

Data 8

Geological Survey

Data 8 Geological Survey

8.1 Introduction

The geological survey was contracted out to a local contractor, and the field works have been carried out from 24th October 2003 and finished 15th December 2003. The laboratory testing has been carried out from 25th October 2003 to 25th December 2003.

This report presents the ground conditions, mechanic of the soils, results of Standard Penetration Test (SPT) and field log recording.

8.2 Scope of Work

The scope of work for investigation included the following:

8.2.1 Field Work

All field works activities were supervised by:

- Mr. PHAT Bonne - Master engineer of geology
- Mr. KONG Sangva - Engineer of geology
- Mr. MEN Tharith - Technician of Geology

Five boreholes of 120mm nominal diameter and 15.0 meters depths with Standard Penetration Test (SPT) were carried by rotary auger machine model **YTB-50M** (Russian equipment). The positions of boreholes are shown in the location plan of boreholes as shown in Figure 8-1. The permeability test was also conducted by using Falling head Borehole Permeameter method.

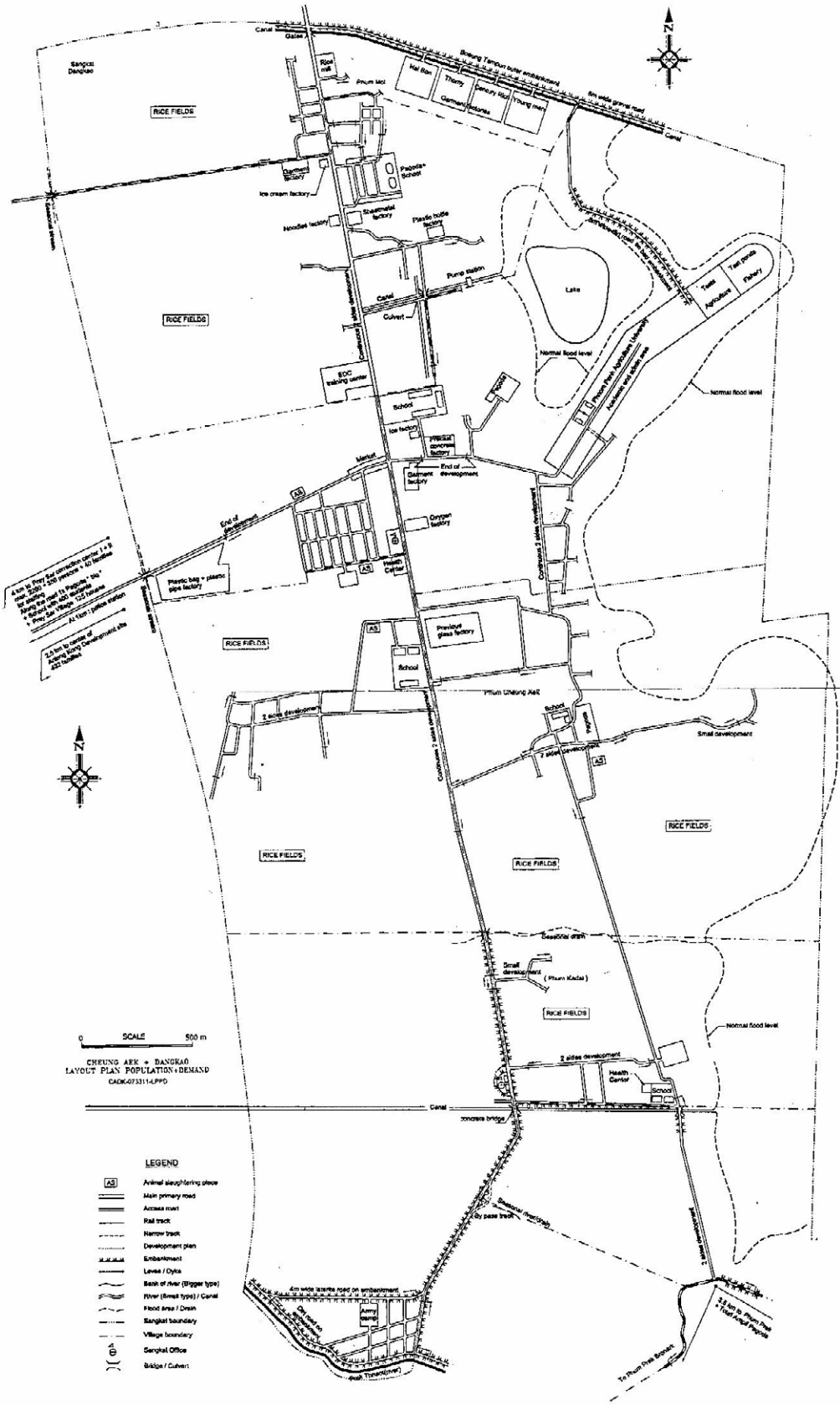


Figure 8-1: Map

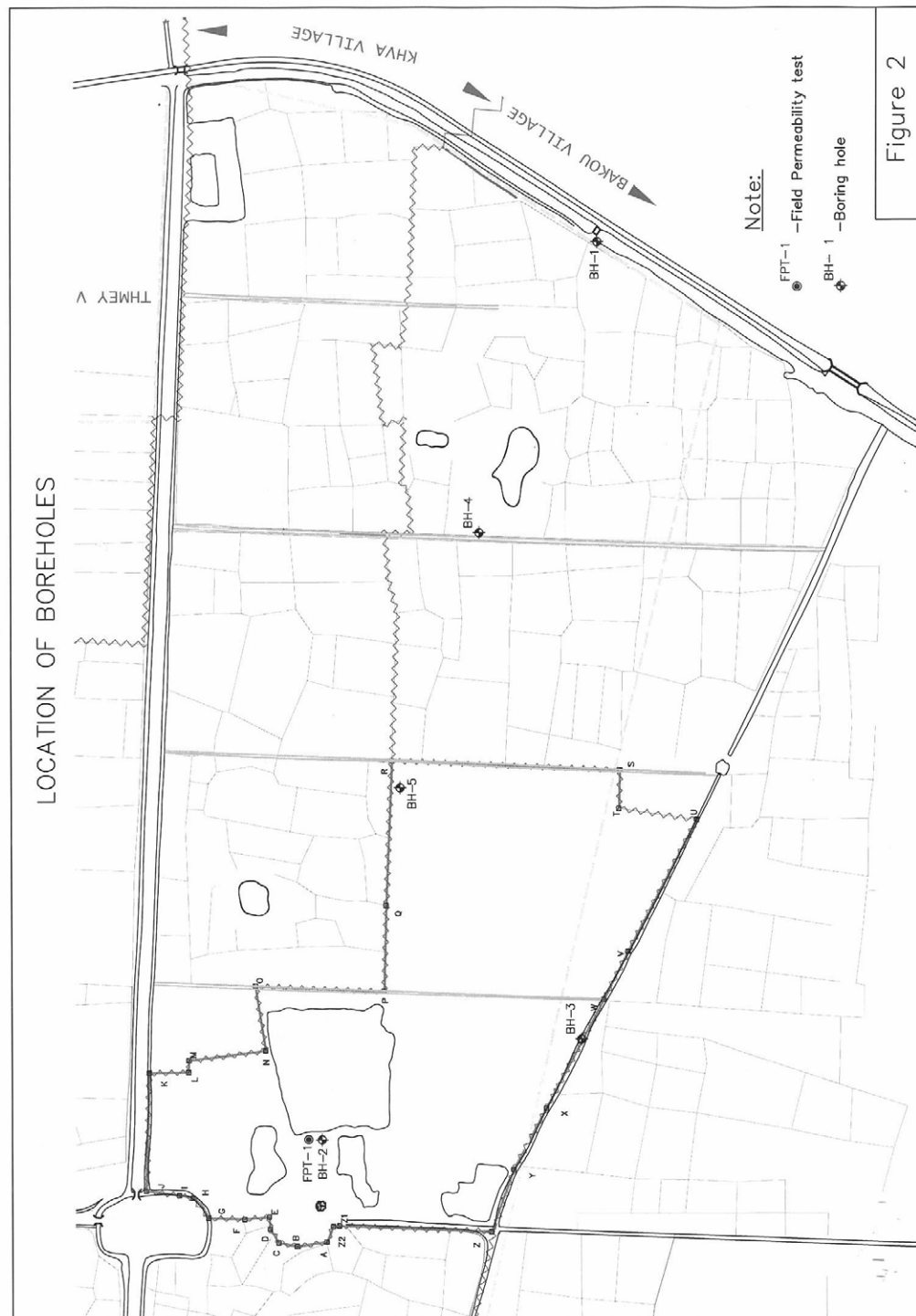


Figure 8-2: Location Plan of Boreholes

8.2.2 Standard Penetration Test (SPT)

Standard Penetration Test was carried out **1.0m** intervals inside the boring hole. A standard split spoons of **50.8mm** diameter with a ball check valve on the top and harden steel cutter. A

Standard spilt spoon was installed and drives into the soil by a **63.5Kg**, automatic drop hammer falling freely from a fixed height of **760mm** along a guide rod.

The blow counts defined for each 150mm penetration of the seating drive. Total penetration of the spoon is **450mm** and the numbers of blow N-value for last **300mm**. Penetration was recorded as the N- value of the soil stratum encountered which indicated the relative density of non-cohesive soil as well the consistency of the cohesive soil.

8.2.3 Sampling

-Undisturbed samples

Undisturbed samples were taken in the natural state of the soil from **firm to stiff clay** and **sandy clay** for testing undrained direct shear test, unconfined compression test, consolidation test...The undisturbed samples were taken by thin wall tube sampler.

-Disturbed samples

The disturbed samples were taken at a rate of 1.5m and all strata in the borehole. The disturbed samples were also collected in soft to stiff clay and sandy soil for laboratory testing.

8.3 Laboratory Testing Program

The Laboratory Testing Program Included:

- Natural water contents determinations
- Unit weight and dry density determinations
- Atterberg limit tests of selected cohesive soil or sandy sieving passing 425 micrometers
- Specific gravity tests (Gs)
- Sieves distribution Tests
- Unconfined compression Tests
- Permeability tests for sand soils
- Consolidation Test

The testing-procedure was conducted in accordance with **ASTM** Standard and classified soil by **USCS** (Unified Soil Classification System).

Summary of testing results was presented in the table *characteristic of Soil Mechanic*.

8.4 Relative Density and Consistency

The relationship between Standard Penetration Test result and consistency clay, silt soil (Cohesive soil) and relative density for sandy soil (non-cohesive soil) are shown in the table No 1 and 2.

Table 8-1: Relation between S.P.T Results and Consistency for Clay, Silt, Clayey-Silt and Silty-Clay (Cohesion Soils)

S.P.T N Value (blows/ 300mm)	CONSISTENCY
0 to 2	Very soft
2 to 4	Soft
4 to 8	Medium
8 to 15	Stiff
15 to 30	Very Stiff
30 over	Hard

Table 8-2: Relation between S.P.T Results and Relative Density for Sand And Gravel.
(Cohesionless Soil)

S.P.T N Value (blows/ 300mm)	RELATIVE DENSITY
Less than 4	Very loose
4 to 10	Loose
10 to 30	Medium dense
30 to 50	Dense
Over 50	Very dense

8.5 Result of the Survey

8.5.1 Ground Condition and Soil Properties

Ground condition from the ground surface to 15.0m depths for this site consisted of filling process of geology was in 4th Era (Young alluvium).

The soil condition encountered on boreholes have been into strata as follows:

Table 8-3: BOREHOLE No 1

Stratum No	Description of soil strata	N-value Blows /300mm
1	- Farm Soil, encountered from top to 0.50m depths.	N-0
2	- Yellow stiff lean clay with sand, encountered from 0.50m to 1.50m.	N-9
3	- Medium stiff yellow lean clay, encountered from 1.50m to 2.60m.	N-7
4	- Medium stiff yellow loose sandy silt, encountered from 2.6m to 4.30m	N-8
5	- Brown medium dense sandy silty clay, encountered from 4.30m to 5.10m	N-18
6	- Brown loose clayey silty fine sand, encountered from 5.10m to 5.90m.	N-13
7	- Brown medium dense clayey fine sand, encountered from 5.90m to 6.30m	N-26
8	- Yellow very stiff fat clay, encountered from 6.30m to 8.50m.	N-24
9	- Yellow stiff sandy silty clay, encountered from 8.50m to 9.50m.	N-26
10	- Yellow loose coarse sand, encountered from 9.50m to 10.30m	N-13
11	- Green medium dense coarse sand, encountered from 10.30m to 13.70m.	N-21; N-22; N-18
12	- Yellow very stiff lean clay, encountered from 13.70m to 15.45m.	N-25; N-20

RESEARCH & DESIGN ENTERPRISE
SOIL TESTING LABORATORY

BORING LOG

PROJECT NAME: The Study on Solid Waste Management.						Borehole N ^o 1						
PROJECT SITE : In Municipality of Phnom Penh, Kingdom of Cambodia.						Date Started: 24/10/2003						
Elevation of borehole: m				EQUIPMENT : ROTARY AUGER METHOD		Date finished: 24/10/2003						
Depth m	Samples No	Sample Type	DESCRIPTION OF STRATA	Depth & Thick m.	Legend	FIELD TESTING				Recovery ratio mm.		
						Vane Test kPa	Depth testing m.	S P T				
								N ₀	N ₁		N ₂	N- value (Blows / 300mm)
						Blows / 150mm						
			Farm soil	0.50								
1	1	U	Yellow stiff lean clay with sand	(1.0)		1.0 to 1.45	2	3	6			400
2	2	U	Medium stiff yellow lean clay	(1.10)		2.0 to 2.45	2	3	4			350
3				2.60		3.00 to 3.45	2	3	5			380
4	3	U	Medium stiff yellow loose sandy silt	(1.70)		4.0 to 4.45	4	8	10			400
5	4	U	Brown medium dense sandy silty clay	(0.80)		5.0 to 5.45	5	5	8			400
6	5	U	Brown loose silty fine sand	(0.80)		6.00 to 6.45	8	11	15			350
7	6	U	Brown medium dense clayey fine sand	5.90								
8	7	U	Yellow very stiff fat clay	6.30		7.0 to 7.45	1	10	14			150
9	8	U		(2.20)		8.0 to 8.45	7	10	14			450
10	9	D	Yellow stiff sandy silty clay	(1.0)		9.00 to 9.45	5	9	17			400
11	10	D	Yellow loose coarse sand	(0.80)		10.0 to 10.45	2	5	8			300
12			Green medium dense coarse sand	10.30		11.0 to 11.45	5	10	11			270
13	11	D		(3.40)		12.0 to 12.45	8	10	12			300
14						13.0 to 13.45	3	6	12			210
15	12	U	Yellow very stiff lean clay	13.70		14.0 to 14.45	7	11	14			350
16	13	D		(1.75)		15.0 to 15.45	6	9	11			200
			End of borehole No1 :15.45m Depth	15.45								

LEGEND: D - Disturbed Sample
U - Undisturbed Sample

Water Strike: 4.50m
Water level: 3.50m

Sheet No 1

FIGURE 3

Table 8-4: BOREHOLE No 2

Stratum No	Description of soil strata	N-value Blows /300mm
1	Farm Soil, encountered from top to 0.50m depths.	N-0
2	Grey very stiff silty clay, encountered from 0.50m to 1.10m.	N-25
3	Yellow very stiff lean clay, encountered from 1.10m to 2.60m.	N-28
4	Yellow stiff lean clay, encountered from 2.60m to 4.50m	N-15,N-12
5	Brown very stiff silty clay with gravel, encountered from 4.50m to 5.25m	N-15
6	Yellow stiff sandy fat clay, encountered from 5.25m to 7.50m.	N-15,N-15
7	Green very stiff sandy lean clay, encountered from 7.50m to 10.60m	N-19,N-20 N-19
8	Dark yellow very stiff fat with lacterite, encountered from 10.6m to 11.7m.	N-22
9	Yellow medium dense clayey silty medium sand, encountered from 11.70m to 13.90m.	N-24, N-28
10	Yellow hard elastic silt, encountered from 13.90m to 15.45m	N-34,N-41

RESEARCH & DESIGN ENTERPRISE
SOIL TESTING LABORATORY

BORING LOG

PROJECT NAME: The Study on Solid Waste Management.		Borehole N ^o 2										
PROJECT SITE : In Municipality of Phnom Penh, Kingdom of Cambodia.		Date Started: 25/10/2003										
Elevation of borehole: m		EQUIPMENT : ROTARY AUGER METHOD										
		Date finished: 25/10/2003										
Depth m	Samples No	Sample Type	DESCRIPTION OF STRATA	Depth & Thick m.	Legend	FIELD TESTING				Recovery ratio mm.		
						Vane Test kPa	Depth testing m.	S P T				
						N ₀	N ₁	N ₂	N-value (Blows / 300mm)			
						Blows / 150mm						
			Farm soil	0.50								
1	1	U	Grey very stiff silty clay	1.10			1.0 to 1.45	10	12	13	25	400
2	2	U	Yellow very stiff lean clay	(1.50)			2.0 to 2.45	8	12	16	28	350
3				2.60			3.00 to 3.45	4	7	8	15	380
4	3	U	Yellow stiff lean clay	(1.90)			4.0 to 4.45	3	5	7	12	400
5	4	U	Brown very stiff silty clay with gravel	4.50 (0.75)			5.0 to 5.45	3	7	8	15	400
6	5	U		5.25			6.00 to 6.45	4	6	9	15	350
7				(2.25)			7.0 to 7.45	4	7	8	15	150
8	6	U	Yellow very stiff fat clay	7.50			8.0 to 8.45	6	9	10	19	450
9	7	U		(3.10)			9.00 to 9.45	7	10	10	20	400
10	8	D	green very stiff sandy lean clay	10.60			10.0 to 10.45	6	8	11	19	300
11	9	U	Dark yellow very stiff fat with lacterite	(1.10)			11.0 to 11.45	7	10	12	22	270
12				11.70			12.0 to 12.45	7	8	16	24	300
13	10	D	yellow medium dense clayey silty medium sand	(2.20)			13.0 to 13.45	13	15	13	28	210
14	11	D		13.90			14.0 to 14.45	9	14	20	34	350
15	12	D		(1.55)			15.0 to 15.45	10	16	25	44	200
	13	U	Yellow hard elastic silt	15.45								
	14	D										
			End of borehole No2 : 15.45m Depth									

LEGEND: D - Disturbed Sample
U - Undisturbed Sample

Water Strike: 14.0m
Water level: 13.0m

Sheet No 1
FIGURE 4

Table 8-5: BOREHOLE No 3

Stratum No	Description of soil strata	N-value Blows /300mm
1	- Brown stiff lean clay, encountered from top to 2.30m depths.	N-14
2	- Brown very stiff lean clay, encountered from 2.30m to 3.80m.	N-27
3	- Brown very stiff silty clay with gravel, encountered from 3.80m to 5.80m.	N-30; N-43
4	- Yellow stiff lean clay, encountered from 5.80m to 7.50m.	N-22; N-18
5	- Yellow medium stiff silty clay, encountered from 7.50m to 10.30m.	N-11; N-13
6	- Yellow stiff silty clay, encountered from 10.30m to 11.30m.	N-20
7	- Yellow medium dense silty fine sand, encountered from 11.30m to 12.70m	N-27
8	- Yellow very dense silty fine sand, encountered from 12.70m to 13.80m.	N-68
9	- Yellow hard lean clay, encountered from 13.80m to 15.45m.	N-37

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BORING LOG

PROJECT NAME: The Study on Solid Waste Management.		Borehole N° 3										
PROJECT SITE : In Municipality of Phnom Penh, Kingdom of Cambodia.		Date Started:	17/11/2003									
Elevation of borehole: m	EQUIPMENT : ROTARY AUGER METHOD	Date finished:	17/11/2003									
Depth m	Samples No	Sample Type	DESCRIPTION OF STRATA	Depth & Thick m.	Legend	FIELD TESTING				Recovery ratio		
						Vane Test kPa	Depth testing m.	SPT N ₀ N ₁ N ₂ Blows / 150mm			N-value (Blows / 300mm)	
1	1	U	Brown stiff lean clay	(2.30)			1.0 to 1.45	5	6	8	14	400
2	2	U	Brown very stiff lean clay	2.30			2.0 to 2.45	5	9	13	27	350
3	3	U		(1.50)			3.00 to 3.45	9	12	15	27	380
4	4	U	Brown very stiff silty clay with gravel	3.80			4.0 to 4.45	10	14	16	30	400
5	5	U		(2.00)			5.0 to 5.45	10	19	24	43	400
6	6	U	Yellow stiff lean clay	5.80			6.00 to 6.45	9	10	12	22	350
7	7	U		(1.70)			7.0 to 7.45	6	9	9	18	150
8	8	U	yellow medium stiff silty clay	7.50			8.0 to 8.45	4	5	6	14	450
9	9	U		(2.80)			9.00 to 9.45	4	6	7	13	400
10	10	D	Yellow stiff silty clay	10.30			10.0 to 10.45	4	6	11	17	300
11	11	U		(1.0)			11.0 to 11.45	6	8	12	20	270
12	13	D	Yellow medium dense silty fine sand	11.30			12.0 to 12.45	7	13	14	27	300
13	14	D		(1.40)			13.0 to 13.45	15	34	34	68	210
14	15	D	Yellow very dense silty fine sand	12.70			14.0 to 14.45	12	16	20	36	350
15	16	U		(1.10)			15.0 to 15.45	13	16	21	37	200
			End of borehole No3 :15.45m Depth	15.45								

LEGEND: D - Disturbed Sample
U - Undisturbed Sample

Water Strike: 12.0m
Water level: 13.0m

Sheet No 1
FIGURE 5

Table 8-6: BOREHOLE No 4

Stratum No	Description of soil strata	N-value Blows /300mm
1	- Very stiff sandy silty clay, encountered from top to 1.80m depths.	N-46
2	- Yellow stiff sandy lean clay, encountered from 1.80m to 3.00m.	N-18
3	- Yellow medium stiff sandy silt, encountered from 3.00m to 6.80m.	N-13; N-10; N-7 N-9
4	- Grey medium dense clayey fine sand encountered from 6.80m to 9.00m.	N-15; N-20
5	- Yellow very dense clayey coarse sand, encountered from 9.00m to 9.50m.	N-50
6	- Yellow dense sandy silty clay, encountered from 9.50m to 10.50m.	N-24
7	- Yellow hard lean clay, encountered from 10.50m to 11.40m	N-50
8	- Grey very dense silty coarse sand, encountered from 11.40m to 13.00m.	N-53
9	- Yellow dense silty fine sand, encountered from 13.00m to 15.45m.	N-36; N-45

RESEARCH & DESIGN ENTERPRISE
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BORING LOG

PROJECT NAME: The Study on Solid Waste Management.		Borehole N° 4											
PROJECT SITE : In Municipality of Phnom Penh, Kingdom of Cambodia.		Date Started: 15/12/2003											
Elevation of borehole: m		EQUIPMENT : ROTARY AUGER METHOD											
		Date finished: 15/12/2003											
Depth m	Samples No	Sample Type	DESCRIPTION OF STRATA	Depth & Thick m.	Legend	FIELD TESTING				Recovery ratio mm.			
						Vane Test kPa	Depth testing m.	SPT N-value (Blows / 300mm)					
						N ₀	N ₁	N ₂					
						Blows / 150mm							
1	1	U	Yellow very stiff sandy silty clay	(1.80)									
	2	D				1.0 to 1.45	15	23	23			46	400
2	3	D	Yellow stiff sandy lean clay	(1.20)									
	4	U				2.0 to 2.45	5	8	10			18	350
3	5	U	Yellow medium stiff sandy silt	(3.80)									
	6	U				3.00 to 3.45	4	6	7			13	380
	7	D				4.0 to 4.45	4	5	5			10	400
	8	U				5.0 to 5.45	2	3	4			7	400
	9	D				6.00 to 6.45	2	4	5			9	350
	10	U				7.0 to 7.45	5	7	8			15	150
7	11	U	Grey medium dense clayey fine sand	(2.20)									
	12	U				8.0 to 8.45	5	10	10			20	450
9	13	D	yellow very dense clayey coarse sand	9.0									
	14	D	yellow dense sandy silty clay	(1.0)									
	15	U	Yellow hard lean clay	(0.9)									
	16	D	Grey very dense silty coarse sand	(1.60)									
	17	D				9.00 to 9.45	9	18	32			60	400
	18	D	10.0 to 10.45	6	12	12			24	300			
	19	U	Yellow dense sandy silty clay	10.50									
	20	U	Yellow hard lean clay	(0.9)									
	21	D	Grey very dense silty coarse sand	(1.60)									
	22	D				11.0 to 11.45	8	17	33			60	270
	23	D	12.0 to 12.45	13	25	28			53	300			
	24	D	yellow dense silty fine sand	(2.45)									
	25	U				13.0 to 13.45	14	17	19			36	210
	26	D	14.0 to 14.45	15	19	26			45	350			
	27	D	yellow dense silty fine sand	(2.45)									
	28	D				15.0 to 15.45	13	18	25			43	200
	29	U	13.0										
	30	U	14.0 to 14.45	15	19	26			45	350			
	31	U	15.0 to 15.45	13	18	25			43	200			
	32	U	End of borehole No4 :15.45m Depth	15.45									

LEGEND: D - Disturbed Sample
U - Undisturbed Sample

Water Strike: 5.0m
Water level: 5.0m

Sheet No 1
FIGURE 6

Table 8-7: BOREHOLE No 5

Stratum No	Description of soil strata	N-value Blows /300mm
1	- Brown medium stiff lean clay with sand, encountered from top to 1.50m depths.	N-10
2	- Brown very stiff sandy lean clay, encountered from 1.50m to 3.00m.	N-23
3	- Brown medium dense clayey fine sand, encountered from 3.00m to 3.50m.	N-24
4	- Brown loose silty fine sand, encountered from 3.50m to 6.20m.	N-5; N-6
5	- Yellow medium stiff fat clay, encountered from 6.20m to 7.50m.	N-12
6	- Brown stiff lean clay, encountered from 7.50m to 9.20m.	N-19;N-16;N-18
7	- Red stiff sandy lean clay, encountered from 9.20m to 10.50m	N-28
8	- Dark brown dense silty coarse sand, encountered from 10.50m to 11.30m.	N-41
9	- Yellow medium dense clayey silty medium sand, encountered from 11.30m to 12.60m.	N-22
10	- Grey very stiff sandy silty clay, encountered from 12.60m to 14.20m.	N-35
11	- Grey dense clayey medium sand, encountered from 14.20m to 15.45m.	N-30

RESEARCH & DESIGN ENTERPRISE
SOIL TESTING LABORATORY

BORING LOG

PROJECT NAME: The Study on Solid Waste Management.		Borehole N ^o 5										
PROJECT SITE : In Municipality of Phnom Penh, Kingdom of Cambodia.		Date Started: 15/12/2003										
Elevation of borehole: m		EQUIPMENT : ROTARY AUGER METHOD										
		Date finished: 15/12/2003										
Depth m	Samples No	Sample Type	DESCRIPTION OF STRATA	Depth & Thick m.	Legend	FIELD TESTING					Recovery ratio mm.	
						Vane Test kPa	Depth testing m.	S P T Blows / 150mm				N-value (Blows / 300mm)
							N ₀	N ₁	N ₂			
1	1	U	Brown medium stiff lean clay with sand	(1.50)		1.0 to 1.45	3	4	6			
	2	D			1.50		2.0 to 2.45	6	11	12		
2	3	D	Brown very stiff sandy lean clay	(1.50)								
3	4	U			3.0		3.00 to 3.45	5	12	12		
	5	D	Brown medium dense clayey fine sand	3.5								
4	6	U	Brown loose silty fine sand	(2.70)		4.0 to 4.45	2	2	3			
5	7	D					5.0 to 5.45	2	3	3		
6					6.20		6.00 to 6.45	4	5	7		
7	8	D	Yellow medium stiff fat clay	(1.30)								
8	10	U			7.5		7.0 to 7.45	6	8	11		
	11	U	Brown stiff lean clay	(1.70)								
9	12	D					8.0 to 8.45	5	7	9		
	13	D			9.20		9.00 to 9.45	8	8	10		
10	14	D	Red stiff sandy lean clay	(1.0)								
	15	U			10.50		10.0 to 10.45	10	13	15		
11	16	D	Dark brown dense silty coarse sand	(0.8)								
				11.30		11.0 to 11.45	8	16	25			
12			yellow medium dense clayey silty medium sand	(1.30)								
	17	D			11.30		12.0 to 12.45	10	11	11		
13			Grey very stiff sandy silty clay	(1.60)								
	18	D			12.6		13.0 to 13.45	13	17	18		
14			Grey dense clayey medium sand	(1.25)								
	19	D			14.2		14.0 to 14.45	11	15	15		
				15.45		15.0 to 15.45	10	14	15			
			End of borehole No5 :15.45m Depth									

LEGEND: D - Disturbed Sample
U - Undisturbed Sample

Water Strike: 5.0m
Water level: 5.0m

Sheet No 1

FIGURE 6

8.5.2 Ground Water Condition

The investigation of the ground water is one of importance for soil investigation, because the variation of the ground water level, the characteristic of soil mechanic can be change.

The ground water is divided into two kinds and two seasons:

a. Water strikes and Ground water level

- During boring activities, water is found at a greater depth (**Water strike**).
- But a few hours or 24 hours after the boring completed, water is stabilized at a higher level (**Ground water level**).

b. The ground water by season

The ground water varies according to the season:

- In dry season the ground water level is **decrease**.
- In rainy season the ground water level is **increase**.

Table 8-8: Water Strikes and Ground Water Level

Borehole No	Boring started date	Boring finished date	Water strike (m.)	Water level (m.)	Date measured
1	09/09/2003	09/09/2003	5.00	2.70	10/09/2003
2	10/09/2003	10/09/2003	6.00	2.80	11/09/2003
3	17/11/2003	17/11/2003	12.00	13.00	18/11/2003
4	15/12/2003	15/12/2003	5.00	5.00	16/12/2003
5	15/12/2003	15/12/2003	6.20	6.20	16/12/2003

8.6 Other data

8.6.1 Summary of Laboratory Testing Result

RESEARCH AND DESIGN ENTERPRISE
SOIL TESTING LABORATORY

Date: 08/11/2003
Sheet No 1

SUMMARY OF LABORATORY TESTING RESULTS

BOREHOLE No 1

Project name: The Study on Solid Waste Management.
Site: In Municipality of Phnom Penh, Kingdom of Cambodia.

SAMPLE No	DEPTH (m)		DESCRIPTION OF STRATA	WATER CONTENT		ATTEBERG LIMIT		LIQUIDITY INDEX	PLASTIC INDEX	UNIT WEIGHT OF SOIL	PARTIAL SIZE DISTRIBUTION				Unconfined compression	SPECIFIC GRAVITY	SOIL CLASS	VOID RATIO	CONSOLIDATION				SPT
	From	to		W %	WL %	IP %	IL				ϕ KN/m ³	Q _d KN/m ³	M&C %	Sand %					Gravel %	Cu kPa	Gs	Compression Index	
-	0.00	0.5	Firm soil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.5	1.5	Stiff lean clay with sand	16.04	27.71	19.73	7.99	<0	20.10	17.32	84.02	15.98	-	141.0	2.60	CL	0.50	6.10 ⁻⁸	0.1	33000	-	-	9
2																							
3	1.50	2.6	Medium stiff lean clay	20.36	34.15	23.45	10.70	<0	19.30	16.03	-	-	106.0	2.59	CL	0.62	1.10 ⁻⁸	0.21	17800	7.10 ⁻⁸	-	-	7
4																							
5	2.60	4.3	Loose sandy silt	22.70	37.74	25.02	12.72	<0	19.00	15.48	82.46	17.55	-	28.0	2.62	ML	0.69	-	6000	1.5.10 ⁻⁷	-	-	8
6																							
7	4.3	5.1	Medium dense sandy silty clay	22.37	28.19	22.83	5.37	<0	19.30	15.77	52.71	47.30	-	38.0	2.61	CL	0.66	7.10 ⁻⁸	0.12	8100	7.10 ⁻⁸	-	18
8																							
9	5.1	5.9	Loose clayey silty fine sand	21.26	23.27	17.78	5.49	-	19.60	16.16	21.60	78.40	-	-	2.61	ML	0.61	-	9900	-	-	-	13
10	5.9	6.3	Medium dense clayey fine sand	18.19	41.18	24.18	17.00	-	20.10	17.00	18.00	82.00	-	-	2.60	SC-SM	0.53	-	20000	4.8.10 ⁻³	-	-	26
11																							
12																							
13	6.3	8.5	Very stiff fat clay	20.37	50.02	27.08	22.94	<0	20.60	17.11	-	-	296.00	2.60	CH	0.52	7.10 ⁻⁸	0.09	32500	4.10 ⁻⁸	-	-	24
14																							
15																							
16	8.5	9.5	Very stiff sandy silty clay	20.24	27.10	20.33	6.77	<0	20.20	16.79	64.20	35.80	-	211.0	2.60	CL	0.55	-	20000	-	-	-	26
17	9.5	10.3	Loose coarse sand	20.54	-	-	-	-	20.00	16.59	4.34	95.66	-	-	2.64	ML	0.59	-	9900	6.6.10 ⁻³	-	-	13
18																							
19																							
20	10.3	13.7	Medium dense coarse sand	17.54	-	-	-	-	20.30	17.27	8.14	91.86	-	-	2.63	SP	0.53	-	17000	3.7.10 ⁻³	-	-	21
21																							
22	13.7	15.45	Very stiff sandy clay	19.92	36.97	23.12	15.85	<0	20.00	16.67	80.93	19.07	-	170.0	2.60	CL	0.56	-	30000	-	-	-	25
23																							

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SUMMARY OF LABORATORY TESTING RESULTS
BOREHOLE No 2

Project name: The Study on Solid Waste Management.
Site: In Municipality of Phnom Penh, Kingdom of Cambodia.

SAMPLE No	DEPTH (m)		DESCRIPTION OF STRATA	WATER CONTENT		ATTERBERG LIMIT		PLASTIC INDEX	LIQUITY INDEX	UNIT WEIGHT OF SOIL		PARTICULAR SIZE DISTRIBUTION				Unconfined compression	SPECIFIC GRAVITY	SOIL CLASS	VOID RATIO	CONSOLIDATION				SPT			
	From	to		W %	WP %	WL %	IP %			IL	KN/m ³	KN/m ³	M&C %	Sand %	Gravel %					Cu	Gs	Compression Index	Young's modulus		Lab. Permeability	Field Permeability	Cv
-	0.00	0.5	Farm soil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1	0.5	1.1	Very stiff silty clay	10.85	26.58	19.81	6.77	<0	<0	21.40	19.30	700	2.58			19000									25		
2																											
3	1.10	2.6	Very stiff lean clay	13.81	36.62	23.60	13.02	<0	<0	20.90	18.36	500	2.73	CL	ML	25000	4.7.10 ⁻⁸								28		
4																											
5	2.60	4.5	Medium stiff lean clay	20.51	40.80	24.46	16.34	<0	<0	20.00	16.59	92	2.64	CL		21000	9.10 ⁻⁹								15		
6																											
7	4.5	5.25	Very stiff silty clay with gravel	22.27	29.47	24.66	4.81	<0	<0	19.50	15.95	242	2.66	CL	ML	22000	3.6.10 ⁻⁸								15		
8																											
9	5.25	7.5	Stiff sandy fat clay	19.66	56.90	26.50	30.41	<0	<0	20.50	17.13	130	2.56	CH		23000	1.7.10 ⁻⁸								15		
10																											
11	7.5	10.6	Very stiff sandy lean clay	17.39	34.87	21.54	13.33	<0	<0	20.30	17.29	165	2.60	CL		15700	-									19	
12																											
13	10.6	11.7	Very stiff fat clay with latrite	16.13	54.34	28.36	25.98	<0	<0	19.30	16.62	182	2.63	CH		32000	-									22	
14																											
15	11.7	13.9	Medium dense clayey silty medium sand	17.27	24.70	18.61	6.09	-	-	20.20	17.22	27.36	2.60	SC	SM	21000	-									24	
16																											
17	13.9	15.45	Hard elastic silt	19.69	58.85	32.03	26.82	<0	<0	20.40	17.04	295	2.70	MH		50000	-									34	
18																											41

SIENG PEOU
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SUMMARY OF LABORATORY TESTING RESULTS
BOREHOLE No 3

Project name: The Study on Solid Waste Management.
Site: In Municipality of Phnom Penh, Kingdom of Cambodia.

SAMPLE No	DEPTH (m)		DESCRIPTION OF STRATA	WATER CONTENT		ATTEBERG LIMIT		PLASTIC INDEX	LIQUITY INDEX	UNIT WEIGHT OF SOIL		PARTICULAR SIZE DISTRIBUTION				Unconfined compression	SPECIFIC GRAVITY	SOIL CLASS	VOID RATIO	CONSOLIDATION				SPT
	From	to		W %	WL %	WP %	IP			IL	+	-	M&C %	Sand %	Gravel %					Cu	Cs	Cc	Cv	
1	0.0	2.3	Stiff silty clay	14.55	42.27	25.54	16.73	<0		20.80	18.15				323	2.59	CL	0.43	1.10 ⁻⁷	43000	5.10 ⁻⁸		14	
2																								
3	2.30	3.8	Very stiff lean clay	13.03	33.69	19.55	14.14	<0		20.10	17.80			401	2.54	CL	0.43	5.10 ⁻⁸	23000	5.10 ⁻⁸		27		
4																								
5	3.80	5.8	Hard lean clay	13.34	35.20	21.30	13.90	<0		20.70	18.20			371	2.57	CL	0.41	9.10 ⁻⁸	31000	5.10 ⁻⁸		30		
6																							43	
7	5.8	7.50	stiff lean clay	18.38	33.74	22.93	10.81	<0		20.60	17.40			120	2.52	CL	0.45	-	21000	-		22		
8																							18	
9	7.50	10.3	Medium stiff silty clay	15.03	20.00	14.83	5.16	0.04		20.50	17.82			97	2.55	CL	0.43	-	17000	-		11		
10																	ML						13	
11	10.3	11.3	Stiff silty clay	16.71	21.45	15.38	6.08	0.22		20.00	17.14			125	2.53	CL	0.48	-	22000	-		20		
12																	ML						27	
13	11.3	12.7	Medium dense silty fine sand	18.49	19.08	16.86	2.22	-		20.00	16.88	65.00		-	2.54	SM	0.51	-	21000	5.10 ⁻³				
14																								
15	12.7	13.8	Very dense silty fine sand	11.58	-	-	-	-		20.00	17.92	84.50		-	2.55	SM	0.43	-	52000	-		68		
16	13.8	15.50															CL	0.46	-	-	-		36	

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SIENG PEOU

SUMMARY OF LABORATORY TESTING RESULTS
BOREHOLE No 4

Project name: The Study on Solid Waste Management.
Site: In Municipality of Phnom Penh, Kingdom of Cambodia.

SAMPLE No	DEPTH (m)		DESCRIPTION OF STRATA	WATER CONTENT		ATTEBERG LIMIT		PLASTIC INDEX	LIQUITY INDEX	UNIT WEIGHT OF SOIL		PARTICULAR SIZE DISTRIBUTION				Unconfined compression	SPECIFIC GRAVITY	SOIL CLASS	VOID RATIO	CONSOLIDATION				SPT N-Value
	From	to		W %	WL %	WP %	IP			IL	ρ_d KN/m ³	ρ KN/m ³	M&C %	Sand %	Gravel %					Cu kPa	Gs	e	Cv m ² /s	
1	0.0	1.8	Very stiff sandy silty clay	12.68	23.56	16.58	6.98	<0	20.20	17.93	70.13	29.87	-	202	2.45	0.37	-	-	35236	-	-	-	-	46
2																								
3	1.80	3.0	Stiff sandy lean clay	17.26	35.65	21.65	14.01	<0	21.20	18.08	63.65	36.35	-	248	2.58	0.43	3.10 ⁻⁸	0.11	21000	4.10 ⁻⁸	-	-	18	
4																								
5			Medium stiff sandy silty	20.86	24.79	21.04	3.76	<0	20.80	17.21	56.31	41.69	-	85	2.57	0.49	3.10 ⁻⁷	0.1	34000	1.10 ⁻⁷	-	-	13	
6																								
7	3.00	6.8																						10
8																								7
9			Medium dense clayey fine sand	20.20	27.60	18.03	9.57	-	20.10	16.72	25.98	74.02	-	-	2.60	0.55	-	-	11490	1.10 ⁻³	-	-	15	
10	6.8	9.00																						20
11	9.00	9.5	Very dense clayey coarse sand	10.71	50.99	27.32	23.67	-	20.50	18.52	22.67	77.33	-	-	2.58	0.39	-	-	38300	-	-	-	50	
12	9.5	10.5																						24
13	10.5	11.4	Hard lean clay	17.79	25.68	19.04	6.64	<0	20.00	16.98	50.61	49.39	-	-	2.60	0.53	-	-	18384	-	-	-	50	
14	11.4	13.0																						53
15	13.0	15.5	Very dense silty coarse sand	12.05	47.35	30.13	17.22	-	20.50	18.30	30.92	69.08	-	-	2.56	0.40	-	-	40598	5.10 ⁻³	-	-	36	
16	15.5	17.0																						45
17	17.0	18.5	Dense silty fine sand	15.89	47.08	30.24	16.84	-	20.00	17.26	28.68	71.32	-	-	2.60	0.51	-	-	27576	-	-	-	36	
18	18.5	20.0																						45

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SIENG PEOU

SUMMARY OF LABORATORY TESTING RESULTS
BOREHOLE No 5

Project name: The Study on Solid Waste Management.
Site: In Municipality of Phnom Penh, Kingdom of Cambodia.

SAMPLE No	DEPTH (m)		DESCRIPTION OF STRATA	WATER CONTENT			ATTEBERG LIMIT			PLASTIC INDEX	LIQUITY INDEX	UNIT WEIGHT OF SOIL		PARTICULAR SIZE DISTRIBUTION				Unconfined compression	SPECIFIC GRAVITY	SOIL CLASS	VOID RATIO	CONSOLIDATION				SPT
	From	to		W %	WL %	WP %	IP %	IL %	ρ KN/m ³			ρ_d KN/m ³	M&C %	Sand %	Gravel %	Cu kPa	Gs					Cosolidation coef	Compression Index	Young's modulus	Lab. Permeability	
1	0.0	1.5	medium stiff lean clay with sand	14.70	35.92	21.96	13.96	<0	20.00	17.44	20.26	-	2.64	CL	0.52	-	-	-	-	-	-	-	-	-	10	
2																										
3	1.50	3.0	Very stiff sandy lean clay	16.91	27.80	17.98	9.82	<0	20.20	17.28	36.01	-	2.62	CL	0.52	2.10 ⁻⁸	0.167	16000	4.10 ⁻⁸	-	-	-	-	23		
4																										
5	3.00	3.50	Medium dense clayey fine sand	15.52	31.43	20.95	10.48	-	20.00	17.31	73.94	-	2.64	SC	0.52	-	-	18384	-	-	-	-	-	24		
6																										
7	3.50	6.2	Loose silty fine sand	14.64	23.30	19.86	3.43	-	18.00	15.70	68.72	-	2.73	SM	0.74	-	4596	-	-	-	-	-	-	5		
8																								6		
9	6.20	7.5	Medium stiff fat clay	23.32	57.49	24.15	33.34	<0	20.10	16.30	-	-	122	CH	0.56	-	21785.7	-	-	-	-	-	-	12		
10																								19		
11	7.5	9.20	Stiff lean clay	21.52	43.27	23.18	20.09	<0	20.10	16.54	-	-	163	CL	0.54	-	29107.1	-	-	-	-	-	-	16		
12																								18		
13																										
14	9.2	10.5	Stiff sandy lean clay	16.31	31.00	20.50	10.50	<0	21.20	18.23	36.98	-	2.57	CL	0.41	-	27321.4	-	-	-	-	-	-	28		
15																										
16	10.5	11.3	Dense silty coarse sand	10.69	-	-	-	-	20.00	18.07	73.15	-	2.58	SM	0.43	-	31406	-	-	-	-	-	-	-	41	
17	11.3	12.6	Medium dense clayey silty medium sand	16.27	22.02	16.73	5.29	-	20.50	17.63	77.22	-	2.60	SM	0.47	-	16852	-	-	-	-	-	-	-	22	
18	12.6	14.2	Very stiff sandy silty clay	21.95	25.88	18.91	6.97	0.44	20.20	16.56	40.64	-	2.60	CL	0.57	-	26810	-	-	-	-	-	-	-	35	
19	14.2	15.5	Dense clayey medium sand	13.61	27.67	15.30	12.37	-	20.10	17.69	76.02	-	2.60	SC	0.47	-	22980	-	-	-	-	-	-	-	30	

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SIENG PEOU

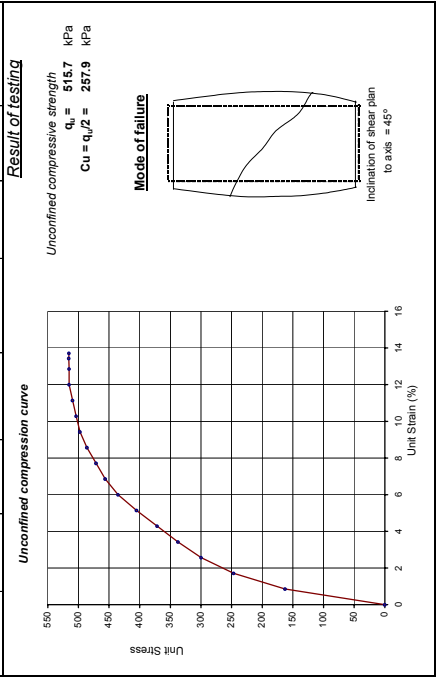
8.6.2 Unconfined Compression Test Result

RESEARCH AND DESIGN ENTERPRISE
SOIL TESTING LABORATORY

UNCONFINED COMPRESSION TEST

PROJECT : THE STUDY ON SOLID WASTE MANAGEMENT		Length:	70	mm.
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter:	35	mm.
		Area:	962	mm ² .
Test date : 26/10/2003		Mass wet soil	143.95	g.
Borehole No.: BH-1		Unit weight	2.14	g/cm ³
Depth sampling: 1.0 to 1.45m		Load ring const:	2.873	N / div.
		Rate of strain:	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	9.621	0	0
60	55.0	0.6	0.657	0.991	0.991	9.704	0.158	162.830
120	84.0	1.2	1.214	0.983	0.983	9.789	0.241	246.535
180	103.0	1.8	2.571	0.974	0.974	9.875	0.296	299.663
240	117.0	2.4	3.429	0.966	0.966	9.963	0.336	337.989
300	130.0	3.0	4.286	0.957	0.957	10.052	0.373	371.661
360	142.0	3.6	5.143	0.949	0.949	10.143	0.411	405.657
420	155.0	4.2	6.000	0.940	0.940	10.235	0.445	439.980
480	164.0	4.8	6.857	0.931	0.931	10.329	0.471	465.145
540	171.0	5.4	7.714	0.923	0.923	10.425	0.491	471.238
600	178.0	6.0	8.571	0.914	0.914	10.523	0.511	485.972
660	184.0	6.6	9.429	0.906	0.906	10.623	0.529	497.644
720	188.0	7.2	10.286	0.897	0.897	10.724	0.540	503.650
780	192.0	7.8	11.143	0.889	0.889	10.828	0.552	509.452
840	196.0	8.4	12.000	0.880	0.880	10.933	0.563	515.649
900	198.0	9.0	12.857	0.871	0.871	11.041	0.569	515.237
940	199.5	9.4	13.429	0.866	0.866	11.114	0.573	515.736
960	200	9.6	13.714	0.863	0.863	11.150	0.575	515.922



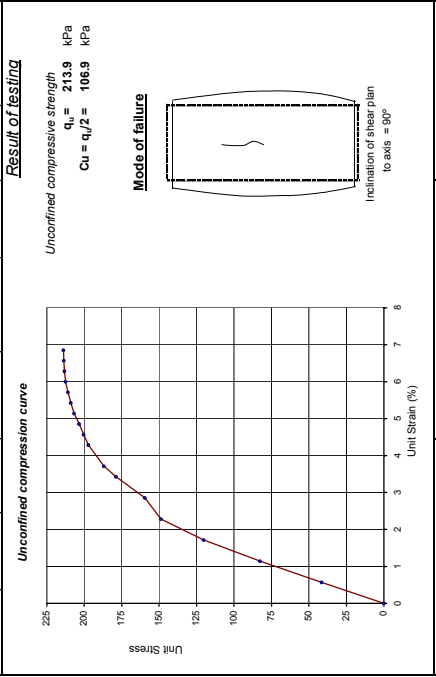
Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 8

RESEARCH AND DESIGN ENTERPRISE
SOIL TESTING LABORATORY

UNCONFINED COMPRESSION TEST

PROJECT : THE STUDY ON SOLID WASTE MANAGEMENT		Length:	70	mm.
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter:	35	mm.
		Area:	962	mm ² .
Test date : 26/10/2003		Mass wet soil	136.45	g.
Borehole No.: BH-1		Unit weight	2.03	g/cm ³
Depth sampling: 2.0 to 2.45m		Load ring const:	2.873	N / div.
		Rate of strain:	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	9.621	0	0
40	14.0	0.4	0.571	0.994	0.994	9.676	0.040	41.567
80	28.0	0.8	1.143	0.989	0.989	9.732	0.080	82.656
120	41.0	1.2	1.714	0.983	0.983	9.789	0.118	120.333
160	51.0	1.6	2.286	0.977	0.977	9.846	0.147	148.612
200	55.0	2.0	2.857	0.971	0.971	9.904	0.158	159.545
240	62.0	2.4	3.429	0.966	0.966	9.963	0.178	176.703
280	66.0	2.8	3.714	0.963	0.963	9.992	0.187	186.889
300	69.0	3.0	4.286	0.957	0.957	10.052	0.198	197.213
320	70.3	3.2	4.571	0.954	0.954	10.082	0.202	203.422
340	71.6	3.4	4.857	0.951	0.951	10.112	0.206	209.678
360	73.0	3.6	5.143	0.949	0.949	10.143	0.210	206.777
380	74.0	3.8	5.429	0.946	0.946	10.173	0.213	208.978
400	74.9	4.0	5.714	0.943	0.943	10.204	0.215	210.881
420	75.7	4.2	6.000	0.940	0.940	10.235	0.217	212.488
440	76.2	4.4	6.286	0.937	0.937	10.266	0.219	213.241
460	76.6	4.6	6.571	0.934	0.934	10.298	0.220	213.707
480	76.9	4.8	6.857	0.931	0.931	10.329	0.221	213.888

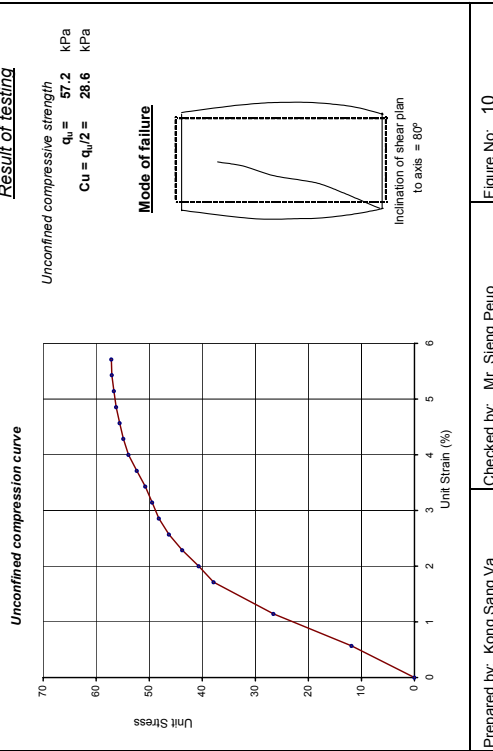


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 9

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
		Area :	962	mm ² .				
Test date : 26/10/2003		Mass wet soil	130.46	g.				
Borehole No: BH-1		Unit weight	1.94	g/cm ³				
Depth sampling: 3.0 to 3.45m		Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.9621	9.621	0	0
40	4.0	0.4	0.571	0.964	9.676	0.011	11.876	11.876
80	9.0	0.8	1.143	0.969	9.732	0.026	26.568	26.568
120	12.9	1.2	1.714	0.983	9.789	0.037	37.881	37.881
140	13.9	1.4	2.000	0.980	9.817	0.040	40.677	40.677
160	15.0	1.6	2.286	0.977	9.846	0.043	43.768	43.768
180	15.9	1.8	2.571	0.974	9.875	0.046	46.259	46.259
200	16.6	2	2.857	0.971	9.904	0.048	48.154	48.154
220	17.1	2.2	3.143	0.969	9.933	0.049	49.458	49.458
240	17.6	2.4	3.429	0.966	9.963	0.051	50.754	50.754
260	18.2	2.6	3.714	0.963	9.992	0.052	52.329	52.329
280	18.8	2.8	4.000	0.960	10.022	0.054	53.894	53.894
300	19.2	3	4.286	0.957	10.052	0.055	54.877	54.877
320	19.5	3.2	4.571	0.954	10.082	0.056	55.568	55.568
340	19.8	3.4	4.857	0.951	10.112	0.057	56.254	56.254
360	20.0	3.6	5.143	0.949	10.143	0.057	56.681	56.681
380	20.2	3.8	5.429	0.946	10.173	0.058	57.045	57.045
400	20.3	4	5.714	0.943	10.204	0.058	57.155	57.155

Result of testing



Prepared by: Kong Sang Va

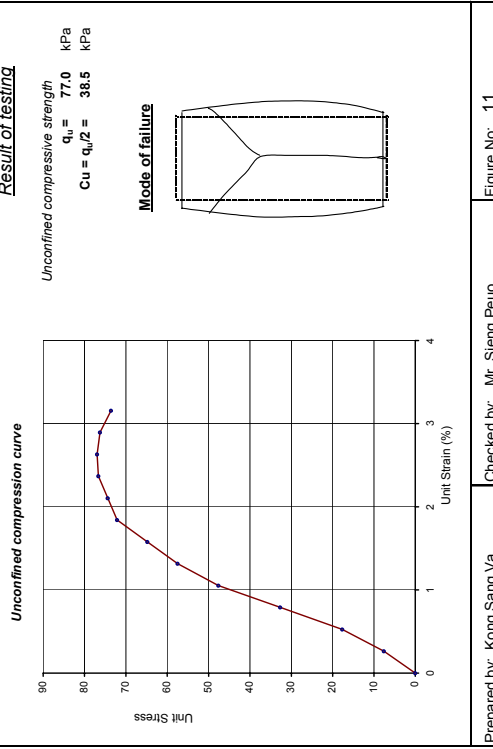
Checked by: Mr. Sieng Peou

Figure No. 10

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.				
		Area :	1134	mm ² .				
Test date : 26/10/2003		Mass wet soil	162.72	g.				
Borehole No: BH-1		Unit weight	1.89	g/cm ³				
Depth sampling: 4.0 to 4.45m		Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.9621	9.621	0	0
20	3.0	0.2	0.263	0.997	11.371	0.009	7.580	7.580
40	7.0	0.4	0.526	0.995	11.401	0.020	17.639	17.639
60	13.0	0.6	0.789	0.992	11.431	0.037	32.672	32.672
80	19.0	0.8	1.053	0.989	11.462	0.055	47.625	47.625
100	23.0	1	1.316	0.987	11.492	0.066	57.488	57.488
120	26.0	1.2	1.579	0.984	11.523	0.075	64.825	64.825
140	29.0	1.4	1.842	0.982	11.554	0.083	72.111	72.111
160	30.0	1.6	2.105	0.979	11.585	0.088	74.398	74.398
180	31.0	1.8	2.368	0.976	11.616	0.089	76.671	76.671
200	31.2	2	2.632	0.974	11.646	0.090	76.958	76.958
220	31.0	2.2	2.895	0.971	11.679	0.089	76.268	76.268
240	30.0	2.4	3.158	0.968	11.711	0.088	73.598	73.598

Result of testing



Prepared by: Kong Sang Va

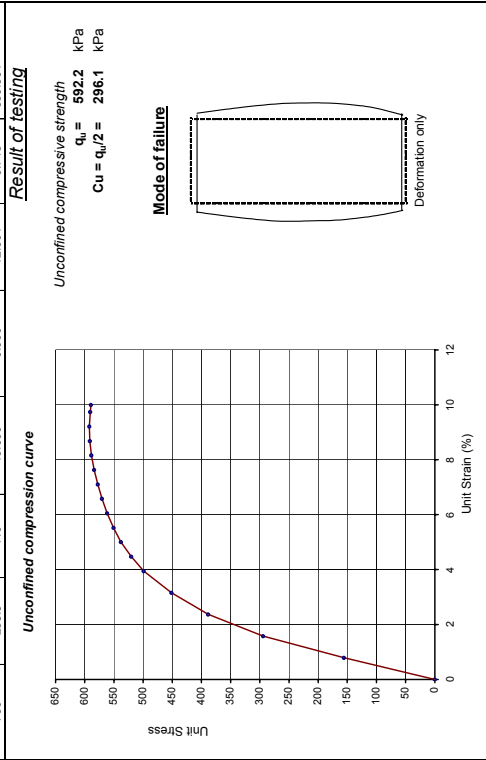
Checked by: Mr. Sieng Peou

Figure No. 11

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA			Diameter :	38	mm.
				Area :	1134	mm ² .
Test date :	26/10/2003	Mass wet soil			175.08	g.
Borehole No:	BH-1	Unit weight			2.03	g/cm ³
Depth sampling:	6.3 to 6.45m	Load ring const:	2.873	N / div.		
		Rate of strain :	2%			

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11.341	0	0
60	62.0	0.6	0.789	0.992	1.1431	0.178	155.822	155.822
120	118.0	1.2	1.579	0.984	11.523	0.339	294.204	294.204
180	157.0	1.8	2.368	0.976	11.616	0.451	388.301	388.301
240	184.0	2.4	3.158	0.968	11.711	0.529	451.939	451.939
300	205.0	3	3.947	0.961	11.807	0.589	498.817	498.817
340	215.0	3.4	4.474	0.955	11.872	0.618	520.283	520.283
380	223.5	3.8	5.000	0.950	11.938	0.642	537.873	537.873
420	230.0	4.2	5.526	0.945	12.005	0.661	550.449	550.449
460	236.0	4.6	6.053	0.939	12.072	0.678	561.662	561.662
500	241.0	5	6.579	0.934	12.140	0.692	570.949	570.949
540	245.5	5.4	7.105	0.929	12.209	0.705	577.725	577.725
580	249.5	5.8	7.632	0.924	12.278	0.717	583.811	583.811
620	253.0	6.2	8.158	0.918	12.349	0.727	588.628	588.628
660	255.5	6.6	8.684	0.913	12.420	0.734	591.038	591.038
700	257.5	7	9.211	0.908	12.492	0.740	592.231	592.231
740	258.3	7.4	9.737	0.903	12.566	0.742	590.627	590.627
760	258.3	7.6	10.000	0.900	12.601	0.743	589.361	589.361

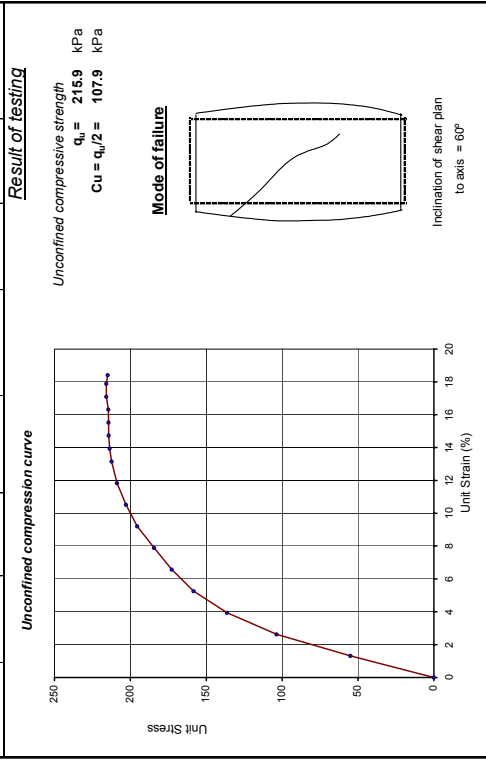


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 12

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA			Diameter :	38	mm.
				Area :	1134	mm ² .
Test date :	26/10/2003	Mass wet soil			176.31	g.
Borehole No:	BH-1	Unit weight			2.05	g/cm ³
Depth sampling:	8.0 to 8.45m	Load ring const:	2.873	N / div.		
		Rate of strain :	2%			

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11.341	0	0
100	22.0	1	1.316	0.987	11.462	0.063	54.988	54.988
200	42.0	2	2.632	0.974	11.648	0.121	103.937	103.937
300	56.0	3	3.947	0.961	11.807	0.161	136.262	136.262
400	66.0	4	5.263	0.947	11.971	0.190	158.395	158.395
500	73.0	5	6.579	0.934	12.140	0.210	172.761	172.761
600	79.0	6	7.895	0.921	12.313	0.227	184.327	184.327
700	85.0	7	9.211	0.908	12.492	0.244	195.494	195.494
800	89.5	8	10.526	0.895	12.675	0.257	202.860	202.860
900	93.5	9	11.842	0.882	12.865	0.269	208.810	208.810
1000	96.5	10	13.158	0.868	13.060	0.277	212.293	212.293
1060	98.0	10.6	13.947	0.861	13.179	0.282	213.633	213.633
1120	99.2	11.2	14.737	0.853	13.301	0.285	214.265	214.265
1180	100.2	11.8	15.526	0.845	13.426	0.288	214.421	214.421
1240	101.2	12.4	16.316	0.837	13.552	0.291	214.537	214.537
1300	102.8	13	17.105	0.829	13.681	0.295	215.673	215.673
1360	103.8	13.6	17.895	0.821	13.813	0.296	215.897	215.897
1400	104	14	18.421	0.816	13.92	0.299	214.927	214.927

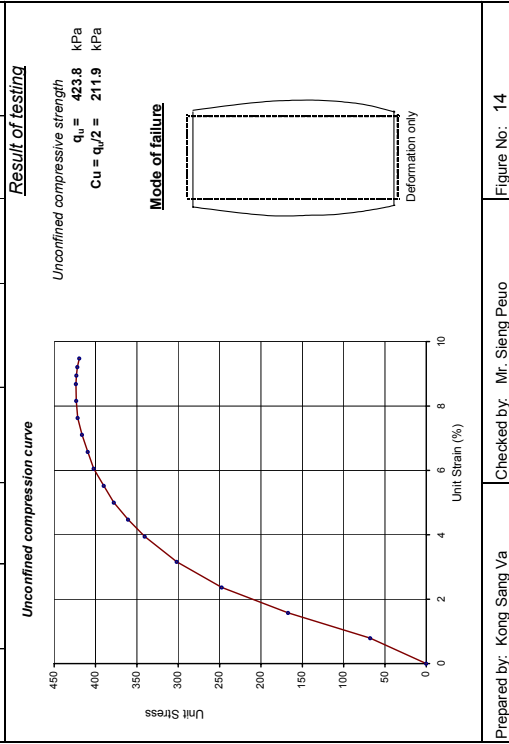


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 13

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter:	38	mm.
			Area :	1134	mm ² .
Test date :	26/10/2003	Mass wet soil	181.68	g	
Borehole No:	BH-1	Unit weight	2.11	g/cm ³	
Depth sampling:	9.0 to 9.45m	Load ring const:	2.873	N / div.	
		Rate of strain:	2%		

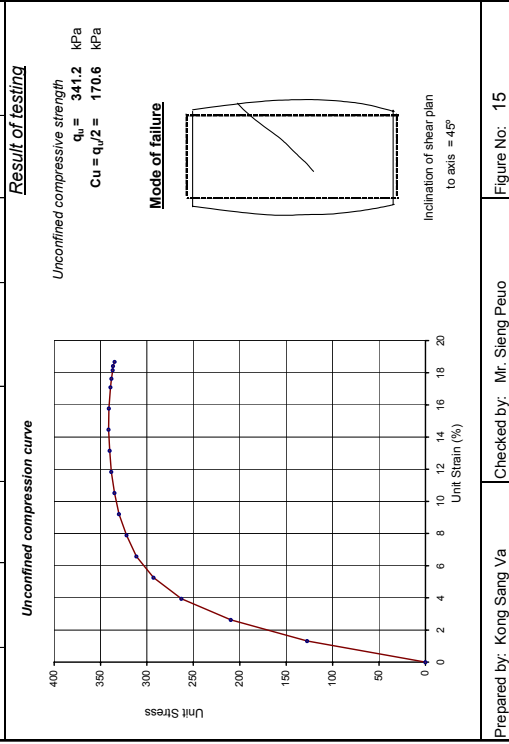
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
60	27.0	0.6	0.789	0.992	11.431	0.078	67.858
120	67.0	1.2	1.579	0.984	11.523	0.192	167.048
180	100.0	1.8	2.368	0.976	11.616	0.287	247.325
240	123.0	2.4	3.158	0.968	11.711	0.353	301.750
300	140.0	3	3.947	0.961	11.807	0.402	340.656
340	149.0	3.4	4.474	0.955	11.872	0.428	360.569
380	157.0	3.8	5.000	0.950	11.938	0.451	377.835
420	163.0	4.2	5.526	0.945	12.005	0.468	390.101
460	169.0	4.6	6.053	0.939	12.072	0.486	402.207
500	173.0	5	6.579	0.934	12.140	0.497	409.420
540	177.0	5.4	7.105	0.929	12.209	0.509	416.527
580	180.2	5.8	7.632	0.924	12.278	0.518	421.655
620	182.0	6.2	8.158	0.918	12.348	0.523	423.440
660	183.2	6.6	8.684	0.913	12.420	0.526	423.789
680	183.5	6.8	8.947	0.911	12.456	0.527	423.260
700	183.5	7	9.211	0.908	12.492	0.527	422.037
720	183	7.2	9.474	0.905	12.528	0.526	419.687



UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter:	38	mm.
			Area :	1134	mm ² .
Test date :	26/10/2003	Mass wet soil	174.42	g	
Borehole No:	BH-1	Unit weight	2.02	g/cm ³	
Depth sampling:	14.0 to 14.45m	Load ring const:	2.873	N / div.	
		Rate of strain:	2%		

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
100	51.0	1	1.316	0.987	11.432	0.147	127.496
200	85.0	2	2.632	0.974	11.648	0.244	209.660
300	108.0	3	3.947	0.961	11.807	0.310	263.792
400	122.0	4	5.263	0.947	11.971	0.351	292.791
500	131.5	5	6.579	0.934	12.140	0.378	311.207
600	138.0	6	7.895	0.921	12.313	0.396	321.990
700	143.5	7	9.211	0.908	12.492	0.412	330.040
800	147.8	8	10.526	0.895	12.675	0.425	335.003
900	151.5	9	11.842	0.882	12.865	0.435	338.339
1000	154.6	10	13.158	0.868	13.060	0.444	340.109
1100	157.5	11	14.474	0.855	13.260	0.452	341.239
1200	159.8	12	15.789	0.842	13.468	0.459	340.896
1300	161.5	13	17.105	0.829	13.681	0.464	339.139
1340	162.1	13.4	17.632	0.824	13.769	0.466	338.238
1380	162.5	13.8	18.158	0.818	13.857	0.467	336.906
1400	162.8	14	18.421	0.816	13.921	0.468	336.443
1420	162.5	14.2	18.684	0.813	13.947	0.467	334.739

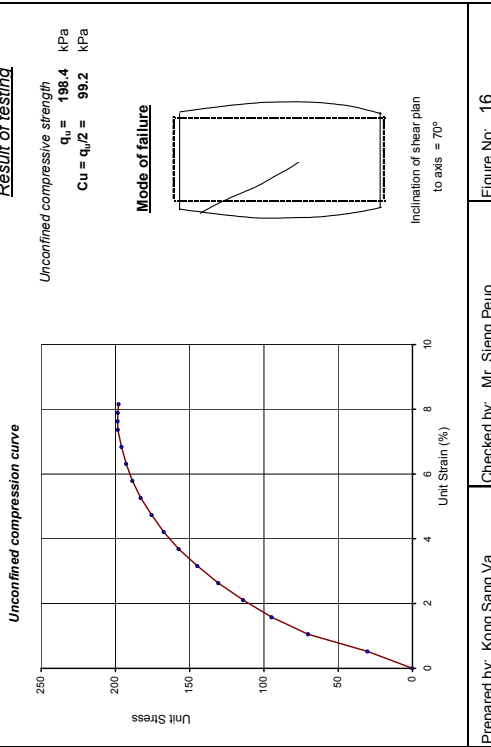


UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.
			Area :	1134	mm ² .
Test date :	26/10/2003	BH-1	Mass wet soil	173.19	g
Borehole No:	BH-1		Unit weight	2.01	g/cm ³
Depth sampling:	15.0 to 15.45m		Load ring const:	2.873	N / div.
			Rate of strain :	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpca)
0	0	0	0.000	1.000	1.000	11.341	0	0
40	12.0	0.4	0.526	0.995	11.401	0.034	30.239	30.239
80	28.0	0.8	1.053	0.989	11.462	0.080	70.184	70.184
120	38.0	1.2	1.579	0.984	11.523	0.109	94.744	94.744
160	46.0	1.6	2.105	0.979	11.585	0.132	114.076	114.076
200	53.0	2	2.632	0.974	11.648	0.152	130.729	130.729
240	59.0	2.4	3.158	0.968	11.711	0.170	144.742	144.742
280	64.5	2.8	3.684	0.963	11.775	0.185	157.375	157.375
320	69.0	3.2	4.211	0.958	11.840	0.198	167.435	167.435
360	72.8	3.6	4.737	0.953	11.905	0.209	175.685	175.685
400	76.2	4	5.263	0.947	11.971	0.219	182.874	182.874
440	79.0	4.4	5.789	0.942	12.038	0.227	188.541	188.541
480	81.2	4.8	6.316	0.937	12.106	0.233	192.709	192.709
520	83.0	5.2	6.842	0.932	12.174	0.238	195.874	195.874
560	84.5	5.6	7.368	0.926	12.243	0.243	198.287	198.287
580	84.8	5.8	7.632	0.924	12.278	0.244	198.426	198.426
600	85.0	6	7.895	0.921	12.313	0.244	198.527	198.527
620	85	6.2	8.158	0.918	12.349	0.244	197.760	197.760

Result of testing



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

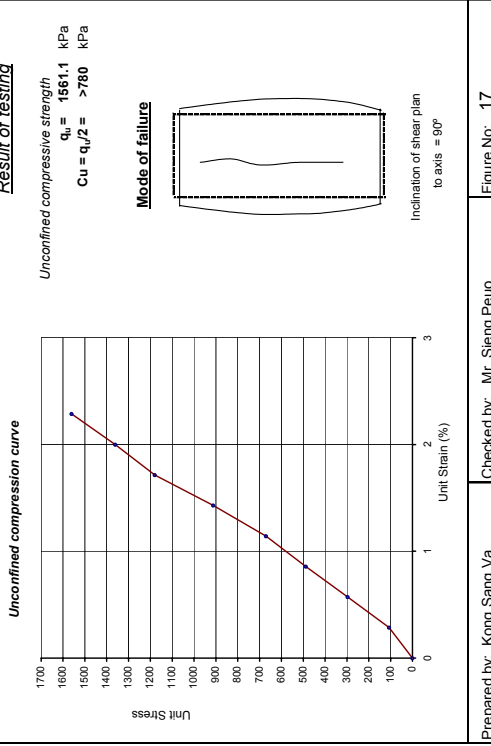
Figure No. 16

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.
			Area :	962	mm ² .
Test date :	26/10/2003	BH-2	Mass wet soil	144.43	g
Borehole No:	BH-2		Unit weight	2.14	g/cm ³
Depth sampling:	1.0 to 1.45m		Load ring const:	2.873	N / div.
			Rate of strain :	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpca)
0	0	0	0.000	1.000	1.000	9.621	0	0
20	36.0	0.2	0.286	0.997	9.649	0.103	107.184	107.184
40	100.0	0.4	0.571	0.994	9.676	0.287	296.907	296.907
60	165.0	0.6	0.857	0.991	9.704	0.474	488.489	488.489
80	227.0	0.8	1.143	0.989	9.732	0.652	670.106	670.106
100	310.0	1	1.429	0.986	9.761	0.891	912.478	912.478
120	402.0	1.2	1.714	0.983	9.789	1.155	1179.648	1179.648
140	465.0	1.4	2.000	0.980	9.817	1.336	1360.782	1360.782
160	535.0	1.6	2.286	0.977	9.846	1.537	1561.067	1561.067

Result of testing



Prepared by: Kong Sang Va

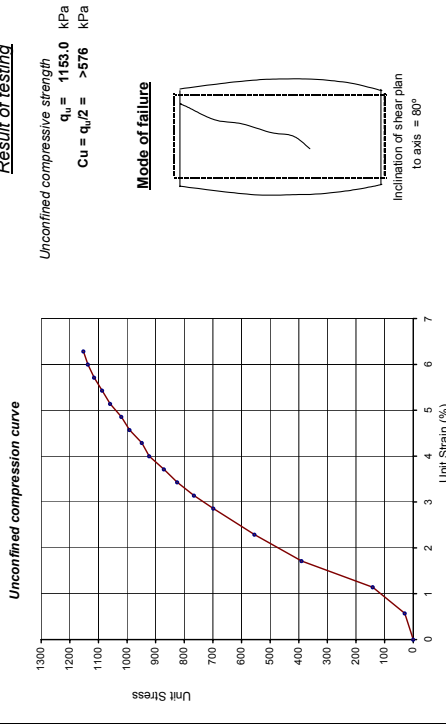
Checked by: Mr. Sieng Peou

Figure No. 17

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
		Area :	962	mm ² .				
Test date :	26/10/2003	Mass wet soil	141.84	g				
Borehole No:	BH-2	Unit weight	2.11	g/cm ³				
Depth sampling:	2.0 to 2.45m	Load ring const:	2.873	N / div.				
		Rate of strain:	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	9.621	0	0	0
40	10.0	0.4	0.571	0.994	9.676	0.029	29.691	8.907
80	48.0	0.8	1.143	0.989	9.732	0.138	141.696	8.907
120	133.0	1.2	1.714	0.983	9.789	0.382	390.348	8.907
160	190.0	1.6	2.286	0.977	9.846	0.546	554.388	8.907
200	241.0	2	2.857	0.971	9.904	0.692	695.097	8.907
220	265.0	2.2	3.143	0.969	9.933	0.761	766.456	8.907
240	286.0	2.4	3.429	0.966	9.963	0.822	824.754	8.907
260	303.0	2.6	3.714	0.963	9.992	0.871	871.193	8.907
280	322.0	2.8	4.000	0.960	10.022	0.925	923.075	8.907
300	332.0	3	4.286	0.957	10.062	0.964	949.969	8.907
320	348.0	3.2	4.571	0.954	10.082	1.000	991.670	8.907
340	359.0	3.4	4.857	0.951	10.112	1.031	1019.953	8.907
360	374.0	3.6	5.143	0.949	10.143	1.075	1059.379	8.907
380	385.0	3.8	5.429	0.946	10.173	1.106	1097.252	8.907
400	398.0	4	5.714	0.943	10.204	1.138	1144.938	8.907
420	405.0	4.2	6.000	0.940	10.235	1.164	1136.822	8.907
440	412	4.4	6.286	0.937	10.266	1.184	1152.958	8.907

Result of testing



Prepared by: Kong Sang Va

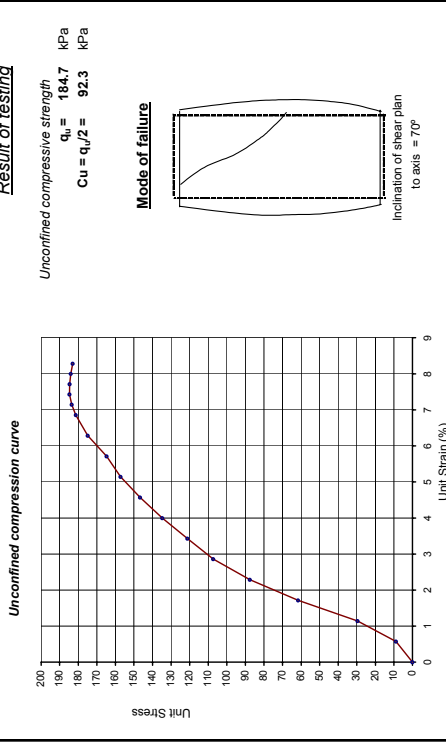
Checked by: Mr. Sieng Peou

Figure No: 18

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
		Area :	962	mm ² .				
Test date :	26/10/2003	Mass wet soil	137.33	g				
Borehole No:	BH-2	Unit weight	2.04	g/cm ³				
Depth sampling:	3.0 to 3.45m	Load ring const:	2.873	N / div.				
		Rate of strain:	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	9.621	0	0	0
40	3.0	0.4	0.571	0.994	9.676	0.009	8.907	8.907
80	10.0	0.8	1.143	0.989	9.732	0.029	29.520	8.907
120	21.0	1.2	1.714	0.983	9.789	0.060	61.634	8.907
160	30.0	1.6	2.286	0.977	9.846	0.086	87.536	8.907
200	37.0	2	2.857	0.971	9.904	0.106	107.330	8.907
240	42.0	2.4	3.429	0.966	9.963	0.121	121.118	8.907
280	47.0	2.8	4.000	0.960	10.022	0.135	134.734	8.907
320	51.5	3.2	4.571	0.954	10.082	0.148	146.756	8.907
360	55.5	3.6	5.143	0.949	10.143	0.159	157.207	8.907
400	58.5	4	5.714	0.943	10.204	0.168	164.707	8.907
440	62.5	4.4	6.286	0.937	10.266	0.174	174.902	8.907
480	65.2	4.8	6.857	0.931	10.329	0.187	181.346	8.907
500	66.2	5	7.143	0.929	10.361	0.190	183.562	8.907
520	66.8	5.2	7.429	0.926	10.393	0.192	184.656	8.907
540	67.0	5.4	7.714	0.923	10.425	0.192	184.637	8.907
560	67.0	5.6	8.000	0.920	10.458	0.192	184.085	8.907
580	66.8	5.8	8.286	0.917	10.490	0.192	182.946	8.907

Result of testing



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

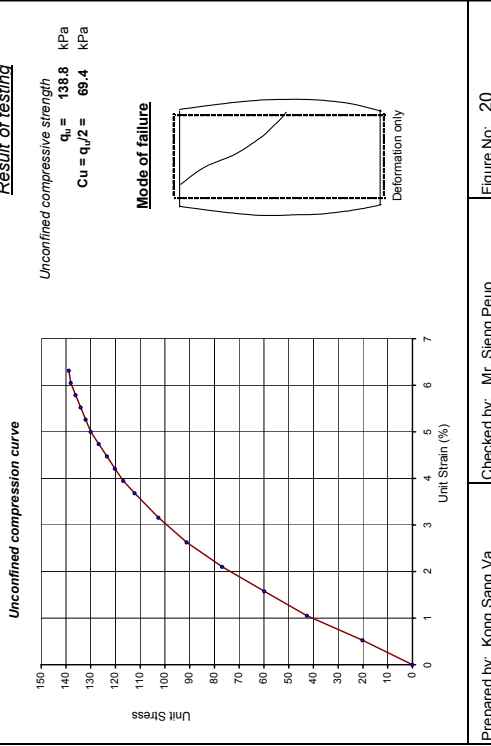
Figure No: 19

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.
			Area :	1134	mm ² .
Test date :	26/10/2003	Mass wet soil	168.90	g.	
Borehole No:	BH-2	Unit weight	1.96	g/cm ³	
Depth sampling:	4.0 to 4.45m	Load ring const:	2.873	N / div.	
		Rate of strain :	2%		

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11.341	0	0
40	8.0	0.4	0.526	0.995	1.1401	11.401	0.023	20.159
80	17.0	0.8	1.053	0.989	11.462	11.462	0.049	42.612
120	24.0	1.2	1.579	0.984	11.523	11.523	0.069	59.838
160	31.0	1.6	2.105	0.979	11.585	11.585	0.089	76.878
200	37.0	2	2.632	0.974	11.648	11.648	0.106	91.264
240	41.8	2.4	3.158	0.968	11.711	11.711	0.120	102.546
280	46.0	2.8	3.684	0.963	11.775	11.775	0.132	112.236
300	48.0	3	3.947	0.961	11.807	11.807	0.138	116.796
320	49.5	3.2	4.211	0.958	11.840	11.840	0.142	120.116
340	51.0	3.4	4.474	0.955	11.872	11.872	0.147	123.416
360	52.5	3.6	4.737	0.953	11.905	11.905	0.151	126.696
380	54.0	3.8	5.000	0.950	11.938	11.938	0.155	129.956
400	55.0	4	5.263	0.947	11.971	11.971	0.158	131.986
420	56.0	4.2	5.526	0.945	12.005	12.005	0.161	134.022
440	57.0	4.4	5.789	0.942	12.038	12.038	0.164	136.036
460	58.0	4.6	6.053	0.939	12.072	12.072	0.167	138.036
480	59.5	4.8	6.316	0.937	12.106	12.106	0.168	138.836

Result of testing



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

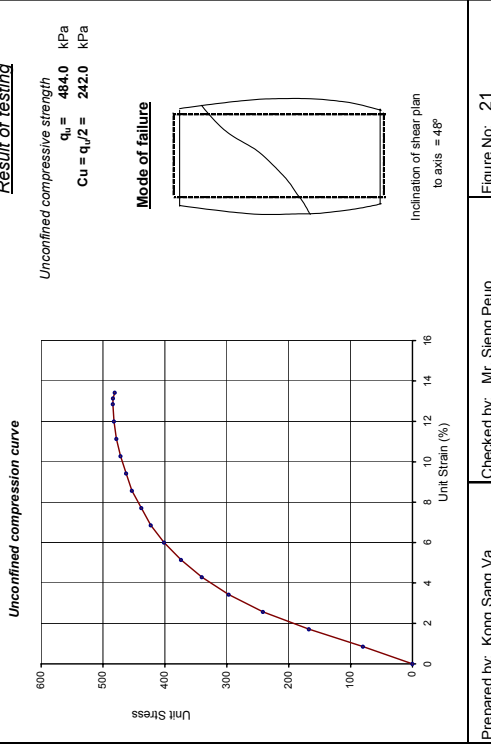
Figure No. 20

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.
			Area :	962	mm ² .
Test date :	26/10/2003	Mass wet soil	140.87	g.	
Borehole No:	BH-2	Unit weight	2.09	g/cm ³	
Depth sampling:	5.0 to 5.45m	Load ring const:	2.873	N / div.	
		Rate of strain :	2%		

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	9.621	0	0
60	27.0	0.6	0.857	0.991	9.704	9.704	0.078	79.935
120	57.0	1.2	1.714	0.983	9.789	9.789	0.164	167.292
180	83.0	1.8	2.571	0.974	9.875	9.875	0.238	241.476
240	103.0	2.4	3.429	0.966	9.963	9.963	0.296	297.027
300	119.0	3	4.286	0.957	10.052	10.052	0.342	340.121
360	132.0	3.6	5.143	0.949	10.143	10.143	0.379	373.888
420	143.0	4.2	6.000	0.940	10.235	10.235	0.411	407.396
480	152.0	4.8	6.857	0.931	10.329	10.329	0.437	422.769
540	159.0	5.4	7.714	0.923	10.425	10.425	0.457	438.169
600	166.0	6	8.571	0.914	10.523	10.523	0.477	453.210
660	171.0	6.6	9.429	0.906	10.623	10.623	0.491	462.484
720	176.0	7.2	10.286	0.897	10.724	10.724	0.506	471.502
780	180.2	7.8	11.143	0.889	10.828	10.828	0.518	478.142
840	183.5	8.4	12.000	0.880	10.933	10.933	0.527	482.201
900	186.0	9	12.857	0.871	11.041	11.041	0.534	484.010
920	186.5	9.2	13.143	0.869	11.077	11.077	0.536	483.720
940	186	9.4	13.429	0.866	11.114	11.114	0.534	480.836

Result of testing



Prepared by: Kong Sang Va

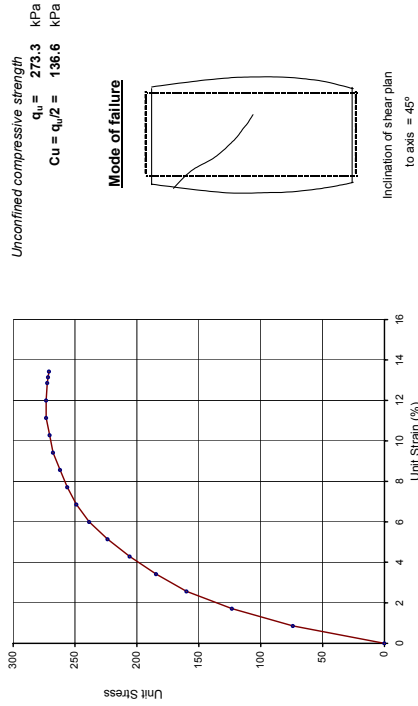
Checked by: Mr. Sieng Peou

Figure No. 21

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
Test date : 28/10/2003		Area :	962	mm ² .				
Borehole No: BH-2		Mass wet soil	140.51	g				
Depth sampling: 6.0 to 6.45m		Unit weight	2.09	g/cm ³				
Load ring const:		2.873	N / div.					
Rate of strain:		2%						
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.999	9.621	0	0
60	25.0	0.6	0.857	0.991	0.974	9.704	0.072	74.014
120	42.0	1.2	1.714	0.983	0.979	9.789	0.121	123.268
180	55.0	1.8	2.571	0.974	0.974	9.875	0.158	160.014
240	64.0	2.4	3.429	0.966	0.966	9.963	0.184	184.560
300	72.0	3	4.286	0.957	0.957	10.052	0.207	205.787
360	79.0	3.6	5.143	0.949	0.949	10.143	0.227	223.773
420	85.0	4.2	6.000	0.940	0.940	10.235	0.244	238.592
480	89.5	4.8	6.857	0.931	0.931	10.329	0.257	248.933
540	93.0	5.4	7.714	0.923	0.923	10.425	0.267	256.287
600	96.0	6	8.571	0.914	0.914	10.523	0.276	262.097
660	99.0	6.6	9.429	0.906	0.906	10.623	0.284	267.754
720	101.0	7.2	10.286	0.897	0.897	10.724	0.290	270.578
780	103.0	7.8	11.143	0.889	0.889	10.828	0.296	273.300
840	104.0	8.4	12.000	0.880	0.880	10.933	0.299	273.291
900	104.7	9	12.857	0.871	0.871	11.041	0.301	272.451
920	104.8	9.2	13.143	0.869	0.869	11.077	0.301	271.817
940	104.8	9.4	13.429	0.866	0.866	11.114	0.301	270.923

Result of testing



Prepared by: Kong Sang Va

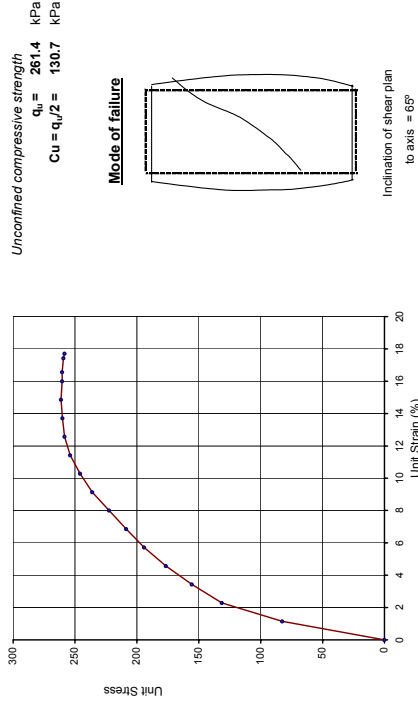
Checked by: Mr. Sieng Peou

Figure No: 22

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
Test date : 28/10/2003		Area :	962	mm ² .				
Borehole No: BH-2		Mass wet soil	137.86	g				
Depth sampling: 7.0 to 7.45m		Unit weight	2.05	g/cm ³				
Load ring const:		2.873	N / div.					
Rate of strain:		2%						
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.999	9.621	0	0
80	28.0	0.8	1.143	0.989	0.989	9.732	0.080	82.656
160	45.0	1.6	2.286	0.977	0.977	9.846	0.129	131.305
240	54.0	2.4	3.429	0.966	0.966	9.963	0.155	155.723
320	62.0	3.2	4.571	0.954	0.954	10.082	0.178	176.677
400	69.0	4	5.714	0.943	0.943	10.204	0.198	194.270
480	75.0	4.8	6.857	0.931	0.931	10.329	0.215	208.603
560	81.0	5.6	8.000	0.920	0.920	10.458	0.233	222.527
640	87.0	6.4	9.143	0.909	0.909	10.589	0.250	236.041
720	91.8	7.2	10.286	0.897	0.897	10.724	0.264	245.931
800	96.0	8	11.429	0.886	0.886	10.863	0.276	253.907
880	99.0	8.8	12.571	0.874	0.874	11.005	0.284	258.463
960	101.0	9.6	13.714	0.863	0.863	11.150	0.290	260.238
1040	102.8	10.4	14.857	0.851	0.851	11.300	0.295	261.367
1120	103.8	11.2	16.000	0.840	0.840	11.454	0.298	260.367
1160	104.5	11.6	16.571	0.834	0.834	11.532	0.300	260.340
1220	105.2	12.2	17.429	0.826	0.826	11.622	0.302	259.591
1240	105.2	12.4	17.714	0.823	0.823	11.692	0.302	258.464

Result of testing



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

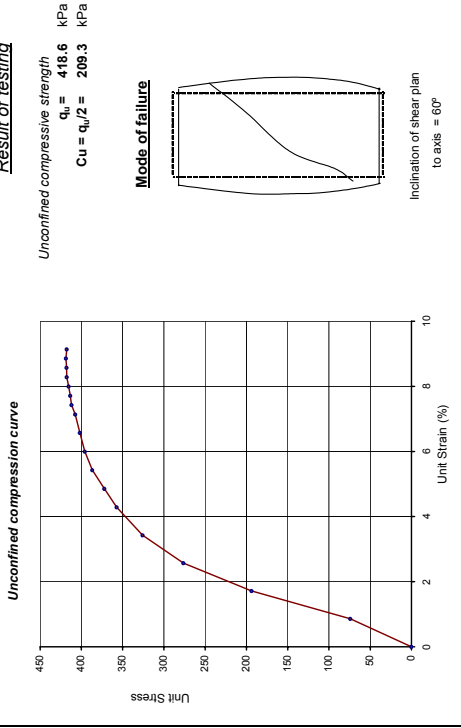
Figure No: 23

UNCONFINED COMPRESSION TEST

PROJECT :	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	70	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA			Diameter :	35	mm.
Test date :	26/10/2003			Area :	962	mm ² .
Borehole No.:	BH-2			Mass wet soil	138.96	g.
Depth sampling:	8.0 to 8.45m			Unit weight	2.06	g/cm ³
				Load ring const:	2.873	N / div.
				Rate of strain :	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.999	9.621	0	0
60	25.0	0.6	0.857	0.991	0.974	9.704	0.072	74.014
120	66.0	1.2	1.714	0.983	0.979	9.789	0.190	193.706
180	95.0	1.8	2.571	0.974	0.974	9.875	0.273	276.988
240	113.0	2.4	3.429	0.966	0.966	9.963	0.325	325.864
300	125.0	3	4.286	0.957	0.957	10.052	0.359	357.270
340	131.0	3.4	4.857	0.951	0.951	10.112	0.376	372.184
380	137.0	3.8	5.429	0.946	0.946	10.173	0.394	386.892
420	141.0	4.2	6.000	0.940	0.940	10.235	0.405	395.783
460	144.0	4.6	6.571	0.934	0.934	10.298	0.414	401.746
500	147.0	5	7.143	0.929	0.929	10.361	0.422	407.668
520	149.0	5.2	7.429	0.926	0.926	10.393	0.428	411.862
540	150.0	5.4	7.714	0.923	0.923	10.425	0.431	413.887
560	151.2	5.6	8.000	0.920	0.920	10.456	0.434	415.384
580	152.5	5.8	8.286	0.917	0.917	10.490	0.438	417.654
600	153.1	6	8.571	0.914	0.914	10.523	0.440	417.981
620	153.8	6.2	8.857	0.911	0.911	10.556	0.442	418.590
640	154	6.4	9.143	0.909	0.909	10.589	0.442	417.820

Result of testing



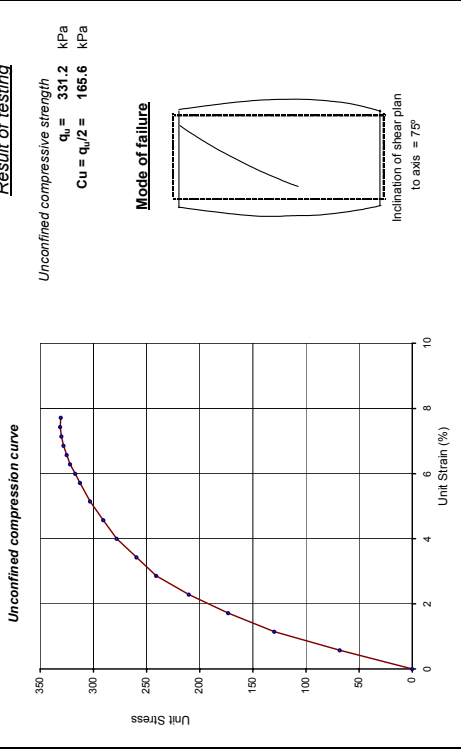
Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 24

UNCONFINED COMPRESSION TEST

PROJECT :	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	70	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA			Diameter :	35	mm.
Test date :	26/10/2003			Area :	962	mm ² .
Borehole No.:	BH-2			Mass wet soil	138.55	g.
Depth sampling:	9.0 to 9.45m			Unit weight	2.06	g/cm ³
				Load ring const:	2.873	N / div.
				Rate of strain :	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.999	9.621	0	0
40	23.0	0.4	0.571	0.994	0.976	9.676	0.066	68.289
80	44.0	0.8	1.143	0.989	0.972	9.732	0.126	129.888
120	59.0	1.2	1.714	0.983	0.969	9.789	0.170	173.162
160	72.0	1.6	2.286	0.977	0.966	9.846	0.207	210.888
200	83.0	2	2.857	0.971	0.964	9.904	0.238	240.768
240	90.0	2.4	3.429	0.966	0.962	9.963	0.259	259.538
280	97.0	2.8	4.000	0.960	0.958	10.022	0.279	278.069
320	102.0	3.2	4.571	0.954	0.954	10.082	0.293	290.682
360	107.0	3.6	5.143	0.949	0.949	10.143	0.307	303.084
400	111.0	4	5.714	0.943	0.943	10.204	0.319	312.921
420	113.0	4.2	6.000	0.940	0.940	10.235	0.325	317.187
440	115.0	4.4	6.286	0.937	0.937	10.266	0.330	321.820
460	116.5	4.6	6.571	0.934	0.934	10.298	0.335	325.024
480	118.0	4.8	6.857	0.931	0.931	10.329	0.339	328.202
500	119.0	5	7.143	0.929	0.929	10.361	0.342	329.868
520	119.8	5.2	7.429	0.926	0.926	10.393	0.344	331.164
540	120	5.4	7.714	0.923	0.923	10.425	0.345	330.863

Result of testing



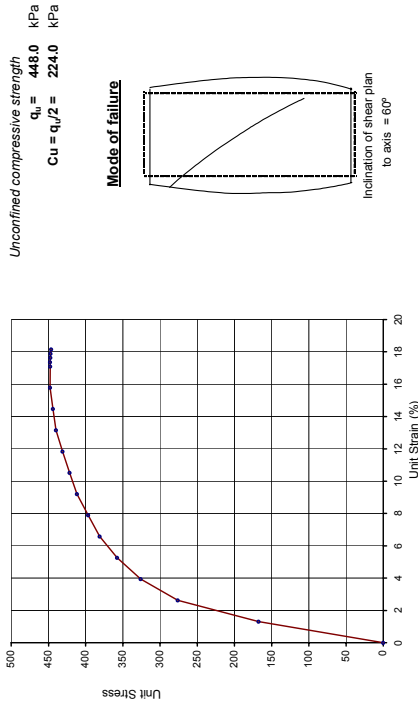
Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 25

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.
			Area :	1134	mm ² .
Test date :	26/10/2003	Unit weight	179.38	g	
Borehole No:	BH-2	Load ring const:	2.873	N / div.	
Depth sampling:	10.3 to 10.45m		Rate of strain:	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
100	67.0	1	1.316	0.987	11.492	0.192	167.495
200	112.0	2	2.632	0.974	11.648	0.322	276.258
300	134.0	3	3.947	0.961	11.807	0.385	326.056
400	149.0	4	5.263	0.947	11.971	0.428	357.589
500	161.0	5	6.579	0.934	12.140	0.463	381.021
600	170.0	6	7.895	0.921	12.313	0.488	396.654
700	179.0	7	9.211	0.908	12.492	0.514	411.687
800	186.0	8	10.526	0.895	12.675	0.534	421.587
900	193.0	9	11.842	0.882	12.865	0.554	431.020
1000	200.0	10	13.158	0.868	13.060	0.575	439.886
1100	205.0	11	14.474	0.855	13.260	0.589	444.163
1200	210.0	12	15.789	0.842	13.468	0.603	447.986
1300	213.2	13	17.105	0.829	13.681	0.613	447.706
1320	214.0	13.2	17.368	0.826	13.725	0.615	447.959
1340	214.5	13.4	17.632	0.824	13.769	0.616	447.576
1360	215.0	13.6	17.895	0.821	13.813	0.616	447.186
1380	215.2	13.8	18.158	0.818	13.857	0.618	446.167

Result of testing



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

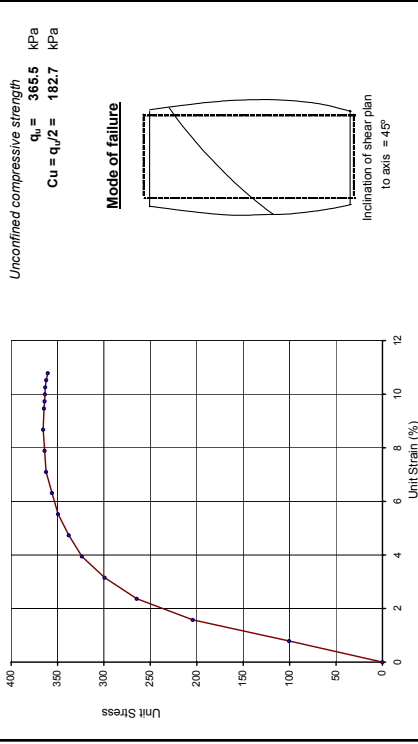
Figure No. 26

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.
			Area :	1134	mm ² .
Test date :	26/10/2003	Unit weight	166.40	g	
Borehole No:	BH-2	Load ring const:	2.873	N / div.	
Depth sampling:	11.0 to 11.45m		Rate of strain:	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
60	40.0	0.6	0.769	0.992	11.431	0.115	100.530
120	82.0	1.2	1.579	0.984	11.523	0.236	204.447
180	107.0	1.8	2.368	0.976	11.616	0.307	264.638
240	122.0	2.4	3.158	0.968	11.711	0.351	299.297
300	133.0	3	3.947	0.961	11.807	0.382	333.623
360	140.0	3.6	4.737	0.953	11.905	0.402	337.856
420	146.0	4.2	5.526	0.945	12.005	0.419	349.416
480	150.0	4.8	6.316	0.937	12.106	0.431	355.989
540	154.0	5.4	7.105	0.929	12.209	0.442	362.402
600	156.0	6	7.895	0.921	12.313	0.448	365.988
660	158.0	6.6	8.684	0.913	12.420	0.454	365.495
720	159.0	7.2	9.474	0.905	12.528	0.457	364.628
740	159.2	7.4	9.737	0.903	12.565	0.457	364.026
760	159.5	7.6	10.000	0.900	12.601	0.459	363.648
780	159.8	7.8	10.263	0.897	12.638	0.459	363.267
800	159.8	8	10.526	0.895	12.675	0.459	362.202
820	159.5	8.2	10.789	0.892	12.713	0.458	360.459

Result of testing



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

Figure No. 27

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.				
		Area :	1134	mm ² .				
Test date :	26/10/2003	Mass wet soil	166.40	g.				
Borehole No:	BH-2	Unit weight	1.93	g/cm ³				
Depth sampling:	12.0 to 12.46m	Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11.341	0	0
20	9.0	0.2	0.263	0.997	1.1371	0.026	22.736	
40	18.0	0.4	0.526	0.995	11.401	0.052	45.359	
60	35.0	0.6	0.789	0.992	11.431	0.101	87.984	
80	51.0	0.8	1.053	0.989	11.462	0.147	127.636	
100	68.0	1	1.316	0.987	11.492	0.195	169.995	
120	84.0	1.2	1.579	0.984	11.523	0.241	208.433	
140	100.0	1.4	1.842	0.982	11.554	0.287	248.659	
160	115.0	1.6	2.105	0.979	11.585	0.330	285.191	
180	125.0	1.8	2.368	0.976	11.616	0.359	309.157	
200	135.0	2	2.632	0.974	11.646	0.388	332.989	
220	142.0	2.2	2.895	0.971	11.679	0.408	346.309	
240	147.0	2.4	3.158	0.968	11.711	0.422	360.629	
260	152.0	2.6	3.421	0.966	11.743	0.437	371.882	
280	155.0	2.8	3.684	0.963	11.775	0.445	378.188	
300	157.0	3	3.947	0.961	11.807	0.451	382.021	
320	156.0	3.2	4.211	0.958	11.840	0.448	376.548	
340	154.5	3.4	4.474	0.955	11.872	0.444	373.878	

Result of testing

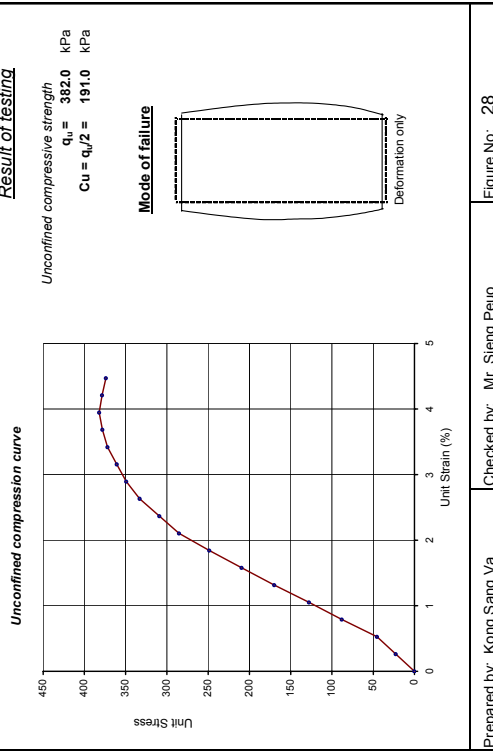


Figure No.: 28

Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.				
		Area :	1134	mm ² .				
Test date :	26/10/2003	Mass wet soil	172.01	g.				
Borehole No:	BH-2	Unit weight	2.00	g/cm ³				
Depth sampling:	14.0 to 14.45m	Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11.341	0	0
20	20	0.2	0.263	0.997	11.371	0.014	12.633	
40	30.0	0.4	0.526	0.995	11.401	0.066	25.598	
60	40	0.6	0.789	0.992	11.431	0.224	49.034	
80	50	0.8	1.053	0.989	11.462	0.310	72.711	
100	60	1	1.316	0.987	11.492	0.382	93.468	
120	70	1.2	1.579	0.984	11.523	0.442	115.961	
140	80	1.4	1.842	0.982	11.554	0.497	140.180	
160	90	1.6	2.105	0.979	11.585	0.552	166.145	
180	100	1.8	2.368	0.976	11.616	0.589	193.017	
200	110	2	2.632	0.974	11.646	0.626	221.716	
220	120	2.2	2.895	0.971	11.679	0.662	252.402	
240	130	2.4	3.158	0.968	11.711	0.672	284.062	
260	140	2.6	3.421	0.966	11.743	0.687	316.735	
280	150	2.8	3.684	0.963	11.775	0.695	350.461	
300	160	3	3.947	0.961	11.807	0.692	385.145	
320	165	3.2	4.211	0.958	11.840	0.684	420.928	
340	170	3.4	4.474	0.955	11.872	0.678	457.102	

Result of testing

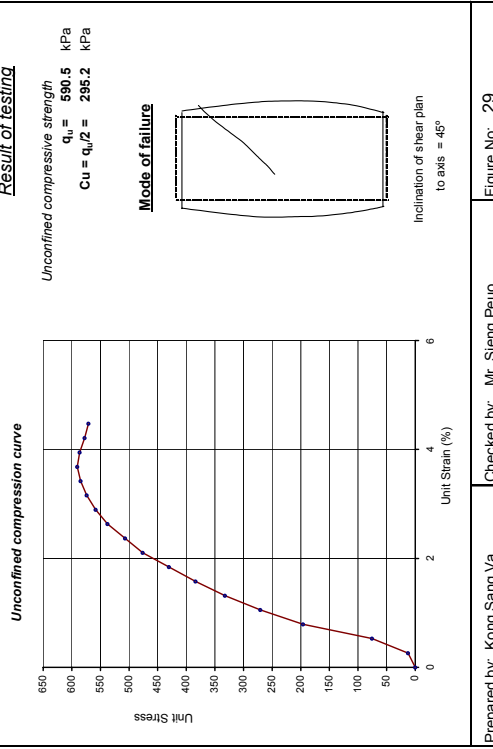


Figure No.: 29

Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

UNCONFINED COMPRESSION TEST

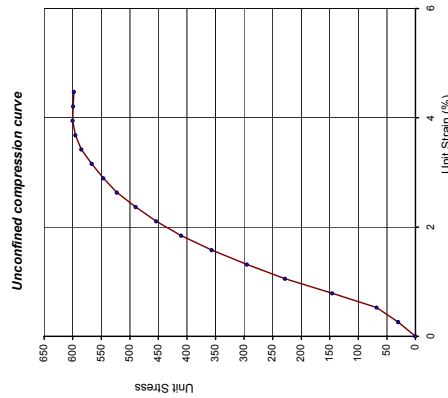
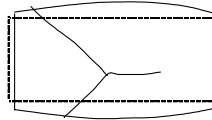
PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA			Diameter :	38	mm.
				Area :	1134	mm ² .
Test date :	26/10/2003	Mass wet soil	176.22	g.		
Borehole No:	BH-2	Unit weight	2.04	g/cm ³		
Depth sampling:	15.0 to 15.46m			Load ring const:	2.873	N / div.
				Rate of strain :	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11.341	0	0
20	12.0	0.2	0.263	0.997	1.1371	0.034	30.319	
40	27.0	0.4	0.526	0.995	11.401	0.078	68.038	
60	58.0	0.6	0.789	0.992	11.431	0.167	145.769	
80	91.0	0.8	1.053	0.989	11.462	0.261	228.099	
100	118.0	1	1.316	0.987	11.492	0.339	294.991	
120	143.0	1.2	1.579	0.984	11.523	0.411	356.535	
140	165.0	1.4	1.842	0.982	11.554	0.474	410.287	
160	183.0	1.6	2.105	0.979	11.585	0.526	463.826	
180	198.0	1.8	2.368	0.976	11.616	0.569	489.704	
200	212.0	2	2.632	0.974	11.646	0.609	522.917	
220	222.0	2.2	2.895	0.971	11.679	0.638	546.103	
240	231.0	2.4	3.158	0.968	11.711	0.664	566.702	
260	239.0	2.6	3.421	0.966	11.743	0.687	584.735	
280	244.0	2.8	3.684	0.963	11.775	0.701	595.341	
300	246.5	3	3.947	0.961	11.807	0.708	599.398	
320	247.0	3.2	4.211	0.958	11.840	0.710	599.388	
340	247	3.4	4.474	0.955	11.872	0.710	597.721	

Result of testing

Unconfined compressive strength
 $q_u = 599.8$ kPa
 $Cu = q_u/2 = 299.9$ kPa

Mode of failure



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

Figure No.: 30

UNCONFINED COMPRESSION TEST

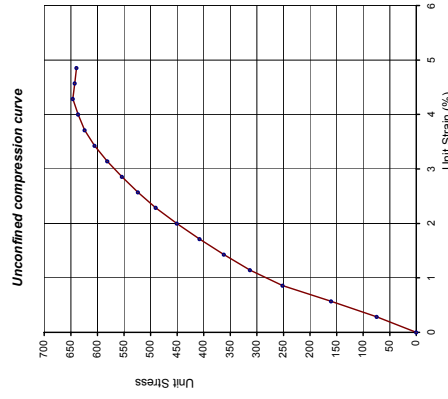
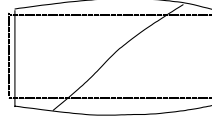
PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	70	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA			Diameter :	35	mm.
				Area :	962	mm ² .
Test date :	19/11/2003	Mass wet soil	143.39	g.		
Borehole No:	BH-3	Unit weight	2.13	g/cm ³		
Depth sampling:	1.0 to 1.45m			Load ring const:	2.873	N / div.
				Rate of strain :	2%	

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	9.621	0	0
20	25.0	0.2	0.286	0.997	9.649	0.072	74.440	
40	54.0	0.4	0.571	0.994	9.676	0.155	160.330	
60	85.0	0.6	0.657	0.991	9.704	0.244	251.646	
80	106.0	0.8	1.143	0.989	9.732	0.305	312.913	
100	123.0	1	1.429	0.986	9.761	0.353	362.048	
120	139.0	1.2	1.714	0.983	9.789	0.389	407.957	
140	154.0	1.4	2.000	0.980	9.817	0.442	450.666	
160	168.0	1.6	2.286	0.977	9.846	0.463	490.204	
180	180.0	1.8	2.571	0.974	9.875	0.517	523.683	
200	191.0	2	2.857	0.971	9.904	0.549	554.056	
220	201.0	2.2	3.143	0.969	9.933	0.577	581.350	
240	210.0	2.4	3.429	0.966	9.963	0.603	605.588	
260	217.0	2.6	3.714	0.963	9.992	0.623	623.923	
280	222.0	2.8	4.000	0.960	10.022	0.638	636.405	
300	226.0	3	4.286	0.957	10.052	0.649	645.944	
320	225.0	3.2	4.571	0.954	10.082	0.648	642.991	
340	225	3.4	4.857	0.951	10.112	0.648	639.247	

Result of testing

Unconfined compressive strength
 $q_u = 645.9$ kPa
 $Cu = q_u/2 = 323.0$ kPa

Mode of failure



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

Figure No.: 31

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.			
		Area :	982	mm ² .			
Test date : 19/11/2003		Mass wet soil	143.82	g.			
Borehole No: BH-3		Unit weight	2.14	g/cm ³			
Depth sampling: 2.0 to 2.45m		Load ring const:	2.873	N / div.			
		Rate of strain :	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	9.621	0	0
20	40.0	0.2	0.286	0.997	9.649	0.115	119.104
40	100.0	0.4	0.571	0.994	9.676	0.287	296.907
60	136.0	0.6	0.657	0.991	9.704	0.391	402.634
80	160.0	0.8	1.143	0.989	9.732	0.460	472.321
100	183.0	1	1.429	0.986	9.761	0.526	536.656
120	200.0	1.2	1.714	0.983	9.789	0.575	596.989
140	215.0	1.4	2.000	0.980	9.817	0.618	629.179
160	230.0	1.6	2.286	0.977	9.846	0.661	671.113
180	244.0	1.8	2.571	0.974	9.875	0.701	709.881
200	256.0	2	2.857	0.971	9.904	0.741	746.411
220	270.0	2.2	3.143	0.969	9.933	0.776	780.917
240	284.0	2.4	3.429	0.966	9.963	0.816	818.988
260	295.0	2.6	3.714	0.963	9.992	0.848	848.191
280	305.0	2.8	4.000	0.960	10.022	0.876	874.341
300	313.0	3	4.286	0.957	10.052	0.899	894.604
320	324.0	3.2	4.571	0.954	10.082	0.931	923.279
340	330	3.4	4.857	0.951	10.112	0.948	937.562

Result of testing

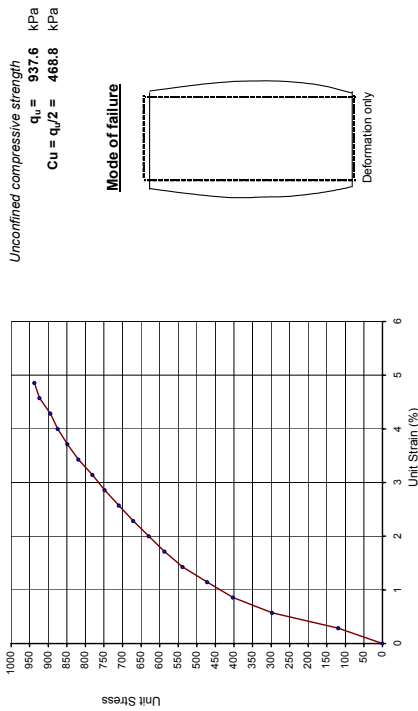


Figure No.: 32

Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.			
		Area :	982	mm ² .			
Test date : 19/11/2003		Mass wet soil	140.26	g.			
Borehole No: BH-3		Unit weight	2.08	g/cm ³			
Depth sampling: 3.0 to 3.45m		Load ring const:	2.873	N / div.			
		Rate of strain :	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	9.621	0	0
40	77.0	0.4	0.571	0.994	9.676	0.221	228.619
80	131.0	0.8	1.143	0.989	9.732	0.376	386.713
120	162.0	1.2	1.714	0.983	9.789	0.465	475.461
160	189.0	1.6	2.286	0.977	9.846	0.543	551.460
200	211.0	2	2.857	0.971	9.904	0.606	612.073
240	229.0	2.4	3.429	0.966	9.963	0.658	660.390
280	246.0	2.8	4.000	0.960	10.022	0.707	705.206
300	252.0	3	4.286	0.957	10.052	0.724	720.266
320	259.0	3.2	4.571	0.954	10.082	0.744	738.663
340	265.0	3.4	4.857	0.951	10.112	0.761	752.860
360	271.0	3.6	5.143	0.949	10.143	0.779	767.625
380	276.0	3.8	5.429	0.946	10.173	0.793	779.433
400	281.0	4	5.714	0.943	10.204	0.807	791.156
420	285.0	4.2	6.000	0.940	10.235	0.819	799.986
440	287.0	4.4	6.286	0.937	10.266	0.825	803.151
460	288.5	4.6	6.571	0.934	10.296	0.823	799.306
480	286	4.8	6.857	0.931	10.329	0.822	795.473

Result of testing

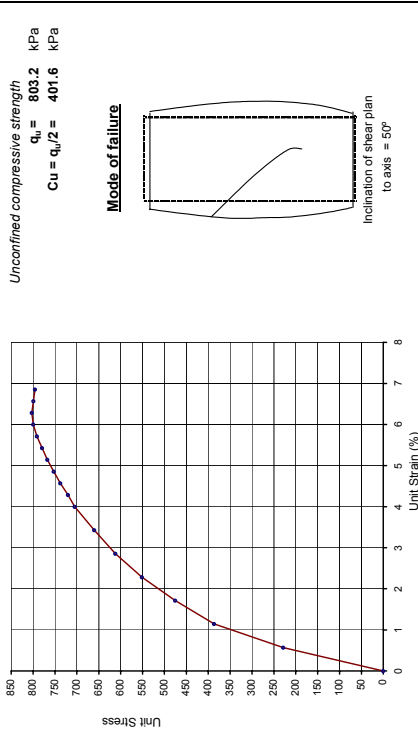


Figure No.: 33

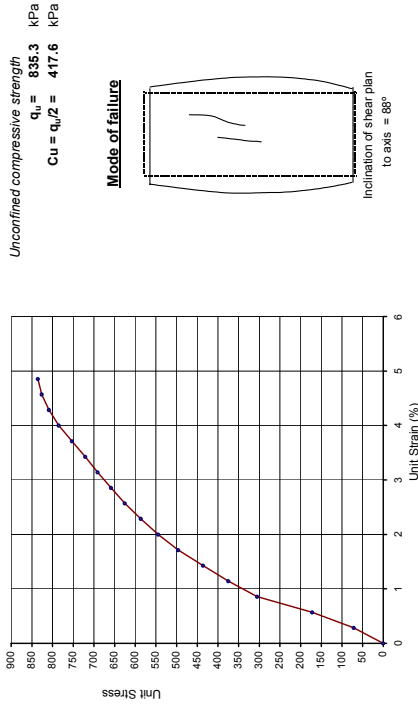
Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
		Area :	962	mm ² .				
Test date : 19/11/2003		Mass wet soil	142.79	g				
Borehole No: BH-3		Unit weight	2.12	N / div.				
Depth sampling: 4.0 to 4.45m		Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kp/cm ²)
0	0	0	0.000	1.000	0.999	9.621	0	0
20	24.0	0.2	0.286	0.997	0.994	9.649	0.069	71.463
40	58.0	0.4	0.571	0.994	0.989	9.676	0.167	172.206
60	103.0	0.6	0.857	0.991	0.983	9.704	0.266	304.936
80	127.0	0.8	1.143	0.989	0.977	9.732	0.365	374.905
100	148.0	1	1.429	0.986	0.966	9.761	0.425	435.635
120	169.0	1.2	1.714	0.983	0.939	9.789	0.486	496.006
140	186.0	1.4	2.000	0.980	0.904	9.817	0.534	544.313
160	201.0	1.6	2.286	0.977	0.866	9.846	0.577	586.494
180	215.0	1.8	2.571	0.974	0.825	9.875	0.618	626.510
200	227.0	2	2.857	0.971	0.782	9.904	0.652	658.466
220	239.0	2.2	3.143	0.969	0.740	9.933	0.687	691.256
240	250.0	2.4	3.429	0.966	0.698	9.963	0.718	720.939
260	262.0	2.6	3.714	0.963	0.657	9.992	0.753	753.308
280	274.0	2.8	4.000	0.960	0.616	10.022	0.787	785.473
300	283.0	3	4.286	0.957	0.575	10.052	0.813	808.859
320	290.0	3.2	4.571	0.954	0.534	10.082	0.833	826.392
340	294	3.4	4.857	0.951	0.493	10.112	0.845	835.282

Result of testing



Prepared by: Kong Sang Va

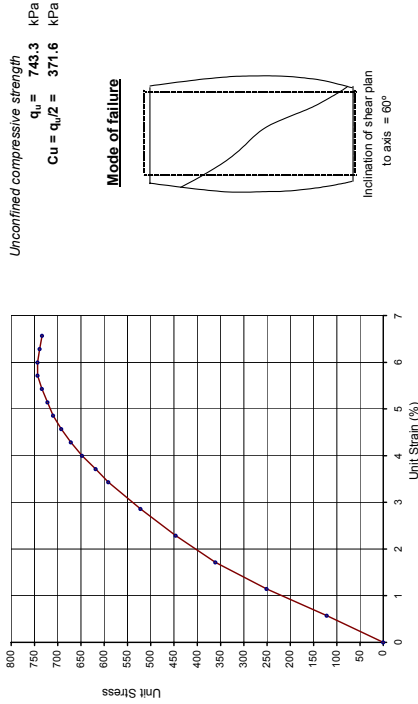
Checked by: Mr. Sieng Peou

Figure No: 34

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
		Area :	962	mm ² .				
Test date : 19/11/2003		Mass wet soil	142.23	g				
Borehole No: BH-3		Unit weight	2.11	g/cm ³				
Depth sampling: 5.0 to 5.45m		Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kp/cm ²)
0	0	0	0.000	1.000	0.999	9.621	0	0
40	41.0	0.4	0.571	0.994	0.994	9.676	0.118	121.732
80	85.0	0.8	1.143	0.989	0.989	9.732	0.244	250.921
120	123.0	1.2	1.714	0.983	0.983	9.789	0.363	360.988
160	153.0	1.6	2.286	0.977	0.977	9.846	0.440	446.436
200	180.0	2	2.857	0.971	0.971	9.904	0.517	522.147
240	205.0	2.4	3.429	0.966	0.966	9.963	0.589	591.170
280	215.0	2.6	3.714	0.963	0.963	9.992	0.618	618.173
300	235.0	3	4.286	0.957	0.957	10.022	0.649	647.872
320	243.0	3.2	4.571	0.954	0.954	10.052	0.675	671.667
340	250.0	3.4	4.857	0.951	0.951	10.112	0.718	710.274
360	255.0	3.6	5.143	0.949	0.949	10.143	0.733	722.304
380	260.0	3.8	5.429	0.946	0.946	10.173	0.747	734.248
400	264.0	4	5.714	0.943	0.943	10.204	0.758	743.292
420	264.8	4.2	6.000	0.940	0.940	10.235	0.761	743.285
440	264.0	4.4	6.286	0.937	0.937	10.266	0.758	738.187
460	263	4.6	6.571	0.934	0.934	10.298	0.756	733.745

Result of testing



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

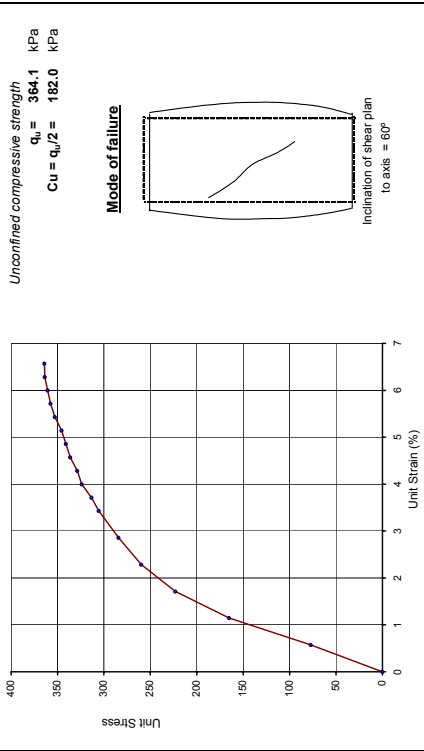
Figure No: 35

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	70	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA			Diameter :	35	mm.
				Area :	962	mm ² .
Test date :	19/11/2003	Unit weight	13779	g/cm ³		
Borehole No:	BH-3	Load ring const:	2.05	N / div.		
Depth sampling:	6.0 to 6.45m	Rate of strain :	2%			

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.999	9.621	0	0
40	26.0	0.4	0.571	0.994	0.976	9.676	0.075	77.196
80	56.0	0.8	1.143	0.989	0.932	9.732	0.161	165.313
120	76.0	1.2	1.714	0.983	0.789	9.789	0.218	223.066
160	89.0	1.6	2.286	0.977	0.646	9.846	0.266	259.891
200	96.0	2	2.857	0.971	0.504	9.904	0.282	284.280
240	106.0	2.4	3.429	0.966	0.363	9.963	0.305	305.078
280	109.0	2.6	3.714	0.963	0.221	9.992	0.313	313.399
290	113.0	2.8	4.000	0.960	0.102	10.022	0.325	323.368
300	115.0	3	4.286	0.957	0.062	10.062	0.330	328.688
320	118.0	3.2	4.571	0.954	0.022	10.082	0.339	336.256
340	120.0	3.4	4.857	0.951	0.012	10.112	0.345	340.831
360	122.0	3.6	5.143	0.949	0.003	10.143	0.351	345.573
380	125.0	3.8	5.429	0.946	0.000	10.173	0.359	353.004
400	127.0	4	5.714	0.943	0.000	10.204	0.365	357.569
420	128.5	4.2	6.000	0.940	0.000	10.235	0.369	360.695
440	130.0	4.4	6.286	0.937	0.000	10.266	0.373	363.797
460	130.5	4.6	6.571	0.934	0.000	10.298	0.375	364.983

Result of testing



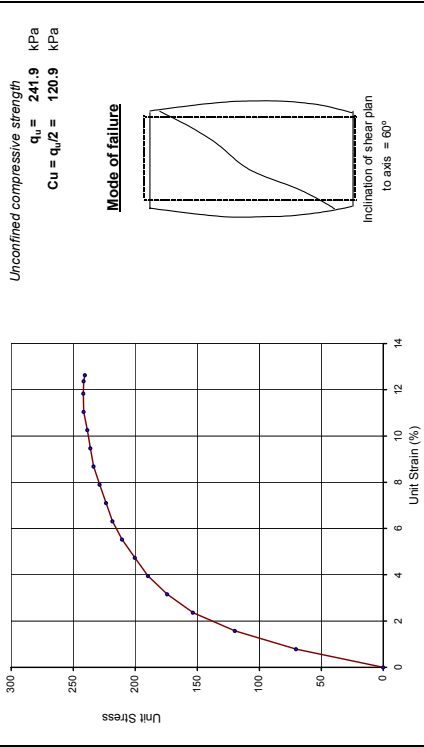
Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 36

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA			Diameter :	38	mm.
				Area :	1134	mm ² .
Test date :	19/11/2003	Unit weight	17740	g/cm ³		
Borehole No:	BH-3	Load ring const:	2.06	N / div.		
Depth sampling:	7.0 to 7.45m	Rate of strain :	2%			

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.999	11.341	0	0
60	28.0	0.6	0.789	0.992	0.984	11.431	0.080	70.371
120	48.0	1.2	1.579	0.984	0.932	11.523	0.138	119.676
180	62.0	1.8	2.368	0.976	0.842	11.616	0.178	153.342
240	71.0	2.4	3.158	0.968	0.711	11.711	0.204	174.161
300	78.0	3	3.947	0.961	0.580	11.807	0.224	188.794
360	83.0	3.6	4.737	0.953	0.450	11.905	0.238	200.300
420	88.0	4.2	5.526	0.945	0.320	12.005	0.253	210.607
480	92.0	4.8	6.316	0.937	0.200	12.106	0.264	218.340
540	95.0	5.4	7.105	0.929	0.080	12.209	0.273	223.560
600	96.0	6	7.895	0.921	0.000	12.313	0.282	228.659
660	101.0	6.6	8.684	0.913	0.000	12.420	0.290	233.639
720	103.0	7.2	9.474	0.905	0.000	12.528	0.296	238.206
780	105.0	7.8	10.263	0.897	0.000	12.638	0.302	242.632
840	107.2	8.4	11.053	0.889	0.000	12.750	0.308	244.550
900	108.3	9	11.842	0.882	0.000	12.865	0.311	244.862
940	108.8	9.4	12.368	0.876	0.000	12.942	0.313	244.528
960	108.7	9.6	12.632	0.874	0.000	12.981	0.312	240.582

Result of testing

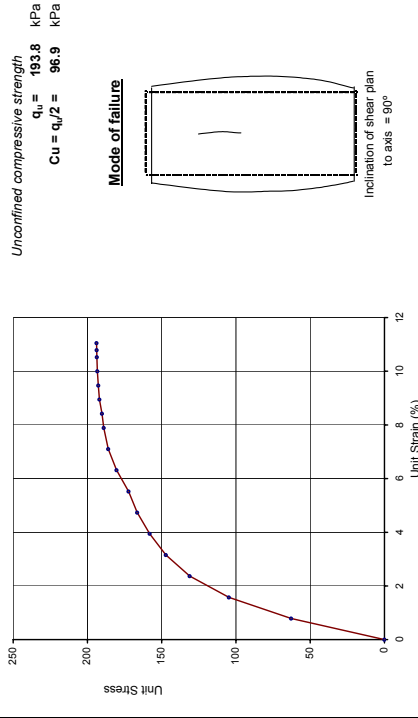


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 37

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter:	38	mm.			
		Area :	1134	mm ² .			
Test date :	19/11/2003	Mass wet soil	177.10	g			
Borehole No:	BH-3	Unit weight:	2.05	g/cm ³			
Depth sampling:	8.0 to 8.45m	Load ring const:	2.873	N / div.			
		Rate of strain:	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
60	25.0	0.6	0.769	0.992	11.431	0.072	62.831
120	42.0	1.2	1.579	0.984	11.523	0.121	104.717
180	53.0	1.8	2.388	0.976	11.616	0.152	131.083
240	60.0	2.4	3.158	0.968	11.711	0.172	147.195
300	65.0	3	3.947	0.961	11.807	0.187	158.162
360	69.0	3.6	4.737	0.953	11.905	0.198	166.515
420	72.0	4.2	5.526	0.945	12.005	0.207	172.315
480	76.0	4.8	6.316	0.937	12.106	0.218	180.368
540	79.0	5.4	7.105	0.929	12.209	0.227	185.987
600	81.0	6	7.895	0.921	12.313	0.233	188.984
640	82.0	6.4	8.421	0.916	12.384	0.236	190.254
680	83.2	6.8	8.947	0.911	12.456	0.239	191.909
720	84.0	7.2	9.474	0.905	12.528	0.241	192.634
760	84.8	7.6	10.000	0.900	12.601	0.244	193.338
800	85.4	8	10.526	0.895	12.675	0.245	193.587
820	85.7	8.2	10.789	0.892	12.713	0.246	193.676
840	86	8.4	11.053	0.889	12.750	0.247	193.781

Result of testing

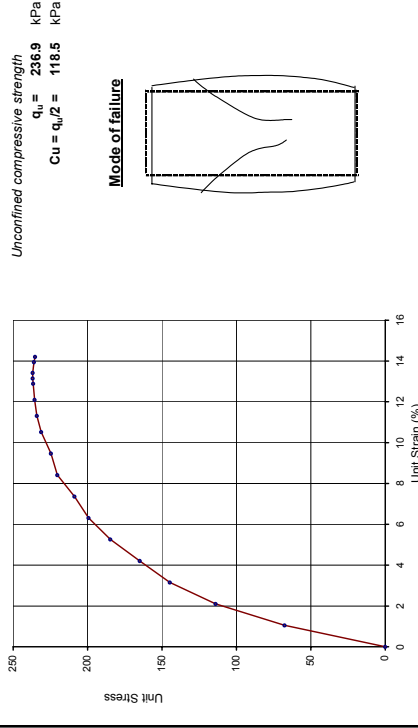


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No.: 38

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter:	38	mm.			
		Area :	1134	mm ² .			
Test date :	19/11/2003	Mass wet soil	184.20	g			
Borehole No:	BH-3	Unit weight:	2.14	g/cm ³			
Depth sampling:	9.0 to 9.45m	Load ring const:	2.873	N / div.			
		Rate of strain:	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
80	27.0	0.8	1.053	0.989	11.462	0.078	67.678
160	46.0	1.6	2.105	0.979	11.585	0.132	114.076
240	59.0	2.4	3.158	0.968	11.711	0.170	144.742
320	68.0	3.2	4.211	0.958	11.840	0.195	165.006
400	77.0	4	5.263	0.947	11.971	0.221	184.794
480	84.0	4.8	6.316	0.937	12.106	0.241	199.354
560	89.0	5.6	7.368	0.926	12.243	0.256	208.847
640	95.0	6.4	8.421	0.916	12.384	0.273	220.393
720	98.0	7.2	9.474	0.905	12.528	0.282	234.740
800	102.0	8	10.526	0.895	12.675	0.293	231.193
860	104.2	8.6	11.316	0.887	12.788	0.299	234.095
920	105.8	9.2	12.105	0.879	12.903	0.304	235.674
980	107.2	9.8	12.895	0.871	13.020	0.308	236.547
1000	107.7	10	13.158	0.868	13.060	0.309	236.932
1020	108.0	10.2	13.421	0.866	13.099	0.310	236.872
1060	108.3	10.6	13.947	0.861	13.179	0.311	236.087
1080	108.3	10.8	14.211	0.858	13.220	0.311	235.865

Result of testing

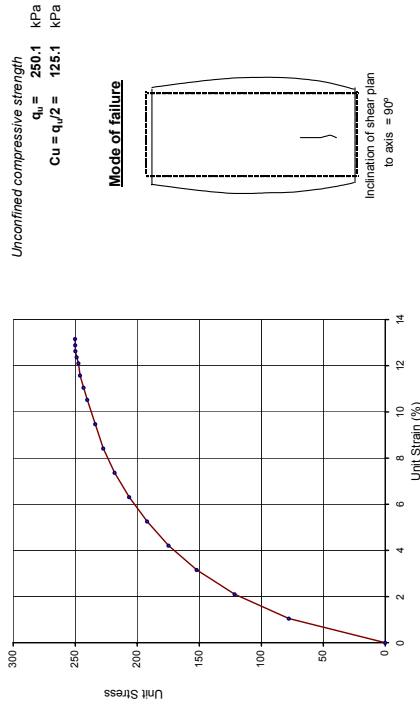


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No.: 39

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.			
		Area :	1134	mm ²			
Test date :	19/11/2003	Mass wet soil	181.29	g			
Borehole No:	BH-3	Unit weight	2.10	g/cm ³			
Depth sampling:	10.0 to 10.45m	Load ring const:	2.873	N / div.			
		Rate of strain :	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
80	31.0	0.8	1.053	0.989	11.462	0.089	77.704
160	49.0	1.6	2.105	0.979	11.585	0.141	121.516
240	62.0	2.4	3.158	0.968	11.711	0.178	152.102
320	72.0	3.2	4.211	0.958	11.840	0.207	174.714
400	80.0	4	5.263	0.947	11.971	0.230	191.994
480	87.0	4.8	6.316	0.937	12.106	0.250	206.473
560	93.0	5.6	7.368	0.926	12.243	0.267	218.233
640	98.0	6.4	8.421	0.916	12.384	0.282	227.353
720	102.0	7.2	9.474	0.905	12.528	0.293	233.913
800	106.0	8	10.526	0.895	12.675	0.305	240.259
840	108.0	8.4	11.053	0.889	12.750	0.310	243.352
880	109.0	8.8	11.579	0.884	12.826	0.316	246.188
920	111.0	9.2	12.105	0.879	12.903	0.319	247.375
940	112.0	9.4	12.368	0.876	12.942	0.322	248.854
960	112.0	9.6	12.632	0.874	12.981	0.324	249.877
980	113.0	9.8	12.895	0.871	13.020	0.326	250.007
1000	113.7	10	13.158	0.868	13.060	0.327	250.132

Result of testing



Prepared by: Kong Sang Va

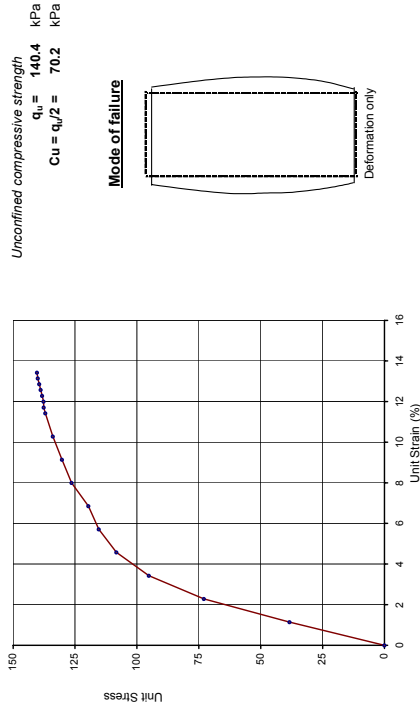
Checked by: Mr. Sieng Peou

Figure No.: 40

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.			
		Area :	962	mm ²			
Test date :	19/11/2003	Mass wet soil	134.60	g			
Borehole No:	BH-3	Unit weight	2.00	g/cm ³			
Depth sampling:	11.0 to 11.45m	Load ring const:	2.873	N / div.			
		Rate of strain :	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	9.621	0	0
80	13.0	0.8	1.143	0.989	9.732	0.037	38.376
160	25.0	1.6	2.286	0.977	9.846	0.072	72.947
240	33.0	2.4	3.429	0.966	9.963	0.095	95.164
320	38.0	3.2	4.571	0.954	10.082	0.109	108.286
400	41.0	4	5.714	0.943	10.204	0.118	115.436
480	43.0	4.8	6.857	0.931	10.329	0.124	119.599
560	46.0	5.6	8.000	0.920	10.458	0.132	126.373
640	48.0	6.4	9.143	0.909	10.589	0.138	130.230
720	50.0	7.2	10.286	0.897	10.724	0.144	133.950
800	51.8	8	11.429	0.886	10.863	0.149	137.004
820	52.2	8.2	11.714	0.883	10.898	0.150	137.617
840	52.4	8.4	12.000	0.880	10.933	0.151	137.697
860	52.8	8.6	12.286	0.877	10.969	0.152	138.297
880	53.2	8.8	12.571	0.874	11.005	0.153	138.891
900	53.6	9	12.857	0.871	11.041	0.154	139.478
920	54.0	9.2	13.143	0.869	11.077	0.155	140.056
940	54.3	9.4	13.429	0.866	11.114	0.156	140.373

Result of testing



Prepared by: Kong Sang Va

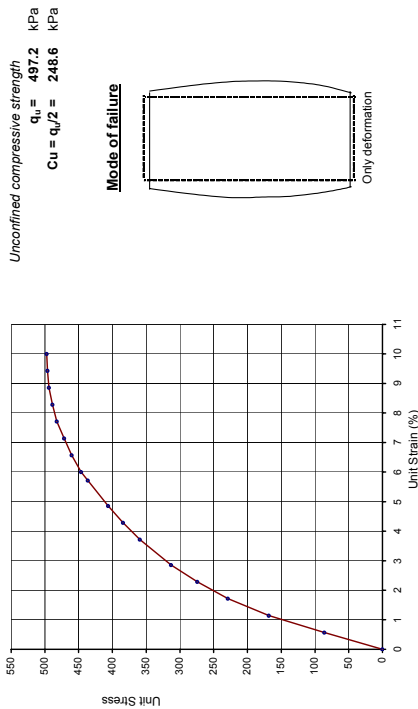
Checked by: Mr. Sieng Peou

Figure No.: 41

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
		Area :	982	mm ² .				
Test date : 15/12/2003		Mass wet soil	142.55	g.				
Borehole No: BH-4		Unit weight	2.12	g/cm ³				
Depth sampling: 2.0 to 2.45m		Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	9.621	0	0	0
40	29.0	0.4	0.571	0.994	9.676	0.083	86.103	86.103
80	57.0	0.8	1.143	0.989	9.732	0.164	168.265	168.265
120	78.0	1.2	1.714	0.983	9.789	0.224	228.926	228.926
160	94.0	1.6	2.286	0.977	9.846	0.270	274.281	274.281
200	108.0	2	2.857	0.971	9.904	0.310	313.288	313.288
280	125.0	2.6	3.714	0.963	9.992	0.359	359.403	359.403
300	134.5	3	4.286	0.957	10.052	0.386	384.422	384.422
340	143.0	3.4	4.857	0.951	10.112	0.411	406.277	406.277
400	155.0	4	5.714	0.943	10.204	0.445	436.403	436.403
420	159.0	4.2	6.000	0.940	10.235	0.457	446.308	446.308
460	165.0	4.6	6.571	0.934	10.298	0.474	460.334	460.334
500	170.0	5	7.143	0.929	10.361	0.488	471.383	471.383
540	175.0	5.4	7.714	0.923	10.425	0.503	482.261	482.261
580	178.5	5.8	8.286	0.917	10.490	0.513	488.860	488.860
620	181.5	6.2	8.857	0.911	10.556	0.521	493.979	493.979
660	183.5	6.6	9.429	0.906	10.623	0.527	496.292	496.292
700	185	7	10.000	0.900	10.690	0.532	497.192	497.192

Result of testing



Prepared by: Kong Sang Va

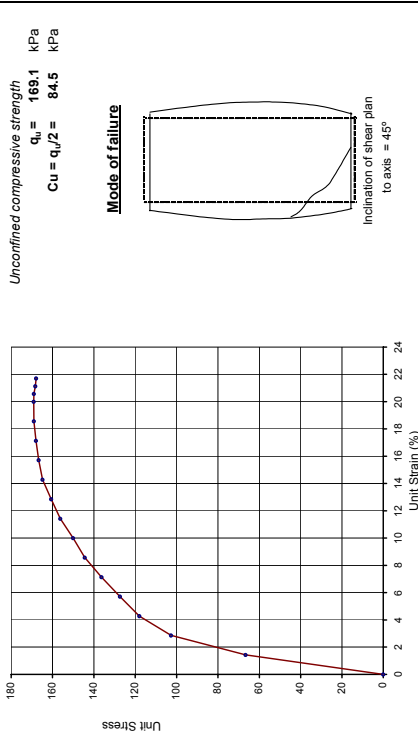
Checked by: Mr. Sieng Peou

Figure No.: 42

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35.3	mm.				
		Area :	979	mm ² .				
Test date : 15/12/2003		Mass wet soil	142.80	g.				
Borehole No: BH-4		Unit weight	2.08	g/cm ³				
Depth sampling: 3.0 to 3.45m		Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	9.787	0	0	0
100	23.0	1	1.429	0.986	9.929	0.066	66.554	66.554
200	36.0	2	2.857	0.971	10.075	0.103	102.662	102.662
300	42.0	3	4.286	0.957	10.225	0.121	118.011	118.011
400	46.0	4	5.714	0.943	10.380	0.132	127.321	127.321
500	50.0	5	7.143	0.929	10.540	0.144	136.296	136.296
600	53.8	6	8.571	0.914	10.704	0.155	144.398	144.398
700	56.8	7	10.000	0.900	10.874	0.163	150.068	150.068
800	60.1	8	11.429	0.886	11.050	0.173	156.266	156.266
900	62.8	9	12.857	0.871	11.231	0.180	160.653	160.653
1000	65.5	10	14.286	0.857	11.418	0.186	164.813	164.813
1100	67.4	11	15.714	0.843	11.611	0.194	168.767	168.767
1200	69.1	12	17.143	0.829	11.812	0.199	172.575	172.575
1300	70.7	13	18.571	0.814	12.019	0.203	176.202	176.202
1400	72.0	14	20.000	0.800	12.233	0.207	179.690	179.690
1440	72.5	14.4	20.571	0.794	12.321	0.208	180.048	180.048
1480	72.7	14.8	21.143	0.789	12.411	0.209	180.295	180.295
1520	73.1	15.2	21.714	0.783	12.501	0.210	180.532	180.532

Result of testing



Prepared by: Kong Sang Va

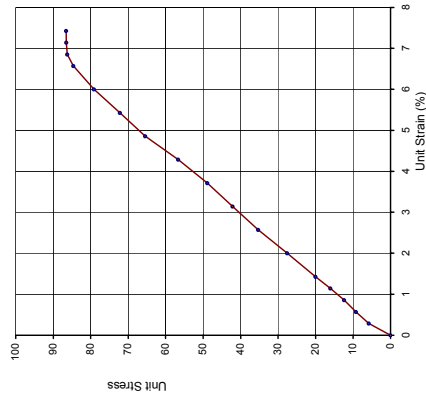
Checked by: Mr. Sieng Peou

Figure No.: 43

UNCONFINED COMPRESSION TEST

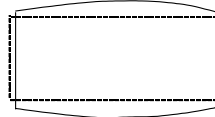
PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length:	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter:	35.5	mm.				
Test date : 15/12/2003		Area:	990	mm ² .				
Borehole No: BH-4		Mass wet soil	142.70	g.				
Depth sampling: 4.0 to 4.45m		Unit weight	2.06	g/cm ³				
Rate of strain: 2%		Load ring const:	2.873	N / div.				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.998	9.988	0	0
20	2.0	0.2	0.286	0.987	9.926	9.926	0.006	5.789
40	3.2	0.4	0.571	0.984	9.955	9.955	0.009	9.235
60	4.3	0.6	0.857	0.981	9.984	9.984	0.012	12.374
80	5.6	0.8	1.143	0.989	10.012	10.012	0.016	16.069
100	7.0	1	1.429	0.986	10.041	10.041	0.020	20.028
140	9.7	1.4	2.000	0.980	10.100	10.100	0.028	27.592
180	12.5	1.8	2.571	0.974	10.159	10.159	0.036	35.350
220	15.0	2.2	3.143	0.969	10.219	10.219	0.043	42.171
260	17.5	2.6	3.714	0.963	10.280	10.280	0.050	48.909
300	20.4	3	4.286	0.957	10.341	10.341	0.059	56.676
340	23.7	3.4	4.857	0.951	10.403	10.403	0.068	65.451
380	26.3	3.8	5.429	0.946	10.466	10.466	0.076	72.185
420	29.0	4.2	6.000	0.940	10.530	10.530	0.083	79.125
460	31.2	4.6	6.571	0.934	10.594	10.594	0.090	84.610
480	31.9	4.8	6.857	0.931	10.627	10.627	0.092	86.244
500	32.1	5	7.143	0.929	10.659	10.659	0.092	86.519
520	32.2	5.2	7.429	0.926	10.692	10.692	0.093	86.521

Unconfined compression curve



Unconfined compressive strength
 $q_u = 86.5$ kPa
 $C_u = q_u/2 = 43.3$ kPa

Mode of failure



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

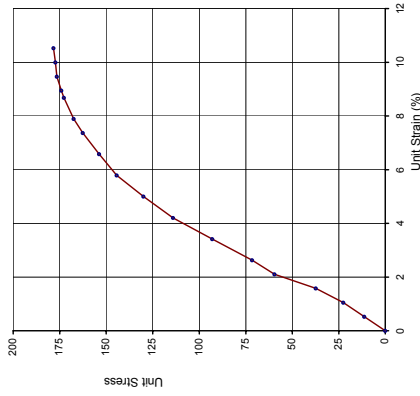
Figure No: 44

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length:	76	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter:	38	mm.				
Test date : 15/12/2003		Area:	1134	mm ² .				
Borehole No: BH-4		Mass wet soil	180.87	g.				
Depth sampling: 7.0 to 7.45m		Unit weight	2.10	g/cm ³				
Rate of strain: 2%		Load ring const:	2.873	N / div.				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11.341	0	0
40	4.5	0.4	0.526	0.995	11.401	11.401	0.013	11.340
80	9.0	0.8	1.053	0.989	11.462	11.462	0.026	22.559
120	15.0	1.2	1.579	0.984	11.523	11.523	0.043	37.309
160	24.0	1.6	2.105	0.979	11.585	11.585	0.069	59.518
200	29.0	2	2.632	0.974	11.648	11.648	0.083	71.531
260	38.0	2.6	3.421	0.966	11.743	11.743	0.109	92.970
320	47.0	3.2	4.211	0.958	11.840	11.840	0.135	114.050
380	54.0	3.8	5.000	0.950	11.938	11.938	0.155	129.956
440	60.5	4.4	5.789	0.942	12.038	12.038	0.174	144.389
500	65.0	5	6.579	0.934	12.140	12.140	0.187	155.828
560	69.3	5.6	7.368	0.926	12.243	12.243	0.199	162.619
600	71.8	6	7.895	0.921	12.313	12.313	0.206	167.528
660	74.7	6.6	8.684	0.913	12.420	12.420	0.215	172.801
680	75.5	6.8	8.947	0.911	12.456	12.456	0.217	174.148
720	77.0	7.2	9.474	0.905	12.528	12.528	0.221	176.581
760	77.8	7.6	10.000	0.900	12.601	12.601	0.224	177.378
800	78.7	8	10.526	0.895	12.675	12.675	0.226	178.381

Result of testing

Unconfined compression curve



Unconfined compressive strength
 $q_u = 178.4$ kPa
 $C_u = q_u/2 = 89.2$ kPa

Mode of failure



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

Figure No: 45

UNCONFINED COMPRESSION TEST

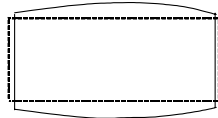
PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA			Diameter :	38	mm.
Test date :	15/12/2003			Area :	1134	mm ² .
Borehole No.:	BH-4			Mass wet soil	173.45	g/cm3
Depth sampling:	11.0 to 11.45m			Unit weight	2.01	g/cm3
	Rate of strain :			2.873	N / div.	2%

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11,341	0	0
20	7.0	0.2	0.263	0.997	11,371	0.020	17.686	17.686
40	15.0	0.4	0.526	0.995	11,401	0.043	37.799	37.799
60	25.0	0.6	0.789	0.992	11,431	0.072	62.831	62.831
80	34.0	0.8	1.053	0.989	11,462	0.086	85.224	85.224
100	47.0	1	1.316	0.987	11,492	0.135	117.496	117.496
120	60.0	1.2	1.579	0.984	11,523	0.172	149.595	149.595
140	73.0	1.4	1.842	0.982	11,554	0.210	181.521	181.521
160	87.0	1.6	2.105	0.979	11,585	0.250	215.753	215.753
180	98.0	1.8	2.368	0.976	11,616	0.282	242.379	242.379
200	110.0	2	2.632	0.974	11,648	0.316	271.325	271.325
240	128.0	2.4	3.158	0.968	11,711	0.368	314.017	314.017
280	139.0	2.8	3.684	0.963	11,775	0.399	339.149	339.149
320	149.0	3.2	4.211	0.958	11,840	0.428	361.562	361.562
340	153.0	3.4	4.474	0.955	11,872	0.440	370.248	370.248
360	155.5	3.6	4.737	0.953	11,905	0.447	375.261	375.261
380	157.0	3.8	5.000	0.950	11,938	0.451	377.835	377.835
400	158	4	5.263	0.947	11,971	0.454	379.188	379.188

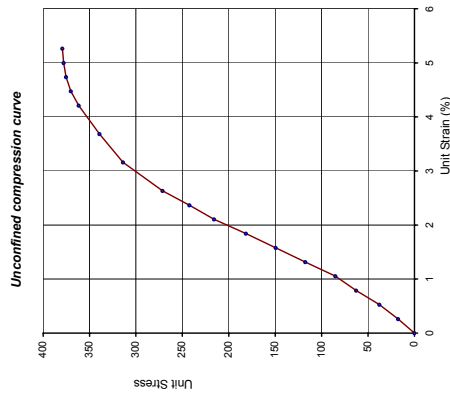
Result of testing

Unconfined compressive strength
 $q_u = 379.2$ kPa
 $C_u = q_u/2 = 189.6$ kPa

Mode of failure



Only deformation



Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No.: 46

UNCONFINED COMPRESSION TEST

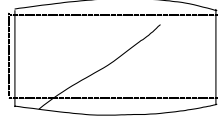
PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT			Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA			Diameter :	38	mm.
Test date :	15/12/2003			Area :	1134	mm ² .
Borehole No.:	BH-4			Mass wet soil	171.01	g
Depth sampling:	14.5 to 14.95m			Unit weight	1.98	g/cm3
	Rate of strain :			2.873	N / div.	2%

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	11,341	0	0
20	30.0	0.2	0.263	0.997	11,371	0.086	75.798	75.798
40	63.0	0.4	0.526	0.995	11,401	0.181	158.755	158.755
60	98.0	0.5	0.658	0.993	11,416	0.282	246.626	246.626
80	121.0	0.6	0.789	0.992	11,431	0.348	304.104	304.104
100	145.0	0.7	0.921	0.991	11,447	0.417	363.938	363.938
120	164.0	0.8	1.053	0.989	11,462	0.471	411.080	411.080
140	180.0	0.9	1.184	0.988	11,477	0.517	450.586	450.586
160	197.0	1	1.316	0.987	11,492	0.566	492.484	492.484
180	208.0	1.2	1.579	0.984	11,523	0.598	518.597	518.597
200	232.0	1.4	1.842	0.982	11,554	0.667	576.888	576.888
240	245.0	1.6	2.105	0.979	11,585	0.704	607.581	607.581
280	256.0	1.8	2.368	0.976	11,616	0.735	633.153	633.153
300	263.0	2	2.632	0.974	11,648	0.756	648.713	648.713
320	266.0	2.2	2.895	0.971	11,679	0.764	654.339	654.339

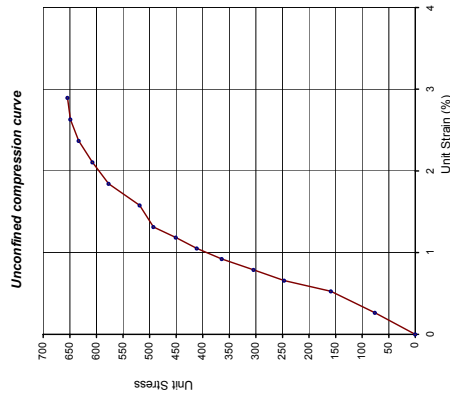
Result of testing

Unconfined compressive strength
 $q_u = 654.3$ kPa
 $C_u = q_u/2 = 327.2$ kPa

Mode of failure



Inclination of shear plan to axis = 50°

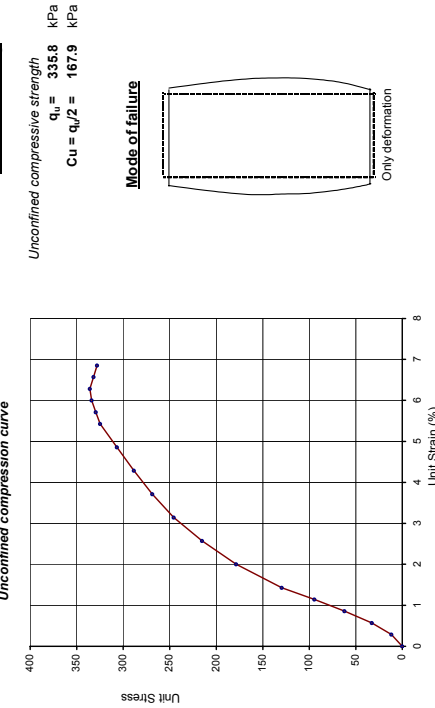


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No.: 47

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
		Area :	962	mm ² .				
Test date : 17/12/2003		Mass wet soil	136.18	g.				
Borehole No: BH-5		Unit weight	2.02	N / div.				
Depth sampling: 1.0 to 1.5m		Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	9.621	0	0
20	4.0	0.2	0.286	0.997	0.997	9.649	0.011	11.910
40	11.0	0.4	0.571	0.994	0.994	9.676	0.032	32.660
60	21.0	0.6	0.857	0.991	0.991	9.704	0.060	62.171
80	32.0	0.8	1.143	0.989	0.989	9.732	0.092	94.464
100	44.0	1	1.429	0.986	0.986	9.761	0.126	129.513
140	61.0	1.4	2.000	0.980	0.980	9.817	0.175	178.511
180	74.0	1.8	2.571	0.974	0.974	9.875	0.213	215.292
220	85.0	2.2	3.143	0.969	0.969	9.933	0.244	245.844
260	93.5	2.6	3.714	0.963	0.963	9.992	0.269	268.833
300	101.0	3	4.286	0.957	0.957	10.052	0.290	286.674
340	108.0	3.4	4.857	0.951	0.951	10.112	0.310	306.898
380	115.0	3.8	5.429	0.946	0.946	10.173	0.330	324.764
400	117.0	4	5.714	0.943	0.943	10.204	0.342	329.414
420	119.0	4.2	6.000	0.940	0.940	10.235	0.345	334.029
440	120.0	4.4	6.286	0.937	0.937	10.266	0.345	335.812
460	119.0	4.6	6.571	0.934	0.934	10.298	0.342	331.989
480	118	4.8	6.857	0.931	0.931	10.329	0.339	326.202

Unconfined compression curve

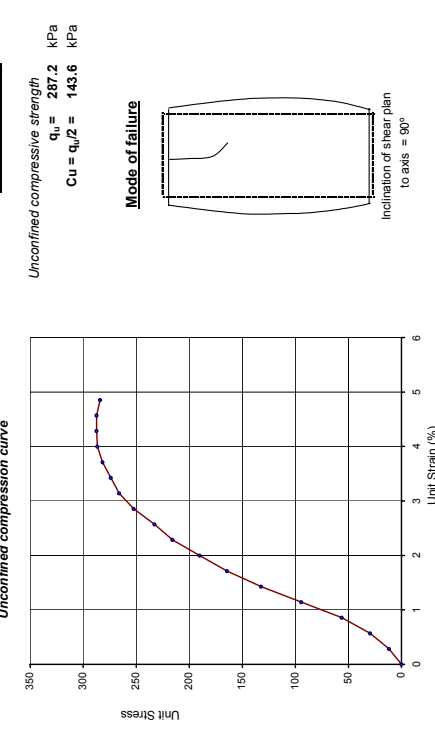


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 48

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.				
		Area :	962	mm ² .				
Test date : 17/12/2003		Mass wet soil	139.91	g.				
Borehole No: BH-5		Unit weight	2.08	g/cm ³				
Depth sampling: 2.0 to 2.45m		Load ring const:	2.873	N / div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	1.000	9.621	0	0
20	4.0	0.2	0.286	0.997	0.997	9.649	0.011	11.910
40	10.0	0.4	0.571	0.994	0.994	9.676	0.029	29.691
60	19.0	0.6	0.857	0.991	0.991	9.704	0.065	56.250
80	32.0	0.8	1.143	0.989	0.989	9.732	0.092	94.464
100	45.0	1	1.429	0.986	0.986	9.761	0.129	132.456
120	56.0	1.2	1.714	0.983	0.983	9.789	0.161	164.357
140	65.0	1.4	2.000	0.980	0.980	9.817	0.187	190.217
160	74.0	1.6	2.286	0.977	0.977	9.846	0.213	215.923
180	80.0	1.8	2.571	0.974	0.974	9.875	0.230	232.748
200	87.0	2	2.857	0.971	0.971	9.904	0.250	252.371
220	92.0	2.2	3.143	0.969	0.969	9.933	0.264	266.090
240	95.0	2.4	3.429	0.966	0.966	9.963	0.273	273.957
260	96.0	2.6	3.714	0.963	0.963	9.992	0.282	281.772
280	100.0	2.8	4.000	0.960	0.960	10.022	0.287	286.669
300	100.5	3	4.286	0.957	0.957	10.052	0.289	287.245
320	100.8	3.2	4.571	0.954	0.954	10.082	0.290	287.242
340	100	3.4	4.857	0.951	0.951	10.112	0.287	284.110

Unconfined compression curve

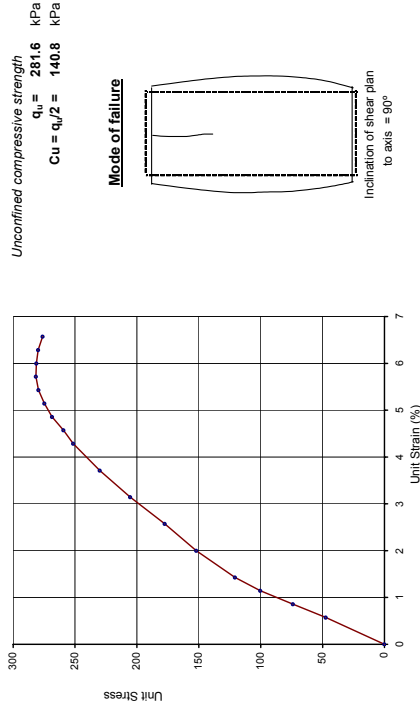


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No: 49

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.			
		Area :	982	mm ² .			
Test date :	17/12/2003	Mass wet soil	132.45	g.			
Borehole No:	BH-5	Unit weight	1.97	g/cm ³			
Depth sampling:	3.0 to 3.45m	Load ring const:	2.873	N / div.			
		Rate of strain :	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	9.621	0	0
40	16.0	0.4	0.571	0.994	9.676	0.046	47.505
60	25.0	0.6	0.857	0.991	9.704	0.072	74.014
80	34.0	0.8	1.143	0.989	9.732	0.098	100.368
100	41.0	1	1.429	0.986	9.761	0.118	120.688
140	52.0	1.4	2.000	0.980	9.817	0.149	152.174
180	61.0	1.8	2.571	0.974	9.875	0.175	177.470
220	71.0	2.2	3.143	0.969	9.933	0.204	205.352
260	80.0	2.6	3.714	0.963	9.992	0.230	230.018
300	88.0	3	4.286	0.957	10.052	0.253	253.518
320	91.0	3.2	4.571	0.954	10.082	0.261	259.316
340	94.5	3.4	4.857	0.951	10.112	0.271	268.464
360	97.0	3.6	5.143	0.949	10.143	0.279	274.759
380	99.0	3.8	5.429	0.946	10.173	0.284	279.579
400	100.0	4	5.714	0.943	10.204	0.287	281.550
420	100.2	4.2	6.000	0.940	10.235	0.288	281.258
440	100.0	4.4	6.286	0.937	10.266	0.287	279.844
460	99	4.6	6.571	0.934	10.298	0.284	276.201

Result of testing

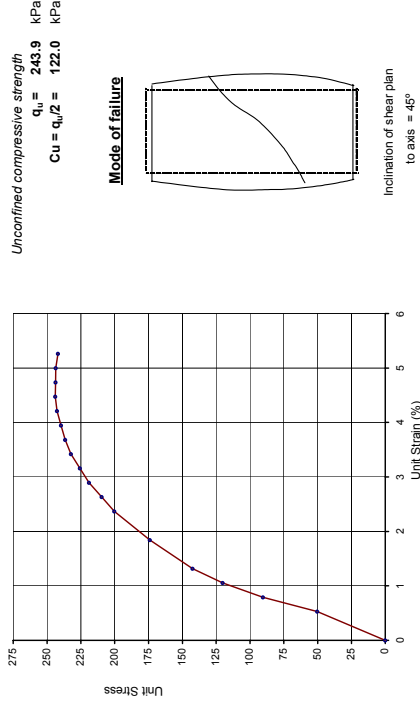


Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No.: 50

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.			
		Area :	1134	mm ² .			
Test date :	17/12/2003	Mass wet soil	173.26	g.			
Borehole No:	BH-5	Unit weight	2.01	g/cm ³			
Depth sampling:	6.0 to 6.45m	Load ring const:	2.873	N / div.			
		Rate of strain :	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
40	20.0	0.4	0.526	0.995	11.401	0.057	50.398
60	36.0	0.6	0.789	0.992	11.431	0.103	90.477
80	48.0	0.8	1.053	0.989	11.462	0.138	120.316
100	57.0	1	1.316	0.987	11.492	0.164	142.495
140	70.0	1.4	1.842	0.982	11.554	0.201	174.061
180	81.0	1.8	2.368	0.976	11.616	0.233	200.334
200	85.0	2	2.632	0.974	11.648	0.244	209.660
220	89.0	2.2	2.895	0.971	11.679	0.256	218.933
240	92.0	2.4	3.158	0.968	11.711	0.264	225.700
260	95.0	2.6	3.421	0.966	11.743	0.273	232.426
280	97.0	2.8	3.684	0.963	11.775	0.279	236.672
300	98.5	3	3.947	0.961	11.807	0.283	239.676
320	100.0	3.2	4.211	0.958	11.840	0.287	242.659
340	100.8	3.4	4.474	0.955	11.872	0.290	243.928
360	101.0	3.6	4.737	0.953	11.905	0.290	243.739
380	101.2	3.8	5.000	0.950	11.938	0.291	243.547
400	100.8	4	5.263	0.947	11.971	0.290	241.912

Result of testing



Prepared by: Kong Sang Va Checked by: Mr. Sieng Peou Figure No.: 51

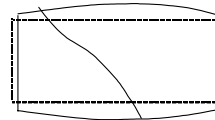
UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.			
		Area :	1134	mm ² .			
Test date :	17/12/2003	Mass wet soil	173.45	g			
Borehole No:	BH-5	Unit weight	2.01	g/cm ³			
Depth sampling:	7.0 to 7.45m	Load ring const:	2.873	N / div.			
		Rate of strain :	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
40	29.0	0.4	0.526	0.995	11.401	0.083	73.078
80	55.0	0.8	1.053	0.989	11.462	0.158	137.862
120	73.0	1.2	1.579	0.984	11.523	0.210	182.008
160	86.0	1.6	2.105	0.979	11.585	0.253	216.233
200	101.0	2	2.632	0.974	11.648	0.290	249.125
240	111.0	2.4	3.158	0.968	11.711	0.319	272.311
280	119.0	2.8	3.684	0.963	11.775	0.342	290.351
320	126.0	3.2	4.211	0.958	11.840	0.362	305.750
360	132.0	3.6	4.737	0.953	11.905	0.379	318.550
400	136.0	4	5.263	0.947	11.971	0.391	326.390
440	140.0	4.4	5.789	0.942	12.038	0.402	334.123
480	143.0	4.8	6.316	0.937	12.106	0.411	339.376
520	146.0	5.2	6.842	0.932	12.174	0.419	344.549
560	147.2	5.6	7.368	0.926	12.243	0.423	348.418
600	148.3	6	7.895	0.921	12.313	0.426	349.022
640	148.8	6.4	8.421	0.916	12.384	0.428	348.205
660	148.5	6.6	8.684	0.913	12.420	0.427	345.919

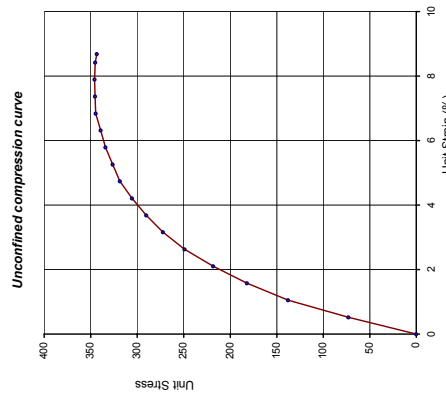
Result of testing

Unconfined compressive strength
 $q_u = 346.0$ kPa
 $C_u = q_u/2 = 173.0$ kPa

Mode of failure



Inclination of shear plan to axis = 45°



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

Figure No. 52

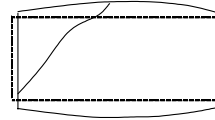
UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.			
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.			
		Area :	1134	mm ² .			
Test date :	17/12/2003	Mass wet soil	176.25	g			
Borehole No:	BH-5	Unit weight	2.04	g/cm ³			
Depth sampling:	8.0 to 8.45m	Load ring const:	2.873	N / div.			
		Rate of strain :	2%				
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L / L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
100	55.0	1	1.316	0.987	11.492	0.158	137.496
200	79.0	2	2.632	0.974	11.648	0.227	194.860
300	96.0	3	3.947	0.961	11.807	0.276	233.593
400	108.0	4	5.263	0.947	11.971	0.310	295.192
500	117.0	5	6.579	0.934	12.140	0.336	276.891
600	124.0	6	7.895	0.921	12.313	0.356	289.324
700	130.0	7	9.211	0.908	12.492	0.373	298.991
800	135.0	8	10.526	0.895	12.675	0.388	305.990
900	140.0	9	11.842	0.882	12.865	0.402	312.657
1000	144.0	10	13.158	0.868	13.060	0.414	316.790
1100	147.0	11	14.474	0.855	13.260	0.422	318.490
1200	151.0	12	15.789	0.842	13.468	0.434	322.123
1300	154.0	13	17.105	0.829	13.681	0.442	323.390
1400	157.0	14	18.421	0.816	13.902	0.451	324.456
1500	160.0	15	19.737	0.803	14.130	0.460	325.323
1600	163.0	16	21.053	0.789	14.365	0.468	325.990
1660	164.5	16.6	21.842	0.782	14.511	0.473	325.700

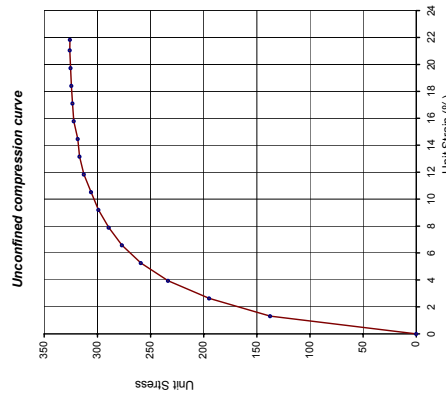
Result of testing

Unconfined compressive strength
 $q_u = 326.0$ kPa
 $C_u = q_u/2 = 163.0$ kPa

Mode of failure



Inclination of shear plan to axis = 45°



Prepared by: Kong Sang Va

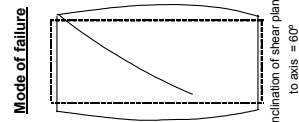
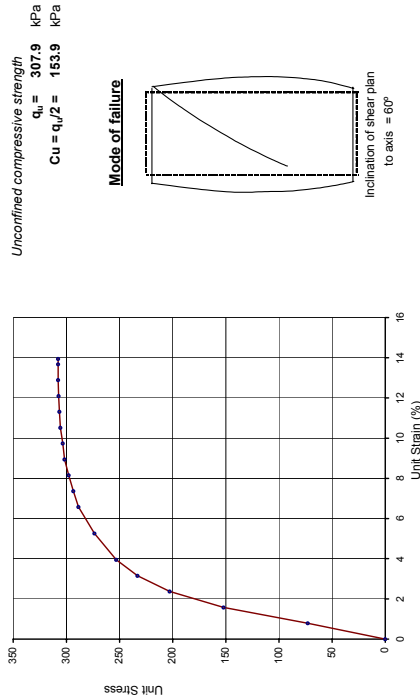
Checked by: Mr. Sieng Peou

Figure No. 53

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.				
		Area :	1134	mm ² .				
Test date :	17/12/2003	Mass wet soil	182.90	g				
Borehole No.:	BH-5	Unit weight	2.12	g/cm ³				
Depth sampling: 9.0 to 9.45m		Load ring const.:	2.873	N/div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0	0
60	29.0	0.6	0.769	0.992	11.431	0.083	72.884	72.884
120	61.0	1.2	1.579	0.984	11.523	0.175	152.089	152.089
180	82.0	1.8	2.368	0.976	11.616	0.236	202.807	202.807
240	95.0	2.4	3.158	0.968	11.711	0.273	233.059	233.059
300	104.0	3	3.947	0.961	11.807	0.299	253.059	253.059
400	114.0	4	5.263	0.947	11.971	0.328	273.591	273.591
500	122.0	5	6.579	0.934	12.140	0.351	288.724	288.724
600	125.0	5.6	7.368	0.926	12.243	0.359	293.324	293.324
620	125.0	6.2	8.158	0.918	12.349	0.368	297.804	297.804
680	130.8	6.8	8.947	0.911	12.456	0.376	301.702	301.702
740	132.7	7.4	9.737	0.903	12.565	0.381	305.431	305.431
800	134.8	8	10.526	0.895	12.675	0.387	309.537	309.537
860	136.5	8.6	11.316	0.887	12.788	0.392	306.680	306.680
920	135.0	9.2	12.105	0.879	12.903	0.396	307.270	307.270
980	135.5	9.8	12.895	0.871	13.020	0.401	307.820	307.820
1040	140.8	10.4	13.684	0.863	13.139	0.405	307.873	307.873
1060	141.2	10.6	13.947	0.861	13.179	0.406	307.806	307.806

Result of testing



Prepared by: Kong Sang Va

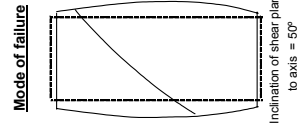
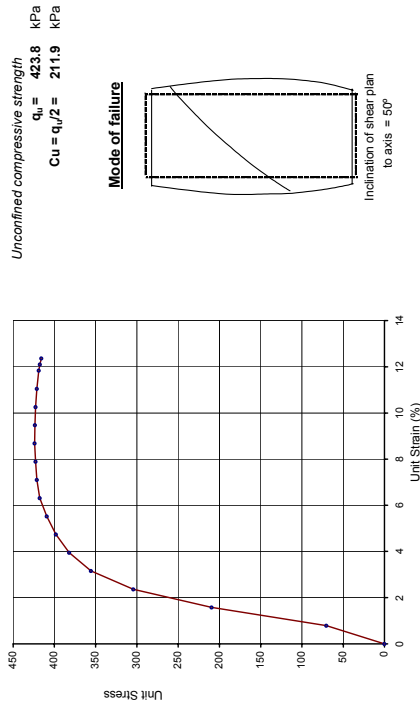
Checked by: Mr. Sieng Peou

Figure No.: 54

UNCONFINED COMPRESSION TEST

PROJECT: THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.				
SITE : IN THE MUNICIPALITY OF PHNOM PENH, IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.				
		Area :	1134	mm ² .				
Test date :	17/12/2003	Mass wet soil	179.44	g				
Borehole No.:	BH-5	Unit weight	2.08	g/cm ³				
Depth sampling: 10.0 to 10.45m		Load ring const.:	2.873	N/div.				
		Rate of strain :	2%					
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0	0
60	28.0	0.6	0.769	0.992	11.431	0.080	70.371	70.371
120	84.0	1.2	1.579	0.984	11.523	0.241	209.433	209.433
180	123.0	1.8	2.368	0.976	11.616	0.353	304.210	304.210
240	145.0	2.4	3.158	0.968	11.711	0.417	355.722	355.722
300	157.0	3	3.947	0.961	11.807	0.451	382.021	382.021
360	165.0	3.6	4.737	0.953	11.905	0.474	398.187	398.187
420	171.0	4.2	5.526	0.945	12.005	0.491	409.247	409.247
480	176.0	4.8	6.316	0.937	12.106	0.506	417.693	417.693
540	179.0	5.4	7.105	0.929	12.209	0.514	421.233	421.233
600	181.2	6	7.895	0.921	12.313	0.521	422.787	422.787
660	185.2	6.6	8.684	0.913	12.420	0.526	423.789	423.789
720	184.7	7.2	9.474	0.905	12.528	0.531	423.585	423.585
780	186.0	7.8	10.263	0.897	12.638	0.534	422.827	422.827
840	185.9	8.4	11.053	0.889	12.750	0.537	421.135	421.135
900	187.5	9	11.842	0.882	12.865	0.539	418.737	418.737
920	187.5	9.2	12.105	0.879	12.905	0.539	417.487	417.487
940	187.3	9.4	12.368	0.876	12.942	0.538	415.793	415.793

Result of testing



Prepared by: Kong Sang Va

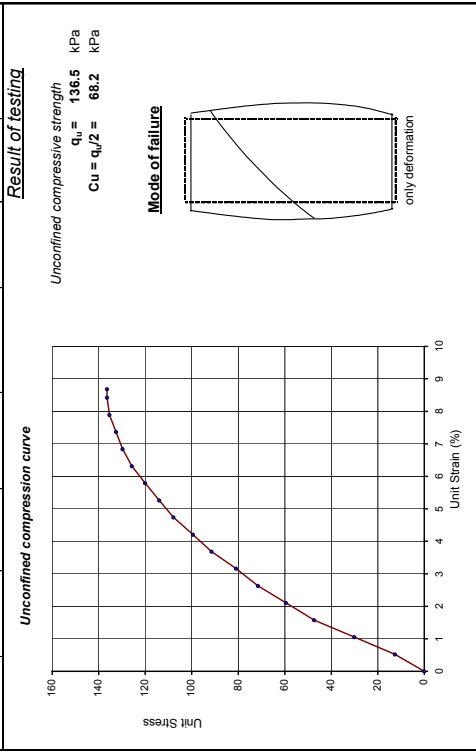
Checked by: Mr. Sieng Peou

Figure No.: 55

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.
			Area :	1134	mm ² .
Test date :	17/12/2003	Mass wet soil	Unit weight	185.35	g.
Borehole No:	BH-5	Load ring const:	Rate of strain :	2.15	g/cm ³
Depth sampling:	11.0 to 11.45m			2.873	N / div.

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
40	5.0	0.4	0.526	0.995	11.401	12.600	12.600
80	12.0	0.8	1.053	0.989	11.462	30.079	30.079
120	19.0	1.2	1.579	0.984	11.523	47.372	47.372
160	24.0	1.6	2.105	0.979	11.585	66.99	66.99
200	29.0	2	2.632	0.974	11.648	71.531	71.531
240	33.0	2.4	3.158	0.968	11.711	80.957	80.957
280	37.5	2.8	3.684	0.963	11.775	108.914	108.914
320	41.0	3.2	4.211	0.958	11.840	118.400	118.400
360	44.7	3.6	4.737	0.953	11.905	128.873	128.873
400	47.5	4	5.263	0.947	11.971	136.986	136.986
440	50.3	4.4	5.789	0.942	12.038	145.000	145.000
480	53.0	4.8	6.316	0.937	12.106	152.783	152.783
520	55.0	5.2	6.842	0.932	12.174	158.996	158.996
560	56.5	5.6	7.368	0.926	12.243	162.982	162.982
600	58.0	6	7.895	0.921	12.313	167.329	167.329
640	58.8	6.4	8.421	0.916	12.384	169.412	169.412
660	59	6.6	8.694	0.913	12.420	170.482	170.482



Prepared by: Kong Sang Va

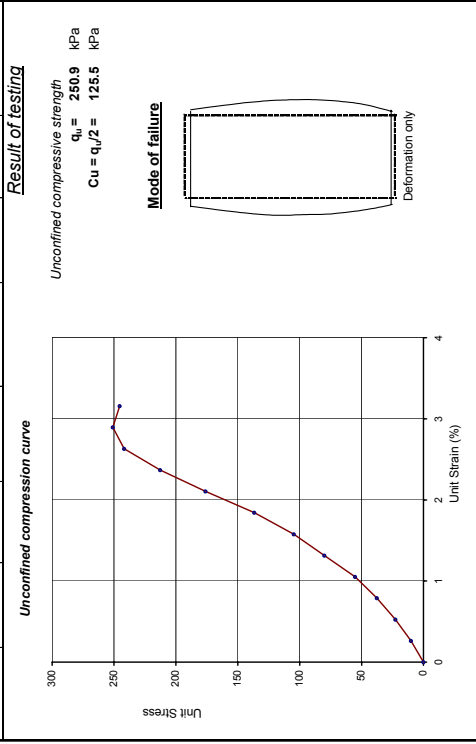
Checked by: Mr. Sieng Peou

Figure No.: 56

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	76	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	38	mm.
			Area :	1134	mm ² .
Test date :	17/12/2003	Mass wet soil	Unit weight	177.04	g.
Borehole No:	BH-5	Load ring const:	Rate of strain :	2.05	g/cm ³
Depth sampling:	12.0 to 12.45m			2.873	N / div.

Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	11.341	0	0
20	4.0	0.2	0.263	0.997	11.371	0.011	10.106
40	9.0	0.4	0.526	0.995	11.401	0.026	22.679
60	15.0	0.6	0.789	0.992	11.431	0.043	37.699
80	22.0	0.8	1.053	0.989	11.462	0.063	55.145
100	32.0	1	1.316	0.987	11.492	0.092	79.997
120	42.0	1.2	1.579	0.984	11.523	0.121	104.717
140	55.0	1.4	1.842	0.982	11.554	0.158	136.762
160	71.0	1.6	2.105	0.979	11.585	0.204	176.074
180	86.0	1.8	2.368	0.976	11.616	0.247	212.700
200	96.0	2	2.632	0.974	11.646	0.282	241.726
220	102.0	2.2	2.895	0.971	11.679	0.293	250.912
240	100.0	2.4	3.158	0.968	11.711	0.287	245.326



Prepared by: Kong Sang Va

Checked by: Mr. Sieng Peou

Figure No.: 57

UNCONFINED COMPRESSION TEST

PROJECT:	THE STUDY ON SOLID WASTE MANAGEMENT		Length :	70	mm.
SITE :	IN THE MUNICIPALITY OF PHNOM PENH. IN THE KINGDOM OF CAMBODIA		Diameter :	35	mm.
Test date :	17/12/2003		Area :	962	mm ²
Borehole No:	BH-5		Mass wet soil	136.03	g
Depth sampling:	13.0 to 13.45m		Unit weight	2.02	g/cm ³
			Load ring const:	2.873	N / div.
			Rate of strain:	2%	

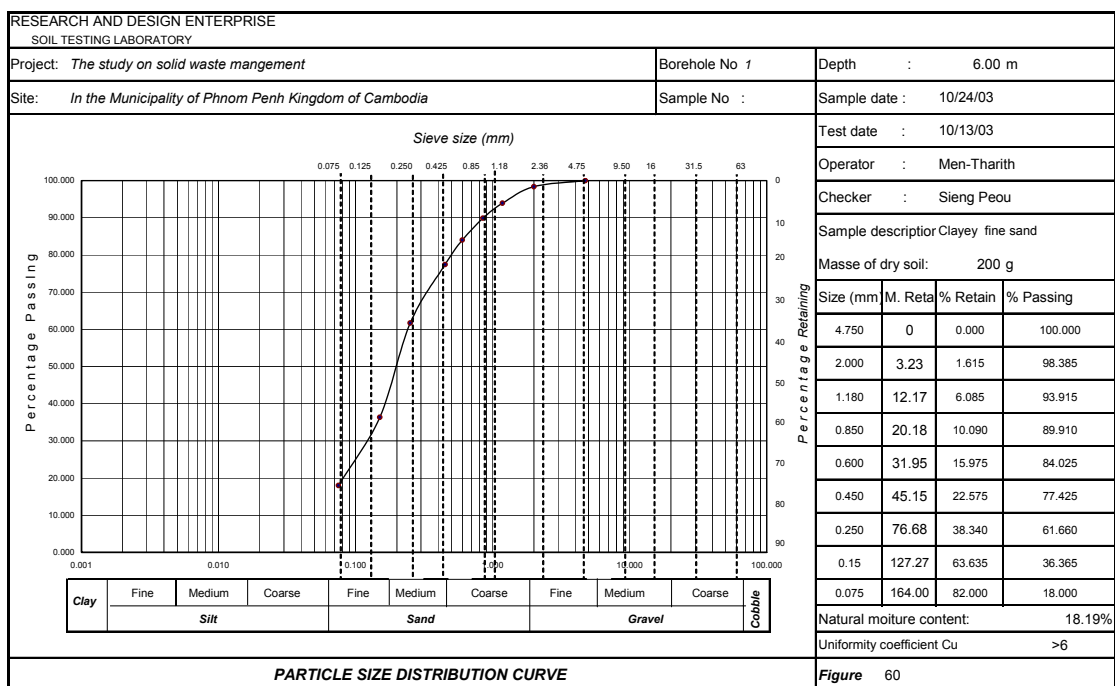
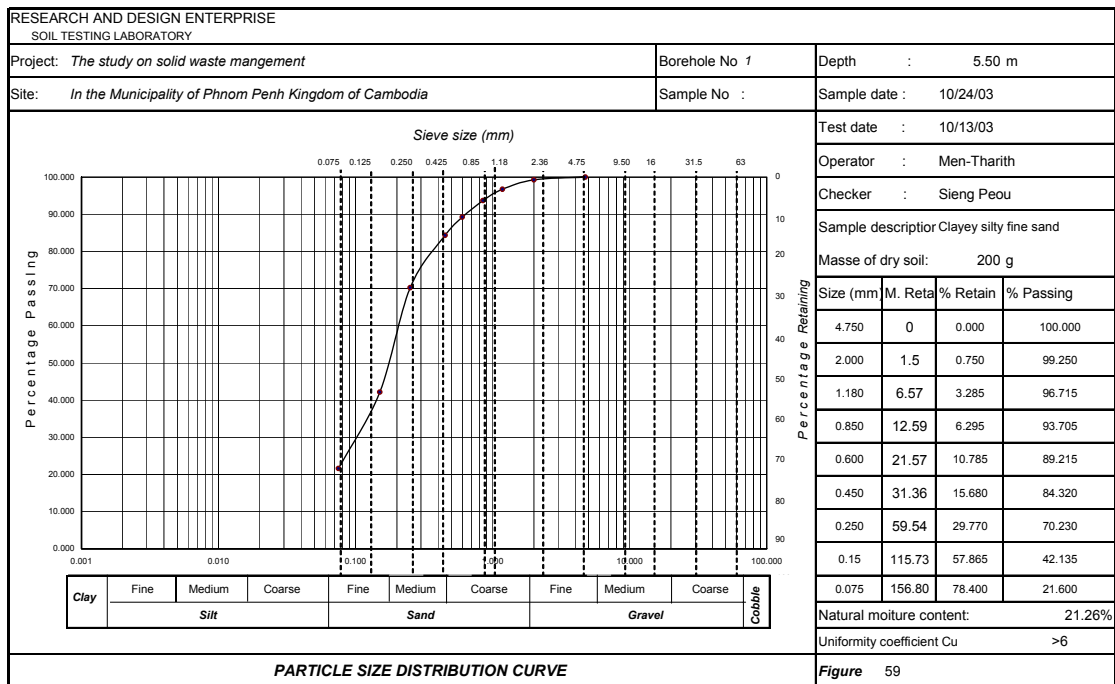
Deformation dial reading (div)	Load dial reading (div)	Sample deformation (mm)	Unit strain $\epsilon = \Delta L/L_0$ %	Area CF	1- ϵ	Corrected area (cm ²)	Total load on sample (kN)	Sample stress (kpa)
0	0	0	0.000	1.000	0.999	9.621	0	0
40	11.0	0.4	0.571	0.994	0.987	9.676	0.032	32.660
60	21.0	0.6	0.857	0.991	0.970	9.704	0.060	62.171
80	33.0	0.8	1.143	0.989	0.932	9.732	0.095	97.416
100	49.0	1	1.429	0.986	0.761	9.761	0.141	144.230
140	78.0	1.4	2.000	0.980	0.817	9.817	0.224	228.260
180	102.0	1.8	2.571	0.974	0.875	9.875	0.283	296.754
200	111.0	2	2.857	0.971	0.904	0.319	321.981	
220	119.0	2.2	3.143	0.969	0.933	0.342	344.182	
240	126.0	2.4	3.429	0.966	0.963	0.362	363.353	
260	134.0	2.6	3.714	0.963	0.982	0.385	385.280	
280	140.0	2.8	4.000	0.960	10.022	0.402	401.337	
300	146.0	3	4.286	0.957	10.052	0.419	417.291	
320	150.0	3.2	4.571	0.954	10.082	0.431	427.444	
340	152.5	3.4	4.857	0.951	10.112	0.438	433.267	
360	153.0	3.6	5.143	0.949	10.143	0.440	433.382	
380	153.5	3.8	5.429	0.946	10.173	0.441	433.469	
400	152	4	5.714	0.943	10.204	0.437	427.956	

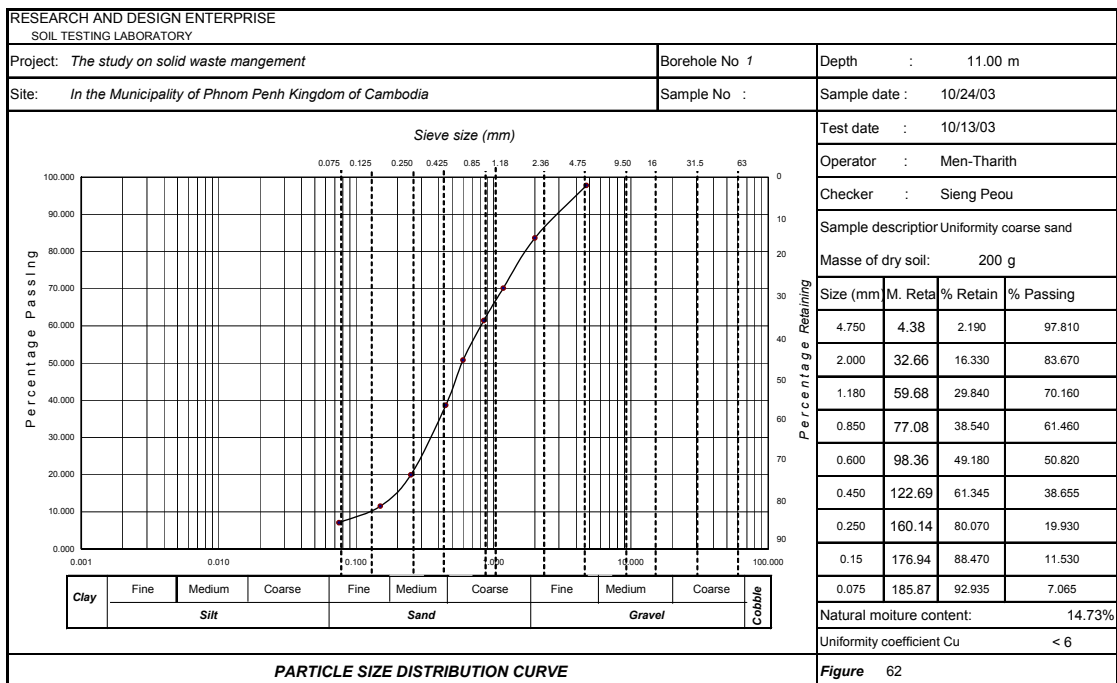
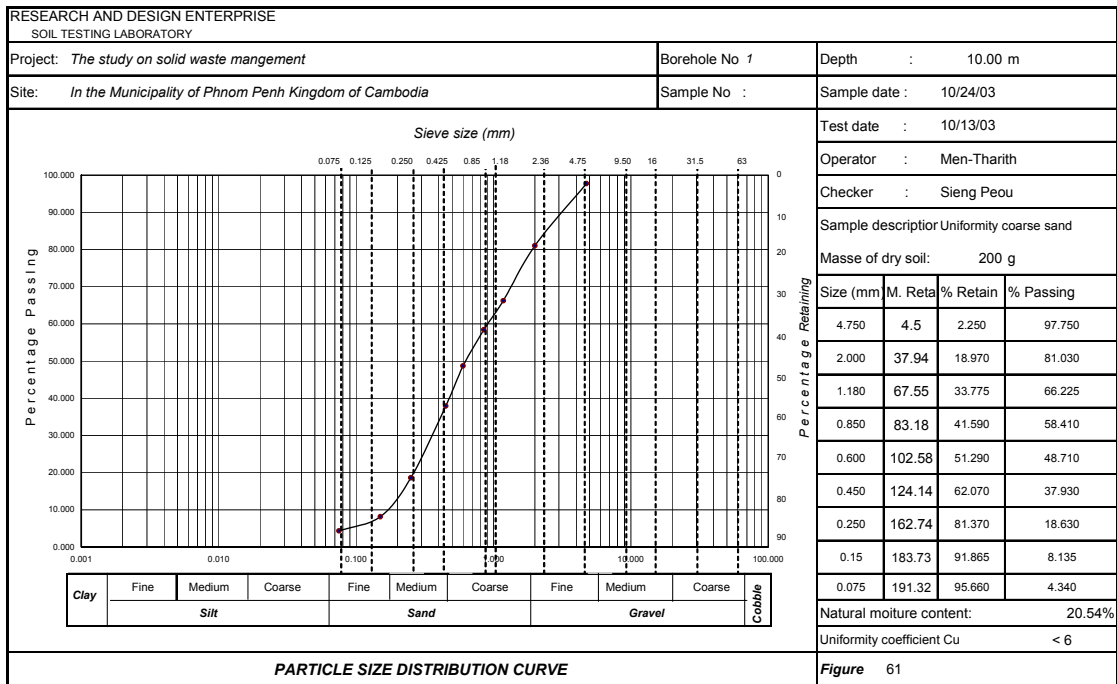
Result of testing	
Unconfined compressive strength	$q_u = 433.5$ kPa
$C_u = q_u/2 =$	216.7 kPa

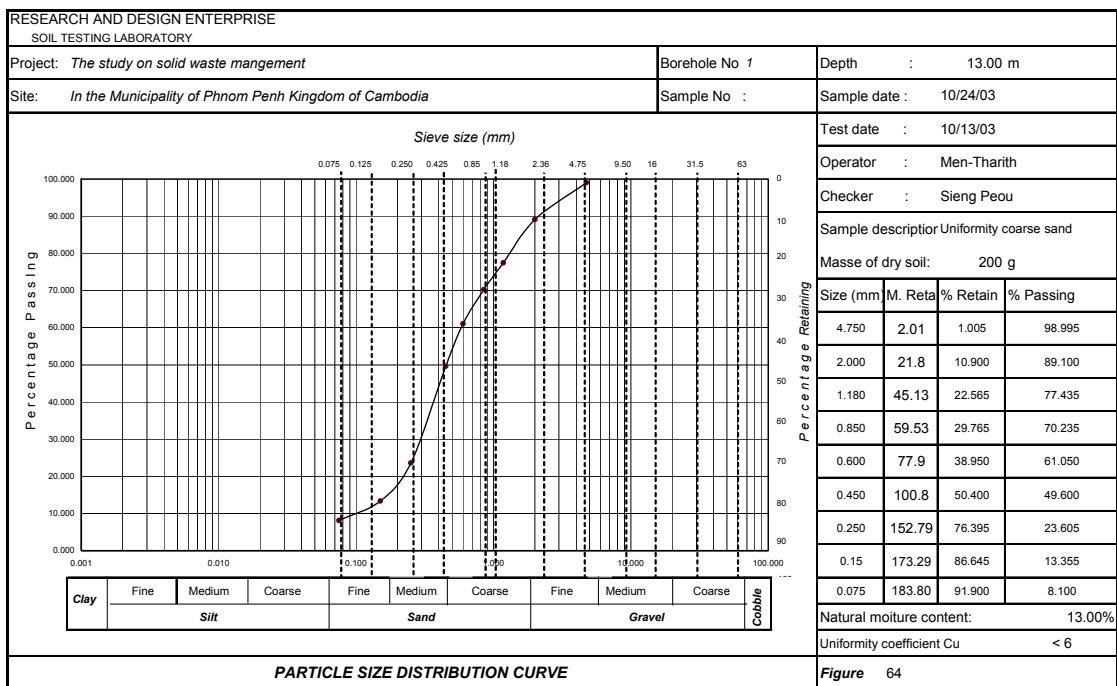
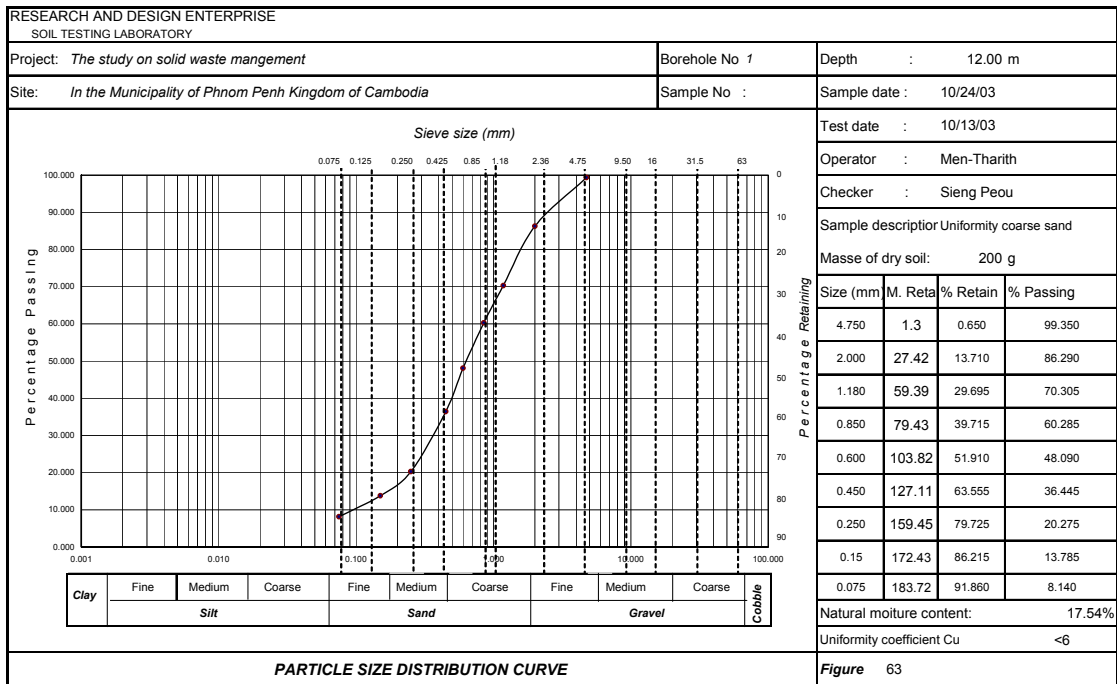
Unconfined compression curve

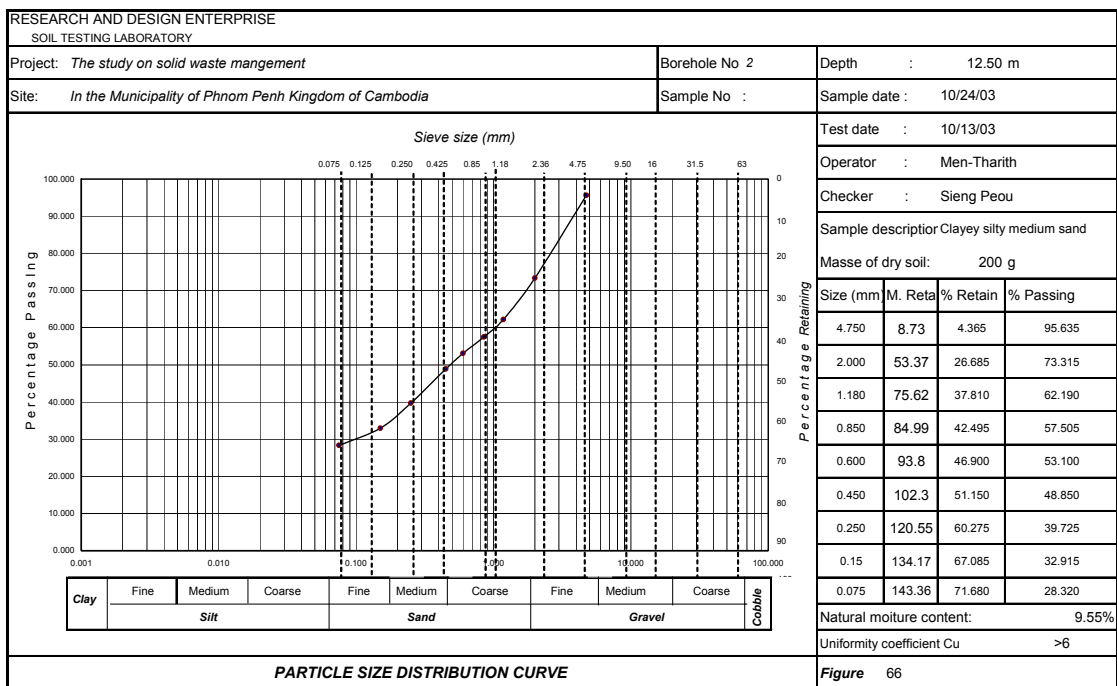
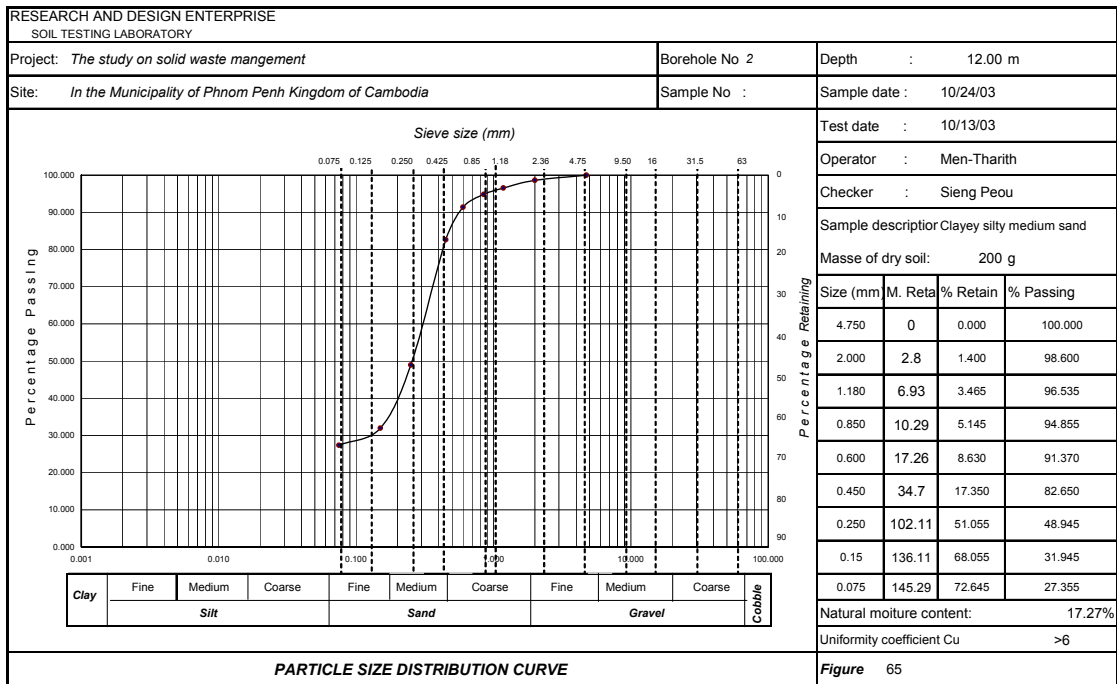
Mode of failure

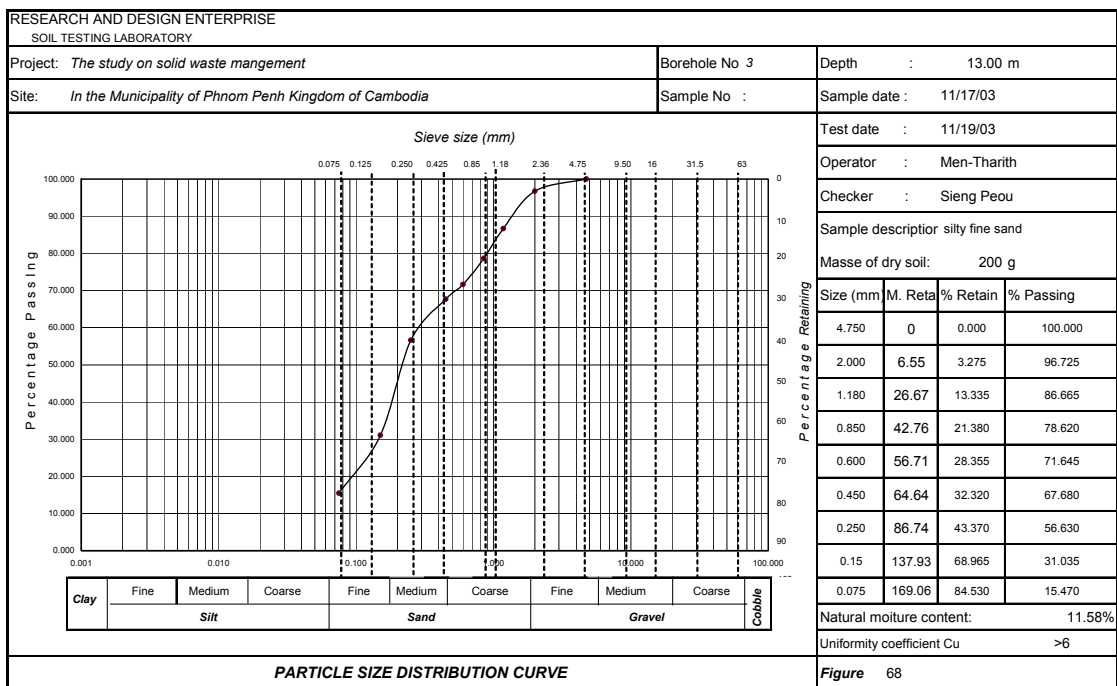
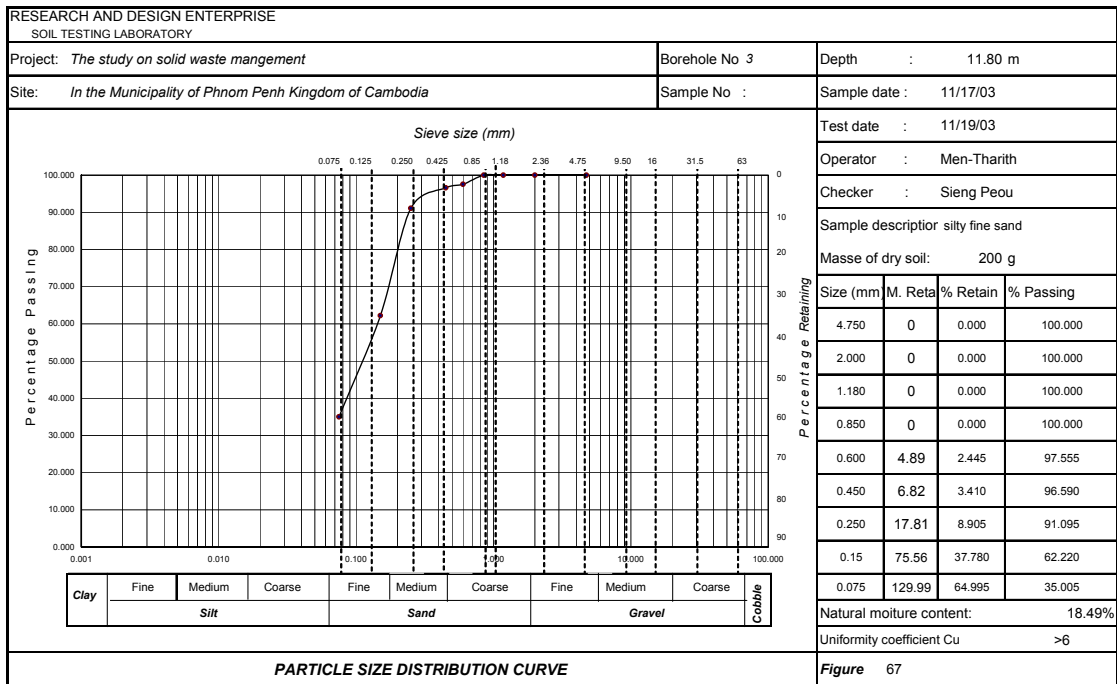
8.6.3 Particle Size Distribution Curve

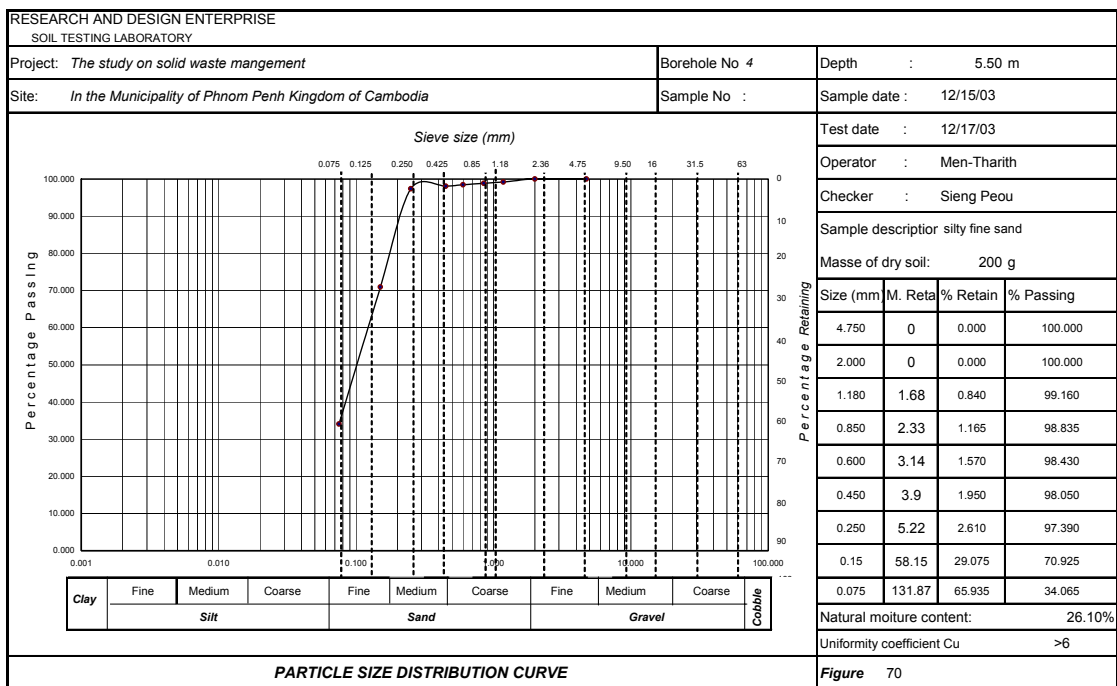
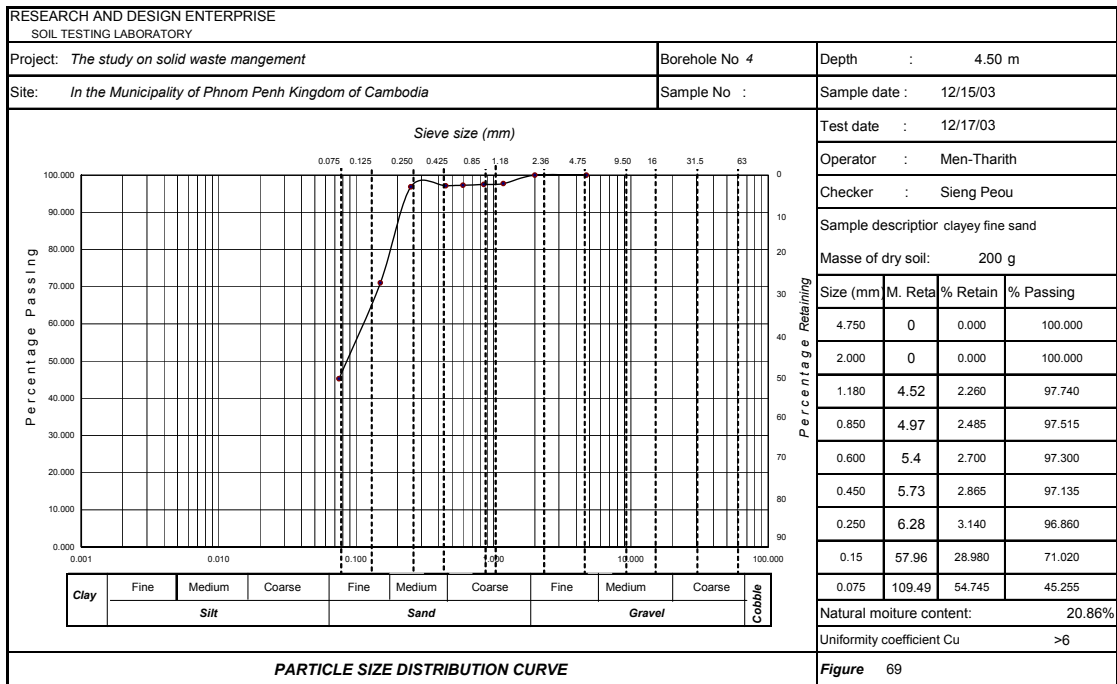


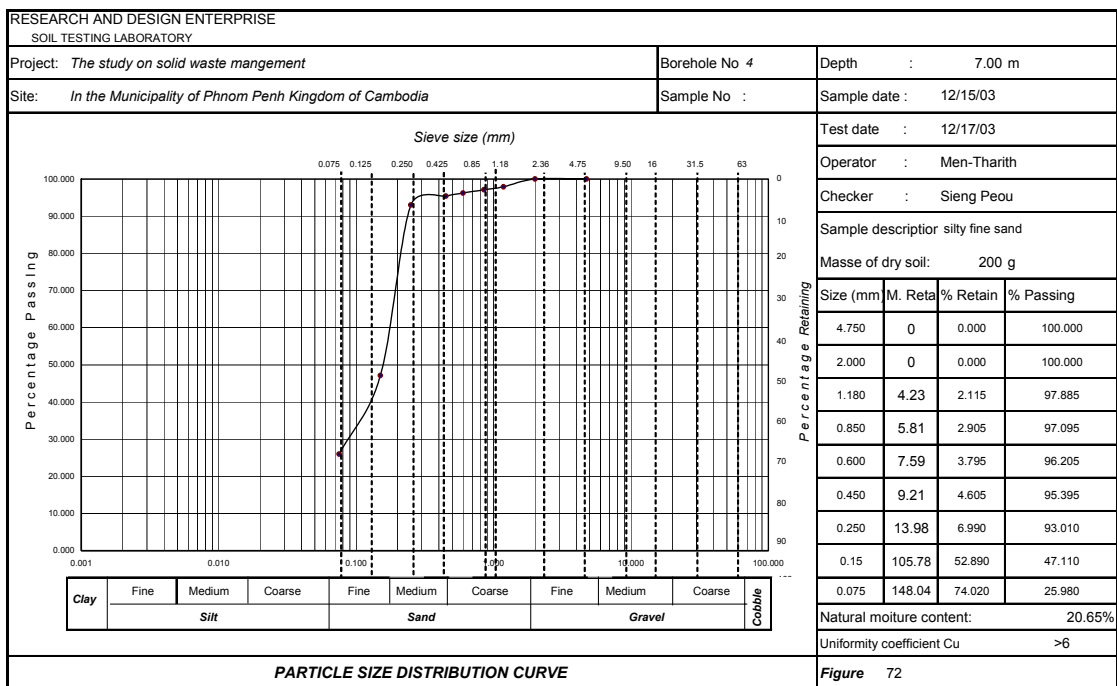
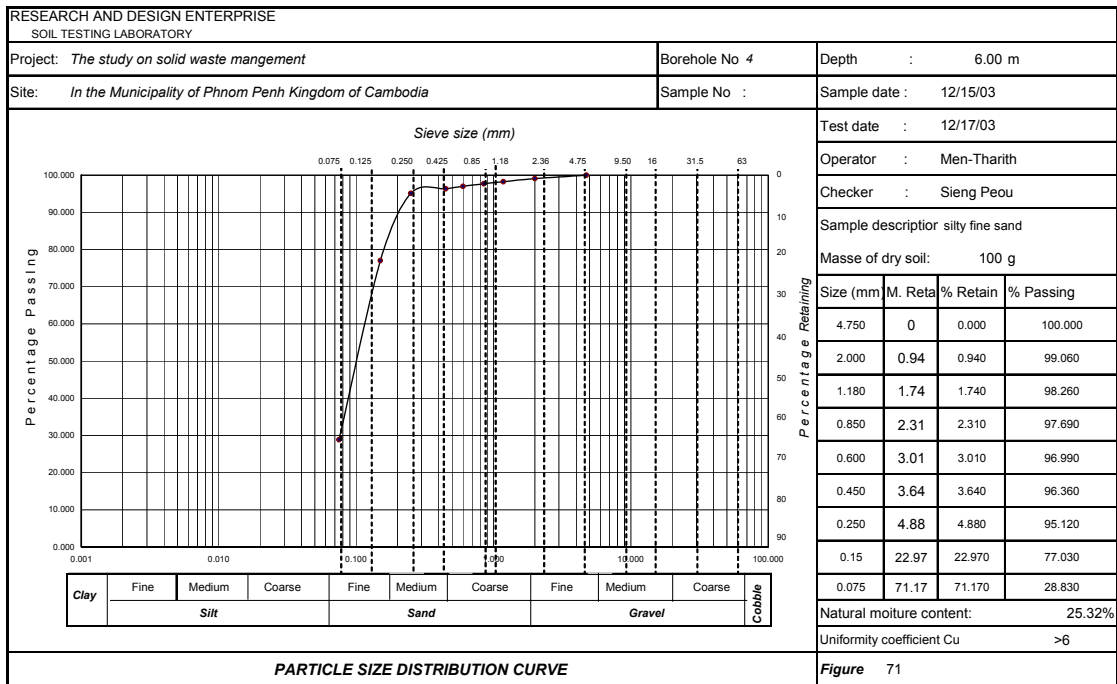


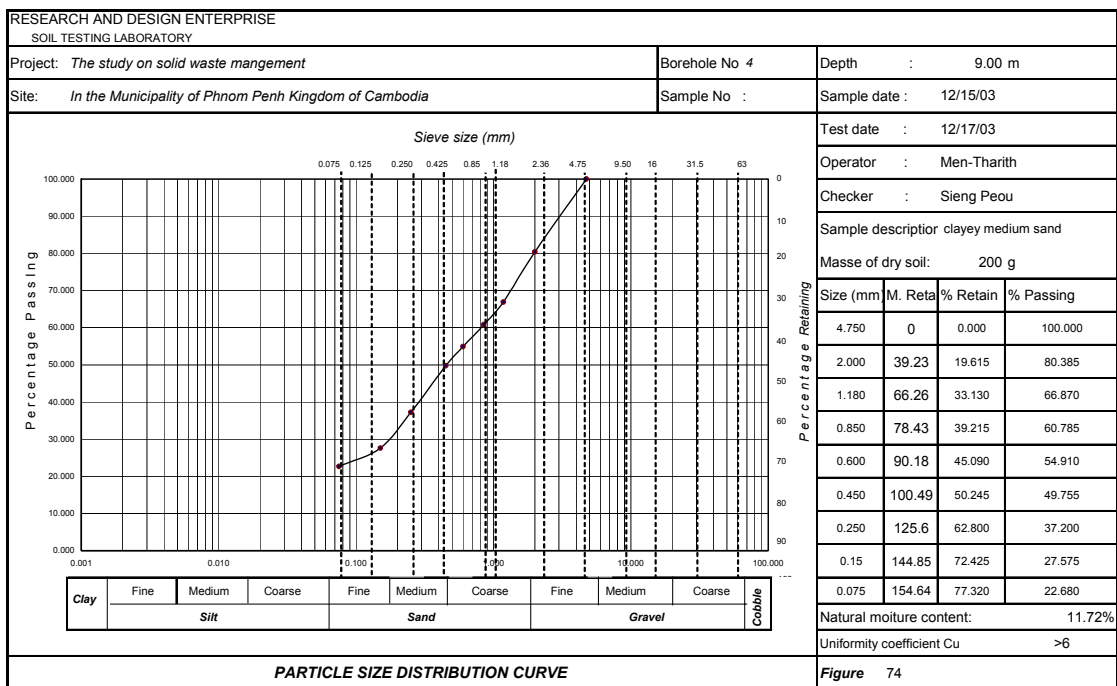
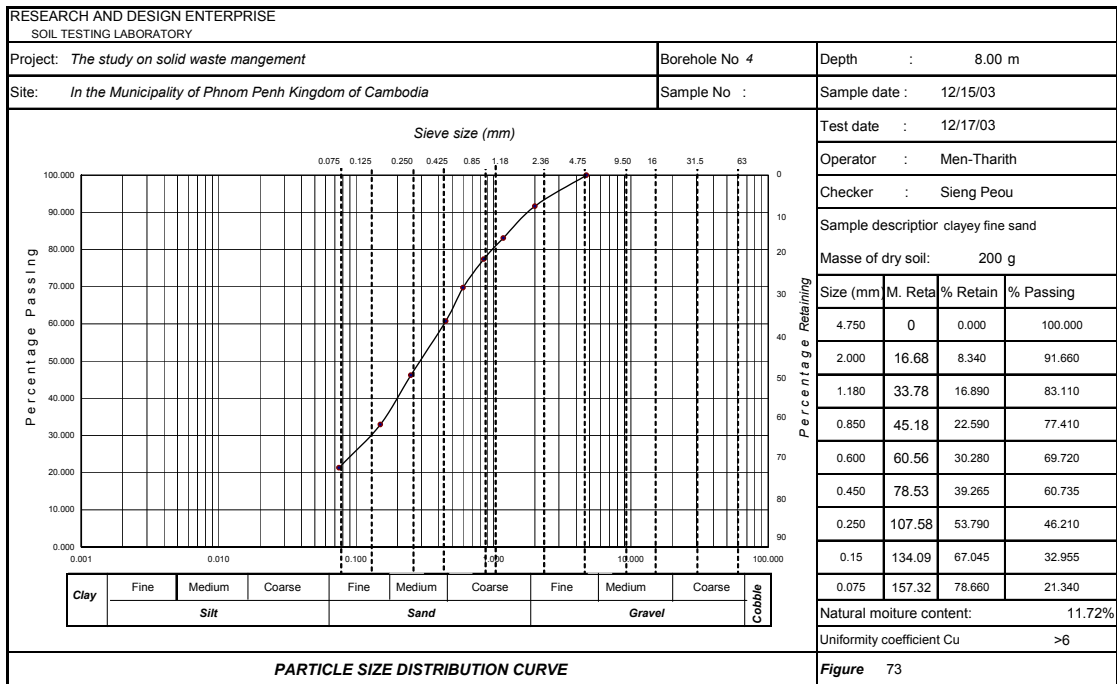


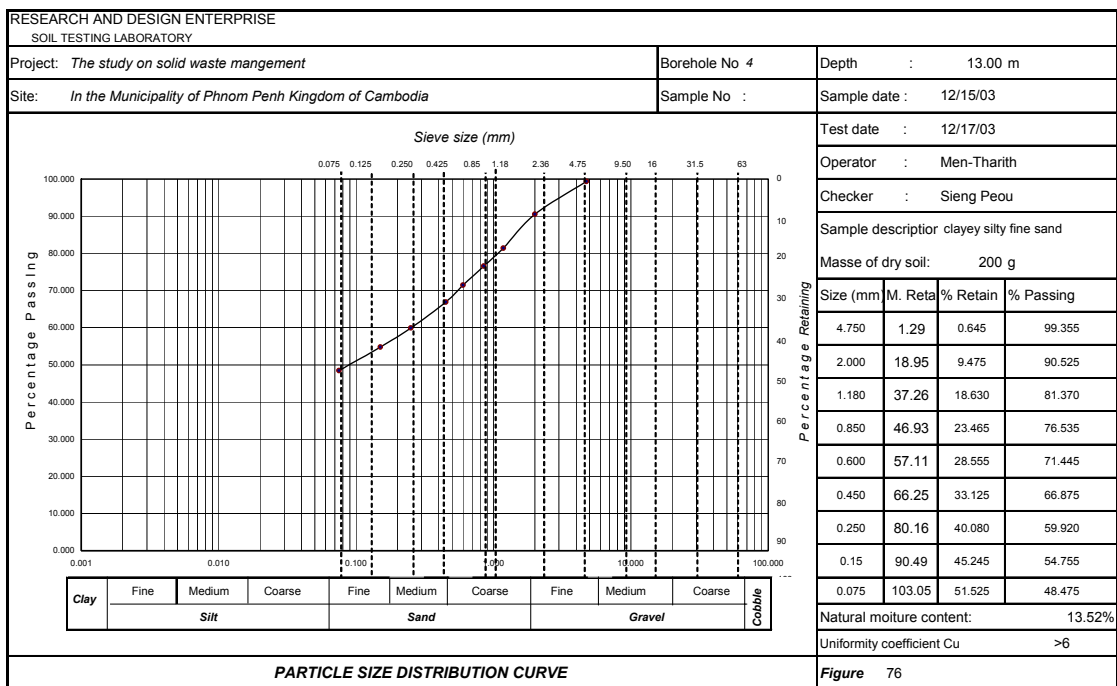
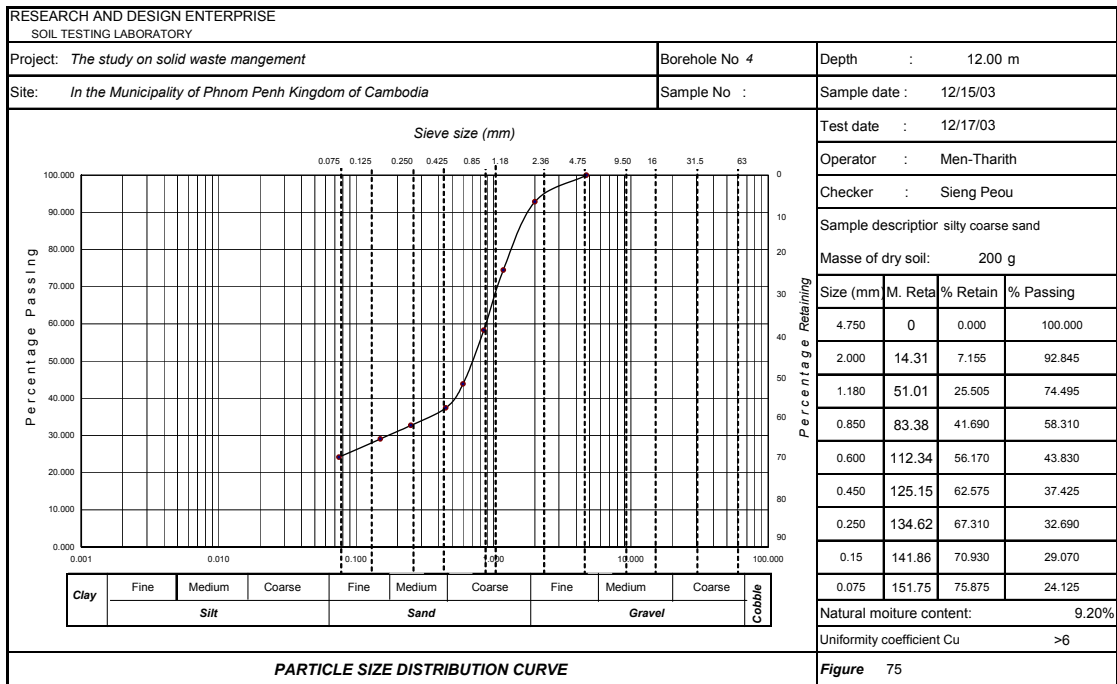












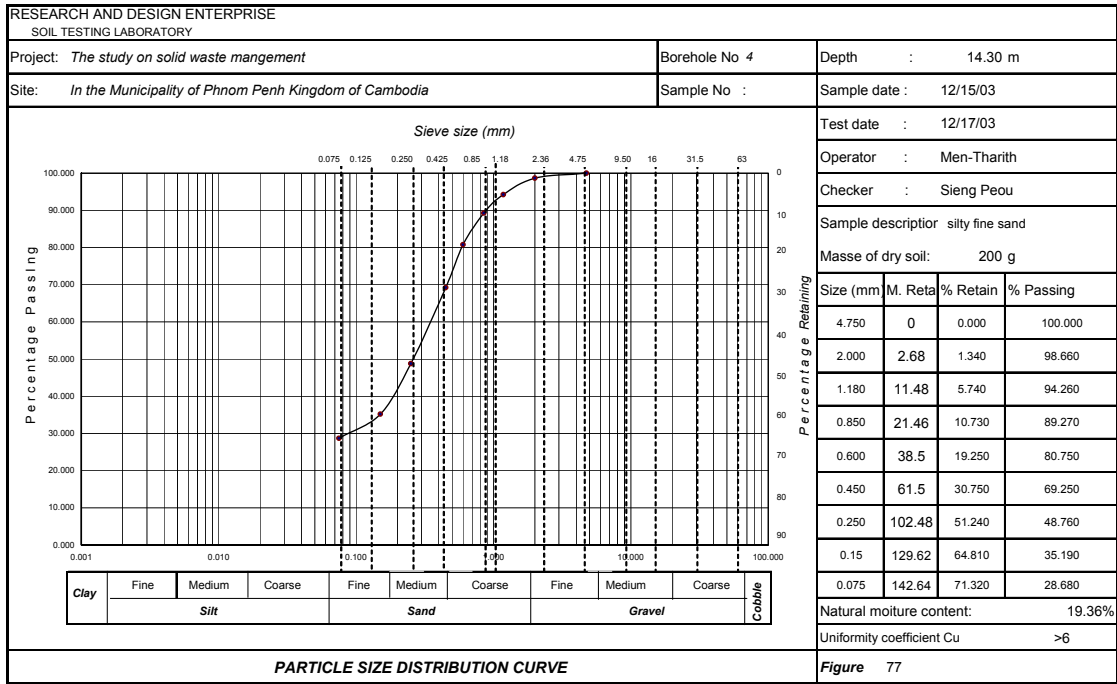


Figure 77

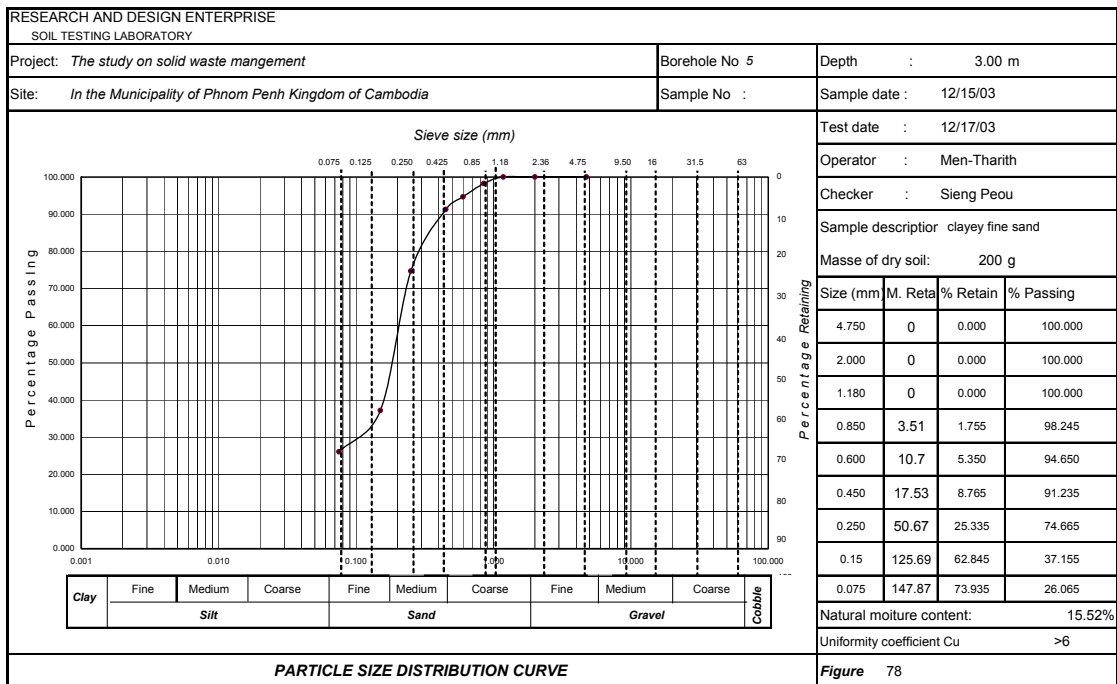
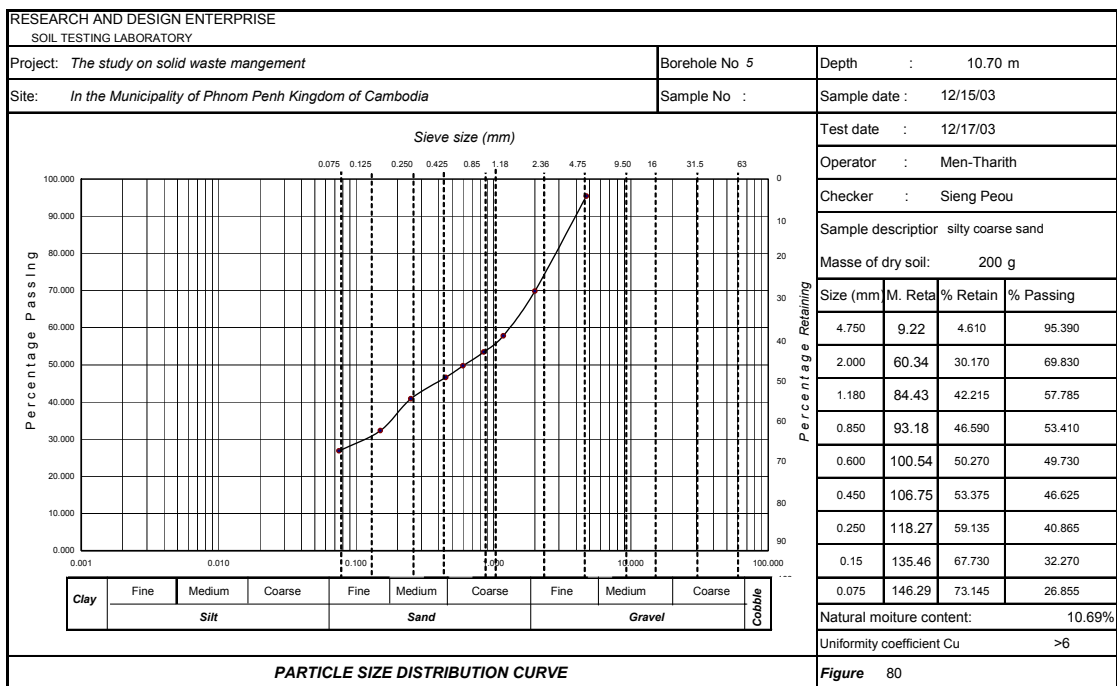
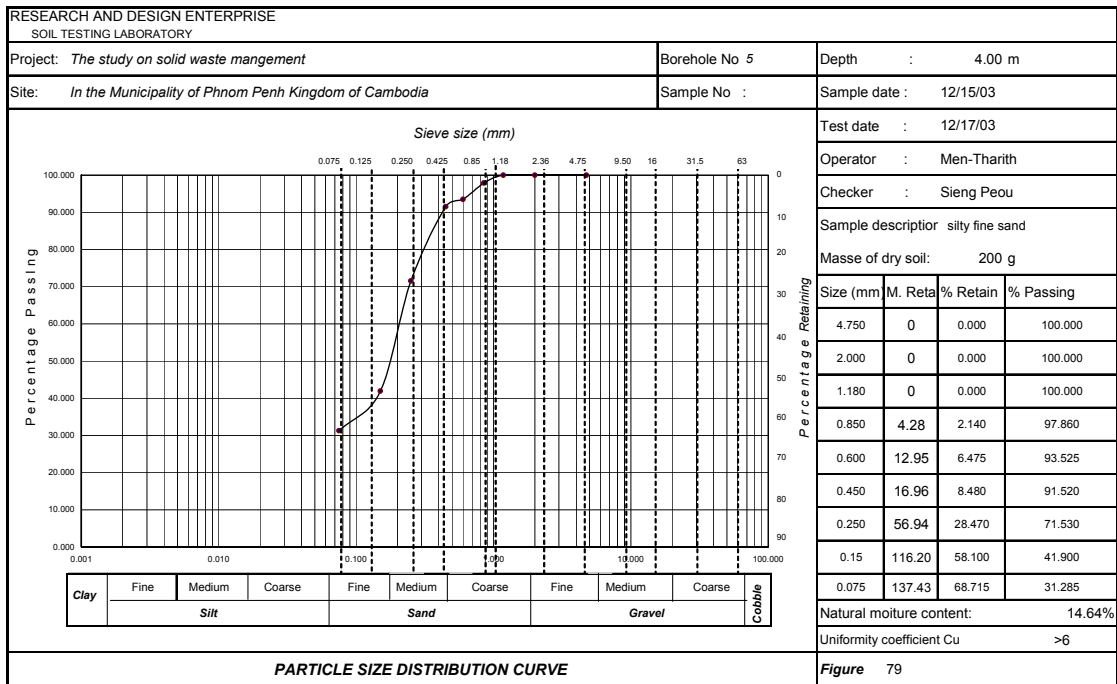
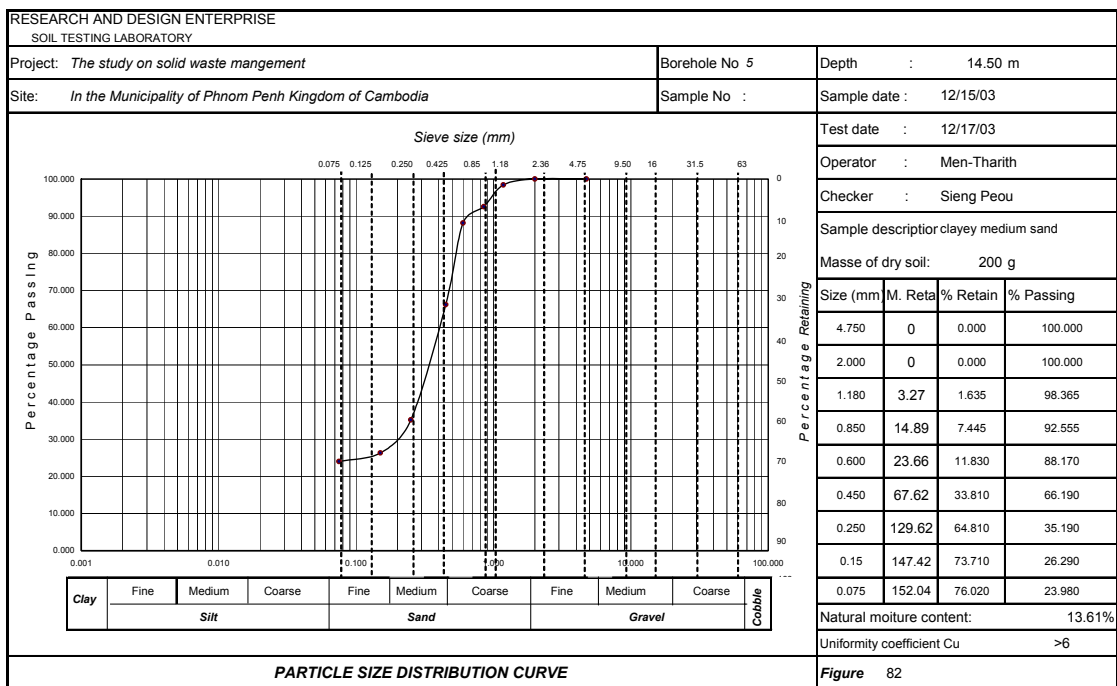
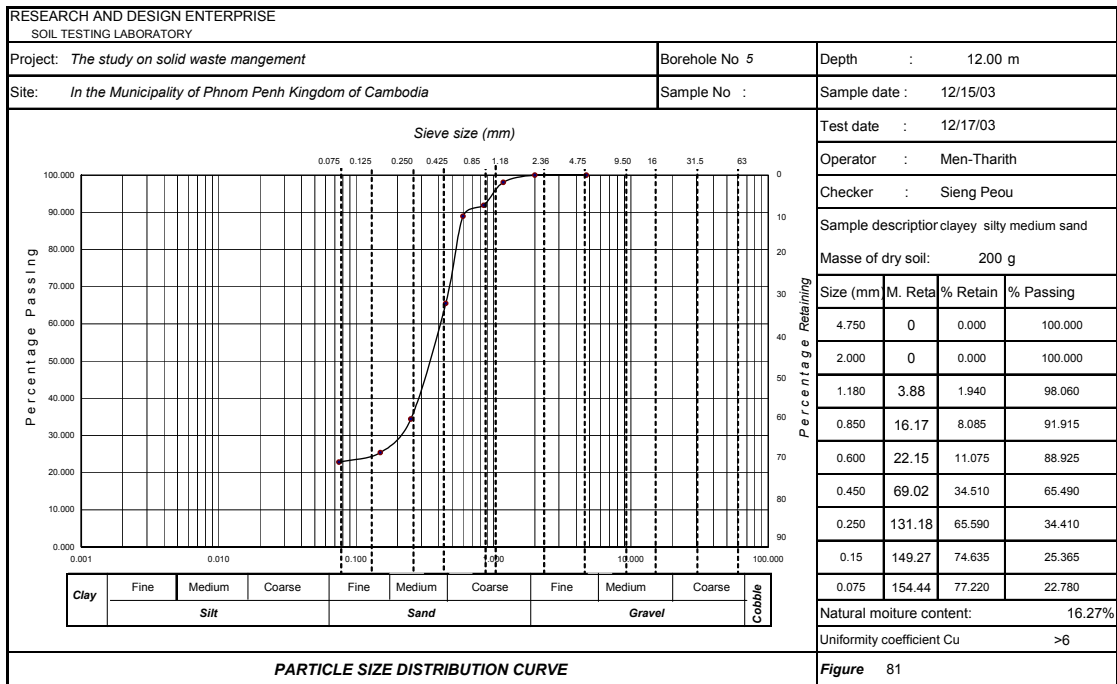


Figure 78

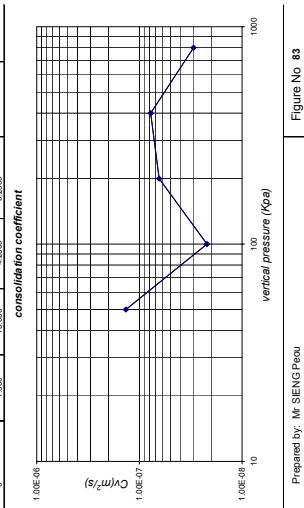




8.6.4 Consolidation Test Result

CONSOLIDATION TEST

Project : The study on solid waste management		Borehole No. : BH-1	
Site : In Municipality of Phnom Penh Kingdom of Cambodia		Date : 24/10/2003	
Depth of sample : 1.50m		Date : 24/10/2003	
Thick. of spec. (mm)	20	Cell No. :	C
Mass (g)	172.62	Diameter of ring (mm)	61.8035
Mass (g)	154.76	Height of ring (mm)	20.00
Mass of ring (g)	43.62	Area of ring (cm ²)	2009.98
Mass of dry spec. (g)	111.34	Volume of ring (cm ³)	60.00
Moisture content (%)	2.14	Moisture ratio (e)	0.0020 (10.9%)
Dry density (g/cm ³)	1.86	Specific gravity (G _s)	0.0014 (10.9%)
Specific gravity (G _s)	2.601	E	3300.34 (kPa)
Day of saturation (S _r)	100.00 %	C _c	0.10304 (10.9%)
Height of soil particles (mm)	14.27	C _u	32.30 (kPa)
Consolid. Coef. (C _v)		e _{max}	180.00 (kPa)
applied pressure (kN/m ²)		total thickness of specimen (mm)	
50	0.520	H-H ₀ (mm)	H-H ₀ (mm)
100	0.730	19.270	5.000
200	1.015	18.805	4.719
400	1.384	18.616	4.549
800	1.915	18.185	3.958
1600	2.720	18.200	3.958
3200	4.010	18.200	4.010
6400	6.030	18.200	4.030
12800	8.590	18.200	4.230
25600	12.800	18.200	4.530
51200	18.800	18.200	4.865

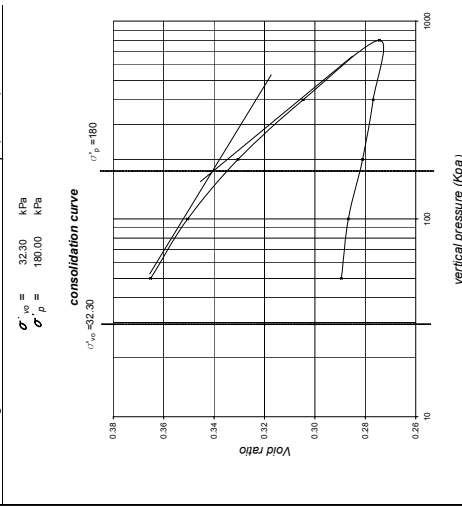


Prepared by: Mr SIENG PEOU

Figure No. 83

CONSOLIDATION CURVE

Project : The study on solid waste management		Borehole No. : BH-1	
Site : In Municipality of Phnom Penh Kingdom of Cambodia		Date : 24/10/2003	
Depth of sample : 1.50m		Date : 24/10/2003	
$\sigma_{v'0}$ (kPa)	32.30	$\sigma_{p'}$ (kPa)	180.00
$\sigma_{p'}$ (kPa)	180.00	$\sigma_{v'0}$ (kPa)	32.30

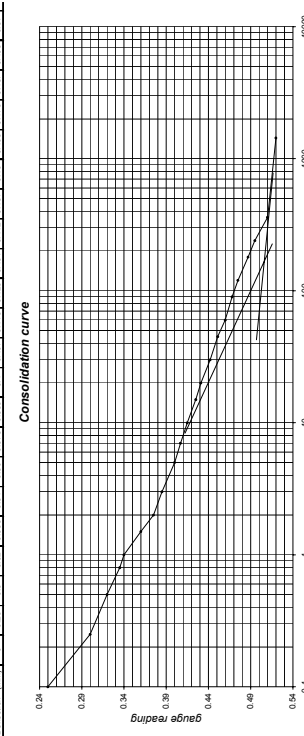


Prepared by: Mr SIENG PEOU

Figure No. 84

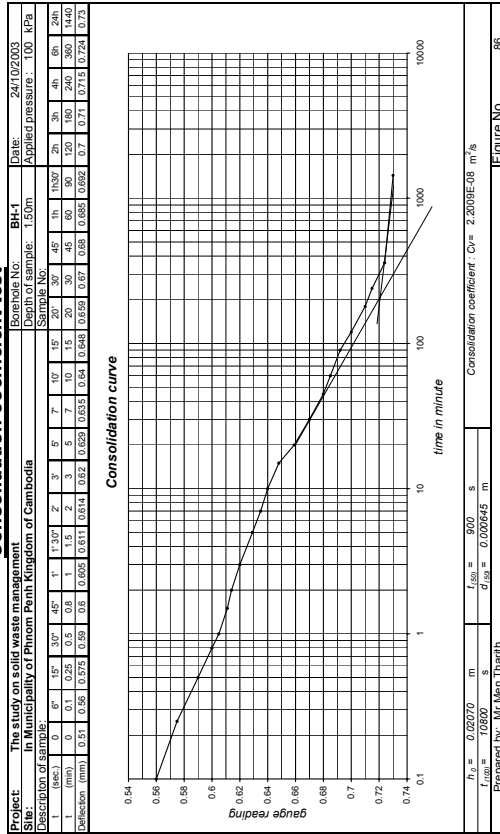
Consolidation coefficient test

Project : The study on solid waste management		Borehole No. : BH-1	
Site : In Municipality of Phnom Penh Kingdom of Cambodia		Date : 24/10/2003	
Depth of sample : 1.50m		Date : 24/10/2003	
Vertical Pressure (kPa)	32.30	Vertical Pressure (kPa)	180.00
Vertical Pressure (kPa)	180.00	Vertical Pressure (kPa)	32.30

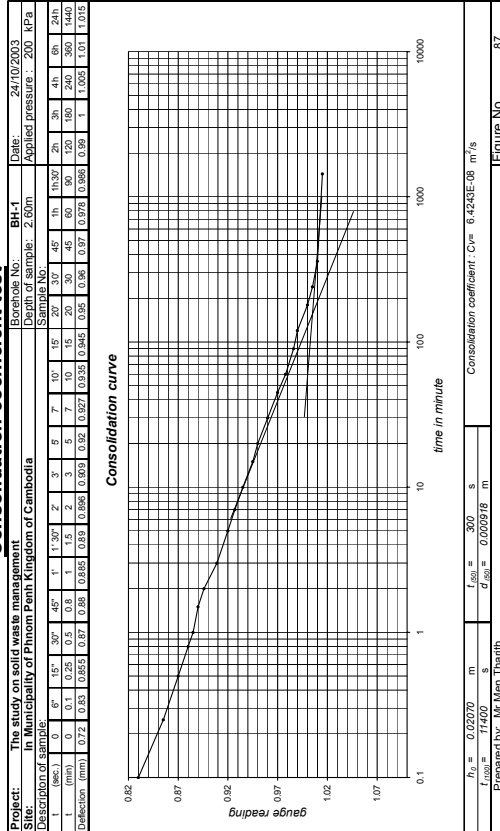


h_v (m)	0.02070	t_{90} (s)	150	Consolidation coefficient (C _v)	1.360E-07 m ² /s
t_{90} (s)	150	d_{90} (m)	0.000378		
Prepared by: Mr Men Tharith					
					Figure No. 85

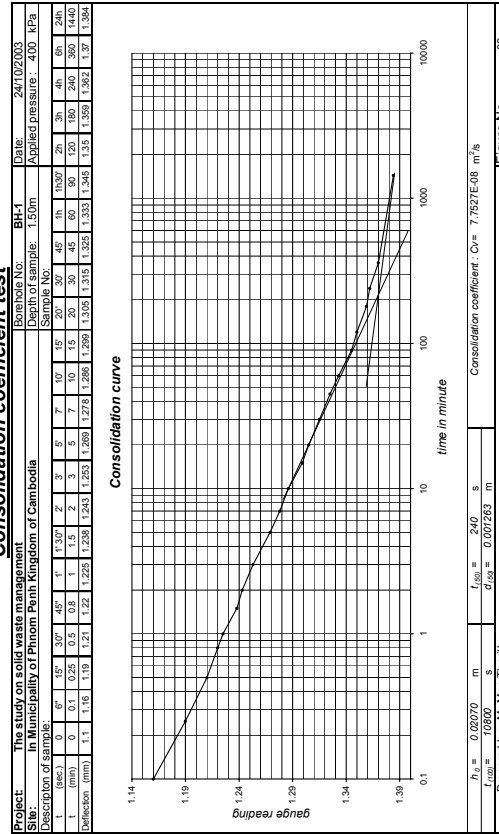
Consolidation coefficient test



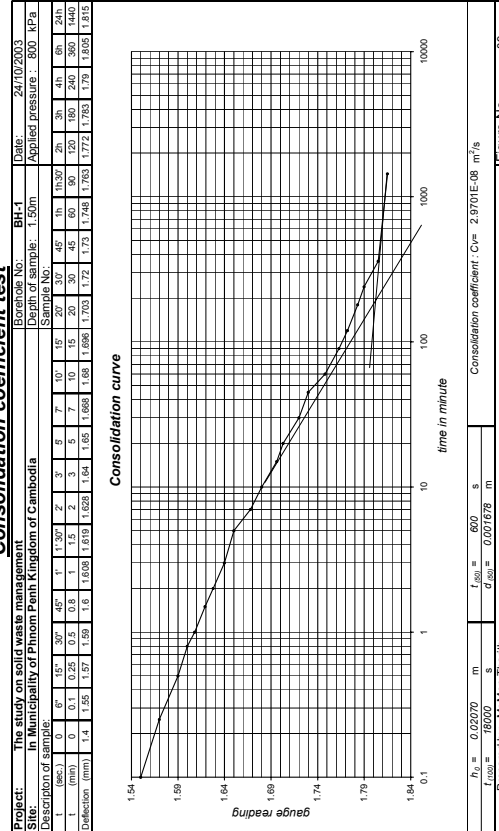
Consolidation coefficient test



Consolidation coefficient test



Consolidation coefficient test

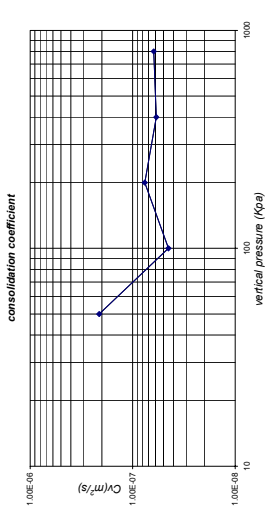


CONSOLIDATION TEST

Project: The study on solid waste management
 Site: In the Municipality of Phnom Penh
 Kingdom of Cambodia

Soil No.:		C	
Borehole No.:		BH-1	
Date:		24/10/2003	
Depth of sample:		4.50m	
Thickness of disc:	H	20.03	mm
Mass of wet soil:	M	108.78	g
Mass of dry soil:	M _d	81.803	mm
Height of ring:	h	20.00	mm
Area of ring:	A	2099.98	mm ²
Volume of ring:	V _r	60.00	cm ³
Water content:	w	22.37	%
Void ratio:	e	0.56341	
Dry density:	ρ _d	1.36	g/cm ³
Specific gravity:	G _s	2.61	
Swelling pressure:	S _p	9217.75	kPa
Day of saturation:	S _d	0.12101	(160%)
No. of soil particles:	N _p	92.92	kN
Consolidation Coef. C _v		20.00	kN

Applied pressure (kPa)	Thickness of specimen (mm)	Height of voids (mm)	Void ratio	e _v	σ _v (kPa)	σ _v (kPa)	K (kN)
0	19.992	19.992	0.928	0.928	2.11527	2.0384110	
100	19.945	19.925	0.9001	0.9128	4.47528	4.0819111	
200	19.903	19.903	0.8281	0.8493	7.62528	7.0799111	
400	1.105	18.935	0.9001	0.8269	6.86528	6.5699111	
600	1.004	18.968	0.9011	0.8156	6.21528	6.0069111	
800	1.000	18.930	0.9051	0.8156			
1000	1.000	18.970	0.9051	0.8136			
50	1.940	18.490	0.9511	0.8136			
0	1.900	18.530	0.9511	0.8136			



Prepared by: Mr SIENG Peou

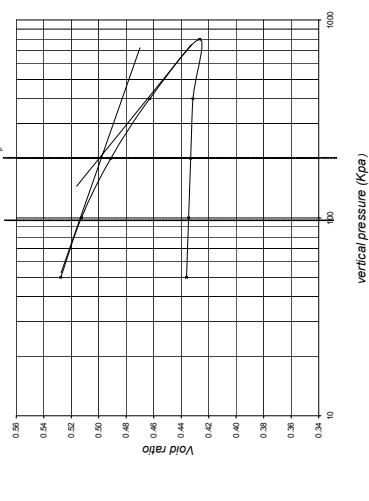
Figure No 90

CONSOLIDATION CURVE

Project: The study on solid waste management
 Site: In the Municipality of Phnom Penh
 Kingdom of Cambodia

Borehole No.: BH-1
 Date: 24/10/2003
 Depth of sample: 4.50m

σ_v = 92.52 kPa
 σ_p = 200.00 kPa



Prepared by: Mr SIENG Peou

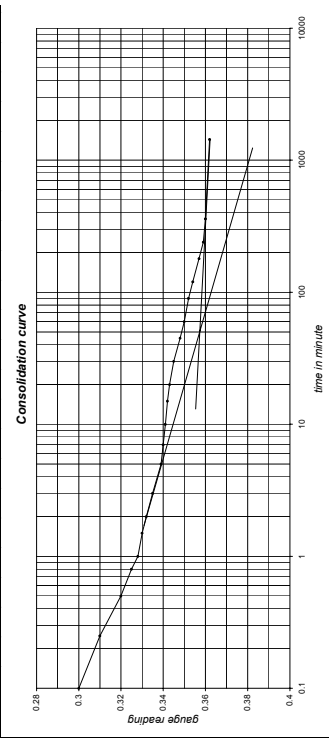
Figure No 91

Consolidation coefficient test

Project: The study on solid waste management
 Site: In the Municipality of Phnom Penh
 Kingdom of Cambodia

Soil No.: C
 Borehole No.: BH-1
 Date: 24/10/2003
 Depth of sample: 4.50m

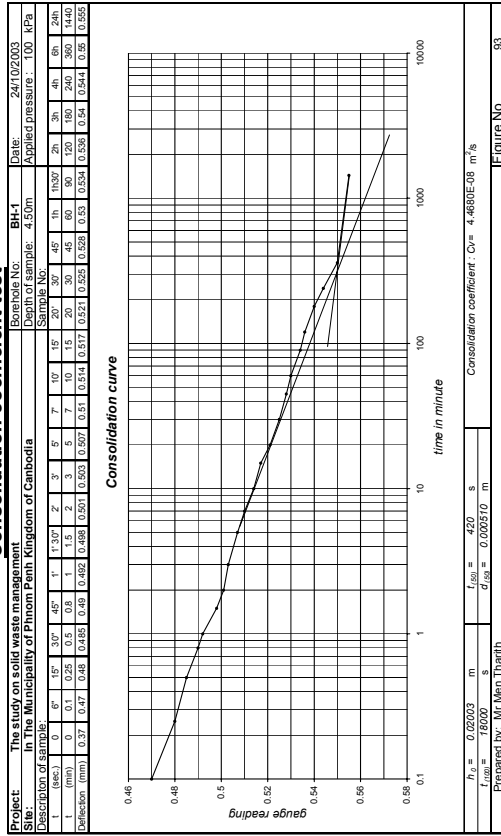
Time (min)	0	15'	30'	45'	1'	1'30"	2'	3'	5'	7'	10'	15'	20'	30'	45'	1h	1h30'	2h	3h	4h	6h
Depth of sample (mm)	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
Vertical stress (kPa)	0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0



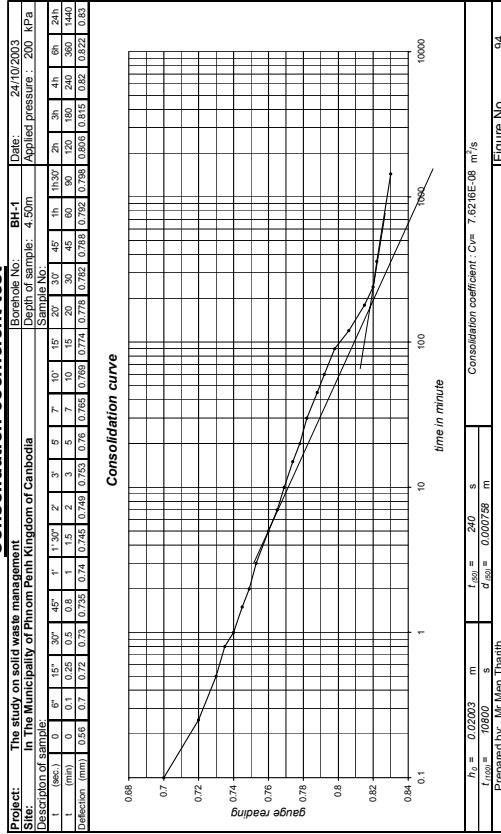
Prepared by: Mr Men Thanth

Figure No 92

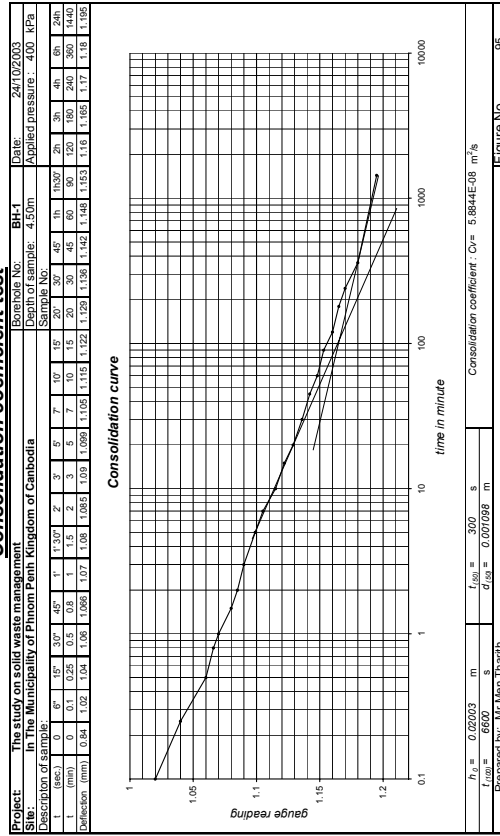
Consolidation coefficient test



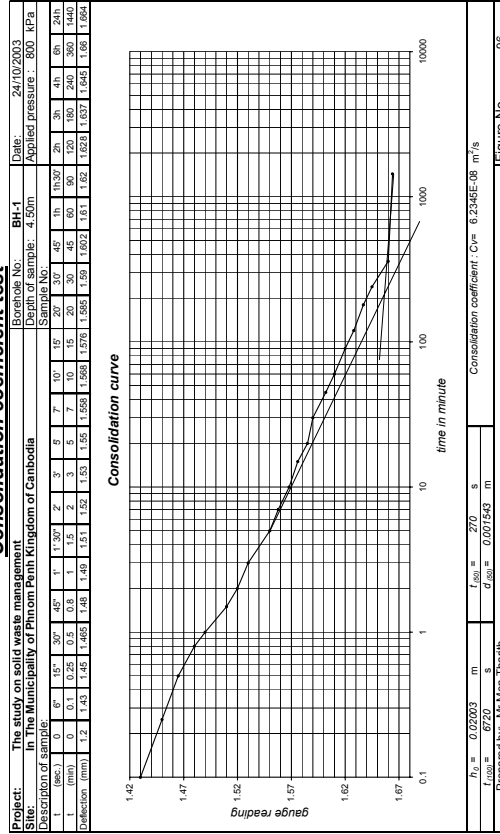
Consolidation coefficient test



Consolidation coefficient test



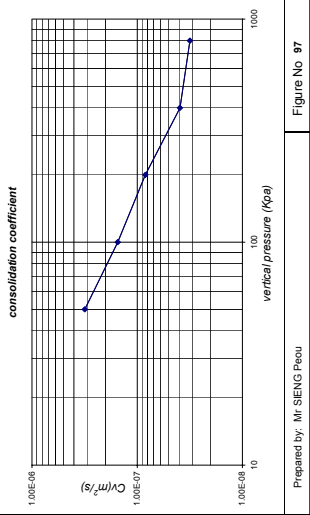
Consolidation coefficient test



CONSOLIDATION TEST

Project : The study on solid waste management		Borehole No: BH-1
Site : In Municipality of Phnom Penh Kingdom of Cambodia		Date : 24/10/2020
Thickness of spec. : 20.125 mm	Depth of sample : 2.60m	C
Mass dry weight spec. : 184.78 g	Diameter of ring : 61.8035 mm	
Mass of ring : 144.28 g	Height of ring : 20.00 mm	
Mass of dry spec. : 103.58 g	Area of ring : 2099.98 mm ²	
Moisture content : w = 20.38 %	Volume of ring : 60.00 cm ³	
Specific gravity : G _s = 2.719	Void ratio e = 0.92555	(1.05%)
Moisture content : w = 20.38 %	Porosity n = 0.20253	(1.05%)
Specific gravity : G _s = 2.719	W ₁₀₀ = 17.0010	MPa
Moisture content : w = 20.38 %	Sw = 0.51974	(1.05%)
Specific gravity : G _s = 2.719	Sk = 82.426	MPa
Moisture content : w = 20.38 %	Sk = 180.00	MPa

Vertical stress	Horizontal stress	Height of specimen	void ratio	C _v	K
σ _v (kPa)	σ _h (kPa)	H (mm)	e	min	min
0	0	18.625	0.7264	0.5284	1.000E-04
50	0	18.625	0.7264	0.5284	3.16E-07
100	0	18.625	0.6494	0.5032	4.454E-11
200	0	18.625	0.5984	0.4777	8.39E-08
400	0	18.625	0.5294	0.4131	3.52E-08
800	0	18.625	0.4754	0.3497	7.439E-11
1600	0	18.625	0.4254	0.3014	3.6329E-11
3200	0	18.625	0.3953		
6400	0	18.625	0.3770		
12800	0	18.625	0.3648		



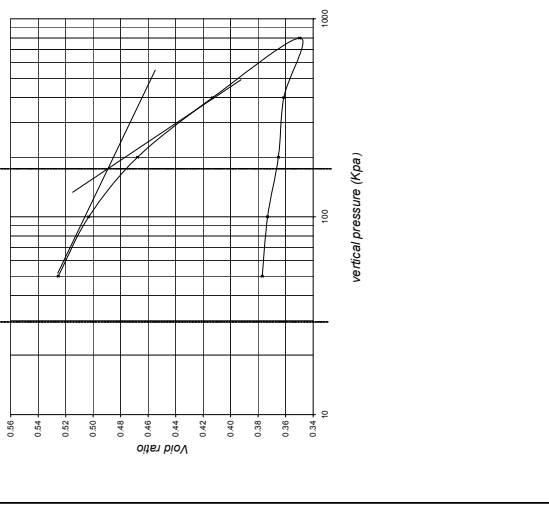
Prepared by: Mr. SIENG PEOU

Figure No 97

CONSOLIDATION CURVE

Project : The study on solid waste management		Borehole No: BH-1
Site : In Municipality of Phnom Penh Kingdom of Cambodia		Date : 24/10/2020
Depth of sample : 2.60m		

$\sigma'_{v0} = 52.45$ kPa
 $\sigma'_p = 180.00$ kPa
 $\sigma'_{v0} = 52.45$
 $\sigma'_p = 180.00$

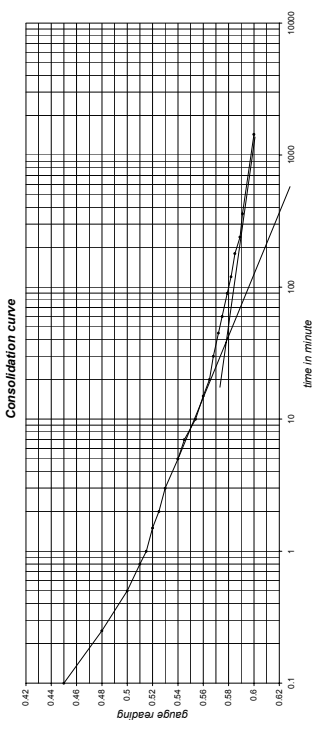


Prepared by: Mr. SIENG PEOU

Figure No 98

Consolidation coefficient test

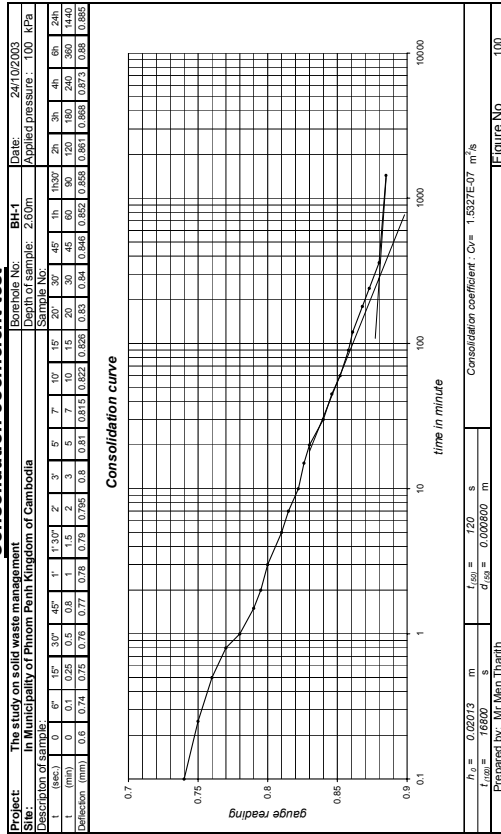
Project : The study on solid waste management		Borehole No: BH-1	
Site : In Municipality of Phnom Penh Kingdom of Cambodia		Date : 24/10/2020	
Depth of sample : 2.60m		Applied pressure : 50	
Sample No	Time (min)	Height (mm)	Void ratio (e)
1	0	19.00	0.545
2	15	18.95	0.545
3	30	18.90	0.545
4	45	18.85	0.545
5	60	18.80	0.545
6	75	18.75	0.545
7	90	18.70	0.545
8	105	18.65	0.545
9	120	18.60	0.545
10	135	18.55	0.545
11	150	18.50	0.545
12	165	18.45	0.545
13	180	18.40	0.545
14	195	18.35	0.545
15	210	18.30	0.545
16	225	18.25	0.545
17	240	18.20	0.545
18	255	18.15	0.545
19	270	18.10	0.545
20	285	18.05	0.545
21	300	18.00	0.545



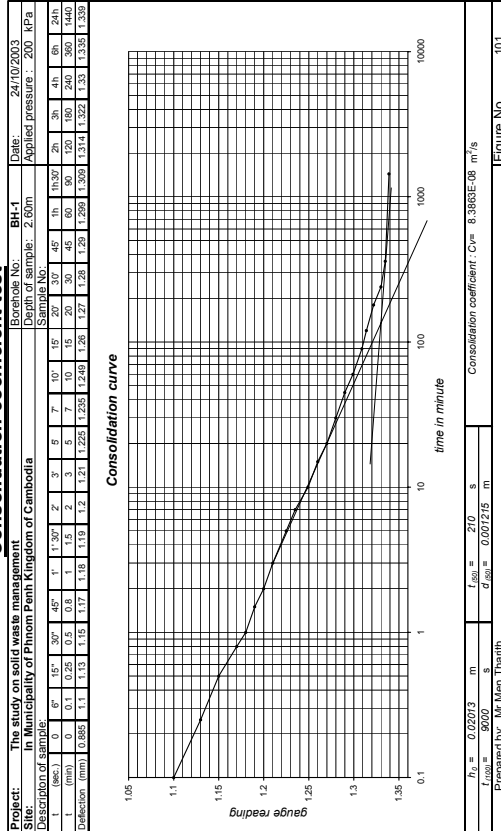
$T_{50} = 0.0293$ m
 $T_{90} = 0.0290$ m
 $C_v = 0.02915$ m
 $C_{\alpha} = 3.158E-07$ m²/s
 Prepared by: Mr. Man Tharith

Figure No 99

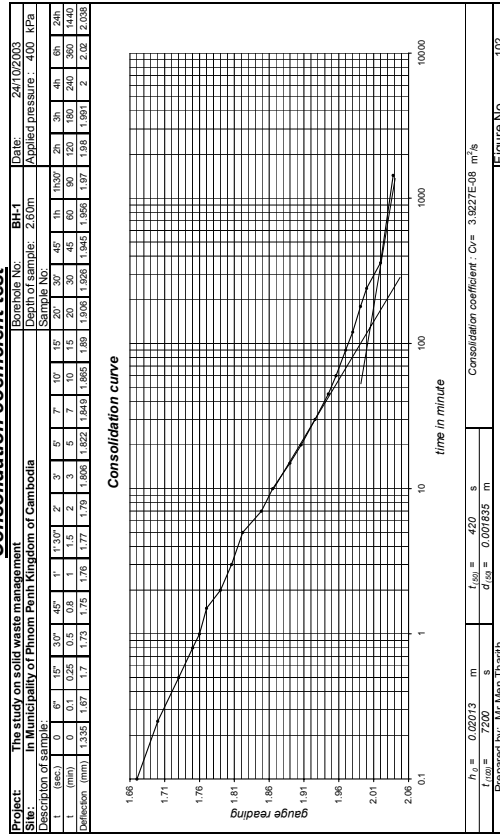
Consolidation coefficient test



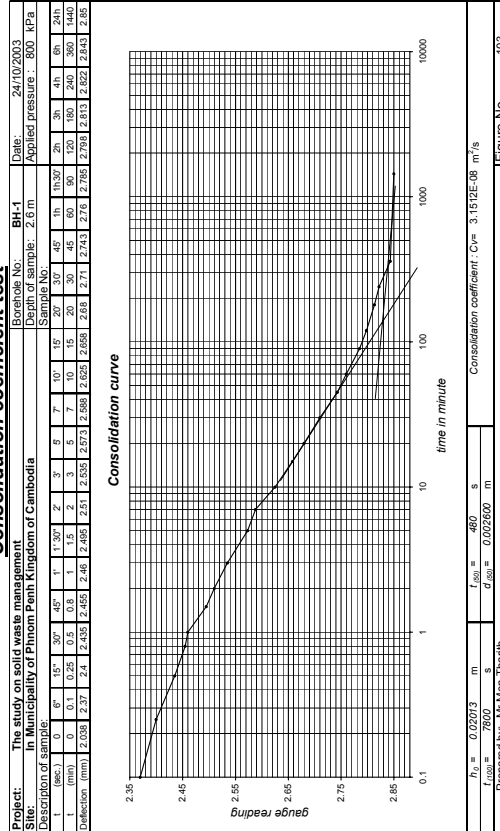
Consolidation coefficient test



Consolidation coefficient test



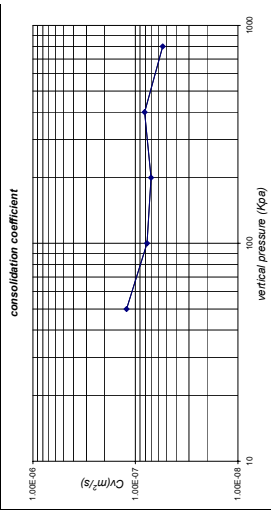
Consolidation coefficient test



CONSOLIDATION TEST

Project : The study on solid waste management		Borehole No. : BH-1
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 02/11/2003
Thickness of spec. : 20 mm		Depth of sample : 7.50m
Mass ring wet spec. : 148.85 g		Diameter of ring : 61.8033 mm
Mass of dry spec. : 105.15 g		Height of ring : 20.00 mm
Area of ring : 43.7 g		Area of ring : 2099.95 mm ²
Moisture content : 19.13 %		Volume of ring : 60.00 cm ³
Bulk density : 2.00 g/cm ³		Void ratio e : 0.4834
Specific gravity : 2.70 g/cm ³		Swelling index : 0.0000
Moisture content : 102.84 %		Compression index : 0.2423
Consolid. Coef. Cv : 1.00E-07		Swelling index : 0.0000
Consolid. Coef. Cv : 1.00E-07		Swelling index : 0.0000

Vertical pressure (kPa)	Void ratio	Swelling index	Compression index
0	0.300	0.0000	0.0000
50	0.300	0.0000	0.0000
100	0.300	0.0000	0.0000
200	0.300	0.0000	0.0000
400	0.300	0.0000	0.0000
800	0.300	0.0000	0.0000
1600	0.300	0.0000	0.0000
3200	0.300	0.0000	0.0000
6400	0.300	0.0000	0.0000
12800	0.300	0.0000	0.0000
25600	0.300	0.0000	0.0000
51200	0.300	0.0000	0.0000
102400	0.300	0.0000	0.0000

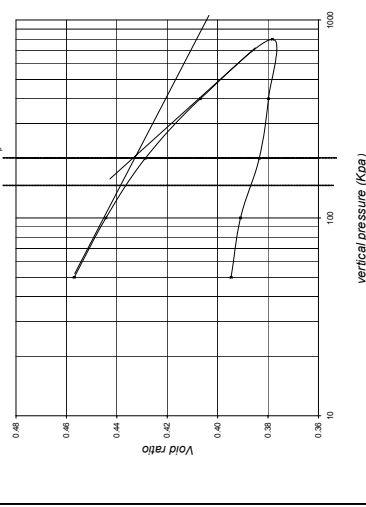


Prepared by: Mr SIENG Pheu Figure No. 104

CONSOLIDATION CURVE

Project : The study on solid waste management		Borehole No. : BH-1
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 02/11/2003
Thickness of spec. : 20 mm		Depth of sample : 7.50m
Mass ring wet spec. : 148.85 g		Diameter of ring : 61.8033 mm
Mass of dry spec. : 105.15 g		Height of ring : 20.00 mm
Area of ring : 43.7 g		Area of ring : 2099.95 mm ²
Moisture content : 19.13 %		Volume of ring : 60.00 cm ³
Bulk density : 2.00 g/cm ³		Void ratio e : 0.4834
Specific gravity : 2.70 g/cm ³		Swelling index : 0.0000
Moisture content : 102.84 %		Compression index : 0.2423
Consolid. Coef. Cv : 1.00E-07		Swelling index : 0.0000
Consolid. Coef. Cv : 1.00E-07		Swelling index : 0.0000

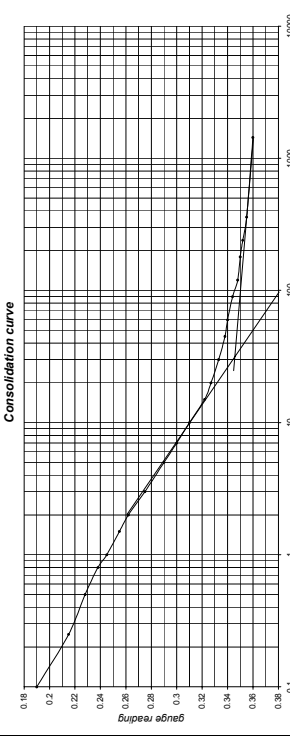
Vertical pressure (kPa)	Void ratio
0	0.48
50	0.48
100	0.48
200	0.48
400	0.48
800	0.48
1600	0.48
3200	0.48
6400	0.48
12800	0.48
25600	0.48
51200	0.48
102400	0.48



Prepared by: Mr SIENG Pheu Figure No. 105

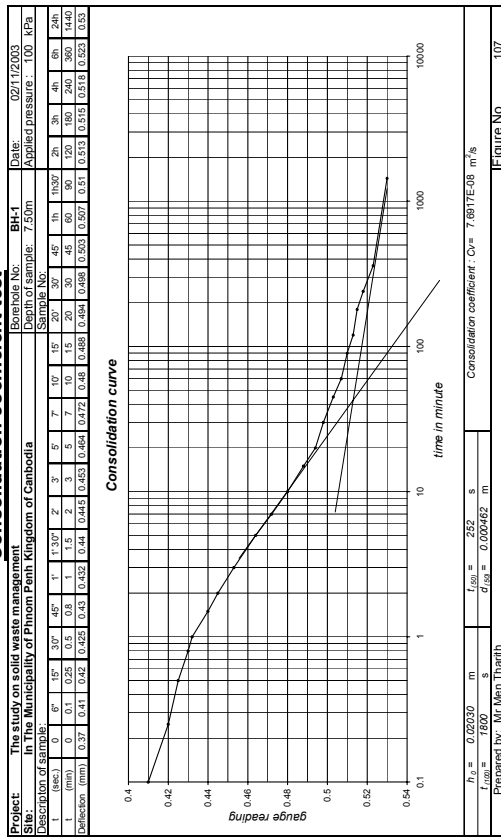
CONSOLIDATION COEFFICIENT TEST

Project : The study on solid waste management		Borehole No. : BH-1
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 02/11/2003
Thickness of spec. : 20 mm		Depth of sample : 7.50m
Mass ring wet spec. : 148.85 g		Diameter of ring : 61.8033 mm
Mass of dry spec. : 105.15 g		Height of ring : 20.00 mm
Area of ring : 43.7 g		Area of ring : 2099.95 mm ²
Moisture content : 19.13 %		Volume of ring : 60.00 cm ³
Bulk density : 2.00 g/cm ³		Void ratio e : 0.4834
Specific gravity : 2.70 g/cm ³		Swelling index : 0.0000
Moisture content : 102.84 %		Compression index : 0.2423
Consolid. Coef. Cv : 1.00E-07		Swelling index : 0.0000
Consolid. Coef. Cv : 1.00E-07		Swelling index : 0.0000

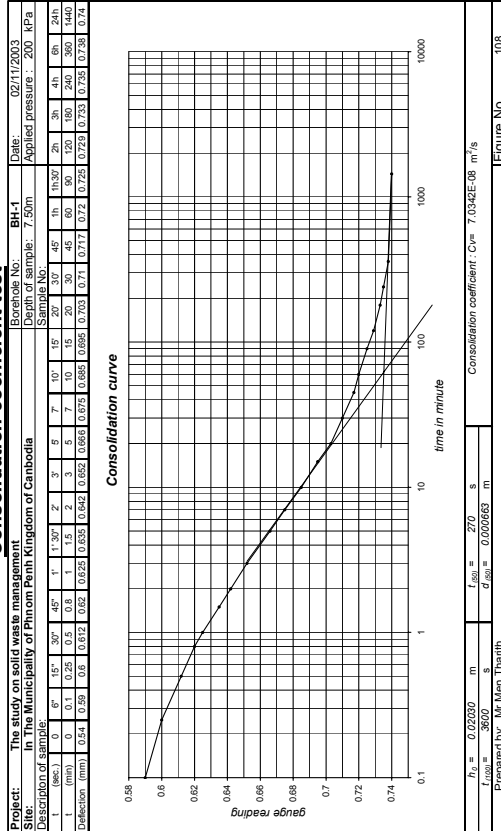


Prepared by: Mr Mhen Haruth Figure No. 106

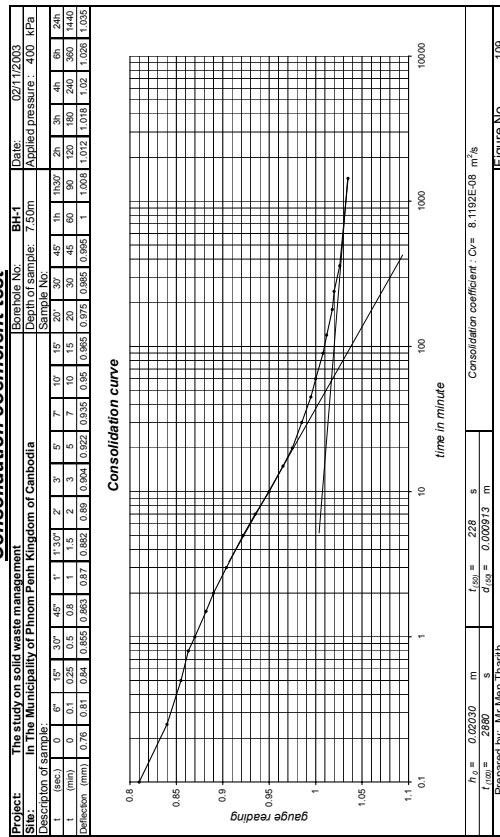
Consolidation coefficient test



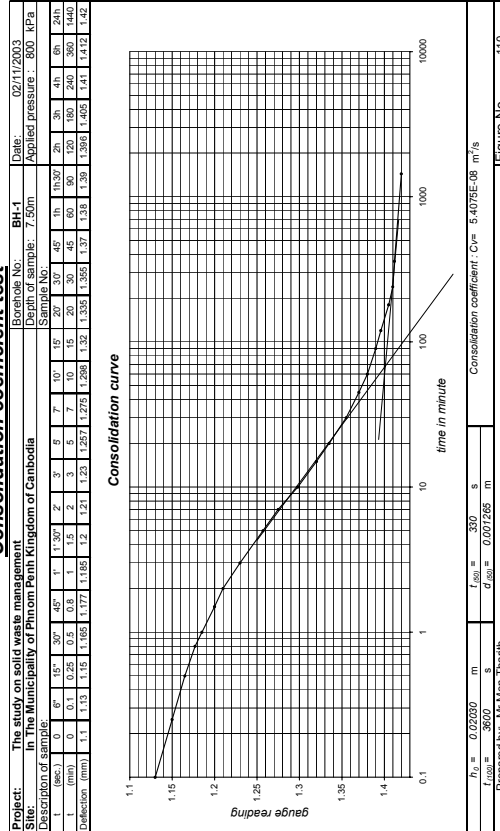
Consolidation coefficient test



Consolidation coefficient test



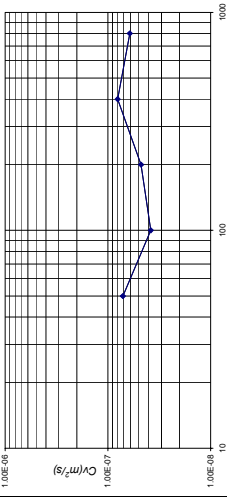
Consolidation coefficient test



CONSOLIDATION TEST

Project : The study on solid waste management		Borehole No. : BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 29/10/2023
		Depth of sample : 1.53m
Thickness of disc (mm)	25	Cu
Mass of dry soil (g)	150.62	Height of ring (mm)
Mass of dry soil (g)	150.62	20.00
Mass of dry soil (g)	150.62	20.00
Mass of dry soil (g)	150.62	20.00
Water content (%)	14.98	Water content (%)
Water content (%)	14.98	14.98
Void ratio e	0.54228	Void ratio e
Dry density ρ_d	1.90	Dry density ρ_d
Dry density ρ_d	1.90	1.90
Specific gravity G_s	2.727	Specific gravity G_s
Specific gravity G_s	2.727	2.727
Day of saturation S_p	86.96	Day of saturation S_p
Day of saturation S_p	86.96	86.96
Height of soil particles (mm)	13.23	Height of soil particles (mm)
Height of soil particles (mm)	13.23	13.23
Consolid. Coef. C_v	0.1307	Consolid. Coef. C_v
Consolid. Coef. C_v	0.1307	0.1307

Applied pressure (kPa)	Thickness of specimen (mm)	Height of void (mm)	Void ratio e	Consolidation coefficient C_v
0	18.200	4.5750	0.3782	
50	18.200	4.5750	0.3782	
100	18.200	4.5750	0.3782	
150	18.200	4.5750	0.3782	
200	18.200	4.5750	0.3782	
300	18.200	4.5750	0.3782	
400	18.200	4.5750	0.3782	
500	18.200	4.5750	0.3782	
600	18.200	4.5750	0.3782	
700	18.200	4.5750	0.3782	
800	18.200	4.5750	0.3782	
900	18.200	4.5750	0.3782	
1000	18.200	4.5750	0.3782	



Prepared by: Mr SIENG POU

Figure No 111

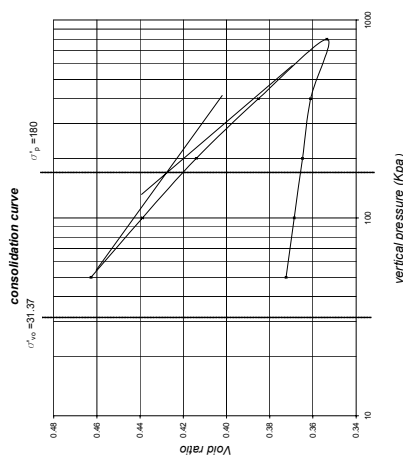
CONSOLIDATION CURVE

Project : The study on solid waste management		Borehole No. : BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 29/10/2023
		Depth of sample : 1.53m

Vertical stress $\sigma_v = 180.00$ kPa

Horizontal stress $\sigma_h = 31.37$ kPa

Effective stress $\sigma'_v = 180.00 - 31.37 = 148.63$ kPa

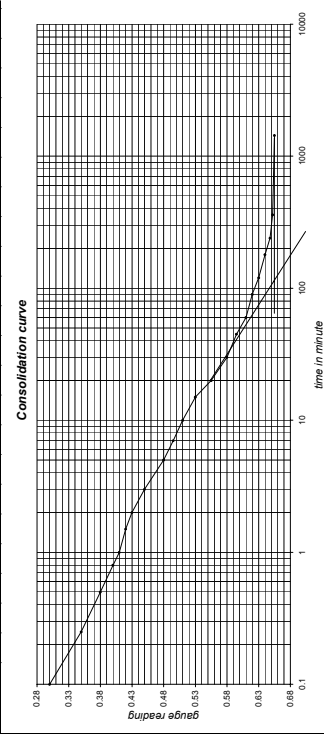


Prepared by: Mr SIENG POU

Figure No 112

Consolidation coefficient test

Project : The study on solid waste management		Borehole No. : BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 29/10/2023
		Depth of sample : 1.53 m



Vertical stress $\sigma_v = 180.00$ kPa

Horizontal stress $\sigma_h = 31.37$ kPa

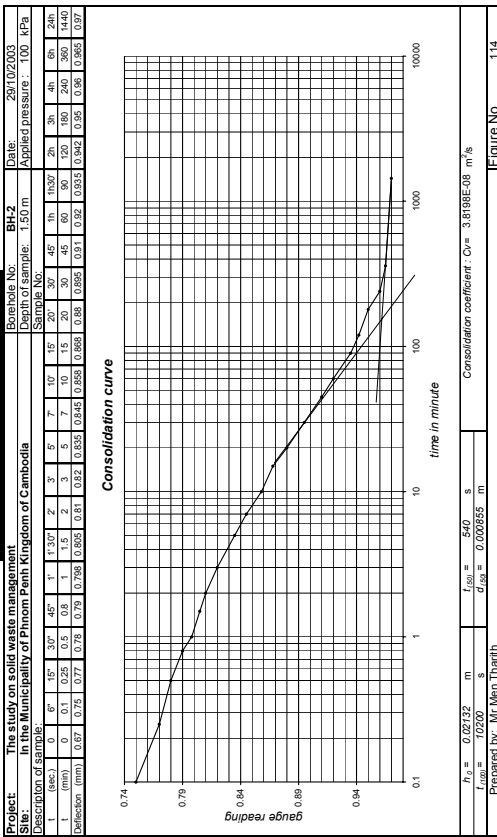
Effective stress $\sigma'_v = 180.00 - 31.37 = 148.63$ kPa

Consolidation coefficient $C_v = 0.1307$

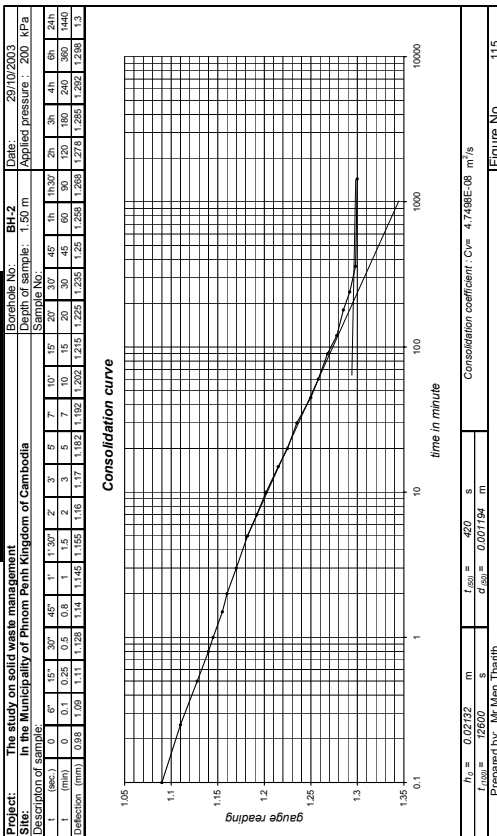
Prepared by: Mr. Ben Math

Figure No 113

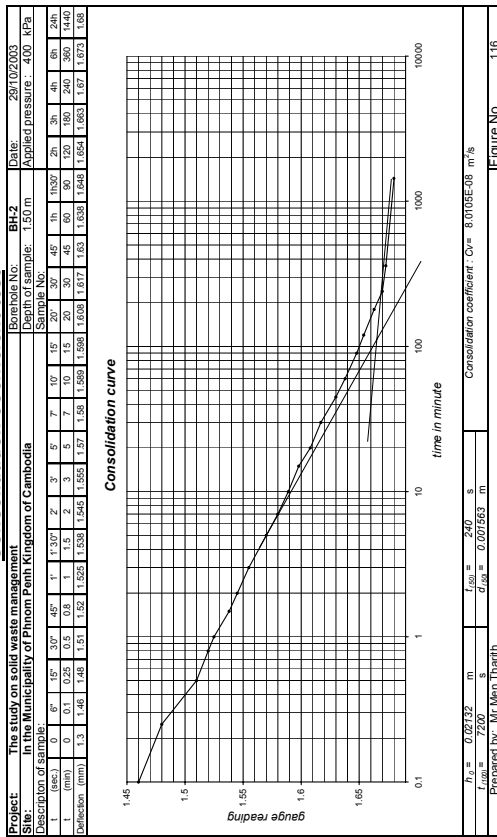
Consolidation coefficient test



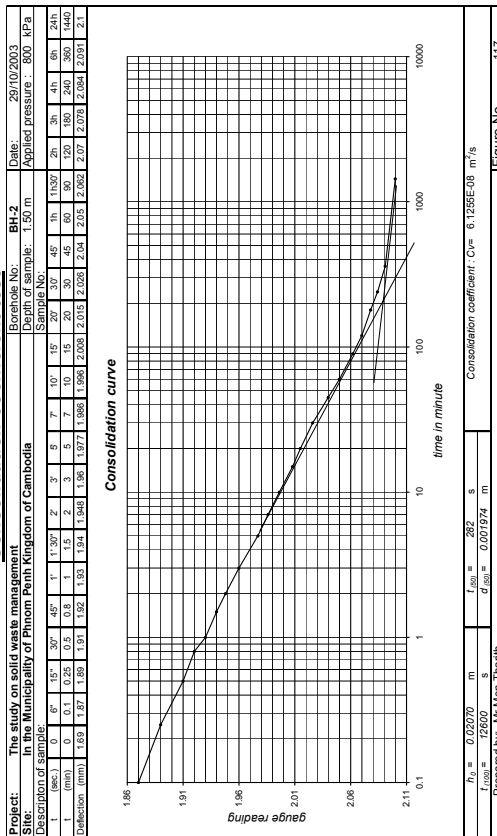
Consolidation coefficient test



Consolidation coefficient test

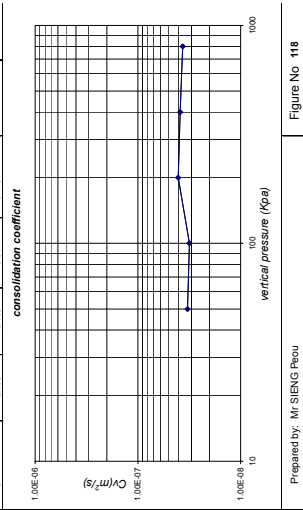


Consolidation coefficient test



CONSOLIDATION TEST

Project : The study on solid waste management		Borehole No. : BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 29/10/2003
		Depth of sample : 3.50m
Thickness of disc (mm)	25	
Area (cm ²)	50	
Mass of dry soil (g)	144.86	
Height of ring (mm)	20.00	
Area of ring (cm ²)	309.68	
Mass of ring (g)	60.93	
Moisture content (%)	20.81	
Water content (w)	20.81	
Dry density (ρ _d)	1.09	g/cm ³
Specific gravity (G _s)	2.835	g/cm ³
Dry of saturation (S _r)	99.26	%
Height of particles (mm)	12.81	
Consolid. Coef. C _v	0.41	
Applied pressure (kPa)	0	
Deflection (mm)	0	
Thickness of specimen (mm)	H=15	
Initial height (mm)	H ₀ =16	
Initial void ratio (e ₀)	0.477	
Applied pressure (kPa)	100	
Deflection (mm)	1.90	
Final height (mm)	H=14.1	
Final void ratio (e)	0.433	
Applied pressure (kPa)	200	
Deflection (mm)	3.80	
Final height (mm)	H=12.2	
Final void ratio (e)	0.390	
Applied pressure (kPa)	300	
Deflection (mm)	5.70	
Final height (mm)	H=10.3	
Final void ratio (e)	0.347	
Applied pressure (kPa)	400	
Deflection (mm)	7.60	
Final height (mm)	H=8.4	
Final void ratio (e)	0.304	
Applied pressure (kPa)	500	
Deflection (mm)	9.50	
Final height (mm)	H=6.5	
Final void ratio (e)	0.261	
Applied pressure (kPa)	600	
Deflection (mm)	11.40	
Final height (mm)	H=4.6	
Final void ratio (e)	0.218	



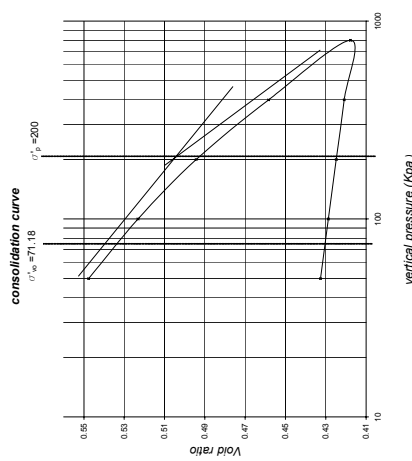
Prepared by: Mr SIENG Peou

Figure No 118

CONSOLIDATION CURVE

Project : The study on solid waste management		Borehole No. : BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 29/10/2003
		Depth of sample : 3.50m

$\sigma_{v,cr} = 71.18 \text{ kPa}$
 $\sigma_p = 200.00 \text{ kPa}$

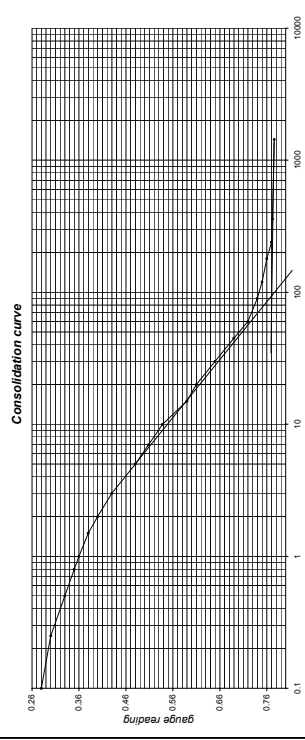


Prepared by: Mr SIENG Peou

Figure No 119

Consolidation coefficient test

Project : The study on solid waste management		Borehole No. : BH-2																																					
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 29/10/2003																																					
		Applied pressure : 50 k																																					
Location of sample (mm)	0	6	15	30	45	7	10	15	20	30	40	50	60	70	80	90	100	120	150	180	240	300																	
Deflection (mm)	0	0.28	0.3	0.33	0.35	0.36	0.38	0.4	0.43	0.48	0.58	0.69	0.81	0.95	1.09	1.22	1.37	1.5	1.5	2	3	5	7	10	15	20	30	40	50	60	70	80	90	100	120	150	180	240	300

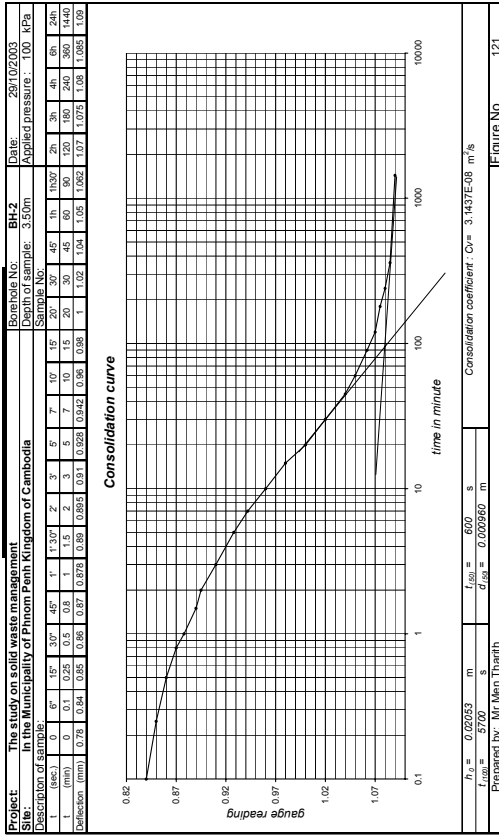


$H_0 =$	0.02053	m	$L_{(90)} =$	600	s	Consolidation coefficient $C_v =$	3.2800E-09	m ² /s
$L_{(50)} =$	5400	s	$d_{(50)} =$	0.00055	m			

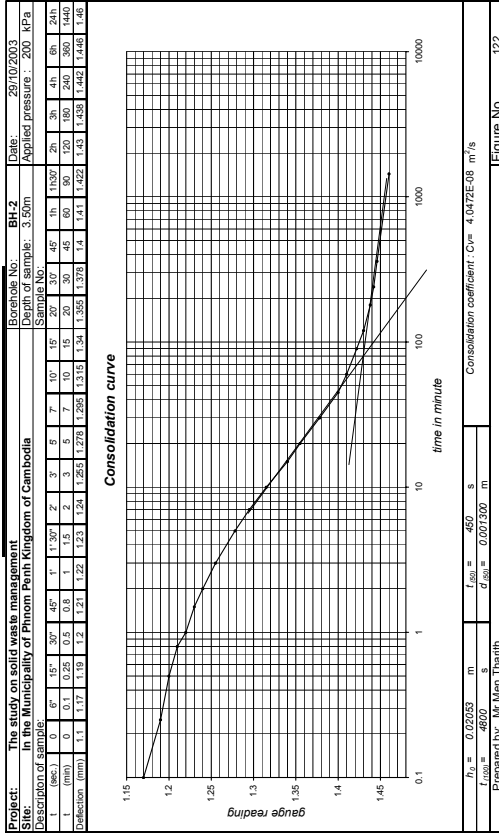
Prepared by: Mr. Ben. Harith

Figure No 120

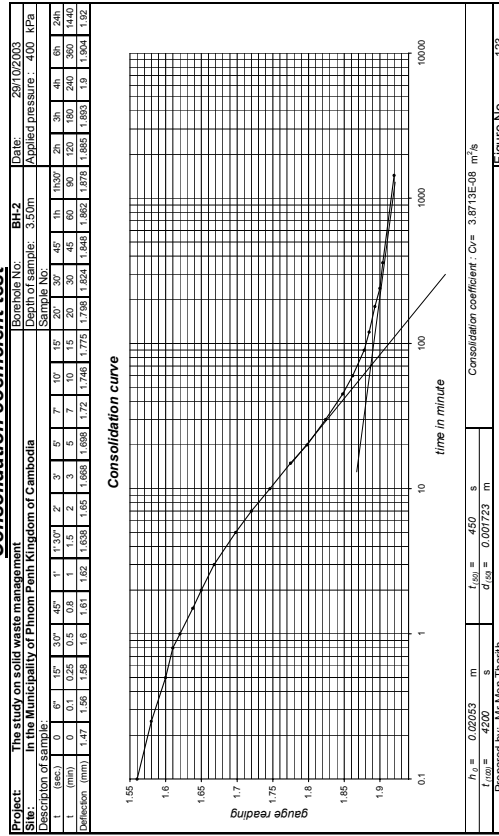
Consolidation coefficient test



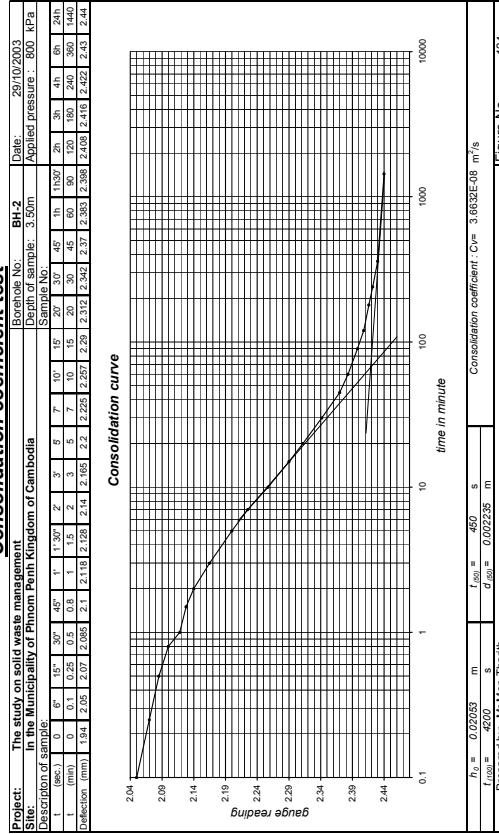
Consolidation coefficient test



Consolidation coefficient test

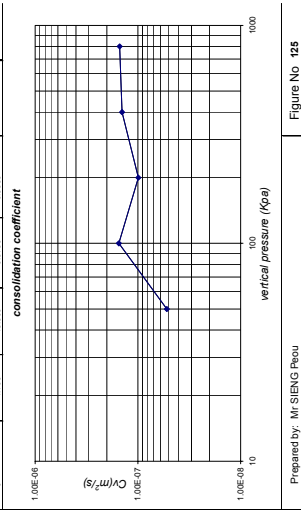


Consolidation coefficient test



CONSOLIDATION TEST

Project : The study on solid waste management		Borehole No. :	BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date :	29/10/2003
Thickness of disc : mm	25	Depth of sample : mm	4.50
Area of disc : mm ²	500		
Mass of dry soil : g	137.97	Height of ring : mm	20.00
Moisture content : %	63.73	Area of ring : mm ²	5000.08
Mass of specimen : g	24.34	Volume of ring : cm ³	60.80
Water content : %	23.37	Void ratio <i>e</i>	0.87267
Dry density ρ_d : g/cm ³	1.92	ρ_w : g/cm ³	0.0025
Specific gravity ρ_s : g/cm ³	2.85	ρ_w : g/cm ³	0.0015
Unit weight γ : kN/m ³	18.26	ρ_w : g/cm ³	0.0015
Day of saturation S_r : %	86.81	ρ_w : g/cm ³	2.282776
He of soil particles : mm	11.92	ρ_w : g/cm ³	0.14971
Compa. Const. C_v :			86.42
Applied pressure : kPa		Thickness of voids : mm	180.00
Pressure increment : kPa		Height of void : mm	
Final height : mm		Initial height : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	
Final void ratio : mm		Final void ratio : mm	

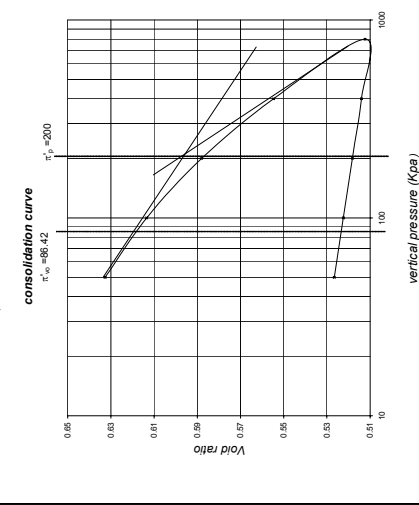


Prepared by: Mr SIENG Peou

Figure No 125

CONSOLIDATION CURVE

Project : The study on solid waste management		Borehole No. :	BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date :	29/10/2003
Thickness of disc : mm	25	Depth of sample : mm	4.50
Area of disc : mm ²	500		
Mass of dry soil : g	137.97	Height of ring : mm	20.00
Moisture content : %	63.73	Area of ring : mm ²	5000.08
Mass of specimen : g	24.34	Volume of ring : cm ³	60.80
Water content : %	23.37	Void ratio <i>e</i>	0.87267
Dry density ρ_d : g/cm ³	1.92	ρ_w : g/cm ³	0.0025
Specific gravity ρ_s : g/cm ³	2.85	ρ_w : g/cm ³	0.0015
Unit weight γ : kN/m ³	18.26	ρ_w : g/cm ³	0.0015
Day of saturation S_r : %	86.81	ρ_w : g/cm ³	2.282776
He of soil particles : mm	11.92	ρ_w : g/cm ³	0.14971
Compa. Const. C_v :			86.42

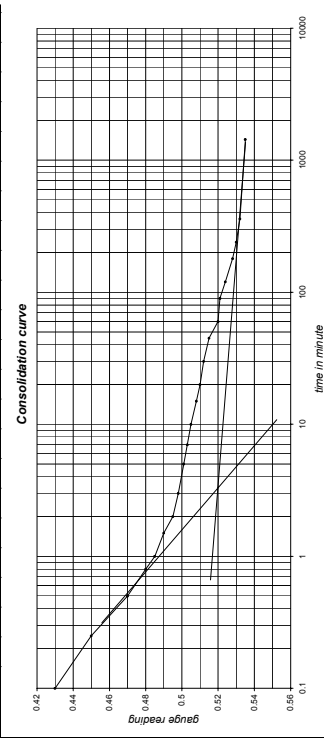


Prepared by: Mr SIENG Peou

Figure No 126

Consolidation coefficient test

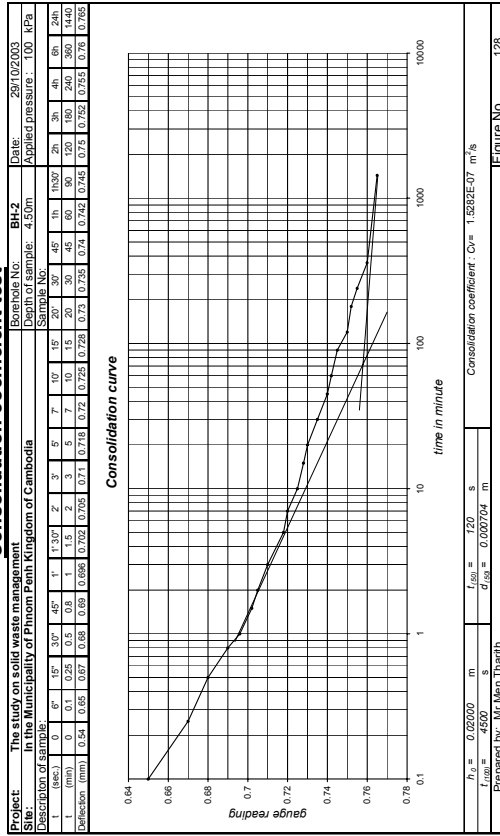
Project : The study on solid waste management		Borehole No. :	BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date :	29/10/2003
Thickness of disc : mm	25	Depth of sample : mm	4.50
Area of disc : mm ²	500		
Mass of dry soil : g	137.97	Height of ring : mm	20.00
Moisture content : %	63.73	Area of ring : mm ²	5000.08
Mass of specimen : g	24.34	Volume of ring : cm ³	60.80
Water content : %	23.37	Void ratio <i>e</i>	0.87267
Dry density ρ_d : g/cm ³	1.92	ρ_w : g/cm ³	0.0025
Specific gravity ρ_s : g/cm ³	2.85	ρ_w : g/cm ³	0.0015
Unit weight γ : kN/m ³	18.26	ρ_w : g/cm ³	0.0015
Day of saturation S_r : %	86.81	ρ_w : g/cm ³	2.282776
He of soil particles : mm	11.92	ρ_w : g/cm ³	0.14971
Compa. Const. C_v :			86.42



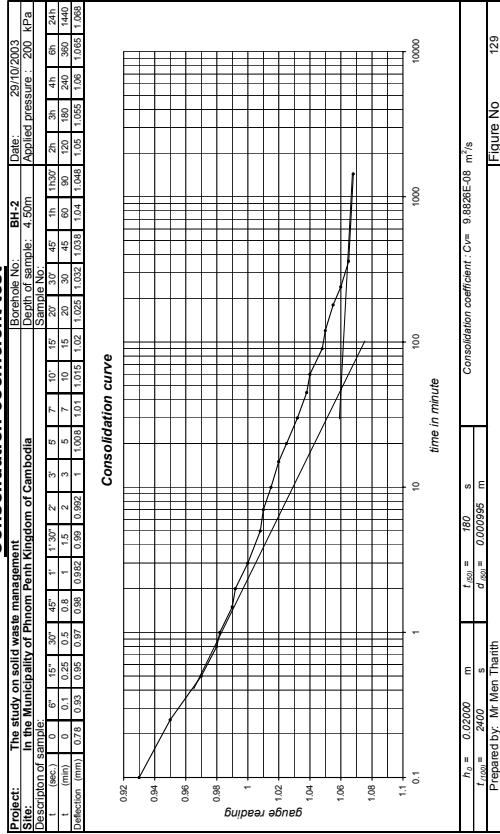
Prepared by: Mr Alean Hathth

Figure No 127

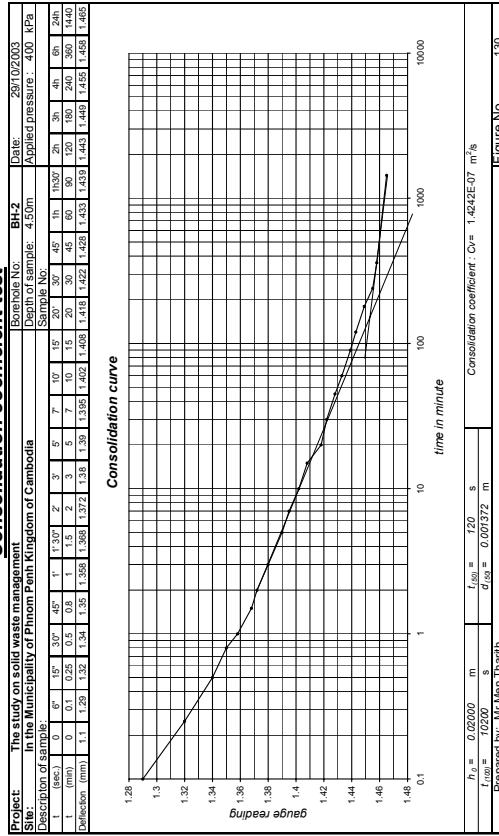
Consolidation coefficient test



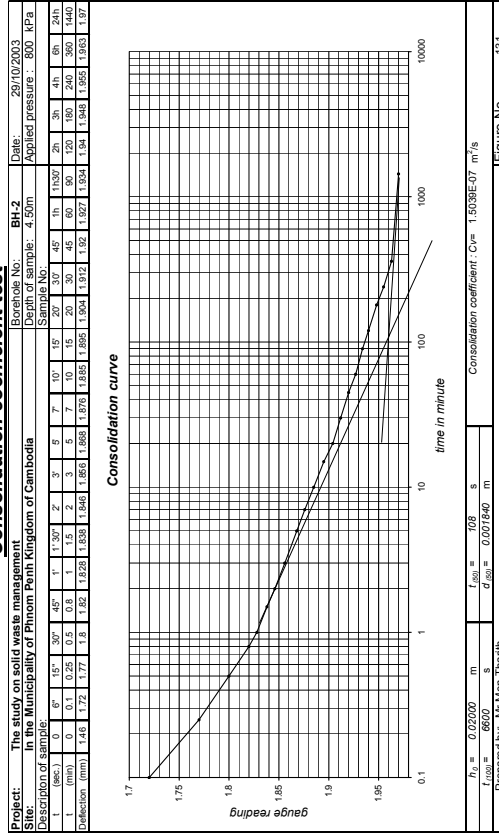
Consolidation coefficient test



Consolidation coefficient test

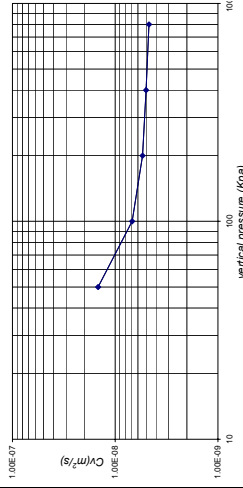


Consolidation coefficient test



CONSOLIDATION TEST

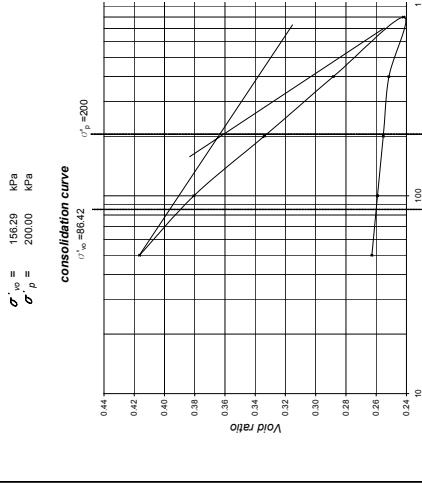
Project : The study on solid waste management		Borehole No. : BH-2					
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 02/11/2013					
Depth of sample : 7.50m		Depth of sample : 7.50m					
Thick. of spec. : HI	20 mm.	Cent No. : C					
Mass ring dry spec. :	127.87 g	Diameter of ring :	61.8033 mm				
Mass of ring :	42.4 g	Height of ring :	20.00 mm				
Mass of dry spec. : m _s	105.47 g	Area of ring :	2099.95 mm ²				
Moist content : w	19.54 %	Volume of ring :	60.00 cm ³				
Dry density : ρ _d	2.00 g/cm ³	Moist ratio e	0.46892				
Specific gravity : G _s	2.65	ρ _s	0.00394				
Swelling pressure : p _s	0.0001 MPa	ρ _w	0.001				
Shrinkage limit : SL	19.73 %	ρ _w	1972.70 kg/m ³				
Moist. content : w _p	13.34 %	C _c	0.14503				
Consolid. Coef. : C _v	0.0001	ρ _w	198.29 kg/m ³				
		ρ _w	200.00 kg/m ³				
Special pressure	deflection	specimen	height of	voids	ratio	C _v	K
(kN/m ²)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm ²)	(m ²)
50	1.100	18.800	5.5776	0.41166	1.4615-0.8	1.0692	
100	1.800	18.420	5.0776	0.38058	0.815-0.8	3.4882	
200	2.200	17.800	4.4576	0.33400	5.4015-0.9	1.8435	
400	2.810	17.190	3.6476	0.28883	5.0015-0.9	5.7008	
800	3.430	16.570	3.2276	0.24149	4.6715-0.9	4.2868	
200	3.200	16.720	3.4076	0.2553			
100	3.300	16.800	3.4576	0.2591			
50	3.150	16.850	3.5076	0.2628			
0	3.000	17.000	3.6500	0.2741			



Prepared by: Mr.SIENG Pheu Figure No. 132

CONSOLIDATION CURVE

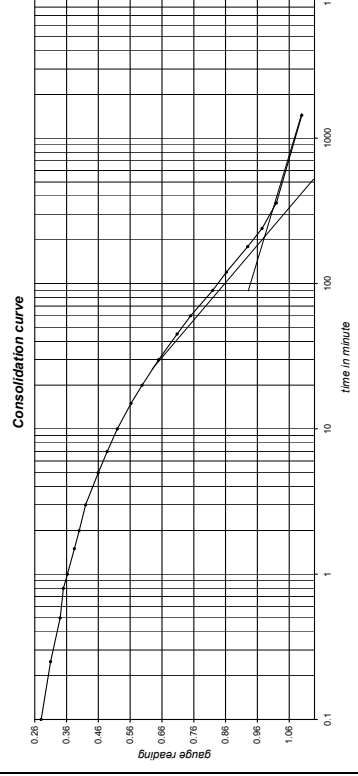
Project : The study on solid waste management		Borehole No. : BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 02/11/2013
Depth of sample : 7.50		Depth of sample : 7.50
σ _v ^{vo}	156.29 kPa	
σ _p	200.00 kPa	



Prepared by: Mr.SIENG Pheu Figure No. 133

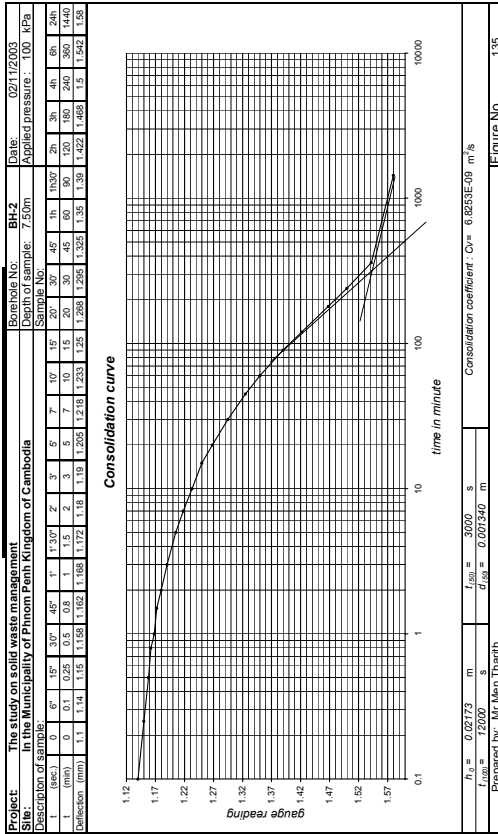
Consolidation coefficient test

Project : The study on solid waste management		Borehole No. : BH-2
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 02/11/2
Depth of sample : 7.50m		Depth of sample : 7.50m
Applied pressure :		
Description of sample :	1" 1.307 2" 1.5 3" 1.67 4" 1.8 5" 1.9 6" 2.0 7" 2.1 8" 2.2 9" 2.3 10" 2.4 15" 2.7 20" 3.0 30" 3.6 45" 4.5 60" 5.4 80" 6.3 100" 7.2 150" 8.1 200" 9.0	Sample No. : 45 50 60 80 100 120 150 180 200
Deflection (mm) :	0 0.28 0.31 0.34 0.35 0.363 0.365 0.4 0.42 0.461 0.488 0.52 0.563 0.598 0.65 0.708 0.75 0.82 0.863 0.93 0.975	

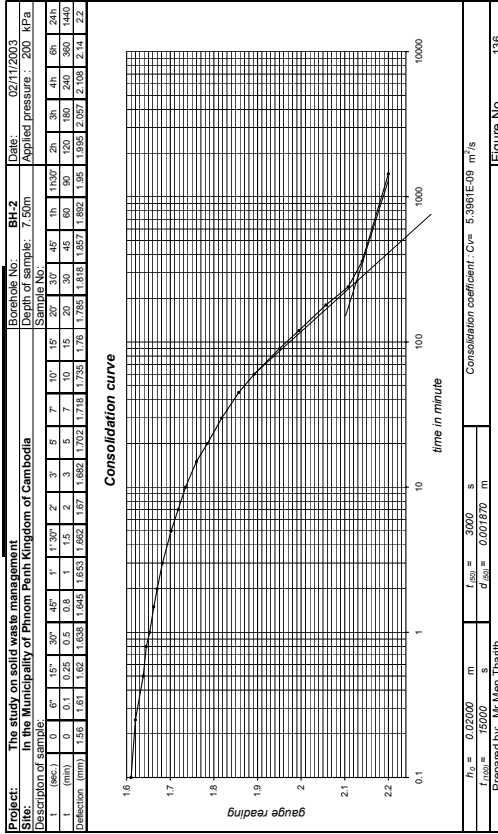


Prepared by: Mr. Men Tharith Figure No.

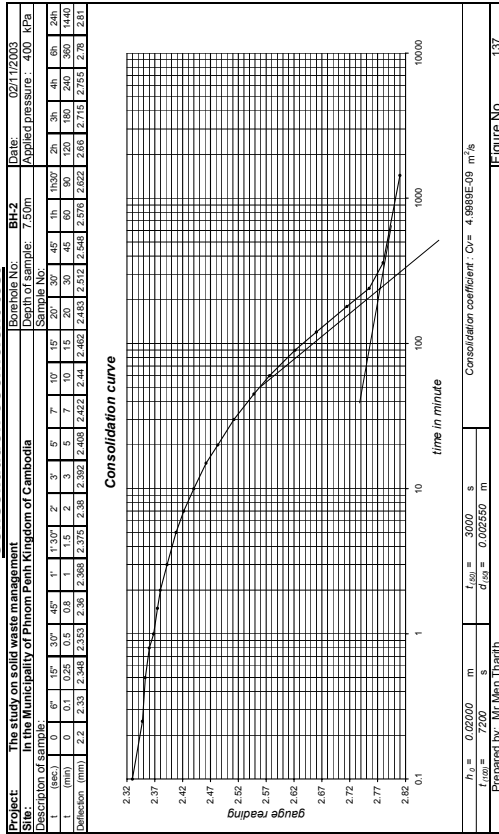
Consolidation coefficient test



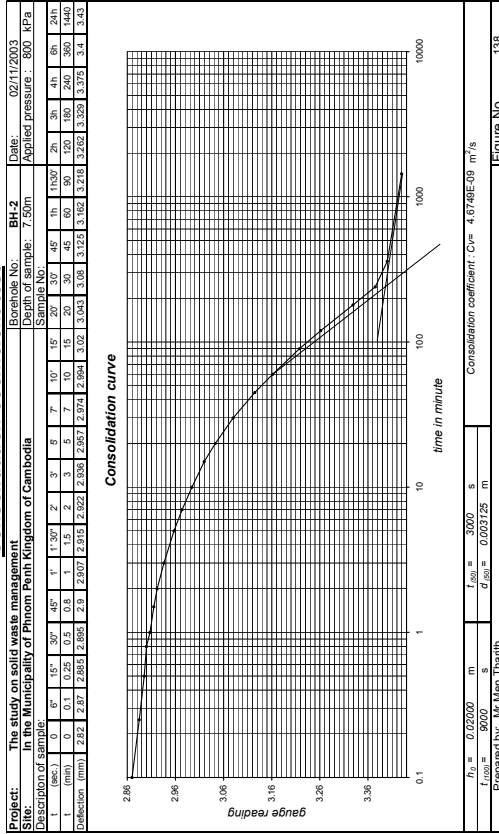
Consolidation coefficient test



Consolidation coefficient test

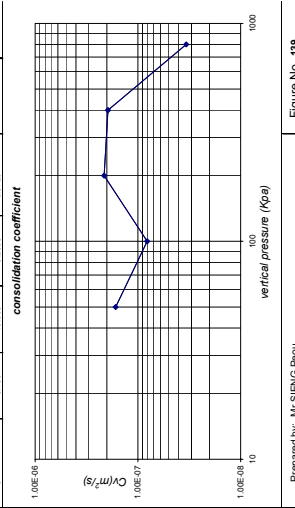


Consolidation coefficient test



CONSOLIDATION TEST

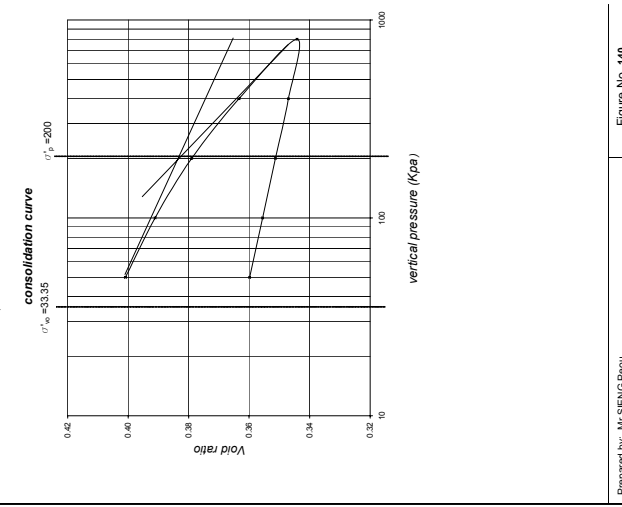
Project : The study on solid waste management		Borehole No. : BH-3	
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 21/11/2003	
Core No. : 1513		Depth of sample : 1.60m	
Thickness of specimen (mm)	25.4	Height of sample (mm)	61.0035
Mass of dry soil (g)	151.59	Area of top (mm ²)	2030.08
Mass of liquid (g)	62.43	Area of base (mm ²)	2030.08
Moisture content (w)	109.17 %	Volume of soil (cm ³)	60.89
Water content (w)	14.15 %	Void ratio (e)	0.42364
Bulk density (ρ _s)	2.99 g/cm ³	Specific gravity (G _s)	2.65
Dry density (ρ _d)	1.92 g/cm ³	Unit weight (γ _s)	19.39 kN/m ³
Specific gravity (G _s)	2.99	Unit weight (γ _{sat})	19.39 kN/m ³
Specific gravity (G _s)	2.99	Unit weight (γ _{sat})	19.39 kN/m ³
Day of saturation (S _r)	89.15 %	Consolidation coefficient (C _v)	0.00979
Height of particles (mm)	14.05	Preconsolidation stress (p _c)	33.35 kPa
Consolidation coefficient (C _v)	0.00979	Final settlement (mm)	200.00
Applied pressure (kPa)	0	Final settlement (mm)	200.00
Thickness of specimen (mm)	0.700	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00



Prepared by: Mr SIENG Peou Figure No 139

CONSOLIDATION CURVE

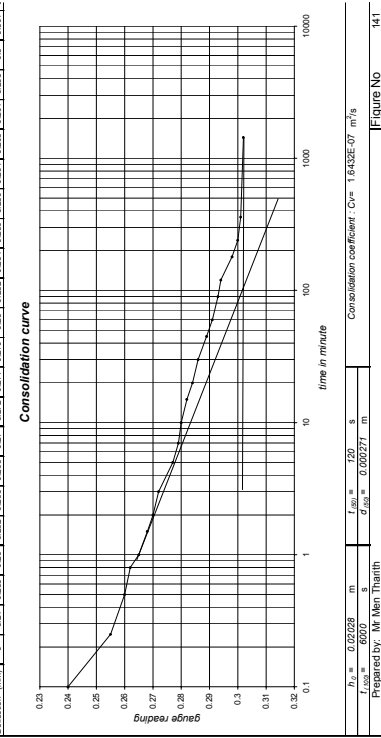
Project : The study on solid waste management		Borehole No. : BH-3	
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 21/11/2003	
Core No. : 1513		Depth of sample : 1.60m	
Thickness of specimen (mm)	25.4	Height of sample (mm)	61.0035
Mass of dry soil (g)	151.59	Area of top (mm ²)	2030.08
Mass of liquid (g)	62.43	Area of base (mm ²)	2030.08
Moisture content (w)	109.17 %	Volume of soil (cm ³)	60.89
Water content (w)	14.15 %	Void ratio (e)	0.42364
Bulk density (ρ _s)	2.99 g/cm ³	Specific gravity (G _s)	2.65
Dry density (ρ _d)	1.92 g/cm ³	Unit weight (γ _s)	19.39 kN/m ³
Specific gravity (G _s)	2.99	Unit weight (γ _{sat})	19.39 kN/m ³
Specific gravity (G _s)	2.99	Unit weight (γ _{sat})	19.39 kN/m ³
Day of saturation (S _r)	89.15 %	Consolidation coefficient (C _v)	0.00979
Height of particles (mm)	14.05	Preconsolidation stress (p _c)	33.35 kPa
Consolidation coefficient (C _v)	0.00979	Final settlement (mm)	200.00
Applied pressure (kPa)	0	Final settlement (mm)	200.00
Thickness of specimen (mm)	0.700	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00



Prepared by: Mr SIENG Peou Figure No 140

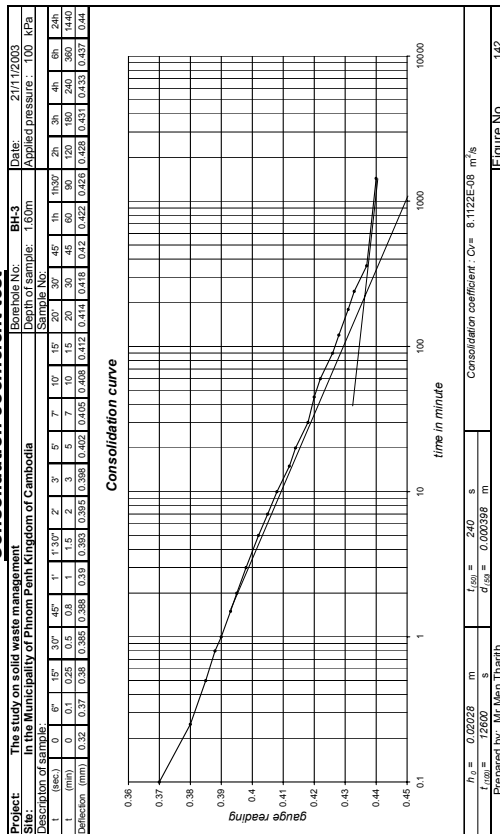
Consolidation coefficient test

Project : The study on solid waste management		Borehole No. : BH-3	
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 21/11/2003	
Core No. : 1513		Depth of sample : 1.60m	
Thickness of specimen (mm)	25.4	Height of sample (mm)	61.0035
Mass of dry soil (g)	151.59	Area of top (mm ²)	2030.08
Mass of liquid (g)	62.43	Area of base (mm ²)	2030.08
Moisture content (w)	109.17 %	Volume of soil (cm ³)	60.89
Water content (w)	14.15 %	Void ratio (e)	0.42364
Bulk density (ρ _s)	2.99 g/cm ³	Specific gravity (G _s)	2.65
Dry density (ρ _d)	1.92 g/cm ³	Unit weight (γ _s)	19.39 kN/m ³
Specific gravity (G _s)	2.99	Unit weight (γ _{sat})	19.39 kN/m ³
Specific gravity (G _s)	2.99	Unit weight (γ _{sat})	19.39 kN/m ³
Day of saturation (S _r)	89.15 %	Consolidation coefficient (C _v)	0.00979
Height of particles (mm)	14.05	Preconsolidation stress (p _c)	33.35 kPa
Consolidation coefficient (C _v)	0.00979	Final settlement (mm)	200.00
Applied pressure (kPa)	0	Final settlement (mm)	200.00
Thickness of specimen (mm)	0.700	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00
Height of specimen (mm)	19.300	Final settlement (mm)	200.00

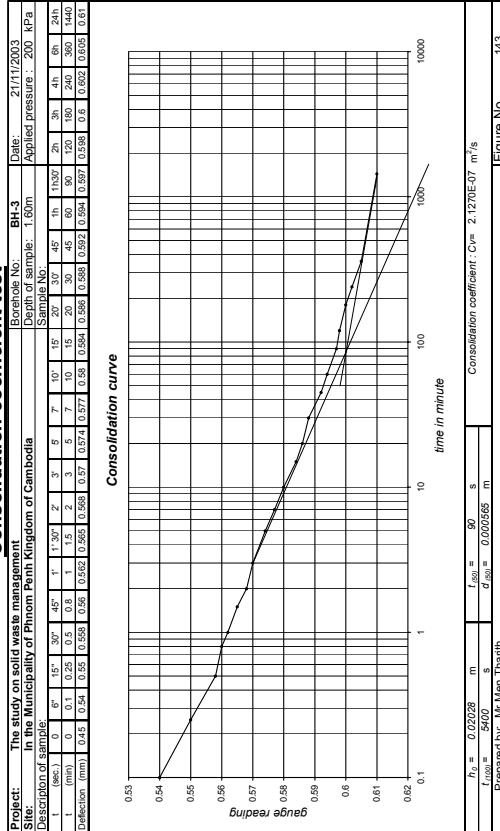


$H_v = 0.02028 \text{ m}$ $t_{(90)} = 720 \text{ s}$ $C_v = 1.6432E-07 \text{ m}^2/\text{s}$
 $T_{(90)} = 6000 \text{ s}$ $d_{(90)} = 0.000277 \text{ m}$ $C_v = 1.6432E-07 \text{ m}^2/\text{s}$
 Prepared by : Mr Sieng Peou Figure No 141

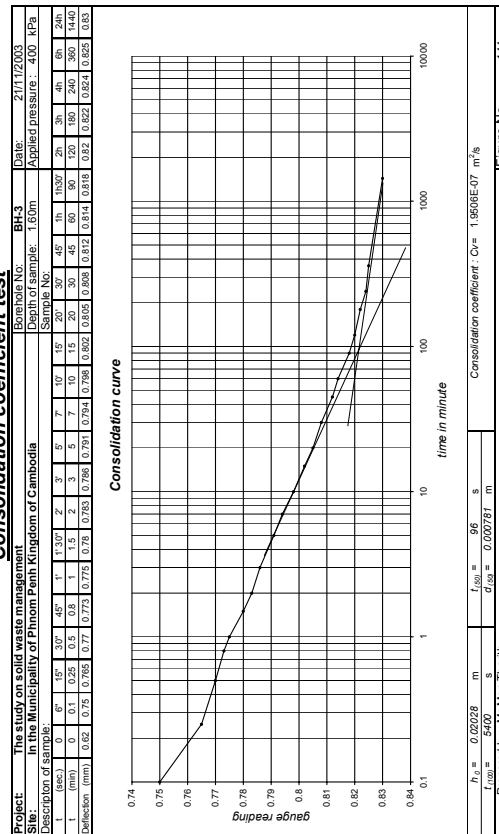
Consolidation coefficient test



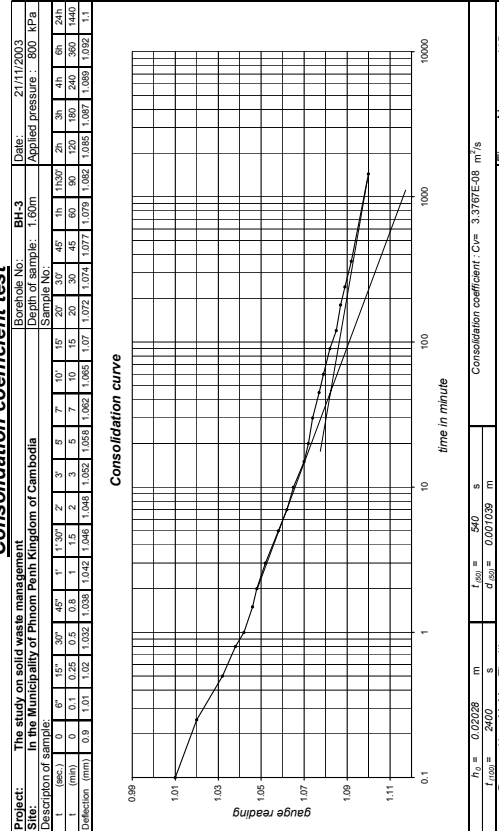
Consolidation coefficient test



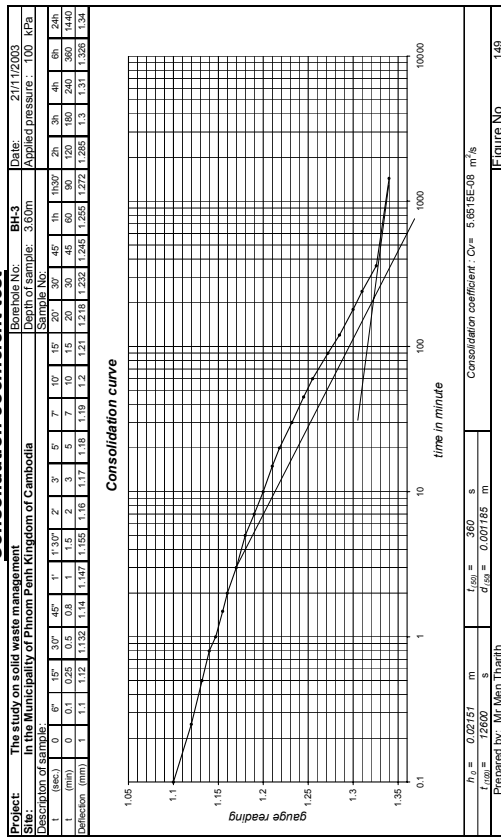
Consolidation coefficient test



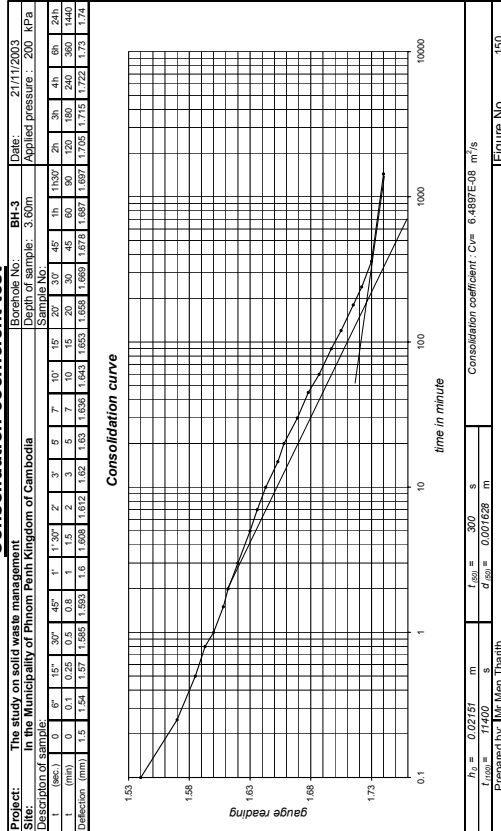
Consolidation coefficient test



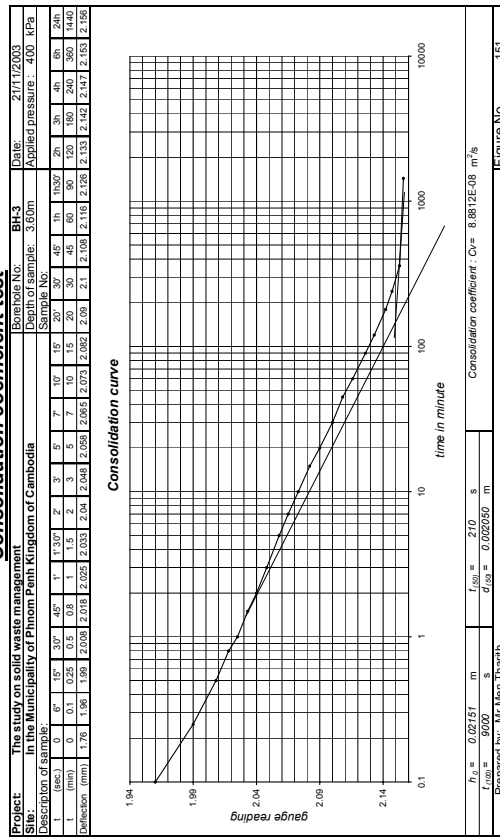
Consolidation coefficient test



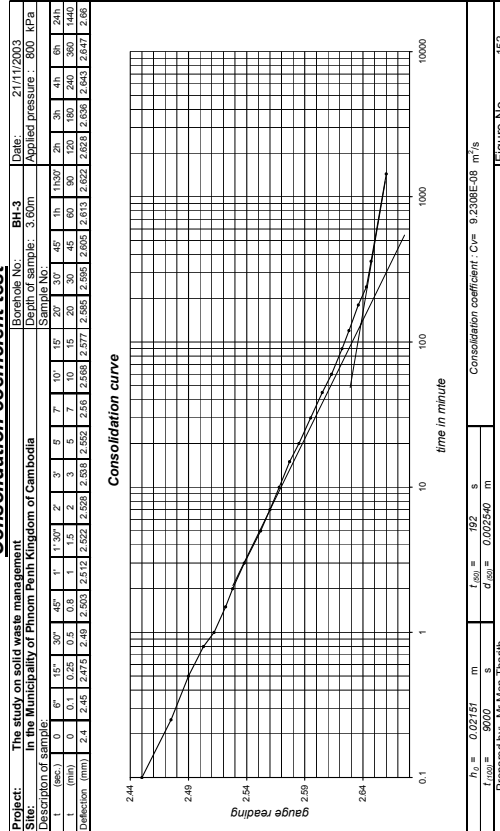
Consolidation coefficient test



Consolidation coefficient test

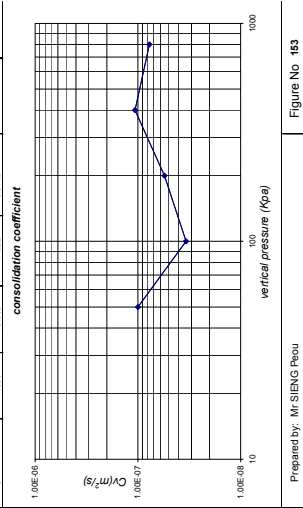


Consolidation coefficient test



CONSOLIDATION TEST

Project: The study on solid waste management		Borehole No.: BH-3
Site: In the Municipality of Phnom Penh Kingdom of Cambodia		Date: 21/11/2003
		Depth of sample: 5.60m
Thickness of disc: 25.33 mm	Ce: 0.0015	Height of sample: 61.9255 mm
Mass of dry soil: 152.92 g	Height of ring: 20.00 mm	
Mass of dry soil: 69.143 g	Area of ring: 2009.68 mm ²	
Mass of dry soil: 109.469 g	Volume of ring: 60.93 cm ³	
Water content: 13.34 %	Void ratio: 0.40009	
Bulk density: 2.07 g/cm ³	m _v : 0.0015 (114.9)	
Specific gravity: 2.86 g/cm ³	E: 30867.74 kPa	
Day of saturation: 84.39 %	Cc: 0.09109 (114.9)	
Height of particles: 14.22 mm	e _{max} : 115.83 kPa	
Consolid. Coef. Cv: 0.0000	200.00 kPa	
applied pressure (kPa)	total thickness of specimen (mm)	height of void (mm)
90	H+D (mm)	H-H ₀ (mm)
100	19.440	5.2162
200	19.100	4.8652
400	18.900	4.6752
800	18.800	4.5852
1600	18.700	4.4952
3200	18.600	4.4052
6400	18.500	4.3152
12800	18.400	4.2252
25600	18.300	4.1352
51200	18.200	4.0452
102400	18.100	3.9552
204800	18.000	3.8652
409600	17.900	3.7752
819200	17.800	3.6852
1638400	17.700	3.5952
3276800	17.600	3.5052
6553600	17.500	3.4152
13107200	17.400	3.3252
26214400	17.300	3.2352
52428800	17.200	3.1452
104857600	17.100	3.0552
209715200	17.000	2.9652
419430400	16.900	2.8752
838860800	16.800	2.7852
1677721600	16.700	2.6952
3355443200	16.600	2.6052
6710886400	16.500	2.5152
13421772800	16.400	2.4252
26843545600	16.300	2.3352
53687091200	16.200	2.2452
107374182400	16.100	2.1552
214748364800	16.000	2.0652
429496729600	15.900	1.9752
858993459200	15.800	1.8852
1717986918400	15.700	1.7952
3435973836800	15.600	1.7052
6871947673600	15.500	1.6152
13743895347200	15.400	1.5252
27487790694400	15.300	1.4352
54975581388800	15.200	1.3452
109951162777600	15.100	1.2552
219902325555200	15.000	1.1652
439804651110400	14.900	1.0752
879609302220800	14.800	1.0000
1759218644441600	14.700	0.9252
3518437288883200	14.600	0.8504
7036874577766400	14.500	0.7756
14073749155532800	14.400	0.7008
28147498311065600	14.300	0.6260
56294996622131200	14.200	0.5512
112589993244262400	14.100	0.4764
225179986488524800	14.000	0.4016
450359972977049600	13.900	0.3268
900719945954099200	13.800	0.2520
1801439891908198400	13.700	0.1772
3602879783816396800	13.600	0.1024
7205759567632793600	13.500	0.0276
14411519135265772800	13.400	0.0000



Prepared by: Mr SIENG PEOU

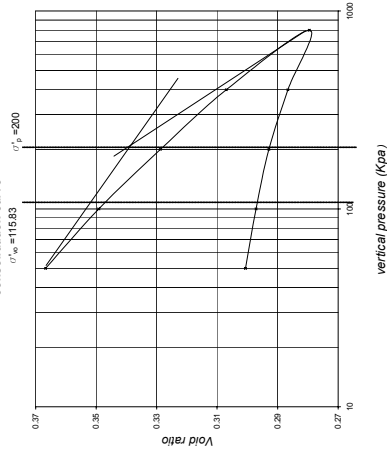
Figure No 153

CONSOLIDATION CURVE

Project: The study on solid waste management		Borehole No.: BH-3
Site: In the Municipality of Phnom Penh Kingdom of Cambodia		Date: 21/11/2003
		Depth of sample: 5.60m

$\sigma_{v,pc} = 115.83$ kPa
 $\sigma_p = 200.00$ kPa

consolidation curve



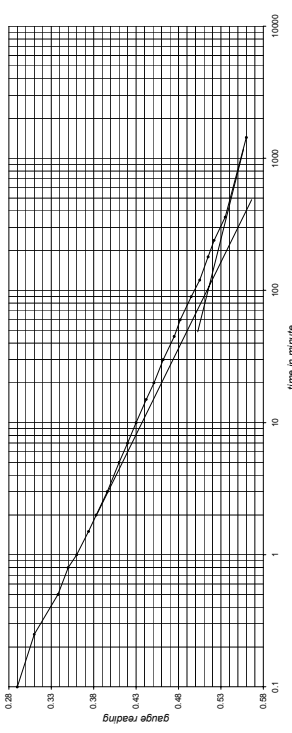
Prepared by: Mr SIENG PEOU

Figure No 154

Consolidation coefficient test

Project: The study on solid waste management		Borehole No.: BH-3
Site: In the Municipality of Phnom Penh Kingdom of Cambodia		Date: 21/11/2003
		Depth of sample: 5.60m
Section of sample (mm)	Height of sample (mm)	Applied pressure (kPa)
1 86.33	10	10
2 86.33	15	30
3 86.33	20	45
4 86.33	25	60
5 86.33	30	75
6 86.33	35	90
7 86.33	40	105
8 86.33	45	120
9 86.33	50	135
10 86.33	55	150
11 86.33	60	165
12 86.33	65	180
13 86.33	70	195
14 86.33	75	210
15 86.33	80	225
16 86.33	85	240
17 86.33	90	255
18 86.33	95	270
19 86.33	100	285
20 86.33	105	300
21 86.33	110	315
22 86.33	115	330
23 86.33	120	345
24 86.33	125	360
25 86.33	130	375
26 86.33	135	390
27 86.33	140	405
28 86.33	145	420
29 86.33	150	435
30 86.33	155	450
31 86.33	160	465
32 86.33	165	480
33 86.33	170	495
34 86.33	175	510
35 86.33	180	525
36 86.33	185	540
37 86.33	190	555
38 86.33	195	570
39 86.33	200	585
40 86.33	205	600
41 86.33	210	615
42 86.33	215	630
43 86.33	220	645
44 86.33	225	660
45 86.33	230	675
46 86.33	235	690
47 86.33	240	705
48 86.33	245	720
49 86.33	250	735
50 86.33	255	750
51 86.33	260	765
52 86.33	265	780
53 86.33	270	795
54 86.33	275	810
55 86.33	280	825
56 86.33	285	840
57 86.33	290	855
58 86.33	295	870
59 86.33	300	885
60 86.33	305	900
61 86.33	310	915
62 86.33	315	930
63 86.33	320	945
64 86.33	325	960
65 86.33	330	975
66 86.33	335	990
67 86.33	340	1005
68 86.33	345	1020
69 86.33	350	1035
70 86.33	355	1050
71 86.33	360	1065
72 86.33	365	1080
73 86.33	370	1095
74 86.33	375	1110
75 86.33	380	1125
76 86.33	385	1140
77 86.33	390	1155
78 86.33	395	1170
79 86.33	400	1185
80 86.33	405	1200

Consolidation curve

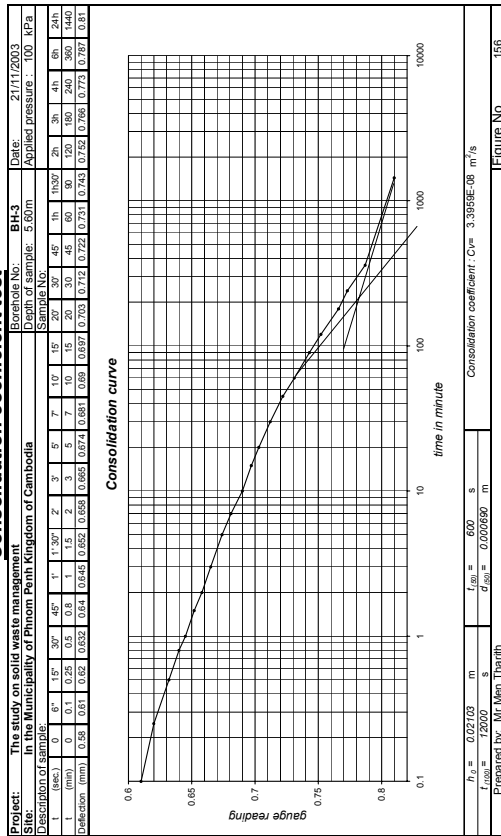


$t_{90} = 0.02103$ m	$t_{90} = 210$ s	Consolidation coefficient: $C_v = 9.9837E-08$ m ² /s
$t_{100} = 600$ s	$d_{90} = 0.00298$ m	

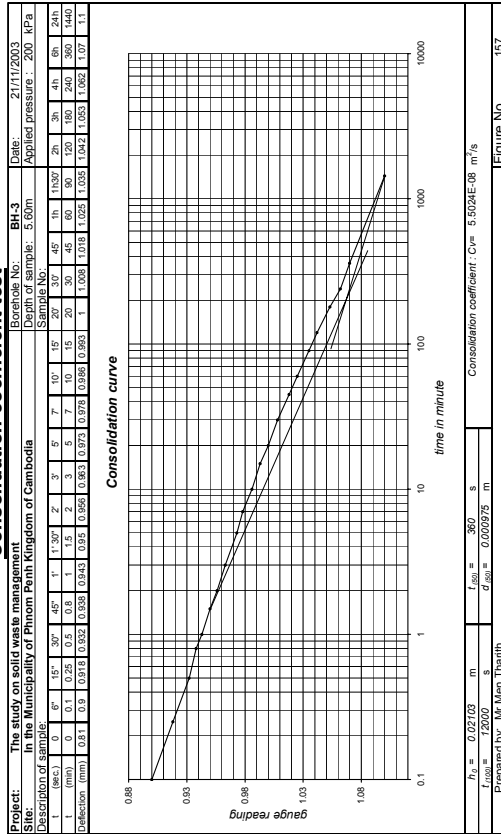
Prepared by: Mr Alan Harath

Figure No 155

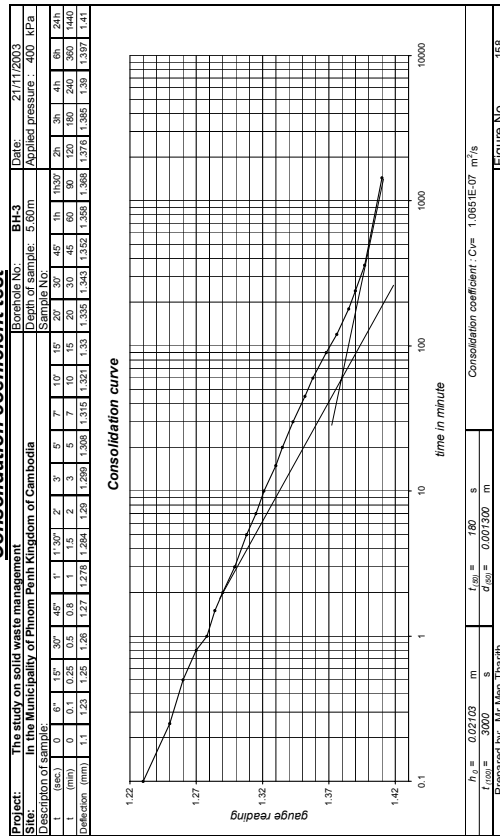
Consolidation coefficient test



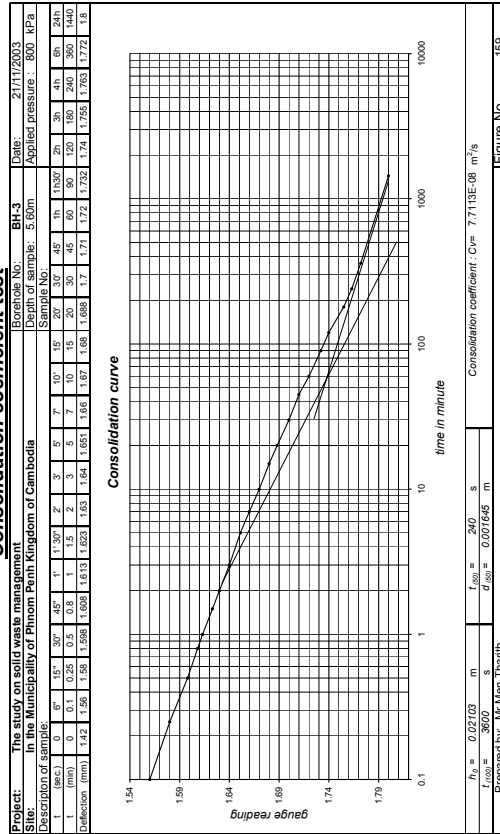
Consolidation coefficient test



Consolidation coefficient test



Consolidation coefficient test



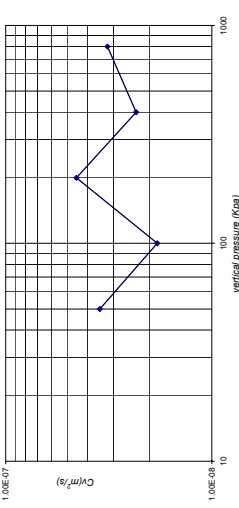
CONSOLIDATION TEST

Project : The study on solid waste management.
 Site : In the Municipality of Phnom Penh Kingdom of Cambodia

Borehole No. : BH-4
 Date : 15/12/2003
 Depth of sample : 2.50m

Thickness of disc	H	20	mm
Mass of wet spec.	M	183.58	g
Mass of dry spec.	M _d	146.74	g
Mass of dry spec. m _d		103.33	g
Water content	w	17.28	%
Bulk density	ρ	1.72	g/cm ³
Dry density	ρ _d	2.58	g/cm ³
Specific gravity	G _s	89.41	%
Day of saturation	S _p	89.41	%
No. of test particles	N	13.35	mm
Consolid. Coef. Cv		50.49	mm ² /s
		2.90	mm ² /s

Applied pressure (kPa)	Thickness of disc (mm)	Height of voids (mm)	Void ratio (e)	Consolidation coefficient (Cv) (mm ² /s)
0	1.88	18.84	5.0811	0.4120
100	1.88	18.84	5.0811	0.4120
200	1.80	18.00	4.6891	0.3497
400	2.42	17.50	3.7541	0.2812
800	2.89	17.10	3.2041	0.2133
2000	2.70	17.240	3.8941	0.2973
4000	2.80	17.200	3.8941	0.2973
8000	2.610	17.390	4.0381	0.3028
0	2.290	17.750	4.3981	0.3296



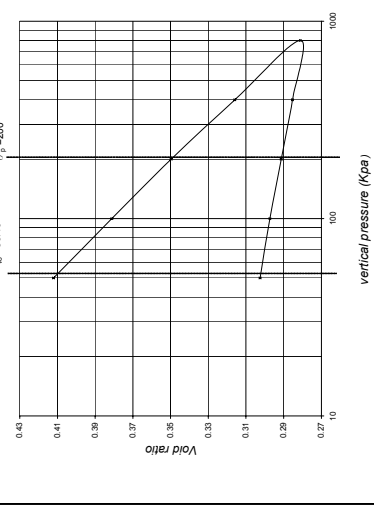
Prepared by: Mr SIENG PEOU Figure No 160

CONSOLIDATION CURVE

Project : The study on solid waste management.
 Site : In the Municipality of Phnom Penh Kingdom of Cambodia

Borehole No. : BH-4
 Date : 15/12/2003
 Depth of sample : 2.50m

$\sigma'_{vs} = 50.49$ kPa
 $\sigma'_p = 200.00$ kPa

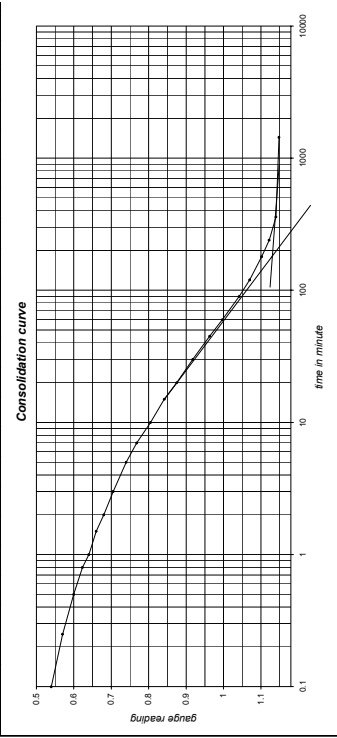


Prepared by: Mr SIENG PEOU Figure No 161

Consolidation coefficient test

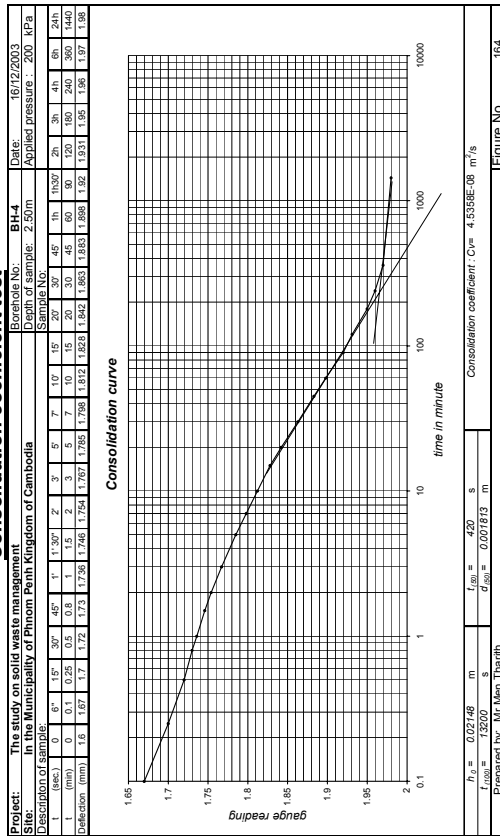
Result: The study on solid waste management.
 Site: In the Municipality of Phnom Penh Kingdom of Cambodia

Description of sample	Date of test										Days Applied pressure = 50 k	
	0	1	2	3	4	5	6	7	8	9		
1 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
2 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
3 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
4 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
5 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
6 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
7 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
8 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
9 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7
10 (60C)	0	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5	6.1	6.7

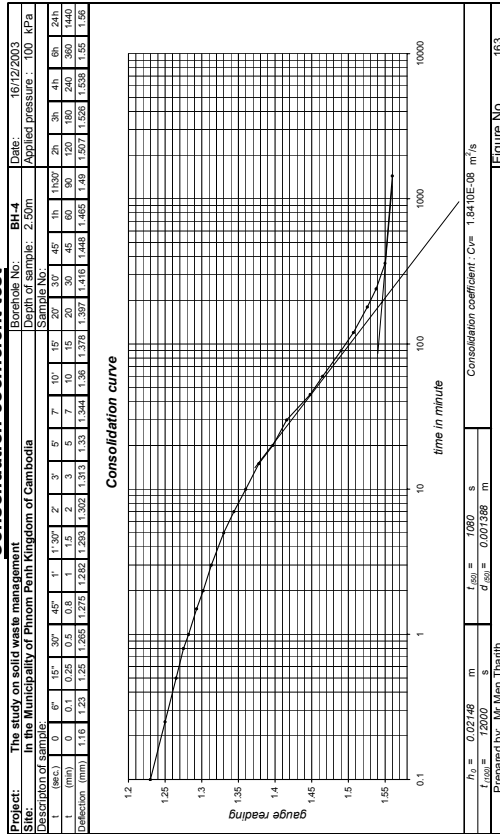


Prepared by: Mr Men Tharith Figure No 162

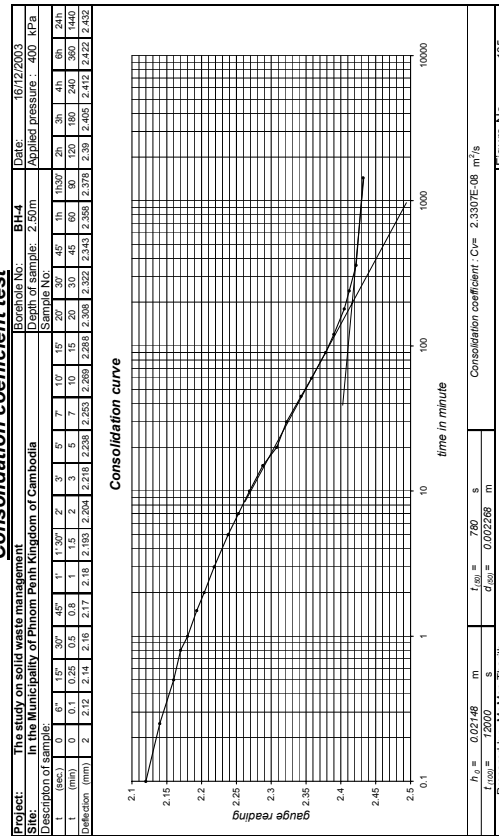
Consolidation coefficient test



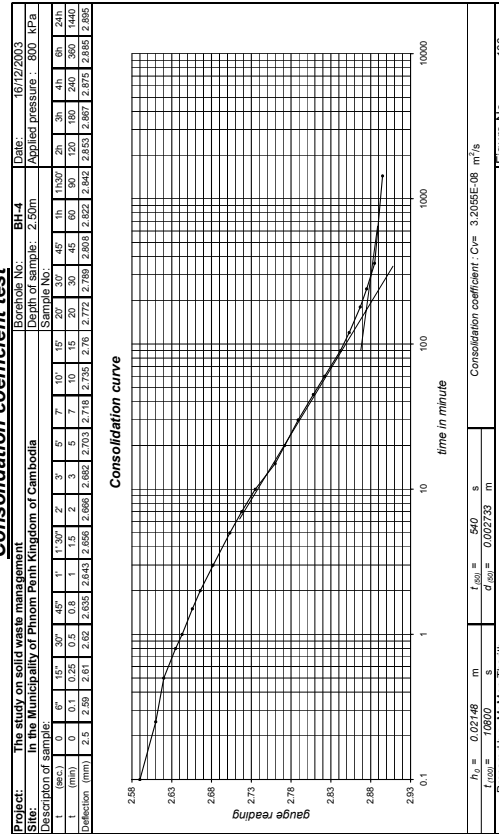
Consolidation coefficient test



Consolidation coefficient test



Consolidation coefficient test

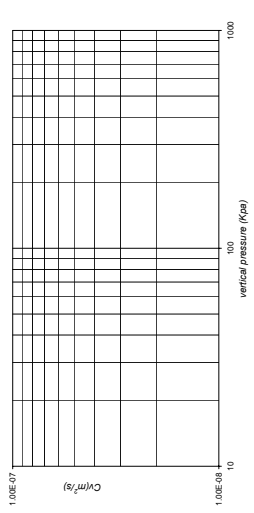


CONSOLIDATION TEST

Project: The study on solid waste management
 Site: In the Municipality of Phnom Penh Kingdom of Cambodia

Borehole No.:	BH-4		
Date:	15/12/2003		
Depth of sample:	4.50m		
Soil No.:	C		
Thickness of disc:	20 mm	Diameter of ring:	61.8035 mm
Mass of ring wet spec:	146.22 g	Height of ring:	20.00 mm
Mass of ring dry spec:	142.21 g	Area of ring:	9999.996 mm ²
Mass of dry spec:	102.81 g	Volume of ring:	60.00 cm ³
Water content:	29.43 %	Void ratio e :	0.95890
Bulk density ρ :	2.06 g/cm ³	$\rho_{s,s}$:	0.00003 (16.9)
Dry density ρ_d :	1.57 g/cm ³	E :	34823.83 kPa
Specific gravity G_s :	2.60	C_c :	0.9709 (16.9)
Day of saturation S_r :	100.45 %	C_u :	92.86 kPa
No. of air particles:	13.33 mm	$r_{\%}$:	0.4351 kPa
Consolidation Coef. C_v :	0.00	$r_{\%}$:	0.4351 kPa

Applied Pressure (kPa)	Compression Height of voids (mm)	Void ratio	O _v (%)	K (kPa)
100	0.850	0.446	0.009	5.2454E+09
200	0.855	0.444	0.008	5.1835E+09
400	0.860	0.444	0.008	5.1835E+09
800	0.865	0.444	0.008	5.1835E+09
1600	0.870	0.444	0.008	5.1835E+09
3200	0.875	0.444	0.008	5.1835E+09
6400	0.880	0.444	0.008	5.1835E+09
12800	0.885	0.444	0.008	5.1835E+09
25600	0.890	0.444	0.008	5.1835E+09
51200	0.895	0.444	0.008	5.1835E+09
102400	0.900	0.444	0.008	5.1835E+09
204800	0.905	0.444	0.008	5.1835E+09
409600	0.910	0.444	0.008	5.1835E+09
819200	0.915	0.444	0.008	5.1835E+09
1638400	0.920	0.444	0.008	5.1835E+09
3276800	0.925	0.444	0.008	5.1835E+09
6553600	0.930	0.444	0.008	5.1835E+09
13107200	0.935	0.444	0.008	5.1835E+09
26214400	0.940	0.444	0.008	5.1835E+09
52428800	0.945	0.444	0.008	5.1835E+09
104857600	0.950	0.444	0.008	5.1835E+09
209715200	0.955	0.444	0.008	5.1835E+09
419430400	0.960	0.444	0.008	5.1835E+09
838860800	0.965	0.444	0.008	5.1835E+09
1677721600	0.970	0.444	0.008	5.1835E+09
3355443200	0.975	0.444	0.008	5.1835E+09
6710886400	0.980	0.444	0.008	5.1835E+09
13421772800	0.985	0.444	0.008	5.1835E+09
26843545600	0.990	0.444	0.008	5.1835E+09
53687091200	0.995	0.444	0.008	5.1835E+09
107374182400	1.000	0.444	0.008	5.1835E+09



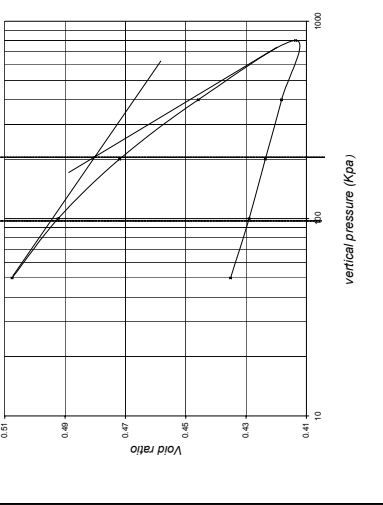
Prepared by: Mr SIENG Peou Figure No. 167

CONSOLIDATION CURVE

Project: The study on solid waste management
 Site: In the Municipality of Phnom Penh Kingdom of Cambodia

Borehole No.: BH-4
 Date: 15/12/2003
 Depth of sample: 4.50m

σ'_{vs} = 92.86 kPa
 σ'_p = 200.00 kPa



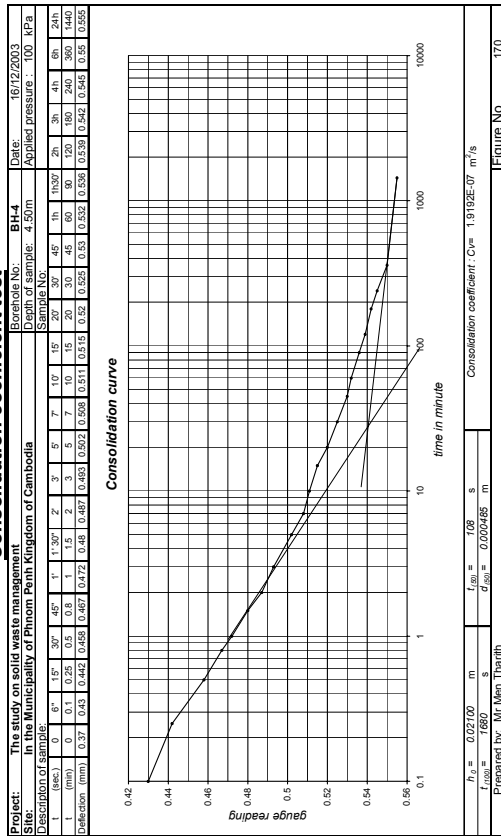
Prepared by: Mr SIENG Peou Figure No. 168

Consolidation coefficient test

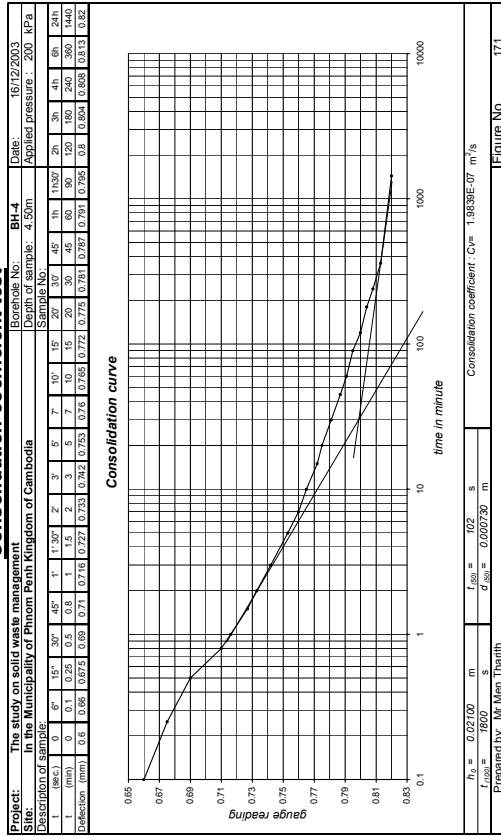
Subject: The study on solid waste management														
Site: In the Municipality of Phnom Penh Kingdom of Cambodia														
Description of sample	Soil No.:			BH-4			Date:			15/12/2003				
	Depth of sample:			4.50m			Applied pressure:			50 k				
1 (69C)	0	0	0	1	1	1	1	1	1	1	1	1	1	1
2	0	0	0	2	2	2	2	2	2	2	2	2	2	2
3	0	0	0	3	3	3	3	3	3	3	3	3	3	3
4	0	0	0	4	4	4	4	4	4	4	4	4	4	4
5	0	0	0	5	5	5	5	5	5	5	5	5	5	5
6	0	0	0	6	6	6	6	6	6	6	6	6	6	6
7	0	0	0	7	7	7	7	7	7	7	7	7	7	7
8	0	0	0	8	8	8	8	8	8	8	8	8	8	8
9	0	0	0	9	9	9	9	9	9	9	9	9	9	9
10	0	0	0	10	10	10	10	10	10	10	10	10	10	10
11	0	0	0	11	11	11	11	11	11	11	11	11	11	11
12	0	0	0	12	12	12	12	12	12	12	12	12	12	12
13	0	0	0	13	13	13	13	13	13	13	13	13	13	13
14	0	0	0	14	14	14	14	14	14	14	14	14	14	14
15	0	0	0	15	15	15	15	15	15	15	15	15	15	15
16	0	0	0	16	16	16	16	16	16	16	16	16	16	16
17	0	0	0	17	17	17	17	17	17	17	17	17	17	17
18	0	0	0	18	18	18	18	18	18	18	18	18	18	18
19	0	0	0	19	19	19	19	19	19	19	19	19	19	19
20	0	0	0	20	20	20	20	20	20	20	20	20	20	20
21	0	0	0	21	21	21	21	21	21	21	21	21	21	21
22	0	0	0	22	22	22	22	22	22	22	22	22	22	22
23	0	0	0	23	23	23	23	23	23	23	23	23	23	23
24	0	0	0	24	24	24	24	24	24	24	24	24	24	24
25	0	0	0	25	25	25	25	25	25	25	25	25	25	25
26	0	0	0	26	26	26	26	26	26	26	26	26	26	26
27	0	0	0	27	27	27	27	27	27	27	27	27	27	27
28	0	0	0	28	28	28	28	28	28	28	28	28	28	28
29	0	0	0	29	29	29	29	29	29	29	29	29	29	29
30	0	0	0	30	30	30	30	30	30	30	30	30	30	30
31	0	0	0	31	31	31	31	31	31	31	31	31	31	31
32	0	0	0	32	32	32	32	32	32	32	32	32	32	32
33	0	0	0	33	33	33	33	33	33	33	33	33	33	33
34	0	0	0	34	34	34	34	34	34	34	34	34	34	34
35	0	0	0	35	35	35	35	35	35	35	35	35	35	35
36	0	0	0	36	36	36	36	36	36	36	36	36	36	36
37	0	0	0	37	37	37	37	37	37	37	37	37	37	37
38	0	0	0	38	38	38	38	38	38	38	38	38	38	38
39	0	0	0	39	39	39	39	39	39	39	39	39	39	39
40	0	0	0	40	40	40	40	40	40	40	40	40	40	40
41	0	0	0	41	41	41	41	41	41	41	41	41	41	41
42	0	0	0	42	42	42	42	42	42	42	42	42	42	42
43	0	0	0	43	43	43	43	43	43	43	43	43	43	43
44	0	0	0	44	44	44	44	44	44	44	44	44	44	44
45	0	0	0	45	45	45	45	45	45	45	45	45	45	45
46	0	0	0	46	46	46	46	46	46	46	46	46	46	46
47	0	0	0	47	47	47	47	47	47	47	47	47	47	47
48	0	0	0	48	48	48	48	48	48	48	48	48	48	48
49	0	0	0	49	49	49	49	49	49	49	49	49	49	49
50	0	0	0	50	50	50	50	50	50	50	50	50	50	50

Prepared by: Mr Men Tharith Figure No. 169

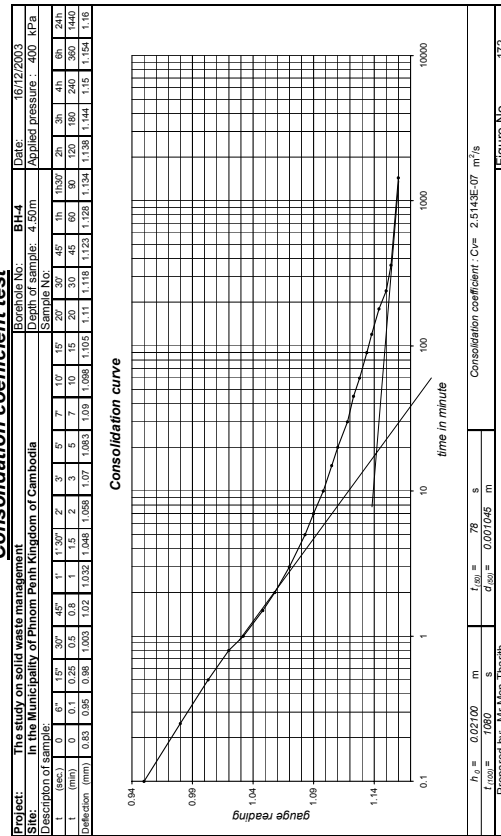
Consolidation coefficient test



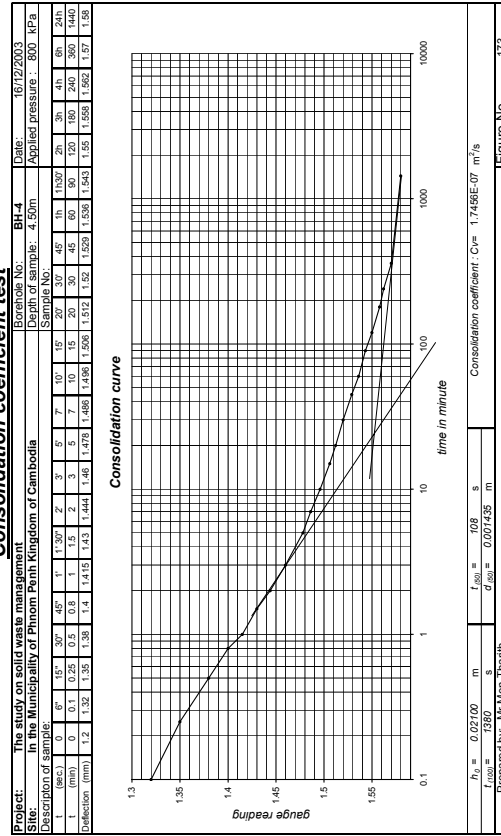
Consolidation coefficient test



Consolidation coefficient test

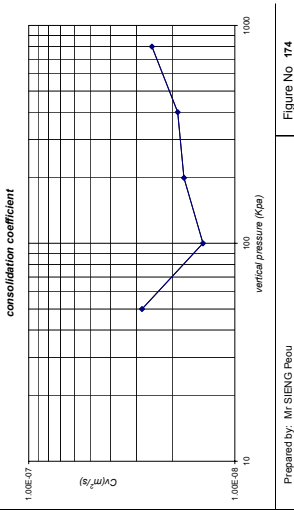


Consolidation coefficient test



CONSOLIDATION TEST

Project : The study on solid waste management		Borehole No. : BH-5	
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 24/12/2003	
Depth of sample : 1.50m		Depth of sample : 1.50m	
Thickness of disc: H	20 mm	Scale No.: C	
Mass of ring wet spec.: M_{1+2}	165.32 g	Diameter of ring: d_r	61.8035 mm
Mass of dry spec.: M_d	147.80 g	Height of ring: h_r	20.00 mm
Mass of ring: M_r	62.41 g	Area of ring: A_r	2099.96 mm ²
Mass of dry spec.: M_d	105.39 g	Volume of ring: V_r	60.00 cm ³
Water content: w	36.02 %	Void ratio: e	0.9092
Bulk density: ρ	2.05 g/cm ³	m_v:	0.0087
Dry density: ρ_d	1.76 g/cm ³	E:	19215.38 kN/m ²
Specific gravity: G_s	2.64	C_c:	0.00031
Mo. of saturation: S_p	87.24 %	C_u:	5.17349
No. of soil particles: N_p	13.31 mm	I_p:	33.73 kN
Consolid. Coef. C_v	w_p	$I_{p,c}$:	20.00 kN
Applied pressure: σ_a	0	Total thickness of voids: ΔH	20.00 mm
Pressure: σ	0	Specimen: H_c	18.420 mm
Height: H	2.800 mm	Height of voids: H_v	15.120 mm
Area: A	2.800 mm ²	Area: A_c	16.620 mm ²
Volume: V	2.910 mm ³	Volume: V_c	4.120 mm ³
Mass: M	3.900 mm ³	Mass: M_c	0.316 mm ³
Weight: W	16.440 mm ³	Weight: W_c	1.775 mm ³
Volume of voids: V_v	16.440 mm ³	Volume of voids: $V_{v,c}$	0.316 mm ³
Weight of voids: W_v	15.745 mm ³	Weight of voids: $W_{v,c}$	1.895 mm ³
Volume of solids: V_s	15.830 mm ³	Volume of solids: $V_{s,c}$	2.226 mm ³
Weight of solids: W_s	4.170 mm ³	Weight of solids: $W_{s,c}$	0.108 mm ³
Volume of water: V_w	15.970 mm ³	Volume of water: $V_{w,c}$	2.602 mm ³
Weight of water: W_w	3.890 mm ³	Weight of water: $W_{w,c}$	0.215 mm ³
Volume of air: V_a	16.380 mm ³	Volume of air: $V_{a,c}$	3.072 mm ³
Weight of air: W_a	16.890 mm ³	Weight of air: $W_{a,c}$	0.282 mm ³

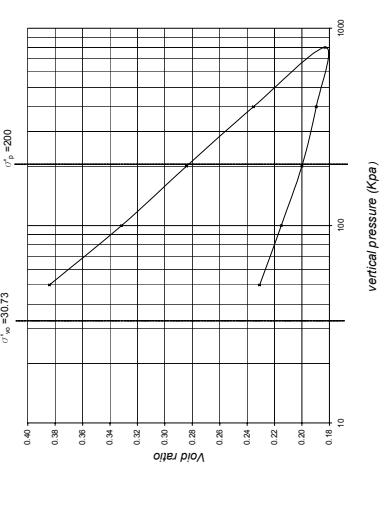


Prepared by: Mr SIENG Peou

Figure No 174

CONSOLIDATION CURVE

Project : The study on solid waste management		Borehole No. : BH-5	
Site : In the Municipality of Phnom Penh Kingdom of Cambodia		Date : 24/12/2003	
Depth of sample : 1.50m		Depth of sample : 1.50m	
σ'_{vs}	30.73 kPa	σ'_p	200.00 kPa



Prepared by: Mr SIENG Peou

Figure No 175

Consolidation coefficient test

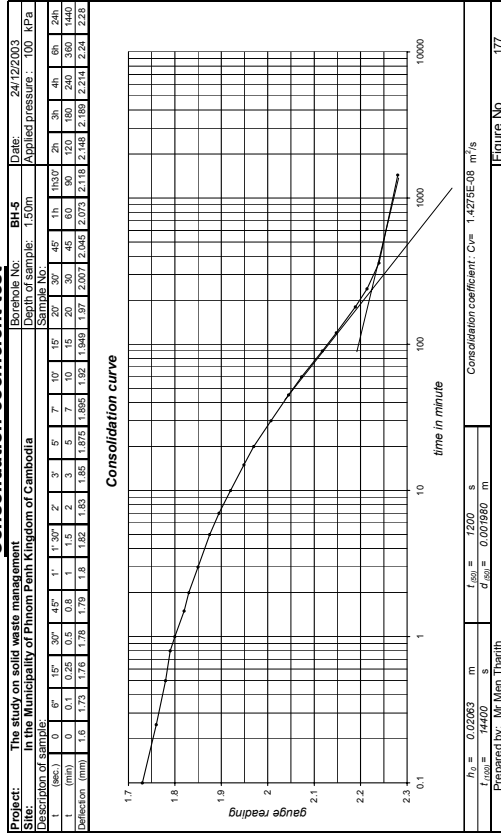
Project: The study on solid waste management		Borehole No.: BH-5	
Site: In the Municipality of Phnom Penh Kingdom of Cambodia		Date: 24/12/2003	
Depth of sample: 1.50m		Depth of sample: 1.50m	
Sample No.:	1	Sample No.:	2
Location of sample:	1	Location of sample:	2
Time:	1:30	Time:	2:30
Temperature:	25	Temperature:	25
Moisture Content (MC):	37.1	Moisture Content (MC):	37.1
Specific Gravity (SG):	2.64	Specific Gravity (SG):	2.64
Consolidation Coef. (Cv):	0.0001	Consolidation Coef. (Cv):	0.0001



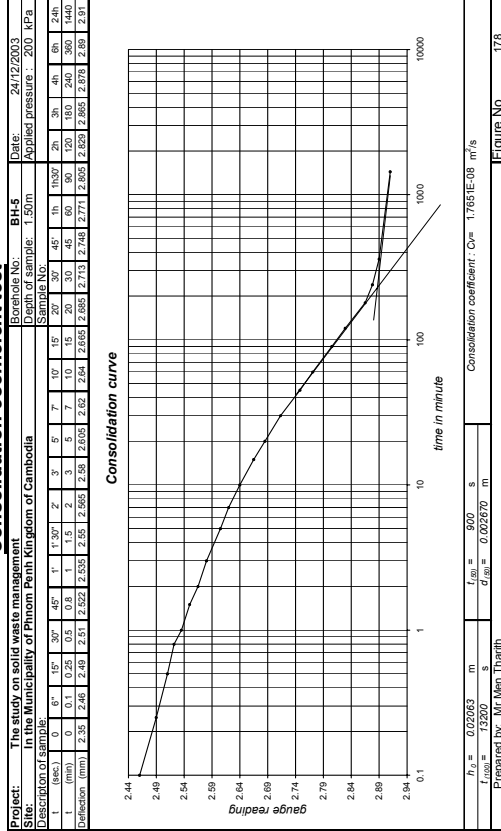
Prepared by: Mr Men Tharith

Figure No 176

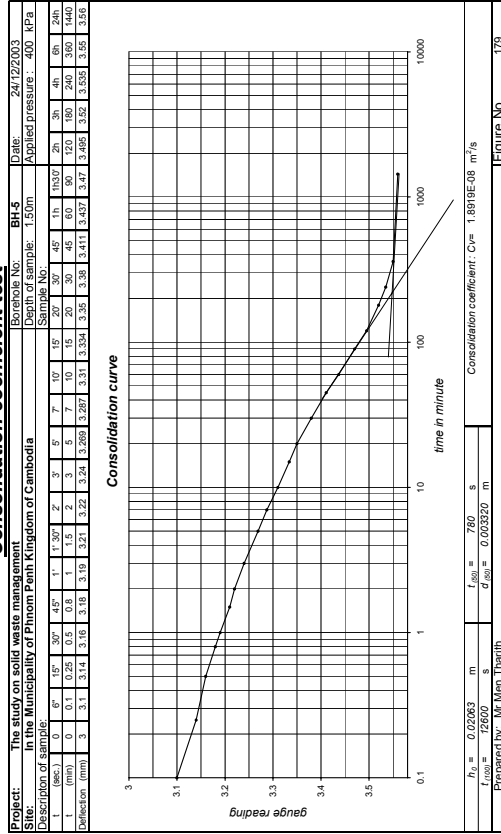
Consolidation coefficient test



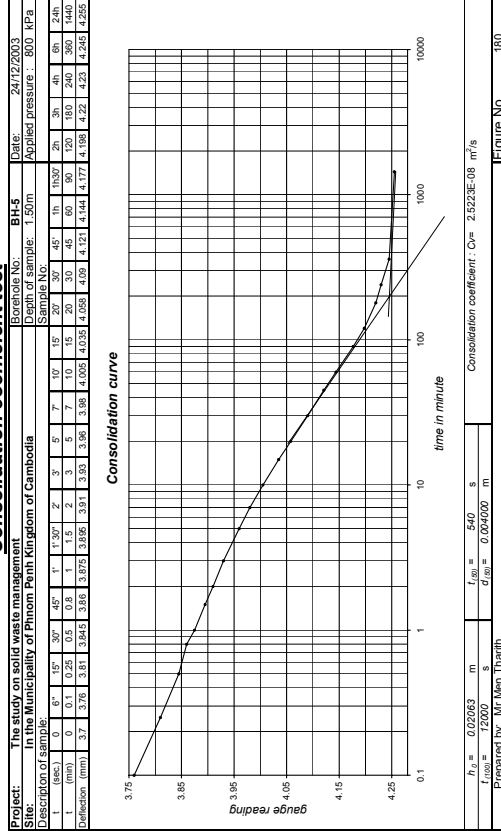
Consolidation coefficient test



Consolidation coefficient test



Consolidation coefficient test

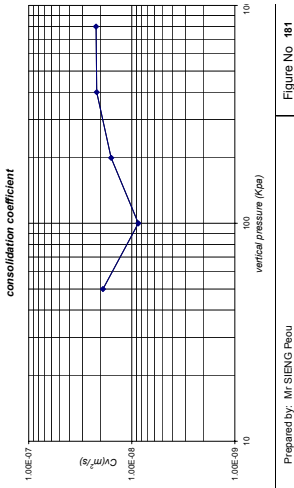


CONSOLIDATION TEST

Project: The study on solid waste management.
Site: In the Municipality of Phnom Penh Kingdom of Cambodia

Borehole No.:	BH-5
Date:	24/12/2003
Depth of sample:	2.50m
Soil No.:	8
Thickness of disc:	Hi = 20 mm
Mass of dry spec.:	M _d = 163.84 g
Mass of wet spec.:	M = 147.00 g
Height of ring:	H = 20.00 mm
Mass of ring:	M _r = 2939.96 mm ³
Volume of ring:	V _r = 60.00 cm ³
Water content:	w = 16 %
Void ratio e:	e = 0.9187
Bulk density ρ:	ρ = 2.01 g/cm ³
Dry density ρ _d :	ρ _d = 1.70 g/cm ³
Specific gravity G _s :	G _s = 2.62
Def. of saturation S _r :	S _r = 81.89 %
Consolid. Coef. C _v :	C _v = 0.9883
Consolid. Coef. C _c :	C _c = 0.28
Consolid. Coef. C _u :	C _u = 3.915

Applied pressure (kPa)	Total thickness of specimen (mm)	Height of voids (mm)	Void ratio (e)
0	18.510	4.930	0.9646
40	18.510	4.930	0.9646
100	17.500	4.180	0.8110
200	16.850	3.416	0.6681
400	16.650	2.708	0.2045
800	15.940	2.041	0.1842
1600	15.275	2.041	0.1616
3200	15.510	2.270	0.1720
6400	15.710	2.670	0.1871
12800	15.888	2.651	0.2003
25600	16.485	3.251	0.2437



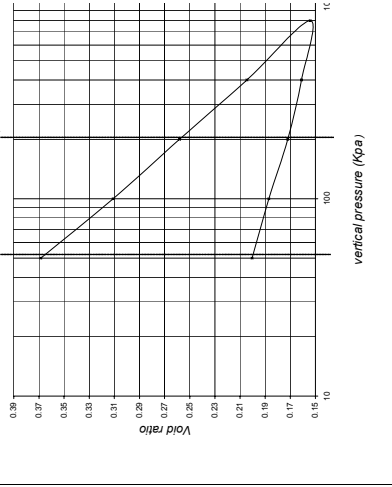
Prepared by: Mr SIENG PEU

Figure No. 181

CONSOLIDATION CURVE

Project: The study on solid waste management.
Site: In the Municipality of Phnom Penh Kingdom of Cambodia

Borehole No.:	BH-5
Date:	24/12/2003
Depth of sample:	2.50m
σ _v ' = 50.28 kPa	
σ _v ' _p = 200.00 kPa	
σ _v ' _s = 50.28	
σ _v ' _p = 200.00	
σ _v ' = 200	

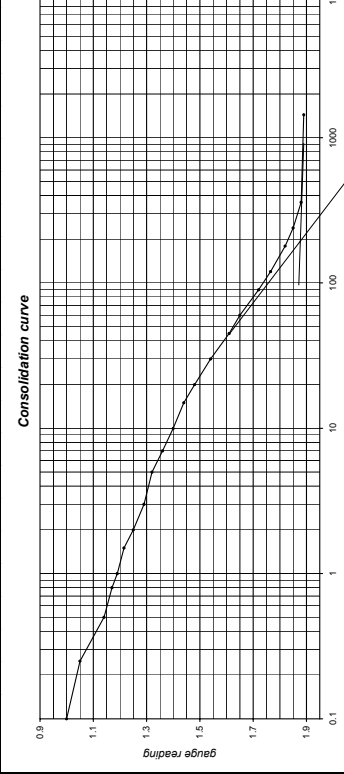


Prepared by: Mr SIENG PEU

Figure No. 182

Consolidation coefficient test

Project: The study on solid waste management
Site: In the Municipality of Phnom Penh Kingdom of Cambodia



Prepared by: Mr Men Thearith

Figure No.

Consolidation coefficient test

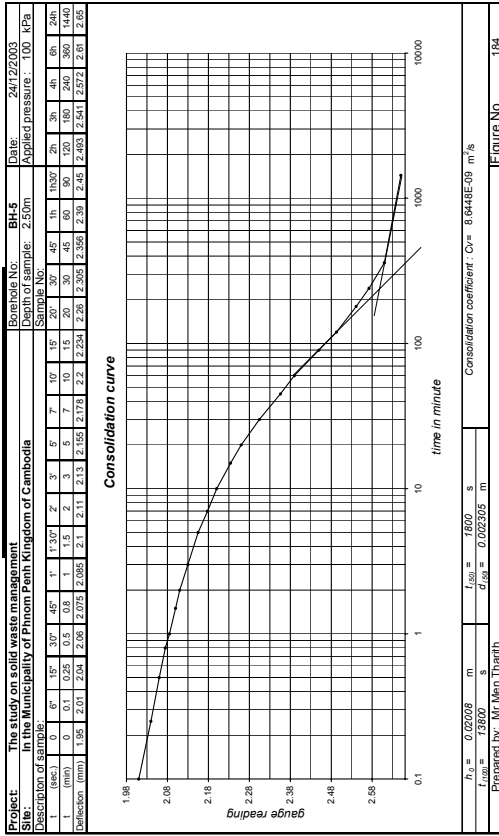


Figure No 184

Consolidation coefficient test

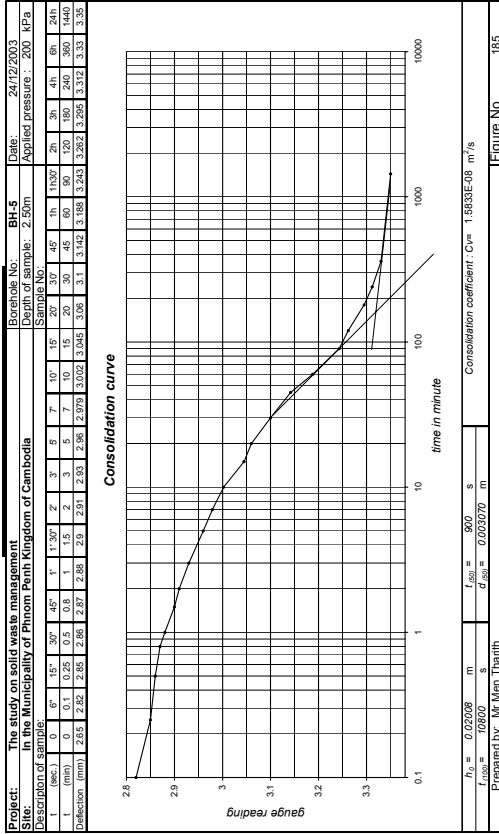


Figure No 185

Consolidation coefficient test

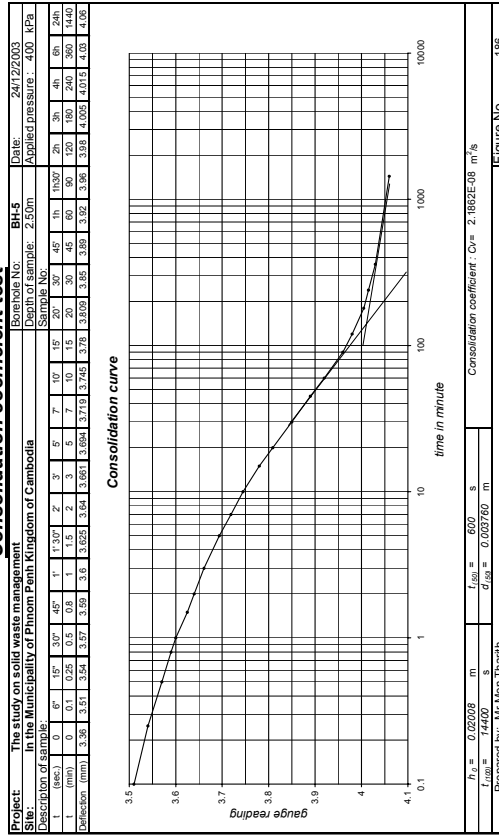


Figure No 186

Consolidation coefficient test

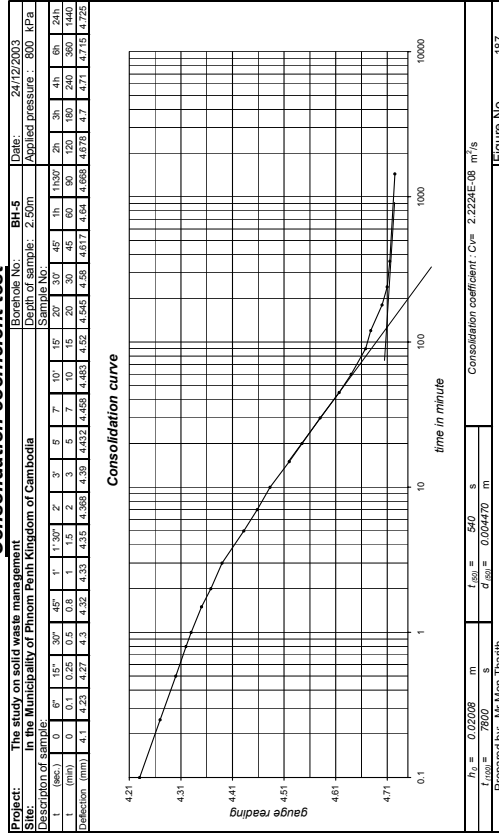
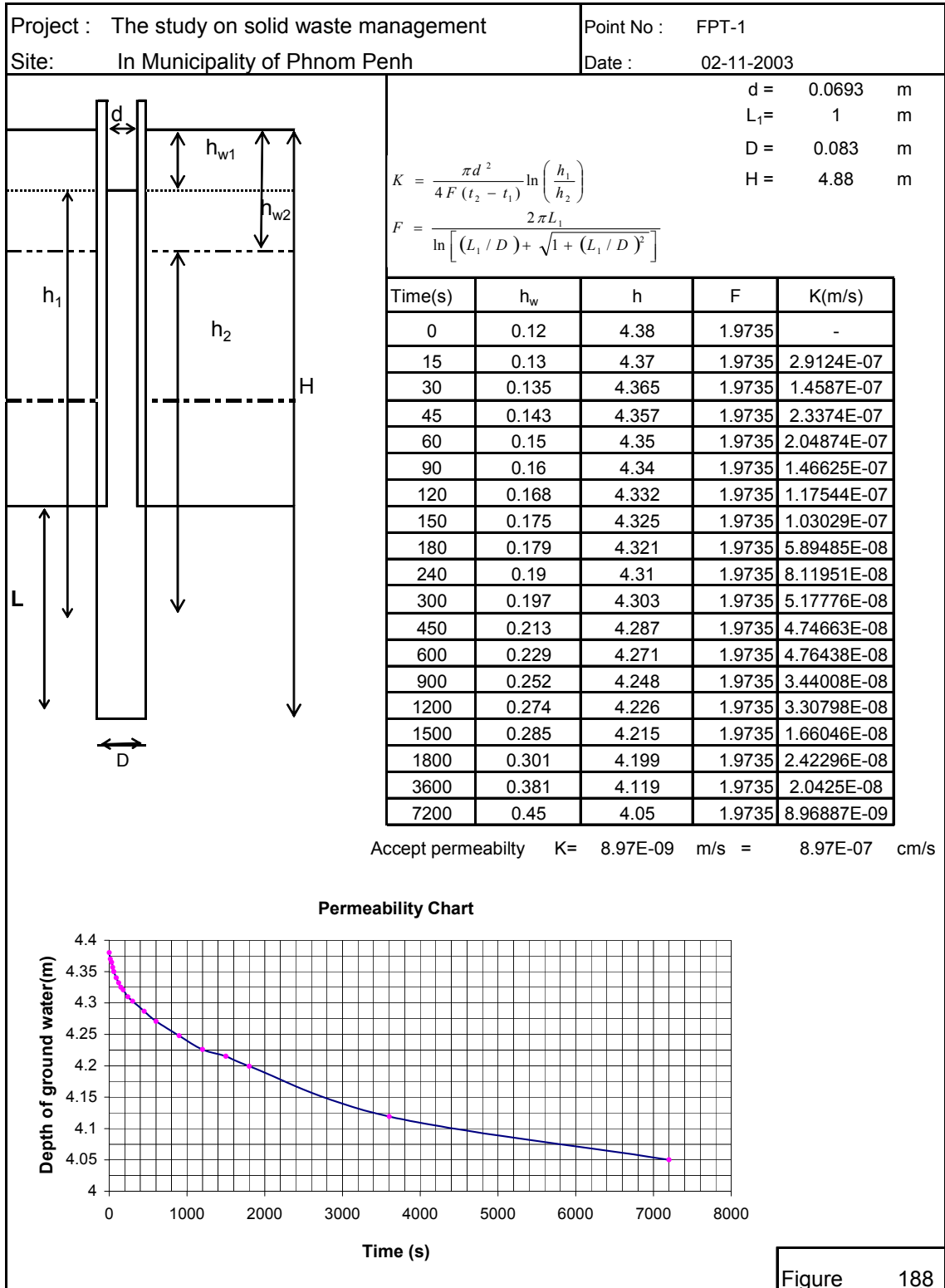


Figure No 187

8.6.5 Field Permeability Test Result

Research and Design Enterprise
 Soil Testing Laboratory

FIELD PERMEABILITY TEST



Data 9

Data Management System

Data 9 Pilot Project: Public Education Campaign Public awareness survey before and after Pilot Project

9.1 Result of the public awareness survey before pilot project

Number of samples

	Households	Business	total
Monorom	108	9	117
Boeung Trabek (BTB)	42	2	44
total	150	11	161

Number of respondents by discharge place

	Monorom					BTB			total
	St 107	St 109	St 134	St 140	undecided	St 432	St 105	St 101	
number	45	55	8	3	6	24	18	2	161

Number of respondents by floor number (in Monorom)

	Ground	1 st Floor	2 nd Floor	3 rd Floor	4 th Floor	total
	30	28	24	26	9	117

1. Awareness of problems caused by solid waste

Q1 In the whole Phnom Penh, are there any problems caused by waste?

	Monorom		BTB		total	
Yes	112	95.7%	43	97.7%	155	96.3%
No	1	0.9%			1	0.6%
I do not know	4	3.4%	1	2.3%	5	3.1%
total	117	100.0%	44	100.0%	161	100.0%

Q1-2 In Phnom Penh, what kinds of problems are there now? (Check all answers you observe.)

	Monorom		BTB		total	
A lot of wastes are scattered on the street.	92	82.1%	42	97.7%	134	86.5%
Wastes on the street are scavenged by animals.	29	25.9%	29	67.4%	58	37.4%
Wastes left on the street cause offensive odor.	101	90.2%	42	97.7%	143	92.3%
Wastes left on the street attract rats and flies.	48	42.9%	28	65.1%	76	49.0%
Dumped wastes in canal block drainage systems and cause flood in rainy season.	77	68.8%	36	83.7%	113	72.9%
Dumped wastes in canal pollute water and this causes skin diseases and diarrhea	54	48.2%	35	81.4%	89	57.4%
Fires often occur at the disposal site and cause air pollution.	32	28.6%	32	74.4%	64	41.3%
Waste at the final disposal site pollutes ground water.	31	27.7%	24	55.8%	55	35.5%
The current dumpsite is almost full.	57	50.9%	30	69.8%	87	56.1%
Others	2	1.8%	1	2.3%	3	1.9%
Collection fee is so expensive						
heap of wastes on the street make traffic jam						

Base: 112 (Monorom) and 43 (BTB)

Q2-1 In your neighbor, are there any problems caused by waste?

	Monorom		BTB		total	
Yes	90	76.9%	41	93.2%	131	81.4%
No	27	23.1%	3	6.8%	30	18.6%
total	117	100.0%	44	100.0%	161	100.0%

Q2-2 What kinds of problems are there now? (Check all answers you observe.)

	Monorom		BTB		total	
A lot of wastes are scattered on the street.	48	53.3%	35	85.4%	83	63.4%
There are always waste heaps on the street	22	24.4%	29	70.7%	51	38.9%
Wastes on the street are scavenged by animals.	16	17.8%	24	58.5%	40	30.5%
Wastes left on the street cause offensive odor.	83	92.2%	37	90.2%	120	91.6%
Wastes left on the street attract rats and flies.	34	37.8%	25	61.0%	59	45.0%
Dumped wastes in canal block drainage systems and cause flood in rainy season.	41	45.6%	30	73.2%	71	54.2%
Dumped wastes in canal pollute water and this	20	22.2%	32	78.0%	52	39.7%

causes skin diseases and diarrhea					
Others	3	3.3%		0.0%	
Heap of wastes are scavenged by waste pickers	1				1 0.8%
heap of wastes on the street make traffic jam and street broken	1				1 0.8%
heap of wastes on the street make traffic jam	1				1 0.8%

Base: 90 (Monorom) and 41 (BTB)

Q2-3 What is the most serious problem? Please select one.

	Monorom		BTB		total	
A lot of wastes are scattered on the street.	13	14.4%	3	7.3%	16	12.2%
There are always waste heaps on the street	6	6.7%	3	7.3%	9	6.9%
Wastes on the street are scavenged by animals.	3	3.3%		0.0%	3	2.3%
Wastes left on the street cause offensive odor.	53	58.9%	20	48.8%	73	55.7%
Wastes left on the street attract rats and flies.	3	3.3%		0.0%	3	2.3%
Dumped wastes in canal block drainage systems and cause flood in rainy season.	7	7.8%	4	9.8%	11	8.4%
Dumped wastes in canal pollute water and this causes skin diseases and diarrhea	5	5.6%	11	26.8%	16	12.2%
total	90	100.0%	41	100.0%	131	100.0%

Q3 How do you think about the condition of your area?

	Monorom		BTB		total	
It is very bad	9	7.7%	5	11.4%	14	8.7%
It is bad a little bit	58	49.6%	31	70.5%	89	55.3%
It is rather good	48	41.0%	7	15.9%	55	34.2%
	1	0.9%			1	0.6%
It is very good	1	0.9%	1	2.3%	2	1.2%
total	117	100.0%	44	100.0%	161	100.0%

Q4 Do you think that cleanness and hygiene are important for your daily life or business?

	Monorom		BTB		total	
It is very important	93	79.5%	32	72.7%	125	77.6%
It is important to some extent	22	18.8%	11	25.0%	33	20.5%
it is not important much	1	0.9%			1	0.6%
it is not important at all						
no response	1		1	2.3%	2	1.2%
total	117	100.0%	44	100.0%	161	100.0%

2. Waste Generation and Storage

Q5 How many times do you cook every day?

	Monorom		BTB		total	
Once	18	15.4%	1	2.3%	19	11.8%
Twice	70	59.8%	33	75.0%	103	64.0%
Three times	23	19.7%	8	18.2%	31	19.3%
I do not know	4	3.4%	1	2.3%	5	3.1%
None	1	0.9%			1	0.6%
no response	1	0.9%	1	2.3%	2	1.2%
total	117	100.0%	44	100.0%	161	100.0%

Q6-1 If you know, please tell us how much waste is generated at your house and discharge every day.

	Monorom		BTB		total	
Yes	114	97.4%	42	95.5%	156	96.9%
No	3	2.6%	2	4.5%	5	3.1%
total	117	100.0%	44	100.0%	161	100.0%

Q6-2 How much? (by pieces of plastic bags)

Pieces of p-bag	Monorom		BTB		total	
0	1	0.9%	2	4.8%	3	1.9%
0.5	4	3.5%	7	16.7%	11	7.1%
1	96	84.2%	27	64.3%	123	78.8%
2	8	7.0%	6	14.3%	14	9.0%
3	5	4.4%		0.0%	5	3.2%
total	114	100.0%	42	100.0%	156	100.0%

Q7 How much waste is generated every week?

Beer cans	Monorom		BTB		total	
0	101	86.3%	43	97.7%	144	89.4%
2	6	5.1%			6	3.7%
3	2	1.7%			2	1.2%
4	2	1.7%			2	1.2%
5	4	3.4%			4	2.5%
6	1	0.9%			1	0.6%
10	1	0.9%			1	0.6%
50		0.0%	1	2.3%	1	0.6%
total	117	100.0%	44	100.0%	161	100.0%

Other cans	Monorom		BTB		total	
0	101	86.3%	39	88.6%	140	87.0%
1	6	5.1%			6	3.7%
2	3	2.6%			3	1.9%
3	4	3.4%	1	2.3%	5	3.1%
5			2	4.5%	2	1.2%
7	2	1.7%			2	1.2%
10			2	4.5%	2	1.2%
14	1	0.9%			1	0.6%
total	117	100.0%	44	100.0%	161	100.0%

Glass bottles	Monorom		BTB		total	
0	96	82.1%	40	90.9%	136	84.5%
1	14	12.0%		0.0%	14	8.7%
2	4	3.4%	1	2.3%	5	3.1%
5	2	1.7%	3	6.8%	5	3.1%
7	1	0.9%		0.0%	1	0.6%
total	117	100.0%	44	100.0%	161	100.0%

plastic (water) bottles	Monorom		BTB		total	
0	97	82.9%	43	97.7%	140	87.0%
1	8	6.8%		0.0%	8	5.0%
2	6	5.1%		0.0%	6	3.7%
3	2	1.7%	1	2.3%	3	1.9%
5	3	2.6%		0.0%	3	1.9%
10	1	0.9%		0.0%	1	0.6%
total	117	100.0%	44	100.0%	161	100.0%

Newspaper	Monorom		BTB		total	
0	104	88.9%	44	100.0%	148	91.9%
1	4	3.4%		0.0%	4	2.5%
2	5	4.3%		0.0%	5	3.1%
3	1	0.9%		0.0%	1	0.6%
5	1	0.9%		0.0%	1	0.6%
7	2	1.7%		0.0%	2	1.2%
total	117	100.0%	44	100.0%	161	100.0%

Cardboard	Monorom		BTB		total	
0	112	95.7%	44	100.0%	156	96.9%
1	4	3.4%		0.0%	4	2.5%
		0.0%		0.0%		0.0%
10	1	0.9%		0.0%	1	0.6%
total	117	100.0%	44	100.0%	161	100.0%

Plastic bags	Monorom		BTB		total	
0	9	7.7%			9	5.6%
1	5	4.3%	1	2.3%	6	3.7%
2	2	1.7%		0.0%	2	1.2%
3	9	7.7%		0.0%	9	5.6%
4	1	0.9%		0.0%	1	0.6%
5	11	9.4%		0.0%	11	6.8%
6	7	6.0%		0.0%	7	4.3%
7	6	5.1%		0.0%	6	3.7%

8	4	3.4%		0.0%	4	2.5%
10	10	8.5%	1	2.3%	11	6.8%
14	2	1.7%	2	4.5%	4	2.5%
15	7	6.0%		0.0%	7	4.3%
20	11	9.4%		0.0%	11	6.8%
21	2	1.7%	8	18.2%	10	6.2%
25	3	2.6%		0.0%	3	1.9%
28	5	4.3%	4	9.1%	9	5.6%
30	9	7.7%	7	15.9%	16	9.9%
35	10	8.5%	10	22.7%	20	12.4%
38		0.0%	2	4.5%	2	1.2%
40	1	0.9%	7	15.9%	8	5.0%
50	2	1.7%	1	2.3%	3	1.9%
70	1	0.9%	1	2.3%	2	1.2%
total	117	100.0%	44	100.0%	161	100.0%

Q8 How do you store waste at your house?

	Monorom		BTB		total	
In a plastic bag	67	57.3%	38	88.4%	105	65.2%
In a paper bag	1	0.9%			1	0.6%
In a rice/cement bag	1	0.9%	1	2.3%	2	1.2%
In a basket with a plastic bag	3	2.6%	4	9.3%	7	4.3%
In a metal/plastic container without a plastic bag	9	7.7%			9	5.6%
In a metal/plastic container with a plastic bag	35	29.9%			35	21.7%
	1	0.9%	1		2	1.2%
total	117	100.0%	44	100.0%	161	100.0%

Q9 What is the condition of your waste in general? Please check all that apply to your case.

	Monorom		BTB		total	
It contains a lot of water	69	59.0%	44	100.0%	113	70.2%
It contains offal of fish or animal	45	38.5%	1	2.3%	46	28.6%
It contains feces	2	1.7%			2	1.2%

Base: 117 (Monorom) and 44(BTB)

3. Waste Collection and Discharge Manners

3-1 Handling

Q10 Who handles and discharges your waste in your household most often?

	Monorom		BTB		total	
female adult	64	54.7%	16	36.4%	80	49.7%
male adult	23	19.7%	12	27.3%	35	21.7%
female children	11	9.4%	7	15.9%	18	11.2%
male children	10	8.5%	8	18.2%	18	11.2%
maid or house staff	1	0.9%		0.0%	1	0.6%
anybody who is available	8	6.8%	1	2.3%	9	5.6%
total	117	100.0%	44	100.0%	161	100.0%

Q11 How do you transport your waste to the collection point and dump it?

	Monorom							BTB		Total	
	Ground	1st	2nd	3rd	4th	total	%	Col	%	Col	%
to bring waste in a bag and put the bag on the ground (or in a collection vehicle)	25	26	23	26	9	109	93.2%	42	95.5%	151	93.8%
to bring waste in a basket/container and leave the basket/container at the discharge point.		1				1	0.9%	1	2.3%	2	1.2%
to bring waste in a basket/container and throw waste inside on the ground	5	1	1			7	6.0%	1	2.3%	8	5.0%
total	30	28	24	26	9	117	100%	44	100%	161	100%

Q12-1 Do you know the collection day?

	Monorom		BTB		total	
Yes	105	89.7%	32	72.7%	137	85.1%
No	12	10.3%	12	27.3%	24	14.9%
total	117	100.0%	44	100.0%	161	100.0%

Q12-2 If you know, please check all when waste collection service is provided.

In Monorom		St 107		St 109		St 134		St 140		undecided	
Monday	Yes										
	No	40	100%	48	100%	8	100%	3	100%	6	100%
Tuesday	Yes	1	2.5%								
	No	39	97.5%	48	100%	8	100%	3	100%	6	100%
Wednesday	Yes										
	No	40	100%	48	100%	8	100%	3	100%	6	100%
Thursday	Yes	1	2.5%								
	No	39	97.5%	48	100%	8	100%	3	100%	6	100%
Friday	Yes	1	2.5%								
	No	39	97.5%	48	100%	8	100%	3	100%	6	100%
Saturday	Yes	1	2.5%								
	No	39	97.5%	48	100%	8	100%	3	100%	6	100%
Sunday	Yes										
	No	40	100%	48	100%	8	100%	3	100%	6	100%

Base: 40 (St. 107), 48 (St. 109), 8 (St. 134), 3 (St. 140), 6 (undecided)

In BTB		St 432		St 105		St 101	
Monday	Yes	1	5.9%				
	No	16	94.1%	13	100.0%	2	100.0%
Tuesday	Yes	13	76.5%	9	69.2%	2	100.0%
	No	4	23.5%	4	30.8%		
Wednesday	Yes	10	58.8%	4	30.8%	1	50.0%
	No	7	41.2%	9	69.2%	1	50.0%
Thursday	Yes	8	47.1%	6	46.2%	1	50.0%
	No	9	52.9%	7	53.8%	1	50.0%
Friday	Yes	10	58.8%	4	30.8%	1	50.0%
	No	7	41.2%	9	69.2%	1	50.0%
Saturday	Yes	13	76.5%	9	69.2%	2	100.0%
	No	4	23.5%	4	30.8%		
Sunday	Yes	2	11.8%				
	No	15	88.2%	13	100.0%	2	100.0%

Base: 17 (St. 432), 13 (St. 105), 2 (St. 101)

Q13-1 Do you know what time waste is collected?

	Monorom		BTB		total	
Yes	107	91.5%	36	81.8%	143	88.8%
No	10	8.5%	8	18.2%	18	11.2%
total	117	100.0%	44	100.0%	161	100.0%

Q13-2 If you know, please tell us when your waste is collected.

In Monorom	St 107		St 109		St 134		St 140		undecided	
3:00 – 6:00			3	6.0%						
6:00 – 9:00			1	2.0%						
9:00 – 12:00				0.0%						
12:00 – 15:00	3	7.5%	1	2.0%	3	37.5%	3	100.0%	1	16.7%
15:00 – 18:00	24	60.0%	8	16.0%					3	50.0%
18:00 – 21:00	4	10.0%	12	24.0%	1	12.5%			1	16.7%
21:00 – 3:00 next day	2	5.0%	15	30.0%						
Irregular	7	17.5%	10	20.0%	4	50.0%			1	16.7%
total	40	100.0%	50	100.0%	8	100.0%	3	100.0%	6	100.0%

In BTB	St 432		St 105		St 101	
3:00 – 6:00	2	9.5%				
6:00 – 9:00	2	9.5%	2	15.4%		
9:00 – 12:00	1	4.8%				
12:00 – 15:00			1	7.7%		
15:00 – 18:00	13	61.9%	4	30.8%	2	100.0%
18:00 – 21:00	3	14.3%	1	7.7%		
21:00 – 3:00 next day						
Irregular			5	38.5%		
total	21	100.0%	13	100.0%	2	100.0%

Q14 When (what day) do you discharge your waste?

In Monorom	St 107		St 109		St 134		St 140		undecided	
Monday	41	91.1%	50	90.9%	5	62.5%	3	100%	5	83.3%
Tuesday	33	73.3%	43	78.2%	6	75.0%	3	100%	5	83.3%
Wednesday	37	82.2%	46	83.6%	7	87.5%	3	100%	5	83.3%
Thursday	35	77.8%	48	87.3%	6	75.0%	3	100%	5	83.3%
Friday	36	80.0%	43	78.2%	5	62.5%	3	100%	4	66.7%
Saturday	40	88.9%	48	87.3%	8	100%	3	100%	5	83.3%
Sunday	39	86.7%	48	87.3%	5	62.5%	3	100%	6	100%
total	45		55		8		3	100%	6	100%

In BTB	St 432		St 105		St 101	
Monday	24	100.0%	18	100.0%	2	100.0%
Tuesday	15	62.5%	14	77.8%		
Wednesday	21	91.3%	15	83.3%	1	50.0%
Thursday	18	78.3%	17	94.4%	1	50.0%
Friday	21	91.3%	15	83.3%	1	50.0%
Saturday	15	65.2%	13	72.2%		
Sunday	24	100.0%	18	100.0%	2	100.0%
total	24		18		2	

Q15 How many times do you discharge waste?

	Ground	1st	2nd	3rd	4th	BTB	total
Once a day	27	24	20	25	7	26	129
twice a day	1	1	2		1	3	8
more than three times	1						1
every second day	1	3			1	6	11
every third day			2	1		9	12
total	30	28	24	26	9	44	161

Q16 What time do you discharge waste (Multi answer question)?

In Monorom	St 107		St 109		St 134		St 140		undecided	
3:00 – 6:00	1	2.2%	1	1.8%						
6:00 – 9:00	5	10.9%	3	5.5%	2	25.0%			1	16.7%
9:00 – 12:00			1	1.8%	1	12.5%	2	66.7%		
12:00 – 15:00	10	21.7%	3	5.5%	4	50.0%	3	100.0%		
15:00 – 18:00	25	54.3%	18	32.7%	1	12.5%			1	16.7%
18:00 – 21:00	7	15.2%	27	49.1%					5	83.3%
21:00 – 3:00 next day	1	2.2%	5	9.1%						
Whenever waste is generated										
total	45	100%	55	100%	8	100%	3	100%	6	100%

In BTB	St 432		St 105		St 101	
3:00 – 6:00	3	13.0%	1	5.6%		
6:00 – 9:00	1	4.3%	5	27.8%		
9:00 – 12:00						
12:00 – 15:00	1	4.3%				
15:00 – 18:00	10	43.5%	9	50.0%	2	100.0%
18:00 – 21:00	10	43.5%				
21:00 – 3:00 next day	1	4.3%				
Whenever waste is generated			2	11.1%		
total	23	100.0%	18	100.0%	2	100.0%

Q17 What time is the most convenient time for you?

	Monorom					BTB			total
	St 107	St 109	St 134	St 140	undecided	St 432	St 105	St 101	
3:00 – 6:00	7	3	2			5	1		18
6:00 – 9:00	1	2	1				3		7
9:00 – 12:00		1		1			1		3
12:00 – 15:00	7	1	2	2	1				13
15:00 – 18:00	12	10	1		3	8	11	2	47
18:00 – 21:00	9	26			2	10	2		49
21:00 – 3:00 next day		7	1			1			9
Whenever waste is generated	9	5	1						15
total	45	55	8	3	6	24	18	2	161

4. Recycling Activities

Q20-1 Do you usually separate and sell recyclables?

	Monorom										BTB		total
	Groud		1st		2nd		3rd		4th				
Yes	21	70.0%	16	57.1%	15	62.5%	22	84.6%	7	77.8%	24	57.1%	105
No	9	30.0%	12	42.9%	9	37.5%	4	15.4%	2	22.2%	18	42.9%	54
total	30	100.0%	28	100.0%	24	100.0%	26	100.0%	9	100.0%	42	100.0%	159

Q20-2 Do you separate and sell the following items?

In Monorom	always		sometimes		rarely		never	
Beer cans	20	24.7%	20	24.7%	26	32.1%	15	18.5%
other cans	3	3.7%	2	2.5%	2	2.5%	74	91.4%
glass bottles	19	23.5%	19	23.5%	28	34.6%	15	18.5%
plastic bottles		0.0%	5	6.2%	6	7.4%	70	86.4%
Hard plastics		0.0%	2	2.5%	9	11.1%	70	86.4%
Nespaper	3	3.7%	7	8.6%	3	3.7%	68	84.0%
Carton box	4	4.9%	5	6.2%	4	4.9%	68	84.0%
Plastic bag			3	3.7%			78	96.3%

In BTB	always		sometimes		rarely		never	
Beer cans			3	12.5%	18	75.0%	3	12.5%
other cans					6	25.0%	18	75.0%
glass bottles			4	16.7%	14	58.3%	5	20.8%
plastic bottles			2	8.3%	7	29.2%	15	62.5%
Hard plastics					3	12.5%	21	87.5%
Nespaper	1	4.2%			1	4.2%	22	91.7%
Carton box					3	12.5%	21	87.5%
Plastic bag							24	100.0%

Q20-3 How often do you sell these recyclable items?

	Monorom							BTB		total	
	Groud	1st	2nd	3rd	4th	total					
everyday	1					1	1.2%			1	1.0%
a few times a week								2	8.3%	2	1.9%
once a week				1		1	1.2%	1	4.2%	2	1.9%
once a twice a month	7	5	3	4	2	21	25.9%	8	33.3%	29	27.6%
every 2nd or 3rd month	12	4	8	9	4	37	45.7%	11	45.8%	48	45.7%
once or twice a year	2	7	4	7	1	21	25.9%	2	8.3%	23	21.9%
total	22	16	15	21	7	81	100%	24	100%	105	100%

Q21 More frequency, more separate waste?

	Monorom						BTB	total
	Groud	1st	2nd	3rd	4th			
Yes	12	7	8	7	3	9	46	
No	18	20	16	18	5	34	111	
I do not know		1			1	1	3	
total	30	28	24	25	9	44	160	

Q22 If a waste buyer come at more convenient time or fixed time, do you separate more waste?

	Monorom						BTB	total
	Groud	1st	2nd	3rd	4th			
Yes	12	7	9	11	3	8	50	
No	18	20	15	15	4	34	106	
I do not know		1			1	2	4	
total	30	28	24	26	8	44	160	

5. Public Cooperation

Q23-1 Have you ever received an instruction how to discharge waste?

	Monorom		BTB		total	
Yes	20	17.1%	16	36.4%	36	22.4%
No	89	76.1%	24	54.5%	113	70.2%
I do not know	5	4.3%	4	9.1%	9	5.6%
blank	3	2.6%			3	1.9%
total	117	100.0%	44	100.0%	161	100.0%

Q23-2 Who gave you the instruction?

	Monorom		BTB		total	
Family members						
School teacher						
Community member	1	5.0%			1	2.8%
NGO member	2	10.0%	12	75.0%	14	38.9%
Municipality	18	90.0%	6	37.5%	24	66.7%
Others:						

Base: 20, 16

Q23-3 Did you change the discharge mannter?

	Monorom		BTB		total	
Yes	16	80.0%	16	100.0%	32	88.9%
No	4	20.0%			4	11.1%
total	20	100%	16	100%	36	100%

Q24 Does anyone in your family clean the sidewalk or adjacent public area?

	Monorom					BTB	total
	Groud	1st	2nd	3rd	4th		
Yes, sometimes	7	15	10	9	6	22	69
Yes, almost everyday	22	5	8	6	1	21	63
No	1	8	6	10	2	1	28
total	30	28	24	25	9	44	160

Q25 Do you agree with waste discharge rules?

	Monorom		BTB		total	
To establish rules is good and I follow the rules	109	93.2%	40	90.9%	149	92.5%
To establish rules is good and if waste collection vehicle/worker come on time, I will follow the rules	6	5.1%	4	9.1%	10	6.2%
I do not know	2	1.7%			2	1.2%
total	117	100.0%	44	100.0%	161	100.0%

5. About Interviewee

Q26 Sex

	Monorom		BTB		total	
Male	32	27.4%	16	36.4%	48	29.8%
Female	85	72.6%	28	63.6%	113	70.2%
total	117	100.0%	44	100.0%	161	100.0%

Q27 Age

	Monorom		BTB		total	
Less than 18	3	2.6%	1	2.3%	4	2.5%
18 - 24 years	24	20.5%	12	27.3%	36	22.4%
25 - 29 years	11	9.4%	3	6.8%	14	8.7%
30 - 34 years	12	10.3%	4	9.1%	16	9.9%
35 - 39 years	8	6.8%	5	11.4%	13	8.1%
40 - 44 years	12	10.3%	9	20.5%	21	13.0%
45 - 49 years	16	13.7%		0.0%	16	9.9%
50 - 54 years	5	4.3%	6	13.6%	11	6.8%
55 - 59 years	8	6.8%		0.0%	8	5.0%
60 - 64 years	7	6.0%	1	2.3%	8	5.0%
Over 65+ years	8	6.8%	3	6.8%	11	6.8%
blank	3	2.6%		0.0%	3	1.9%
total	117	100.0%	44	100.0%	161	100.0%

Q26 Are you literate?

	Monorom		BTB		total	
Yes	96	82.1%	35	79.5%	131	81.4%
No	15	12.8%	9	20.5%	24	14.9%
Blank	6	5.1%			6	3.7%
total	117	100.0%	44	100.0%	161	100.0%

Q27 How long have you lived in the current house?

	Monorom		BTB		total	
less than 5 years	29	24.8%	16	36.4%	45	28.0%
5-9 years	15	12.8%	8	18.2%	23	14.3%
10-19 years	36	30.8%	8	18.2%	44	27.3%
20 years or longer	30	25.6%	12	27.3%	42	26.1%
blank	7	6.0%		0.0%	7	4.3%
total	117	100.0%	44	100.0%	161	100.0%

Q30 Frequency to access to the news on the following media

	Monorom				BTB			
	Never	Rarely	Once or twice a week	Everyday	Never	Rarely	Once or twice a week	Everyday
Newspaper	38.5%	31.6%	16.2%	8.5%	29.5%	29.5%	29.5%	11.4%
Magazine	43.6%	31.6%	15.4%	4.3%	40.9%	29.5%	20.5%	9.1%
Radio	13.7%	13.7%	17.9%	49.6%	6.8%	9.1%	15.9%	65.9%
TV	4.3%	6.8%	7.7%	76.1%	11.4%	13.6%	11.4%	61.4%

Q32 Last grade of formal education completed

	Monorom		BTB		total	
No formal schooling	16	13.7%	7	15.9%	22	14.2%
Some primary	27	23.1%	11	25.0%	37	23.9%
Completed Primary School	11	9.4%	4	9.1%	15	9.7%
Some Secondary School	32	27.4%	12	27.3%	44	28.4%
Completed Secondary School	14	12.0%	5	11.4%	19	12.3%
Technical / Vocational	1	0.9%		0.0%	1	0.6%
Some/completed Pre-University (A-Level).		0.0%	1	2.3%	1	0.6%
Some/completed Diploma Degree	1	0.9%		0.0%	1	0.6%
University	7	6.0%	4	9.1%	11	7.1%
Post Graduate	1	0.9%		0.0%	1	0.6%
Do not know	1	0.9%		0.0%	1	0.6%
blank	6	5.1%		0.0%		0.0%
total	117	100.0%	44	100.0%	155	100.0%

Q33 Number of household member

	Monorom	BTB	total
1	4		3
2	6	3	9
3	11	5	16
4	21	4	24
5	17	8	25
6	17	9	23
7	15	5	20
8	7	2	9
9	5	3	8
10	3	3	6
11	2	2	4
12	1		1
13	1		1
blank	7		
Average	5.48	5.93	5.46

9.2 Result of the public awareness survey after pilot project

Number of samples

Monorom	31
Boeung Trabek (BTB)	20
Total	51

Floor Number (in Monorom)

	Ground	1 st floor	2 nd floor	3 rd floor	4 th floor	total
Count	11	6	6	6	2	31
%	35.5%	19.4%	19.4%	19.4%	6.5%	100.0%

1. Waste Storage

Q 1- How do you store waste at your house?

	Monorom		BTB		Total	
In a plastic bag	27	87.1%	15	75.0%	42	82.4%
In a paper bag	0		0		0	
In a rice/cement bag	0		3	15.0%	3	5.9%
In a carton box	0		0		0	
In a basket without a plastic bag	0		0		0	
In a basket with a plastic bag	0		1	5.0%	1	2.0%
In a metal/plastic container without a plastic bag	0		0		0	
In a metal/plastic container with a plastic bag	4	12.9%	1	5.0%	5	9.8%
On the ground	0		0		0	
Others (please specify)	0		0		0	

Q2- What is the condition of your waste in general? Please check all that apply to your case ?

	Monorom		BTB		Total	
It contains a lot of water	31	100.0%	20	100.0%	51	100.0%
It contains offal of fish or animal	0		0		0	
It contains feces	0		0		0	

2. Waste collection and discharge manner

Q3- Who handles and discharges your waste in your household most often?

	Monorom		BTB		Total	
female adult	20	64.5%	18	90.0%	38	74.5%
male adult	4	12.9%	1	5.0%	5	9.8%
female children	1	3.2%	0	0.0%	1	2.0%
male children	3	9.7%	0	0.0%	3	5.9%
maid or house staff	0	0.0%	0	0.0%	0	0.0%
anybody who is available	3	9.7%	1	5.0%	4	7.8%
pay someone to discharge	0	0.0%	0	0.0%	0	0.0%
Others (Please specify)	0	0.0%	0	0.0%	0	0.0%

Q4- How do you transport your waste to the collection point and dump it?

	Monorom		BTB		Total	
to bring waste in a bag and put the bag on the ground (or in a collection vehicle)	31	100%	20	100%	51	100%
to bring waste in a bag and throw waste inside on the ground (bring back the bag)	0		0		0	
to bring waste in a bag and throw waste inside on the ground (bring back the bag) to bring waste in a basket/container and leave the basket/container at the discharge point. After waste is collected, bring the basket/container back home	0		0		0	
to bring waste in a basket/container and throw waste inside on the ground (return home with the basket/container)	0		0		0	

Q5-1 Do you know when waste is collected?

	Monorom		BTB		Total	
Yes, I know	31	100.0%	18	90.0%	49	96.1%
No, I do not know	0		2	10.0%	2	

Q5-2 If you know, please check the day when waste collection service is provided.

	Monorom		BTB	
Monday	31	100.0%	0	
Tuesday	31	100.0%	18	100.0%
Wednesday	31	100.0%	0	
Thursday	31	100.0%	18	100.0%
Friday	31	100.0%	0	
Saturday	31	100.0%	18	100.0%
Sunday	31	100.0%	0	

Base: 31 (Monorom) and 18 (BTB)

Q6-1 Do you know what time waste is collected?

	Monorom		BTB		Total	
	Count	Percentage	Count	Percentage	Count	Percentage
Yes, I know	30	96.8%	19	95.0%	49	96.1%
No, I do not know	1	3.2%	1	5.0%	2	3.9%

Q6-2 If you know, please tell us when your waste is collected.

	Monorom			BTB			
	St. 109	St. 107	Alleyway	Alleyway	St. 432	St. 105	Others
Early in the morning (3:00 – 6:00)							
6:00 – 9:00						2	
9:00 – 12:00						1	
12:00 – 15:00			2	8	6		
15:00 – 18:00		1	25				1
18:00 – 21:00			1				
Late at night (21:00 – 3:00 next day)	1						
Whenever waste is generated						1	
total	1	1	28	8	6	4	1

Q7 When do you discharge waste.

	Monorom		BTB	
	Count	Percentage	Count	Percentage
Monday	31	100.0%		
Tuesday	31	100.0%	20	100.0%
Wednesday	31	100.0%		
Thursday	31	100.0%	18	90.0%
Friday	31	100.0%		
Saturday	31	100.0%	17	85.0%
Sunday	31	100.0%		

Q8- How many times do you usually discharge waste per day?

	Monorom		BTB		Total	
	Count	Percentage	Count	Percentage	Count	Percentage
once	31	100.0%	19	95.0%	50	98.0%
twice	0		0		0	
three times	0		0		0	
more	0		0		0	

Q9 What time do you usually discharge waste every day? (multi-answer question)

	Monorom			BTB			
	St. 109	St. 107	Alleyway	Alleyway	St. 432	St. 105	Others
Early in the morning (3:00 – 6:00)							
6:00 – 9:00						3	
9:00 – 12:00						1	
12:00 – 15:00			28	9	6		
15:00 – 18:00		1	1				1
18:00 – 21:00	1						
Late at night (21:00 – 3:00 next day)							
Whenever waste is generated							
total	1	1	29	9	6	4	1

Q10- Where is your discharge point?

	Monorom		BTB		Total	
	Count	Percentage	Count	Percentage	Count	Percentage
Along St. 109	1	3.2%	0		1	2.0%
Along St. 107	1	3.2%	0		1	2.0%
Along the alleyway (Monorom)	29	93.5%	0		29	56.9%
Along the alleyway (BTB)	0		9	45.0%	9	17.6%
Along St. 432	0		6	30.0%	6	11.8%
Along St. 105	0		4	20.0%	4	7.8%
Others (Please specify)	0		1	5.0%	1	2.0%

3. Waste discharge rules

Q11-1 Do you know discharge rules?

	Monorom		BTB		Total	
	Count	Percentage	Count	Percentage	Count	Percentage
Yes	29	93.5%	16	80.0%	45	88.2%
No	2	6.5%	2	10.0%	4	7.8%
No response			2	10.0%	2	3.9%

Q11-2 How did you get information on discharge rules? (multi-answer question)

	Monorom		BTB		Total	
at working group meeting	2	6.9%	1	6.3%	3	6.7%
from members of working group meeting	13	44.8%	5	31.3%	18	40.0%
at community meetings	4	13.8%	11	68.8%	15	33.3%
from participants of community meetings	6	20.7%	1	6.3%	7	15.6%
from leaflets	12	41.4%	6	37.5%	18	40.0%
from poster	11	37.9%	6	37.5%	17	37.8%
from signboard	2	6.9%	0		2	4.4%
Others	0		0		0	

Base: 29 (Monorom) and 16 (BTB)

Q11-3 Can you describe the waste discharge rules now?

	Monorom		BTB		Total	
Yes	30	96.8%	16	80.0%	46	90.2%
No	1	3.2%	3	15.0%	4	7.8%
No response			1	5.0%	1	2.0%

Q11-4 Please tell us discharge rules.

	Monorom		BTB		Total	
Waste should be discharged in front of houses or stairs along the sidewalk or alleyway.	27	90.0%	16	100.0%	43	93.5%
Waste should be discharged only shortly before the collection time	21	70.0%	9	56.3%	30	65.2%
Waste should be discharged in a container, basket or plastic bag	11	36.7%	9	56.3%	20	43.5%
The plastic bag should be bound tightly.	17	56.7%	10	62.5%	27	58.7%
Don't bring waste to other areas (outside your residential area)	3	10.0%	4	25.0%	7	15.2%
Others	0	0.0%	1	6.3%	1	2.2%

Base: 30 (Monorom) and 16 (BTB)

Q12-1-1 How do you think about the content of waste discharge rules?

	Monorom		BTB		Total	
It is clear and easy to understand	30	96.8%	18	90.0%	48	94.1%
it is difficult a little bit to understand	1	3.2%	0		1	2.0%
It is difficult to understand	0		0		0	
Others:	0		0		0	

Q12-1-2 How do you think about the discharge rules in general?

	Monorom		BTB		Total	
there are no problems about following rules in daily life	30	96.8%	18	90.0%	48	94.1%
there are some obstacles to follow rules	1	3.2%	1	0.05	2	3.9%
New rules are difficult to follow in daily life	0		0		0	
Others	0		0		0	

Q12-2 Which items of waste discharge rules are difficult to follow?

	Monorom		BTB		Total	
Discharge time						
Discharge place	1	100.0%	1	100.0%	2	100.0%
Discharge ways						

Q13-1 How do you and your families respect discharge rules?

	Monorom		BTB		Total	
Yes, every day	30	96.8%	12	60.0%	42	82.4%
Yes, but sometime I did not respect	1	3.2%	8	40.0%	9	17.6%
No, Did not respect	0		0		0	

Q13-2 Why do you follow discharge rules?

	Monorom		BTB		Total	
it is not difficult to follow	5	16.1%	5	25.0%	10	19.6%
I think that waste discharge rules are good	21	67.7%	14	70.0%	35	68.6%

I want to keep my area clean	30	96.8%	18	90.0%	48	94.1%
Sangkat and Phum officers asked me to follow rules	3	9.7%	1	5.0%	4	7.8%
Neighbors are looking	1	3.2%	0	0.0%	1	2.0%
Others	1	3.2%	0	0.0%	1	2.0%

Base: 31 (Monorom) and 20 (BTB)

Q13-3 Why it is difficult to follow rules?

	Monorom		BTB		Total	
I do not keep waste at home long	1		5			
It is a bother for me to follow rules						
No one is at home at 2-3 o'clock						
Others	1		4			

Base: 1 (Monorom) and 8 (BTB)

Q14 How do you think about the effect of waste discharge rules?

	Monorom		BTB		Total	
improved the situations here a lot	24	77.4%	16	80.0%	40	78.4%
Improved the situations here to some extent	6	19.4%	2	10.0%	8	15.7%
did not change the situations	1	3.2%	2	10.0%	3	5.9%
made the situations worse	0		0		0	
total	31		20		51	

4. Educational tools

Q15 We want to know your opinion about our educational tools.

Q15-1 Leaflet

1- Content: easiness to understand	Monorom		BTB		Total	
easy to understand	31	100.0%	20	100.0%	51	100.0%
Neither easy not difficult	0	0	0		0	
difficult to understand	0		0		0	

1- Content: volume of information	Monorom		BTB		Total	
All the necessary information was included	31	100.0%	20	100.0%	51	100.0%
Some necessary information was not included	0	0	0		0	
There are many unnecessary information	0		0		0	

2- Layout	Monorom		BTB		Total	
easy to understand	31	100.0%	20	100.0%	51	100.0%
Neither easy nor difficult	0		0		0	
difficult to understand	0		0		0	

3-Illustrations and pictures	Monorom		BTB		Total	
easy to understand	30	96.8%	20	100.0%	50	98.0%
Neither easy nor difficult	1	3.2%	0		1	2.0%
difficult to understand	0		0		0	

Size	Monorom		BTB		Total	
too big	0		0		0	
appropriate size	31	100.0%	20	100.0%	51	100.0%
too small	0		0		0	

Q15-2 Poster

1- Content: easiness to understand	Monorom		BTB		Total	
easy to understand	31	100.0%	20	100.0%	51	100.0%
Neither easy not difficult	0		0		0	
difficult to understand	0		0		0	

2-Content: volume of information	Monorom		BTB		Total	
All the necessary information was included	31	100.0%	20	100.0%	51	100.0%
Some necessary information was not included	0		0		0	

There are many unnecessary information	0	0	0
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2- Layout	Monorom		BTB		Total	
easy to understand	31	100.0%	20	100.0%	51	100.0%
Neither easy not difficult	0		0		0	
difficult to understand	0		0		0	

3- Illustrations and pictures	Monorom		BTB		Total	
easy to understand	30	96.8%	20	100.0%	50	98.0%
Neither easy not difficult	1	3.2%	0		1	2.0%
difficult to understand	0		0		0	

4- Size	Monorom		BTB		Total	
too big	2	6.5%	1	5.0%	3	5.9%
appropriate size	28	90.3%	19	95.0%	47	92.2%
too small	1	3.2%	0	0.0%	1	2.0%

Q15-3 Singhboard

1- Content: easiness to understand	Monorom		BTB		Total	
easy to understand	29	93.5%	20	100.0%	49	96.1%
Neither easy nor difficult	2	6.5%	0		2	3.9%
difficult to understand	0		0		0	

1-Content: volume of information	Monorom		BTB		Total	
All the necessary information was included	30	96.8%	20	100.0%	50	161.3%
Some necessary information was not included	1	3.2%	0		1	3.2%
There are many unnecessary information	0		0		0	

2- Layout	Monorom		BTB		Total	
easy to understand	29	93.5%	20	100.0%	49	158.1%
Neither easy not difficult	2	6.5%	0		2	6.5%
difficult to understand	0		0		0	

3- Illustrations and pictures	Monorom		BTB		Total	
easy to understand	28	90.3%	20	100.0%	48	94.1%
Neither easy nor difficult	3	9.7%	0		3	
difficult to understand	0		0		0	

4- Size	Monorom		BTB		Total	
too big	0		0		0	
appropriate size	27	87.1%	15	75.0%	42	82.4%
too small	4	12.9%	5	25.0%	9	17.6%

Q16-1 Have you changed the manner to discharge wastes after the introduction of waste discharge rules?

	Monorom		BTB		Total	
Yes	31	100.0%	19	95.0%	50	98.0%
No	0		1	5.0%	1	2.0%
I do not know	0		0		0	

Q16-2 How did you change the way of discharging place?

	Monorom		BTB		Total	
I changed discharge places	31	100.0%	19	95.0%	50	98.0%
I changed discharge days	4	12.9%	12	60.0%	16	31.4%
I changed discharge time	29	93.5%	17	85.0%	46	90.2%
I changed discharge ways	2	6.5%	1	5.0%	3	5.9%
Others	0		0		0	

5. Opinion and comment on waste discharge rules

Q17 If you have opinions or comments on waste discharge rules, please let us know.

About discharge rules

- Many people have to participate
- Please educate people not to discharge waste at drainage pipe (2)
- Please continue to educate people not to discharge waste at a wrong time
- It is necessary to add waste selection day
- Please continue to control on the bridge
- Change discharge point which is far from little house

About leaflet and poster

No opinions or comments

6. About you and your family

Q18 Record Gender

	Monorom		BTB		Total	
Male	8	25.8%	4	20.0%	12	23.5%
Female	23	74.2%	16	80.0%	39	76.5%

Q19- Could you please tell me your age ?

	Monorom		BTB		Total	
Less than 18	1	3.2%	1	5.0%	2	3.9%
18 - 24 years	3	9.7%	4	20.0%	7	13.7%
25 - 29 years	2	6.5%	1	5.0%	3	5.9%
30 - 34 years	4	12.9%	1	5.0%	5	9.8%
35 - 39 years	5	16.1%	3	15.0%	8	15.7%
40 - 44 years	5	16.1%	0	0.0%	5	9.8%
45 - 49 years	3	9.7%	3	15.0%	6	11.8%
50 - 54 years	3	9.7%	4	20.0%	7	13.7%
55 - 59 years	3	9.7%	0	0.0%	3	5.9%
60 - 64 years	0	0.0%	1	5.0%	1	2.0%
Over 65+ years	2	6.5%	2	10.0%	4	7.8%

Q 20- Are you literacy?

	Monorom		BTB		Total	
Yes	30	96.8%	17	85.0%	47	92.2%
No	1	3.2%	3	15.0%	4	7.8%

Q22- What is the last grade of formal education you completed ?

	Monorom		BTB		Total	
No formal schooling.	6	19.4%	3	15.0%	9	17.6%
Some primary	0		7	35.0%	7	13.7%
Completed Primary School.	1	3.2%	0		1	2.0%
Some Secondary School.	14	45.2%	8	40.0%	22	43.1%
Completed Secondary School.	1	3.2%	2	10.0%	3	5.9%
Technical / Vocational	2	6.5%	0		2	3.9%
Some/completed Pre-University (A-Level)	4	12.9%	0		4	7.8%
Some/completed Diploma Degree	0		0		0	
University	1	3.2%	0		1	2.0%
Post Graduate	0		0		0	
Do not know	0		0		0	
Refused	0		0		0	

Data 10

Environment Impact Assessment

Data 10 Database Management System

10.1 Weighbridge Data

The weighbridge data obtained on the 1st of December, 2003 is shown as a reference below.

Table 10-1: Weighbridge Data of December 1, 2003

ID	Seq ID	Ticket No	Truck ID	Customer ID	WASTE ID	Location ID	Date	In Time	Gross Ton	Truck W(t)	Net W(t)	F20	Trade
24344	6	25924	CINTRI-023	02	01	0308	2003/12/1	13:44:54	9.63	5.47	4.16	2	S
24345	44	25925	CINTRI-042	02	01	0307	2003/12/1	14:06:58	10.56	5.38	5.18	2	S
24346	63	25926	CINTRI-098	02	01	0604	2003/12/1	23:51:25	9.61	5.32	4.29	2	S
24347	26	25927	CINTRI-081	02	01	0201	2003/12/1	13:56:49	22.07	13.15	8.92	2	S
24348	8	25928	CINTRI-025	02	01	0109	2003/12/1	13:46:15	22.48	13.41	9.07	2	S
24349	10	25929	CINTRI-027	02	01	0304	2003/12/1	13:47:21	22.56	13.25	9.31	2	S
24350	16	25930	CINTRI-061	02	01	0604	2003/12/1	13:50:23	17.39	11.12	6.27	2	S
24351	35	25931	CINTRI-011	02	01	0604	2003/12/1	14:03:06	7.71	5.48	2.23	2	S
24352	48	25932	CINTRI-049	02	01	0401	2003/12/1	14:08:52	9.7	5.32	4.38	2	S
24353	46	25933	CINTRI-045	02	01	0401	2003/12/1	14:08:07	22.56	13.45	9.11	2	S
24354	45	25934	CINTRI-043	02	01	0204	2003/12/1	14:07:39	23	13.76	9.24	2	S
24355	50	25935	CINTRI-054	02	01	0101	2003/12/1	14:09:53	21.68	13.24	8.44	2	S
24356	20	25936	CINTRI-068	02	01	0105	2003/12/1	13:53:17	9.19	5.46	3.73	2	S
24357	25	25937	CINTRI-080	02	01	0211	2003/12/1	13:56:17	24.46	13.11	11.35	2	S
24358	9	25938	CINTRI-026	02	01	0706	2003/12/1	13:46:54	23.97	13.65	10.32	2	S
24359	27	25939	CINTRI-089	02	01	0410	2003/12/1	13:57:14	19.48	13.4	6.08	2	S
24360	24	25940	CINTRI-079	02	01	0307	2003/12/1	13:55:34	22.08	13.61	8.47	2	S
24361	39	25941	CINTRI-015	02	01	0105	2003/12/1	14:04:32	21.88	13	8.88	2	S
24362	47	25942	CINTRI-047	02	01	0307	2003/12/1	14:08:37	7.49	5.35	2.14	2	S
24363	44	25943	CINTRI-042	02	01	0201	2003/12/1	14:06:58	9.89	5.38	4.51	2	S
24364	6	25944	CINTRI-023	02	01	0308	2003/12/1	13:44:54	9.11	5.47	3.64	2	S
24365	88	25945	CINTRI-052	02	01	0307	2003/12/1	5:56:26	17.98	11.12	6.86	3	S
24366	15	25946	CINTRI-059	02	01	0205	2003/12/1	13:50:04	15.02	10.94	4.08	2	S
24367	42	25947	CINTRI-072	02	01	0707	2003/12/1	14:06:08	5.95	3.73	2.22	2	S
24368	13	25948	CINTRI-063	02	01	0108	2003/12/1	13:48:56	4.75	3.64	1.11	2	S
24369	60	25949	CINTRI-076	02	01	0702	2003/12/1	11:26:42	5.74	3.6	2.14	2	S
24370	8	25950	CINTRI-025	02	01	0102	2003/12/1	13:46:15	20.19	13.41	6.78	2	S
24371	18	25951	CINTRI-065	02	01	0506	2003/12/1	13:51:58	8.77	5.49	3.28	2	S
24372	21	25952	CINTRI-071	02	01	0702	2003/12/1	13:54:04	8.17	5.37	2.8	2	S
24373	50	25953	CINTRI-054	02	01	0101	2003/12/1	14:09:53	18.26	13.24	5.02	2	S
24374	47	25954	CINTRI-047	02	01	0401	2003/12/1	14:08:37	6.54	5.35	1.19	2	S
24375	25	25955	CINTRI-080	02	01	0211	2003/12/1	13:56:17	17.58	13.11	4.47	2	S
24376	26	25956	CINTRI-081	02	01	0201	2003/12/1	13:56:49	20.89	13.15	7.74	2	S
24377	32	25957	CINTRI-K42	02	01	0505	2003/12/1	14:00:38	9.16	6.74	2.42	2	S
24378	33	25958	PV-DKM	04	03	0409	2003/12/1	14:01:40	7.87	4.24	3.63	2	S
24379	63	25959	CINTRI-098	02	01	0201	2003/12/1	23:51:25	9.37	5.32	4.05	2	S
24380	37	25960	CINTRI-013	02	01	0606	2003/12/1	14:03:38	19.87	13.59	6.28	2	S
24381	45	25961	CINTRI-043	02	01	0402	2003/12/1	14:07:39	18.04	13.76	4.28	2	S
24382	46	25962	CINTRI-045	02	01	0409	2003/12/1	14:08:07	20.81	13.45	7.36	2	S
24383	48	25963	CINTRI-049	02	01	0506	2003/12/1	14:08:52	9.51	5.32	4.19	2	S
24384	44	25964	CINTRI-042	02	01	0306	2003/12/1	14:06:58	8.17	5.38	2.79	2	S
24385	24	25965	CINTRI-079	02	01	0607	2003/12/1	13:55:34	19.25	13.61	5.64	2	S
24386	31	25966	PV-7815	05	06	0410	2003/12/1	14:00:03	6.03	3.01	3.02	2	S
24387	32	25967	CINTRI-K42	02	01	0505	2003/12/1	14:00:38	8.87	6.74	2.13	2	S
24388	16	25968	CINTRI-061	02	01	0209	2003/12/1	13:50:23	17.15	11.12	6.03	2	S
24389	3	25969	CINTRI-029	02	01	0112	2003/12/1	13:40:57	6.3	3.76	2.54	2	S
24390	13	25970	CINTRI-063	02	01	0409	2003/12/1	13:48:56	6.25	3.64	2.61	2	S
24391	51	25971	CINTRI-057	02	01	0408	2003/12/1	14:10:10	5.26	3.06	2.2	2	S
24392	28	25972	CINTRI-092	02	01	0211	2003/12/1	13:57:36	5.97	3.7	2.27	2	S
24393	18	25973	CINTRI-065	02	01	0506	2003/12/1	13:51:58	7.8	5.49	2.31	2	S
24394	33	25974	PV-DKM	04	03	0409	2003/12/1	14:01:40	7.35	4.24	3.11	2	S
24395	17	25975	CINTRI-062	02	01	0402	2003/12/1	13:51:17	7.77	5.39	2.38	2	S
24396	88	25976	CINTRI-052	02	01	0409	2003/12/1	21:16:38	15.36	11.12	4.24	2	S
24397	96	25977	PPWM-003	01	01	0104	2003/12/1	17:47:22	7.71	6.39	1.32	2	S
24398	31	25978	PV-7815	05	06	0410	2003/12/1	14:00:03	5.01	3.01	2	2	S
24399	21	25979	CINTRI-071	02	01	0702	2003/12/1	13:54:04	8.66	5.37	3.29	2	S
24400	42	25980	CINTRI-072	02	01	0705	2003/12/1	14:06:08	6.08	3.73	2.35	2	S
24401	13	25981	CINTRI-063	02	01	0409	2003/12/1	13:48:56	6.14	3.64	2.5	2	S
24402	14	25982	CINTRI-066	02	01	0707	2003/12/1	13:49:18	8.62	5.41	3.21	2	S
24403	1	25983	PPWM-001	01	01	0103	2003/12/1	13:37:19	21.72	12.97	8.75	2	S
24404	23	25984	CINTRI-077	02	01	0207	2003/12/1	13:55:14	5.65	3.9	1.75	2	S
24405	20	25985	CINTRI-068	02	01	0208	2003/12/1	13:53:17	8.86	5.46	3.4	2	S
24406	2	25986	PPWM-002	01	01	0104	2003/12/1	13:37:59	5.94	4.77	1.17	2	S
24407	33	25987	PV-DKM	04	03	0409	2003/12/1	14:01:40	8.4	4.24	4.16	2	S
24408	96	25988	PPWM-003	01	01	0104	2003/12/1	17:47:22	7.48	6.39	1.09	2	S
24409	51	25989	CINTRI-057	02	01	0408	2003/12/1	14:10:10	5.63	3.06	2.57	2	S
24410	60	25990	CINTRI-076	02	01	0405	2003/12/1	11:26:42	6.13	3.6	2.53	2	S
24411	13	25991	CINTRI-063	02	01	0409	2003/12/1	13:48:56	5.95	3.64	2.31	2	S
24412	35	25992	CINTRI-011	02	01	0607	2003/12/1	14:03:06	9.7	5.48	4.22	2	S
24413	6	25993	CINTRI-023	02	01	0307	2003/12/1	13:44:54	8.22	5.47	2.75	2	S
24414	3	25994	CINTRI-029	02	01	0112	2003/12/1	13:40:57	5.89	3.76	2.13	2	S
24415	96	25995	PPWM-003	01	01	0104	2003/12/1	17:47:22	7.37	6.39	0.98	2	S
24416	28	25996	CINTRI-092	02	01	0211	2003/12/1	13:57:36	5.5	3.7	1.8	2	S
24417	32	25997	CINTRI-K42	02	01	0505	2003/12/1	14:00:38	8.85	6.74	2.11	2	S
24418	5	25998	CINTRI-022	02	01	0106	2003/12/1	13:43:49	5.06	4.14	0.92	2	S
24419	23	25999	CINTRI-077	02	01	0208	2003/12/1	13:55:14	4.6	3.9	0.7	2	S
24420	31	26000	PV-7815	05	06	0410	2003/12/1	14:00:03	6.44	3.01	3.43	2	S
24421	21	26001	CINTRI-071	02	01	0707	2003/12/1	13:54:04	8.32	5.37	2.95	2	S
24422	15	26002	CINTRI-059	02	01	0205	2003/12/1	13:50:04	17.68	10.94	6.74	2	S
24423	10	26003	CINTRI-027	02	01	0307	2003/12/1	13:47:21	20.08	13.25	6.83	2	S
24424	47	26004	CINTRI-047	02	01	0205	2003/12/1	14:08:37	8.93	5.35	3.58	2	S

ID	Seq ID	Ticket No	Truck ID	Customer ID	WASTE ID	Location ID	Date	In Time	Gross Ton	Truck W(t)	Net W(t)	F20	Trade
24425	51	26005	CINTRI-057	02	01	0402	2003/12/1	14:10:10	5.41	3.06	2.35	2	S
24426	8	26006	CINTRI-025	02	01	0110	2003/12/1	13:46:15	19.33	13.41	5.92	2	S
24427	50	26007	CINTRI-054	02	01	0410	2003/12/1	14:09:53	26.65	13.24	13.41	2	S
24428	34	26008	CINTRI-009	02	01	0210	2003/12/1	14:02:32	7.69	5.64	2.05	2	S
24429	42	26009	CINTRI-072	02	01	0707	2003/12/1	14:06:08	6.17	3.73	2.44	2	S
24430	96	26010	PPWM-003	01	01	0104	2003/12/1	17:47:22	7.35	6.39	0.96	2	S
24431	13	26011	CINTRI-063	02	01	0410	2003/12/1	13:48:56	5.84	3.64	2.2	2	S
24432	17	26012	CINTRI-062	02	01	0205	2003/12/1	13:51:17	7.97	5.39	2.58	2	S
24433	9	26013	CINTRI-026	02	01	0408	2003/12/1	13:46:54	25.12	13.65	11.47	2	S
24434	63	26014	CINTRI-098	02	01	0202	2003/12/1	23:51:25	9.96	5.32	4.64	2	S
24435	39	26015	CINTRI-015	01	02	0205	2003/12/1	14:04:32	21.34	13	8.34	3	S
24436	1	26016	PPWM-001	01	01	0103	2003/12/1	13:37:19	23.64	12.97	10.67	2	S
24437	27	26017	CINTRI-089	02	01	0603	2003/12/1	13:57:14	20.42	13.4	7.02	2	S
24438	25	26018	CINTRI-080	02	01	0408	2003/12/1	13:56:17	19.43	13.11	6.32	2	S
24439	20	26019	CINTRI-068	02	01	0208	2003/12/1	13:53:17	6.94	5.46	1.48	2	S
24440	26	26020	CINTRI-081	02	01	0702	2003/12/1	13:56:49	20.01	13.15	6.86	2	S
24441	60	26021	CINTRI-076	02	01	0404	2003/12/1	11:26:42	5.8	3.6	2.2	2	S
24442	46	26022	CINTRI-045	02	01	0407	2003/12/1	14:08:07	23.86	13.45	10.41	2	S
24443	37	26023	CINTRI-013	02	01	0204	2003/12/1	14:03:38	21.88	13.59	8.29	2	S
24444	5	26024	CINTRI-022	02	01	0407	2003/12/1	13:43:49	6.14	4.14	2	2	S
24445	13	26025	CINTRI-063	02	01	0410	2003/12/1	13:48:56	5.83	3.64	2.19	2	S
24446	28	26026	CINTRI-092	02	01	0211	2003/12/1	13:57:36	5.39	3.7	1.69	2	S
24447	11	26027	CINTRI-028	02	01	0704	2003/12/1	13:47:57	11.12	8.14	2.98	2	S
24448	23	26028	CINTRI-077	02	01	0207	2003/12/1	13:55:14	5.43	3.9	1.53	2	S
24449	33	26029	PV-DKM	04	03	0409	2003/12/1	14:01:40	7.67	4.24	3.43	2	S
24450	51	26030	CINTRI-057	02	01	0404	2003/12/1	14:10:10	5.05	3.06	1.99	2	S
24451	45	26031	CINTRI-043	02	01	0407	2003/12/1	14:07:39	23.01	13.76	9.25	2	S
24452	5	26032	CINTRI-022	02	01	0408	2003/12/1	13:43:49	5.69	4.14	1.55	2	S
24453	60	26033	CINTRI-076	02	01	0405	2003/12/1	11:26:42	5.9	3.6	2.3	2	S
24454	24	26034	CINTRI-079	02	01	0711	2003/12/1	13:55:34	20.8	13.61	7.19	2	S
24455	33	26035	PV-DKM	04	03	0409	2003/12/1	14:01:40	8.07	4.24	3.83	2	S
24456	18	26036	CINTRI-065	02	01	0501	2003/12/1	13:51:58	8.13	5.49	2.64	2	S
24457	3	26037	CINTRI-029	02	01	0112	2003/12/1	13:40:57	5.37	3.76	1.61	2	S
24458	41	26038	CINTRI-069	02	01	0207	2003/12/1	14:05:43	7.26	5.35	1.91	2	S
24459	1	26039	PPWM-001	01	01	0103	2003/12/1	13:37:19	21.03	12.97	8.06	2	S
24460	20	26040	CINTRI-068	02	01	0208	2003/12/1	13:53:17	6.88	5.46	1.42	2	S
24461	34	26041	CINTRI-009	02	01	0210	2003/12/1	14:02:32	8.24	5.64	2.6	2	S
24462	51	26042	CINTRI-057	02	03	0408	2003/12/1	14:10:10	5.01	3.06	1.95	2	S
24463	35	26043	CINTRI-011	02	01	0601	2003/12/1	14:03:06	9.35	5.48	3.87	2	S
24464	33	26044	PV-DKM	04	03	0409	2003/12/1	14:01:40	7.09	4.24	2.85	2	S
24465	6	26045	CINTRI-023	02	01	0304	2003/12/1	13:44:54	9.49	5.47	4.02	2	S
24466	23	26046	CINTRI-077	02	01	0210	2003/12/1	13:55:14	5.35	3.9	1.45	2	S
24467	8	26047	CINTRI-025	02	01	0105	2003/12/1	13:46:15	21.21	13.41	7.8	2	S
24468	10	26048	CINTRI-027	02	01	0305	2003/12/1	13:47:21	20.92	13.25	7.67	2	S
24469	5	26049	CINTRI-022	02	01	0203	2003/12/1	13:43:49	8.21	4.14	4.07	2	S
24470	21	26050	CINTRI-071	02	01	0706	2003/12/1	13:54:04	7.83	5.37	2.46	2	S
24471	17	26051	CINTRI-062	02	01	0201	2003/12/1	13:51:17	8.05	5.39	2.66	2	S
24472	15	26052	CINTRI-059	02	01	0205	2003/12/1	13:50:04	16.18	10.94	5.24	2	S
24473	60	26053	CINTRI-076	02	01	0405	2003/12/1	11:26:42	5.77	3.6	2.17	2	S
24474	9	26054	CINTRI-026	02	01	0408	2003/12/1	13:46:54	19.1	13.65	5.45	2	S
24475	7	26055	CINTRI-024	02	01	0505	2003/12/1	13:45:37	7.42	5.51	1.91	2	S
24476	63	26056	CINTRI-098	02	01	0202	2003/12/1	23:51:25	9.17	5.32	3.85	2	S
24477	27	26057	CINTRI-089	02	01	0601	2003/12/1	13:57:14	18.18	13.4	4.78	2	S
24478	20	26058	CINTRI-068	02	01	0208	2003/12/1	13:53:17	7.88	5.46	2.42	2	S
24479	41	26059	CINTRI-069	02	01	0207	2003/12/1	14:05:43	7.48	5.35	2.13	2	S
24480	25	26060	CINTRI-080	02	01	0408	2003/12/1	13:56:17	17.91	13.11	4.8	2	S
24481	39	26061	CINTRI-015	02	01	0205	2003/12/1	14:04:32	20.11	13	7.11	2	S
24482	46	26062	CINTRI-045	02	01	0408	2003/12/1	14:08:07	18.86	13.45	5.41	2	S
24483	50	26063	CINTRI-054	02	01	0410	2003/12/1	14:09:53	21.38	13.24	8.14	2	S
24484	26	26064	CINTRI-081	02	01	0708	2003/12/1	13:56:49	20.55	13.15	7.4	2	S
24485	11	26065	CINTRI-028	02	01	0208	2003/12/1	13:47:57	10.59	8.14	2.45	2	S
24486	45	26066	CINTRI-043	02	01	0408	2003/12/1	14:07:39	18.54	13.76	4.78	2	S
24487	35	26067	CINTRI-011	02	01	0601	2003/12/1	14:03:06	7.11	5.48	1.63	2	S
24488	24	26068	CINTRI-079	02	01	0702	2003/12/1	13:55:34	18.5	13.61	4.89	2	S
24489	76	26069	CINTRI-048	02	01	0604	2003/12/1	17:56:24	8.34	5.02	3.32	2	S
24490	16	26070	CINTRI-061	02	01	0201	2003/12/1	13:50:23	15.43	11.12	4.31	2	S
24491	18	26071	CINTRI-065	02	01	0106	2003/12/1	13:51:58	8.47	5.49	2.98	2	S
24492	33	26072	PV-DKM	04	03	0409	2003/12/1	14:01:40	7.38	4.24	3.14	2	S
24493	6	26073	CINTRI-023	02	01	0303	2003/12/1	13:44:54	8.18	5.47	2.71	2	S
24494	44	26074	CINTRI-042	02	01	0201	2003/12/1	14:06:56	9.69	5.39	4.31	2	S
24495	17	26075	CINTRI-062	02	01	0205	2003/12/1	13:51:17	7.33	5.39	1.94	2	S
24496	34	26076	CINTRI-009	02	01	0210	2003/12/1	14:02:32	7.52	5.64	1.88	2	S
24497	88	26077	CINTRI-052	02	01	0105	2003/12/1	21:16:38	16.5	11.12	5.38	2	S
24498	10	26078	CINTRI-027	02	01	0301	2003/12/1	13:47:21	23.82	13.25	10.57	2	S
24499	63	26079	CINTRI-098	02	01	0401	2003/12/1	23:51:25	8.79	5.32	3.47	2	S
24500	20	26080	CINTRI-068	02	01	0402	2003/12/1	13:53:17	9.04	5.46	3.58	2	S
24501	30	26081	CINTRI-099	02	01	0409	2003/12/1	13:58:15	8.35	5.53	2.82	2	S
24502	41	26082	CINTRI-069	02	01	0402	2003/12/1	14:05:43	8.94	5.35	3.59	2	S
24503	37	26083	CINTRI-013	02	01	0203	2003/12/1	14:03:38	17.31	13.59	3.72	2	S
24504	11	26084	CINTRI-028	02	01	0410	2003/12/1	13:47:57	11.27	8.14	3.13	2	S
24505	42	26085	CINTRI-072	02	01	0601	2003/12/1	14:06:08	5.8	3.73	2.07	2	S
24506	76	26086	CINTRI-048	02	01	0604	2003/12/1	17:56:24	7.02	5.02	2	2	S
24507	22	26087	CINTRI-075	02	01	0105	2003/12/1	13:54:32	8.45	3.69	4.76	2	S
24508	44	26088	CINTRI-042	02	01	0308	2003/12/1	14:06:58	9.27	5.38	3.89	2	S
24509	26	26089	CINTRI-081	02	01	0211	2003/12/1	13:56:49	17.41	13.15	4.26	2	S
24510	20	26090	CINTRI-068	02	01	0402	2003/12/1	13:53:17	8.51	5.46	3.05	2	S
24511	17	26091	CINTRI-062	02	01	0109	2003/12/1	13:51:17	8.45	5.39	3.06	2	S
24512	63	26092	CINTRI-098	02	01	0401	2003/12/1	23:51:25	8.64	5.32	3.32	2	S

The waste amount brought to the disposal site from each Sangkat by month obtained from the weighbridge database is shown in the table below. The operation of the weighbridge started in June, 2003, and in the first several months the staff had difficulty to identify the collection area of some collection vehicles. Therefore, the reliability of data by Sangkat in the first several months is not high.

Table 10-2: Monthly Waste Amount by Sangkat

	Chamkar Mon	Doun Penh	Prampir Meakkakra	Tuol Kouk	Dangkao	Mean Chey	Ruessei Kaev	Others	total
Ton									
2003									
August	4,856.9	5,857.4	4,138.2	5,666.3	2,01.2	6.2	409.2	213.0	21,348.3
September	4,140.3	6,445.7	3,427.7	5,800.1	2,34.0		206.4	263.8	20,518.0
October	4,870.7	6,239.7	2,715.9	5,819.6	5,16.2	991.6	948.1	120.7	22,222.5
November	5,194.6	4,751.7	2,924.7	4,836.8	7,06.4	1,761.1	1,484.7	2.8	21,662.8
December	4,378.2	4,298.4	2,402.2	4,595.9	6,27.5	1,530.9	1,534.6		19,367.7
2004									
January	4,838.4	4,218.4	2,661.2	4,613.7	649.6	1,561.7	1,719.8		20,262.9
February	4,505.8	4,382.6	2,597.1	4,487.3	624.2	1,689.9	1,492.8		19,779.5
March	4,824.8	4,540.5	2,886.7	5,039.7	716.5	1,886.0	1,787.8		21,682.0
April	4,589.3	4,054.3	2,565.1	4,549.2	607.2	1,786.9	1,656.5		19,808.6
May	5,053.8	4,676.9	2,886.5	5,198.4	810.2	2,055.7	1,830.2		22,511.6
June	5,133.3	4,347.6	2,786.3	5,468.3	864.4	2,221.2	2,033.8		22,854.8
July	4,772.2	4,656.1	2,905.6	5,837.0	880.5	2,412.5	1,949.1	4.6	23,417.6
August	4,725.6	4,267.2	2,735.3	5,129.7	772.6	3,289.1	1,747.3		22,666.8

Daily waste amount brought to the disposal site and the number of collection vehicle in each month after November, 2003 also shown below.

Table 10-3: Daily Amount of Waste Brought to Disposal Site and Number of Collection Vehicles

November, 2003										Ton	
Date		Chamkar Mon	Doun Penh	Prampir Meakkakra	Tuol Kouk	Dangkao	Mean Chey	Ruessei Kaev	Others	total amount	Vehicle Number
11/1		235.7	156.7	104.0	133.3	19.5	43.7	67.3		760.1	175
11/2	S	217.1	150.9	57.2	120.6	21.6	71.1	40.1		678.5	157
11/3		126.2	147.6	117.7	199.3	20.4	51.7	43.7		706.5	161
11/4		215.3	143.1	99.7	114.7	20.7	48.8	51.8		694.1	152
11/5		75.5	128.6	111.4	174.6	8.6	34.1	21.5		554.4	123
11/6		177.9	123.3	92.1	137.4	24.0	50.6	18.4		623.6	136
11/7		183.5	138.5	98.4	152.7	26.8	29.6	38.4		667.9	149
11/8		207.9	203.2	122.4	99.8	12.1	37.4	32.8		715.5	163
11/9	S	110.7	230.6	113.1	89.9	22.1	44.5	42.2		653.2	145
11/10		170.4	202.6	97.2	155.4	30.3	54.9	44.7		755.6	168
11/11		240.8	148.2	116.8	168.0	33.1	80.1	37.8		824.8	175
11/12		153.6	144.3	117.2	264.7	28.3	82.8	67.6		858.4	176
11/13		215.2	173.4	94.7	169.3	22.8	81.2	60.8		817.4	175
11/14		137.5	173.5	99.4	263.2	26.5	63.1	62.6		825.7	191
11/15		232.5	161.4	96.5	128.1	28.5	60.3	48.1		755.4	173
11/16	S	137.2	157.5	115.3	148.6	20.2	59.4	58.1		696.2	163
11/17		102.7	157.5	109.2	245.3	27.3	63.3	31.8		737.0	171
11/18		235.9	116.5	108.9	146.2	21.0	61.9	49.2		739.4	172
11/19		139.2	170.4	109.3	188.9	31.3	64.3	54.3		757.7	178
11/20		219.1	160.9	85.3	151.4	22.6	67.7	50.3		757.4	179
11/21		108.2	160.8	94.5	231.2	24.4	55.1	42.1		716.4	166
11/22		263.3	144.4	75.4	117.8	22.7	52.5	50.4		726.4	158
11/23	S	126.8	166.9	103.3	147.9	22.3	63.7	49.7		680.5	160
11/24		124.2	134.6	99.4	223.3	30.0	61.4	90.5		763.4	167
11/25		246.5	199.4	91.4	135.0	23.7	74.7	56.5		827.1	199
11/26		127.0	156.6	105.7	211.1	24.9	71.3	66.1	2.8	765.5	187
11/27		254.4	149.3	75.6	126.4	25.0	66.1	48.3		745.1	186
11/28		123.2	153.2	68.0	163.5	25.0	45.9	73.9		652.7	169
11/29		209.5	156.9	76.5	116.9	19.8	67.9	32.6		679.9	177
11/30	S	78.0	141.0	69.2	112.6	21.0	52.2	53.2		527.2	137
total		5,194.6	4,751.7	2,924.7	4,836.8	706.4	1,761.1	1,484.7	2.8	21,662.8	4,988

S: Sunday

December, 2003									ton	
Date		Chamkar Mon	Doun Penh	Prampir Meakkakra	Tuol Kouk	Dangkao	Mean Chey	Ruessei Kaev	total amount	Vehicle Number
12/1		113.1	169.0	81.0	209.6	21.0	53.6	63.5	710.8	169
12/2		233.0	151.3	93.4	99.9	21.1	57.7	72.8	729.0	178
12/3		112.8	174.2	97.6	190.4	21.6	59.4	43.6	699.5	191
12/4		180.1	157.0	33.6	119.0	22.8	49.6	45.7	607.8	164
12/5		105.0	138.1	70.8	194.8	22.7	60.1	44.4	635.8	166
12/6		178.3	141.5	89.9	98.6	17.3	54.2	28.2	608.0	154
12/7	S	79.2	166.4	89.9	85.4	22.2	58.2	42.7	543.8	127
12/8		67.7	93.8	49.4	181.5	18.4	25.8	48.7	485.3	126
12/9		201.0	131.6	88.5	121.3	20.8	64.5	50.8	678.4	166
12/10		117.9	149.0	87.0	245.8	20.7	53.8	46.8	721.0	179
12/11		220.7	146.2	81.4	119.8	22.2	71.8	39.0	700.9	175
12/12		98.1	163.5	92.0	181.3	23.9	56.4	42.7	657.9	163
12/13		151.0	156.1	81.8	118.4	24.7	67.6	34.4	634.0	159
12/14	S	103.8	129.1	87.6	100.5	18.7	41.7	47.6	529.0	134
12/15		110.9	147.1	76.3	195.6	21.9	54.6	41.7	648.1	162
12/16		233.9	126.9	91.9	110.1	24.2	39.9	67.6	694.5	177
12/17		116.6	143.6	74.4	222.0	18.4	39.0	56.1	670.1	174
12/18		173.1	128.9	88.5	100.8	20.9	50.8	48.1	611.1	159
12/19		111.5	149.6	76.5	177.7	16.8	30.8	67.4	630.2	174
12/20		197.9	122.9	54.1	106.5	19.6	36.2	61.4	598.5	167
12/21	S	93.8	109.2	81.8	91.0	18.5	48.7	32.4	475.4	132
12/22		118.9	128.5	58.1	180.6	19.3	45.3	48.6	599.1	169
12/23		219.1	124.2	67.4	130.6	20.7	56.4	49.2	667.6	180
12/24		111.2	147.8	75.2	204.1	21.4	45.7	43.1	648.3	174
12/25		187.5	148.3	72.7	106.7	16.6	54.2	46.8	632.9	174
12/26		101.7	140.7	74.5	195.6	24.8	33.2	49.9	620.4	160
12/27		192.9	130.6	73.6	112.4	22.0	37.0	75.9	644.4	175
12/28	S	109.3	114.3	67.1	93.4	20.7	53.2	50.2	508.1	138
12/29		86.5	143.2	81.9	214.1	16.4	49.3	53.3	644.8	164
12/30		144.3	128.1	86.0	140.2	15.8	37.7	54.2	606.4	162
12/31		107.8	97.9	78.3	148.4	11.7	44.8	38.0	527.0	143
total		4378.2	4298.4	2402.2	4595.9	627.5	1530.9	1534.6	19367.7	5035

S: Sunday

January, 2004									ton	
Date		Chamkar Mon	Doun Penh	Prampir Meakkakra	Tuol Kouk	Dangkao	Mean Chey	Ruessei Kaev	total amount	Vehicle Number
1/1		179.2	111.7	64.6	78.8	17.3	61.7	39.4	552.6	145
1/2		130.2	116.2	60.3	140.8	17.9	28.7	37.9	532.0	152
1/3		172.4	122.7	75.4	91.5	22.4	44.5	73.0	601.9	150
1/4	S	106.2	144.3	73.8	118.0	21.3	40.3	84.3	588.2	140
1/5		116.0	146.1	93.5	194.6	20.3	37.7	58.2	666.4	155
1/6		197.2	135.1	93.9	97.2	22.2	32.0	42.8	620.4	152
1/7		125.7	154.6	73.0	208.1	18.3	54.5	35.5	669.7	159
1/8		191.5	153.9	96.1	109.9	18.9	43.4	55.1	668.8	161
1/9		96.1	138.6	92.2	228.1	23.0	50.8	70.3	699.0	165
1/10		240.5	152.7	99.9	130.1	21.4	47.5	62.3	754.2	169
1/11	S	130.3	96.4	77.4	153.7	25.6	47.8	45.1	576.2	133
1/12		123.3	151.4	88.5	229.5	19.5	27.4	63.0	702.5	166
1/13		214.5	165.7	100.5	139.7	24.0	77.2	44.7	766.1	181
1/14		132.3	146.1	96.9	211.0	24.5	46.4	63.3	720.5	168
total		2155.2	1935.6	1185.8	2130.8	296.5	639.8	774.9	9118.5	2196

Data 11

*Environment Impact Assessment
Survey (Appendix)*

Data 11 Environment Impact Assessment Survey (Appendix)

11.1 Meteorological data from 1999 till 2003

Department of Meteorology
Office of Datagathering
Station: Pochentong

Average Maximum Temperature 1994-2002

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1994	32.1	34.4	33.7	-	33.9	32.6	32.0	-	30.7	30.1	-	-
1995	-	-	-	-	-	-	-	-	-	-	-	-
1996	31.0	31.8	34.7	34.6	34.0	34.0	34.0	32.5	32.0	31.6	30.5	28.7
1997	30.8	32.4	34.4	35.3	35.2	35.2	32.3	32.6	32.1	31.5	31.1	32.2
1998	33.5	34.9	37.1	36.8	33.6	33.1	33.4	32.3	31.9	31.4	30.1	29.0
1999	31.5	32.8	35.8	33.9	33.3	32.6	32.2	32.5	32.6	30.9	30.0	27.3
2000	31.8	32.7	34.1	34.2	34.0	33.0	32.2	32.1	32.0	30.4	30.1	31.5
2001	31.1	32.6	33.4	35.4	34.5	33.4	33.3	32.3	32.5	31.5	29.3	30.7
2002	31.7	33.3	35.1	36.0	35.6	34.6	34.5	32.3	32.2	31.7	30.9	31.5
Average	31.7	33.1	34.8	35.2	34.3	33.6	33.0	32.4	32.0	31.1	30.3	30.1

Department of Meteorology
Office of Datagathering
Station: Pochentong

Average Minimum Temperature 1994-2002

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1994	21.2	23.5	23.6	25.8	25.7	25.1	24.9	24.7	24.3	24.1	23.1	22.1
1995	-	-	-	-	-	-	-	-	-	-	-	-
1996	20.6	21.8	23.4	25.3	25.3	24.7	23.7	24.9	24.3	27.2	26.3	22.0
1997	20.6	23.3	23.6	24.9	25.6	25.3	24.7	24.9	24.5	24.6	24.2	23.0
1998	22.7	23.8	24.9	26.0	25.6	25.3	24.7	24.9	24.5	24.6	24.2	23.0
1999	21.9	22.4	24.7	25.0	24.9	24.5	24.7	24.4	24.5	24.2	23.8	20.5
2000	22.7	22.8	24.3	25.2	25.4	24.7	24.2	24.8	25.5	23.7	23.4	23.4
2001	23.1	22.6	24.2	25.6	25.7	24.9	24.9	24.4	23.9	23.8	21.8	22.0
2002	21.3	22.2	24.4	25.5	25.8	25.6	25.7	24.5	24.8	24.6	24.2	24.2
Average	21.8	22.8	24.1	25.4	25.5	25.0	24.7	24.7	24.5	24.6	23.9	22.5

Monthly Humidity Average (%) - Year 1996 - 2002

Year/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	72	67	66	75	79	79	90	90	90	89	82	72
1997	73	74	73	73	84	73	80	81	84	84	80	73
1998	75	74	68	71	72	77	80	83	82	79	73	69
1999	79	75	76	82	81	80	81	81	84	87	84	77
2000	76	74	77	81	82	84	83	82	84	88	82	78
2001	79	75	80	76	80	80	80	82	85	86	79	73
2002	73	73	70	72	75	76	73	82	82	83	81	82
Average	75	73	73	76	79	78	81	83	84	85	80	75

Department of Meteorology
Office of Datagather
Station: Pochentong

Monthly Evaporation Rate Average - Year 1990 - 1998

Year/Monthly	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990	4.6	6.2	6.1	7.5	4.5	5.5	4.6	3.9	2.7	2.8	3.3	4.3
1991	4.2	5.6	6.7	7.3	5.5	3.8	2.7	3.2	2.4	2.3	3.9	5.0
1992	5.2	6.2	7.5	7.5	6.7	4.4	3.7	0.0	0.0	3.0	4.6	4.1
1993	4.7	5.5	5.8	6.5	6.3	6.2	7.4	8.0	6.6	5.8	5.2	4.3
1994	2.6	3.8	4.5	5.3	3.9	4.1	3.2	3.0	4.2	2.8	2.9	3.0
1995	4.5	6.9	5.5	6.7	4.3	2.7	2.1	2.7	2.3	1.8	3.5	4.4
1996	5.2	5.0	7.6	4.8	3.1	2.1	1.3	1.7	2.1	1.7	2.1	3.6
1997	2.4	3.5	4.7	5.1	3.7	4.5	2.9	3.2	4.1	2.7	2.4	2.9
1998	3.9	5.6	4.8	4.2	4.9	6.1	5.3	4.7	3.6	3.6	3.5	5.3
1999	3.3	4.0	4.7	4.2	4.1	4.3	3.9	4.5	5.4	4.5	5.4	3.9
Average	4.1	5.2	5.8	5.9	4.7	4.4	3.7	3.5	3.3	3.1	3.7	4.1

Department of Meteorology
Office of Datagathering
Station: Pochentong

Monthly Average Precipitation (mm) - Years 2000 - 2003

Year/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	56.5	8.3	52.0	190.8	206.2	240.3	234.4	147.3	124.7	442.5	124.7	301.1
2001	74.4	(1)	171.1	55.0	104.7	139.2	110.6	245.8	254.0	410.3	40.5	9.2
2002	(1)	0.4	0.4	20.3	80.2	144.6	98.9	178.9	236.1	302.3	165.8	58.2
2003	(1)	(1)	46.6	10.1	148.1	188.0	288.1	115.1	298.5	(1)	(1)	(1)
Average	65.5	4.4	67.5	69.1	134.8	178.0	183.0	171.8	228.3	385.0	110.3	122.8

(1) Data not available at the time of the survey

Department of Meteorology
Office of Datagathering
Station: Pochentong

Monthly Wind Speed Average (m/s) - Year 1995 - 2002

Year/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1995	2.7	3.1	3.3	3.5	3.3	4.7	4.2	2.6	2.2	2.5	3.1	3.6
1996	2.5	3.2	3.4	2.9	2.3	2.6	3.8	2.9	2.6	2.0	2.6	3.5
1997	2.0	1.9	2.6	3.3	4.0	5.6	4.4	4.1	2.7	3.4	3.1	4.6
1998	4.0	4.3	4.6	4.3	5.4	5.6	4.0	5.3	3.7	2.6	3.7	4.3
1999	4.2	5.1	6.5	5.1	7.3	7.6	6.7	7.8	6.7	5.7	5.3	8.3
2000	4.6	5.3	7.7	7.9	4.9	6.5	6.8	6.1	4.4	3.6	6.0	4.8
2001	3.2	3.4	4.7	3.0	6.3	4.8	5.6	4.7	3.3	3.0	3.1	4.2
2002	3.0	2.4	2.5	4.4	2.4	4.3		4.7	4.6	4.0	4.4	3.3
Average 95-0	3.3	3.6	4.4	4.3	4.5	5.2	5.1	4.8	3.8	3.4	3.9	4.6

Note: Data not available for period before 1995

Department of Meteorology
Office of Datagathering
Station: Pochentong

Monthly Average Sunshine - Years 1985-2002

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	9.8	9.6	9.2	8.2	8.9	5.4	7.4	6.4	6.1	7.1	7.6	9.3
1986	9.1	10.1	10.6	8.7	6.2	7.5	7.3	5.4	5.8	7.4	6.7	9.5
1987	9.5	10.4	9.8	8.5	11.7	6.6	5.8	8.0	6.2	6.3	6.7	9.3
1988	10.0	8.7	10.2	8.7	8.0	6.5	7.7	7.8	7.5	5.1	6.5	9.6
1989	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1990	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1991	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1992	7.3	8.0	9.2	8.2	7.7	5.0	5.7	3.6	4.4	5.4	8.2	7.5
1993	8.0	6.7	7.6	7.6	6.7	4.9	5.8	5.1	4.7	5.7	7.8	7.4
1994	8.5	7.6	7.1	8.7	6.8	4.6	3.5	5.2	4.8	6.7	8.7	7.4
1995	8.4	8.8	7.9	9.5	7.4	6.9	6.1	5.9	4.8	5.9	5.6	7.5
1996	8.5	8.6	9.5	7.2	6.2	7.1	4.9	6.0	4.3	4.5	5.6	5.6
1997	9.1	6.5	9.0	6.7	6.2	7.1	4.2	5.1	5.4	6.5	7.7	9.6
1998	8.9	7.8	9.4	7.4	6.9	7.3	7.7	7.0	5.3	4.6	4.7	6.0
1999	6.7	7.1	7.9	5.3	6.6	5.5	5.3	5.2	6.3	5.8	5.8	6.4
2000	7.6	7.1	5.9	7.1	6.3	5.1	5.2	5.5	4.7	4.1	7.1	5.6
2001	6.5	7.1	7.9	5.1	6.6	5.5	5.3	5.2	6.3	5.7	5.8	6.4
2002	8.6	7.0	7.0	5.4	6.6	5.2	6.1	4.1	4.1	5.5	7.2	8.3
Total	126.5	121.1	128.2	112.3	108.8	90.2	88.0	85.5	80.7	86.3	101.7	115.4
Average	8.4	8.1	8.5	7.5	7.3	6.0	5.9	5.7	5.4	5.8	6.8	7.7

(1) Data not available

11.2 The data for traffic volume survey

Station01

Peak hour	6h00-7h00		7h00-8h00		8h00-9h00		9h00-10h00		10h00-11h00		11h00-12h00		12h00-13h00		13h00-14h00		14h00-15h00		15h00-16h00		16h00-17h00		17h00-18h00		18h00-19h00		
Type	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	
Bicycle	62	274	42	60	38	30	52	81	145	88	66	60	48	109	90	168	104	96	90	88	138	108	78	36	60	48	
Motorcycle	775	1363	975	973	860	918	720	924	693	411	693	548	390	495	508	540	559	695	591	547	957	812	1085	757	904	547	
Motorumok	1	21	16	5	7	7	14	10	12	10	1	8	5	2	9	3	12	15	4	8	16	10	9	9	5	7	
Passenger car	14	38	40	31	41	33	40	24	47	36	30	28	26	26	17	26	24	32	34	30	14	43	28	29	30	21	
Pickup and Minibus	22	42	40	63	47	56	42	43	47	65	45	46	41	29	54	57	49	56	49	40	52	53	40	44	28	26	
Large Bus	3	4	8	5	6	9	9	4	15	9	10	11	7	8	6	7	15	9	6	9	8	6	4	8	5	4	
Large Tract and tractor	12	11	15	28	26	15	22	26	26	25	11	15	17	9	11	10	14	13	16	10	15	14	24	10	11	10	
Tractor with full trailer	2	1																								1	
Others																											2

Station No.: 2

Peak hour	6h00-7h00		7h00-8h00		8h00-9h00		9h00-10h00		10h00-11h00		11h00-12h00		12h00-13h00		13h00-14h00		14h00-15h00		15h00-16h00		16h00-17h00		17h00-18h00		18h00-19h00	
Type	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Bicycle	85	289	55	60	46	42	27	26	34	29	124	53	86	88	47	40	44	25	34	39	125	50	161	25	127	30
Motorcycle	235	533	236	146	290	158	154	133	165	158	205	74	193	217	157	157	168	163	155	204	338	210	373	289	307	152
Motorumok	2	1	2	11		2	3	2	4	4	2	3	3	3	1	5	1	2	1	5	2	2	2	2	2	2
Passenger car	3	11	3	11	13	10	15	5	17	12	16	13	9	14	9	10	10	11	6	7	10	15	7	6	12	4
Pickup and Minibus	5	7		2	2	4	4	3	7	2	2	4	4	4	6	2	7	11	5	5	12	17			2	2
Large Bus					1		1	1	3	2	4	3	3	1			1	2	1	1	1	2				1
Large Tract and tractor with semi-trailer																										
Tractor with full trailer																						1	1			
Others																										

Station No.: 3

Peak hour	6h00-7h00		7h00-8h00		8h00-9h00		9h00-10h00		10h00-11h00		11h00-12h00		12h00-13h00		13h00-14h00		14h00-15h00		15h00-16h00		16h00-17h00		17h00-18h00		18h00-19h00	
Type	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Bicycle	17	190	26	77	33	16	74	20	20	4	132	6	8	110	26	47	17	10	50	11	64	6	43	37	105	10
Motorcycle	59	226	91	104	74	64	70	47	79	51	67	58	46	67	57	64	37	56	47	50	90	57	90	62	100	35
Motorumok	1	1	1	5	1	1	1	1			5	1		2					1	2						
Passenger car		2		2	6		4	4	5	5	6	5	3	5	2	5	4	2	3	7	1	1		1		
Pickup and Minibus		1			1	1	4	1	4	3	2	2	2	3	2	2	1		2	2	1	1	4	4		
Large Bus					2		2	2	1	5	2		1	2	3	1	2	2	3	3	2	4				
Large Tract and tractor with semi-trailer																										
Tractor with full trailer																										
Others		1		2	2							1							1							

11.3 The results for fauna and flora survey

11.3.1 Threatened and CITES listed Herp Species in Cambodia

N-t : Near Threatened
CR : Critical Endanger
DD : Data deficient
VU : Vulnerable
EN : Endanger
LR/cd : Low Risk / Concern deficient

Threatened and CITES listed Herp Species in Cambodia					
	Khmer name	Scientific name	English name	IUCN	CITES
1	អណ្ដើកសរសៃ	Batagur baska	Mangrove Terrapin	CR	I
2	អណ្ដើកបិទមុខឆ្មាចិន	Cuora galbinfron	Indochinese Box Turtle	CR	II
3	អណ្ដើកសមុទ្រស្លឹកស្លែក	Dermochelys coriacea	Leatherbark Sea Turtle	CR	I
4	អណ្ដើកសមុទ្រចំពុះស្នាំង	Eretmochelys imbricata	Hawksbill Sea Turtle	CR	I
5	ក្រពើត្រី	Crocodylus siamensis	Siamese Crocodile	CR	I
6	អណ្ដើកក្បាលធំ	Platystemon megalcephalum	Big-headed Turtle	EN	
7	អណ្ដើកក្របីក្បាលលឿង	Hieremys annandalii	Yellow-headed Temple	EN	
8	អណ្ដើកភ្នំ	Indotestudo elongata	Elongated Tortoise	EN	II
9	កន្ទាយក្បាលកង្កែប	Pelochelys cantorii	Asian Giant Softshell Turtle	EN	
10	អណ្ដើកសមុទ្រក្បាលធំ	Caretta caretta	Loggerhead Sea Turtle	EN	I
11	អណ្ដើកសមុទ្រស្ទឹងបៃតង	Chelonia mydas	Green Sea Turtle	EN	I
12	អណ្ដើកសមុទ្រស្ទឹងប្រផេះ	Lepidochelys olivacea	Olive Ridley Sea turtle	EN	I
13	អណ្ដើកសោមញី	Heosemys grandis	Giant Asian Pond turtle	VU	
14	អណ្ដើកបិទមុខស្លឹកខ្មៅ	Cuora amboinensis	Asian Box Turtle	VU	II
15	អណ្ដើកសកល	Malayemys subtrijuga	Malayan Snail-eating Turtle	VU	
16	អណ្ដើកក្អែកខ្មៅ	Siebenrockiella crassicollis	Black Marsh Turtle	VU	
17	អណ្ដើកតិកកាល់បន្ទាមួយ	Manouria impressa	Impressed Tortoise	VU	II
18	កន្ទាយអាស៊ី	Amyda cartilaginea	Asiatic Softshell	VU	
19	អណ្ដើកសោមណ្ឌាល	Cyclemys spp	Asian Leaf Turtle	N-t	
20	ពស់ថ្នាំនំតូច	Python molurus bivittatus	Burmese Python	N-t	II

11.3.2 List of mammal species protected in Cambodia

N-t : Near Threatened
CR : Critical Endanger
DD : Data deficient
VU : Vulnerable
EN : Endanger
LR/cd : Low Risk / Concern deficient

	Scientific name	English name	Local name	Remark
1	Manis javanica	Sunda Pangolin	ពង្រួល	N-t
2	Rhinolophus shameli	Shamel's Horseshoes Bat	ប្រម្រើវី	N-t
3	Myotis rosseti	Thick-thumbed Whiskered Bat	ប្រម្រើវី	N-t
4	Myotis annectans	Hairy-faced Myotis	ប្រម្រើវី	N-t
5	Harpiocephalus mordax	Hairy-winged Bat	ប្រម្រើវី	N-t
6	Otomops wroughtoni	Wroughton's Free-tailed Bat	ប្រម្រើវី	CR
7	Nycticebus coucang	Slow Loris	រញឹប្រផេះ	DD
8	Nycticebus pygmaeus	Pygmy Loris	រញឹក្រើង	VU
9	Macaca nemestrina	Pig-tailed Macaque	ស្វាត្រាស	VU
10	Macaca fascicularis	Long-tailed Macaque	ស្វាក្រាម	N-t
11	Macaca arctoides	Stump-tailed Macaque	ស្វាអង្កត់	VU
12	Semnopithecus cristatus	Silvered Langur	ស្វាព្រាម	NT
13	Pygathrix nemaeus	Douc Langur	ស្វាក្រវ៉ាត់	EN
14	Hylobates pileatus	Pileated Gibbon	ទោចម្ពង់	VU
15	Hylobates gabriellae	Yellow-cheeked Gibbon	ទោចផ្តាសលឿង	VU
16	Cuon alpinus	Dhole	ផ្តែព្រៃ	VU
17	Ursus thibetanus	Asiatic Black Bear	ខ្នាញ់ធំ	VU
18	Ursus malayanus	Sun Bear	ខ្នាញ់តូច	DD
19	Lutra lutra	Eurasian Otter	កេក្យាលស័បៃត	VU
20	Lutra sumatrana	Hairy-nosed Otter	កេក្យាលម្រមុះ	DD
21	Lutrogale perspicillata	Smooth Otter	កេខ្នុរលោង	VU
22	Aonyx cinerea	Oriental Small-clawed Otter	កេតូច	N-t
23	Hemigalus owstoni	Owston's Civet	កំពុងដូង	VU
24	Prionailurus viverrinus	Fishing Cat	ខ្នាត្រី	N-t
25	Catopuma temminckii	Asian Golden Cat	ខ្នាញ់មាស	N-t
26	Pardofelis marmorata	Marbled Cat	ខ្នាញ់កែវ	DD

	Scientific name	English name	Local name	Remark
27	Neofelis nebulosa	Clouded Leopard	ខ្នាតពក	VU
28	Panthera tigers	Tiger	ខ្នាតដំបង	EN
29	Sousa chinensis	Indo-Pacific Hump-backed Dolphin	ផ្សោតព័ណ្ណផ្កាឈូក	DD
30	Stenella attenuate	Pantropical Spotted Dolphin		LR/cd
31	Stenella longirostris roseiventris	Dwart Spinner Dolphin	ផ្សោតបង្វិល	LR/cd
32	Tursiops truncatus	Bottle-nosed Dolphin	ផ្សោតច្រមុះដប	DD
33	Orcaella brevirostris	Irrawaddy Dolphin	ផ្សោតទន្លេ	DD
34	Globicephala macrorhynchus	Short-finned Pilot Whale		LR/cd
35	Neophocaena phocaenoides	Finless Porpoise	ផ្សោតគ្មានព្រួលខ្នង	DD
36	Balaenoptera sp.	rorqual whale		DD/EN
37	Dugong dugon	Dugong	ជ្រូកទឹក	VU
38	Elephas maximus	Asian Elephant	ដំរី	EN
40	Rhinoceros sondaicus	Javan Rhinoceros	រមាស	CR
41	Cervus eldii	Eld's Deer	រមាំង	VU
42	Axis porcinus	Hog Deer	ក្តាន់	DD
43	Bos sauveli	Kouprey	តោព្រៃ	CR
44	Bos gaurus	Gaur	ខ្នីង	VU
45	Bos Javanicus	Banteng	ទន្សោង	EN
46	Bubalus arnee	Wild Water Buffalo	ក្របីព្រៃ	EN
47	Pseudonovibos spiralis	Khting Vor	ខ្នីងវល្ល័យ	EN
48	Naemorhedus sumatraensis	Southern Serow	កែវ	VU
49	Trogopterus pearsonii	Hairy-footed Flying Squirrel	កំប្រុកស្លាប	N-t
50	Hylopetes alboniger	Particoloured Flying Squirrel	កំប្រុកស្លាបភ្នំ	EN

11.3.3 List of flora identified on the study site

N°	Flora list			N°	Flora list		
	Khmer name	Scientific name	English name		Khmer name	Scientific name	English name
1	កណ្តឹងតោ	Khaya senegalensis	African mahogany	41	ក្រូចខ្មែរ, ក្រូចកោះ	Caesalpinia pulcherrima	Peacock flower
2	កណ្តឹងតោក	Sphenoclea zeylanica	Gooseweed	42	កន្ទួតអាល	Boehmeria interrupta	
3	ក្រូចខ្មែរ	Caesalpinia pulcherrima	Peacock flower	43	ខ្លឹម	Zingiber officinale	Zingiber
4	កណ្តឹងតោ	Neptunia oleracea	Water mimosa	44	ខ្លឹម	Mucuna pruriens	Cow itch
5	ក្រូចខ្មែរ	Feroniella lucida		45	ខ្លឹម	Boesenbergia rotunda	Petit doigts (FN)
6	កណ្តឹងតោ	Chrysopogon aciculatus	Chiendent grmille (FN)	46	ខ្លឹមក្រហម	Allium cepa evg. aggregatum	Shallott
7	កណ្តឹងតោ	Eichhornia crassipes	Water hyacinth	47	ខ្លឹមខ្យល់	Allium ampeloprasum	Leek
8	កណ្តឹងតោ	Sandoricum koetjape	Santol	48	ខ្លឹមសរ	Allium sativum	Garlic
9	កណ្តឹងតោ	Murraya koenigii	Curry leaf	49	ខ្លឹមស្លឹក	Allium fistulosum	Welsch onion
10	កណ្តឹងតោ	Phyllanthus acidus		50	ខ្លឹម	Artocarpus heterophyllus	Jak
11	កណ្តឹងតោ	Leucaena leucocephala	Leucaenan	51	ខ្លឹម	Limonia acidissima	
12	កណ្តឹងតោ	Colocasia esculenta var. antiquorum		52	សារក	Artocarpus communis	Breadfruit
13	កណ្តឹងតោ	Alocasia macrorrhiza	Giant Taro	53	គីរ	Ceiba pentandra	Silk cotton tree
14	កណ្តឹងតោ	Cyperus cyperoides	Jonc (FN)	54	គីរ	Hopea	
15	កណ្តឹងតោ	Cyperus kyllingia		55	ក្រូច	Lagenaria siceraria	Calabash, bottle gourd
16	កណ្តឹងតោ	Crotalaria juncea		56	កណ្តឹងតោ	Sauropus androgynus	Star gooseberry
17	កណ្តឹងតោ	Juncellus serotinus		57	កណ្តឹងតោ	Pistia Stratiotes	Water lettuce
18	កណ្តឹងតោ			58	កណ្តឹងតោ	Salvinia natans	
19	កណ្តឹងតោ	Catharianthus roseus	Madagascar periwinkle	59	កណ្តឹងតោ	Lemna minor	
20	កណ្តឹងតោ (វិជ្ជ)			60	កណ្តឹងតោ	Monochoria vaginalis	Oval-leaved
21	កណ្តឹងតោ	Cassia timoriensis		61	កណ្តឹងតោ	Heliconia bihai	
22	កណ្តឹងតោ	Citrus aurantifolia	Lime	62	កណ្តឹងតោ	Polianthes tuberosa	Tuberose
23	កណ្តឹងតោ	Citrus sinensis	Sweet orange	63	កណ្តឹងតោ	Marsilea quadrifolia	
24	កណ្តឹងតោ	Citrus maxima	Pomelo, pompelmous	64	កណ្តឹងតោ	Musa spp.	Banana
25	កណ្តឹងតោ	Citrus hystrix	Citron combera (FN)	65	កណ្តឹងតោ	Raphistemma hooperianum	
26	កណ្តឹងតោ	Crinum asiaticum		66	កណ្តឹងតោ	Butea monosperma	Flame of the forest
27	កណ្តឹងតោ	Sphenoclea zeylanica	Gooseweed	67	កណ្តឹងតោ	Adenium obesum	Desert rose
28	កណ្តឹងតោ	Sindora siamensis		68	កណ្តឹងតោ	Plumeria alba	Frangipani
29	កណ្តឹងតោ	Scolopia macrophylla		69	កណ្តឹងតោ	Plumeria rubra	Frangipani
30	កណ្តឹងតោ	Guioa Cambodiana		70	កណ្តឹងតោ	Michelia alba	
31	កណ្តឹងតោ	Careya arborea	Patana oak	71	កណ្តឹងតោ	Alstonia scholaris	
32	កណ្តឹងតោ	Peperomia pellucida		72	កណ្តឹងតោ	Dipterocarpus	
33	កណ្តឹងតោ	Allium tuberosum	Chinese chive	73	កណ្តឹងតោ	Nelumbo nucifera	
34	កណ្តឹងតោ	Corchorus capsullaris	Jute	74	កណ្តឹងតោ	Cananga latifolia	
35	កណ្តឹងតោ	Dioscorea hispida		75	កណ្តឹងតោ	Syzygium malaccense	Rose apple
36	កណ្តឹងតោ	Clausena excavata		76	កណ្តឹងតោ	Syzygium jambos	Rose apple
37	កណ្តឹងតោ	Ludwigia adscendens	Herbe spongieuse (FN)	77	កណ្តឹងតោ	Alstonia spathulata	
38	កណ្តឹងតោ	Pouzolia zeylanica		78	កណ្តឹងតោ	Ocimum Basilicum	Basil
39	កណ្តឹងតោ	Sida acuta subsp. acuta	Broom-weed	79	កណ្តឹងតោ	Eryngium foetidum	Panicaut (FN)
40	កណ្តឹងតោ	Sida rhombifolia		80	កណ្តឹងតោ	Ocimum gratissimum	Ceylan basilic
				81	កណ្តឹងតោ	Coleus ambioinicus	

N°	Flora list		
	Khmer name	Scientific name	English name
82	ជីអង្កាម	Mentha arvensis	Menthe
83	ជើងចាប	Dasymaschalon lomentaceum	
84	ជើងតុកកែវ	Hegnere obcordata	
85	ជើងបង្កង	Altenmanthera sessilis	
86	ជ្រៃដូង	Ficus rumphii	
87	ជ្រៃក្រឹម	Ficus benamina	Benjamin tree
88	ជីក្រសាំងទំហំ		
89	ជីបាក់ង	Eryngium foetidum	Panicaut
90	លើងអែម	Albizia myriophylla	
91	ល្អិតស្រុក	Morinda citrifolia	
92	ដូង	Cocos nucifera	Coconut
93	ដង្ហិត	Cassia Olota	
94	ដំឡូង	Ipomoea batatas	sweet potato
95	ដំបងយក្សសំបែត	Lemaire	
96	ដំបងយក្សមូល	Lemaire ocereus	
97	ប្រុង	Cycas siamensis	
98	ប្រទាលកន្ទុយ ក្រពើ	Aloe vera	
99	ដំកខ្លឹមតូច	Ixora coccinea Dokhim	
100	ដំកខ្លឹមធំ ផ្កាស	Ixora krewanhensis	
101	ប្រទាលរាសី	Kalanchoe tubiflora	
102	ដូងព្រៃ	Arenga pinnata	Sugar palm
103	ដៃវបាត់	Allophyllus serrulatus	
104	ដំឡូងលើ	Manihot esculenta	cassava
105	ដំឡូងដ្ឋា	Ipomoea batatas	sweet potato
106	ដំឡូងត្រីង	Amomum Villusom	
107	ដំឡូងជ្រូក	Dioscorea oryzetorum	Pig yam
108	ដំឡូងឈាមមាត់	Discorea alata	Water yam
109	ដំឡូងដូង	Discorea esculenta	Potato yam
110	ដំឡូងដៃខ្លា	Discorea pentaphylla	
111	ដំឡូងស្បា	Discorea hispida Kdourch	
112	ដោះគុណ (វឺឡី)	Tetraceara indica	
113	ណាត្រី	Cestrum nocturnum	Lady of night
114	ដង្កូវក្របាច	Antidesma ghaesembilla	
115	ត្នោត	Borassus flabellifer	Palmyra palm
116	ត្រគូន	Ipomoea aquatica	Water convolvulus
117	ត្រគូនកន្ត្រែក	Ipomoea pes-caprae	
118	ត្បាច់កិន	Abutilon indicum	
119	ត្បាច់	Albizia procera	
120	ត្រដៀត	Monochoria hastata	Hastate-leaved pondweed
121	ត្រដៀតរងាម	Limnocharis flava	Velvet leaf
122	ត្រដៀតទន្សាយ	Argyreia obtecta	
123	ត្រងិត	Cayratia trifolia	
124	ត្រច្ឆក	Costus speciosus	

N°	Flora list		
	Khmer name	Scientific name	English name
125	ត្រប់វែង	Solanum melongena	Eggplant
126	ត្រប់ពត់ចំពូង	Solanum torvum	
127	ត្រប់ក	Psidium guajava	Common guavas
128	ត្រឡៀកប្រាជ្ញ	Centella asiatica	
129	ត្រាវ	Colocasia esculenta	Cocoyam, dasheen
130	តោយ	Pandanus amaryllifolius	
131	ត្បែង	Dipterocarpus obtusifolius	
132	ត្រប់ព្រៃ	Crypteronia paniculata	
133	ត្រឡើង	Diospyros pilosanthera	
134	ត្រម័ល់	Acronychia pedunculata	
135	ត្រប់កព្រៃ	Lagerstroemia floribunda	
136	ត្រសក់	Cucumis sativus	cucomber
137	ត្រសំ	Combretum trifoliatum	
138	ត្រី (វឺឡី)	Ichocarpus frutescens	
139	ត្រៀលស្វា	Uvaria rufa	
140	ត្រីក (វឺឡី)	Merremia hederacea	
141	ថ្នូរ	Anthocethapus chinensis	
142	ត្រីព្រៃ	Desmodium heterophyllum	spanish clover
143	ថ្នាំង	Crateva adansonii	
144	ថ្នាំងទឹក	Xyris indica	
145	ថ្នាំង (វឺឡី)	Aganonerion polymorphum	
146	ថ្នាំងត្រី	Marsilea quadrifolia	
147	ថ្នាំង (វឺឡី)	Ventilago madraspatana	
148	ទម្រឹម	Punica granatum	Pomegrenate
149	ទម្រនាខេត្ត	Chromolaena odorata	Siam weed
150	ទម្រនាឈាមសរ	Sida acuta	Broom-weed
151	ទឹកដោះខ្លា	Holarrhena pubescens	Coessie (FN)
152	ទាស់	Amorphophallus harmandii	
153	ទឹកដោះគោ	Chrysophyllum cainito	star apple
154	ទៀបបាក់រាំង	Annona muricata	soursop
155	ទៀបខ្មែរ	Annona Squamosa	sweetsop
156	ទេវតាប្រើប៊ីទិស (ប្រទាល)	Euphorbia milii	Epine du christ FN
157	ទំពាំងបាយជូរព្រៃ	Ampelocissus martinii	
158	ទ្រលីងមីង	Averrhoa bilimbi	bilimbing
159	ទ្រៀលដោះក្របី	Anomianthus dulcis	
160	ទ្រៀលស្វា	Uvaria rufa	
161	ថ្នា	Acacia caesia	
162	ធូលីត្រី	Bridelia Cambodiana	
163	នាមាងជ្រូង	Luffa acutangula	Ridged gourd
164	នាមាងមូល	Luffa aegyptiaca	Sponge gourd
165	បក្សីវាសស្និត	Strelitzia reginae	Bird of paradise
166	បញ្ជីកែវ	Helixanthera longispicata	Plant parasite

N°	Flora list		
	Khmer name	Scientific name	English name
167	បណ្ណុលពេជ្រ	Tinospora crispa	Liane quinine FN
168	បន្ទាយក្ស	Mimosa Pigra	Giant sensitive
169	បន្ទាស្លឹក	Caparis flavicans	
170	ក្រខុប	Muntingia calabura	calabura, jamaican cherry
171	ប៉េងពេច	Lycopersiconesulentum	tomato, love apple
172	បាយក្តាំង	Leea indica	
173	បាក់ក្បាល (ស្នៅ)	Echinochloa crus-galli	cock chicken grass foot, panic
174	បាយតំណើប (វិធី)	Acacia thailandica	
175	បាស, ស្លឹកបាស	Coccinia grandis	
176	ប៊ីសន្លឹក	Arytera littoralis	
177	ប៊ីប្រាក់	Drynaria fortunei	
178	ប៉ែងកាមាត	Eupatorium triplinerve	
179	ប៉េងពេចស្រោម	Physalis angulata	
180	ប្រាក់វិធី	Phyllanthus urinaria	
181	ត្រសក់ស្រូវ	Cucumis melo	melo
182	ត្រសេក	Peltophorum dasyrrhachis	
183	ត្រឡាច	Benincasa hispida	white gourd, max gourd
184	ប្រទាលកន្ទុយក្រពើ	Aloe vera	
185	ប្រទាលជិត្តាតំដ	Euphorbia antiquorum	
186	ប្រទាលទាងសរ	Cymbidium poilanei	
187	ប្រទាលបាយតំណើប	Cymbidium aloifolium	
188	ប្រទាលបូស	Caesalpinia godefroyana	
189	ប្រទាលពានជញ្ជាំង	Banamcanda chinensis	
190	ប្រទាលពស់	Hylocereus undatus	
191	ទ្រទិចប្តី		
192	ប្រទាលព្រះអង្កាស	Curcuma zedoaria	
193	ប្រទាលមហាជម្ពូរ	Eleutherine bulbosus	
194	ប្រទាលរលះជើងក្តាម	Euphorbia tirucalli	
195	ប្រទាលសេដ្ឋី	Kalanchoe tubiflora	
196	ប្រទាលអ៊ុសមួយ		
197	ប្រទាលអង្ករជុំ		
198	ប្រទាលគង់ទ្រព្យ		
199	ប្រទាលក្រុងសិរិសោ		
200	ប្រទាលព្រះឈ្នះ		
201	ប្រទាលសារិកា		
202	ប្រទាលប្រហោង		
203	ប្រទាលអង្ករជុំទើ		
204	ប្រទាលជំពែងព្រះរាម		
205	ប្រទាលកបិល្លាស្ត		
206	ប្រទាលរោមជី		
207	ប្រទាលពានជើង		
208	ប្រើសស្នា		

N°	Flora list		
	Khmer name	Scientific name	English name
209	ប្រទាលកន្ទុយមាត់		
210	ប្រទាលមហាទាតសរ		
211	ប្រទាលទាតក្រហម		
212	ប្រទាលស្លែងបាក់ កន្ទែងពេច		
213	ប្រទាលបារត		
214	ប្រទាលតាំងកាមាត		
215	ប្រទាលពោរហោម		
216	ប្រមួយ	Croton Caudatus	
217	ប្រជុក	Bombar thorelii	
218	ប្រពាយជ្រូង	Psophocarpus tetragonolobus	winged bean
219	ប្រពាយស្បែក	Canavalia ensiformis	sabre bean
220	ប្រម៉ាតជី	Mazus japonicus	
221	ប្រៀងខ្យល់	Eucalyptus tereticornis	
222	មេម (វិធី)	Paederia scandens	
223	ផ្កាក្រពេន	Lowsonia invermis	
224	ផ្កាក្រដាសក្រហម	Bougainvillea buttiiana	
225	ផ្កាក្រមុន	Thevetia peruviana	
226	ផ្កាដង្កូវ	Aloysia Urticoides	
227	ផ្កាតាំងធូ	Catharanthus roseus	
228	ផ្កាទំហ្សិ	Gomphrena globosa	
229	ផ្កាម៉ាងដំបូក្រហម	Pontulaca grandiflora	
230	ផ្កាម៉ាងដំបូ សរ	Pontulaca	
231	ផ្កាម៉ាងដំបូ ស្វាយ	Pontulaca	
232	ផ្ការំយោល	Hibiscus rosa-sinensis	
233	ផ្កាស្នៅ	Ruellia tuberosa	
234	ផ្កាស្លឹកក្រហម	Euphorbia pulcherrima	
235	ផ្កាឈូកវិញ	Helianthus annuus	sunflowers
236		Gomphrena globosa	globe amaranth tumhou
237	ផ្កាស្បែករឿង	Tagetes erecta	African marigold
238	ផ្កាកុលាប	Rosa	Roses
239			
240	ផ្កាដូង	Amaranthus tricolour	Joseph's coat
241	ផ្កាដំ	Amaranthus hybridus	Prince's feather
242	ផ្កាបន្លា	Amaranthus spinosus	spinash piquant
243	ផ្កាសរ	Amanrathus albus	Pig weed
244	ផ្កាដុំ		
245	ផ្កាអាយម៉ាមាត់	Amanrathus viridis	slender amaranth
246	ស្នៅជុំ	Andrographis paniculata	
247	ពន្លឺ	Zingiber purpureum	
248	ពរពេល	Hopea recopei	
249	ពុទ្រា	Zizyphus mauritiana	indian jujube
250	ពោធិ៍	Ficus religiosa	pagoda figuier
251	ពង្រ		

N°	Flora list		
	Khmer name	Scientific name	English name
252	ព្រឺលីត	Nymphaea lotus	Nymphaea
253	ពុកផ្កា	Pavetta indica var. indica	
254	ព្រឺង	Syzygium Cumini	
255	ព្រឺមបន្ទា	Drypetes roxburghii	
256	ព្រឺខ្លឹប	Mimosa pudica	sensitive
257	ព្រឺកព្រាប	Breynia vitis idarea	
258	ព្រឺក្នុង	Hymenocardia wallichii	
259	មមាញ	Cleome gynandra	cat whiskers
260	មមាញខ្មោច	Cleome viscosa	
261	ម៉ាកឆ្នើ	Diospyros mollis	ebony tree
262	មាស (វឺធី)	Cassipourea filiformis	
263	មុខល្បាង	Christia vespertilionis	
264	ម្សៅ	Dimocarpus longan	longan
265	ម្នាក់	Spondias cytherea	jew's plum
266	ម្រូសខ្នាំង	Capsicum frutescens fasciculatum	bird pepper
267	ម្រូសប្លោក	Capsicum annuum	salad pepper
268	ម្រូសឆាងដៃ	Capsicum frutescens longum	long pepper
269	ម្រូសវិញ	Tabernaemontana bovina	
270	ម្រូសហាវី	Capsicum frutescens grossum	paprika
271	ម្នាក់	Ananas comosus	pine apple
272	ម្រឹញ	Milletia erythrocalyx	
273	ម្រុម	Moringa oleifera	Horseradish tree
274	ម្រុះ	Momordica charantia	bitter gourd, bitter cucumber
275	ម្រុះព្រៅ	Ocimum tenuiflorum	basilic moines FN
276	ម្រូប	Piper betle	betel plant
277	ម្រូង	Jasminum sambac	Arabian jasmine
278	ម្រូងរត	Gardenia lucida	
279	ម្រូងលា	Clerodendron philippinum	glory bower
280	ម្រូង		
281	ម្រូងវិញ		
282	ម្រូញ		
283	ម្រូងដី	Limnophila chinensis	
284	ម្រូងក្តាម	Limnophila repens	swamp leaf
285	ម្រូងស្រែ	Limnophila geoffrayi	
286	រពាក់	Calamus salicifolius	
287	ល្បើត	Curcuma domestica	turmeric
288	រម្បិតសរ	Sphenodesme pentandra	
289	រលួស	Erythrina variegata	corail tree
290	រាក់សរ	Calotropis gigantea	wara yercum
291	រលួសថៃ	Erythrina fusca	
292	រតែក	Pandanus humilis	
293	រតែង	Nymphaea nouchali	water lily

N°	Flora list		
	Khmer name	Scientific name	English name
294	ស្លាបឆ្មា	Ottelia alismoides	
295	ស្លឹក	Combretum quadrangulare	cigarette paper
296	ស្លឹកក្របី	Desmodium heterocarpon	carpon desmodium
297	ស្លាម	Melaleuca cajuputi	
298	ស្លាដំឡូង	Carthamus tinctorius	saflower
299	ស្លឹកថ្លើម (វឺធី)	Aganonerion polymorphum	
300	ស្លឹកធាត	Coccoloba grandis	Liana
301	សាវមាវិញ	Passiflora foetida	Climbing herb
302	ស្លាវិញ	Vernonia cinerea	Dwarfish herb
303	ស្លាវិញ	Rotula aquatica	Sub-shrub
304	ស្លាព្រាម	Capparis Separia	
305	ស្លាដង	Aplasia officinarum	Galandal
306	ស្លឹកសាយសក់	Lygodium conforme	Climbing fern
307	ស្លា	Barringtonia asiatica	
308	ស្លឹក	Dendrocalamus membranaceus	Bamboo
309	ស្លឹកព្រិច	Arundinaria falcata	Small bamboo
310	ស្លាដង	Flueggea virosa	
311	ស្លា	Cucurbita maxima	pumpkin
312	ស្លា	Ficus racemosa	figs
313	ស្លា	Carica papaya	melon tree
314	ស្លាខ្នង	Jatropha curcas	purging nut
315	ស្លាខ្នងព្រាម	Jatropha multifida	purging nut
316	ស្លាប្រេង	Ricinus communis	castor oil
317	ស្លឹកស្រីប		
318	ស្លឹករំពេច		
319	ស្លឹកមាស	Butea superba	Long ligneous liana
320	ស្លឹកមាស	Cassipourea filiformis	Herbaceous liana
321	ស្លឹកស្រីប	Coriandrum sativum	coriander
322	ស្លាស្រីប	Impatiens relaxata	
323	ស្លឹក	Zizyphus oenophia	
324	ស្លាព្រាមខ្មោច	Cassia occidentalis	coffeeweed
325	ស្លាព្រាមកូរ	Vigna unguiculata	yard-long bean
326	ស្លាតូរ	Maranta arundinacea	arrowroot
327	ស្លាភាយ	Utricularia aurea	
328	ស្លាស្រីមាសព្រាម	Celosia cristata	cock'scomb
329	ស្លាស្រីមាស	Celosia argentea	cock'scomb
330	ស្លាដា	Pouteria sapota	sapote
331	ស្លា	Azadirachta indica	margosa
332	ស្លាយ	Streblus asper	
333	ស្លាដង	Bauhinia variegata	orchid tree
334	ស្លា	Sesbania javanica	
335	ស្លាភោក	Sesbania sesban	
336	ស្លាភោកមាស	Aeschynomene indica	

N°	Flora list		
	Khmer name	Scientific name	English name
337	ស្លាអំពេច	Aeschynomene aspera	
338	ស្លាចំពុះខា	Cyanotis critata	
339	ស្លាគ្រិច	Aeginetia indica	
340	ស្លាស្លាបខា	Commelina salicifolia	
341	ស្លាតោ	Brachiaria mutica	para grass, mauritus grass
342	ស្លាវី	Imperata cylindrical	cotton grass, satintail
343	ស្លាវឿង	Tagetes erecta	african marigold
344	ស្លាមុង	Aponogeton lakhonensis	
345	ស្លាត្រៃ	Cymbopogon nardus	citronella, mana grass
346	ស្លាធារាំង		french herb
347	ស្លាប្រាំញដ្ឋក	Cyperus rotundus	coco grass
348	ស្លាចំព្យួន		
349	ស្លាវែង	Oryza rufipogon	wild rice
350	ស្លាវី	Oryza sativa	rice
351	ស្លា	Areca catechu	areca nut, betel nut
352	ស្លាបខា	Commelina salicifolia	herb
353	ស្លាង	Strychnos nux-vomica	nux-vomica
354	ស្លាយ	Mangifera indica	mango
355	ស្លាយចន្ទី	Anacardium occidentale	acajou, cashew-apple
356	ស្លា	Acacia megaladena	
357	ស្លាដី	Sesbania grandiflora	

N°	Flora list		
	Khmer name	Scientific name	English name
358	អង្កាមអង្កាម	Abrus precatorius	crab's eye, coral pea
359	អង្កាម		
360	អង្កាញ់	Cassia siamensis	perdix wood
361	អង្កាឈ្មោល	Gomphia serrata	
362	អង្កាញ់	Zizyphus cambodiana	Thorny shrub
363	អណ្តាតតោ	Achyranthes bidentata	
364	អណ្តាញ	Gmelina asiatica	
365	អំពិល	Tamarindus indica	tamarind
366	អំពិលទឹក	Pithecellobium dulce	Manila tamarind
367	អំពិលធារាំង	Albizia saman	rain tree
368	អាចម៍សត្វ	Brownlowia emarginata	
369	អាភៀន	Papaver somniferum	opium plant
370	អូយមួយ	Cacia grandis	
371	អំពៅ	Saccharum officinarum	sugar cane
372	ម្នីម្នីក	Citrullus lanatus	water melon
373	ដើមត្រព្យួន		
374	វិស្សីកំពេ		
375	ព្រៃង		
376	សាតូ	Maranta arundinacea	arrowroot
377	ដើមផ្លែមាត់		
378	តាតុក	Costus speciosus	

11.3.4 Bird species encountered in the study area.

N°	Local name	Scientific name	English name
1	ចាបពេត	Orthotomus sutorius	Common Tailorbird
2	ចាបពពេចច្រូងពេត	Saxicola torquata	Common Dtonechst
3	ចាបដង្កូវធំ	Prinia polychroa	Brown prinia
4	ចាបស្រុក	Passer flaveolus	Plain-backed Sparrow
5	ស្វាមេក	Copsychus saularis	Oriental Mag Robin
6	ចាបប្រកម	Pyononotus goiavier	Yellow-ventedBul bul
7	ចាបជូនតា	Acrocephalus orientalis	Oriental Reed Warbler
8	ចាបវាលស្រែ កខ្មៅវី	Luscinia svecica	Bluethroat
9	ចាបផ្ទះ	Passer montanus	Eurasian TreeSparrow
10	ចាបមាត់កង្កែប	Batrachostomus javensis	Javan Frogmouth
11	សេកសោម	Pstitalaca eupatria	Alexandrine Parakeet
12	សែកអាត់	Pstitalaca roseata	BlossomheadedPa raket
13	អន្ទេបខ្មៅ	Dicurus macrocercus	Black Drongo
14	អន្ទេបប្រជែង	Dicurus leucopphaeus	Ashy Drongo
15	អន្ទេបមាត់កង្កែប	Dicurus paradiseus	Greater Racket-tailed Drongo
16	ក្រពើក្រណាត់	Sturnus nigricollis	Black-collared Starling
17	ក្រពើក្រណាត់	Sturnus burmannicus	Vinous-breasted Starling

N°	Local name	Scientific name	English name
18	សាវិកកែវតោ	Acridotheres tristis	Common Myna
19	សាវិកកែវក្របី	Acridotheres grandis	White-vented Myna
20	ត្រសេះដំរី	Mulleripicus pulverulentus	Great slaty woodpecker
21	ត្រចៀកកាំព្រៃ	Hemiprocne coronata	Crested Treeswift
22	ប្រីវីក	Dendrocygna javanica	Lesser Whistling-duck
23	ប្រីវីក	Nettapus coromandelianus	Cotton pygmy-goose
24	ក្រូចតូច	Turnix sylvatica	Small Buttonquail
25	ក្រូចម្នីត	Turnix suscitator	Barred Buttonquail
26	ក្រូចម្នីតជើងលឿង	Turnix tanki	Yellow-legged Buttonquail
27	ក្រូចម្នីត	Turnix suscitator	Barred Buttonquail
28	ត្រសេះតូចកំពែយលឿង	Picus chlorolophus	Lesser yellownape
29	ខ្មៅវីខ្មៅវី	Coracias benghalensis	Indian Roller
30	ត្រងវីតូច	Merops orientalis	Green Bee-eater
31	ស្លាស្លាវី	Centropus bengalensis	Lesser Coucal
32	ស្លាស្លាវី	Centropus sinensis	Greater coucal
33	ទីមួយធំព្រៃ	Bubo nipalensis	Spot-bellied Eagle owl
34	ម្រម្រង់	Strix seloputo	Spotted Wood owl

N°	Local name	Scientific name	English name	N°	Local name	Scientific name	English name
35	ខ្លែងស្រោក	Tyto alba	Barn Owl	48	កុកម្លូសដុំ	Lxobrychus cinnamomous	Cinnamon Bittern
36	ម្លេងតូចភ្នំ	Athene brama	Spotted Owllet	49	មុងស	Pelecanus onocrotalus	Great White Pelican
37	ក្របត្រែក	Columba livia	Rock Pigeon	50	មុងប្រដេះ	Pelecanus philippinsis	Spot-billed pelcan
38	ម៉ាន់មីក	Amauromis phoenicurus	White-breasted waterhen	52	ក្អែក	Corvus macrorhynchos	Large-billed crow
39	ក្អែក	Gallinago cinerea	Watercock	53	ក្រសា	Ardea	
40	ខ្លែកត្រោក	Gallinago gallinago	Common Snipe	54	ទាព្រៃតូច	Anas crecca	Common Teal
41	ខ្លែកធំ	Scolopax rusticala	Eurasian woodcock	55	ចមាតក្រឹម	Aleedo atthis	Common kingfisher
42	ត្រងេវីរិចទន្លេ	Vanellus duvaucelii	River Lapwing	56	ឈរកម្រាំង	Streptopelia tranquebarica	Red Collared Dove
43	ស្នាំងសណក	Elanus caeruleus	Black-shouldered kite	57	ឈរកាយ	Streptopelia chinensis	Spofted Dove
44	ស្មោញ	Anhinga melanogaster	Darter	58	ជើងឡើង	Himantopus himantopus	
45	កុកត្រាងតូច	Egretta garzetta	Little Egret	59	ឈរក្នុង	Macropygia unchall	Barred Cuckoo Dove
46	កុកត្រាងធំ	Camerodius albus	Great Egret	60	ខ្លែងឆាបឆើងក្រមើ	Haliastur Indus	Brahminy kite
47	កុកសំបកត្រងាំង	Lxobrychus sinensis	Yellow Bittern				

11.3.5 Fish species encountered in the study area.

N°	Fish species		
	Khmer name	Local name	Scientific name
1	ត្រីឆាំង	Trey chhlaing	Mystus nemurus
2	ត្រីកេស	Trey kess	Micronema bleekeri
3	ត្រីក្តាំងហាយ	Trey klaing hay	Bilodontichthys dipema
4	ត្រីរាល	Trey rill	Henicorhynchus caudimaculatus
5	ត្រីលីញ	Trey linh	Thynnithys thynnoides
6	ត្រីកំពត	Trey kampo	Chelonodon fluviatilis
7	ត្រីកញ្ចាញ់ច្រាំង	Trey kanchagn chass thom	Parambassis apogonoides
8	ត្រីស្លាត	Trey slat	Chitala lopis
9	ត្រីច្រវាមូល	Trey chravar mou	Rasbara ternieri
10	ត្រីផ្ទៃ	Trey ptoung	Xenentodon canila
11	ត្រីអ៊ុន	Trey chhpin	Hypsibarbus pierrei
12	ត្រីបណ្តុលអំពៅ	Trey bandaul ampouv	Clupeoides borneensis
13	ត្រីច្រវាភ្លើង	Trey chrovar pleing	Esomus metallicus
14	ត្រីអណ្តាតខ្ពស់	Trey andat chkei	Achiroidrs melanorhynchus
15	ត្រីកន្ត្រប់	Trey kantrap	Pristolepis fasiata
16	ត្រីក្រហែ	Trey kra hei	Barbodes altus
17	ត្រីក្រស	Trey kross	Cyclocheilichthys apogon
18	ត្រីច្រវាឆេង	Trey chrovar no naung	Lobocheilos melanataenia
19	ត្រីកញ្ចាញ់ក្របី	Trey kanchoss kra bey	Glyptothorax fuscus
20	ត្រីកញ្ចាញ់ក្រាង	Trey kanchoss kdaung	Heterobagrus bocourti
21	ត្រីក្បក	Trey kbork	Tenualosa thibaudeaui
22	ត្រីឡា	Trey kya	Mystus wyckioides

---	Fish species		
	Khmer name	Local name	Scientific name
23	ត្រីប្រា	Trey prar	Pangasianodon hypophthalmus
24	ត្រីប្រាខ្មៅ	Trey prar khmao	Pangasius bocourti
25	ត្រីឈ្មួត	Trey chevitt	Pangasius polyuranodon
26	ត្រីតាអោន	Trey taoan	Ompok
27	ត្រីកញ្ចាញ់	Trey kanch chrouk	Botia
28	ត្រីស្លឹកឫស្សី	Trey sleek russey	Paralaubuca harmandi
29	ត្រីក្អែក	Trey kaek	Osteochilusbrach ynopteroides
30	ត្រីបួសចេក	Trey russ chek	Acantopsis
31	ត្រីកញ្ចាញ់ស្ទឹង	Trey kampleiv steing	Kryptopterus cheveyi
32	ត្រីខ្លាំងវែង	Trey knang veing	Dangila kuhli
33	ត្រីពោ	Trey pair	Pangasius larnaudiei
34	ត្រីត្រសក់	Trey trassak	Probarbus jullieni
35	ត្រីតាឆេង	Trey taneil	Mystus filamentus
36	ត្រីខ្លាំង	Trey khcheing	Macragnathus maculatus
37	ត្រីក្រំ	Trey krom	Osteochilus melanopleurus
38	ត្រីក្រមម	Trey kramam	Hemisilurus mekongensis
39	ត្រីកញ្ចាញ់ប្រេង	Trey kantrang preing	Parambassis wotffi
40	ត្រីក្រឹមដល់	Trey kreim choul	Betta splendens
41	ត្រីក្រឹមទន្សាយ	Trey kreim tunsay	Trichopsis pumila
42	ត្រីកញ្ចាញ់ក្អែក	Trey kampleign plouk	Trichogaster microlepis
43	ត្រីអណ្តាតទន់	Trey andeign toun	Charias meladerma
44	ត្រីក្រាញ់ស្រែ	Trey kragn srei	Anabas testudineus
45	ត្រីផ្ទៃប្រវែង	Trey roass	Channa marulius

N°	Fish species		
	Khmer name	Local name	Scientific name
46	អង្គង់	Trey antougn	Ophisternon bengalense
47	ត្រីធីរី	Trey damrey	Oxyeleotris marmorata
48	ត្រីអាចម៍កុក	Trey ach kok	Dangila spilopleura
49	ត្រីច្រកែង	Trey chrar keign	Puntionplites sp cf waandersi
50	ត្រីកញ្ជះថ្ម	Trey kanchoss tmar	Leiocassis siamensis
52	ត្រីអណ្តែងរឹង	Trey andeign ring	Clarias batrachus

N°	Fish species		
	Khmer name	Local name	Scientific name
53	ត្រីតាពត	Trey tar pork	Scleropages formosus
54	ត្រីក្រឡង់	Trey krar lang	Cirrhinus microlepis
55	ត្រីកុក	Trey kaok	Arius sagor
56	ត្រីលលកស	Trey lolok sar	Osteochilus schlegelii
57	ត្រីឈ្នួញ	Trey chhlaung	
58	ត្រីកញ្ជះស្បូវ	Trey kanchoss sbouv	
59	ត្រីព្រលួង	Trey pror loung	

11.3.6 Other aquatic species encountered in the study area.

N°	Other aquatic species		
	Khmer name	Local name	Scientific name
1	បង្កង	Bang Kang	Fresh water gambas
2	គីតិស	Kam Peiss	Fresh water shrimp
3	ក្តាមត្រាង	Kdam kraung	Rice field crab
4	ក្តាមស្រងែ	Kdam srangè	Rice field crab
5	កង្កែបតោប	Kang Kèp kaub	Frog
6	កង្កែបអាមមីតោ	Kankeb Ach Kor	Frog
7	ត្រីកក់	King Kourk	Toad
8	ហ្វីងជាំ	Hing Chir	Toad
9	ហ្វីងជាំ	Hing Chor	Toad
10	កញ្ជក់ចេក	Kanchang cheek	Toad
11	កូនក្តាត់	Kaun koat	Tadpole
12	កូនកុក	Kaun Kaoc	Tadpole
13	កន្តាសទុក	Kantear Touk	Cockchafer

N°	Other aquatic species		
	Khmer name	Local name	Scientific name
14	កន្តាសឡង់	Kantear Lang	Cockchafer
15	ឆ្កែង	Chhloeung	Leech
16	ដងរែក	Dang Rèk	
17	ត្រី	Kroum	Big mussels
18	លាស	Lears	Small mussels
19	ឆ្កែម	Chang Kaum	
20	ខ្យងធំ	Khayân	Snail
21	ខ្យងសោក	Khayân sor	Snail
22	ខ្មៅ	Kachay	Snail
23	ពពឹងទឹក	PoPeang Toeuk	
24	ដង្កូវទឹក	Dang Koe Toeuk	Mosquito larva
25	រែមទឹក	Chay Toeuk	Fresh water larva
26	ជំនួន	Chun Leung	Worm

11.3.7 Mammal species encountered in the study area.

N°	Mammals species		
	Khmer name	Local name	Scientific name
1	ស្វាព្រៃ	Skar Kreis (Macaque)	Macaca cynomolgus
2	ទន្សាយ	Toun Say	Lepus cochinsinensis
3	កំប្រកស្លាប	Kom Prok Slaab	Siurus petorita
4	ខ្លាត្រី	Kla Trey	Felis viverrina
5	ស្លា	Skar	
6	កំប្រក	Kom Prok (Mongoose)	Squirrel

N°	Mammals species		
	Khmer name	Local name	Scientific name
7	កង្កឹក	Kan thoeuk (Tree shrew)	Tupaia belangeri
8	កណ្តុរច្រូង	Kandol Preng (Large bandicoot Rat)	Bandicota indica
9	កណ្តុរប្រមេះ	Kandol Pror Mes (House shrew)	Suneus murinus
10	ប្រដេវីវ	Whiskered Bat	Myotis
11	ត្រីង	Flying – fox	Pteropus Lylei

11.3.8 Reptile species encountered in the study area

N°	Reptiles species		
	Khmer name	Local name	Scientific name
1	កាស់ប្រាជិតខ្យង	Pos Pra lit kachor	Snake
2	កាស់ចាន់លូម	Pos Chan Lmom	Snake
3	កាស់ត្រី	Pos Trey	Snake
4	កាស់សំលាប់កង្កែប	Pos samlab ang kep	Snake
5	កាស់ចារ	Pos Char	Snake

N°	Reptiles species		
	Khmer name	Local name	Scientific name
6	កាស់ហនុមាន	Pos haknouk	Snake
7	កាស់ជាំ	Pos Chear	Snake
8	កាស់សង់ស្បី	Pos Sang Soeu	Snake
9	កាស់ស្រកាចាស់	Pos Sra Ka chas	Snake
10	កាស់ខ្យងតោ	Pos Ksè Kor	Snake

N°	Reptiles species		
	Khmer name	Local name	Scientific name
11	សាស្ត្រី	Pos Dey	Snake
12	សាស្ត្រីភ្នំ	Pos kom Plak	Snake
13	សាស្ត្រីអុច	Pos Oc	Snake
14	សាស្ត្រីកែវ	Pos Toeuk Kès	Snake
15	សាស្ត្រីកុក	Pos Kor Koc	Snake
16	ត្រីកែវ	Tokay	Gecko
17	សាស្ត្រីធ្លា	Pos Tlan	Python
18	សាស្ត្រីវែកដំបូក	Pos Vek Dam bauk	Naja naja atra
19	សាស្ត្រីរាងត្រាវ	Pos Theang Trav	Ahaetulla prasina
20	សាស្ត្រីព្រៃ	Pos Prey	Ptyas korrs

N°	Reptiles species		
	Khmer name	Local name	Scientific name
21	សាស្ត្រីស្នាអន្សាង	Pos Sna Ang Saung	Elaphe radiatar
22	សាស្ត្រីវែកក្របី	Pos Vek Kabey	Naja sputatrix
23	សាស្ត្រីវែកស្រងៃ	Pos Vek Sra Ngè	Waja naja kaouthia
24	សាស្ត្រីអង្កាច់មាស	Pos AngKach Meas	Oligodon purpurascens
25	អណ្តើកស្រែ	An Doeuk Srè (tortue)	Malayemys subtrijuga
26	ដង្កែបកំ	Ching Chak	specy of lizard
27	បង្កុយ	Bang Kouy	specy of lizard
28	ថ្លែន	Thlèn	specy of lizard

11.3.9 Insect species encountered in the study area

N°	Insect species		
	Local name	Local name	English name
1	ដង្កូវបាក់ខ្នង	Dang Koev Bak Knung	worm
2	ដង្កូវបាយក្តាំង	Dang KoevBay Kdaing	worm
3	ដង្កូវរមាស់	Dang Koev Romos	worm
4	ដង្កូវដូង	Dang Koev Daung	worm
5	ដង្កូវខ្សែវ	Dang Koev Khoeuv	worm
6	ម្រើមព្រះ	Moroem Preah	Mille-pattes
7	ខ្សាចរី	Kha Damrey	Scorpion
8	កែប	Ka Ep	Mille-pattes
9	ខ្នុយ	Ktouy	Mille-pattes
10	កញ្ជ្រោ	Kanchè	
11	ឃ្មុំ	Khmoum	bee
12	ប្រូត	Prout	bee
13	ស្រាំង	Sraing	
14	ឌីម៉ាល់	Or Mal	
15	អង្រួង	Ang Krang	specy of ant
16	ស្រមោចក្រហម	Sramoch Kraham	specy of ant
17	ស្រមោចខ្មៅ	Sramoch Kmao	specy of ant
18	ស្រមោចអាត់	Sramouch At	specy of ant
19	សង្ការ	Sang Ar	specy of ant
20	ស្រមោចតាវ៉ាវ	Sramoch Toa Roa	specy of ant
21	ខ្លើយរែ	Rey	specy of cricket
22	ចម្រិតដេក	Chanret Dek	specy of cricket
23	ចម្រិតភ្លើង	Chanret Ploeing	specy of cricket
24	ចម្រិតដូង	Chanret Daung	specy of cricket
25	កន្ត្រាតតំ	Kanlat Thom	specy of cockroach
26	កន្ត្រាតស្លឹក	Kanlat Sloeuk	specy of cockroach
27	ត្នូល	Tmol	specy of bee
28	កង្កង់	Kang Laong	specy of bee
29	មមាច	Momeach	specy of night fly
30	សូច	Soch	specy of horsefly
31	មូស	Mous	mosquito
32	មេភ្លៀង	Mè Phleang	specy of rain fly
33	កណ្តៀ	KanDear	Termites
34	អណ្តើកមាស	Andèk Meas	specy of ladybird
35	ខូត	Khnout	specy of billbug
36	ល្បាយ	Lbaum	specy of horsefly
37	កំរោម	Kam Phem	specy of cockroach
38	ពឹងពាង	Ping Pearng	spider
39	ទឹកកែតា	Toeukè	flea
40	អំពិលអំពែក	Ampil Ampék	firefly

N°	Insect species		
	Local name	Local name	English name
41	មេអំបោស្លាបលឿង	Mé Amboa Slab Learnng	specy of butterfly
42	មេអំបោស្លាបស	Mé Amboa Slab Sor	specy of butterfly
43	មេអំបោលឿងខ្លីមានអុឌខ្មៅ	Mé Amboa Learnng kchey Auch Kmao	specy of butterfly
44	មេអំបោប្រផេះ	Mé Amboa PraPhes	specy of butterfly
45	មេអំបោខ្មៅមានសក់កន្ទុយ	Mé Amboa Khmao Kantouy Sor	specy of butterfly
46	មេអំបោខ្មៅ	Mé Amboa Khmao	specy of butterfly
47	មេអំបោស្លាបអុឌខ្មៅ	Mé Amboa Slab Auch khmao	specy of butterfly
48	មេអំបោខ្លីស្លាបប្រផេះ	Mé Amboa sor slab ParPhès	specy of butterfly
49	មេអំបោលឿងសមុទ្រ	Mé Amboa Learnng Auch	specy of butterfly
50	មេអំបោប្រផេះអុឌខ្មៅ	Mé Amboa PraPhes Auch Khmao	specy of butterfly
51	មេអំបោលឿងចាស់	Mé Amboa Learnng Chas	specy of butterfly
52	មេអំបោស្រលេត	Mé Amboa Sor	specy of butterfly
53	មេអំបោស្លាបខ្មៅក្រហមកណ្តាល	Mé Amboa Slab Khmao Kraham	specy of butterfly
54	មេអំបោស្លាបក្រហមស	Mé Amboa Slab Kraham	specy of butterfly
55	មេអំបោលឿងអុឌខ្មៅ	Mé Amboa Learnng Kkmao	specy of butterfly
56	មេអំបោស្លាបលឿងអុឌ	Mé Amboa Slab Learnng	specy of butterfly
57	មេអំបោស្លាបខ្មៅចុងស្លាបប្រផេះ	Mé Amboa Slab Kmao Chong PraPhes	specy of butterfly
58	កង្កុយក្រហម	KanTom Rouy Kramham	specy of dragonfly
59	កង្កុយលឿង	KanTom Learnng Rouy	specy of dragonfly
60	កង្កុយប្រផេះ	KanTom Praphes Rouy	specy of dragonfly
61	កង្កុយប៉ារ៉ា	KanTom Rouy Para	specy of dragonfly
62	កង្កុយខ្មៅស្លាបលឿងអុឌ	KanTom Rouy Slab Learnng	specy of dragonfly
63	កង្កុយស្រូវ	KanTom Rouy Sroev	specy of dragonfly
64	កង្កុយយក្ស	KanTom Rouy Yak	specy of dragonfly
65	កង្កុយស្នាមសពកំកណ្តាល	KanTom Rouy Sor Pak Kandal	specy of dragonfly
66	កង្កុយបុកស្រូវ	Kandob Bok Sroev	specy of grasshopper
67	កង្កុយសេះ	Kandob Sès	specy of grasshopper
68	កង្កុយយក្ស	Kandob Yak	specy of grasshopper

11.3.10 Fruit trees encountered in the study area.



Artocarpus heterophyllus



Zizyphus mauritiana



Carica papaya



Areca catechu



Alocasia



Pandanus capusii

11.3.11 Flowers encountered in the study area



Bougainvillea



Bougainvillea



Canna



Phatt samley



Ochna integerrima



Hibiscus



Nelumbo nucifera



Nelumbo nucifera



Nymphaea nouchali



Ipomoea aquatica

11.3.12 Trees encountered in the study area



Rise *Oryza sativa*



Psidium guajava



Banana *Musa* spp



Rose apple – *Syzygium jambos*



Coconut tree-*Cocos nucifera*



Phynanthus acidus

11.4 The results of noise monitoring

Noise level station 1

27/10/2003 N1

Time	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Max	52.4	59.9	54	52.9	54	55.4	47.6	53.8	50.4	49.6	46.9	47.9	55.9
Min	42.9	42.4	43.3	38.3	35.2	35.3	36.3	37.2	38.8	35.4	36.7	34	40.8
Mean	47.65	51.15	48.65	45.6	44.6	45.35	41.95	45.5	44.6	42.5	41.8	40.95	48.35
Standard	60	60	60	60	60	60	60	60	60	60	60	60	60

Time	19:00	20:00	21:00	22:00
Max	54.7	53.8	54.1	52
Min	41.5	42.1	40.9	41.8
Mean	48.1	47.95	47.5	46.9
Standard	50	50	50	50

Time	23:00	0:00	1:00	2:00	3:00	4:00	5:00
Max	52.5	50.6	50.3	51.2	50.2	51.6	52.7
Min	41.4	40.4	39	38.6	38.7	39	40.1
Mean	46.95	45.5	44.65	44.9	44.45	45.3	46.4
Standard	45	45	45	45	45	45	45

Noise level station 2

28/10/2003 លើទំនប់ N2

Time	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Max	70.5	78.8	70.9	72.5	77.9	72.4	72.9	85.4	78.8	79	86.4	76.3	47.7
Min	44.3	43.8	42.5	42.9	43.3	45.2	44	28	37.5	39.3	40.4	41.1	40.1
Mean	57.4	61.3	56.7	57.7	60.6	58.8	58.45	56.7	58.15	59.15	63.4	58.7	43.9
Standard	60	60	60	60	60	60	60	60	60	60	60	60	60

Time	19:00	20:00	21:00	22:00
Max	52.6	51.9	50.2	55.6
Min	41.3	41.6	41.2	39.4
Mean	46.95	46.75	45.7	47.5
Standard	50	50	50	50

Time	23:00	0:00	1:00	2:00	3:00	4:00	5:00
Max	52.6	51.8	50.3	49.2	47.6	50.2	53.4
Min	38.7	39.5	38.1	39.4	39.4	40	42.1
Mean	45.65	45.65	44.2	44.3	43.5	45.1	47.75
Standard	45	45	45	45	45	45	45

Noise level station 3

27/10/2003 N3

Time	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Max	76.4	73.6	74.1	72	73.6	73.8	72.1	75	72.3	64.4	63	55.5	50.3
Min	42.9	42.7	40.5	35.5	38.7	38.4	37	36.5	36	37	40.8	41.2	43.7
Mean	59.65	58.15	57.3	53.75	56.15	56.1	54.55	55.75	54.15	50.7	51.9	48.35	47
Standard	60	60	60	60	60	60	60	60	60	60	60	60	60

Time	19:00	20:00	21:00	22:00
Max	52.5	51.6	51.1	51.4
Min	45.3	44.7	43.7	42.6
Mean	48.9	48.15	47.4	47
Standard	50	50	50	50

Time	23:00	0:00	1:00	2:00	3:00	4:00	5:00
Max	50.7	50	50.5	51.2	50.2	50.5	55.5
Min	40.1	39.7	39.8	40.6	39.6	40	39.8
Mean	45.4	44.85	45.15	45.9	44.9	45.25	47.65
Standard	45	45	45	45	45	45	45

Noise level station 4

3/10/2003 N4

Time	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Max	70.1	79.8	62.2	68.4	66.3	69.8	78.8	79.2	57.6	56.7	64.3	65.6	74.6
Min	42.2	42.5	42.6	44	43.4	45	42.8	40.5	42	40.8	40.8	45.1	43.4
Mean	56.15	61.15	52.4	56.2	54.85	57.4	60.8	59.85	49.8	48.75	52.55	55.35	59
Standard	60	60	60	60	60	60	60	60	60	60	60	60	60

Time	19:00	20:00	21:00	22:00
Max	55.8	51.9	54.2	53.4
Min	42.1	41.8	41.6	40.6
Mean	48.95	46.85	47.9	47
Standard	50	50	50	50

Time	23:00	0:00	1:00	2:00	3:00	4:00	5:00
Max	49.4	50.1	48.6	50	48.4	50.8	54.3
Min	38.6	38.1	39.1	41.6	39.1	39.8	41.2
Mean	44	44.1	43.85	45.8	43.75	45.3	47.75
Standard	45	45	45	45	45	45	45

Noise level station 5

27/10/200 N5

Time	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Max	67.1	63.8	63.1	77.9	72.2	73.4	74	80.4	72.3	67.4	65.4	74.7	55.8
Min	43.1	43.6	40.5	35.9	32.3	32.8	34.4	34	34.6	35.5	36.7	38.7	38.8
Mean	55.1	53.7	51.8	56.9	52.25	53.1	54.2	57.2	53.45	51.45	51.05	56.7	47.3
Standard	60	60	60	60	60	60	60	60	60	60	60	60	60

Time	19:00	20:00	21:00	22:00
Max	55.6	54.8	53.9	53.7
Min	39.1	40.2	41.5	42.3
Mean	47.35	47.5	47.7	48
Standard	50	50	50	50

Time	23:00	0:00	1:00	2:00	3:00	4:00	5:00
Max	52.6	51.5	49.8	50.6	50.9	50.4	60.7
Min	41.4	40.4	38.7	39.7	39.6	38.9	40.1
Mean	47	45.95	44.25	45.15	45.25	44.65	50.4
Standard	45	45	45	45	45	45	45

Noise level station 6

29/10/2003 N6

Time	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Max	80.9	68.4	70.1	71	72.3	67.8	80.9	60.7	75.3	75.2	73.1	71.6	67.2
Min	41.2	41.5	59.8	58.3	58.6	58.1	55	54.8	55.8	55.7	58.2	41.6	46.3
Mean	61.05	54.95	64.95	64.65	65.45	62.95	67.95	57.75	65.55	65.45	65.65	56.6	56.75
Standard	60	60	60	60	60	60	60	60	60	60	60	60	60

Time	19:00	20:00	21:00	22:00
Max	50.6	52.4	55.7	53.1
Min	44.5	40.5	41.4	39.8
Mean	47.55	46.45	48.55	46.45
Standard	50	50	50	50

Time	23:00	0:00	1:00	2:00	3:00	4:00	5:00
Max	49.6	49.3	48.2	51.6	50.9	50.3	56.4
Min	39.1	39.4	40	40.6	38.7	39.9	41.6
Mean	44.35	44.35	44.1	46.1	44.8	45.1	49
Standard	45	45	45	45	45	45	45

Noise level station 7

28/10/2003 N7

Time	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Max	69.7	80.8	76	67.5	77	66.5	70.9	71	80.8	65.4	88	73.1	61.1
Min	41.6	42	48	46.9	36.4	47.6	47	47.9	43.7	46.1	43.3	40.2	40.6
Mean	55.65	61.4	62	57.2	56.7	57.05	58.95	59.45	62.25	55.75	65.65	56.65	50.85
Standard	60	60	60	60	60	60	60	60	60	60	60	60	60

Time	18:00	19:00	20:00	21:00	22:00
Max	61.1	58.9	49.3	52.8	53.4
Min	40.6	42.5	43.9	43.6	41.6
Mean	50.85	50.7	46.6	48.2	47.5
Standard	50	50	50	50	50

Time	23:00	0:00	1:00	2:00	3:00	4:00	5:00
Max	52.7	47.7	49.6	50.2	50.4	52.7	54.1
Min	40.6	38.1	38.4	39.3	40	42.7	46.3
Mean	46.65	42.9	44	44.75	45.2	47.7	50.2
Standard	45	45	45	45	45	45	45

11.5 The methodology for noise monitoring

11.5.1 Conditions of noise level meter

- Installation of the noise level meter to a height of 1.2-1.5m on a tripod-stand
- Frequency weighting: A-weighted
- Dynamic characteristic: FAST

11.5.2 Measurement

By using a noise level meter, the dB (A) sound pressure level shall be measured for ten (10) minutes per hour.

With an ordinary sound level meter the dB (A) sound pressure level shall be measured for ten (10) minutes per measurement every one (1) hour

Measurements shall be done over a 24 hour period for each station. Each measurement shall consist of a maximum level, minimum level and mean level.

11.6 The methodology for air pollution monitoring

11.6.1 Method of Analysis for Nitrogen Dioxide (NO₂)

a. Apparatus

Absorber

The sample is absorbed in an all-glass bubbler. Carefully clean the apparatus with detergent and then rinse it thoroughly with distilled water.

Air Metering Device

A rotameter capable of accurately measuring a flow of 0.4 liters/ min or less is suitable.

Sampling probe

A tube 6 to 10 mm in diameter provided with a downward- facing intake is suitable. A small loosely fitting plug of glass wool may be inserted in the probe, when desirable, to exclude water droplets and particulate matter.

Spectrophotometer

A laboratory instrument suitable for measuring the pink color at 545 nm with cuvettes.

a.1 Reagents

Purity of Chemicals, Water

All chemicals should be analytical reagent grade. All solutions are made in nitrite-free water.

Absorbing Reagent

Dissolve 1g of triethanolamine [(CH₂CH₂OH)₃N] and 0.6ml of formalin in 90 ml of water, and up to 100 ml with DW. This solution should be made daily.

Sulfanilamide, Stock Solution (1%)

Dissolve 1g of anhydrous sulfanilamide in 100ml of 20% hydrochloric acid (HCl).3.4
N-(1-Naphthyl) –Ethylcnediamine Stock Solution (0.1%)

Dissolve 0.1g of N-(1-Naphthyl)–Ethylenediamine Dihydrochloride in100 ml of water. The solution will be stable for several months if kept well-stoppered in a brown bottle in the refrigerator3.5. Standard Sodium Nitrite Solution, Stock Solution (154.0 mg/ liter)

Before dissolving, dry up sodium nitrite (NaNO_2) at 105 -110 °C degree for 3 hrs. Dissolve 15.4 mg of dried NaNO_2 in 100 ml of water. Dilute the solution to 200 times with absorbing reagent just before use. (1ml = 0,5 μl NO_2)

a.2 Sampling

Sampler

Assemble a sampling probe, a glass retractor, two fritted absorbers (one is for sampling, one is for trapping), and a pump, in that order. Use ground-glass connections upstream from the absorber. The sampling Rota meter may be used upstream from the bubbler provided occasional checks are made to show that no nitrogen dioxide is lost. The rotameter must be kept free from spray or dust.

Reagent

Pipet 20.0 ml of absorbing reagent into a dry sampling bottle. Draw an air sample through it at the rate of 0.4 liter/ min or less. More than 50 liters of air sample should be acceded. Note the total air volume sampled. Measure and record the sample air temp.

a.3 Measurement

Sample

All amounts of sample reagent dilute up to 25.0 ml with absorbing reagent. For colorimetric assay, 10.0 ml of 25.0 ml will be used.

Standard solution

Add graduated amounts of the NaNO_2 solution up to 1 ml (measured accurately in a graduated pipet or small buret) to a series of 200 ml volumetric flasks, and dilute to the marks with absorbing reagent. This solution contains 0.5 μl of NO_2 in 1 ml at standard condition (0 °C, 760 torr).

Colorimetric Assay

- 1) Add 1.0 ml of sulfanilamide stock solution to 10.0 ml of sample or standard solution, mix well and incubate at room temp (RT) for 15min.
- 2) Add 1.0 ml of 0.1 % N -(1-naphthyl) – ethylenediaminc stock solution to the mixture, mix wall and incubate at RT for 30min. This solution may appear pink color.
- 3) Measure absorbance at 545nm, and then plot the absorbance of the standard colors against the μ -liters of nitrogen dioxide per ml of absorbing reagent. From the standard straight line, you will be able to calculate the NO_2 content of the sample.

Formula for calculation

$$\text{NO}_2 \text{ (ppm)} = a \times 25 / \{V \times (273 / 273 + t) \}$$

a : calculated NO_2 content of the sample
V: sampled air volume (liter)
t : average temp at the sampling (°C)

b. Method of Analysis for Sulfur Dioxide (SO_2)

b.1 Apparatus

Absorber

Same as the method of NO₂ analysis.

Air Metering Device

Same as the method of NO₂ analysis.

Sampling probe

Same as the method of NO₂ analysis.

Spectrophotometer

A laboratory instrument suitable for measuring the pink color at 560 nm with cuvettes.

b.2 Reagents

Purity of chemicals

All chemicals should be analytical reagent grade.

Absorbing Reagent

Dissolve 2g of triethanolamine [(CH₂CH₂OH)₃N] and 0.005g of sodium azide (NaN₃) in 100 ml of water. This solution should be made daily.

Pararosaniline and Formalin Stock Solution

Dissolve 0.2g of the pararosaniline-hydrochloride in 100 ml of water.

Add 20 ml of hydrochloric acid (HCl) to 20 ml of solution A), and up to 100ml with distilled water.

Add 100 ml of 0.2 % formalin to 100 ml of solution B).

Standard Sodium Sulfite Solution

1) Tentative Standard Sulfite Solution

Dissolve 0.5 g of sodium sulfite (NaHSO₃) in 100 ml of high-quality distilled water. The actual concentration in the standard solution is determined by adding HCl and excess iodine, and back-titrating with sodium thiosulfate (Na₂S₂O₃) immediately. The sulfate solution is unstable.

2) Back-titration

Back-titration is performed in the following manner: into each of two 100-ml flask, pipet accurately 15 ml of 0.1 N iodine (I₂) and 2.5 ml of 20 % HCl. To flask A (blank) add 10 ml of DW, and to flask B (sample) pipet 10 ml of the tentative standard sulfite solution. By means of a buret containing standard 0.1 N thiosulfate, titrate each flask in turn to a pale yellow color. Then add 5 ml of starch solution and continue the titration to the disappearance of the blue color. Note the number of ml for blank (a ml) and for sample (b ml).

3) Dilute Sulfite Solution

89.3 / (0-6) ml of standard sulfite solution up to 100 ml with absorbing reagent. This solution contains 100 µl of SO₂ per ml. For use as a standard solution, dilute x100 with absorbing reagent. (1ml = 1 µl SO₂).

b.3 Sampling

Sampler

Same as the method of NO₂ sampling

Reagent

Pipet 20.0 ml of absorbing reagent into a dry sampling bottle. Draw an air sample through it at the rate of 1 to 5 liter/min. Note the total air volume sampled. Measure and record the air temp.

b.4 Measurement

Sample

All amounts of sample reagent dilute up to 25.0 ml with absorbing reagent. For colorimetric assay, 10.0 ml of 25.0 ml will be used.

Standard solution

Add graduated amounts of the standard solution up to 1 ml (measured accurately in a graduated pipet or small buret) to a series of 100 ml volumetric flasks, and dilute to the marks with absorbing reagent. This solution contains 1 µl of SO₂ in 1 ml at standard condition (0 °C, 760 torr).

Colorimetric Assay

Add 2 ml of pararosaniline and formalin stock solution to 100 ml of sample, standard solution or blank, mix well and incubate at RT for 35 min.

Measure absorbance at 560nm, plot the absorbances of the standard colors against the µ-liters of sulfur dioxide per ml of absorbing reagent. From the standard straight line, you will be able to calculate SO₂ content of the sample.

Formula for calculation

$$\text{SO}_2 \text{ (ppm)} = a \times 25 / \{V \times (273 / 273 + t)\}$$

a : calculated NO₂ content of the sample
V : sampled air volume (liter)
t : average temp at the sampling (°C)

c. Analysis method for Lead and Total Solid Particulate

The volume air sampler can collect air borne particulate at the suction velocity of 25 L / min. First, the quartz filter with 6 cm diameter is dried in the desiccators (or drying oven with temperature of 110 °C) until the constant weight is attained, followed by being weighed with the accurate balance (weight A). After that, the filter is attached to the air sample, and the sampler is operated at the sampling point for the appropriate time.

The base for deciding the sampling time is by operating the sampler for 6 hours with good accuracy, using a balance with an accuracy of 0.1 mg. After collection, the filter should be dried in the desiccators (or drying oven with temperature of 110 °C) again until the constant weight is attained, followed by being weighed with the accurate balance (weight B).

The amount of particulate = B – A (mg)

c.1 Pretreatment for determination

Pretreatment is done as follows:

(1) Take sample into the 200 ml beaker made of Pyrex glass.

Deposition: The appropriate volume of the collected sample, should be evaporated to dryness before being subjected to analysis

Water sample: The appropriate volume of the collected sample, should be evaporated to dryness before being subjected to analysis

The blank sample should be also prepared and treated in the same manner as an actual sample.

(2) Add 10ml of nitric acid and 20 ml of hydrochloric acid to the beaker followed by capping with watch glass, and heat for decomposition until the volume of solution becomes to the half of original.

(3) Cool down to the room temperature and add 20 ml of nitric acid.

(4) Heat for decomposition until the volume becomes about 5 ml. If the color of solution is dark, add an additional 10 ml of nitric acid and heat again for complete decomposition.

(5) Cool down to room temperature, and add 50 ml of deionizer water (or distilled water).

(6) Filter the solution using appropriate filter paper (for example, ADVANTEC 5B), and keep the filtrate.

(7) Wash the residue 2 or 3 times using diluted hydrochloric acid (1+10), and combine the wash solution with the previous filtrate in 200 ml beaker.

(8) Heat and concentrate the solution to 2 to 3 ml. If the color of solution after concentration is brown, add 10 ml of nitric acid and 5 ml of hydrochloric acid, and heat for decomposition until just before dry.

(9) Cool down to room temperature, and add 10 ml of hydrochloric acid (1+10)

(10) Boil the solution for dissolution of residue

(11) Add distilled water to make the volume up to about 50 ml, and transfer the solution to the 200 ml separately funnel.

At this time, we have to prepare the sample simultaneously to make the calculation curve (Pb content 0, 5, 15, 25, 50, μg).

(12) Add 5ml of 30 w/ v % ammonium hydrogen citrate and 5 to 6 drops of 0.1 % met cresol purple solution.

(13) Adjust the pH from 9 to 9.5 using 25 % ammonium solution (the color changes to violet).

(14) Add 10 ml of 5 w/ v % sodium diethyldithiocarbamate solution.

(15) Add distilled water to increase the volume to about 150 ml.

(16) Shake slightly and let stand for 15minutes.

(17) Add 10 ml of butyl acetate, and shake vigorously (using shaker).

(18) Let stand until the organic phase separates from the aquatic phase.

(19) Discard the aquatic phase (into the waste solution tank), and keep the organic phase in the test tube. At this time, the use of cotton wool is effective to remove the water from the organic phase.

(20) The organic phase is subjected to the Atomic Absorption Spectroscopy (AAS).

d. Method for CO (Carbone monoxyde) analysis

Analysis by colorimetric tubes for 20 hours per day

Calculation of CO concentration was done by the following formula;

$$\text{Concentration of CO (mg/m}^3\text{)} = X \frac{M}{22,4}$$

where

X : concentration of CO measured by tube (average of concentration)

M : molecular weight of CO