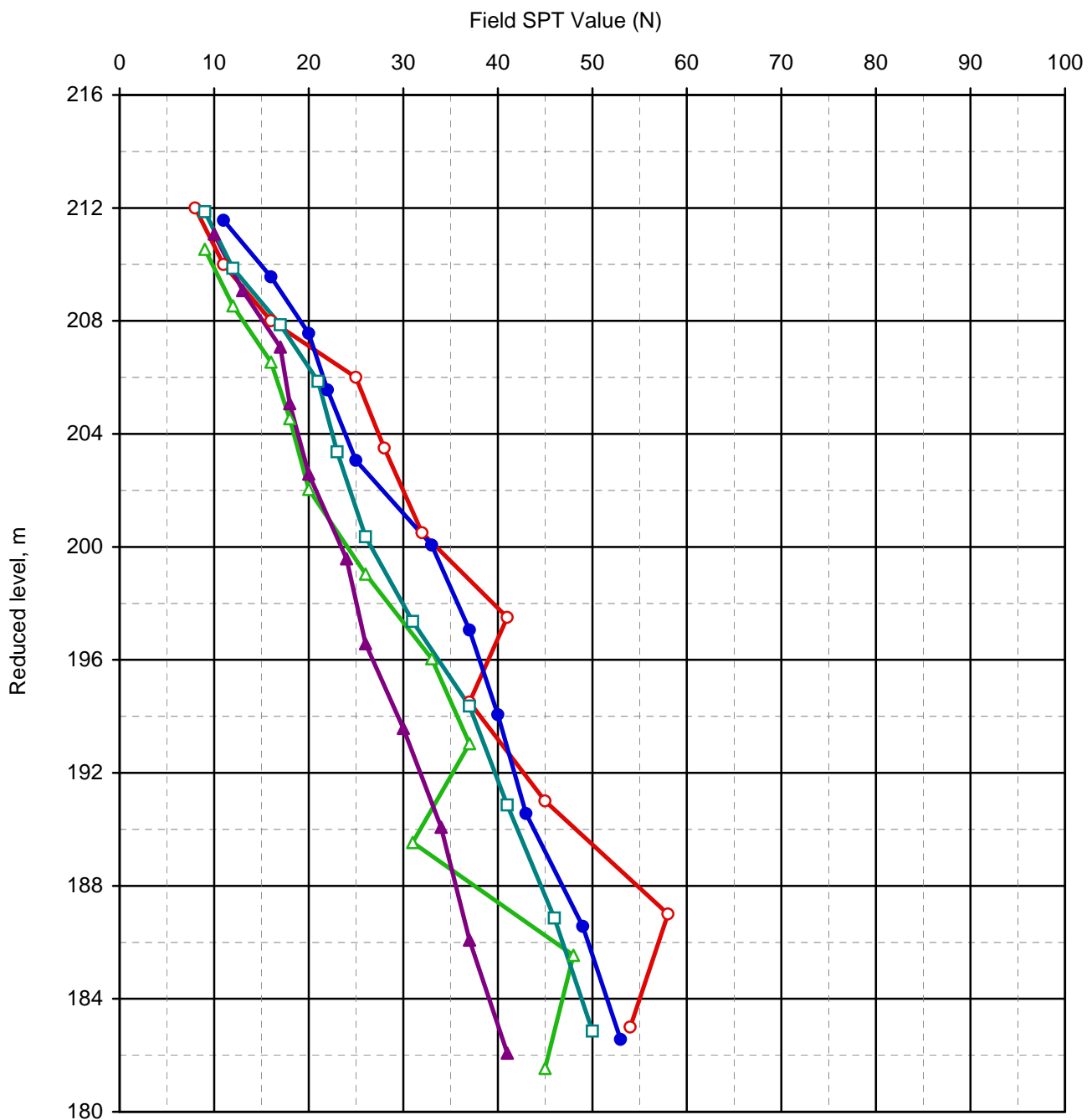
Summary of Borehole Profiles



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-73	213.000	Office-15
●	PBH-74	212.560	
△	PBH-75	211.538	
▲	PBH-76	212.076	
□	PBH-77	212.860	



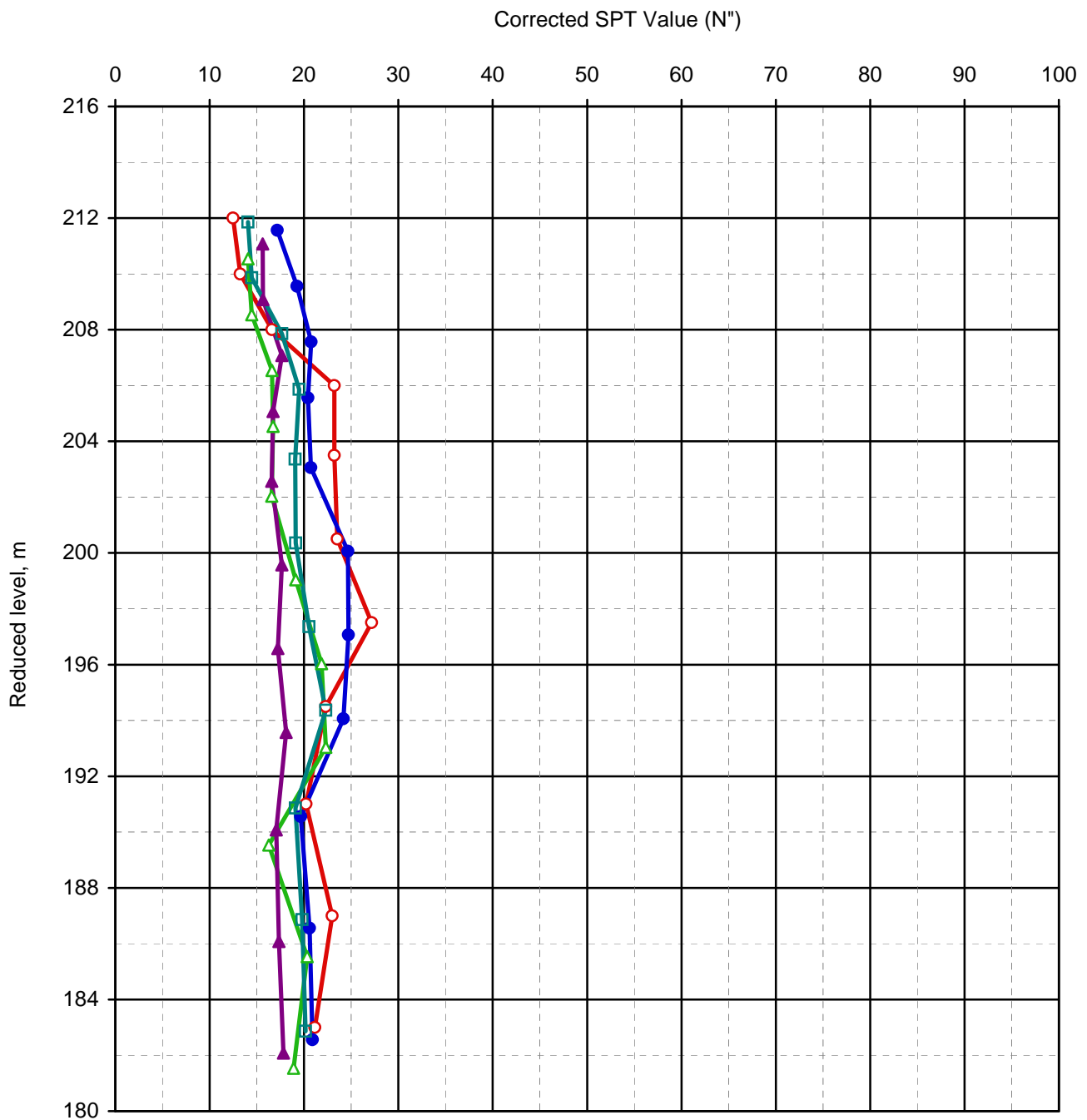
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-73	213.000	Office-15
	PBH-74	212.560	
	PBH-75	211.538	
	PBH-76	212.076	
	PBH-77	212.860	



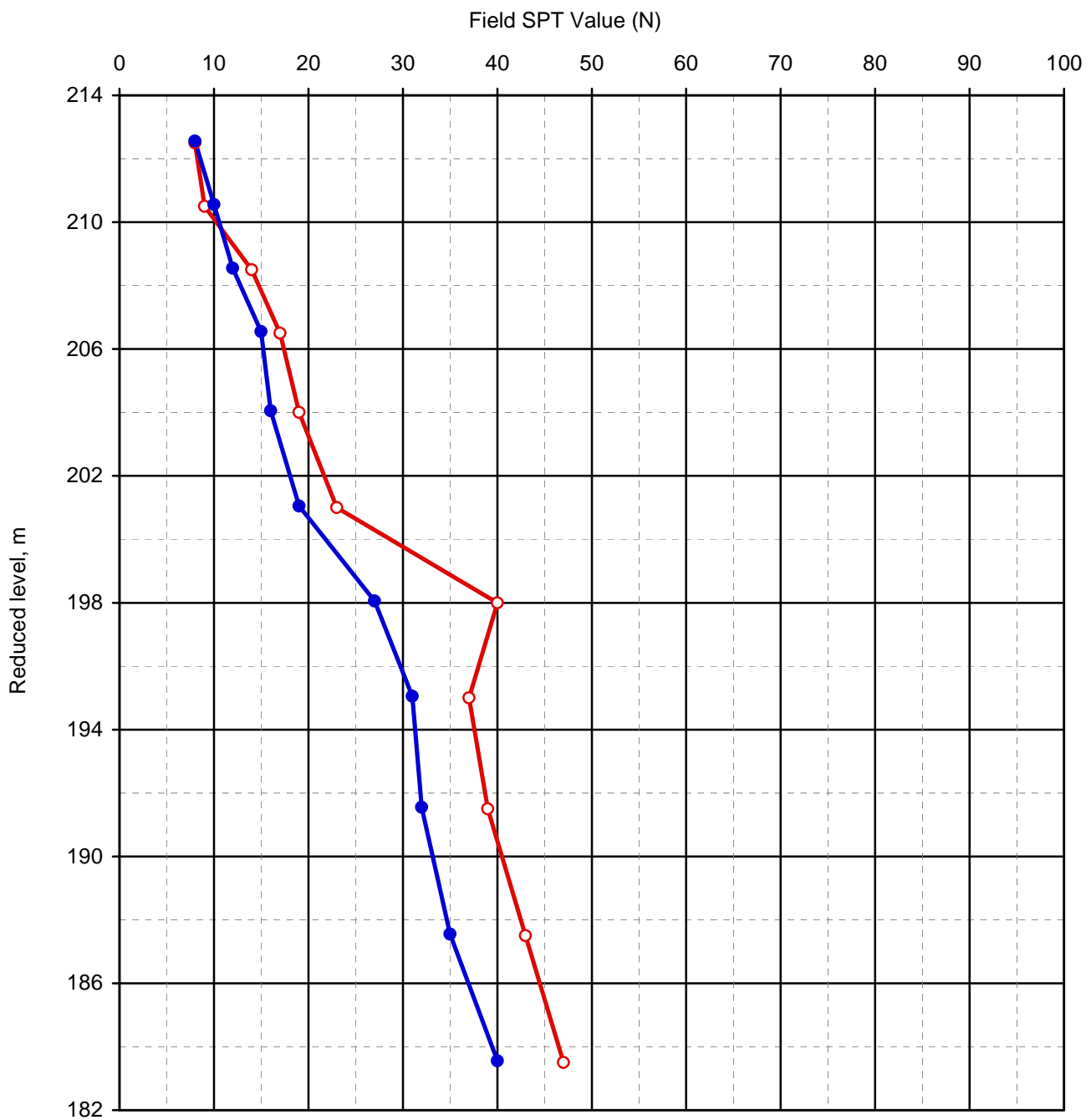
Corrected SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-115	213.500	Office-17
●	PBH-116	213.554	



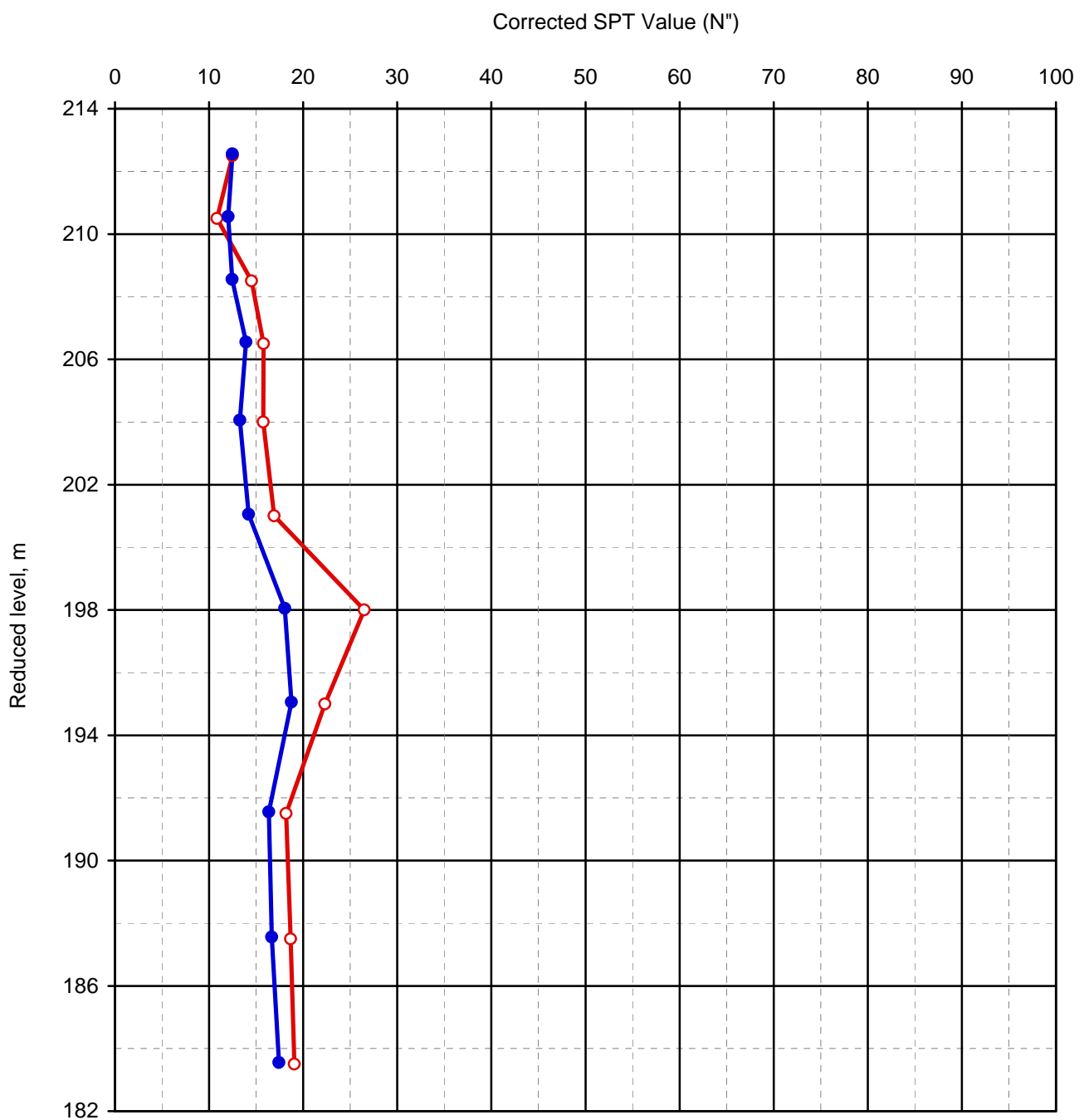
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
—○—	PBH-115	213.500	Office-17
—●—	PBH-116	213.554	




Corrected SPT Values vs. Reduced level

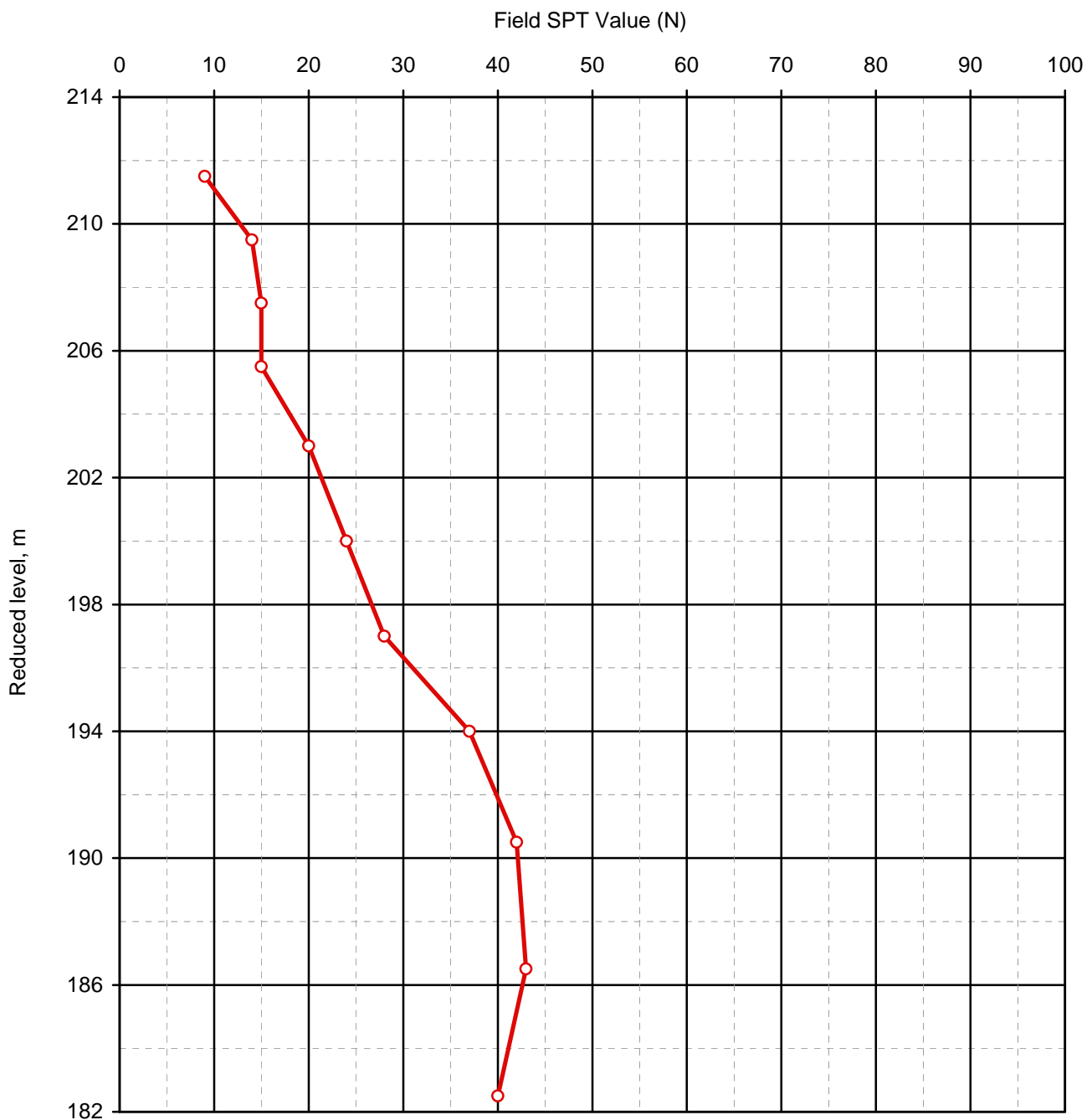




### Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-117	212.500	Retail-16




Field SPT Values vs. Reduced level



### Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-117	212.500	Retail-16



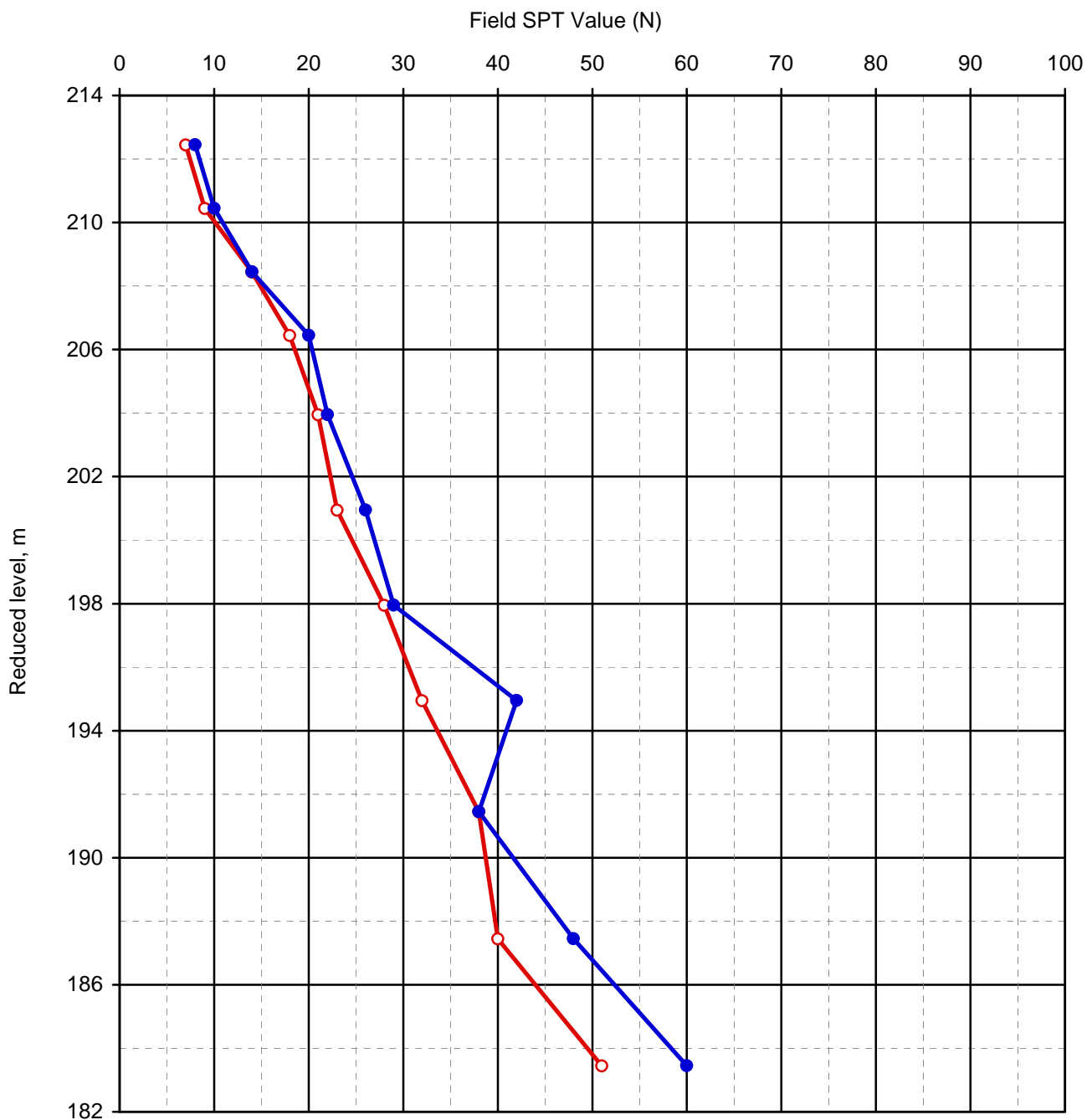
Corrected SPT Values vs. Reduced level



### Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
—○—	PBH-118	213.442	Office-13
—●—	PBH-119	213.450	



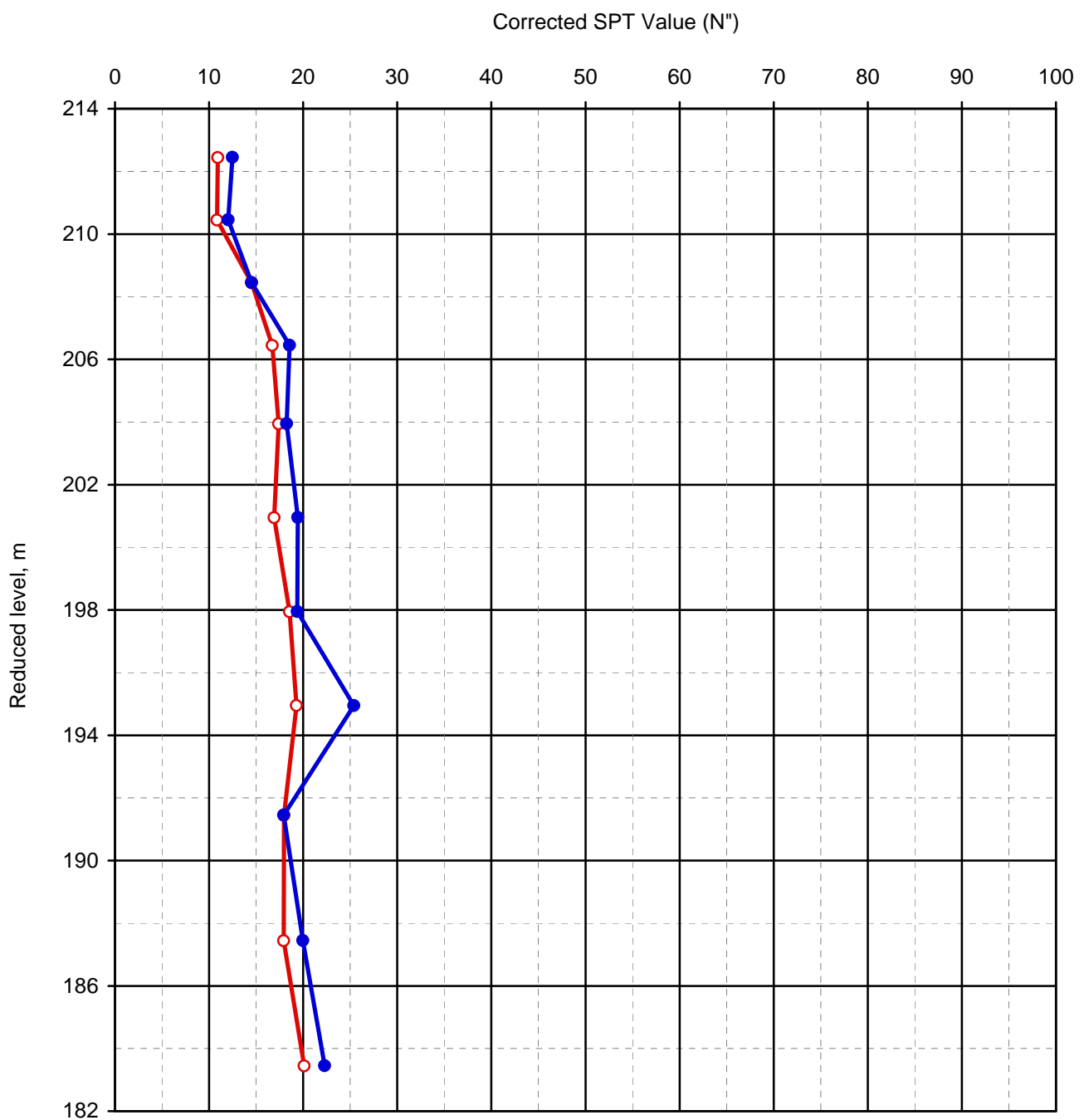
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○—	PBH-118	213.442	Office-13
●—	PBH-119	213.450	



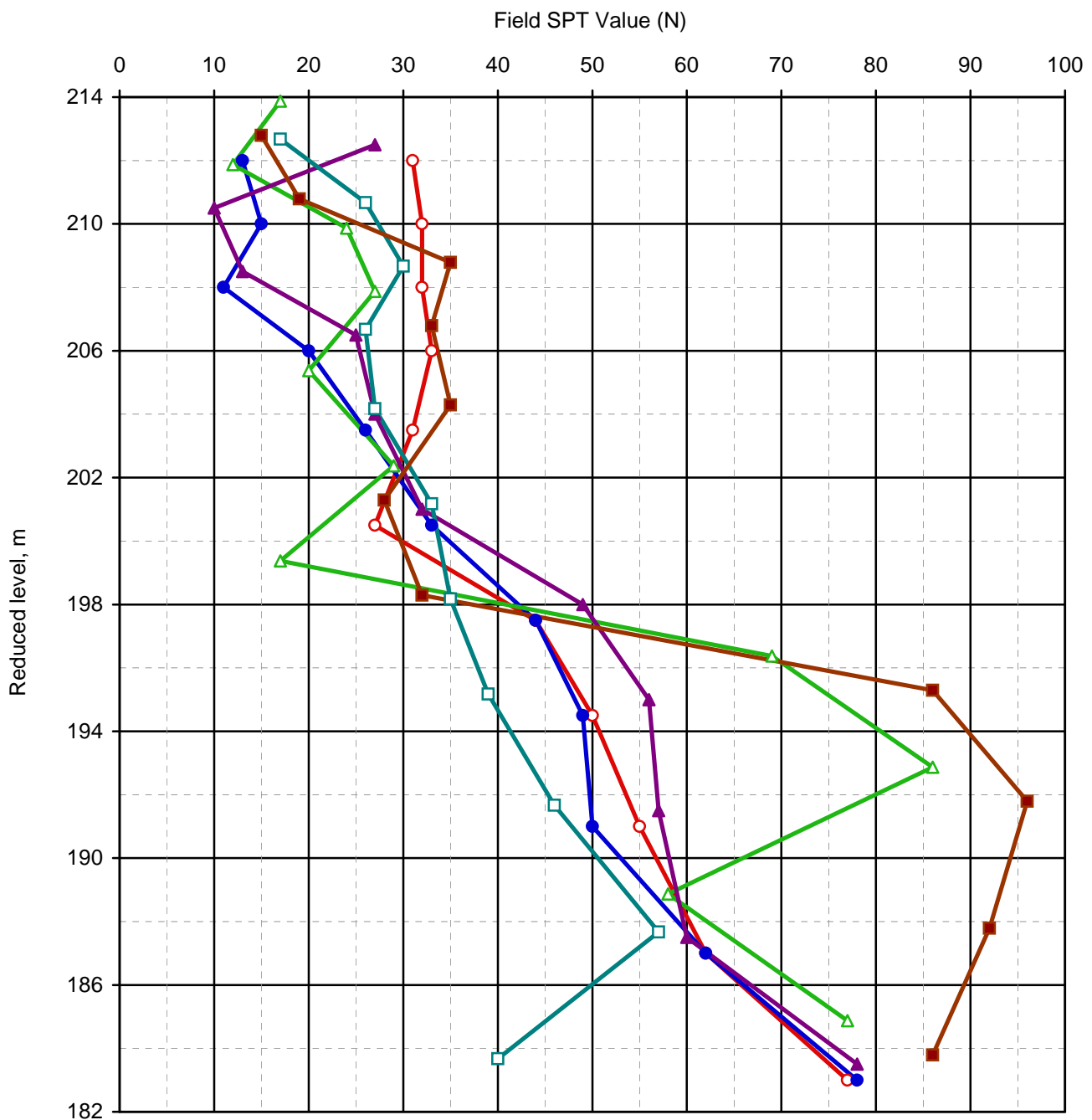
Corrected SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	BH-120	213.000	Arena-08
●	BH-121	213.000	
△	BH-122	214.870	
▲	BH-123	213.500	
□	BH-124	213.670	
■	BH-125	213.790	

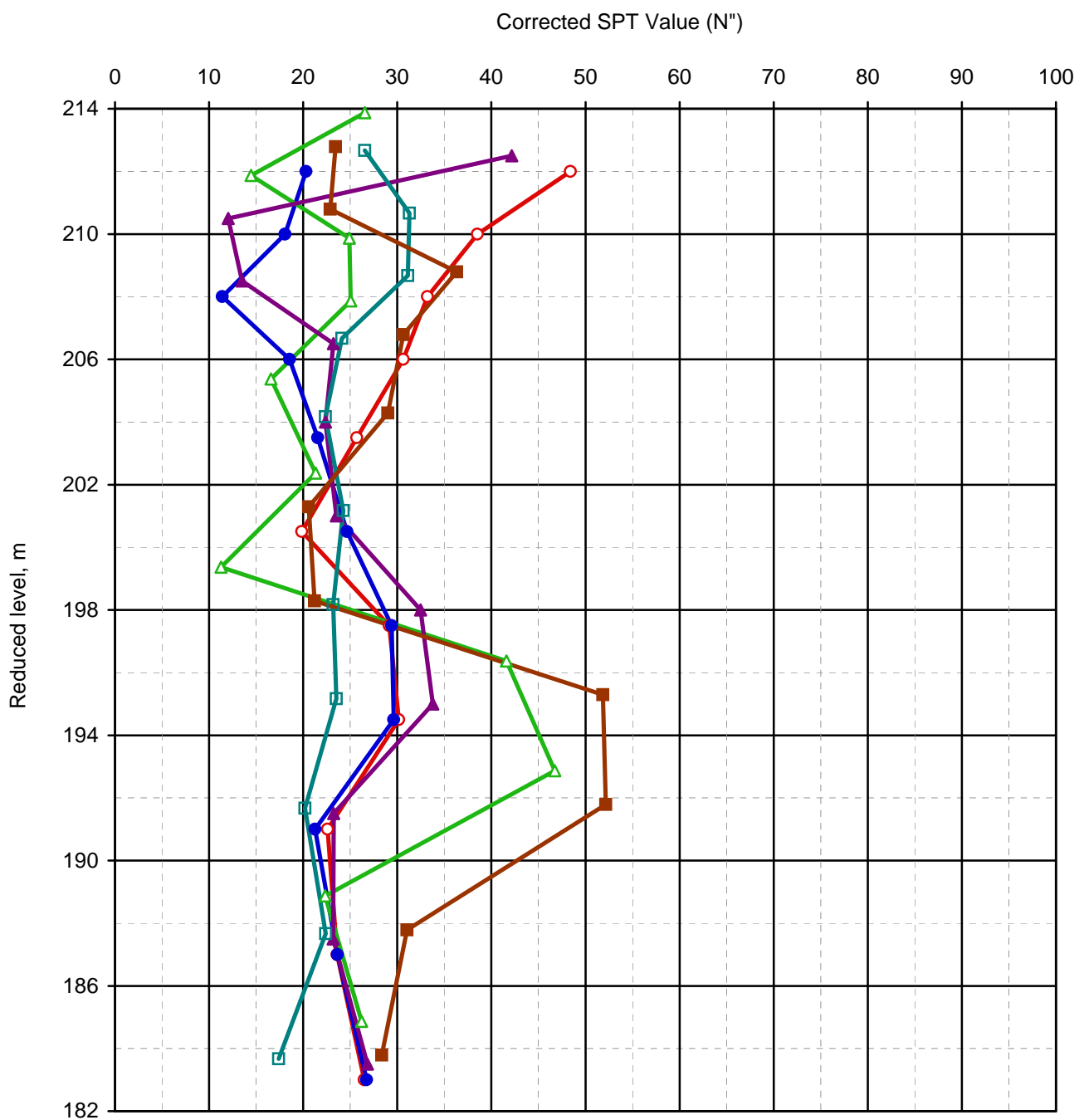




## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	BH-120	213.000	Arena-08
	BH-121	213.000	
	BH-122	214.870	
	BH-123	213.500	
	BH-124	213.670	
	BH-125	213.790	

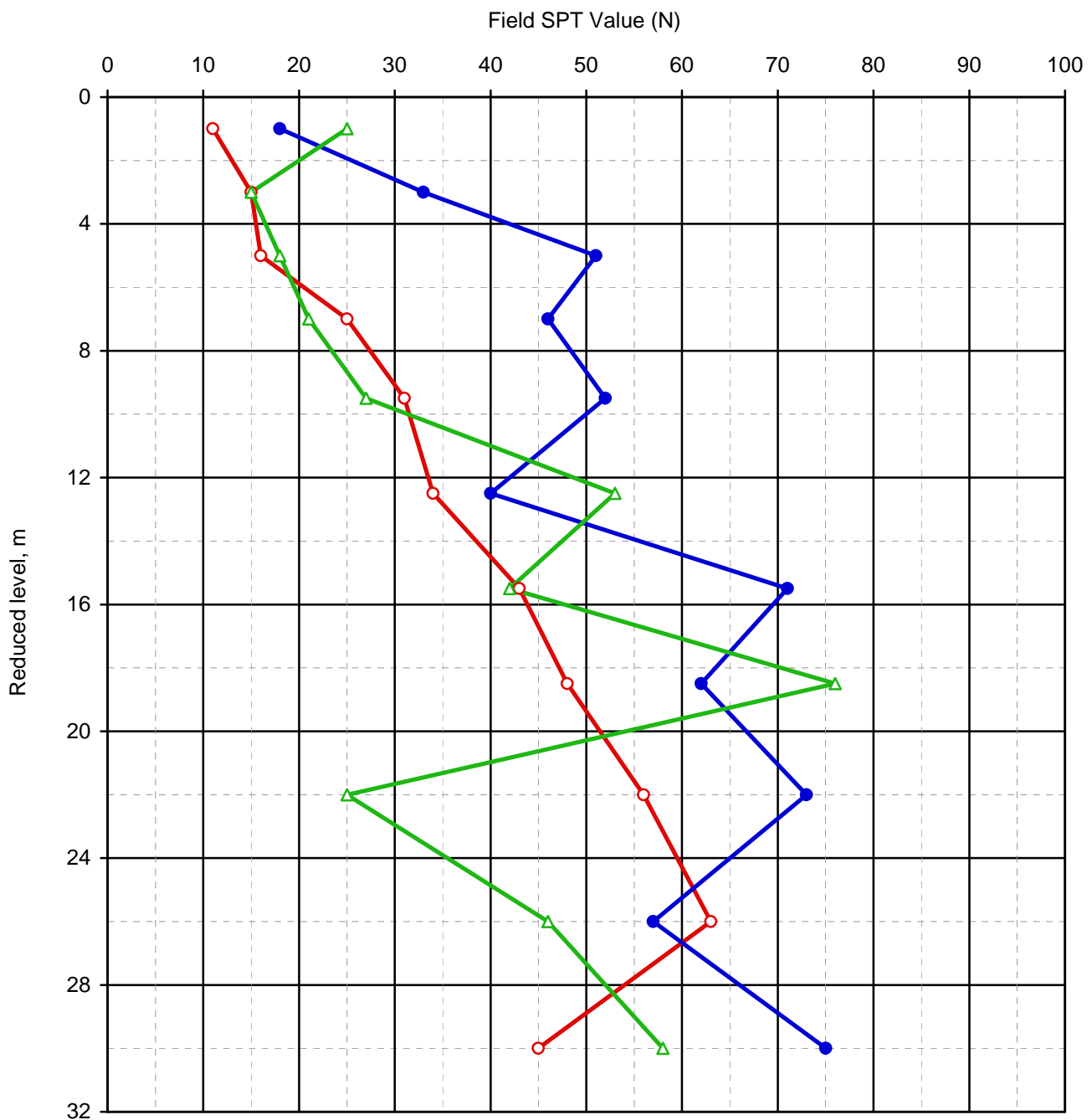




## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	BH-126	213.061	Arena-08
●	BH-127	213.222	
△	BH-128	213.151	



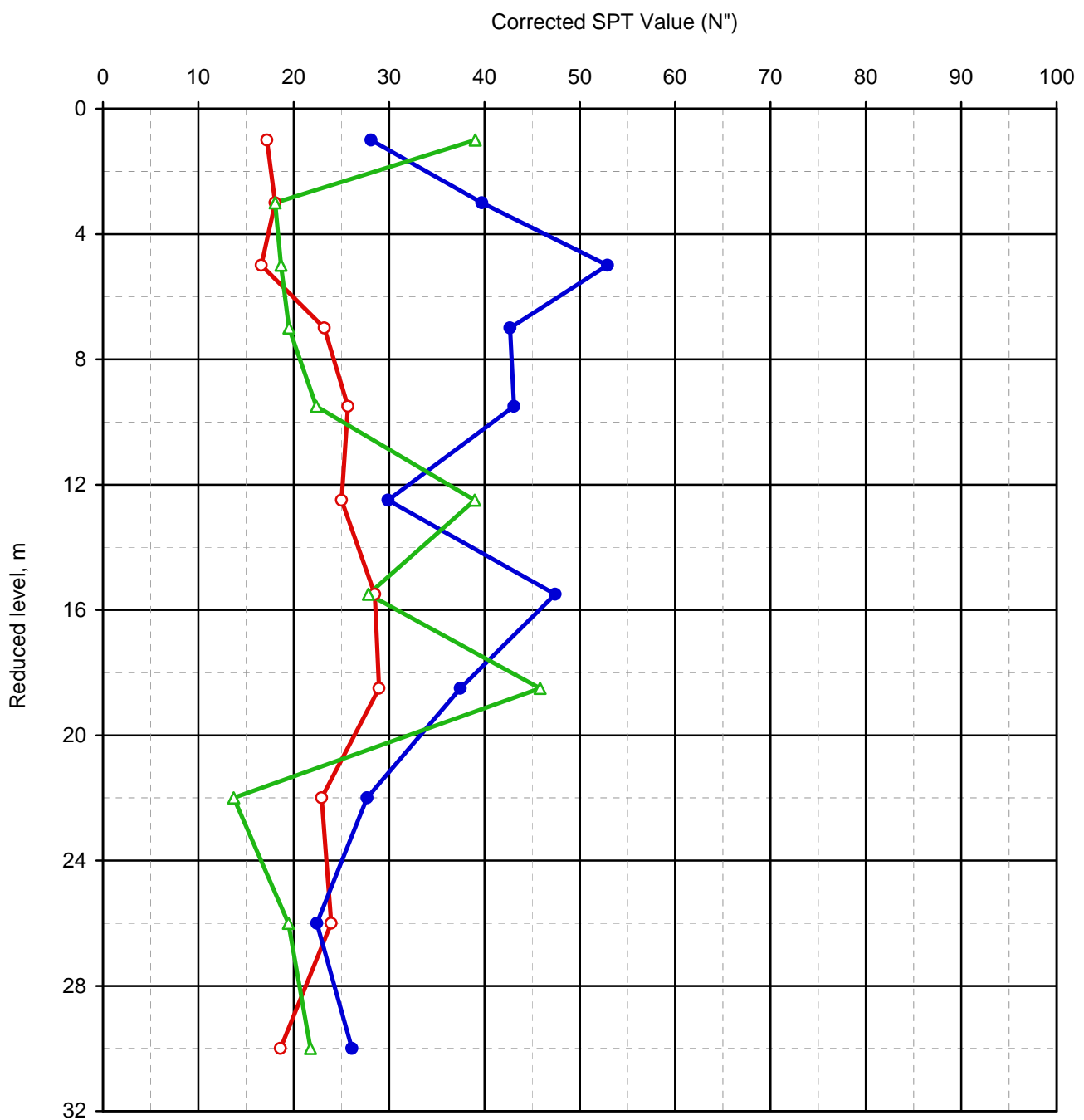
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	BH-126	213.061	Arena-08
●	BH-127	213.222	
△	BH-128	213.151	



Corrected SPT Values vs. Reduced level

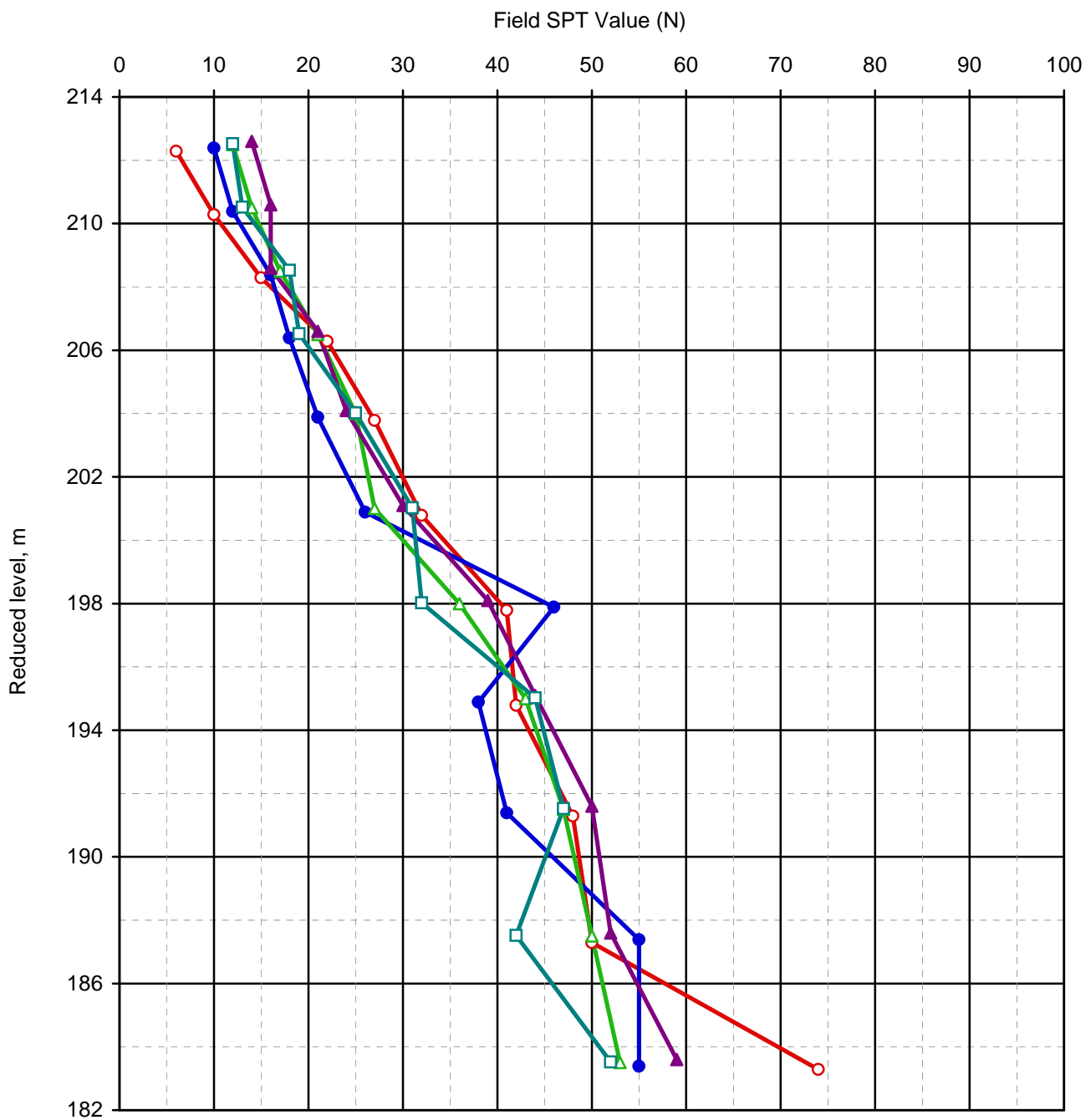




## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-133	213.286	5*Hotel-11
●	PBH-134	213.385	
△	PBH-135	213.500	
▲	PBH-136	213.595	
□	PBH-137	213.522	



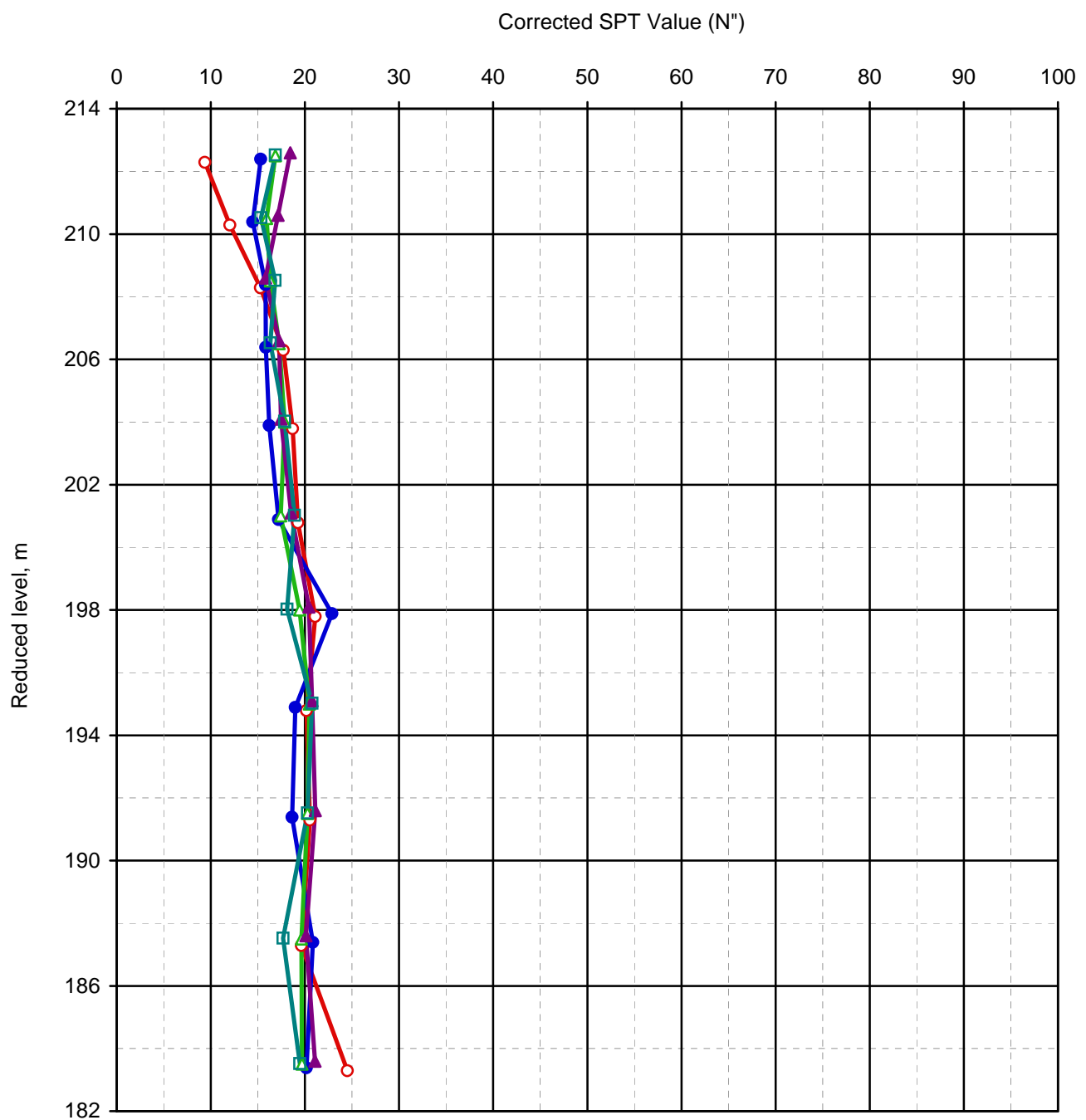
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-133	213.286	5*Hotel-11
●	PBH-134	213.385	
△	PBH-135	213.500	
▲	PBH-136	213.595	
□	PBH-137	213.522	



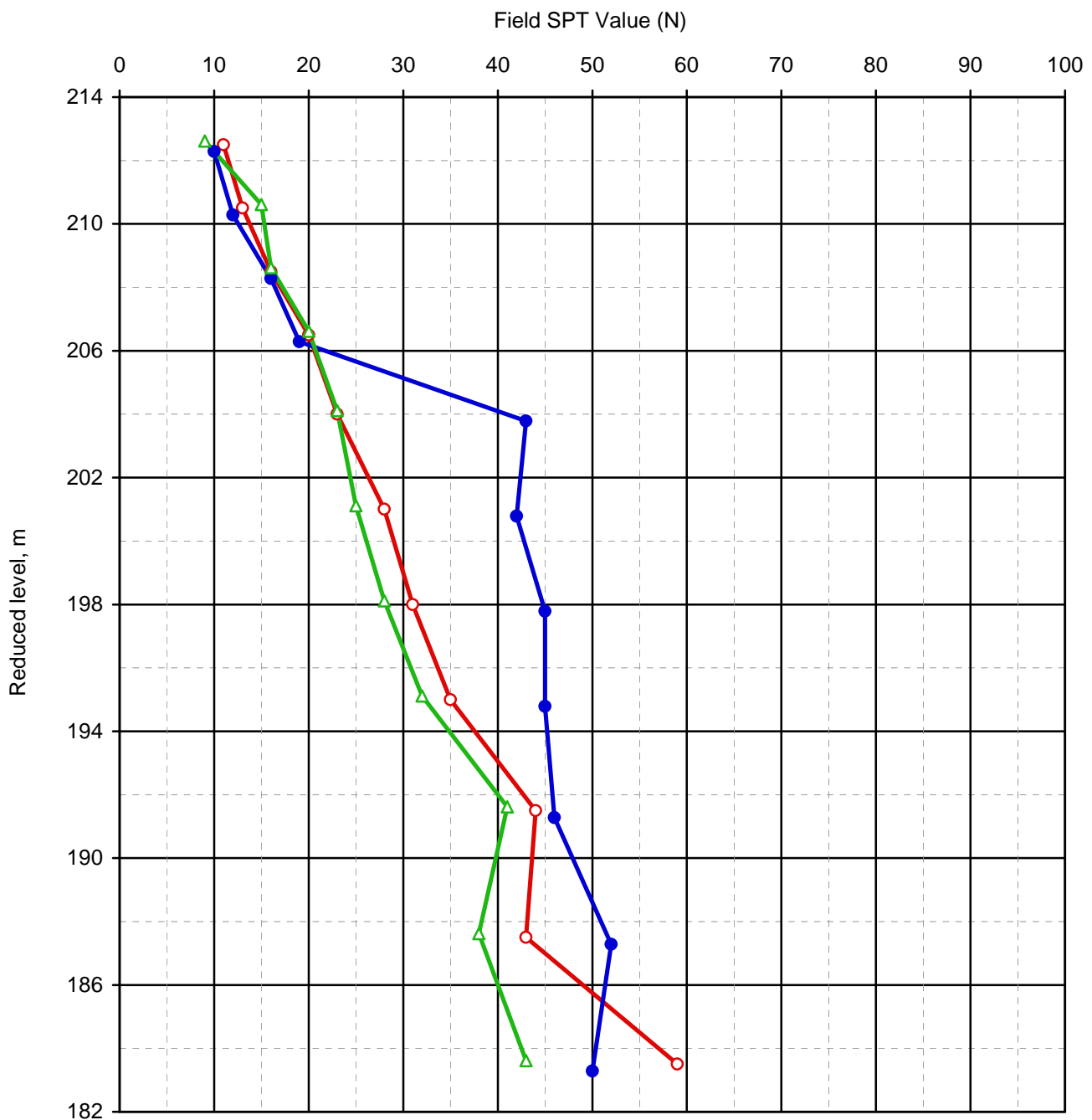
Corrected SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-138	213.500	Office 14
●	PBH-139	213.282	
△	PBH-140	213.615	



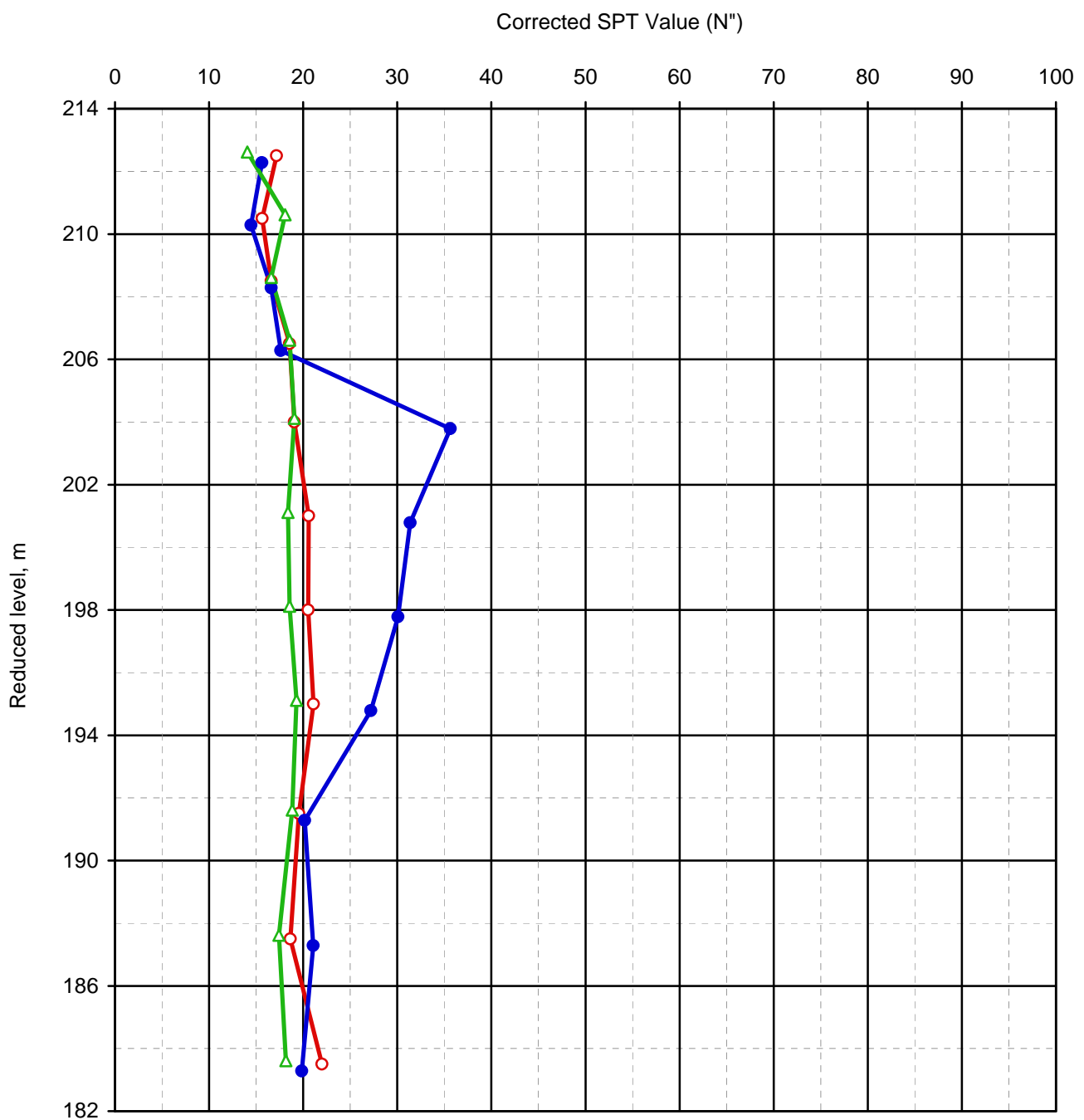
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-138	213.500	Office 14
●	PBH-139	213.282	
△	PBH-140	213.615	




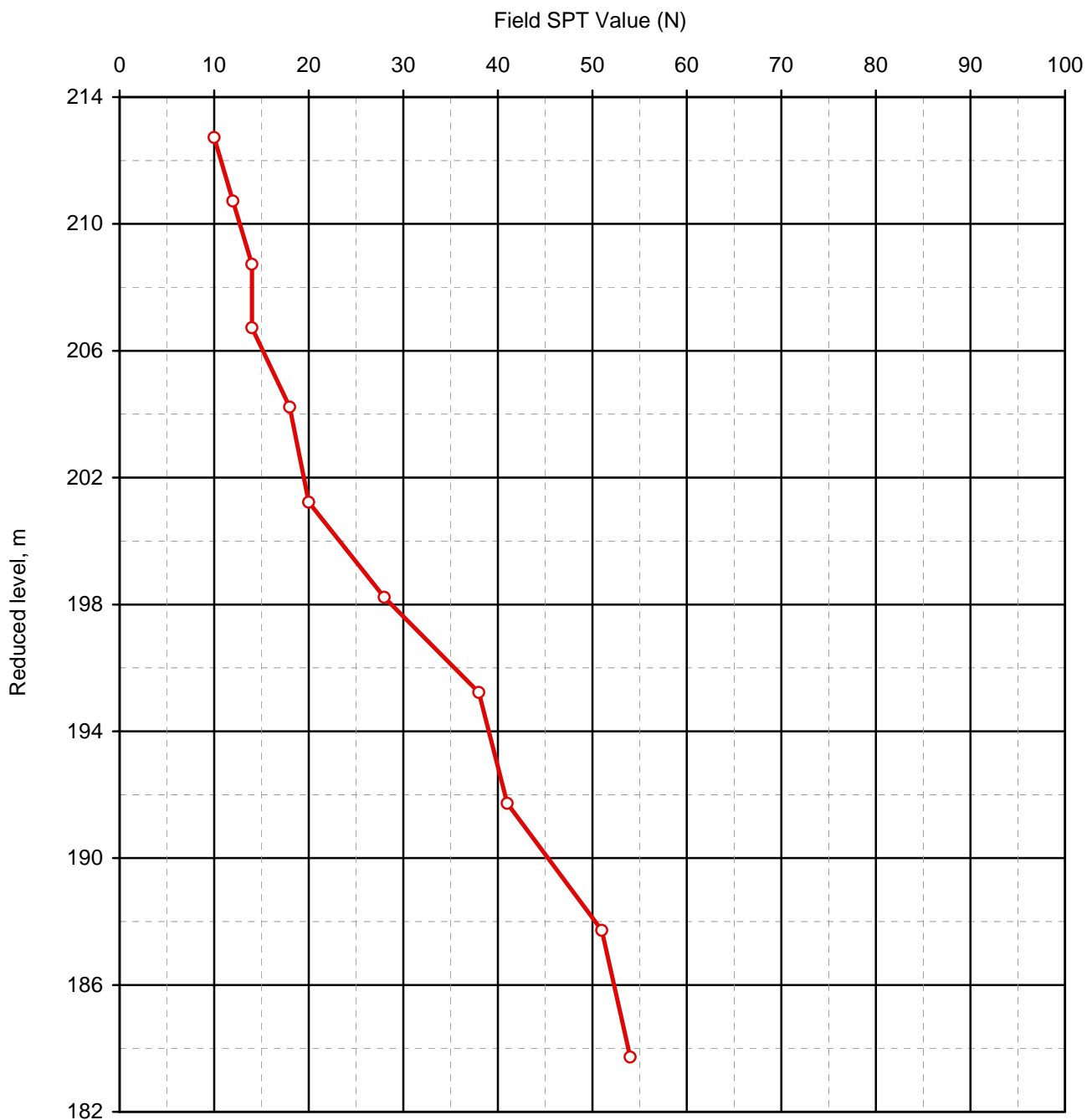
Corrected SPT Values vs. Reduced level



### Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-141	213.723	Refer Plate 1




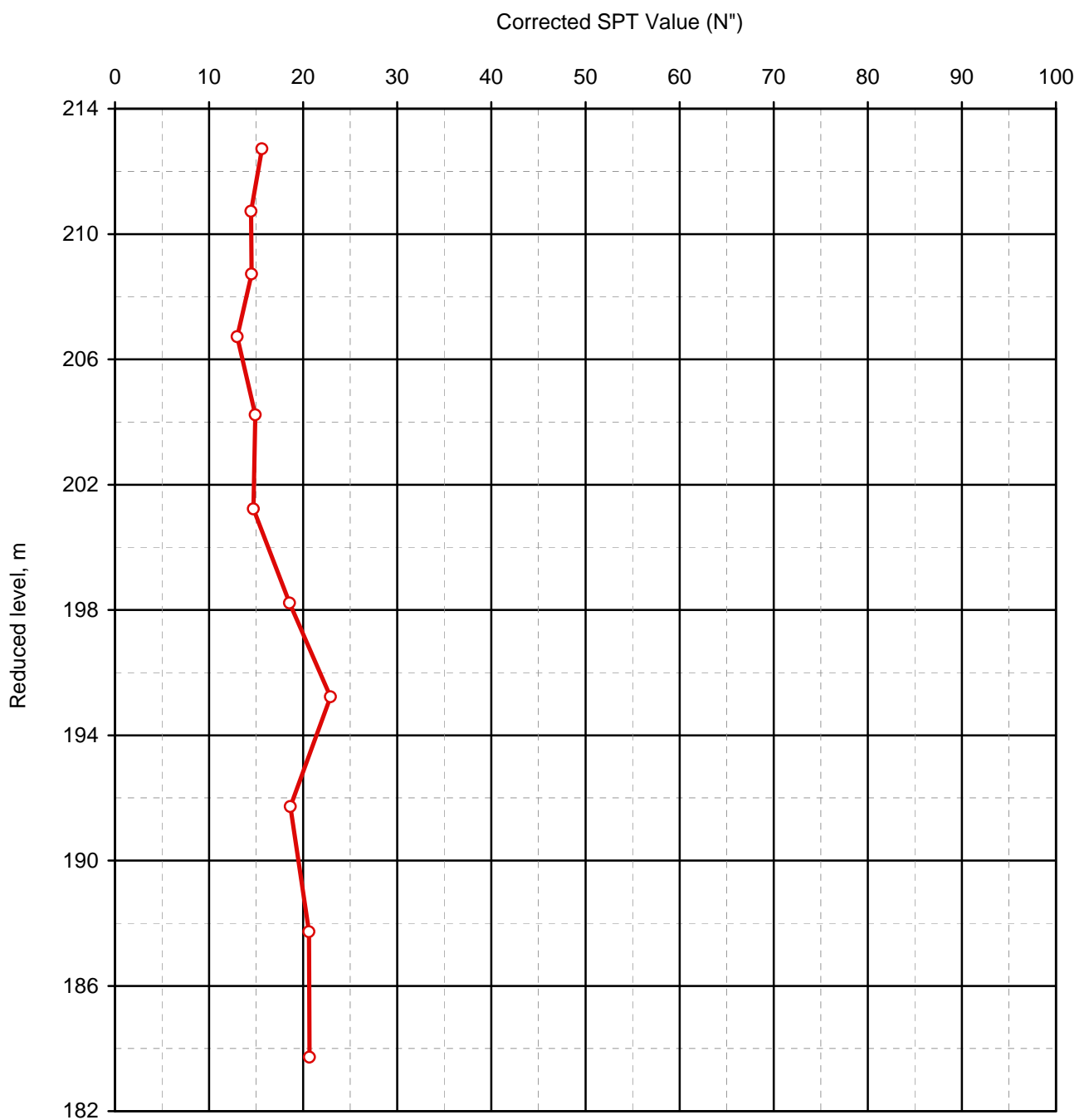
Field SPT Values vs. Reduced level



### Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
	PBH-141	213.723	Refer Plate 1



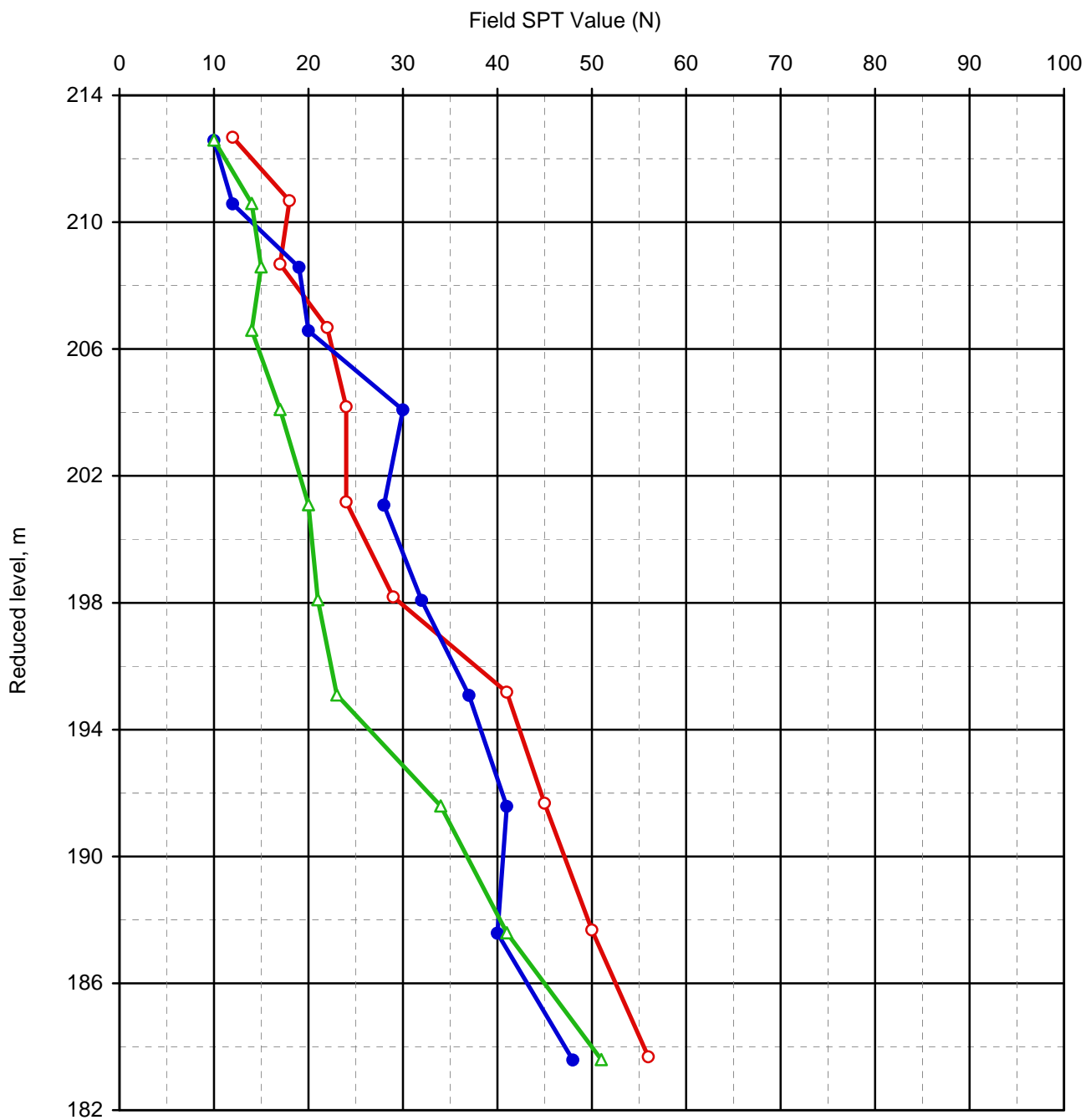
Corrected SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○—	PBH-142	213.679	Office-18
●—	PBH-143	213.575	
△—	PBH-144	213.594	



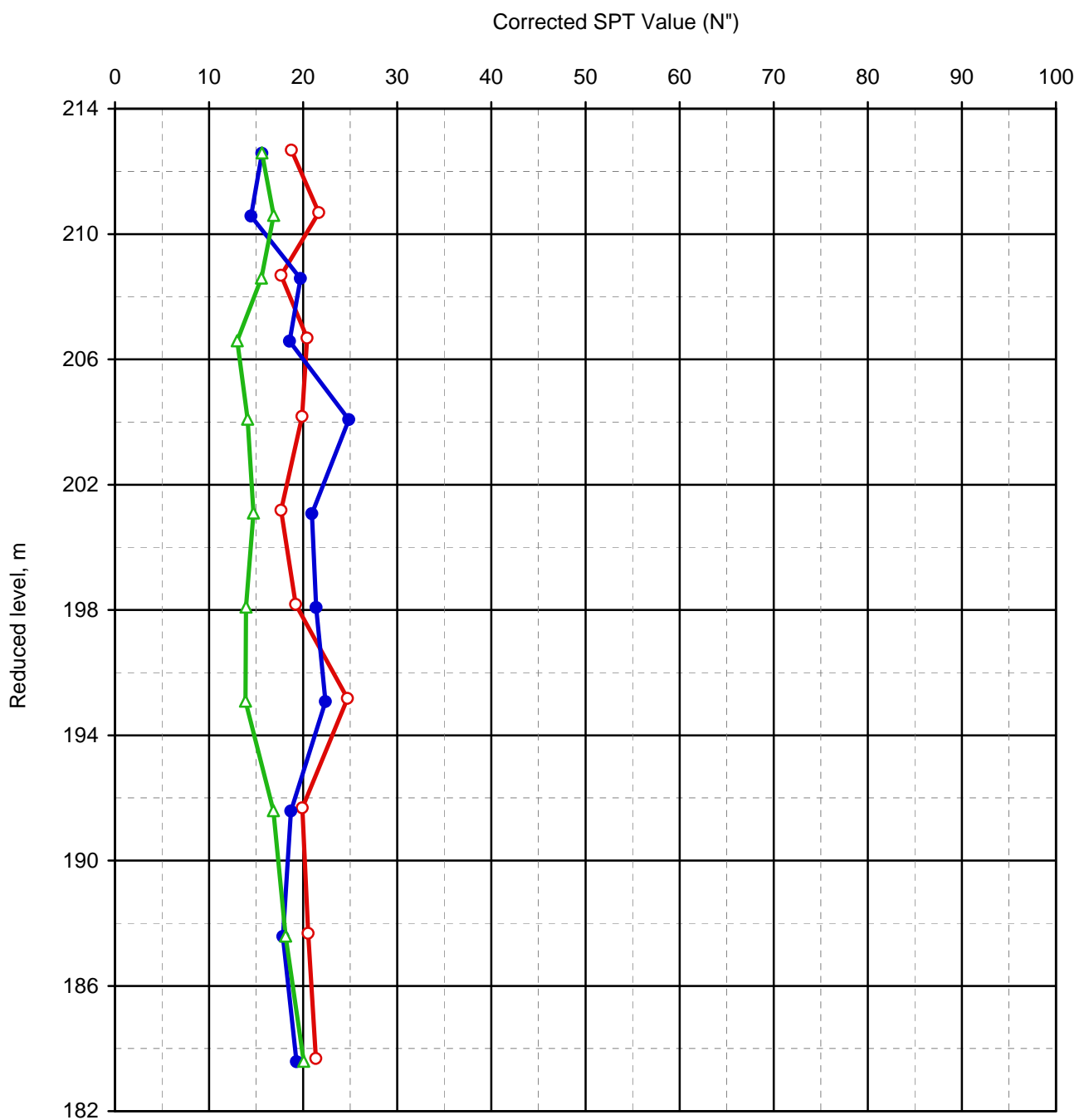
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-142	213.679	Office-18
●	PBH-143	213.575	
△	PBH-144	213.594	



Corrected SPT Values vs. Reduced level

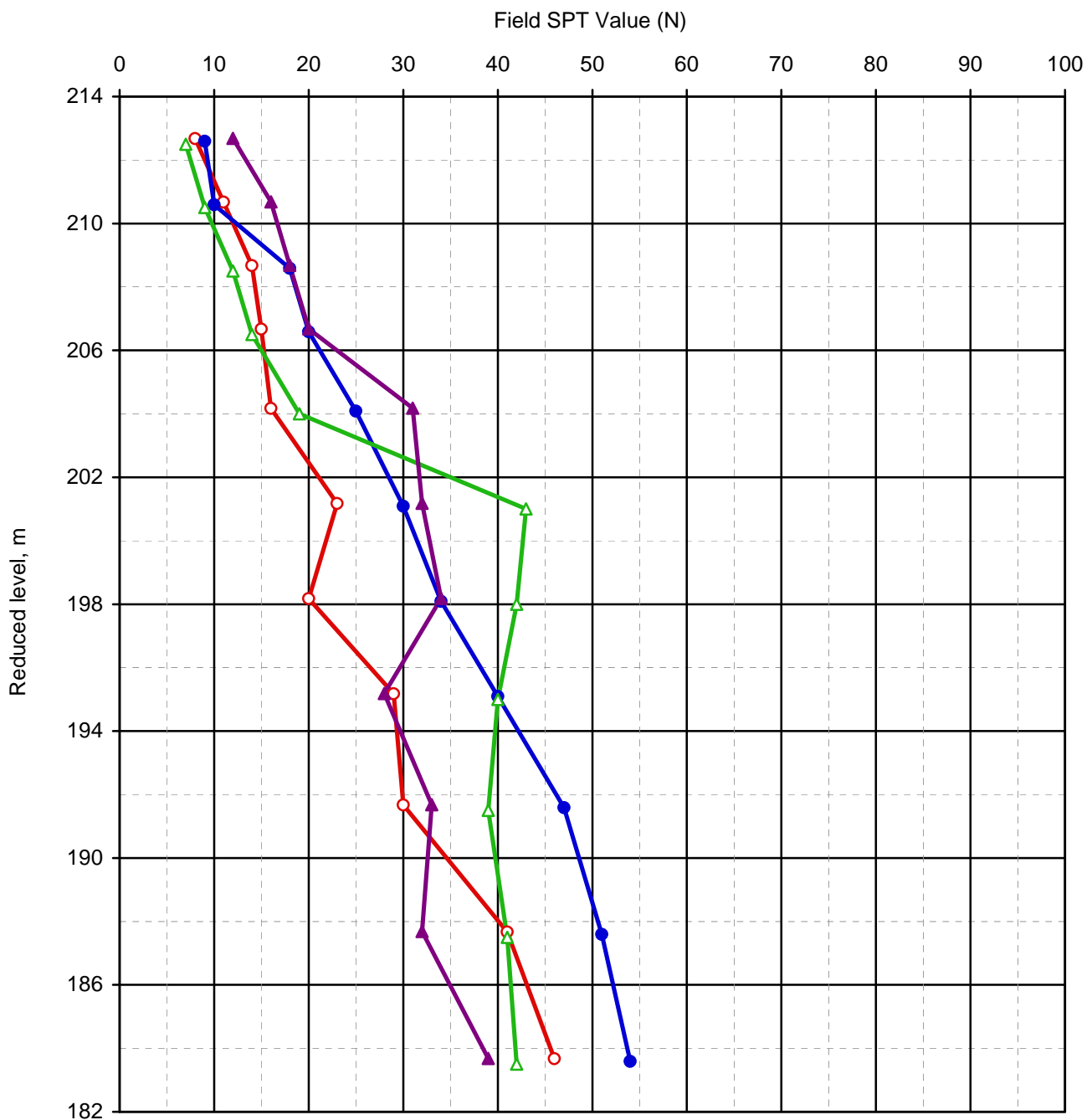




### Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-145	213.671	4*Hotel-21
●	PBH-146	213.588	
△	PBH-147	213.500	
▲	PBH-149	213.681	



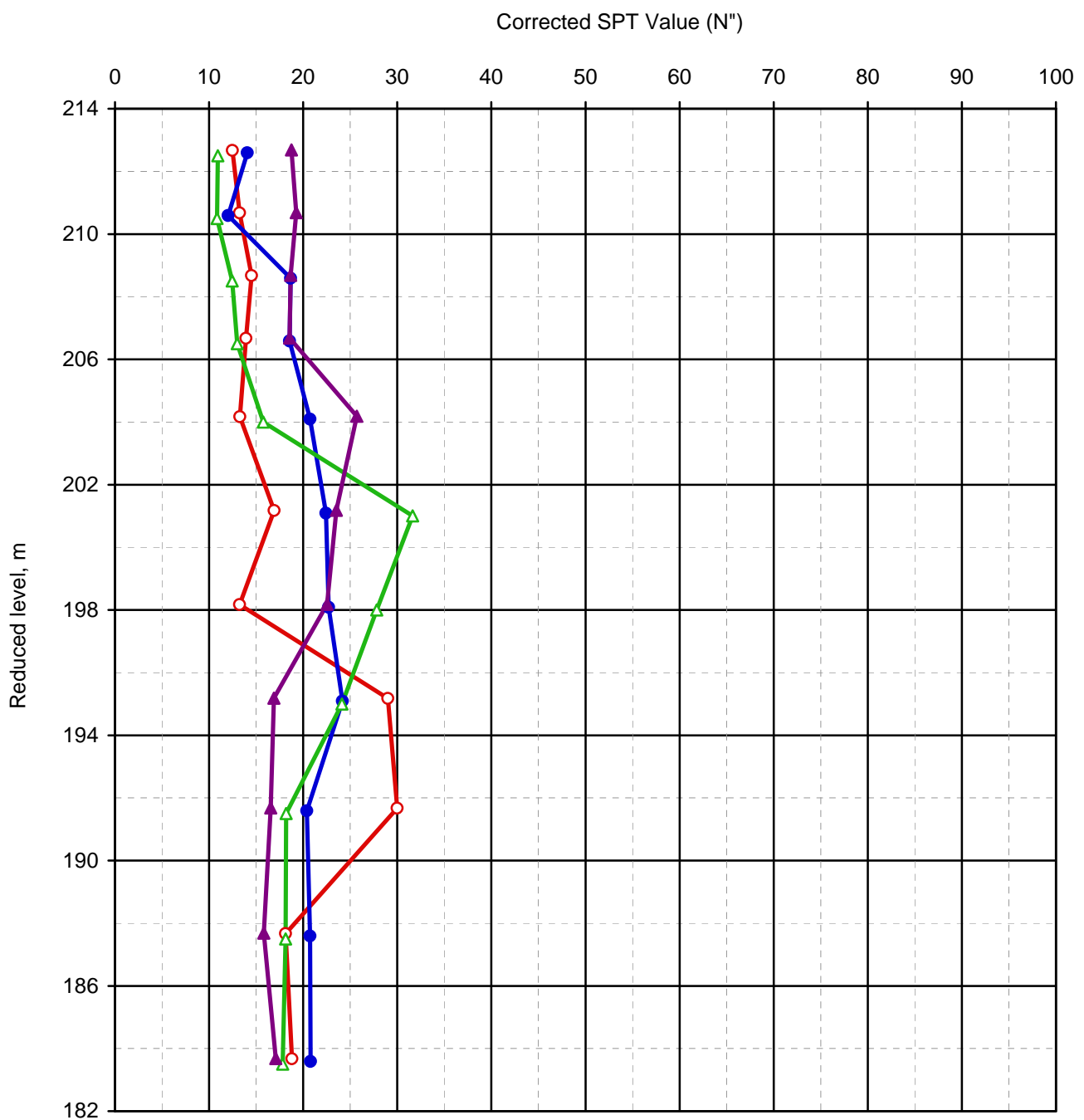
Field SPT Values vs. Reduced level



## Standard Penetration Test

IS : 2131-1981, RA-2007

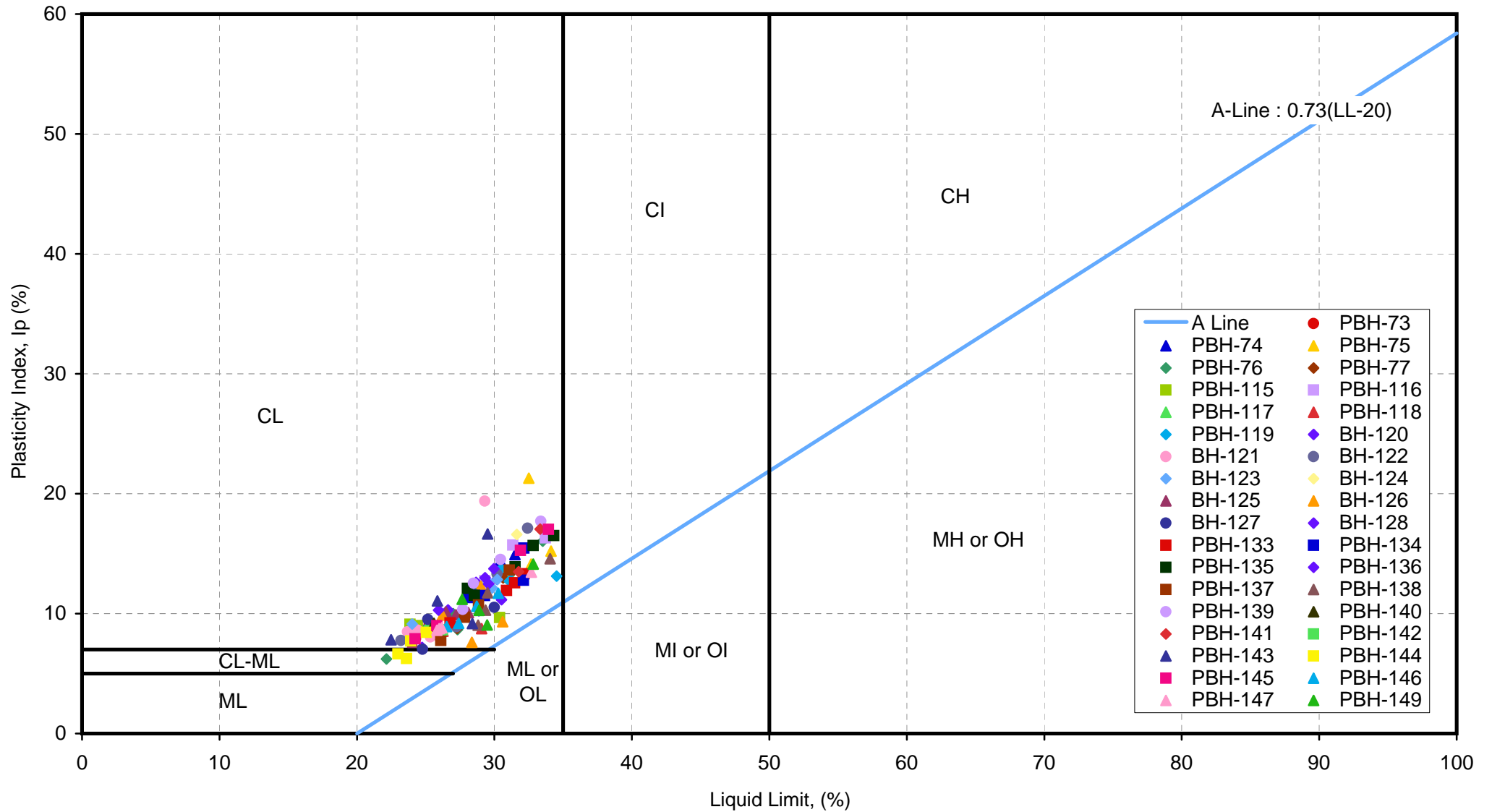
Borehole Details			
Symbol	Borehole Number	Reduced Level,m	Location
○	PBH-145	213.671	4*Hotel-21
●	PBH-146	213.588	
△	PBH-147	213.500	
▲	PBH-149	213.681	



Corrected SPT Values vs. Reduced level

# Atterberg Test

IS : 2720 (Part-5)-1985, RA-2010



Plasticity Chart



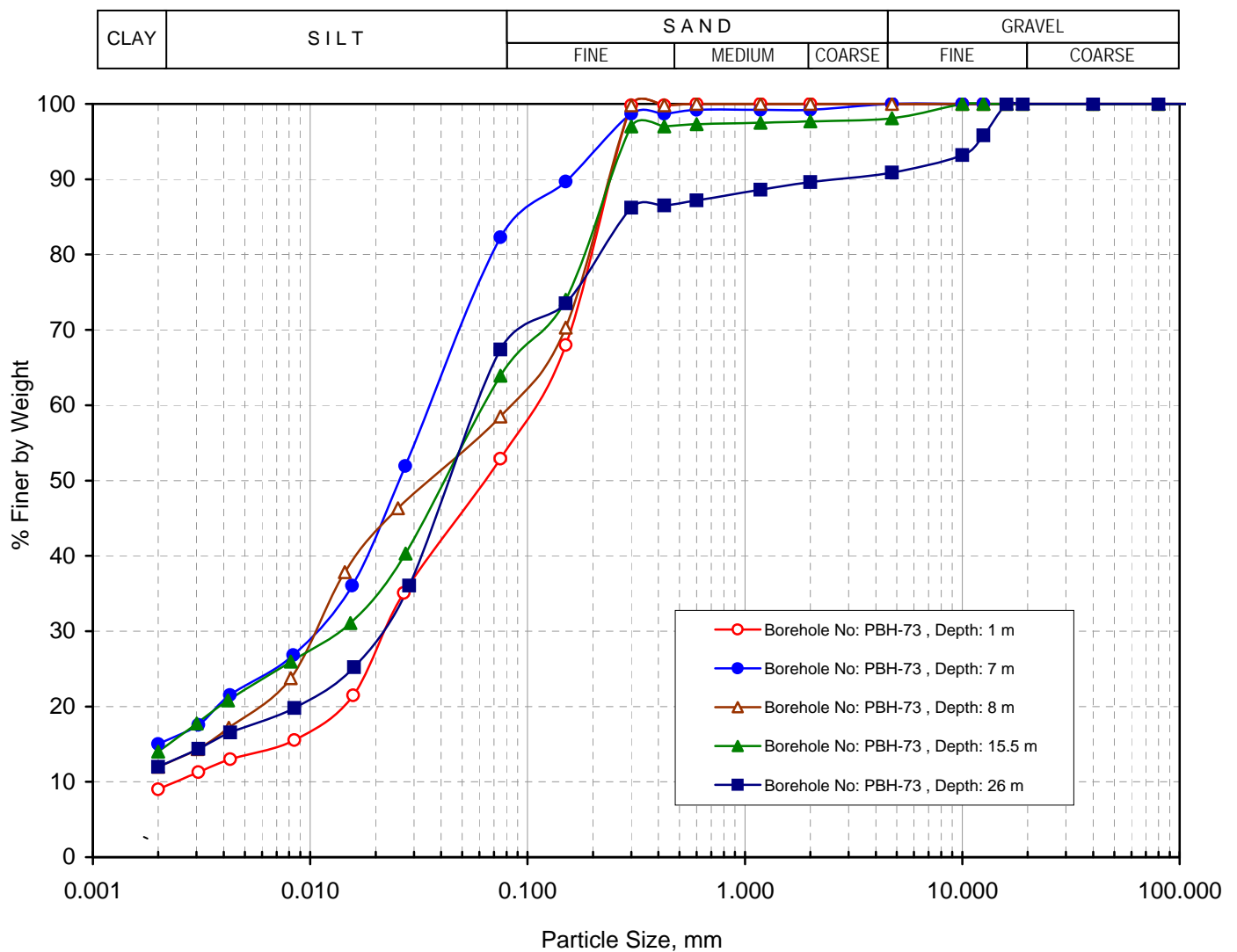
## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-73	1.00	Silty fine sand (SM)	0	47	44	9	0.110	0.023	0.002	55.0	2.40
PBH-73	7.00	Sandy silt (CL)	0	17	68	15	0.040	0.011			
PBH-73	8.00	Sandy silt (CL)	0	41	47	12	0.085	0.011			
PBH-73	15.50	Sandy silt with traces of gravels (CL)	2	34	50	14	0.067	0.014			
PBH-73	26.00	Sandy silt with gravels (CL)	9	23	56	12	0.064	0.022			

Hydrometer Analysis

Sieve Analysis



Grain Size Distribution Curve

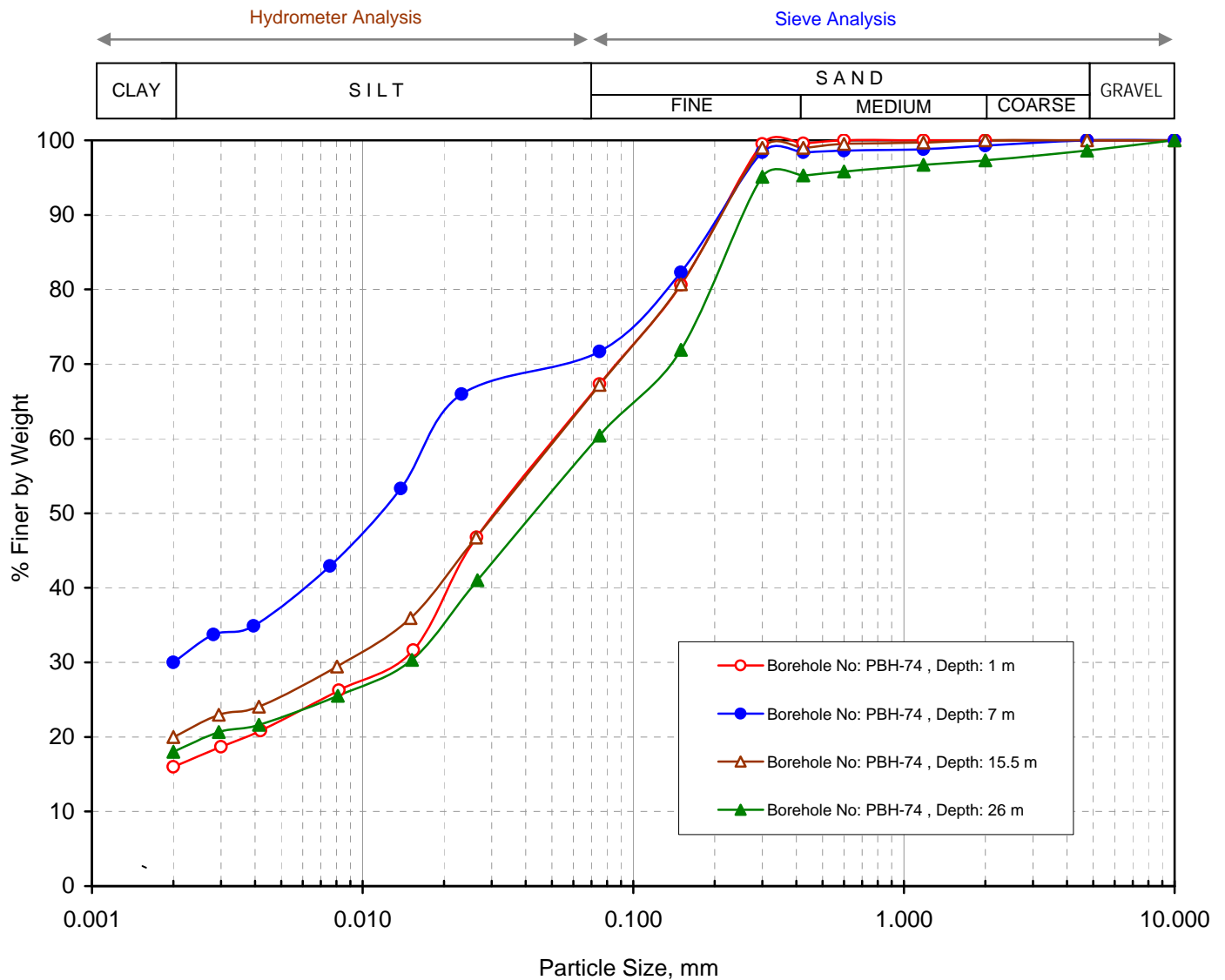




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-74	1.00	Sandy silt (CL)	0	32	52	16	0.058	0.013			
PBH-74	7.00	Sandy silt (CL)	0	28	42	30	0.019	0.002			
PBH-74	15.50	Sandy silt (CL)	0	32	48	20	0.058	0.009			
PBH-74	26.00	Sandy silt with traces of gravels (CL)	1	38	43	18	0.074	0.015			



Grain Size Distribution Curve

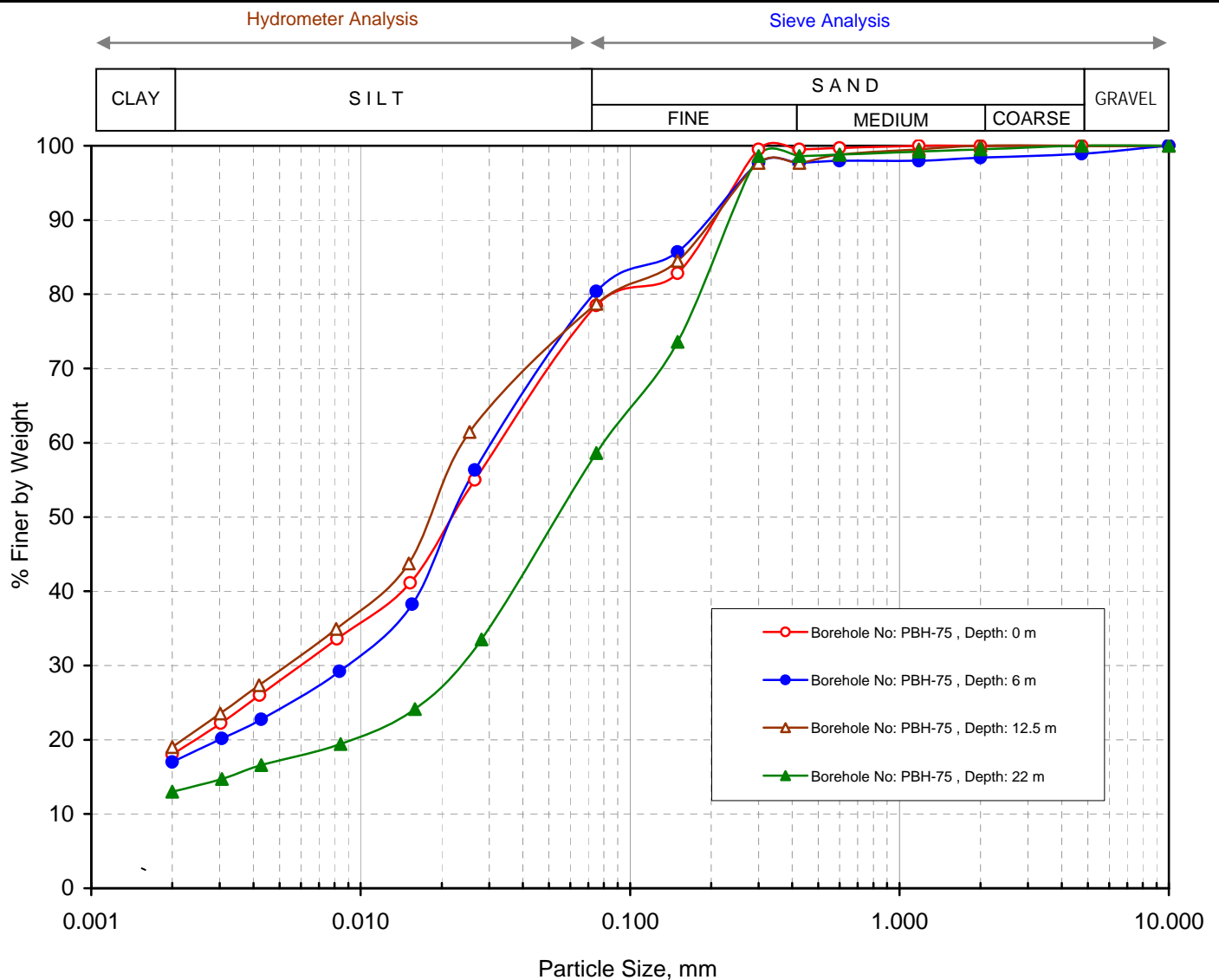




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-75	0.00	Sandy silt (CL)	0	21	61	18	0.037	0.006			
PBH-75	6.00	Sandy silt with traces of gravels (CL)	1	18	64	17	0.034	0.009			
PBH-75	12.50	Sandy silt (CL)	0	21	60	19	0.025	0.006			
PBH-75	22.00	Sandy silt (CL)	0	41	46	13	0.082	0.024			



Grain Size Distribution Curve





## Grain Size Analysis

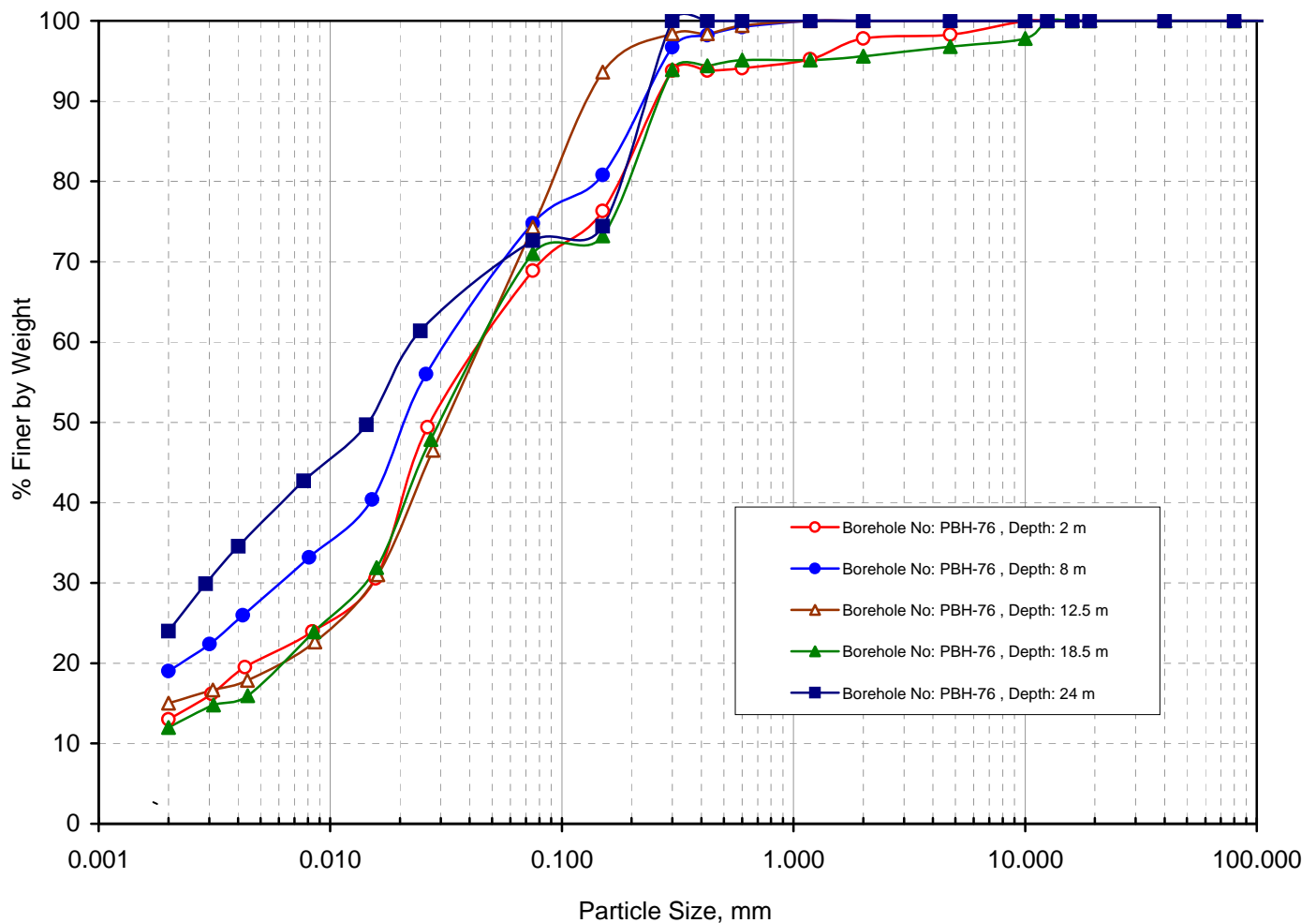
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-76	2.00	Sandy silt with traces of gravels (CL)	2	29	56	13	0.053	0.015			
PBH-76	8.00	Sandy silt (CL)	0	25	56	19	0.036	0.006			
PBH-76	12.50	Sandy silt (CL)	0	25	60	15	0.051	0.015			
PBH-76	18.50	Sandy silt with traces of gravels (CL)	3	25	60	12	0.052	0.014			
PBH-76	24.00	Sandy silt (CL)	0	27	49	24	0.023	0.003			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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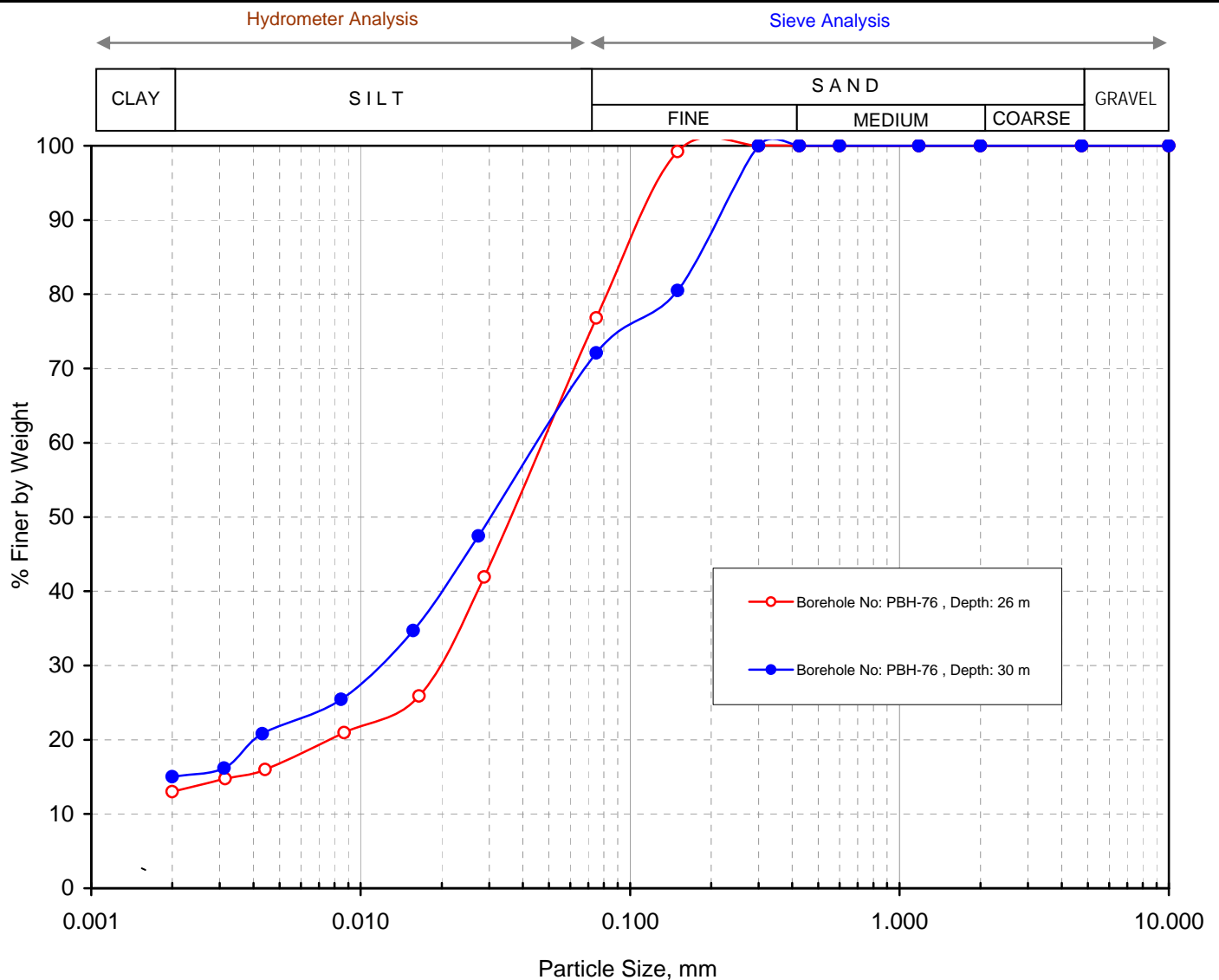




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-76	26.00	Sandy silt (CL)	0	23	64	13	0.053	0.020			
PBH-76	30.00	Sandy silt (CL)	0	27	58	15	0.052	0.012			



Grain Size Distribution Curve







## Grain Size Analysis

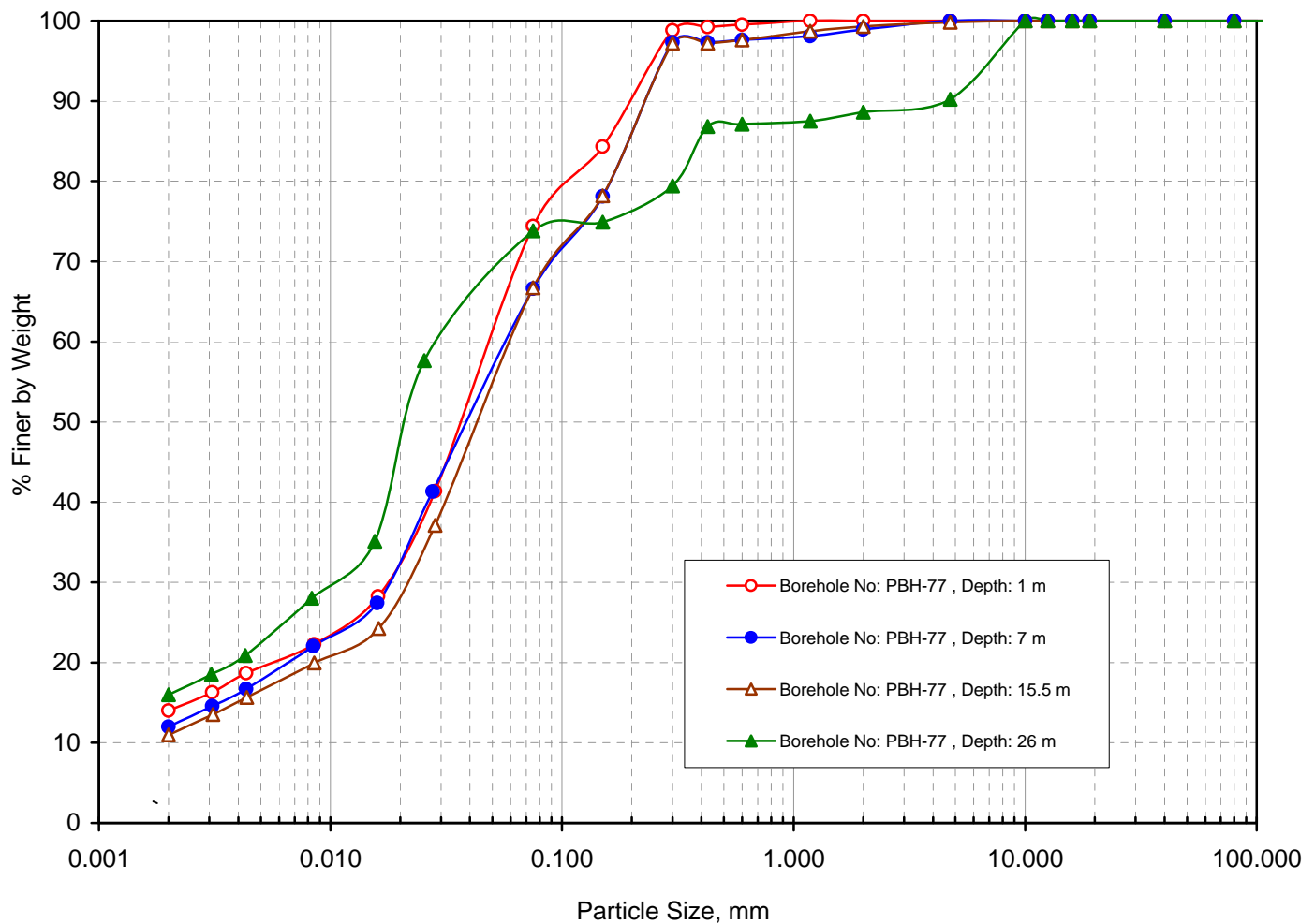
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-77	1.00	Sandy silt (CL)	0	25	61	14	0.055	0.018			
PBH-77	7.00	Sandy silt (CL)	0	33	55	12	0.063	0.018			
PBH-77	15.50	Sandy silt (CL)	0	33	56	11	0.064	0.022			
PBH-77	26.00	Sandy silt with gravels (CL)	10	16	58	16	0.033	0.010			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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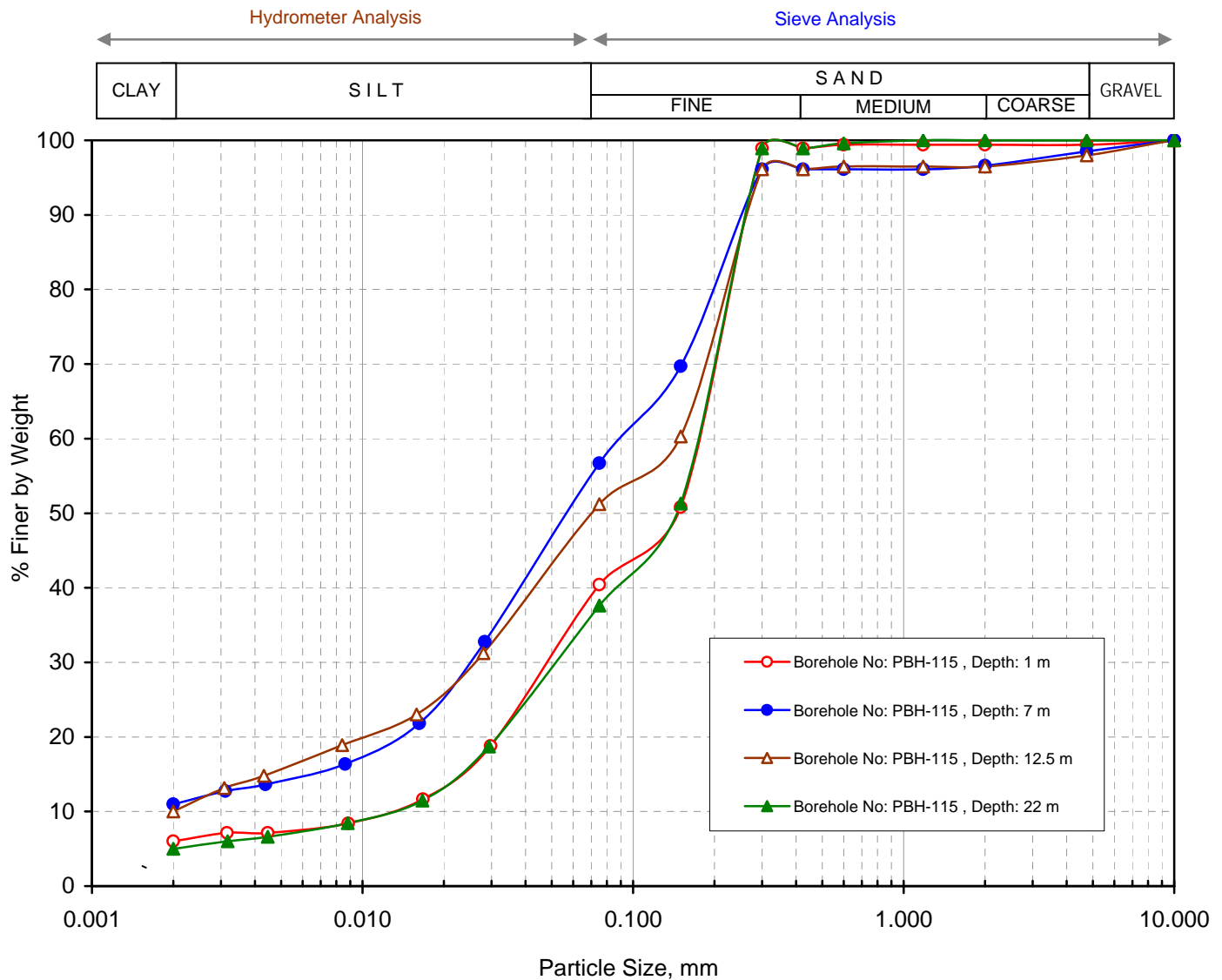




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-115	1.00	Silty fine sand with traces of gravels (SM)	1	59	34	6	0.179	0.053	0.013	13.8	1.21
PBH-115	7.00	Sandy silt with traces of gravels (CL)	2	41	46	11	0.094	0.025			
PBH-115	12.50	Sandy silt with traces of gravels (CL)	2	46	42	10	0.148	0.026	0.002	74.0	2.28
PBH-115	22.00	Silty fine sand (SM)	0	62	33	5	0.177	0.057	0.013	13.6	1.41



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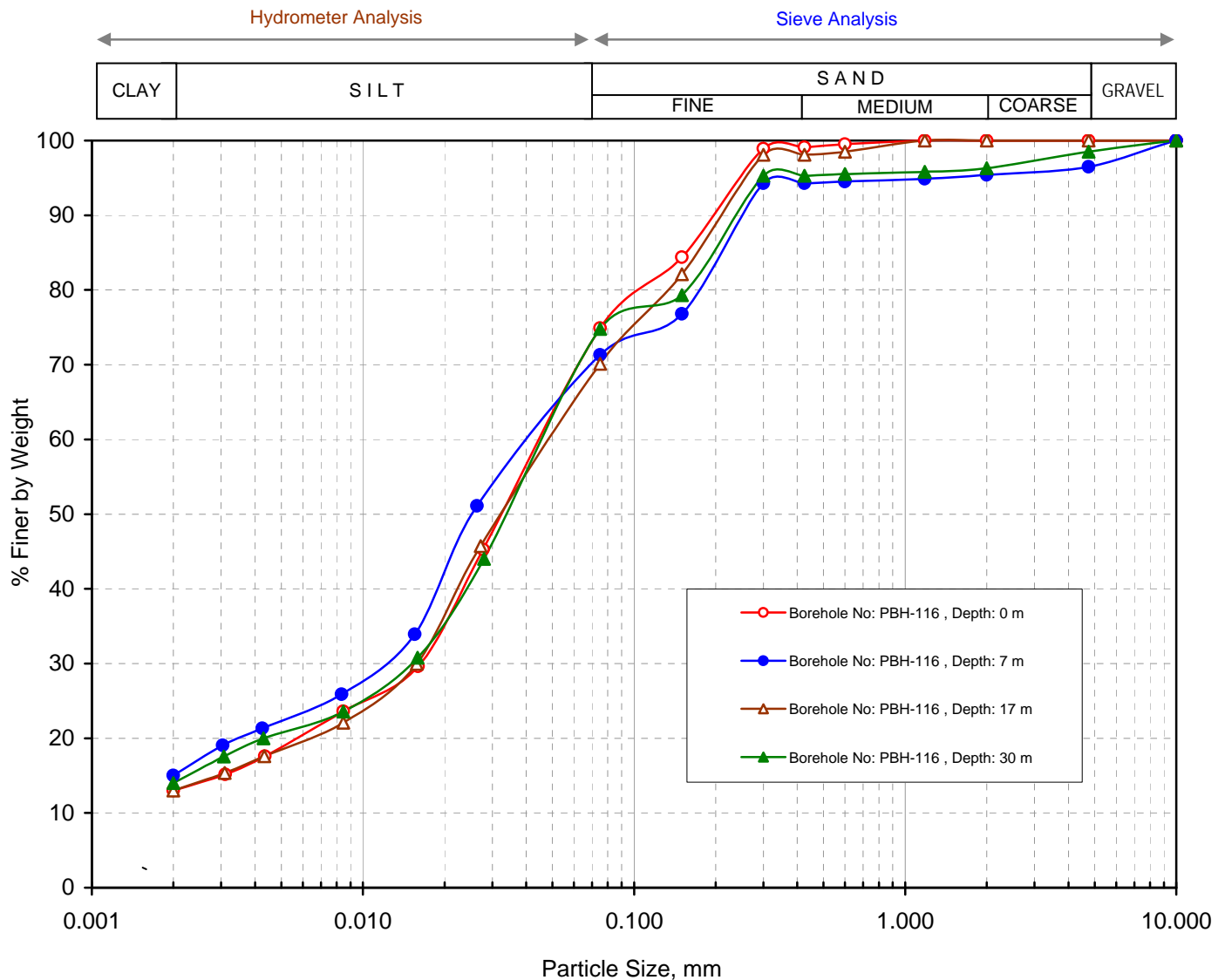
## Grain Size Distribution Curve



## 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 ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-116	0.00	Sandy silt (CL)	0	25	62	13	0.051	0.016			
PBH-116	7.00	Sandy silt with traces of gravels (CL)	4	25	56	15	0.048	0.012			
PBH-116	17.00	Sandy silt (CL)	0	29	58	13	0.055	0.016			
PBH-116	30.00	Sandy silt with traces of gravels (CL)	2	23	61	14	0.052	0.015			

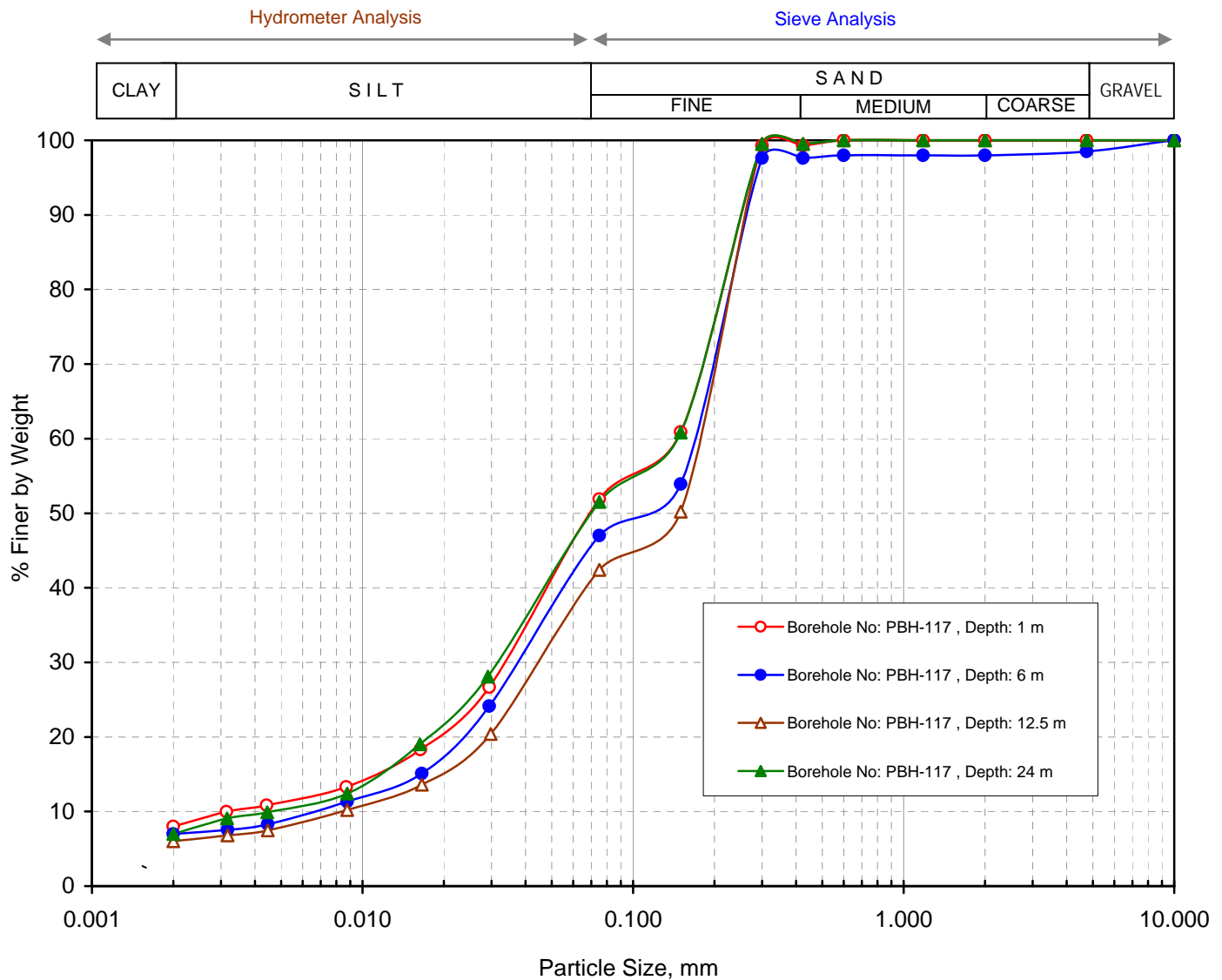




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-117	1.00	Silty fine sand (SM)	0	48	44	8	0.143	0.035	0.003	47.7	2.86
PBH-117	6.00	Silty fine sand with traces of gravels (SM)	2	51	40	7	0.171	0.041	0.007	24.4	1.40
PBH-117	12.50	Silty fine sand (SM)	0	57	37	6	0.180	0.050	0.008	22.5	1.74
PBH-117	24.00	Silty fine sand (SM)	0	48	45	7	0.144	0.033	0.005	28.8	1.51

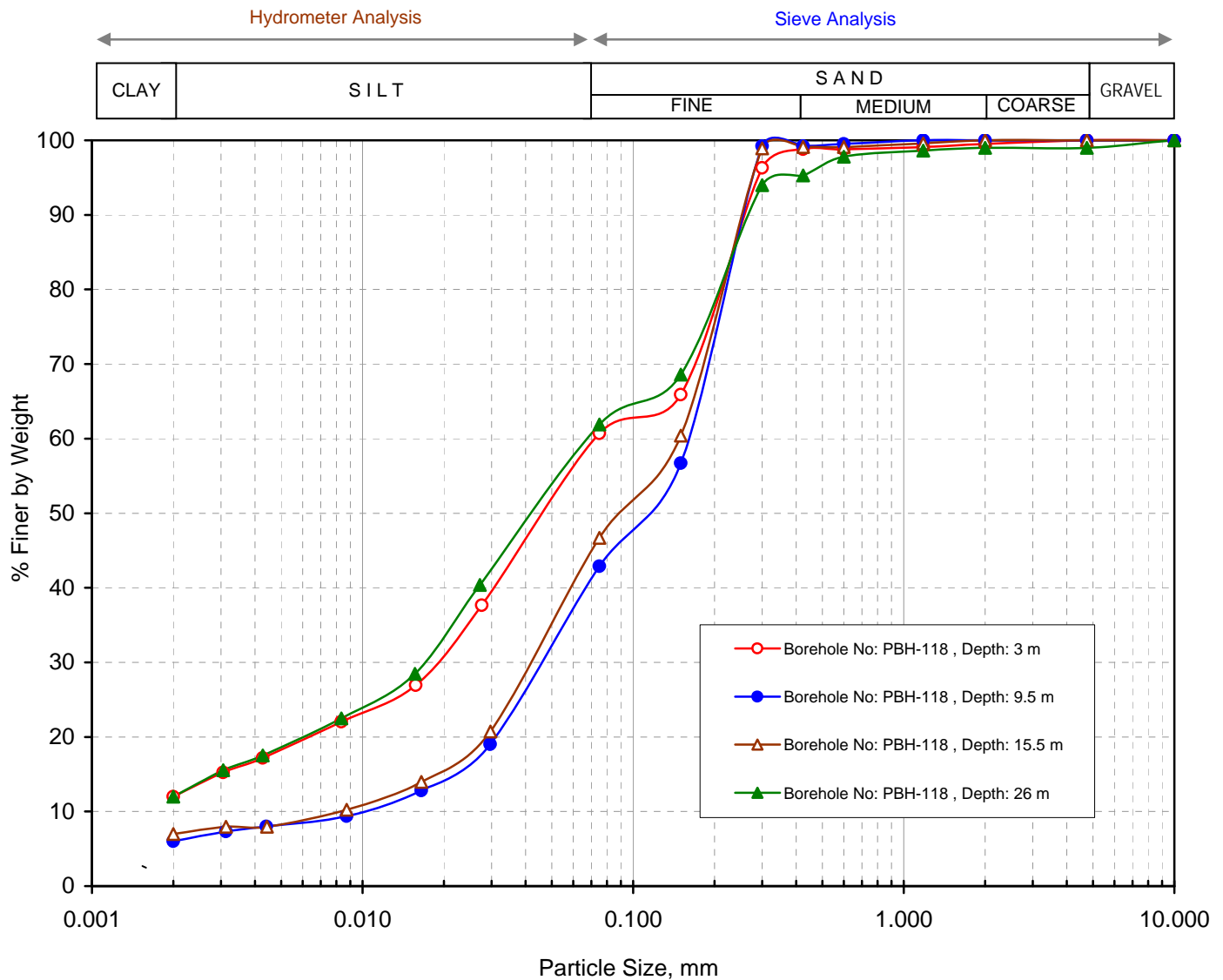




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-118	3.00	Sandy silt (CL)	0	39	49	12	0.074	0.019			
PBH-118	9.50	Silty fine sand (SM)	0	57	37	6	0.162	0.050	0.010	16.2	1.54
PBH-118	15.50	Silty fine sand (SM)	0	53	40	7	0.148	0.046	0.008	18.5	1.79
PBH-118	26.00	Sandy silt with traces of gravels (CL)	1	37	50	12	0.071	0.017			



Grain Size Distribution Curve





## Grain Size Analysis

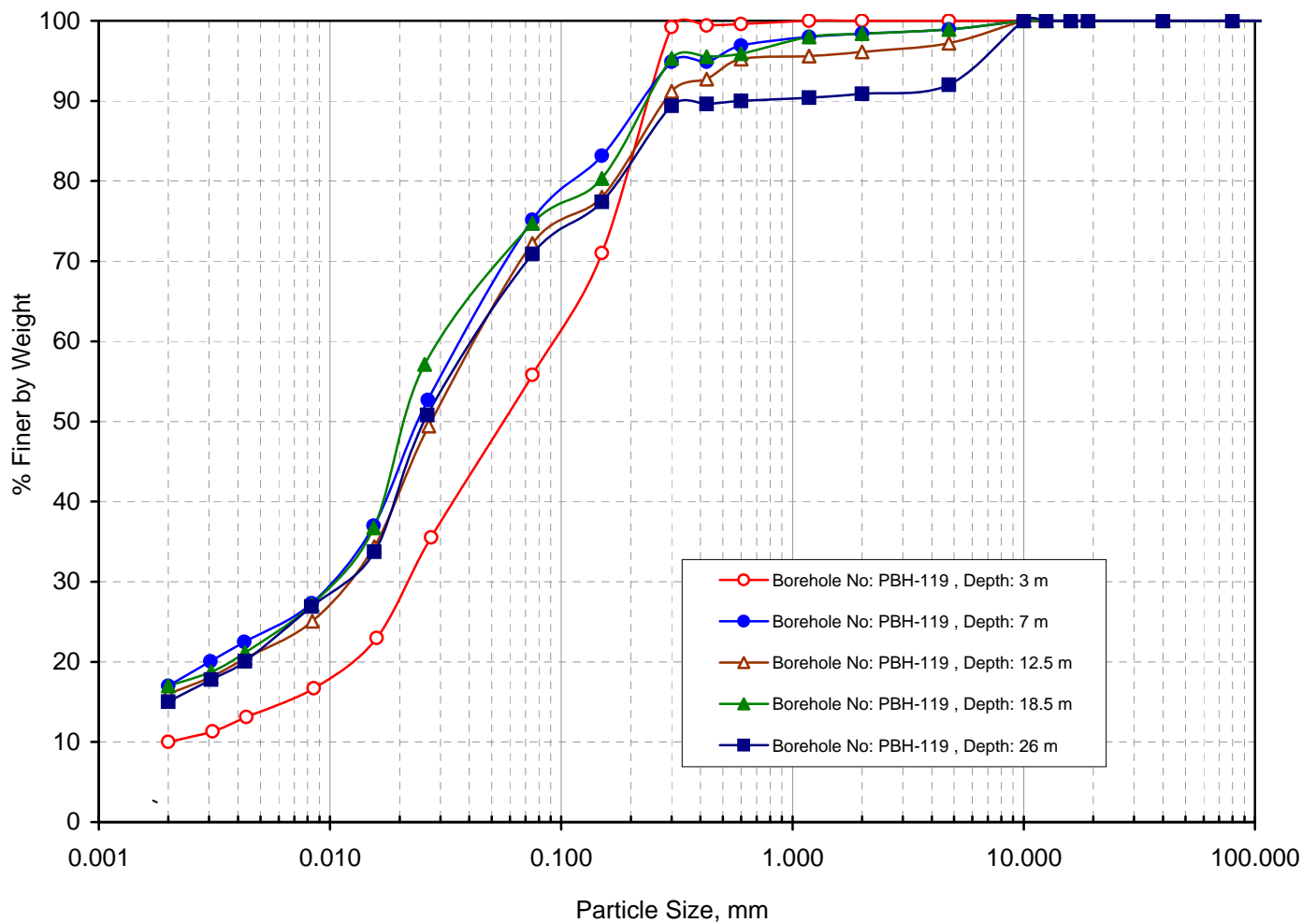
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-119	3.00	Sandy silt (CL)	0	44	46	10	0.096	0.022	0.002	48.0	2.52
PBH-119	7.00	Sandy silt with traces of gravels (CL)	1	23	59	17	0.042	0.010			
PBH-119	12.50	Sandy silt with traces of gravels (CL)	3	25	56	16	0.049	0.012			
PBH-119	18.50	Sandy silt with traces of gravels (CL)	1	24	58	17	0.034	0.010			
PBH-119	26.00	Sandy silt with gravels (CL)	8	21	56	15	0.049	0.012			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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## Grain Size Analysis

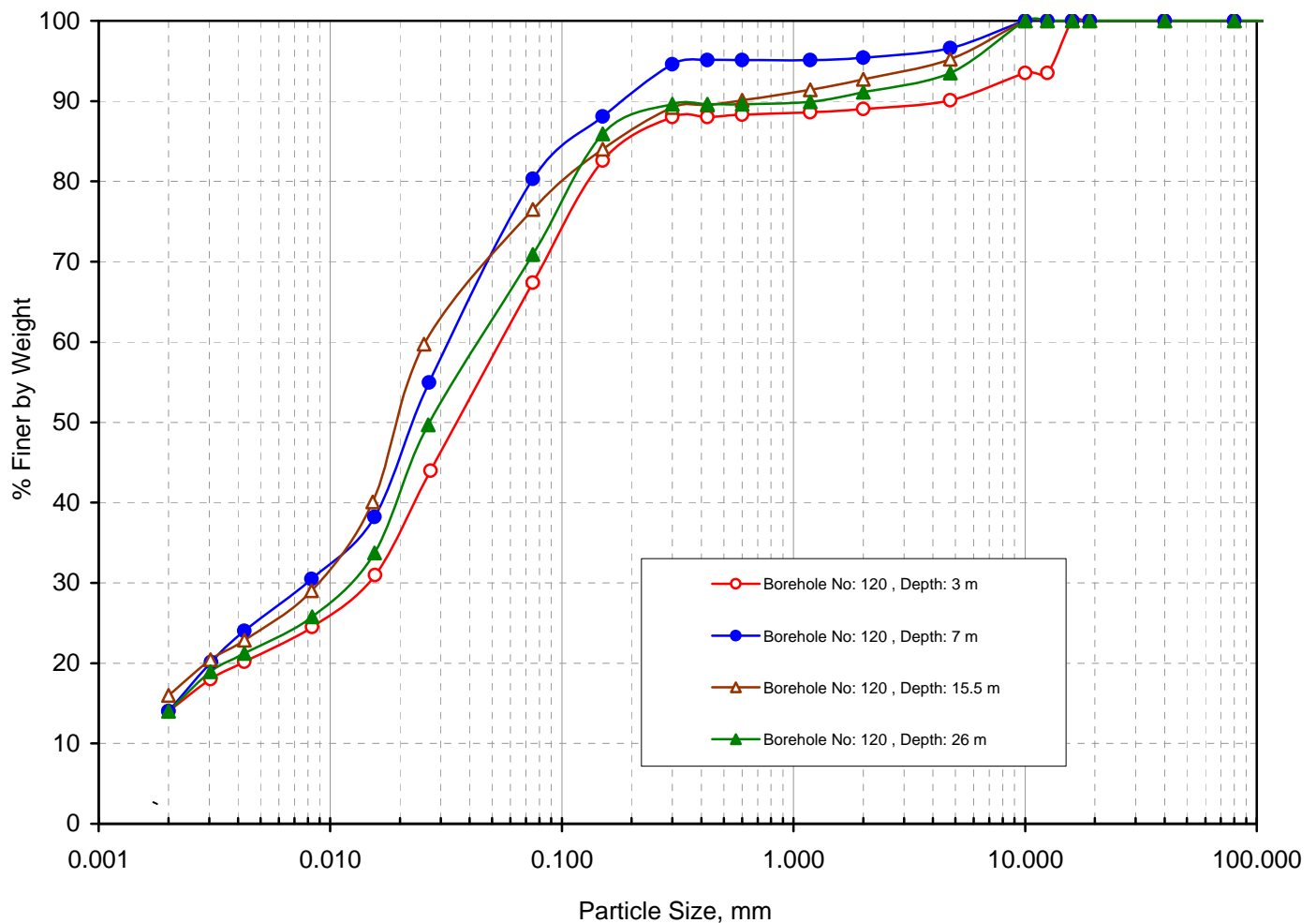
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-120	3.00	Sandy silt with gravels (CL)	10	22	54	14	0.060	0.015			
BH-120	7.00	Sandy silt with traces of gravels (CL)	3	16	67	14	0.036	0.008			
BH-120	15.50	Sandy silt with gravels (CL)	5	18	61	16	0.026	0.009			
BH-120	26.00	Sandy silt with gravels (CL)	7	22	57	14	0.050	0.012			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



## Grain Size Distribution Curve

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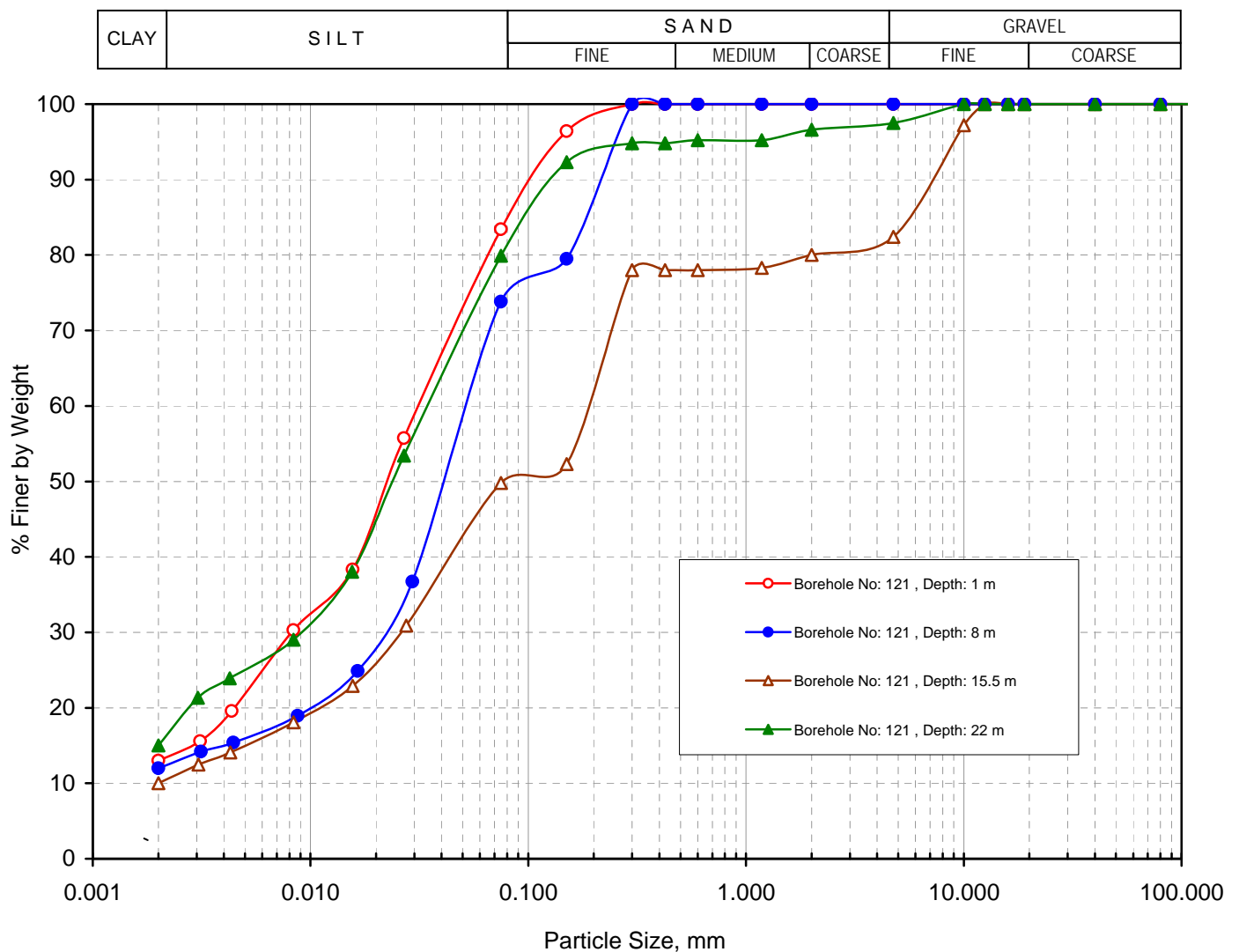
## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-121	1.00	Sandy silt (CL)	0	16	71	13	0.034	0.008			
BH-121	8.00	Sandy silt (CL)	0	26	62	12	0.058	0.022			
BH-121	15.50	Sandy silt with gravels (CL)	18	32	40	10	0.195	0.026	0.002	97.5	1.73
BH-121	22.00	Sandy silt with traces of gravels (CL)	3	17	65	15	0.039	0.009			

Hydrometer Analysis

Sieve Analysis



Grain Size Distribution Curve



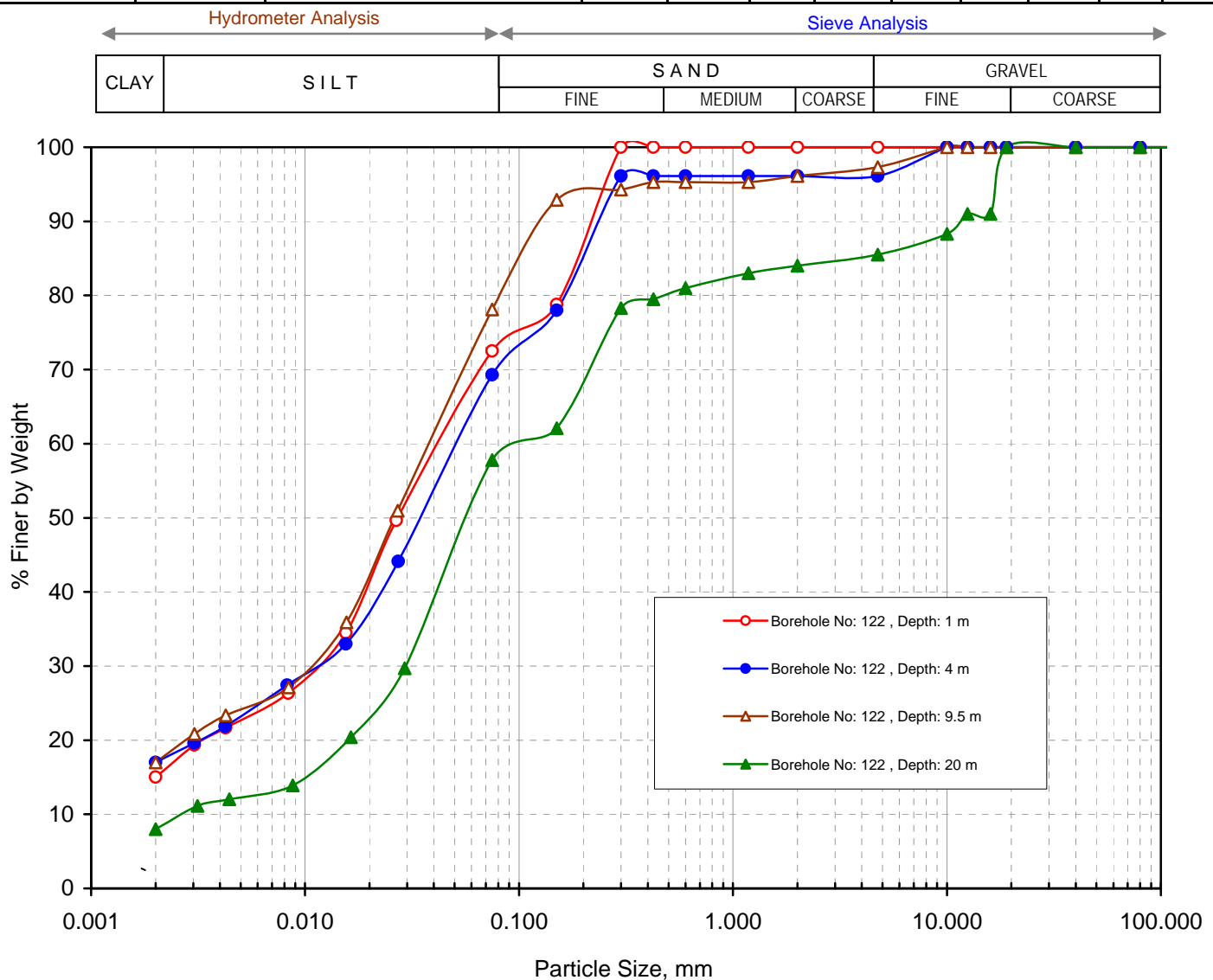




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-122	1.00	Sandy silt (CL)	0	27	58	15	0.049	0.012			
BH-122	4.00	Sandy silt with traces of gravels (CL)	4	26	53	17	0.057	0.012			
BH-122	9.50	Sandy silt with traces of gravels (CL)	3	19	61	17	0.043	0.011			
BH-122	20.00	Sandy silt with gravels (CL)	15	27	50	8	0.113	0.030	0.003	37.7	2.65



Grain Size Distribution Curve





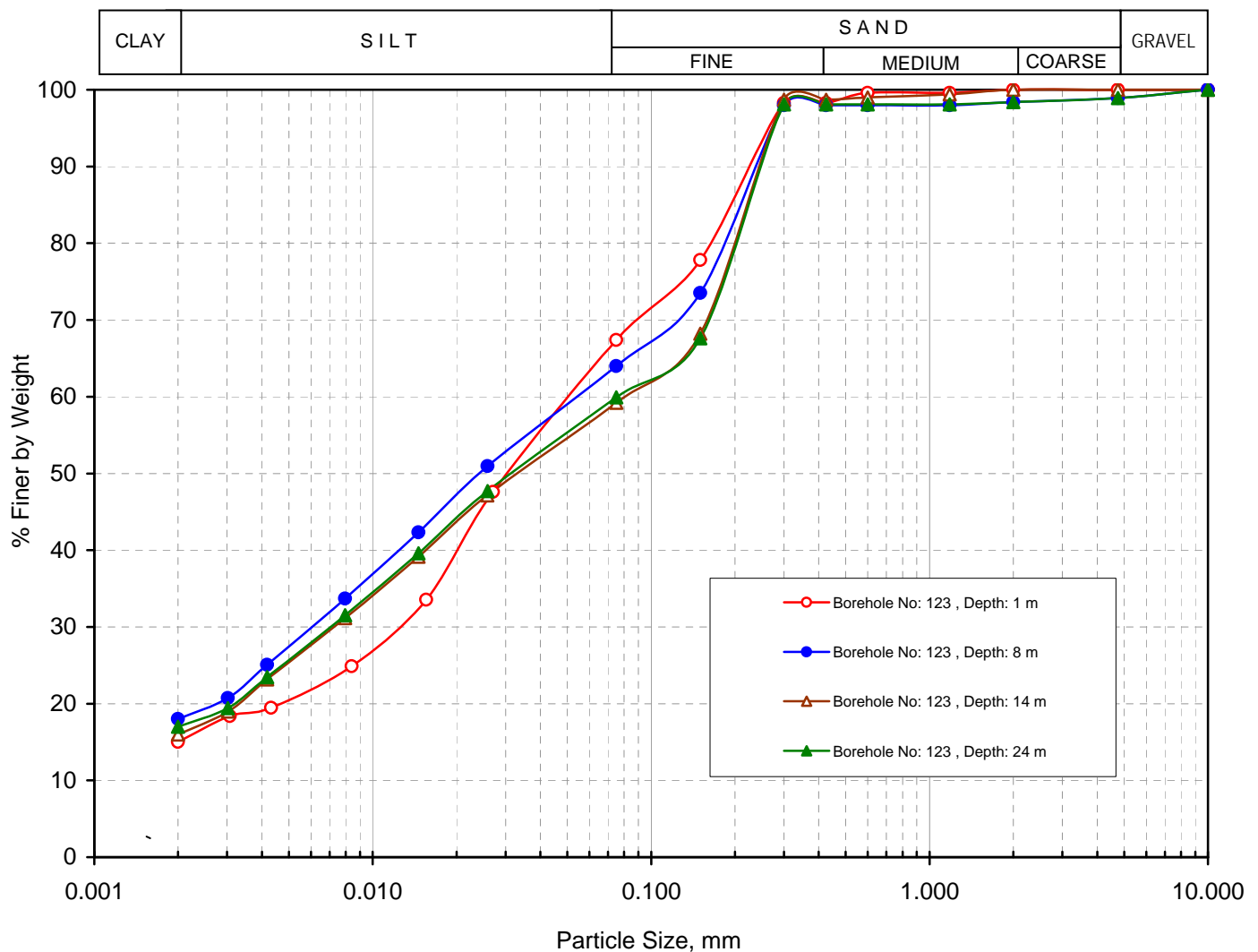
## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-123	1.00	Sandy silt (CL)	0	32	53	15	0.057	0.013			
BH-123	8.00	Sandy silt with traces of gravels (CL)	1	34	47	18	0.060	0.006			
BH-123	14.00	Sandy silt (CL)	0	40	44	16	0.082	0.007			
BH-123	24.00	Sandy silt with traces of gravels (CL)	1	39	43	17	0.076	0.007			

Hydrometer Analysis

Sieve Analysis



Grain Size Distribution Curve

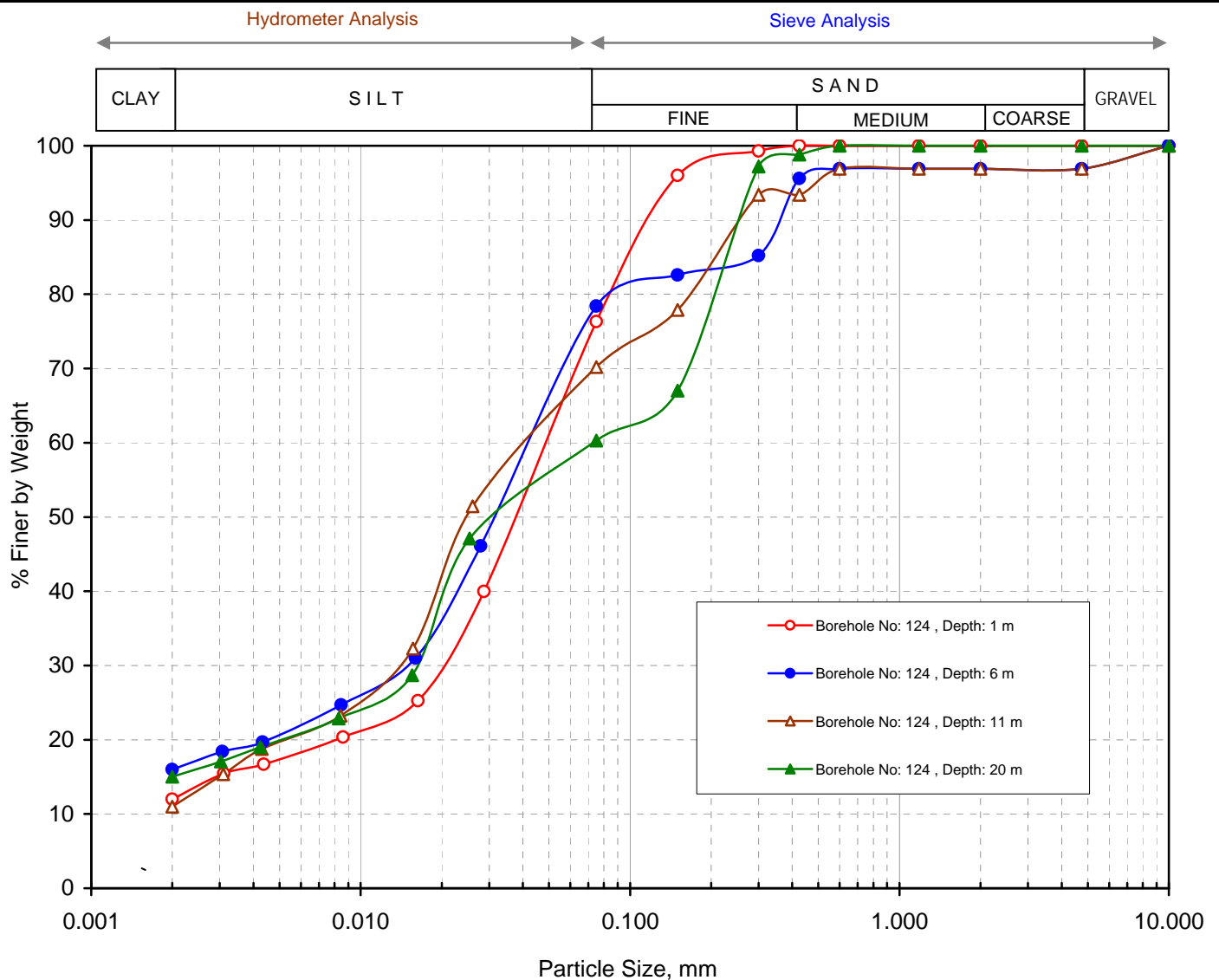




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-124	1.00	Sandy silt (CL)	0	23	65	12	0.054	0.020			
BH-124	6.00	Sandy silt with traces of gravels (CL)	3	18	63	16	0.048	0.015			
BH-124	11.00	Sandy silt with traces of gravels (CL)	3	26	60	11	0.048	0.014			
BH-124	20.00	Sandy silt (CL)	0	39	46	15	0.074	0.016			



## Grain Size Distribution Curve



## Grain Size Analysis

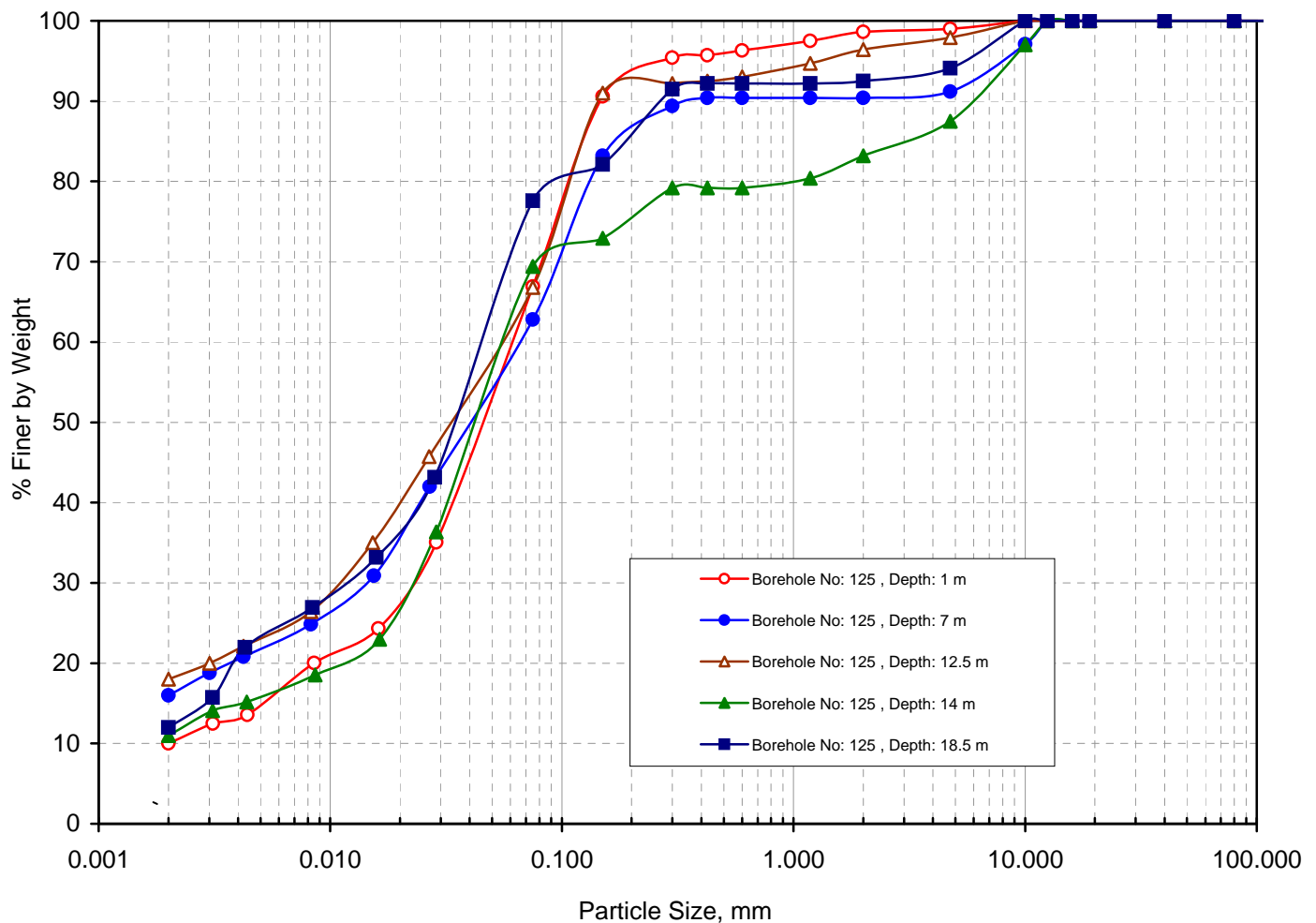
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-125	1.00	Sandy silt with traces of gravels (CL)	1	32	57	10	0.065	0.023	0.002	32.5	4.07
BH-125	7.00	Sandy silt with gravels (CL)	9	28	47	16	0.069	0.014			
BH-125	12.50	Sandy silt with traces of gravels (CL)	2	31	49	18	0.059	0.011			
BH-125	14.00	Sandy silt with gravels (CL)	13	18	58	11	0.062	0.023			
BH-125	18.50	Sandy silt with gravels (CL)	6	16	66	12	0.051	0.012			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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## Grain Size Analysis

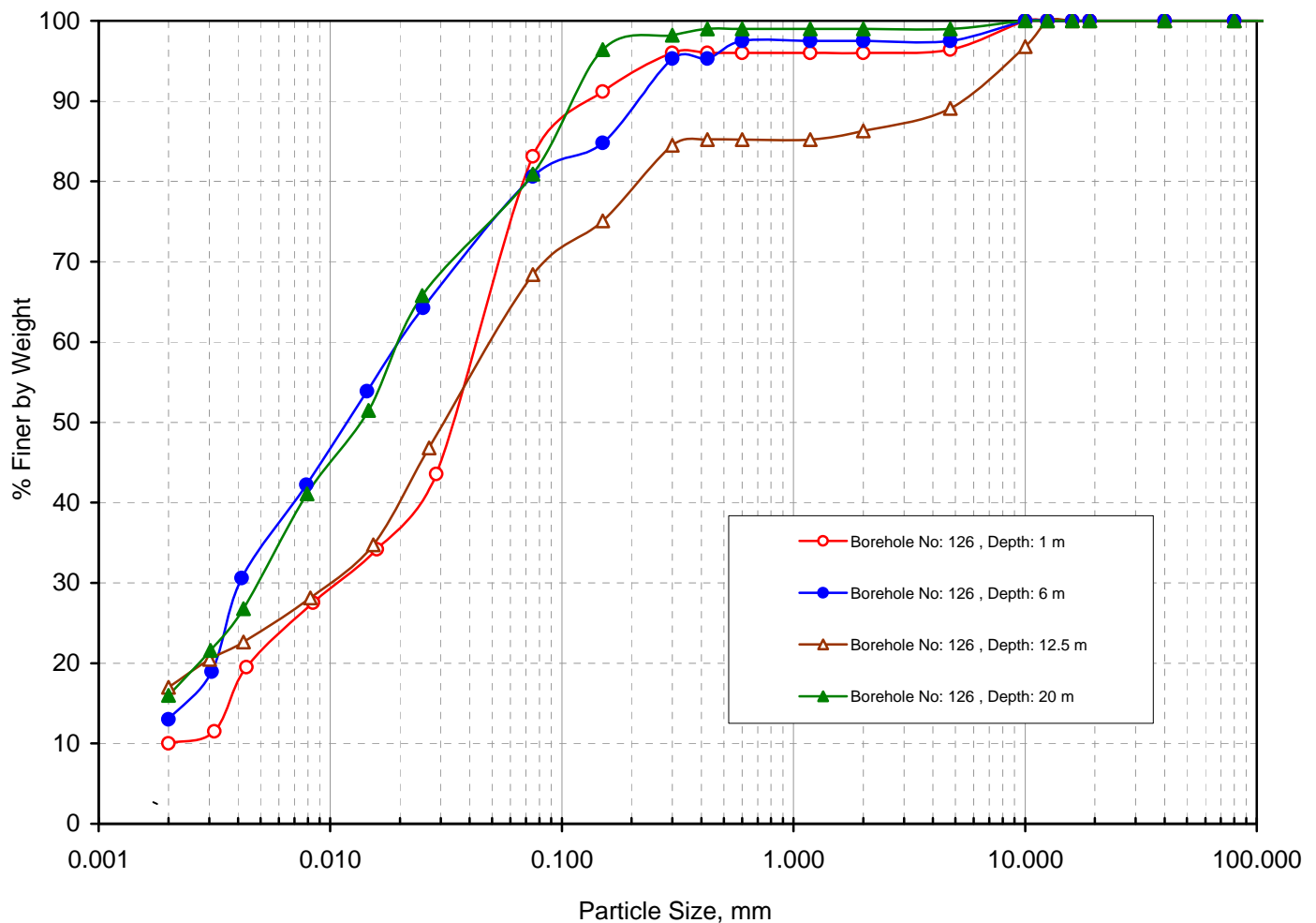
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-126	1.00	Sandy silt with traces of gravels (CL)	4	13	73	10	0.048	0.011	0.002	24.0	1.26
BH-126	6.00	Sandy silt with traces of gravels (CL)	3	16	68	13	0.021	0.004			
BH-126	12.50	Sandy silt with gravels (CL)	11	20	52	17	0.056	0.010			
BH-126	20.00	Sandy silt with traces of gravels (CL)	1	18	65	16	0.021	0.005			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve





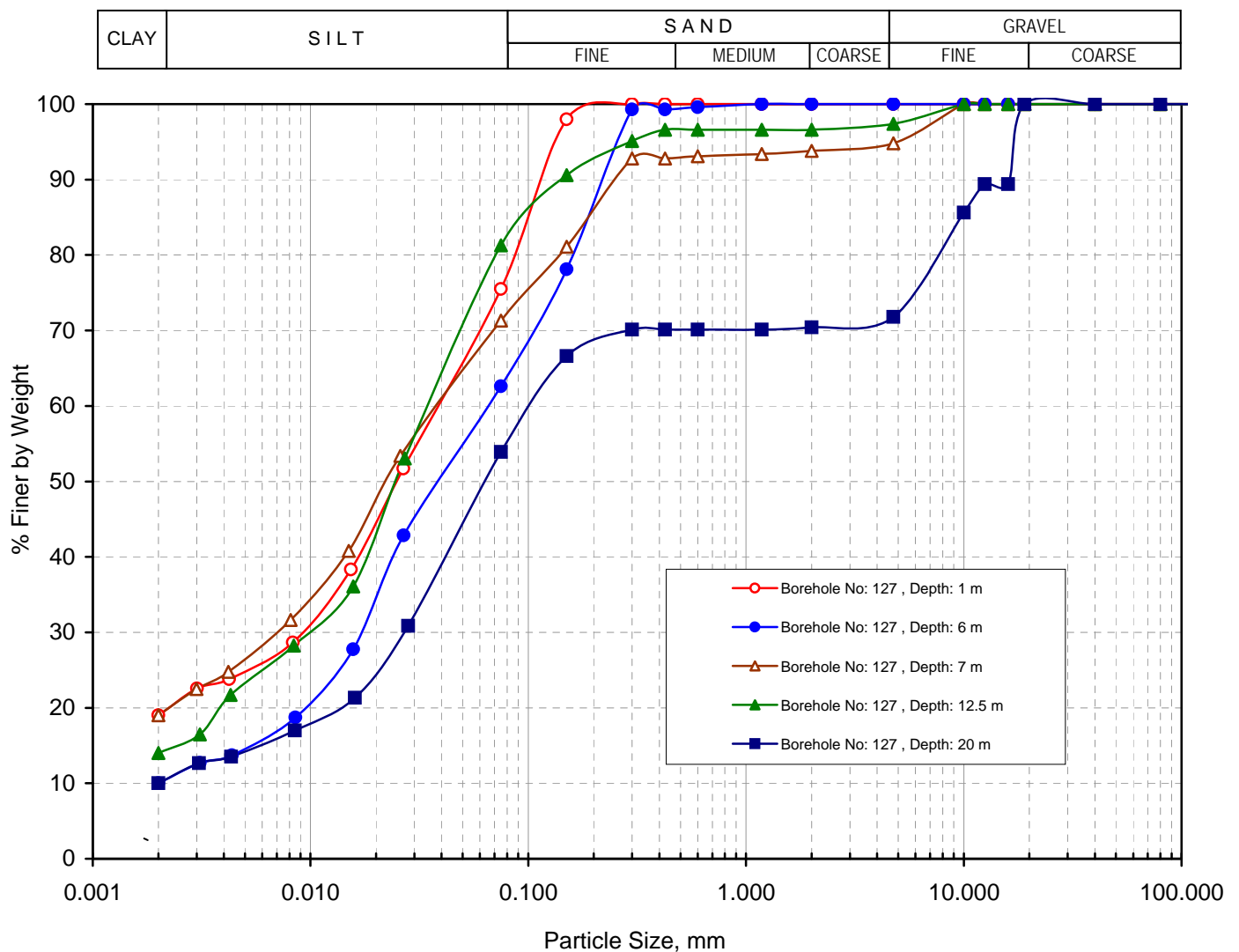
## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-127	1.00	Sandy silt (CL)	0	24	57	19	0.044	0.009			
BH-127	6.00	Sandy silt (CL)	0	37	53	10	0.069	0.017	0.002	34.5	2.09
BH-127	7.00	Sandy silt with gravels (CL)	5	23	53	19	0.044	0.007			
BH-127	12.50	Sandy silt with traces of gravels (CL)	3	16	67	14	0.039	0.010			
BH-127	20.00	Sandy silt intermixed with gravels (CL)	28	17	45	10	0.111	0.027	0.002	55.5	3.28

Hydrometer Analysis

Sieve Analysis



Grain Size Distribution Curve

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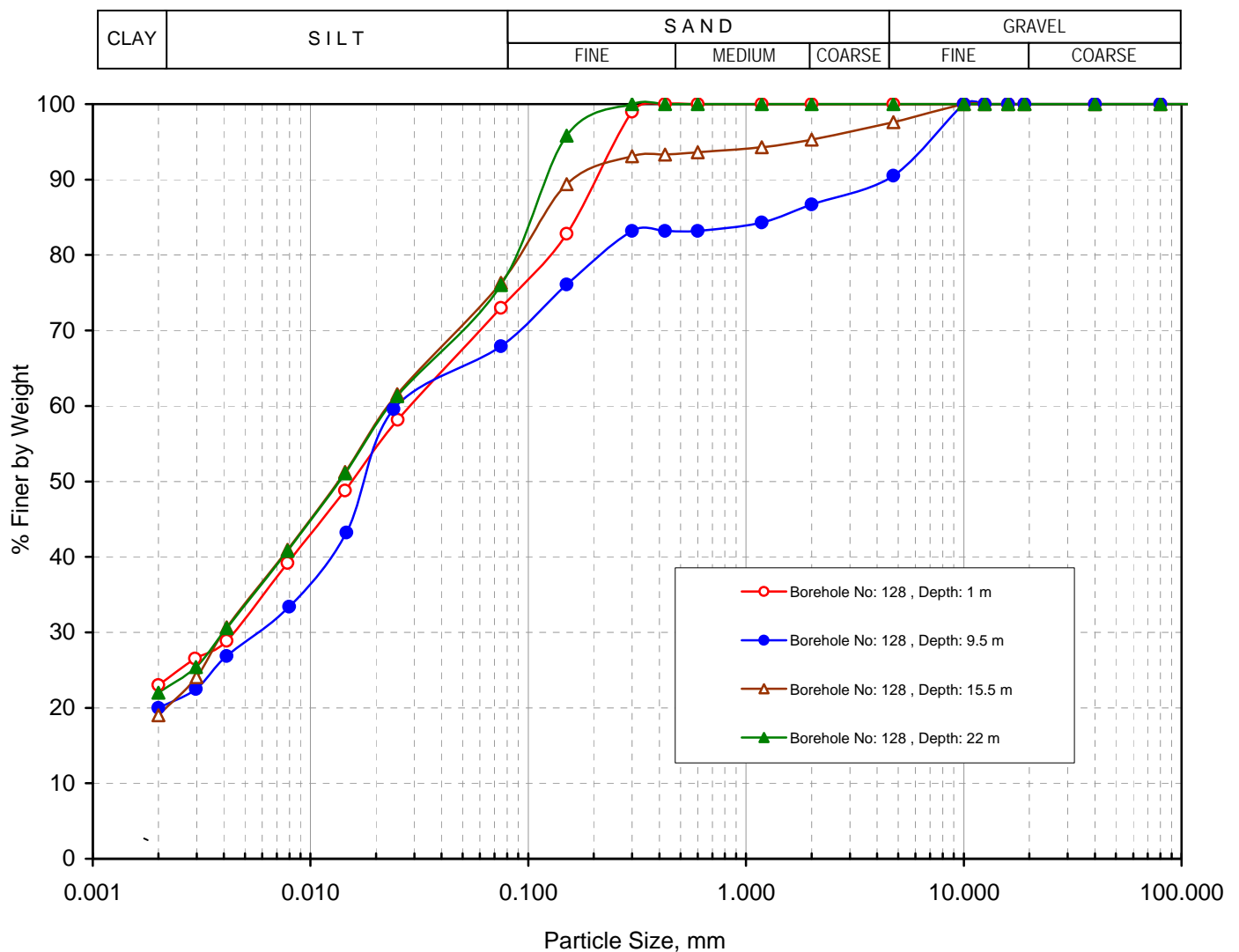
## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
BH-128	1.00	Sandy silt (CL)	0	27	50	23	0.031	0.005			
BH-128	9.50	Sandy silt with gravels (CL)	10	22	48	20	0.027	0.006			
BH-128	15.50	Sandy silt with traces of gravels (CL)	2	21	58	19	0.023	0.004			
BH-128	22.00	Sandy silt (CL)	0	24	54	22	0.024	0.004			

Hydrometer Analysis

Sieve Analysis



Grain Size Distribution Curve

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## Grain Size Analysis

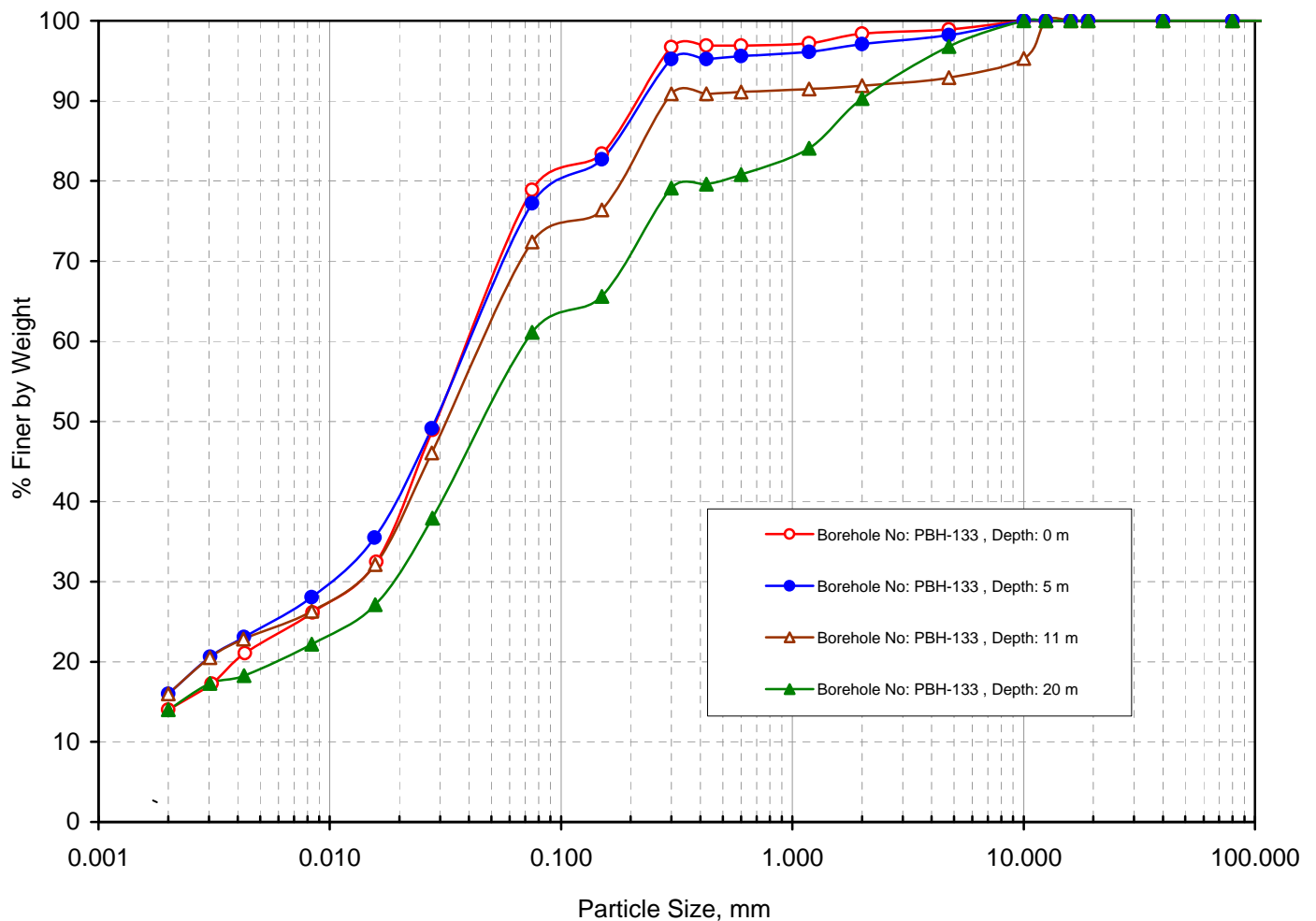
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-133	0.00	Sandy silt with traces of gravels (CL)	1	20	65	14	0.045	0.013			
PBH-133	5.00	Sandy silt with traces of gravels (CL)	2	21	61	16	0.046	0.010			
PBH-133	11.00	Sandy silt with gravels (CL)	7	20	57	16	0.053	0.013			
PBH-133	20.00	Sandy silt with traces of gravels (CL)	3	35	48	14	0.073	0.019			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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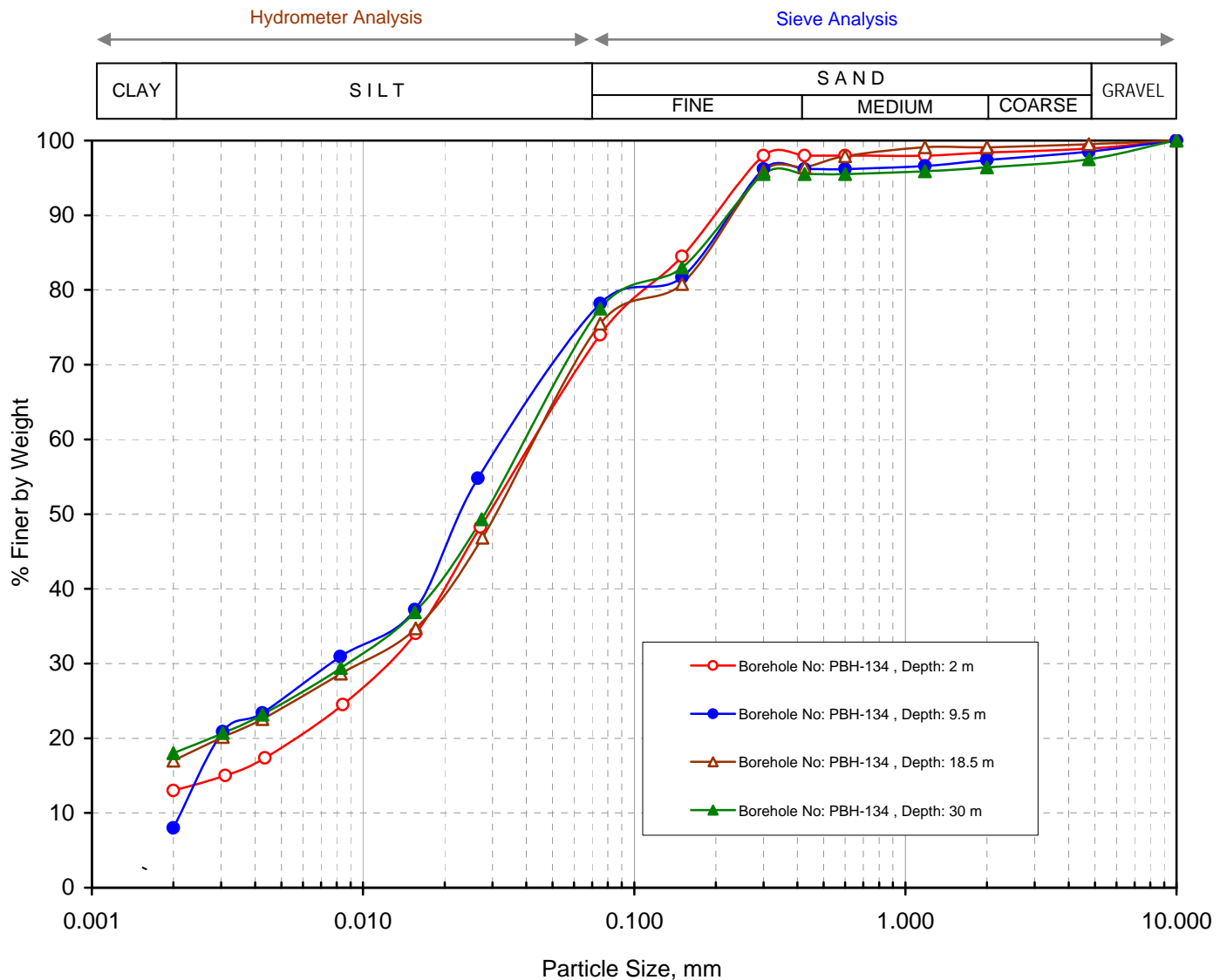




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-134	2.00	Sandy silt with traces of gravels (CL)	1	24	62	13	0.049	0.013			
PBH-134	9.50	Sandy silt with traces of gravels (CL)	2	20	70	8	0.037	0.008	0.002	18.5	0.86
PBH-134	18.50	Sandy silt with traces of gravels (CL)	1	24	58	17	0.049	0.010			
PBH-134	30.00	Sandy silt with traces of gravels (CL)	3	20	59	18	0.045	0.009			





## Grain Size Analysis

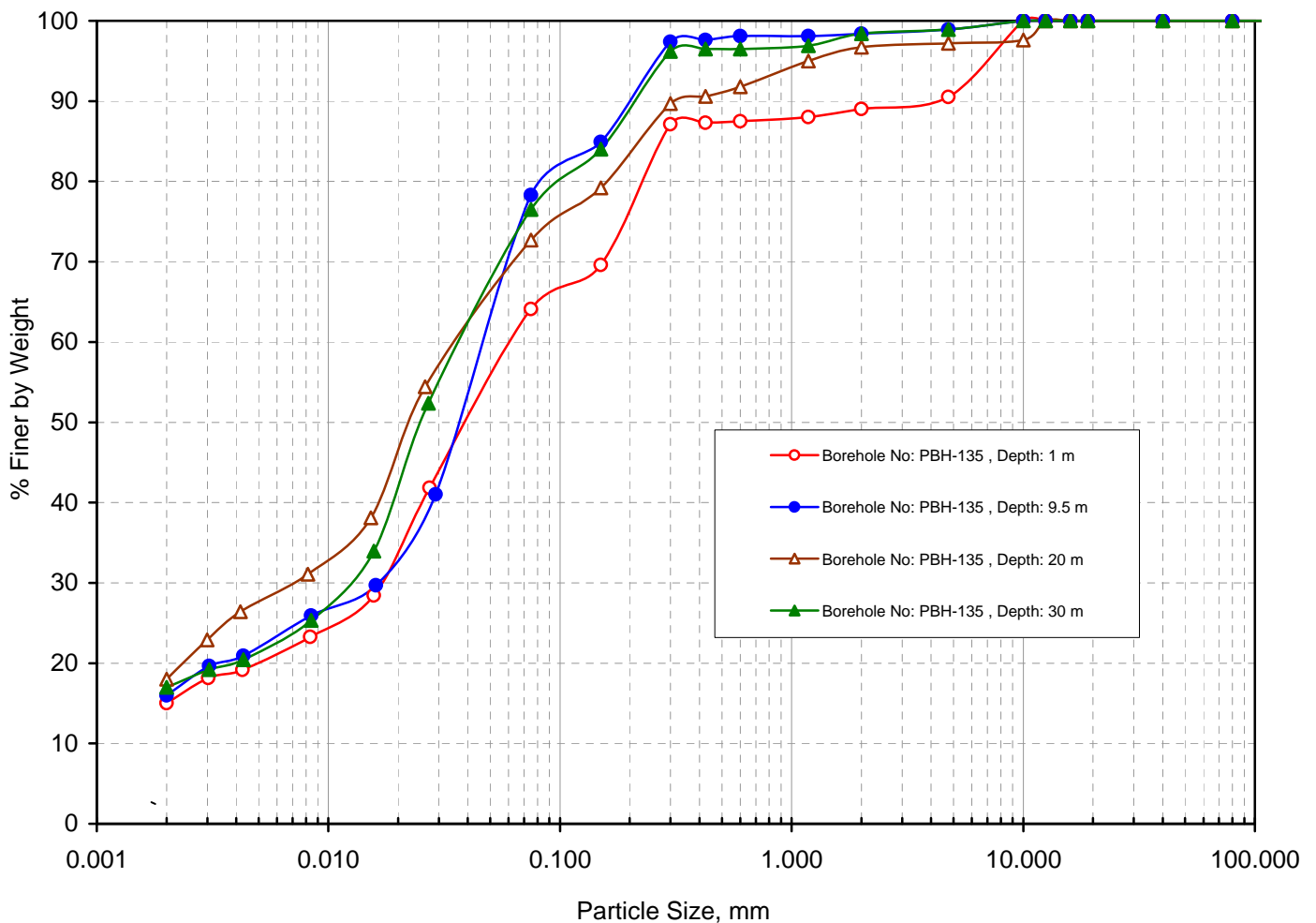
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-135	1.00	Sandy silt with gravels (CL)	10	26	49	15	0.066	0.017			
PBH-135	9.50	Sandy silt with traces of gravels (CL)	1	20	63	16	0.052	0.016			
PBH-135	20.00	Sandy silt with traces of gravels (CL)	3	24	55	18	0.041	0.007			
PBH-135	30.00	Sandy silt with traces of gravels (CL)	1	22	60	17	0.042	0.012			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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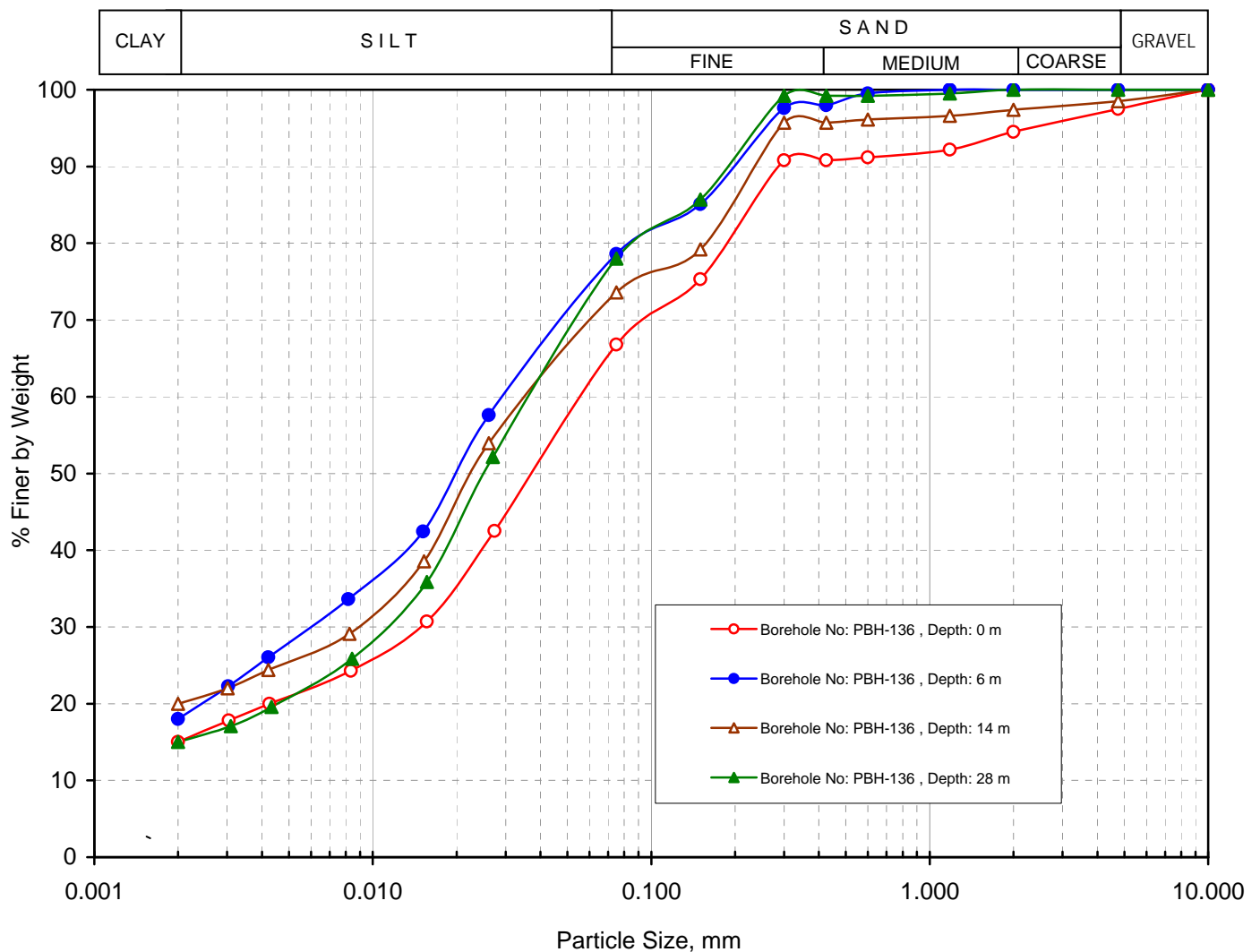
## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-136	0.00	Sandy silt with traces of gravels (CL)	3	30	52	15	0.062	0.015			
PBH-136	6.00	Sandy silt (CL)	0	21	61	18	0.032	0.006			
PBH-136	14.00	Sandy silt with traces of gravels (CL)	2	24	54	20	0.041	0.009			
PBH-136	28.00	Sandy silt (CL)	0	22	63	15	0.042	0.011			

Hydrometer Analysis

Sieve Analysis



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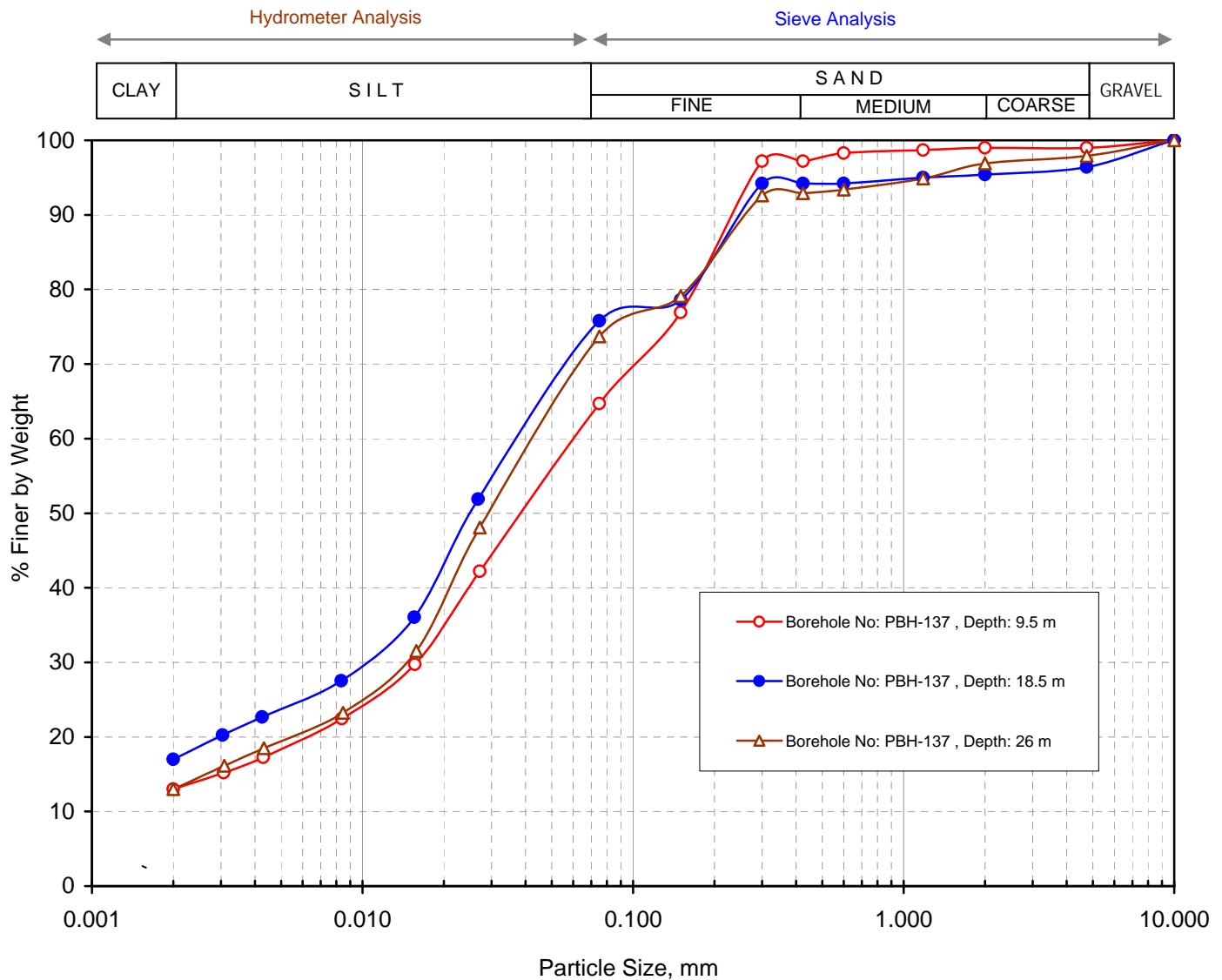
## Grain Size Distribution Curve



## 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 ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-137	9.50	Sandy silt with traces of gravels (CL)	1	34	52	13	0.065	0.016			
PBH-137	18.50	Sandy silt with traces of gravels (CL)	4	20	59	17	0.043	0.010			
PBH-137	26.00	Sandy silt with traces of gravels (CL)	2	24	61	13	0.049	0.014			



Grain Size Distribution Curve

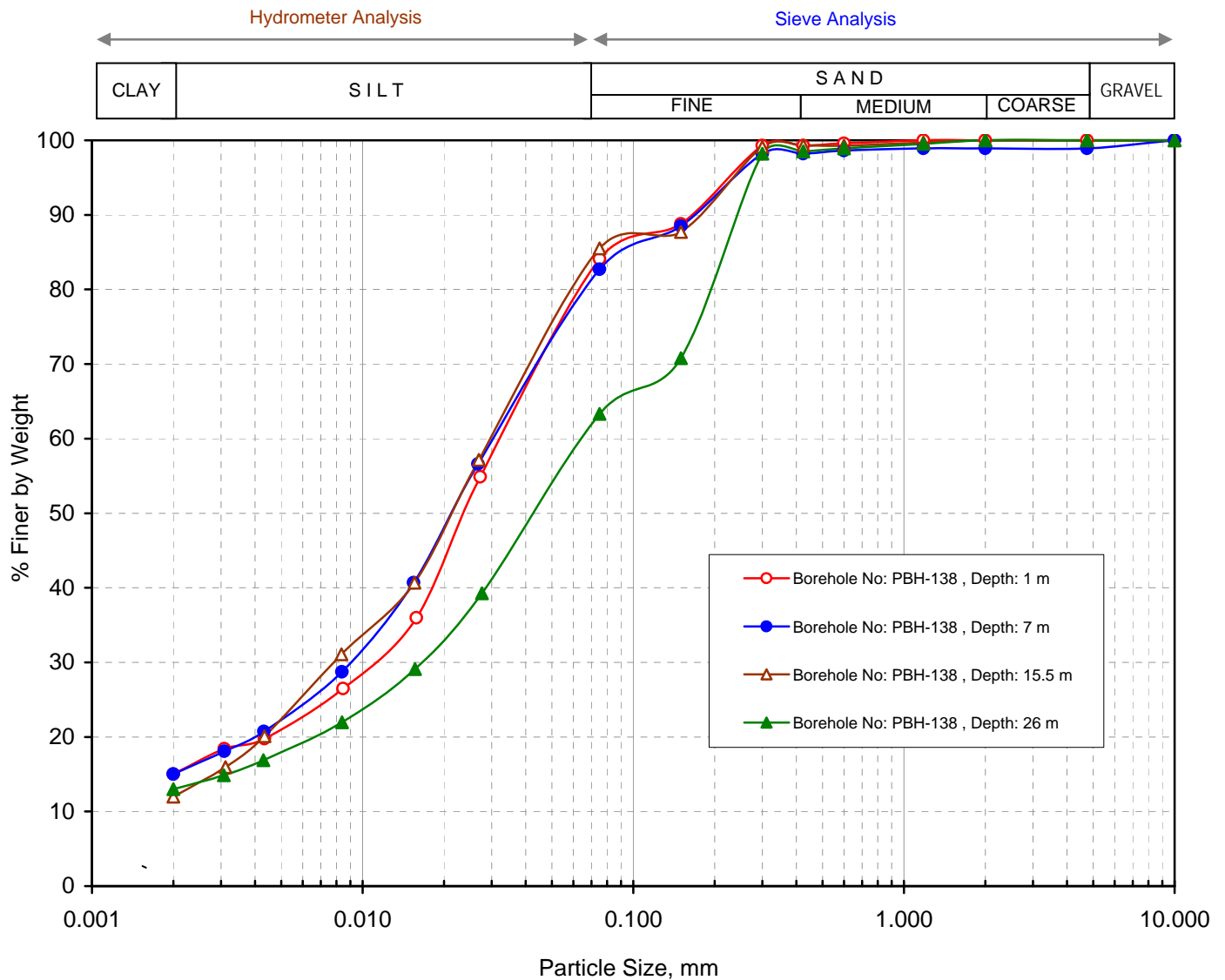




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-138	1.00	Sandy silt (CL)	0	15	70	15	0.036	0.011			
PBH-138	7.00	Sandy silt with traces of gravels (CL)	1	16	68	15	0.033	0.009			
PBH-138	15.50	Sandy silt (CL)	0	14	74	12	0.032	0.008			
PBH-138	26.00	Sandy silt (CL)	0	36	51	13	0.068	0.017			

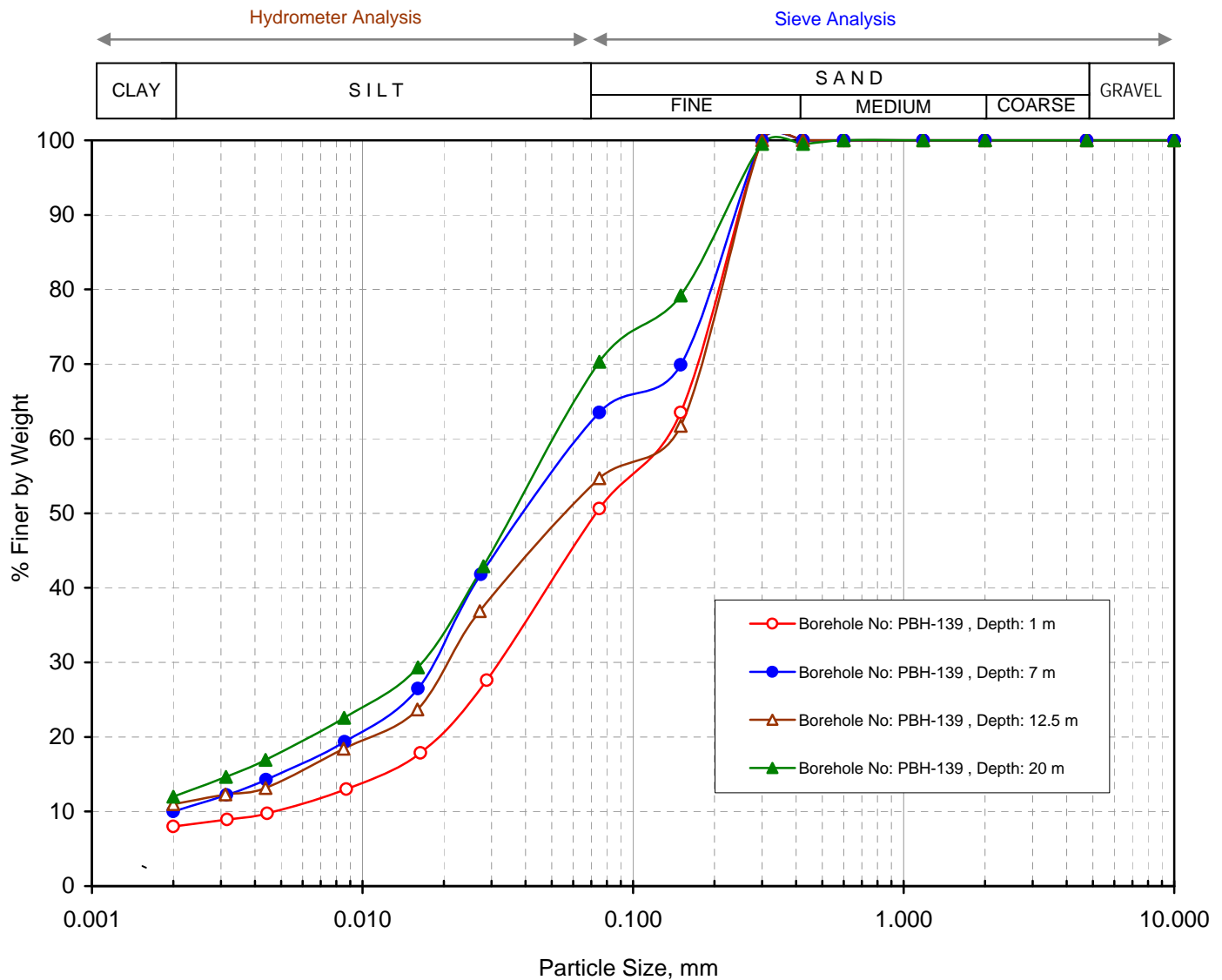




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-139	1.00	Silty fine sand (SM)	0	49	43	8	0.130	0.034	0.005	26.0	1.78
PBH-139	7.00	Sandy silt (CL)	0	36	54	10	0.067	0.019	0.002	33.5	2.69
PBH-139	12.50	Silty fine sand (SM)	0	45	44	11	0.132	0.021			
PBH-139	20.00	Sandy silt (CL)	0	29	59	12	0.057	0.017			



Grain Size Distribution Curve





## Grain Size Analysis

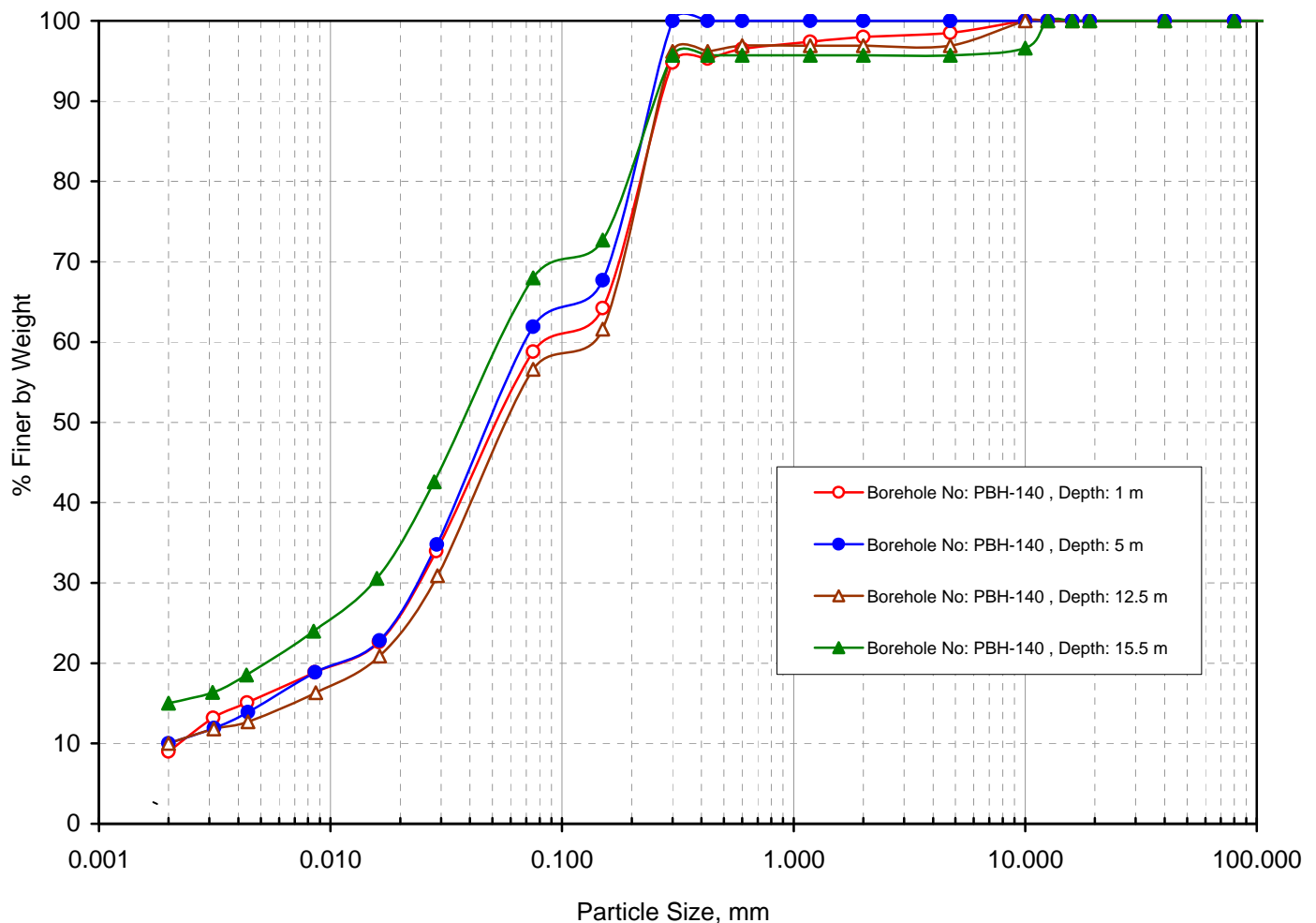
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-140	1.00	Sandy silt with traces of gravels (CL)	2	39	50	9	0.092	0.024	0.002	46.0	3.13
PBH-140	5.00	Sandy silt (CL)	0	38	52	10	0.072	0.024	0.002	36.0	4.00
PBH-140	12.50	Sandy silt with traces of gravels (CL)	3	40	47	10	0.126	0.028	0.002	63.0	3.11
PBH-140	15.50	Sandy silt with traces of gravels (CL)	4	27	54	15	0.060	0.015			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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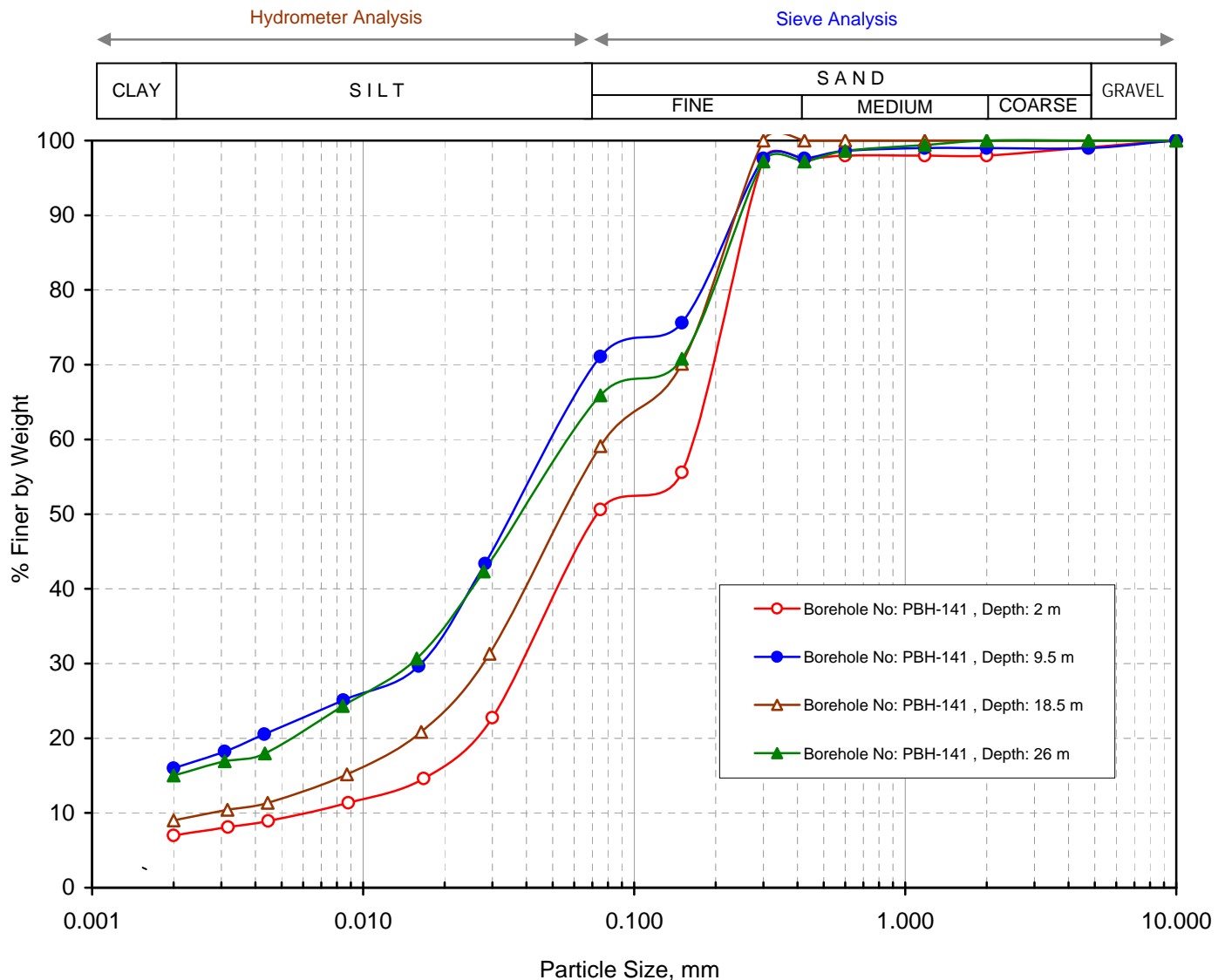




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-141	2.00	Silty fine sand with traces of gravels (SM)	1	48	44	7	0.166	0.042	0.006	27.7	1.77
PBH-141	9.50	Sandy silt with traces of gravels (CL)	1	27	56	16	0.056	0.016			
PBH-141	18.50	Sandy silt (CL)	0	40	51	9	0.081	0.028	0.003	27.0	3.23
PBH-141	26.00	Sandy silt (CL)	0	34	51	15	0.063	0.015			



Grain Size Distribution Curve



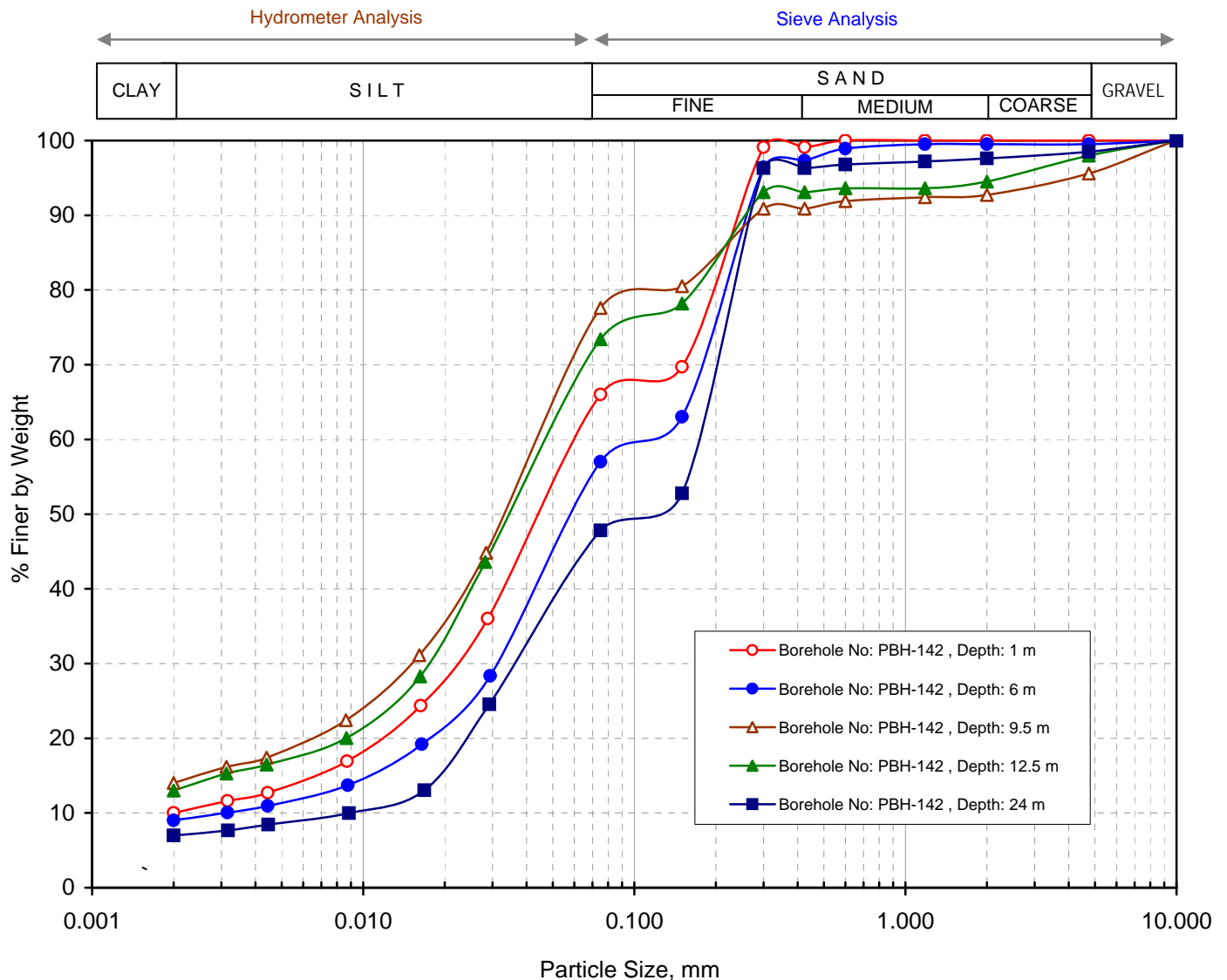




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-142	1.00	Sandy silt (CL)	0	34	56	10	0.066	0.022	0.002	33.0	3.67
PBH-142	6.00	Sandy silt with traces of gravels (CL)	1	42	48	9	0.113	0.032	0.003	37.7	3.02
PBH-142	9.50	Sandy silt with traces of gravels (CL)	4	18	64	14	0.050	0.015			
PBH-142	12.50	Sandy silt with traces of gravels (CL)	2	24	61	13	0.054	0.018			
PBH-142	24.00	Silty fine sand with traces of gravels (SM)	2	50	41	7	0.175	0.040	0.009	19.4	1.02



Grain Size Distribution Curve

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## Grain Size Analysis

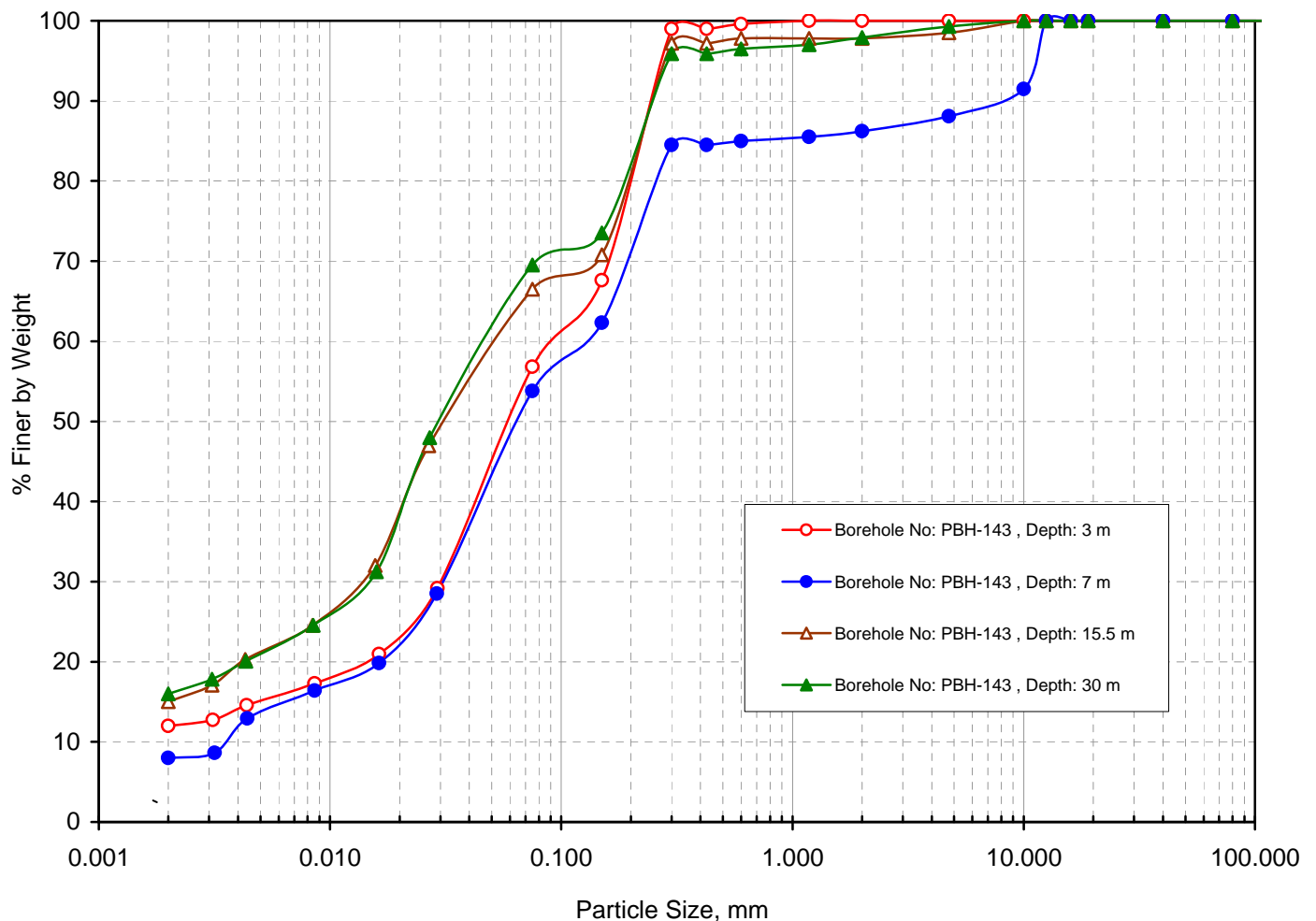
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-143	3.00	Sandy silt (CL)	0	43	45	12	0.097	0.031			
PBH-143	7.00	Sandy silt with gravels (CL)	12	34	46	8	0.130	0.032	0.004	32.5	1.97
PBH-143	15.50	Sandy silt with traces of gravels (CL)	2	32	51	15	0.059	0.014			
PBH-143	30.00	Sandy silt with traces of gravels (CL)	1	29	54	16	0.054	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

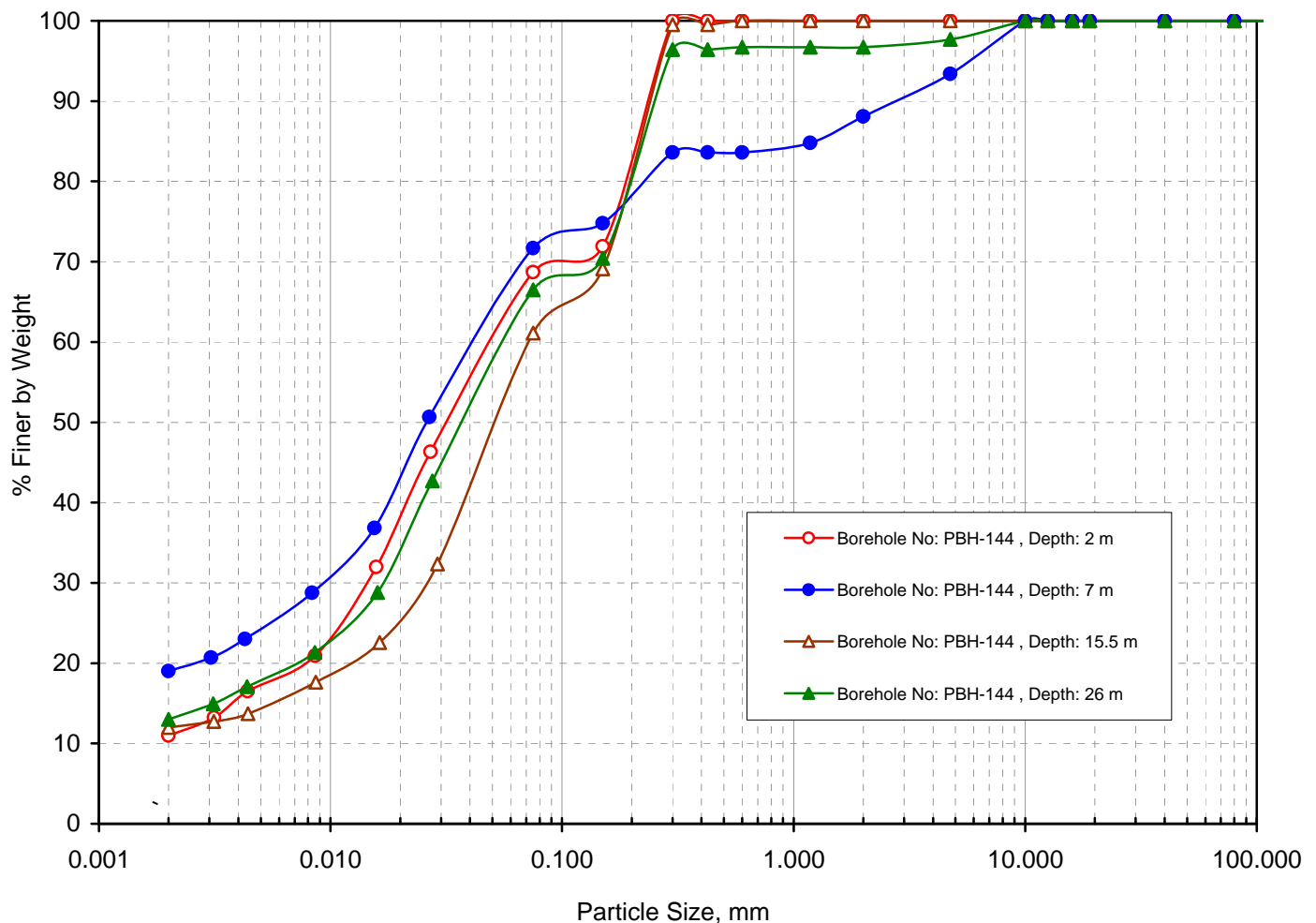
IS : 2720 (Part 4) - 1985, RA-2010

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-144	2.00	Sandy silt (CL)	0	31	58	11	0.056	0.014			
PBH-144	7.00	Sandy silt with gravels (CL)	7	21	53	19	0.048	0.009			
PBH-144	15.50	Sandy silt (CL-ML)	0	38	50	12	0.073	0.026			
PBH-144	26.00	Sandy silt with traces of gravels (CL-ML)	2	31	54	13	0.062	0.017			

Hydrometer Analysis

Sieve Analysis

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Grain Size Distribution Curve

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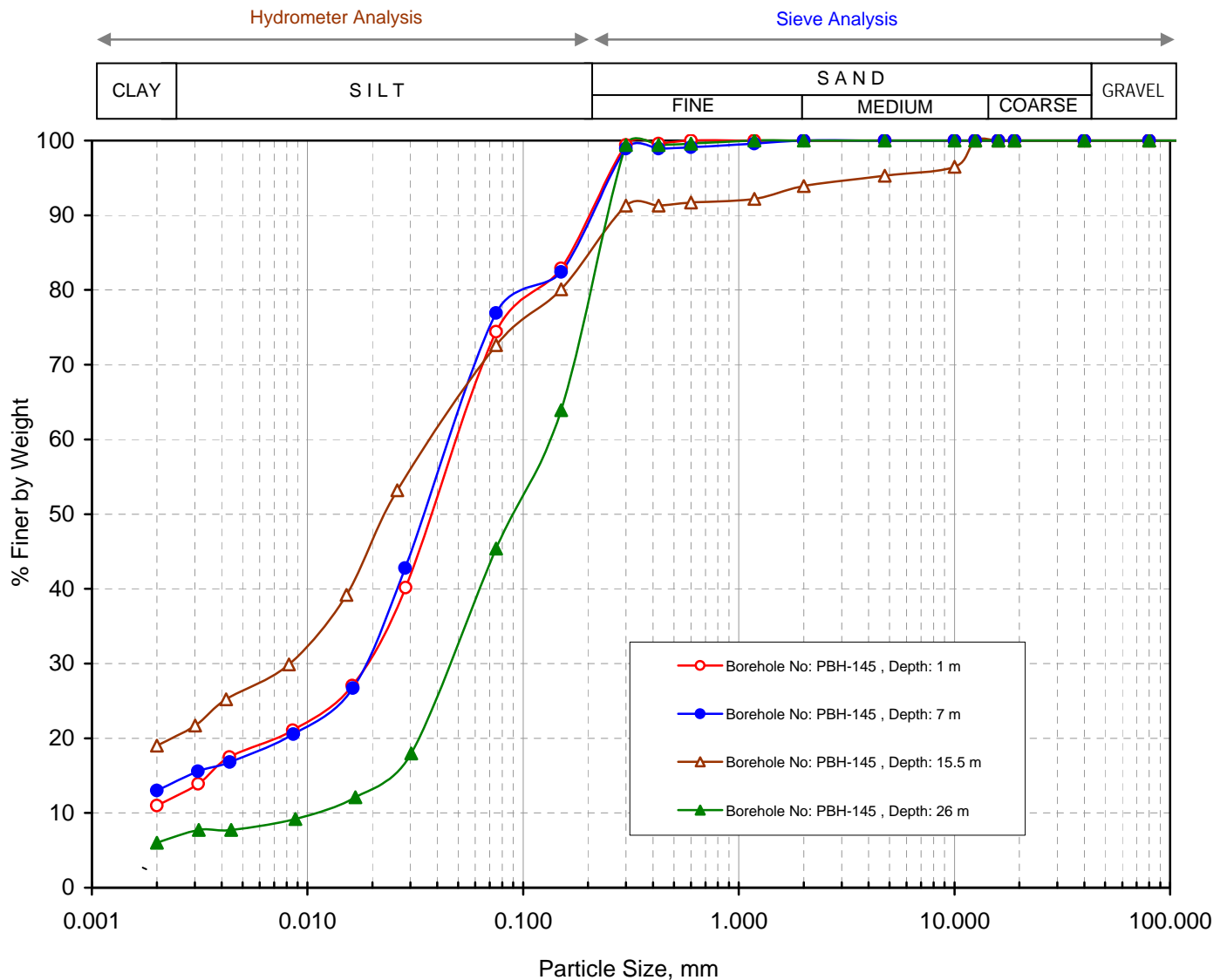




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-145	1.00	Sandy silt (CL)	0	25	64	11	0.055	0.019			
PBH-145	7.00	Sandy silt (CL)	0	23	64	13	0.052	0.019			
PBH-145	15.50	Sandy silt with gravels (CL)	5	22	54	19	0.043	0.008			
PBH-145	26.00	Silty fine sand (SM)	0	54	40	6	0.134	0.050	0.011	12.2	1.70



Grain Size Distribution Curve

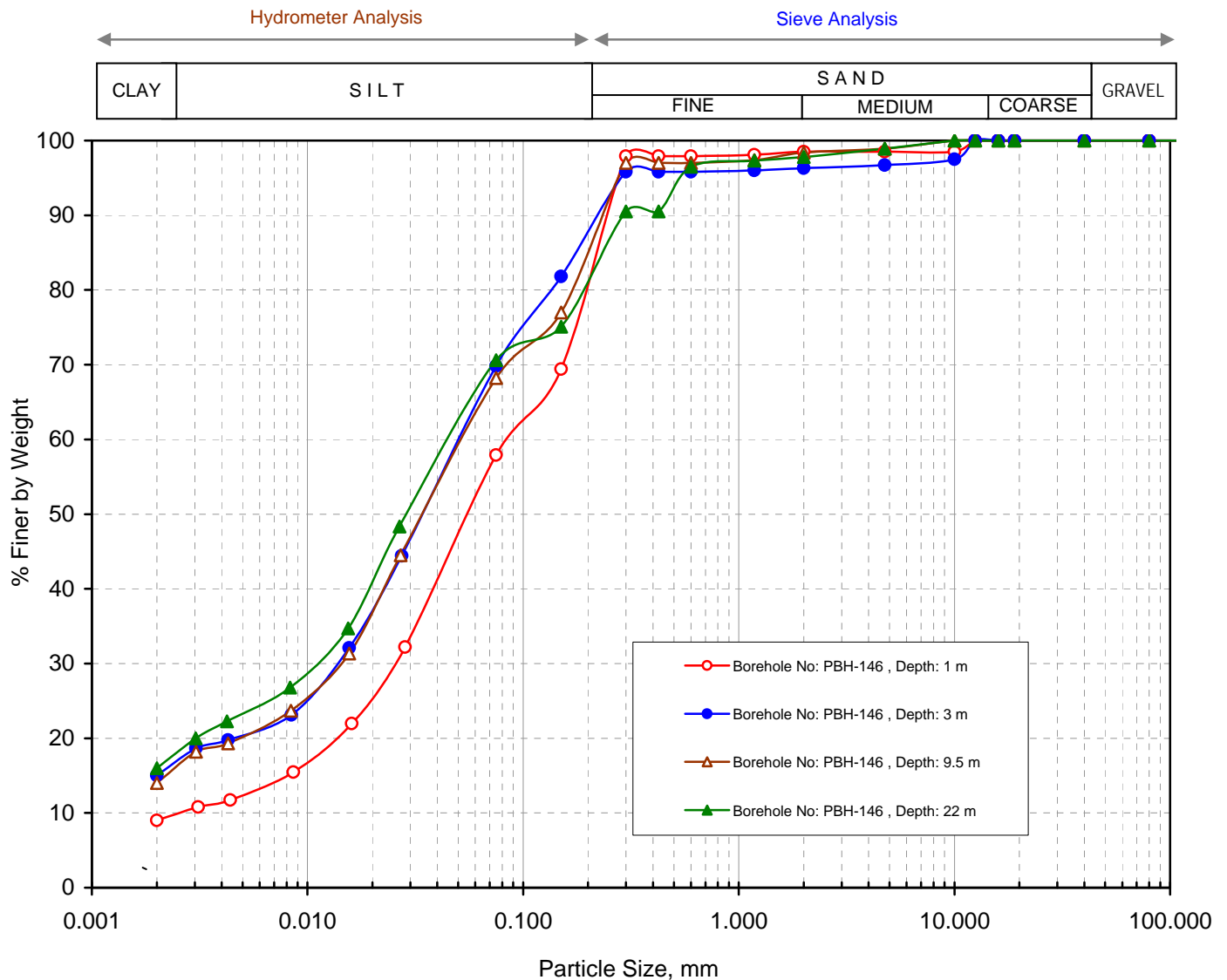




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-146	1.00	Sandy silt with traces of gravels (CL)	2	40	49	9	0.089	0.026	0.003	29.7	2.53
PBH-146	3.00	Sandy silt with traces of gravels (CL)	3	26	56	15	0.057	0.014			
PBH-146	9.50	Sandy silt with traces of gravels (CL)	1	30	55	14	0.058	0.014			
PBH-146	22.00	Sandy silt with traces of gravels (CL)	1	28	55	16	0.052	0.011			



Grain Size Distribution Curve

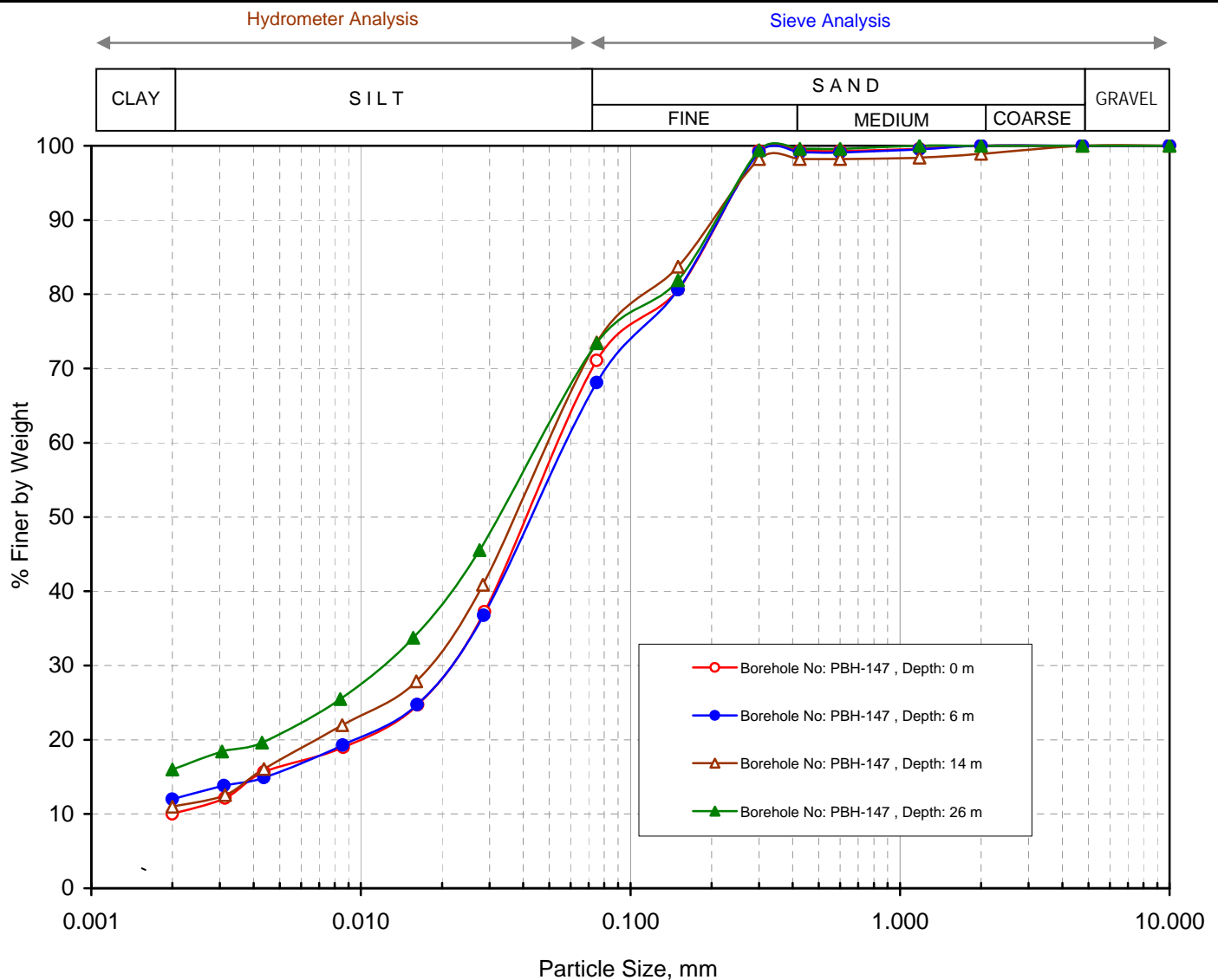




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-147	0.00	Sandy silt (CL)	0	28	62	10	0.060	0.022	0.002	30.0	4.03
PBH-147	6.00	Sandy silt (CL)	0	31	57	12	0.063	0.022			
PBH-147	14.00	Sandy silt (CL)	0	26	63	11	0.056	0.018			
PBH-147	26.00	Sandy silt (CL)	0	26	58	16	0.052	0.012			



Grain Size Distribution Curve

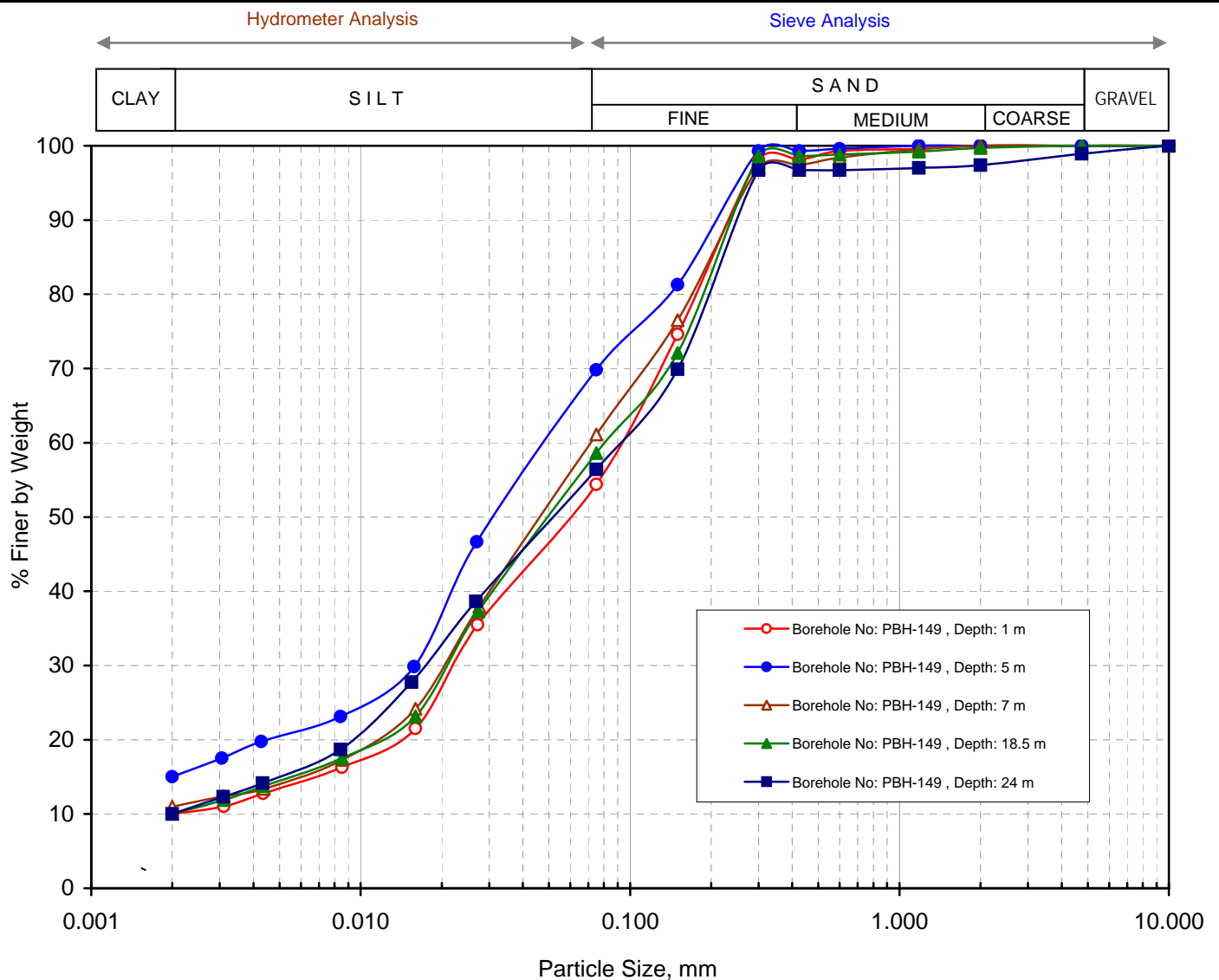




## Grain Size Analysis

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

Sample Details			Test Results								
Borehole Number	Sample Depth, m	Sample Description	% Gravel	% Sand	% Silt	% Clay	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
PBH-149	1.00	Silty fine sand (SM)	0	45	45	10	0.096	0.023	0.002	48.0	2.76
PBH-149	5.00	Sandy silt (CL)	0	30	55	15	0.055	0.016			
PBH-149	7.00	Sandy silt (CL)	0	38	51	11	0.073	0.021			
PBH-149	18.50	Sandy silt (CL)	0	41	49	10	0.083	0.021	0.002	41.5	2.66
PBH-149	24.00	Sandy silt with traces of gravels (CL)	1	42	47	10	0.095	0.018	0.002	47.5	1.71

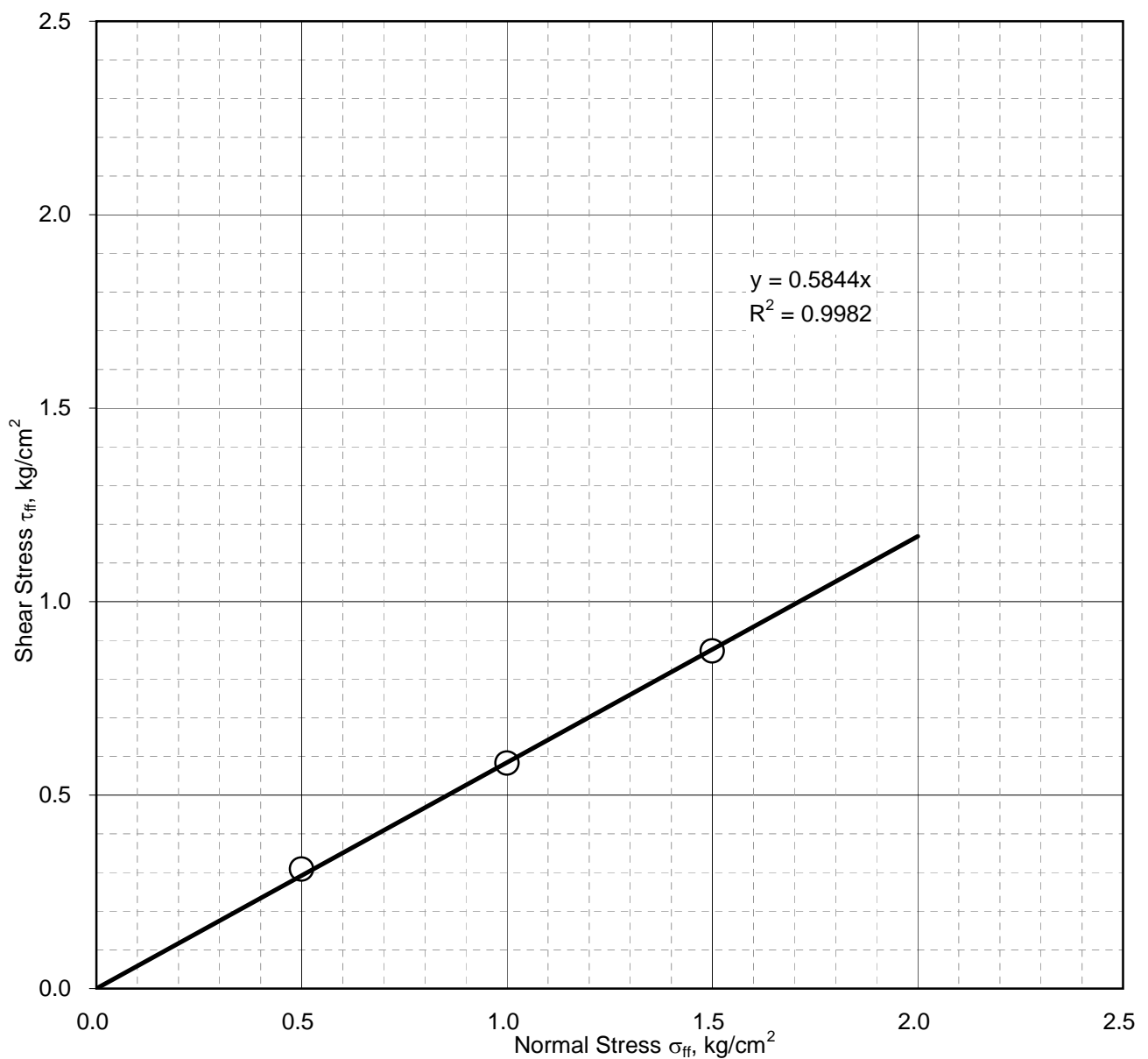




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-73	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Silty fine sand
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.66
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	30.3 degrees



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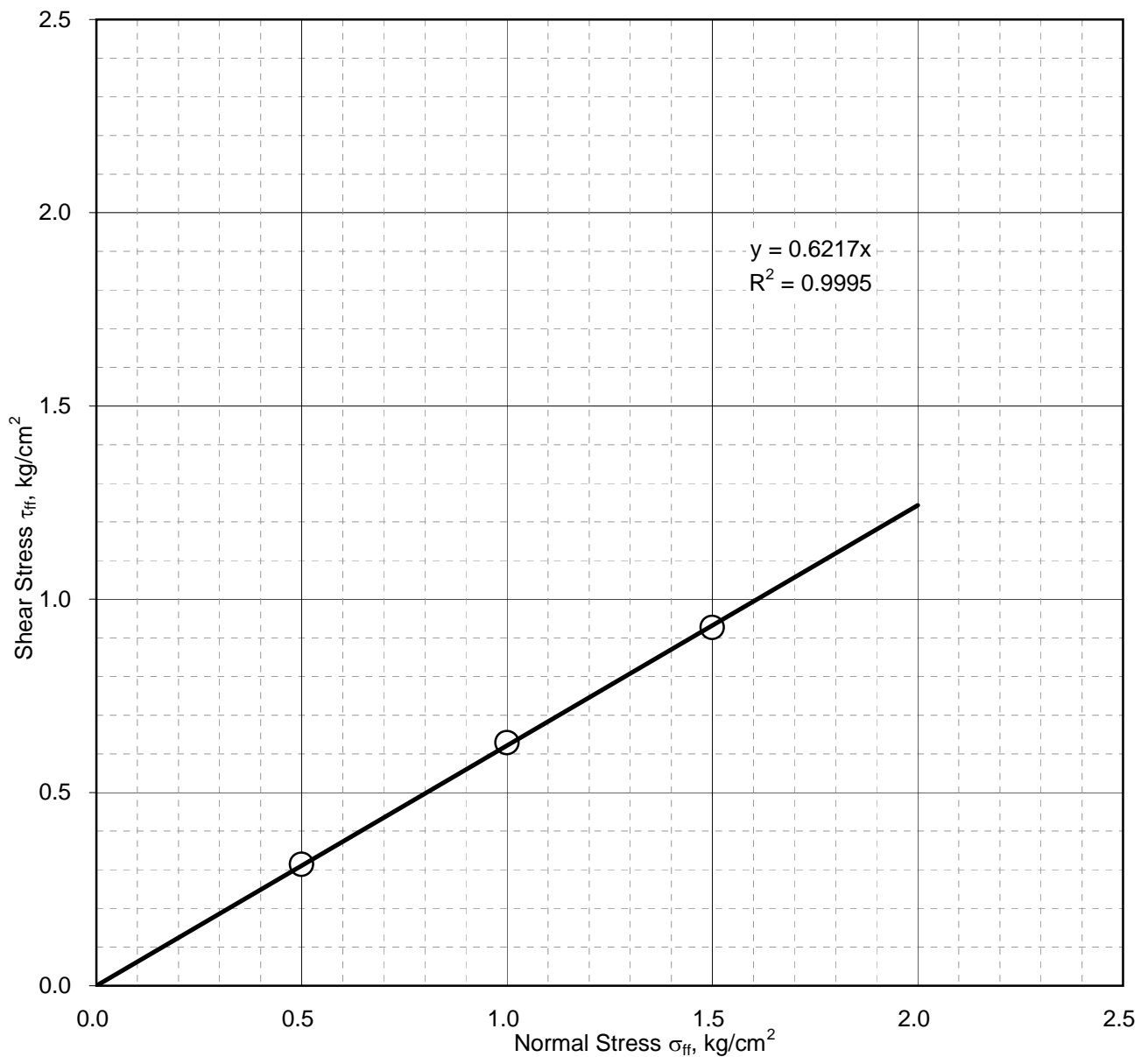




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-74	Sample Depth: 6 m
	Sample No.: UDS-3	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.70
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	31.9 degrees



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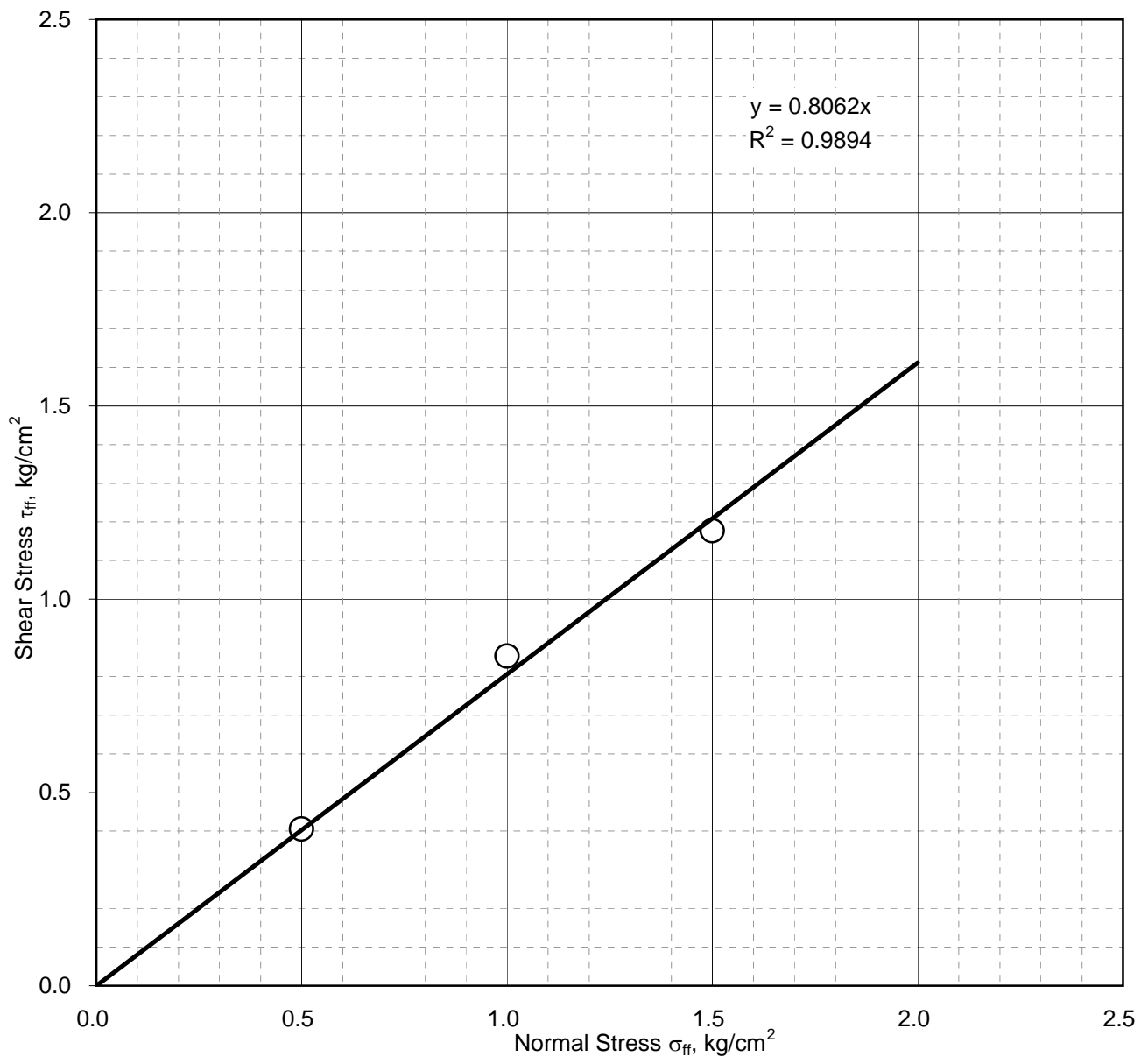




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-75	Sample Depth: 6 m
	Sample No.: UDS-3	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, $\phi$ :	38.9 degrees



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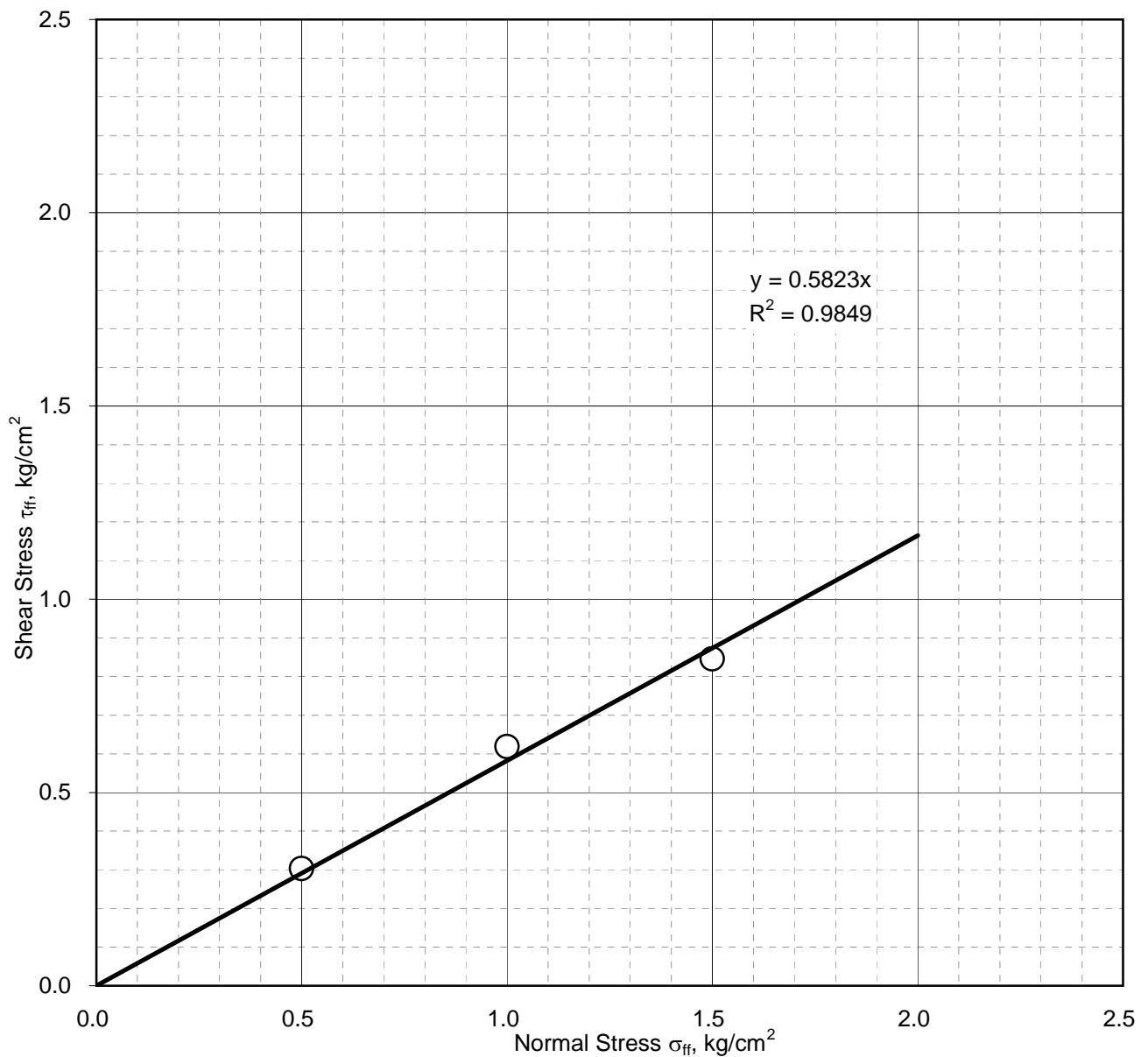




### Drained Direct Shear Test

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

Test Results	Borehole No.: PBH-76		Sample Depth: 4 m	
	Sample No.: UDS-2		Sample Description: Sandy silt	
	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, $\phi$ :		30.2	degrees



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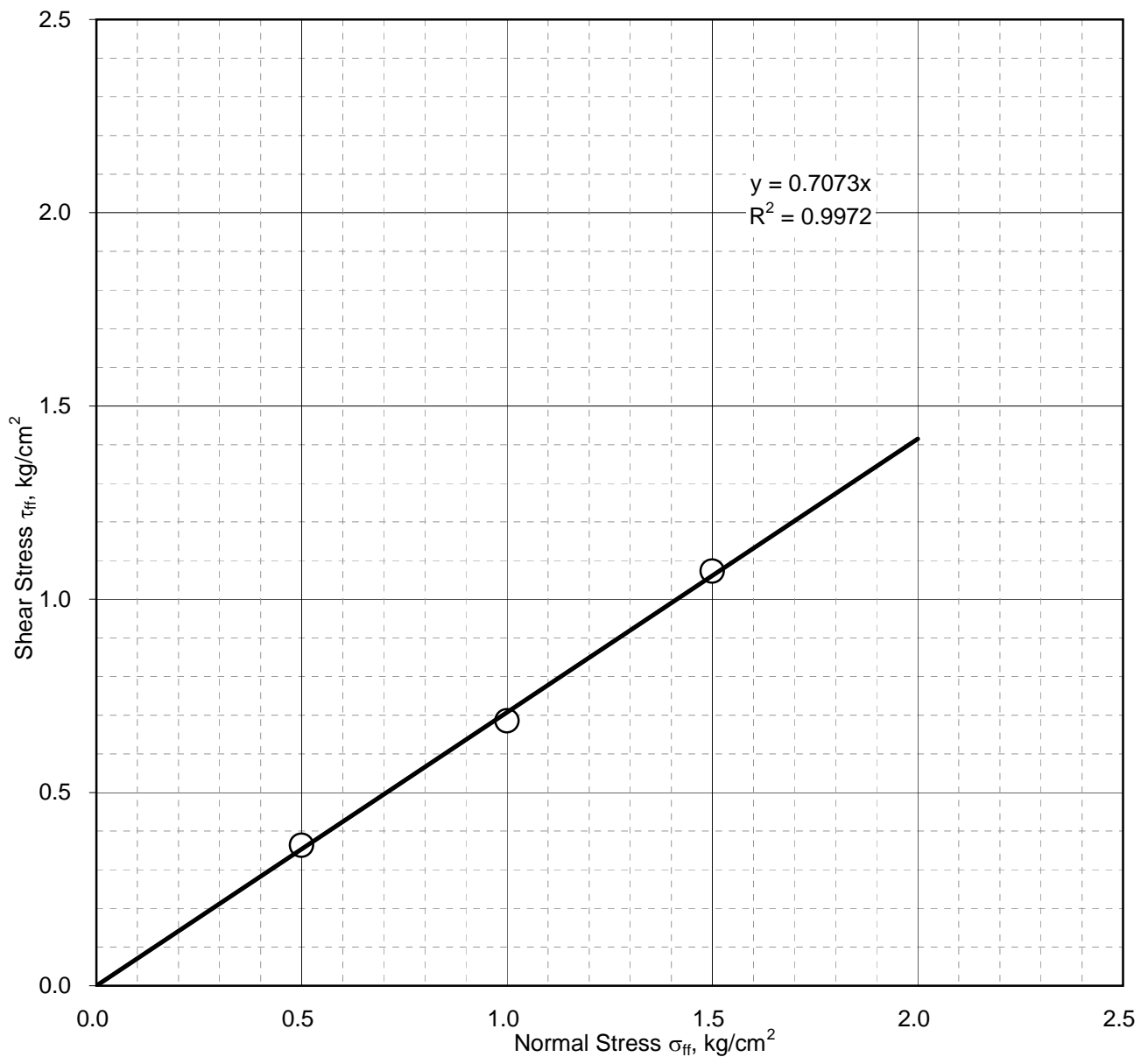




### Drained Direct Shear Test

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

Test Results	Borehole No.: PBH-77		Sample Depth: 11 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, $\phi$ :		35.3	degrees



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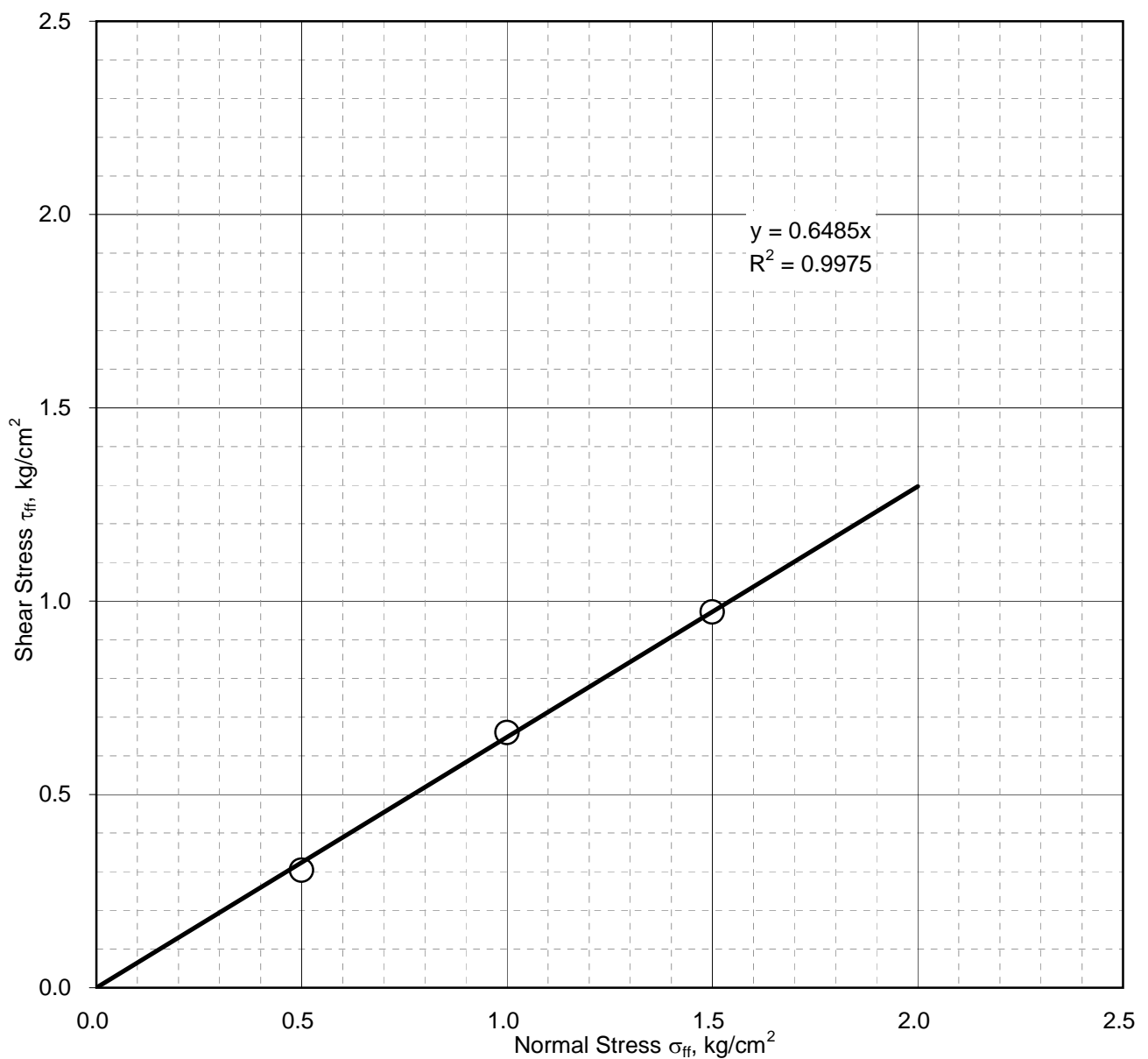




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-115	Sample Depth: 6 m
	Sample No.: UDS-3	Sample Description: Silty fine sand
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, $\phi$ :	33.0 degrees



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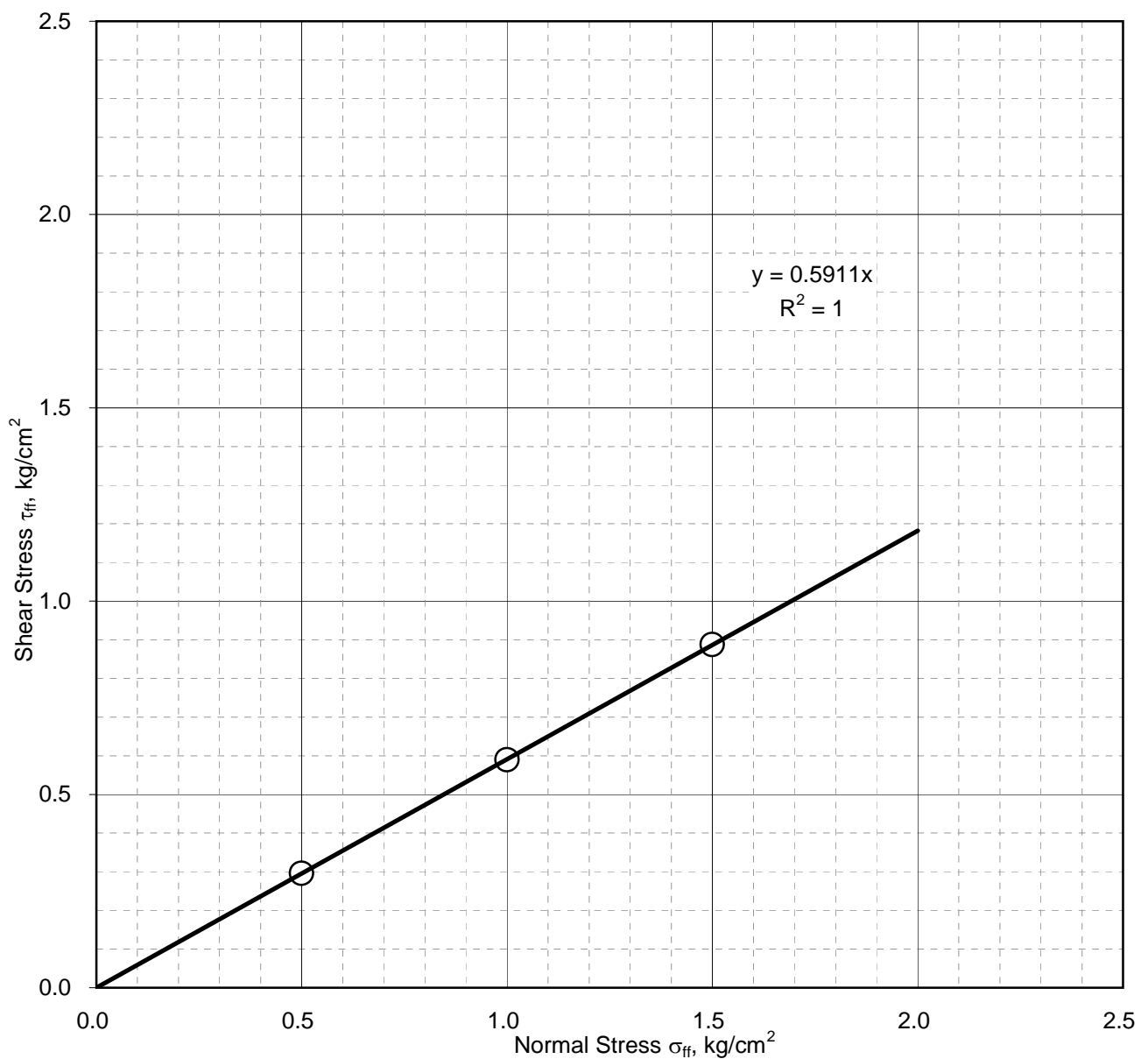




### Drained Direct Shear Test

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

Test Results	Borehole No.: PBH-116		Sample Depth: 11 m	
	Sample No.: UDS-4		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, $\phi$ :		30.6	degrees



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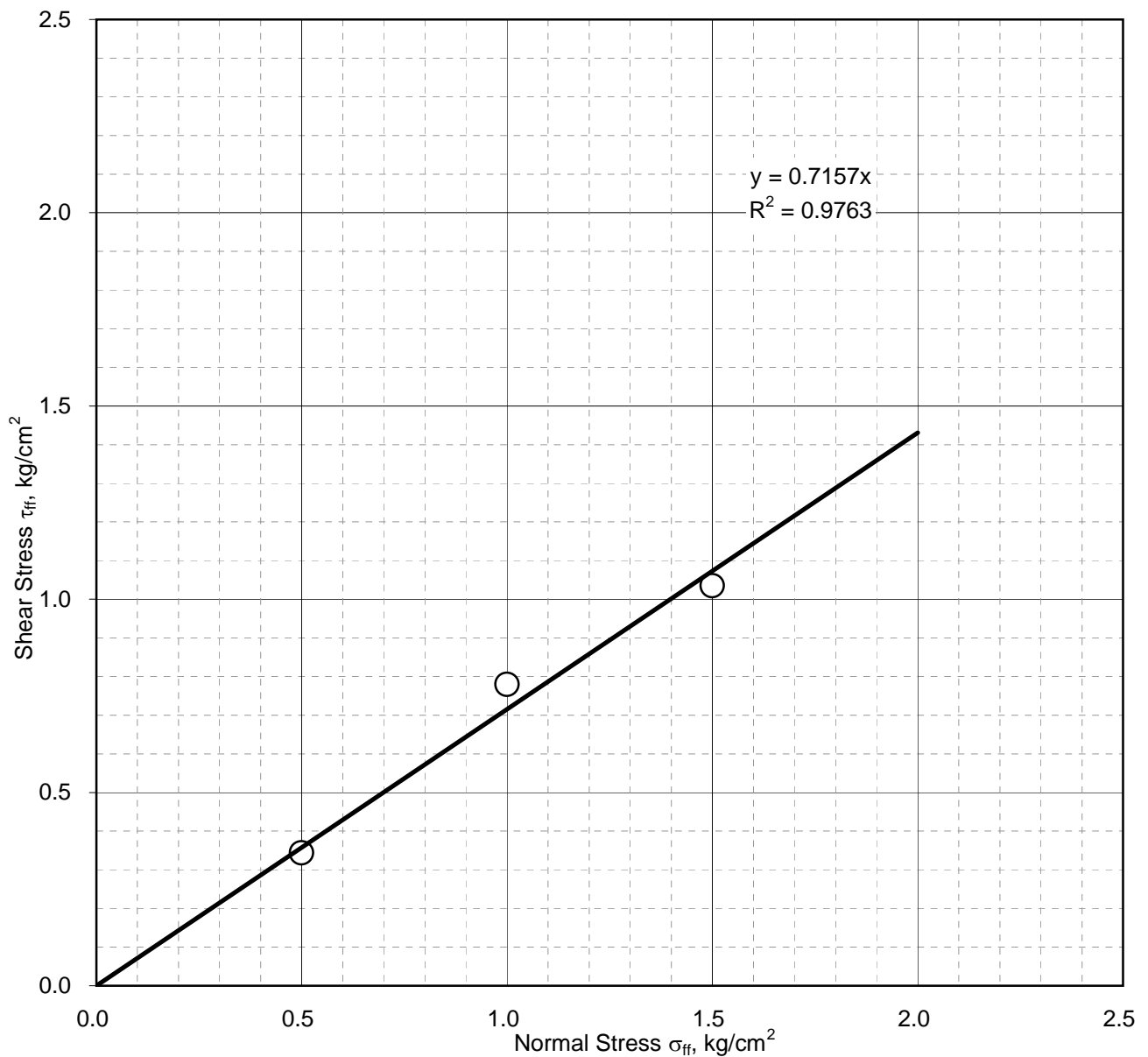




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-117	Sample Depth: 2 m
	Sample No.: UDS-1	Sample Description: Silty fine sand
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.66
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	35.6 degrees



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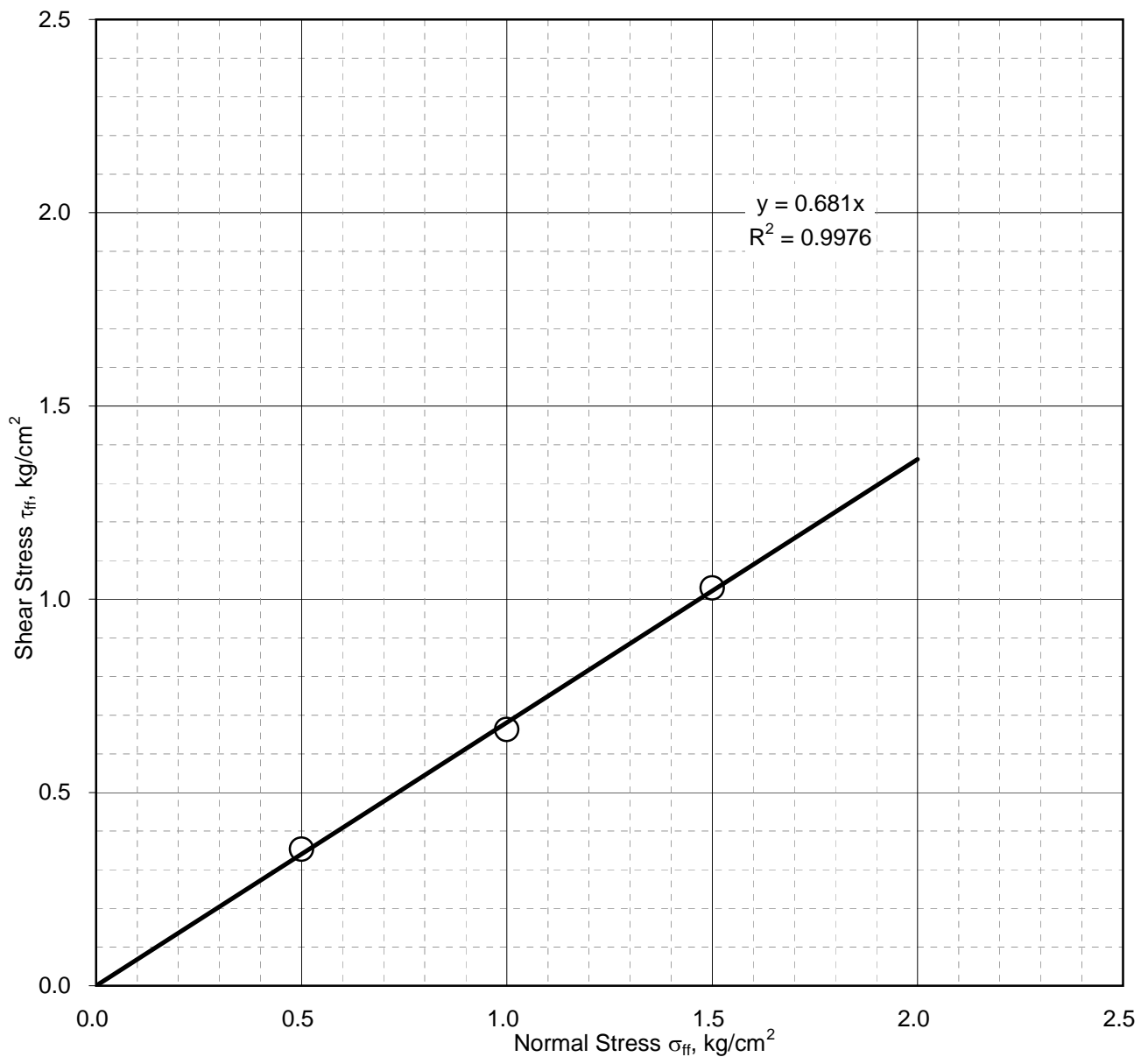




### Drained Direct Shear Test

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

Test Results	Borehole No.: PBH-118		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, $\phi$ :		34.3	degrees



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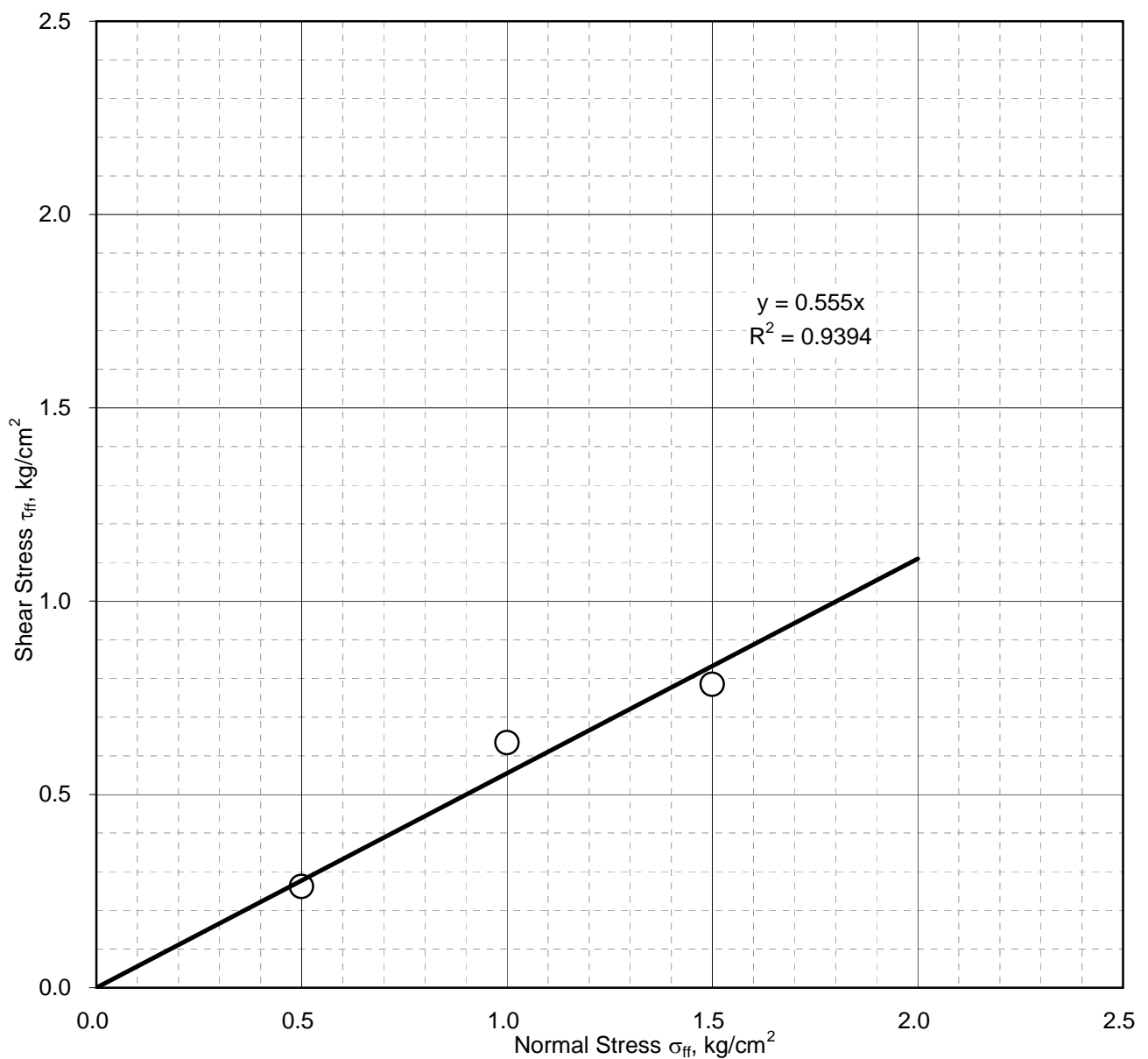




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-119	Sample Depth: 6 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, $\phi$ :	29.0 degrees



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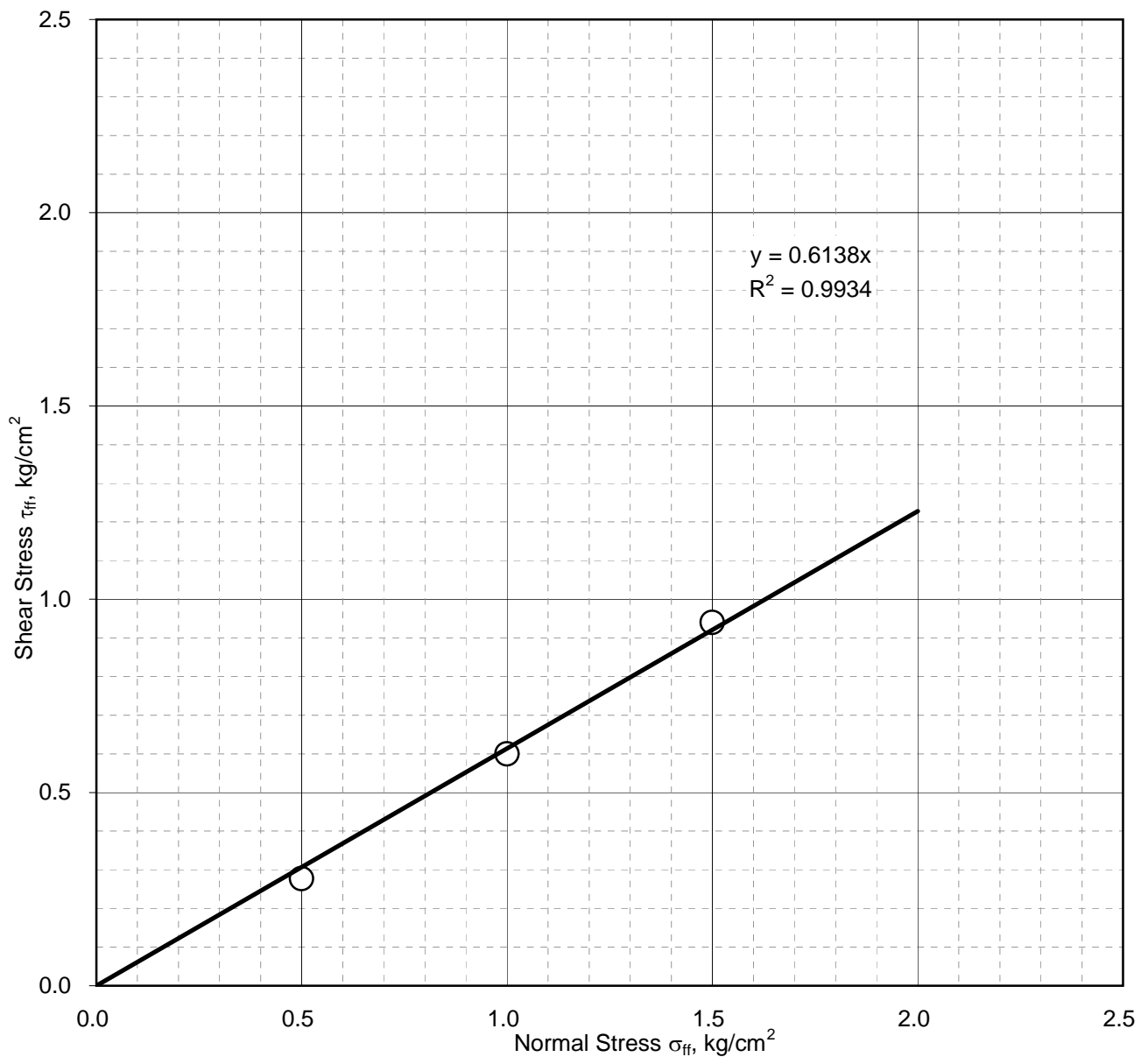




### Drained Direct Shear Test

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

Sample Details	Borehole No.: BH-120	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, $\phi$ :	31.5 degrees



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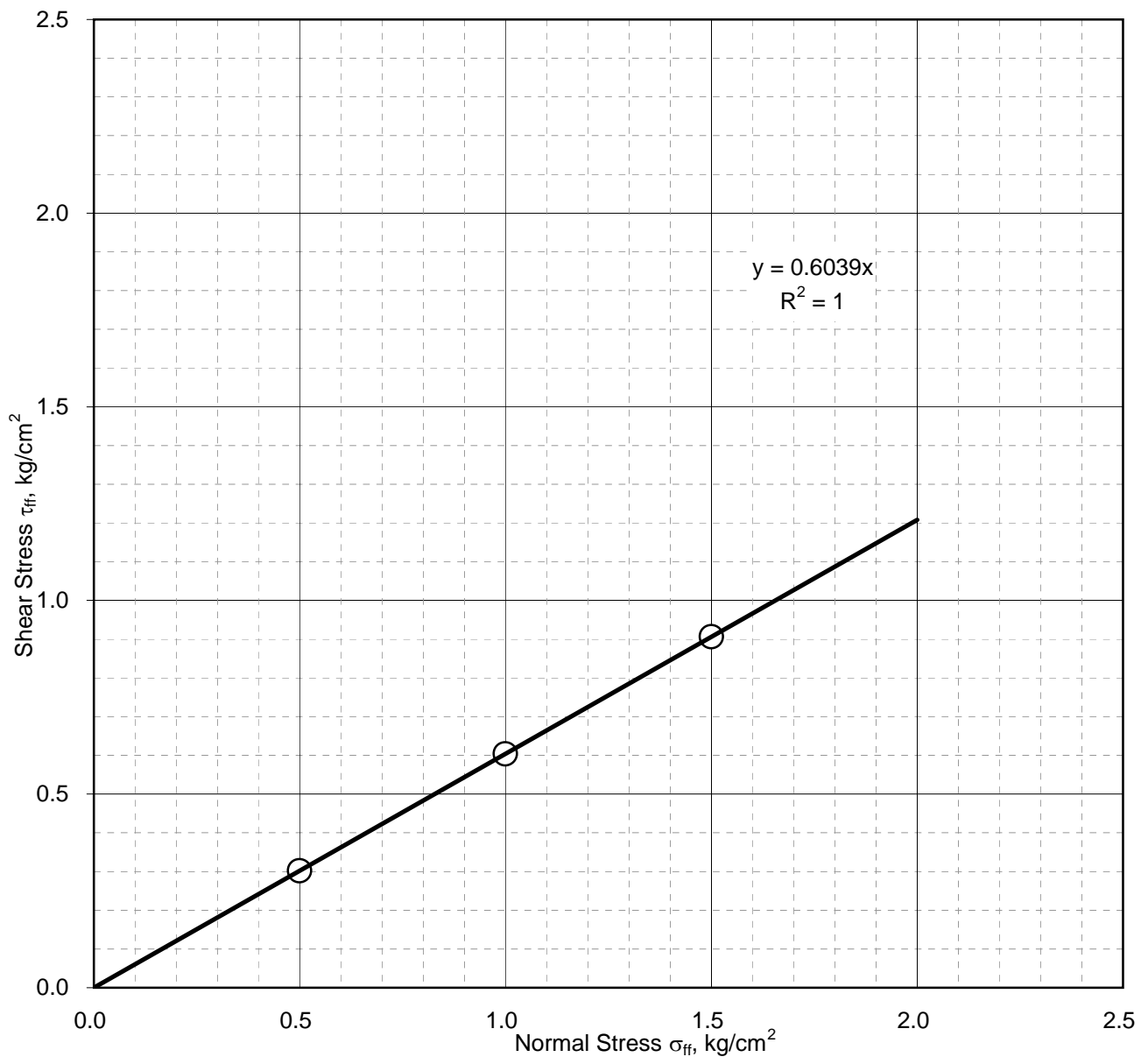




### Drained Direct Shear Test

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

Sample Details	Borehole No.: BH-121	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, $\phi$ :	31.1 degrees



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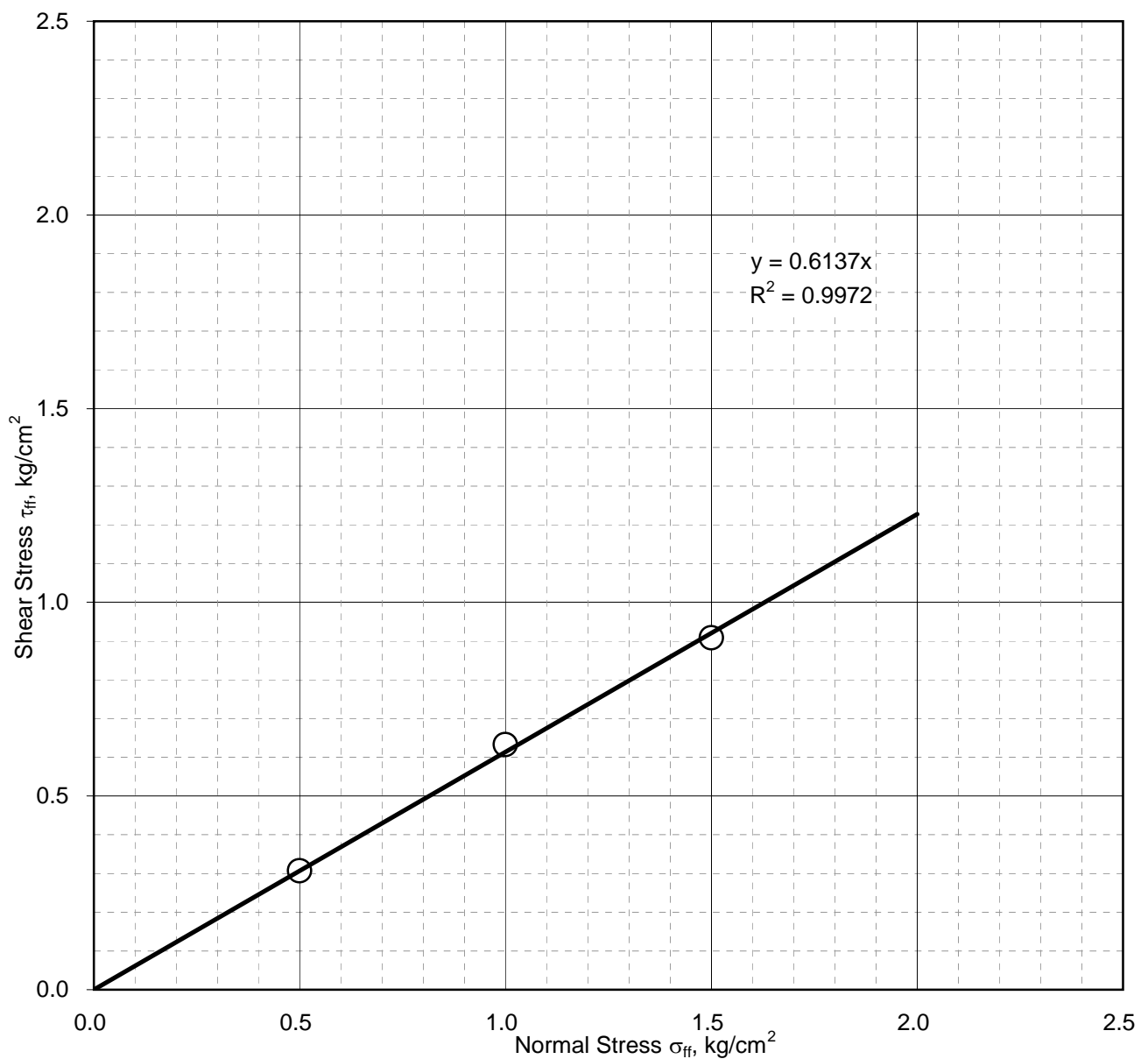




### Drained Direct Shear Test

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

Sample Details	Borehole No.: BH-122	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, $\phi$ :	31.5 degrees



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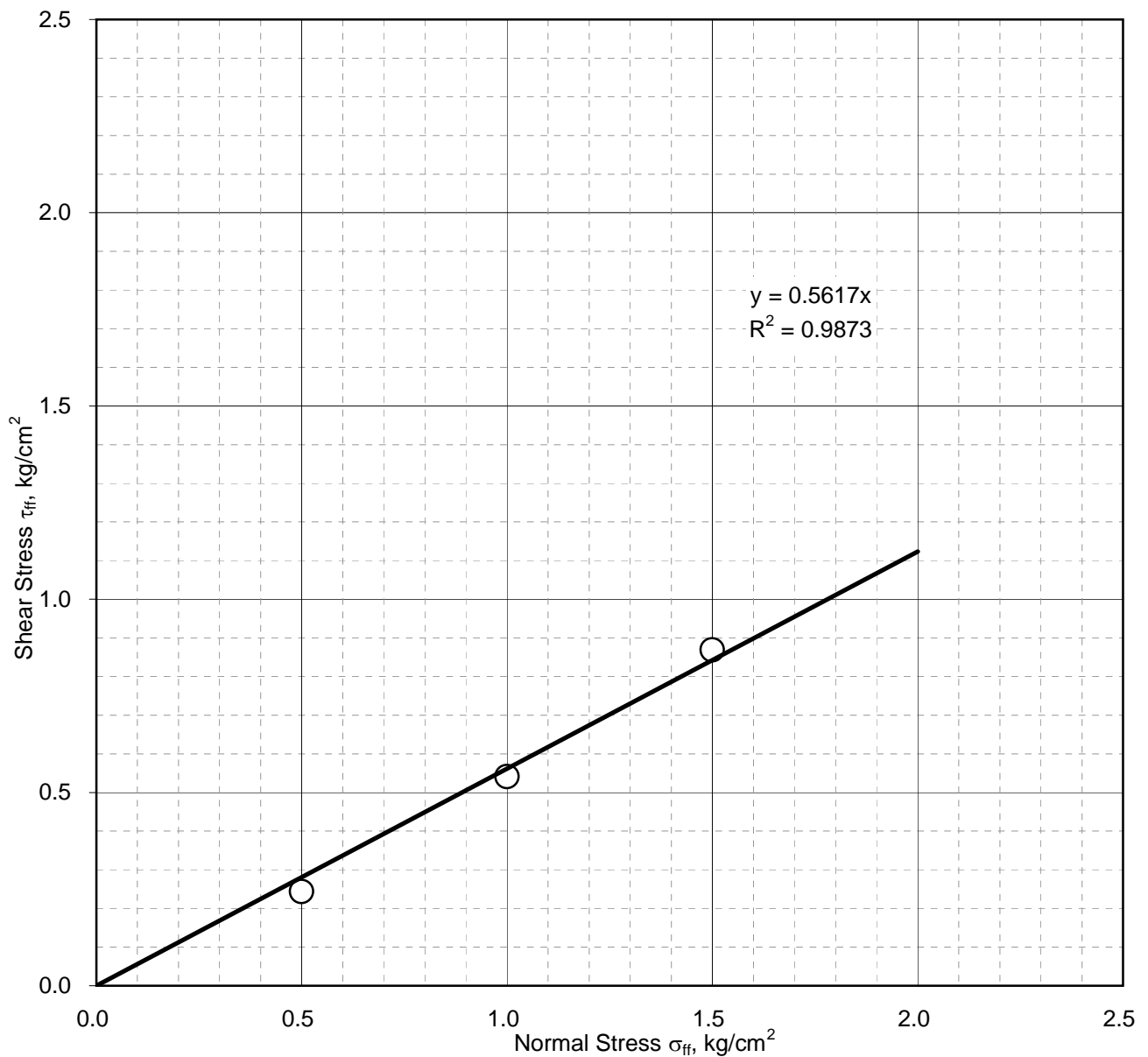




### Drained Direct Shear Test

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

Sample Details	Borehole No.: BH-123	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, $\phi$ :	29.3 degrees



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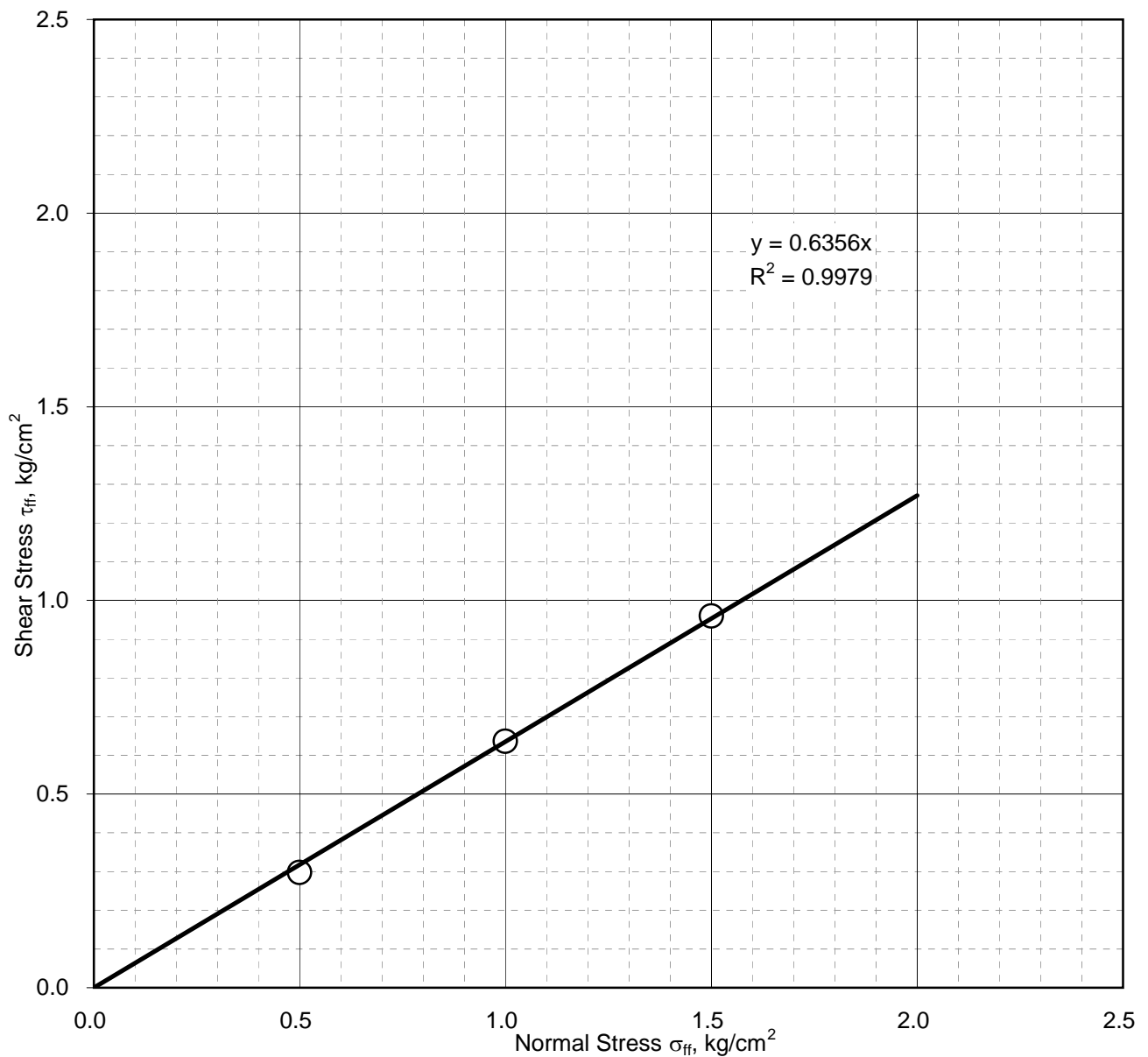




### Drained Direct Shear Test

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

Sample Details	Borehole No.: BH-124	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.69
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	32.4 degrees



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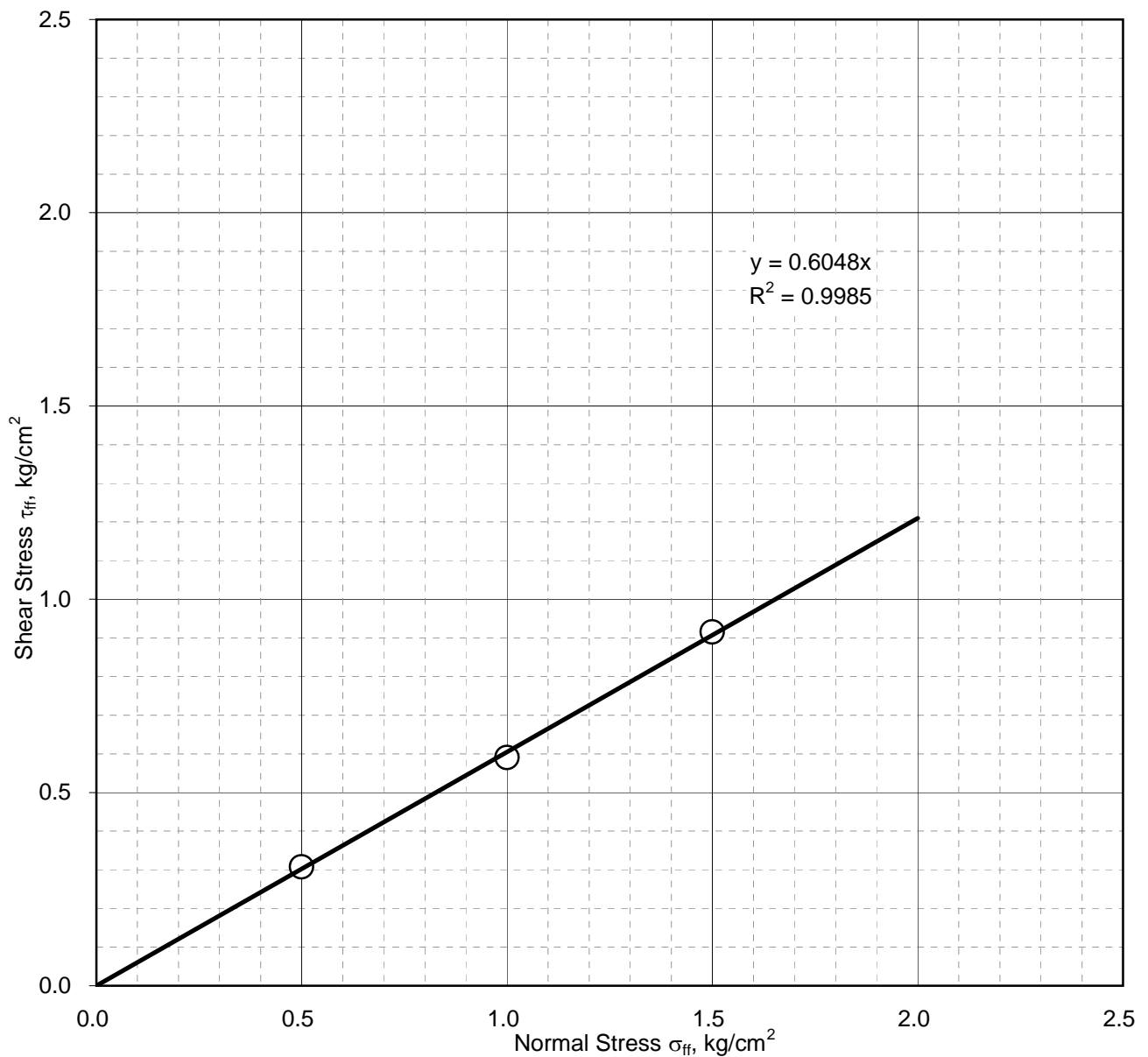




### Drained Direct Shear Test

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

Sample Details	Borehole No.: BH-125	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, $\phi$ :	31.2 degrees



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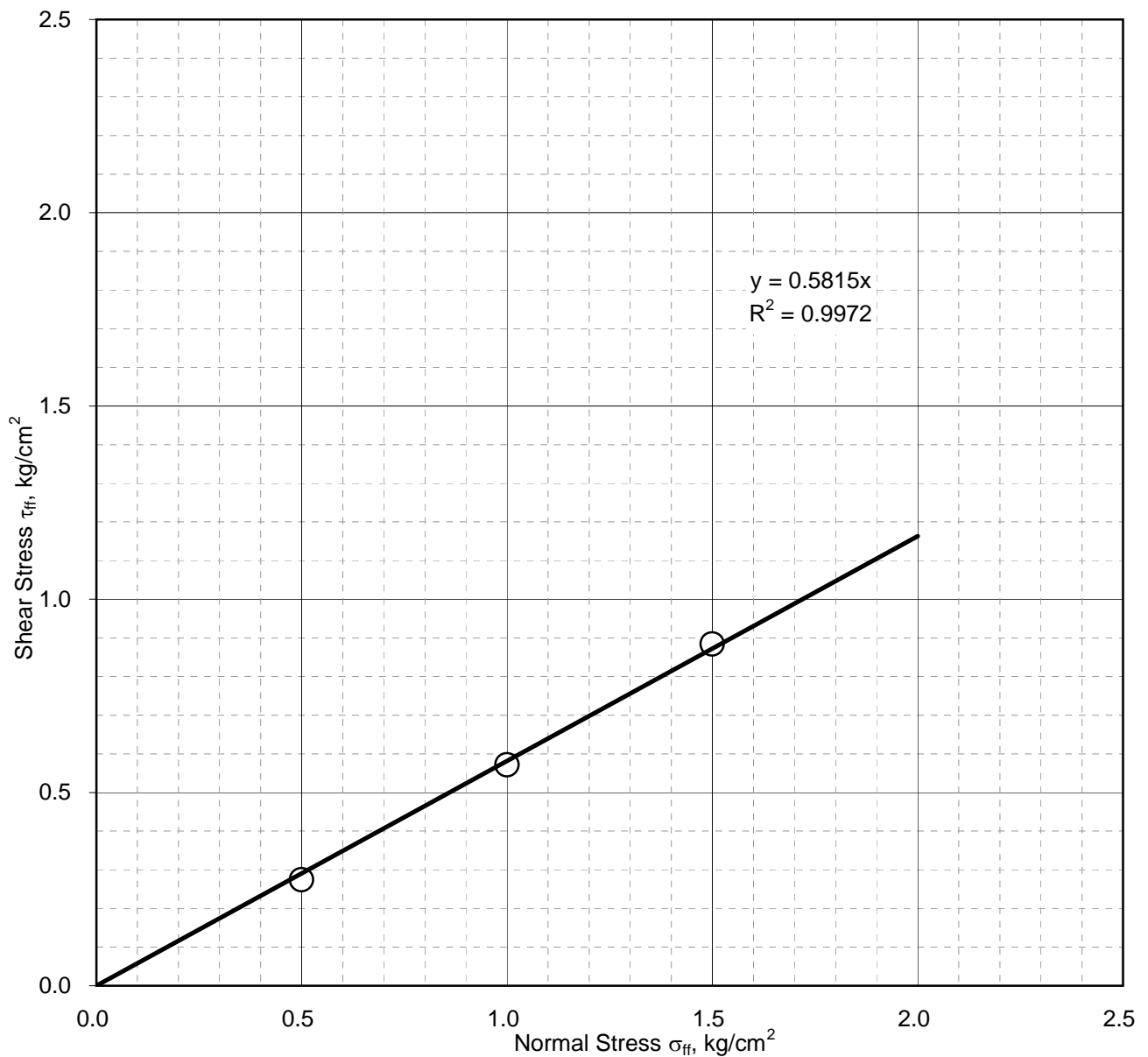




### Drained Direct Shear Test

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

Test Results	Borehole No.: BH-126		Sample Depth: 4 m	
	Sample No.: UDS-2		Sample Description: Sandy silt	
	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, $\phi$ :		30.2	degrees



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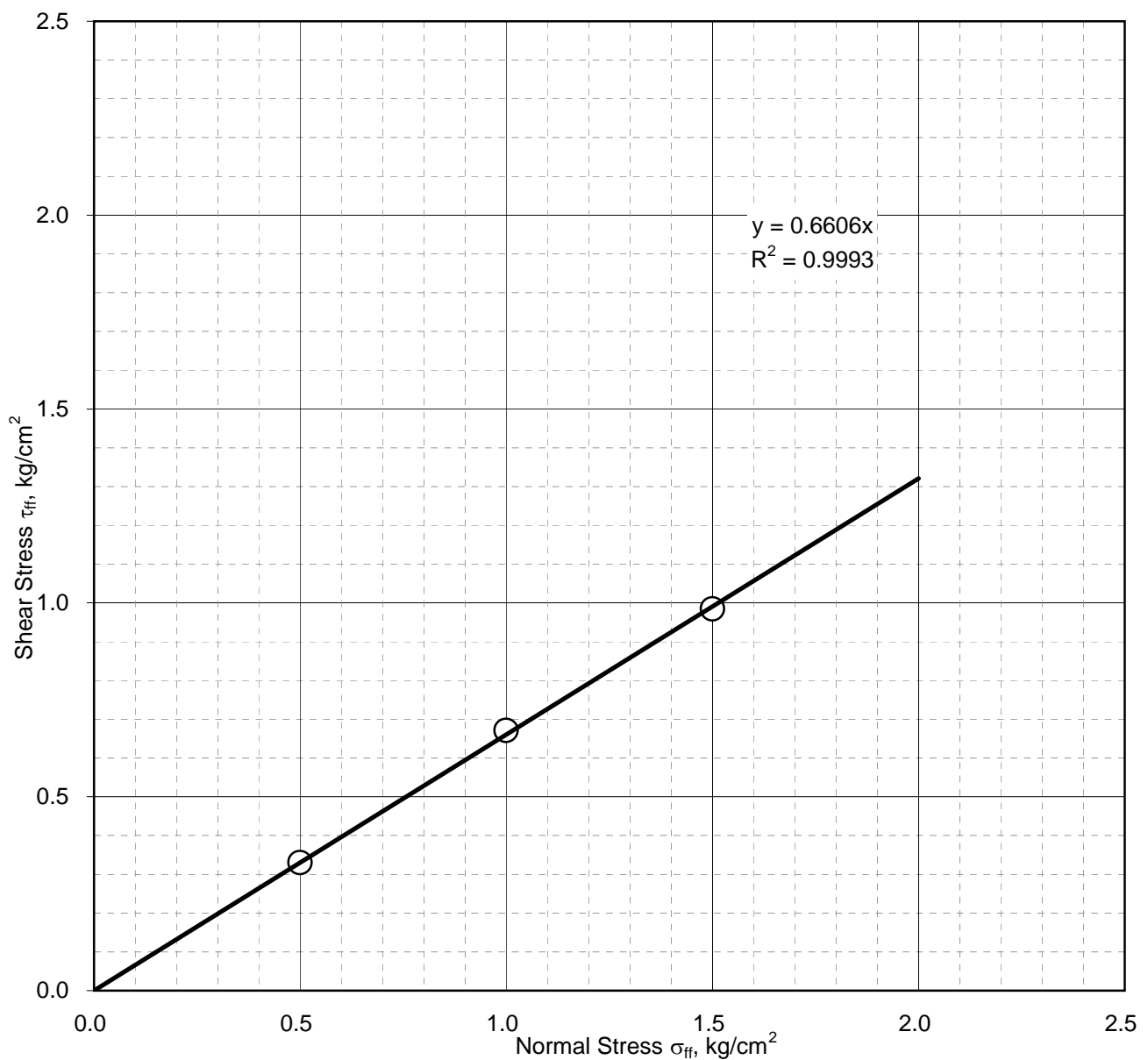




### Drained Direct Shear Test

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

Sample Details	Borehole No.: BH-127	Sample Depth: 4 m
	Sample No.: UDS-2	Sample Description: Sandy silt
Test Results	Dry Density of Soil ( $\text{g/cm}^3$ ):	1.67
	Moisture Content (%):	Saturated
	Cohesion Intercept, $c$ :	0.00 $\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :	33.4 degrees



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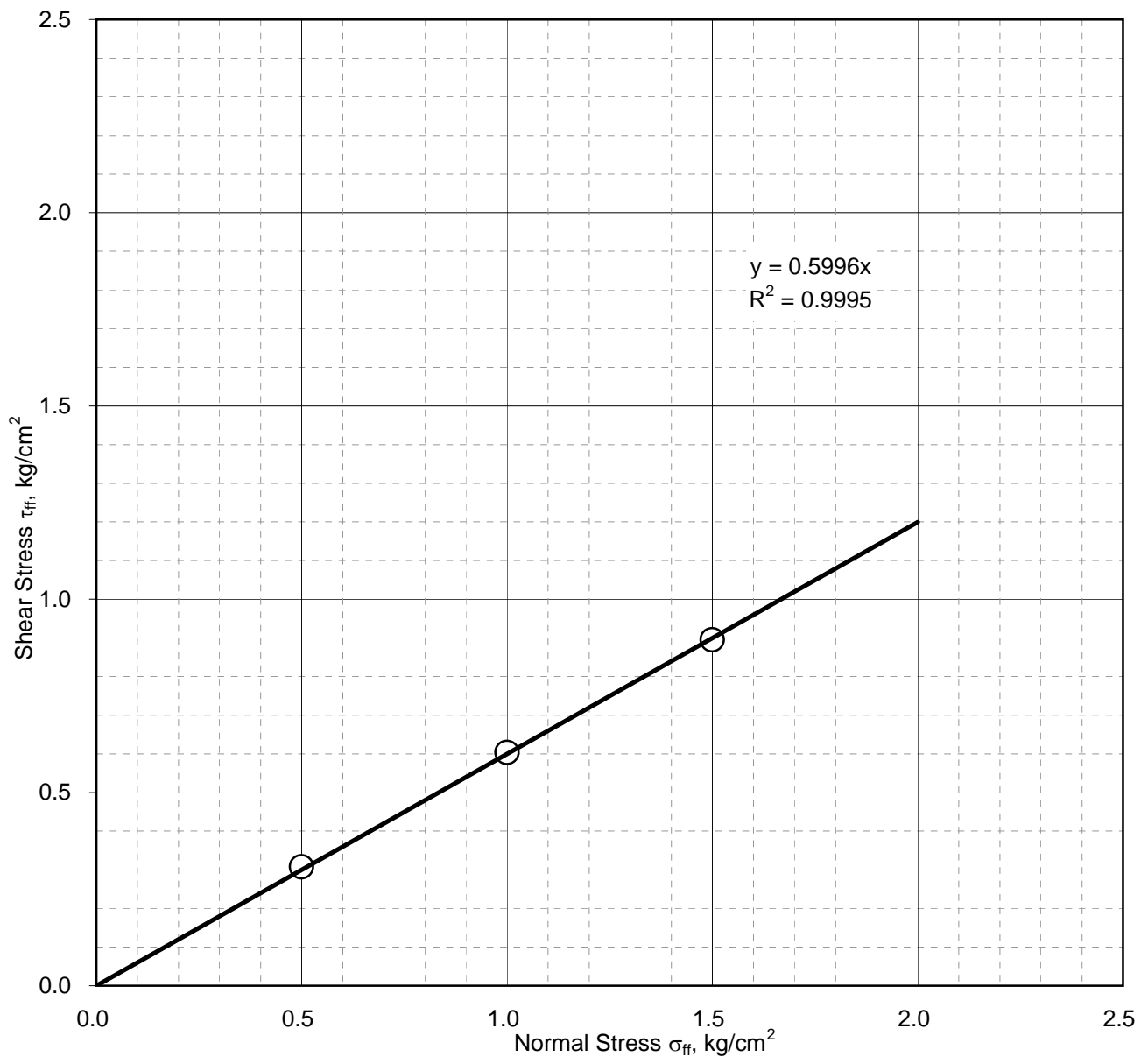




### Drained Direct Shear Test

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

Test Results	Borehole No.: BH-128		Sample Depth: 4 m	
	Sample No.: UDS-2		Sample Description: Sandy silt	
	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, $\phi$ :		30.9	degrees



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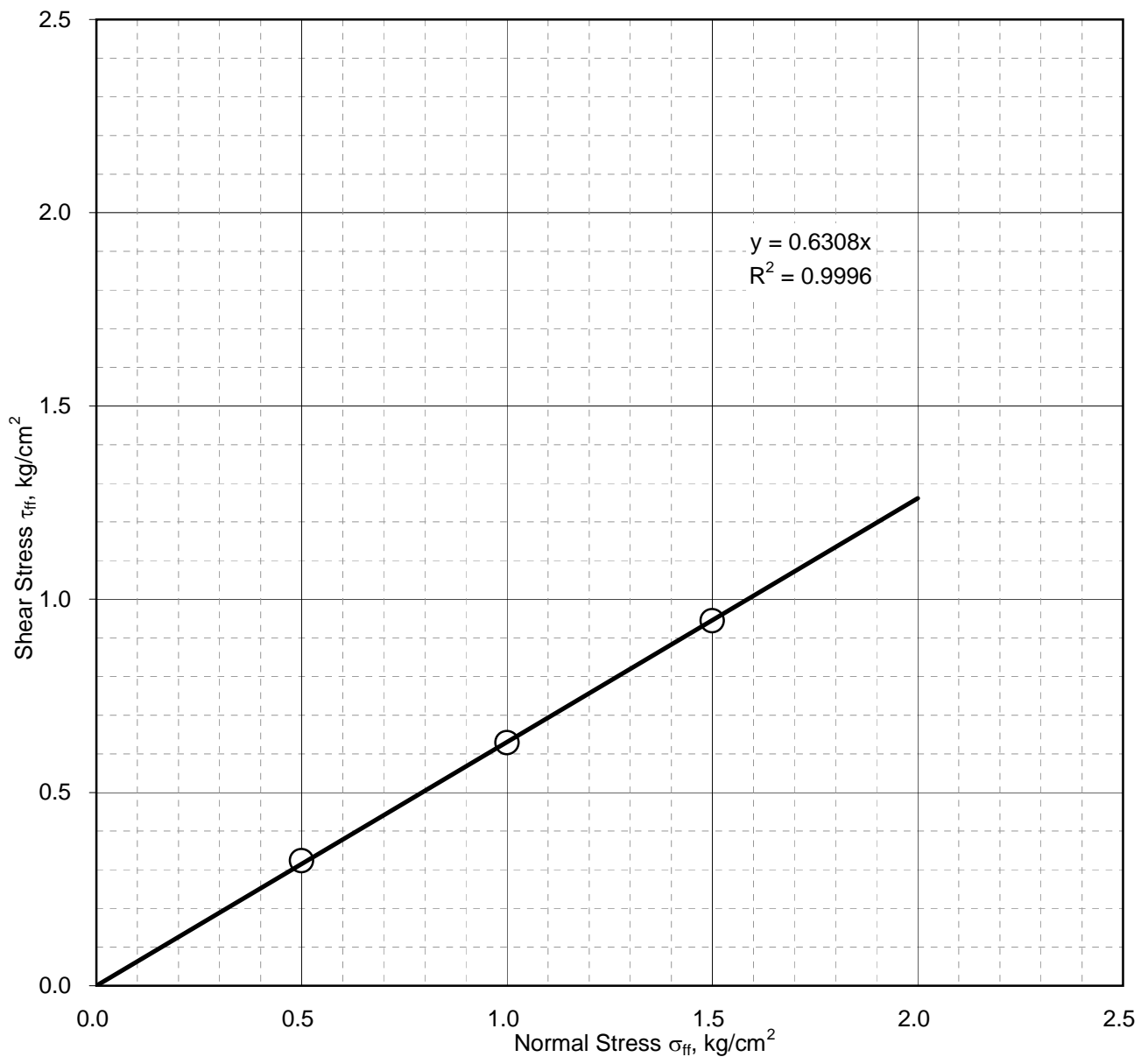




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-133	Sample Depth: 17 m
	Sample No.: UDS-6	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, $\phi$ :	32.2 degrees



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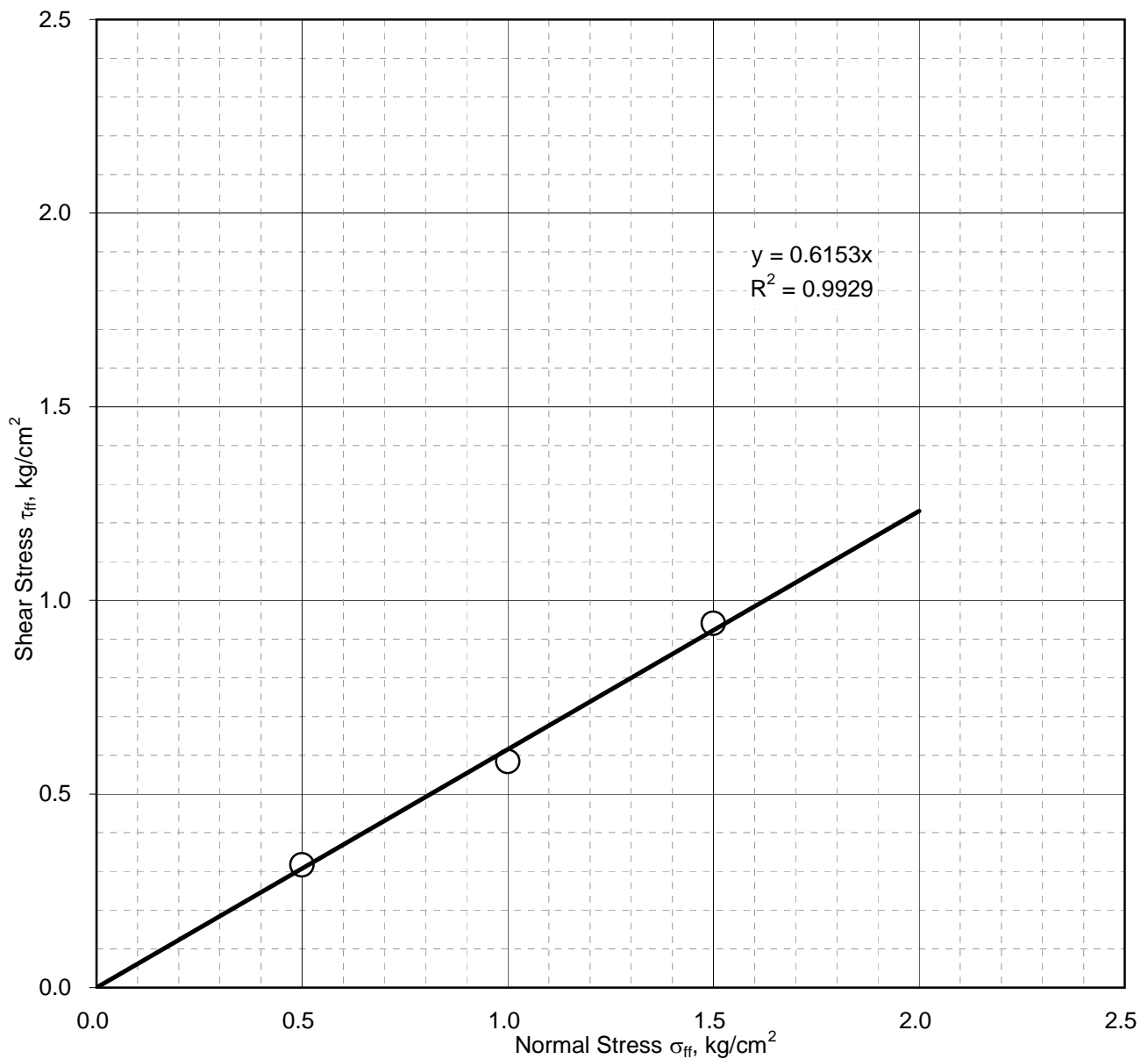




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-134	Sample Depth: 6 m
	Sample No.: UDS-3	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, $\phi$ :	31.6 degrees



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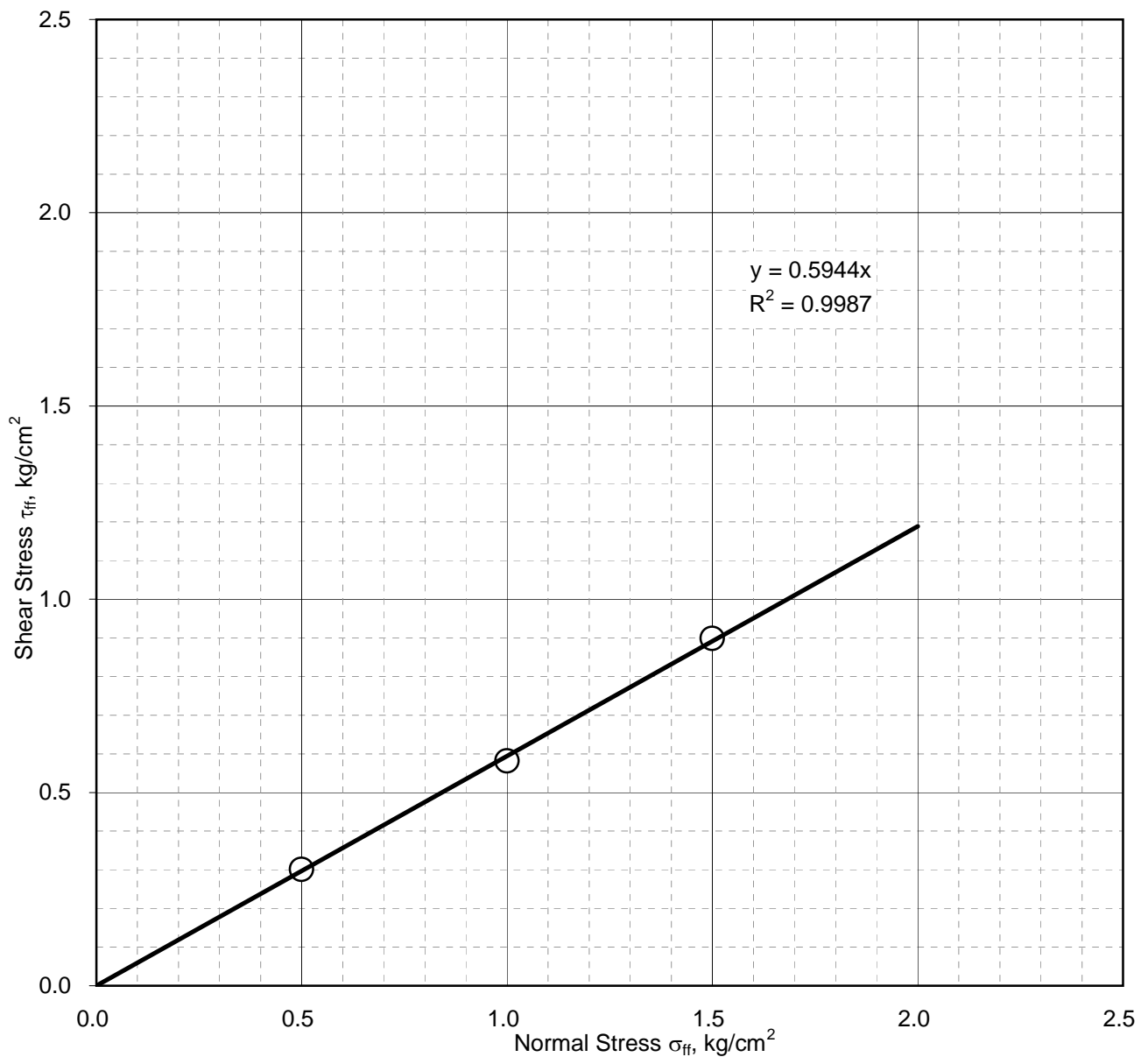




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-135	Sample Depth: 2 m
	Sample No.: UDS-1	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, $\phi$ :	30.7 degrees



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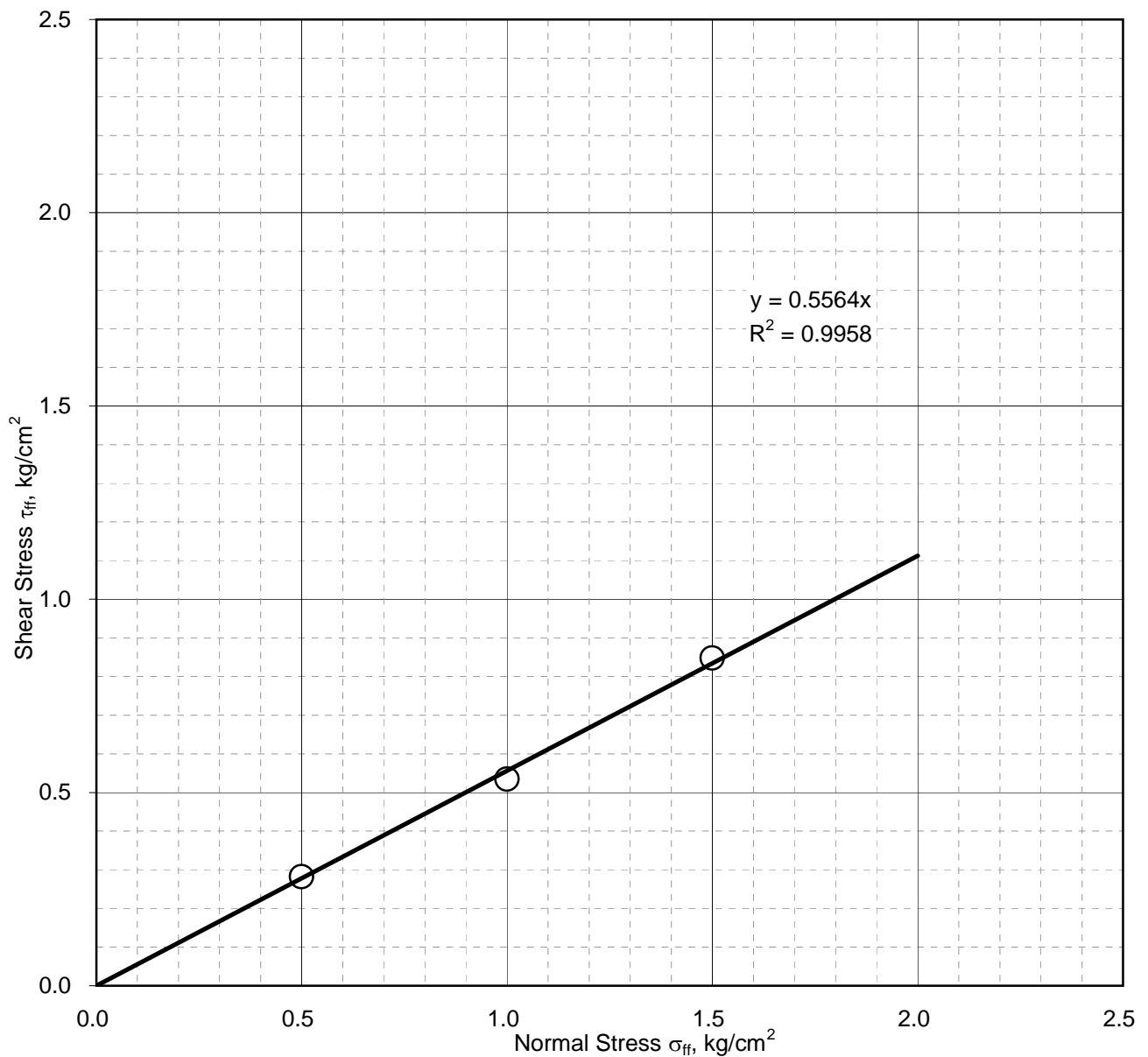




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-136	Sample Depth: 8 m
	Sample No.: UDS-4	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, $\phi$ :	29.1 degrees



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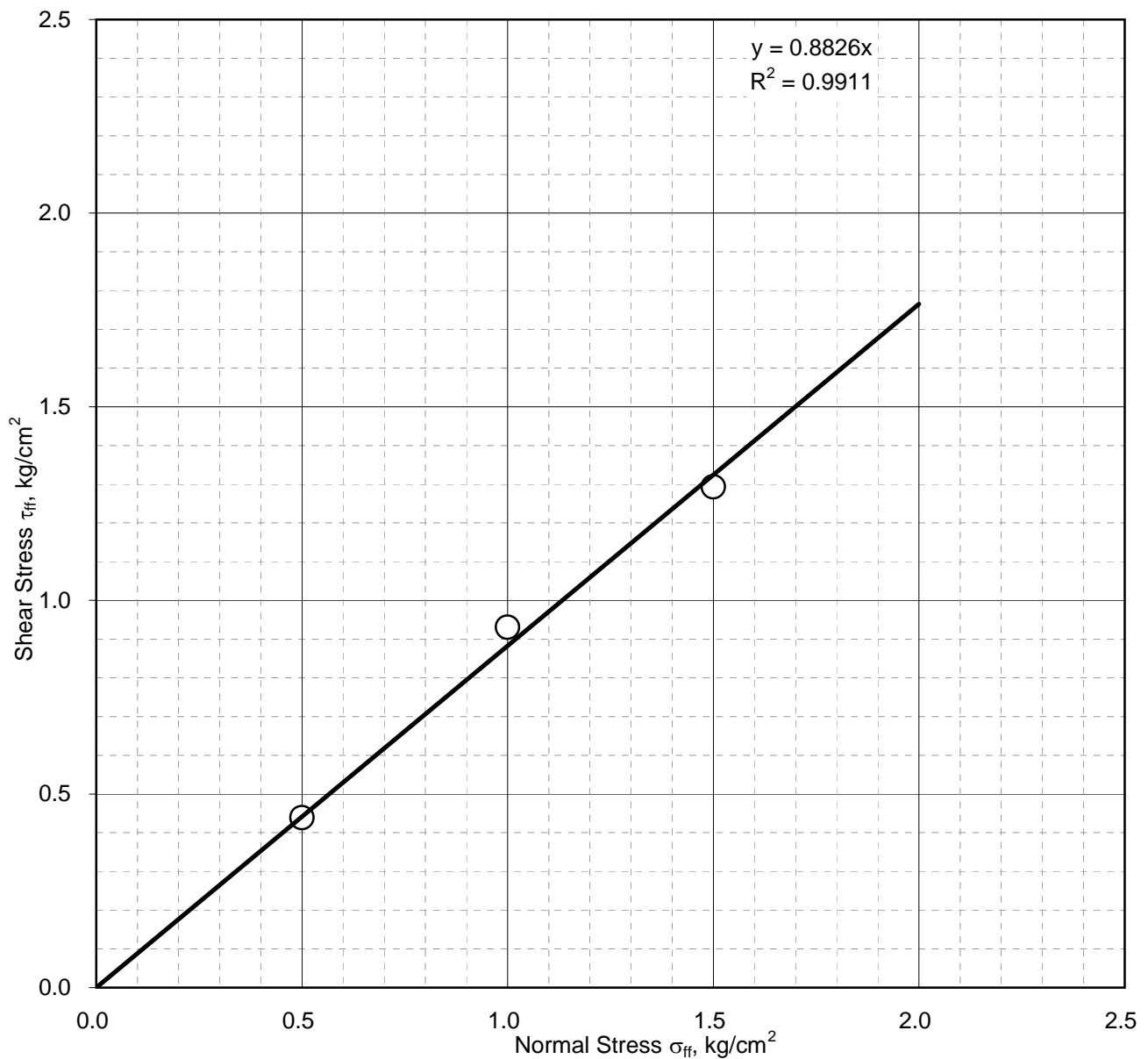




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-137	Sample Depth: 11 m
	Sample No.: UDS-5	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, $\phi$ :	41.4 degrees



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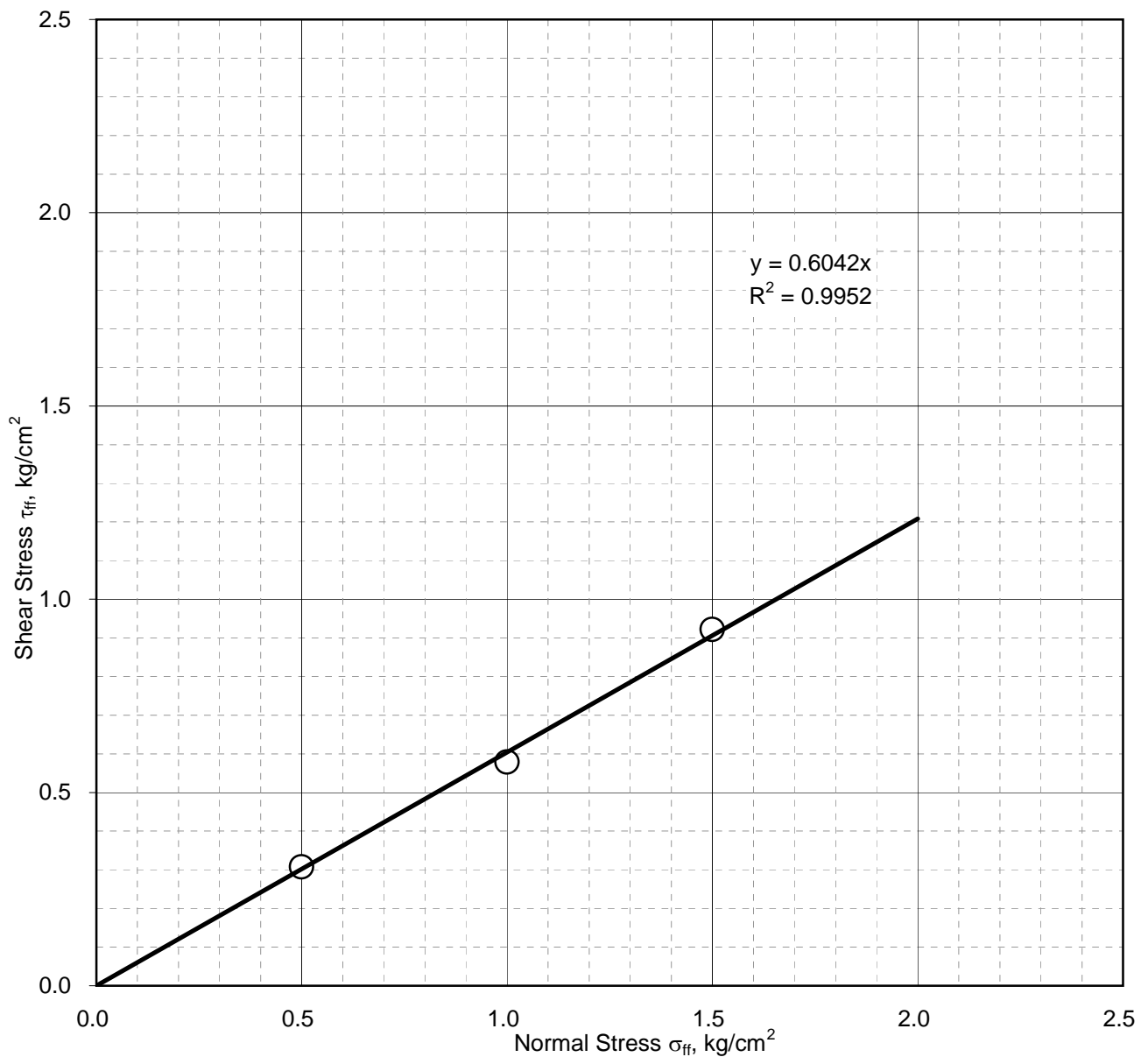




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-138	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, $\phi$ :	31.1 degrees



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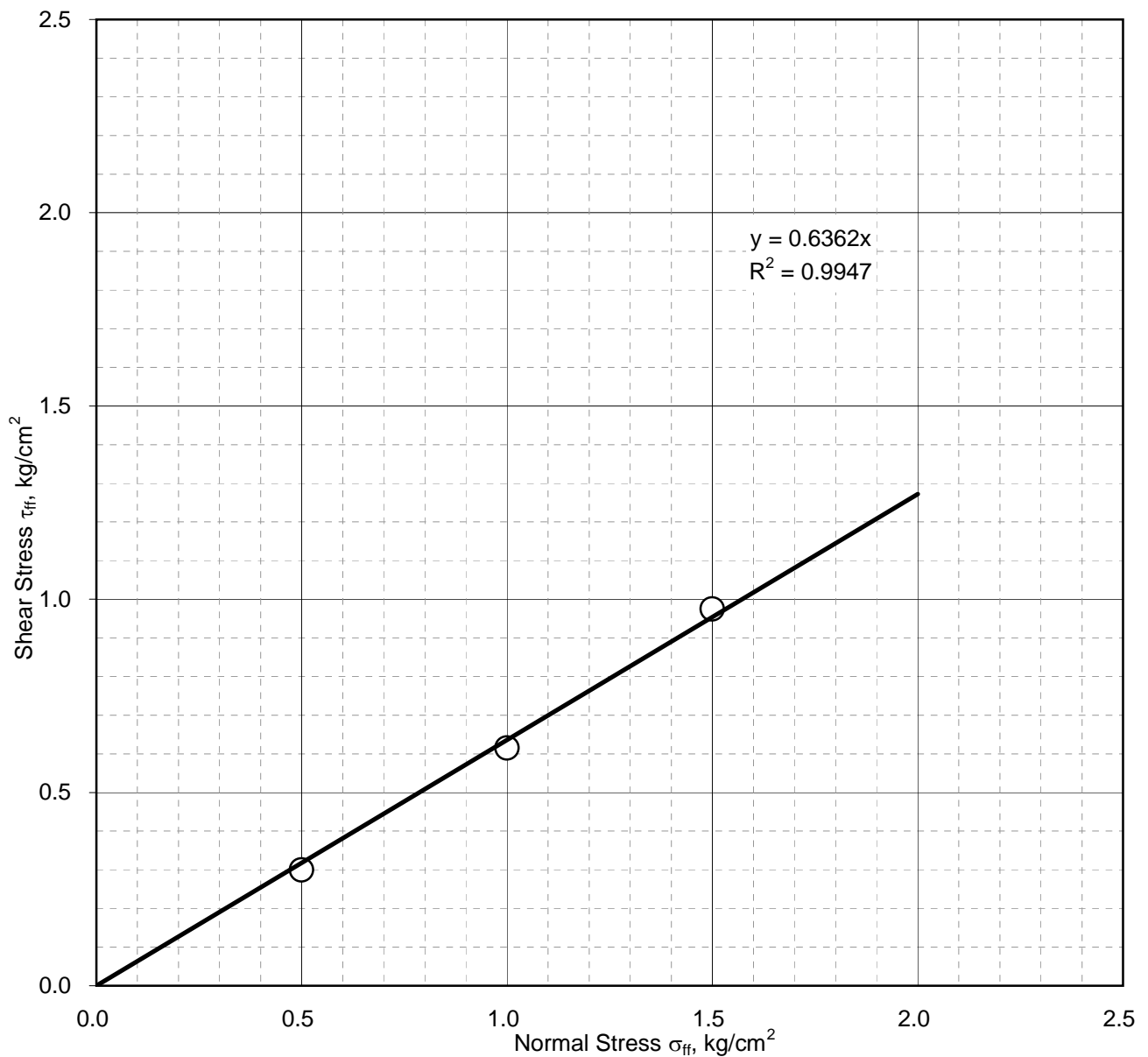




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-139	Sample Depth: 4 m
	Sample No.: UDS-2	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, $\phi$ :	32.5 degrees



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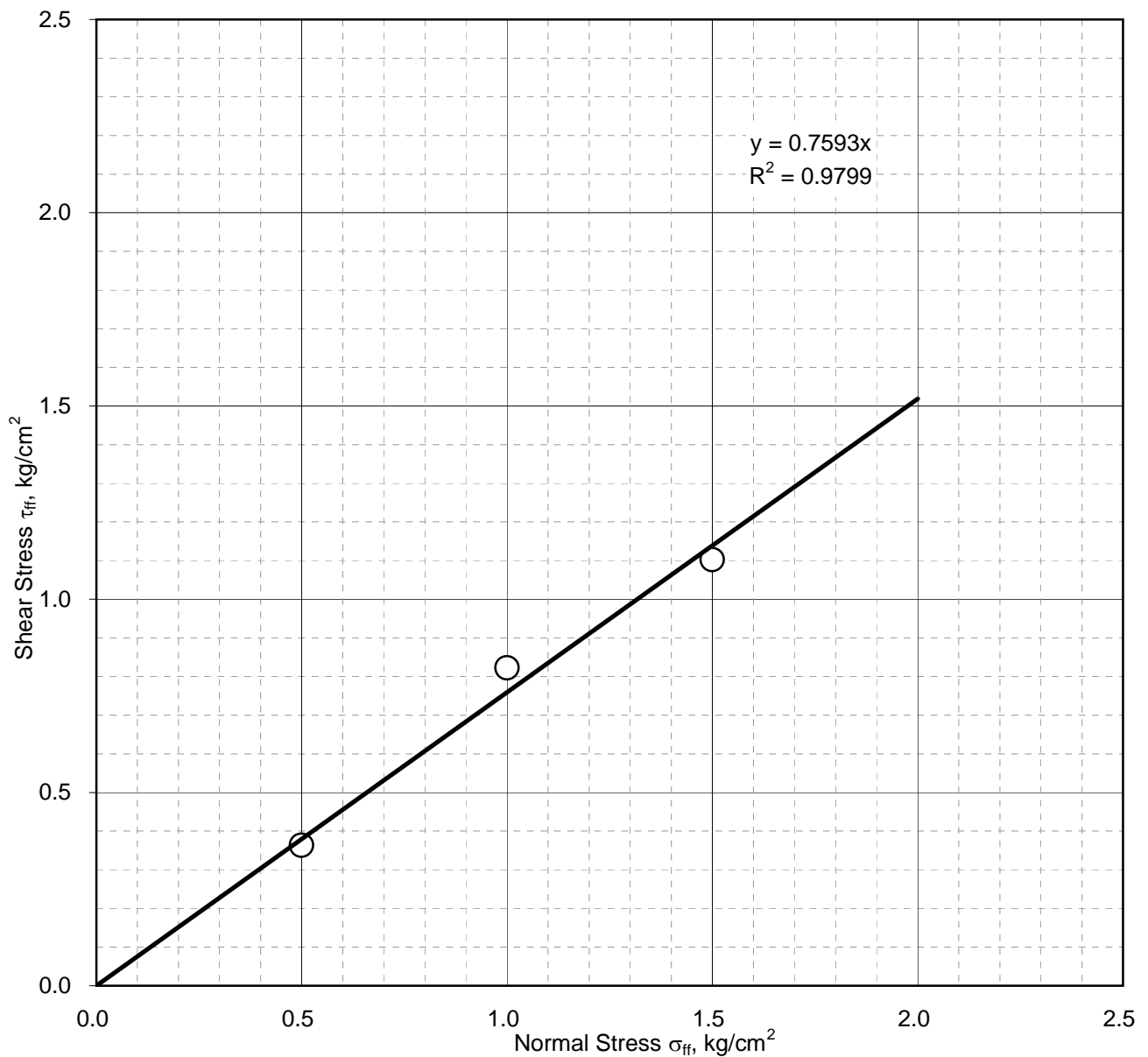




### Drained Direct Shear Test

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

Test Results	Borehole No.: PBH-140		Sample Depth: 4 m	
	Sample No.: UDS-2		Sample Description: Sandy silt	
	Dry Density of Soil ( $\text{g/cm}^3$ ):		1.67	
	Moisture Content (%):		Saturated	
	Cohesion Intercept, $c$ :		0.00	$\text{kg/cm}^2$
	Angle of Internal Friction, $\phi$ :		37.2	degrees



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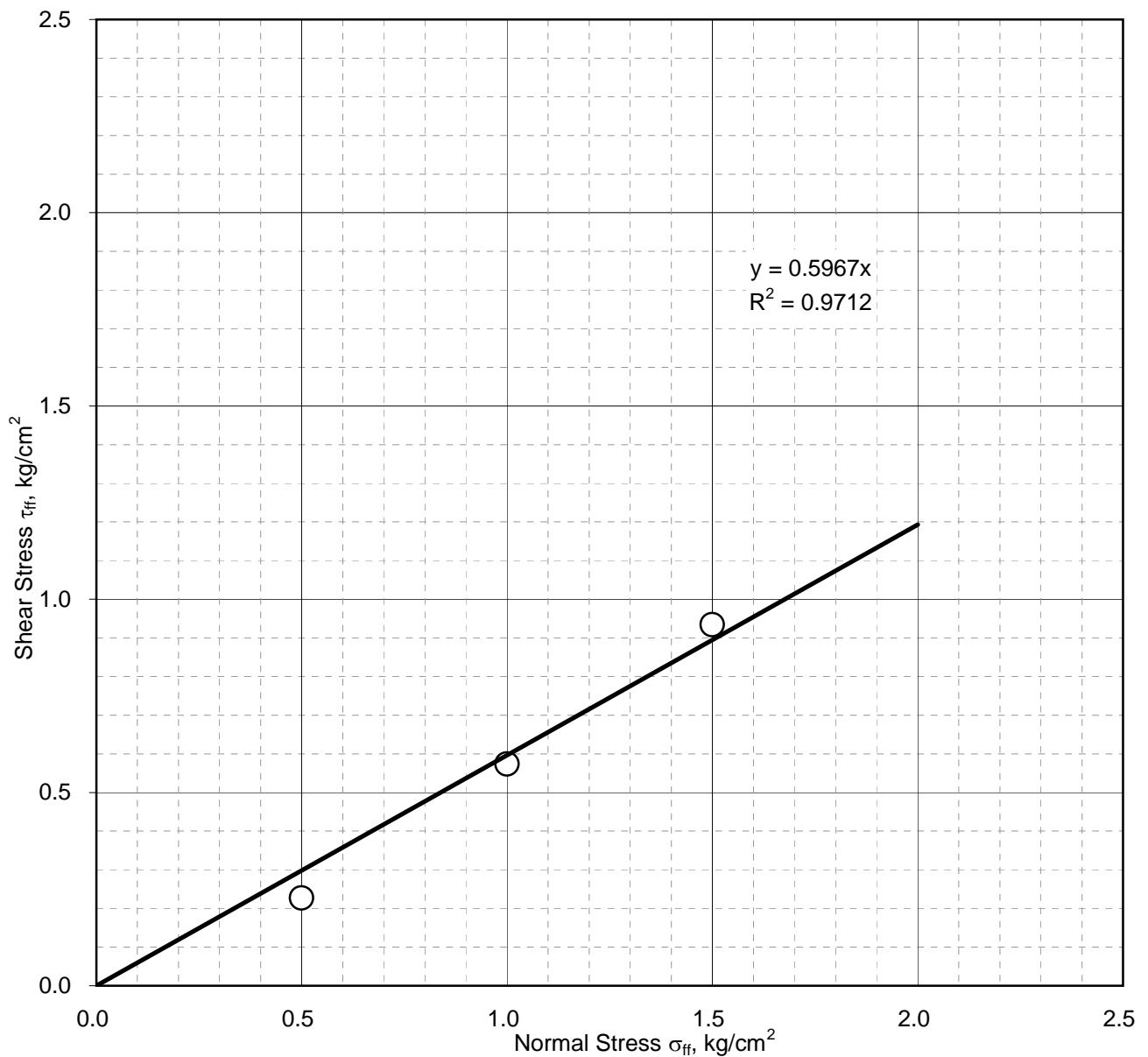




### Drained Direct Shear Test

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

Test Results	Borehole No.: PBH-141		Sample Depth: 11 m	
	Sample No.: UDS-5		Sample Description: Sandy silt	
	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, $\phi$ :		30.8	degrees



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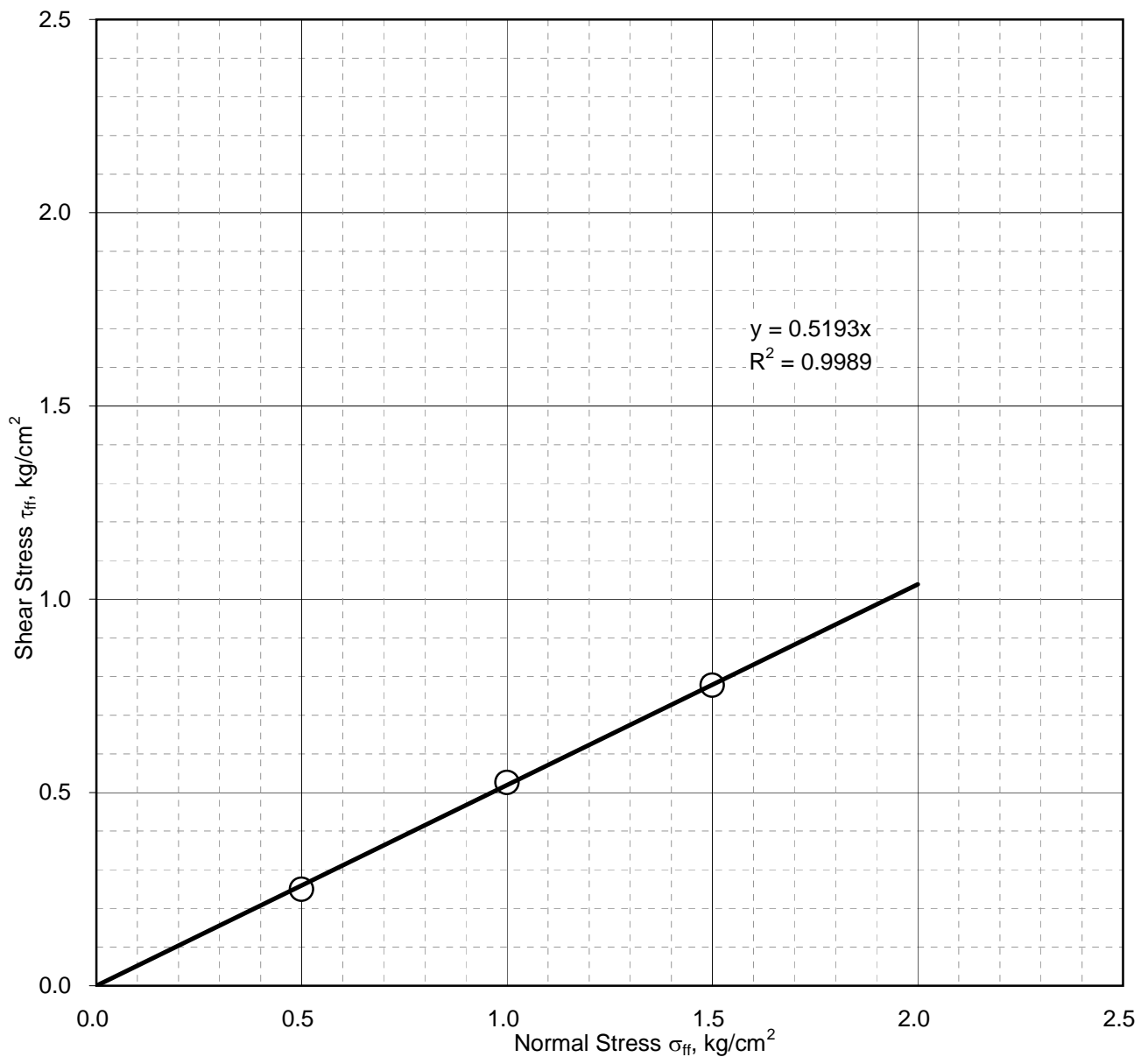




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-142	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, $\phi$ :	27.4 degrees



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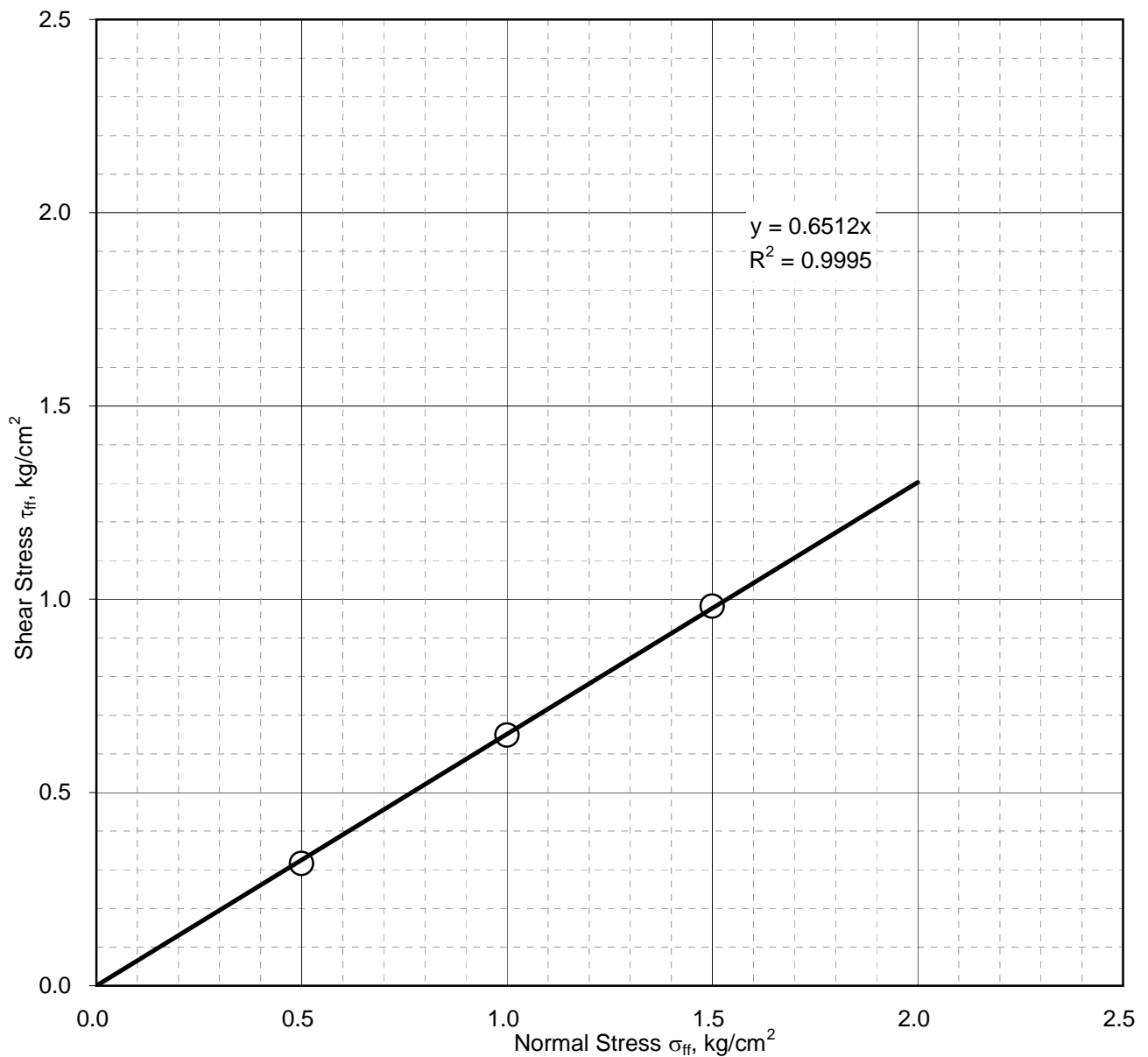




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-143	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, $\phi$ :	33.1 degrees



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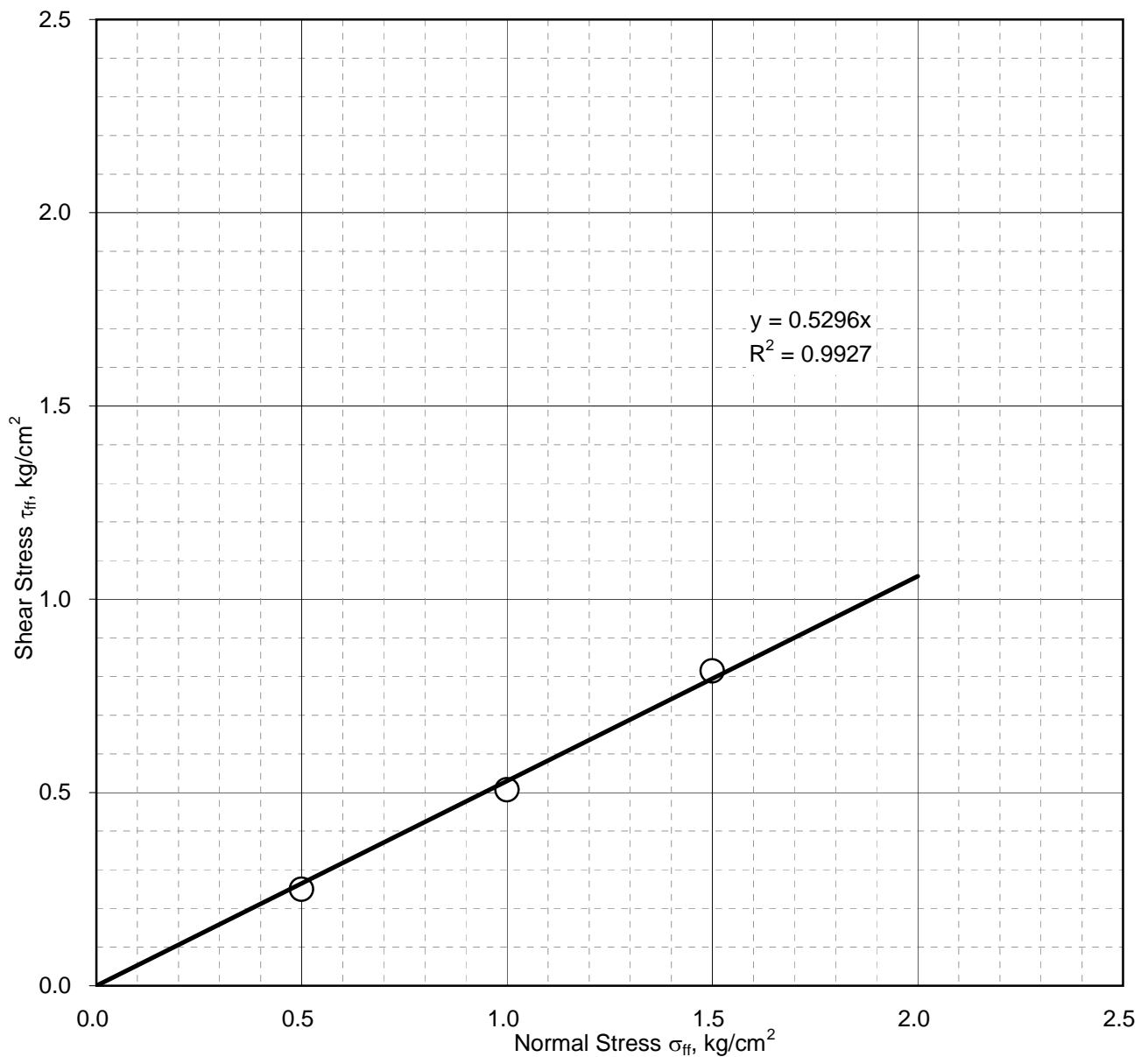




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-144	Sample Depth: 11 m
	Sample No.: UDS-4	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, $\phi$ :	27.9 degrees



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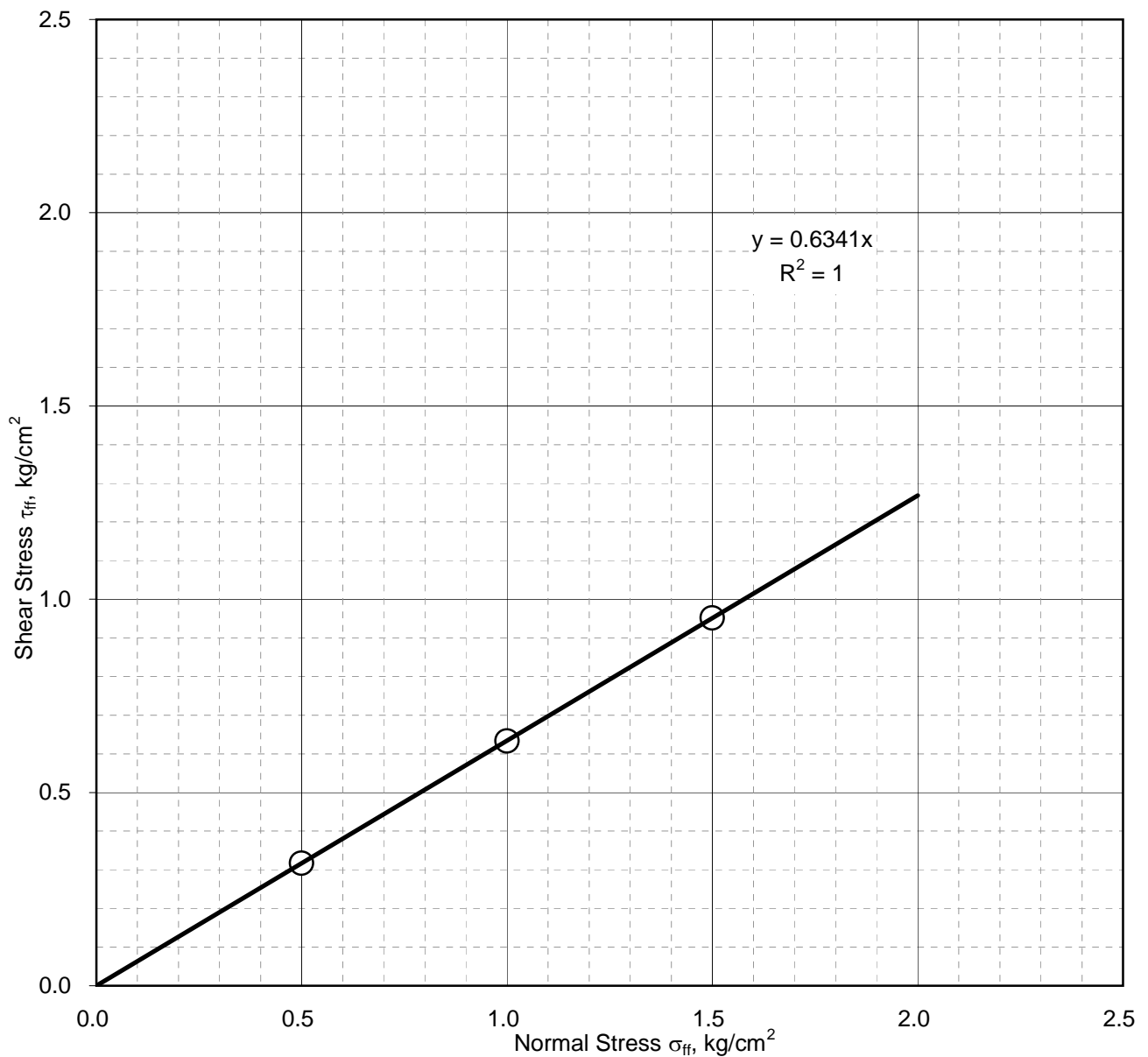




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-145	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, $\phi$ :	32.4 degrees



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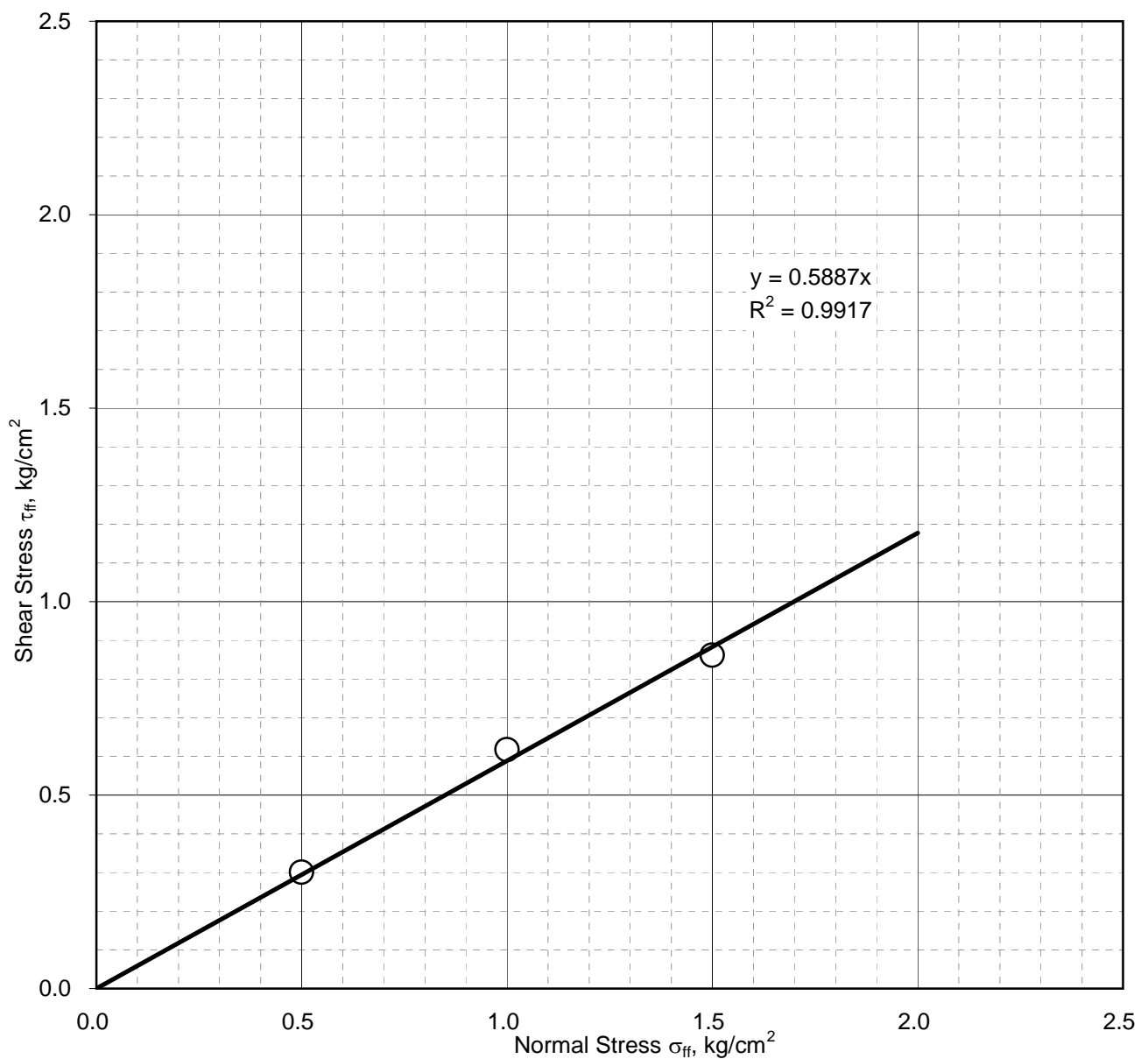




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-146	Sample Depth: 8 m
	Sample No.: UDS-3	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, $\phi$ :	30.5 degrees



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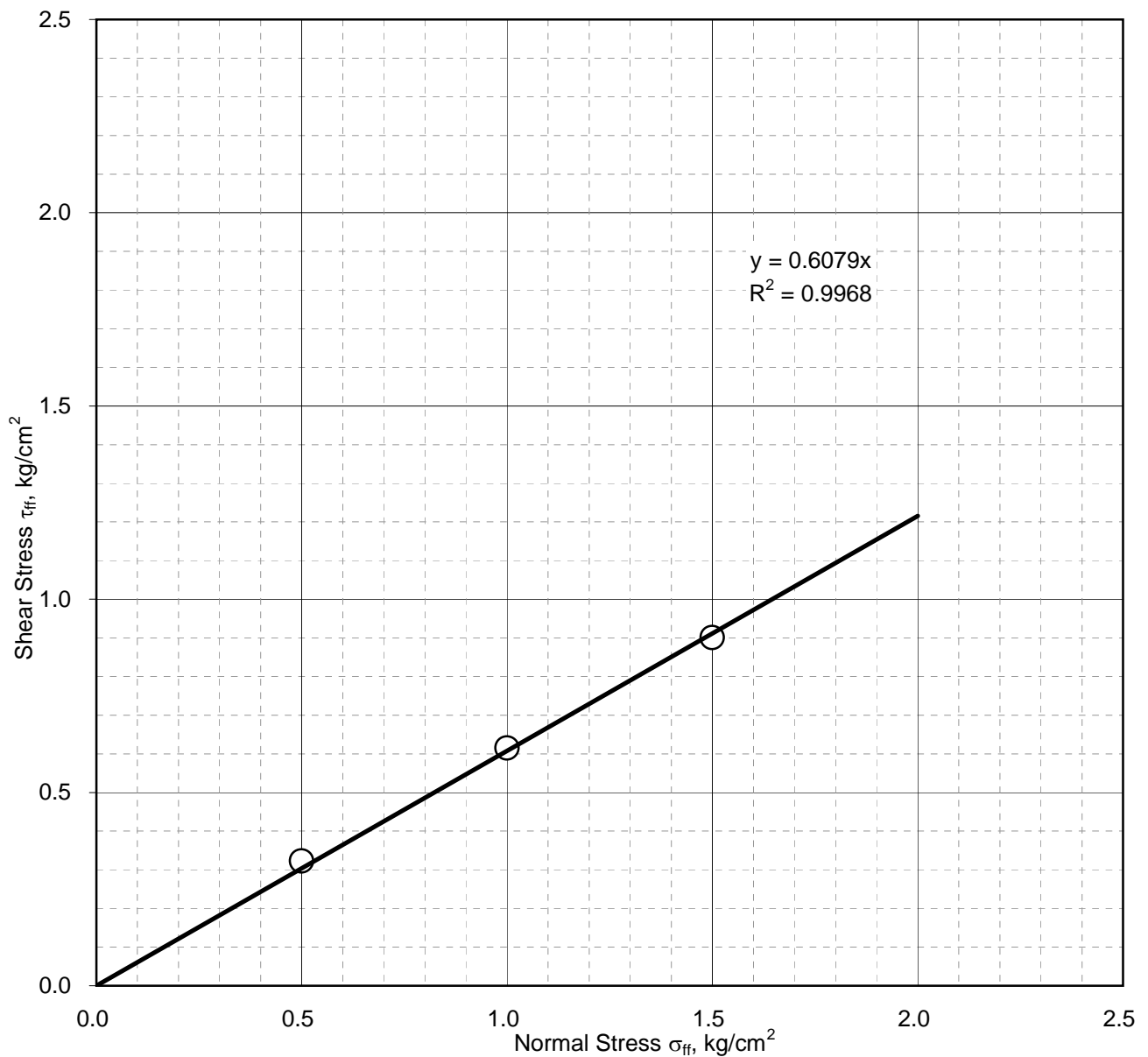




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-147	Sample Depth: 2 m
	Sample No.: UDS-1	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, $\phi$ :	31.3 degrees



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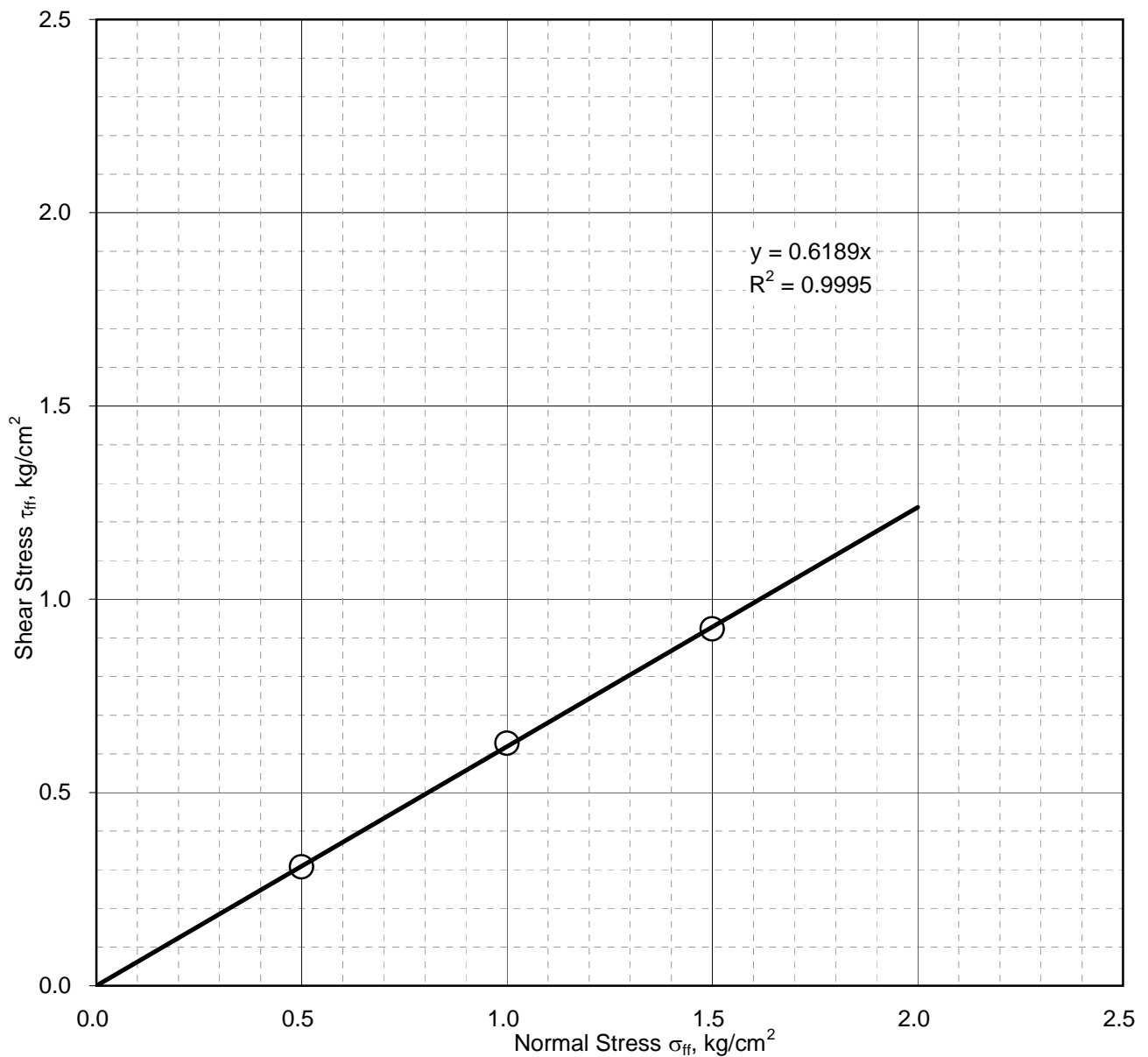




### Drained Direct Shear Test

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

Sample Details	Borehole No.: PBH-149	Sample Depth: 14 m
	Sample No.: UDS-5	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, $\phi$ :	31.8 degrees



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### TEST RESULTS

Groundwater Test Results			
Borehole No.	Sulphate Content (SO ₃ ), mg/l	Chloride Content (Cl), mg/l	pH Value
PBH-73	352	296	7.5
PBH-118	339	273	7.8

### 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 ₃ 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-78



Borehole No. PBH-80



Borehole No. PBH-115



Borehole No. PBH-118

### Site Photographs