Fisheries facility (1) ~ (5)
(1) Topographical Survey and bathymetric Survey (Grenville fisheries facilities)

# CRC OVERSEAS CO-OPERATION INC.

## PROPOSED FISH MARKET, GRENVILLE, GRENADA

### **TOPOGRAPHIC SURVEY FOR FISHERIES FACILITIES IN GRENVILLE**

#### WORKING METHOD

The land topographic survey works were sub-contracted to a local company. The company used a Sokkisha SDM5 optical theodolite with Electonic Distance Measuring (EDM) attachment.

Horizontal control was based on site control stations with assumed co-ordinates.

The data submitted by the local company was based on an assumed datum, and processed at LYP's Port of Spain Head Office. The X, Y, Z co-ordinates of the survey points were plotted and AutoCAD software with Eagle Point digital terrain modelling software used to generate the contours.

WORKING SCHEDULE

Field Work :	Start - July 3, 2001 End - July 3, 2001
Data Processing:	Start – July 30, 2001 End – August 15, 2001
Final Report:	Submitted – August 28, 2001

# EQUIPMENT LIST

The following equipment was used:

Sokkisha SDM5 optical theodolite with Electronic Distance Measuring (EDM) attachment.

Accessories (survey) - tapes, pegs, spray paint, cutlasses, hammer, etc.

## **STAFFING**

One surveyor and two labourers (chainmen) were involved in the topographic survey.

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### CRC OVERSEAS CO-OPERATION INC.

### PROPOSED FISH MARKET, GRENVILLE, GRENADA

#### BATHYMETRIC SURVEY

#### WORKING METHOD

Lee Young & Partners used a Continuous Recording Raytheon DE719C Fathometer for the bathymetric survey. The fathometer was able to give a permanent echo sounder recording of the seabed profile along the path of the survey vessel. Horizontal control for the bathymetric survey was provided by Lee Young & Partners' Trimble GPS Total Station 5700. Vertical control was provided through periodic readings at the site tide gauge.

At Lee Young & Partners' Port of Spain Head Office, the fathometer tape recordings were sampled and the spot heights at selected points plotted along the vessel path, adjusted for tide. This data was then entered onto a spreadsheet along with its corresponding X and Y co-ordinates acquired from the GPS total station. The X, Y and Z co-ordinates were then plotted in AutoCAD and this data processed, using the AutoCAD and Eagle Point Software.

#### WORKING SCHEDULE

Field Work :	Start - July 11, 2001 End - July 11, 2001
Data Processing:	Start – July 30, 2001 End – August 15, 2001
Final Report:	Submitted – August 28, 2001

# EQUIPMENT LIST

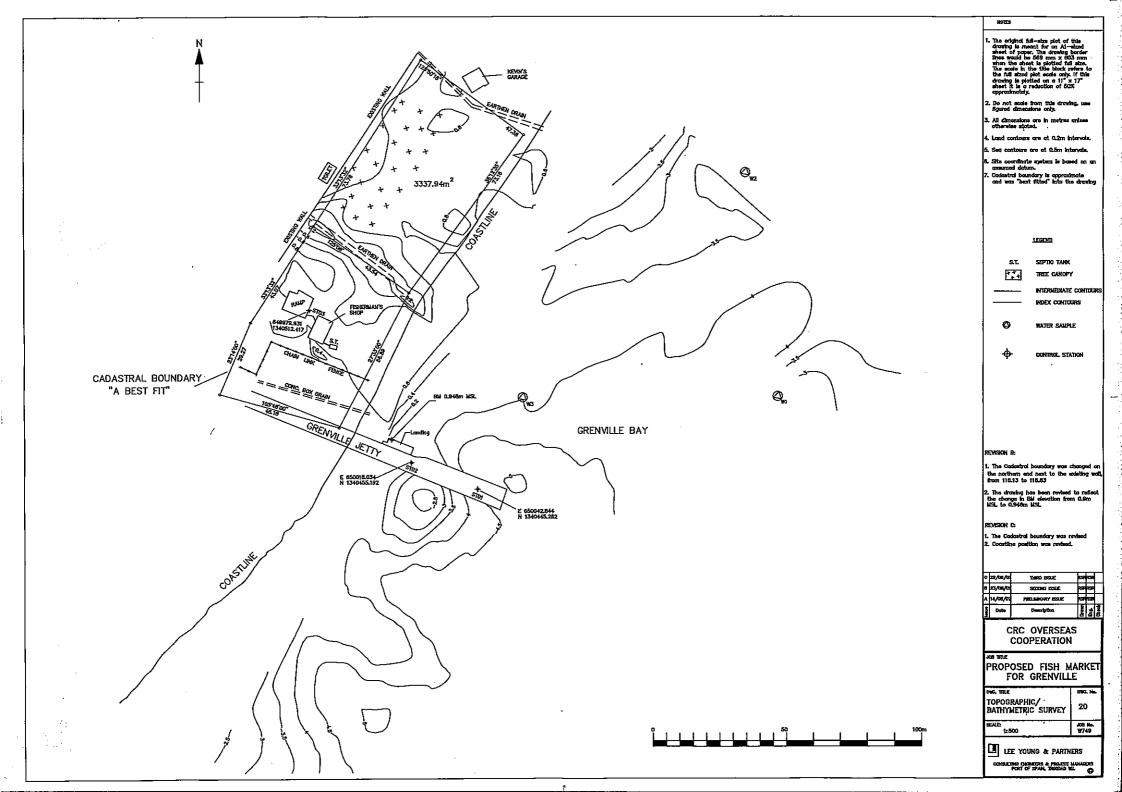
The following equipment was used:

- Raytheon DE 719C Fathometer (Echo Sounder)
  - Trimble GPS Total Station 5700.
- Tapes for tide measurements.

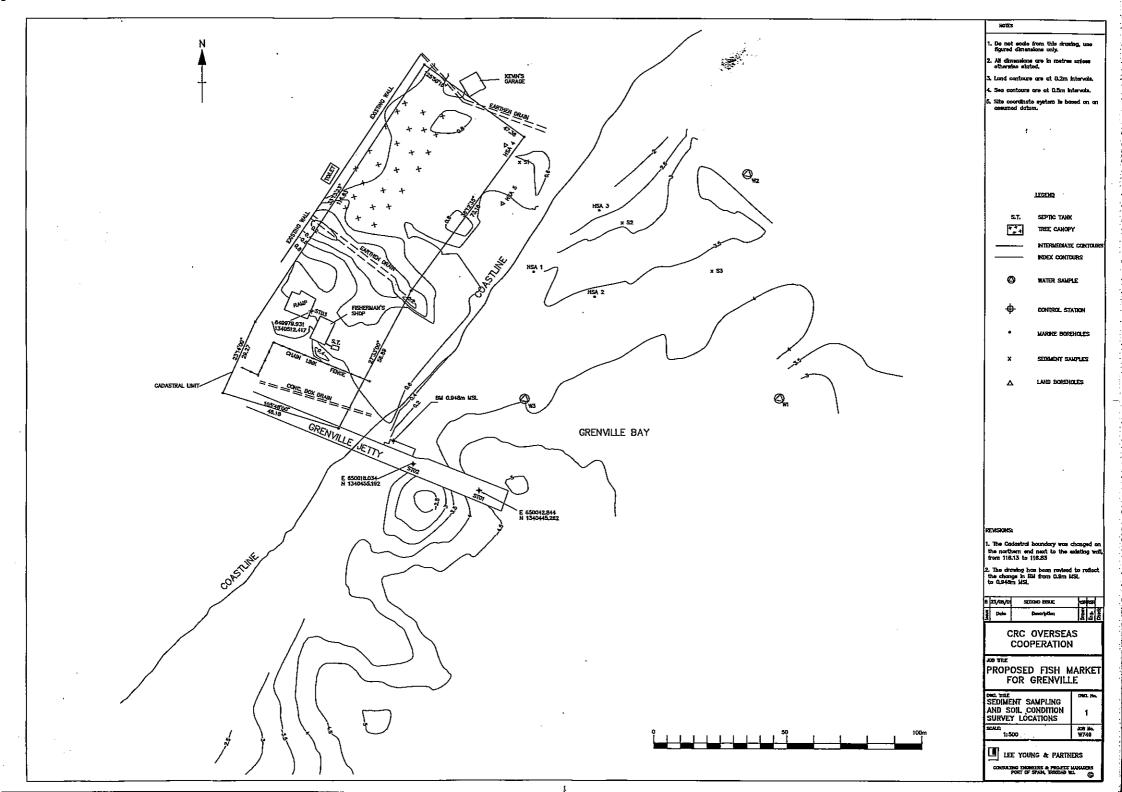
# **STAFFING**

-	1 Surveyor for GPS Equipment
-	1 Surveyor for Echo Sounder
-	1 Technician for tide measurements

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(2) Soil condition survey(Grenville fisheries facility)



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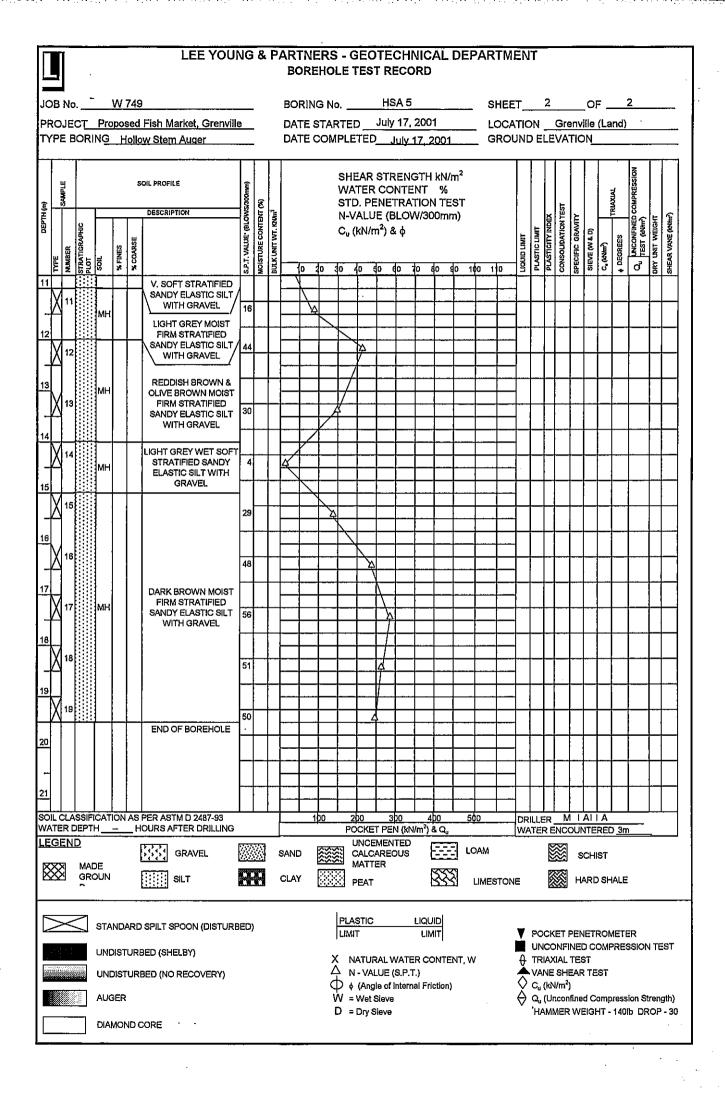
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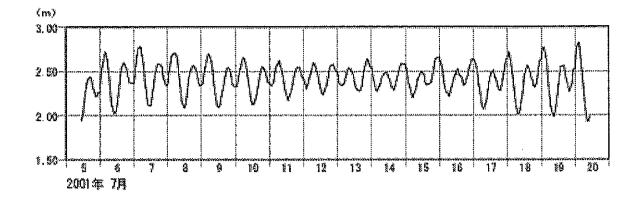
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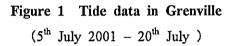
(3) Tide Analysis

# (Grenville fisheries facility)

# Tide Analysis

(1) Result of Survey





# (2) Summary of Tide

Summary of Tide, Chart Datum Level (C.D.L) and Mean Sea Level (M.S.L) are as follow.

Observation basis line (m)	um Level (m)		
2.780	0.880	<u>M. H. W. L (Zo+Hm+Hs+H'+H</u> o) (M. H. H. W)	
2_650	0 750		
2_620	0_720	M. H. H. W. L (Zo+Hm+Hs)	
2_550	0_650	M. H. W. L (Zo+Hm)	
2_480	0_580	<u>M. H. L. W. L (Zo+Hm-Hs)</u>	
2_340	0_440	M. S. L (Zo)	
2_200	0_300	M. L. L. W. L (Zo-Hm+Hs)	
2.130	0.230	M. L. W. L (Zo-Hm)	
2 060	0.160	M. L. H. W. L (Zo-Hm-Hs)	
1_990	0_090	(M. L. L. W)	
1_900	0.000	C. D. L (Zo-Hm+Hs+H'+Ho)	
0_000	-1_970	Observation basis line (m)	

Figure 2 Summary of tide in Grenville

(4) Wave Analysis

(Grenville fisheries facility)

Characters of offshore Wave			Wave direction and wave height around planned jetty tip		
Offshore Wave Direction	Wave Height (m)	Period (s)	Wave Direction(degree)	Wave Height(m)	
NE	4.9	15.3	128-131	0.33-0.38	
ENE	4.1	13.5	127-131	0.33-0.37	
E	4.2	8,0	127-131	0.30-0.34	
ESE	4.2	8.0	128-134	0.31-0.35	

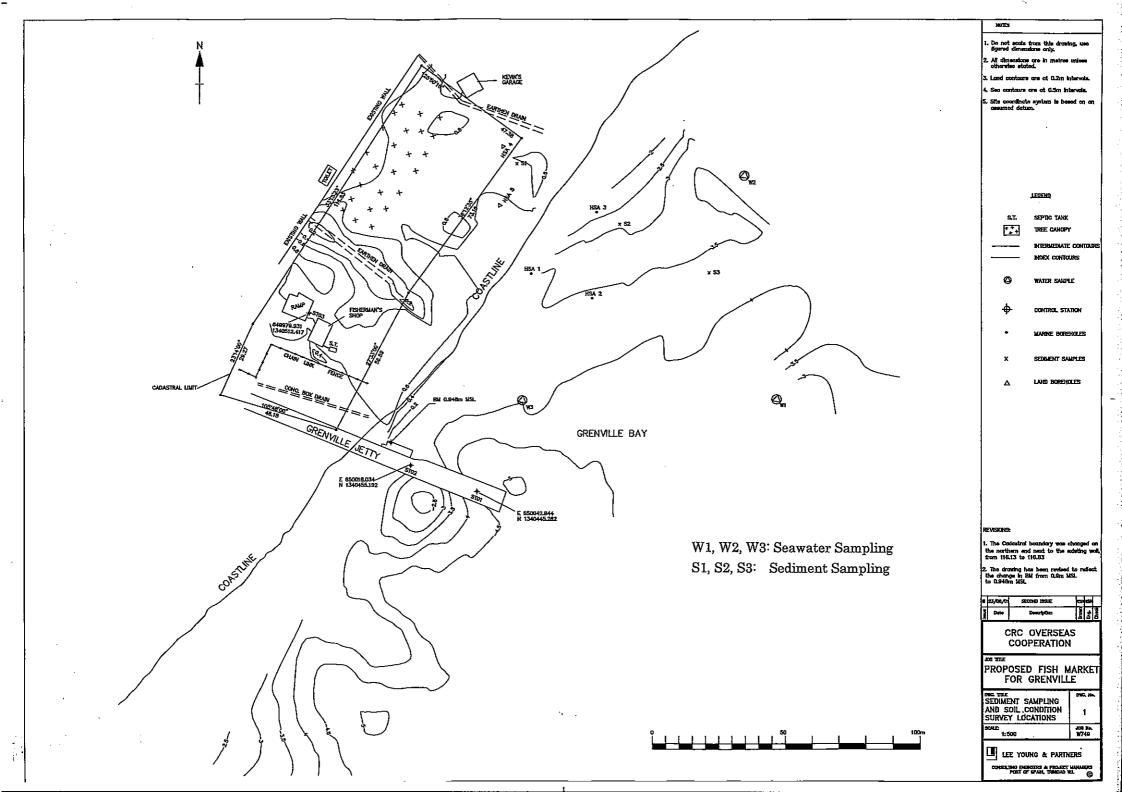
#### Table 1 Wave direction and wave height around planed jetty tip

Note: Characters of offshore wave are fixed from NE, ENE, E, and ESE. Typical wave directi on and wave height are calculated by distribution of average wave direction and wave height in wave transforming calculation.

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# (5) Seawater Analysis, Sediment Sampling & Analysis (Grenville fisheries facility)

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# **LEE YOUNG & PARTNERS**

# CRC OVERSEAS CO-OPERATION INC. PROPOSED FISH MARKET, GRENVILLE, GRENADA

# SEA WATER ANALYSIS

#### EQUIPMENT LIST

The YSI 63 pH and Temperature Meter (Data logs 60 data sets and automatically compensates pH measurements for temperature) was used to measure pH and temperature.

### **RESULTS**

Location	Time	pH	Temperature	BOD <sub>5</sub> (mg O <sub>2</sub> /L)	COD (mg O <sub>2</sub> /L)
<b>W</b> 1	July 3, 2:45 p.m.	7.96	30.3	4.08	5998
W2	July 3, 2:50 p.m.	8.04	30.4	2.74	7798
W3	July 3, 2:55 p.m.	8.04	30.1	<dl< td=""><td>5236</td></dl<>	5236
W1	July 4, 9:07 a.m.	7.94	28.0	<dl< td=""><td>7656</td></dl<>	7656
W2	July 4, 9:10 a.m.	7.96	28.0	<dl< td=""><td>6610</td></dl<>	6610
W3	July 4, 9:05 a.m.	7.88	28.2	2.00	3165

The above table presents the results from the tests performed.

The bathymetric survey report includes a map which identifies the location of the samples corresponding to their identification number.

The analytical data sheet and quality control data sheets as well as photographs illustrating the general area where sampling wads done are attached.

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# **LEE YOUNG & PARTNERS**

Client Name: Lee Young and Partners. Sample Receive Date: 4/07/01 Sample Matrix: Water Project number: 033-005

# ANALYTICAL DATA SHEET

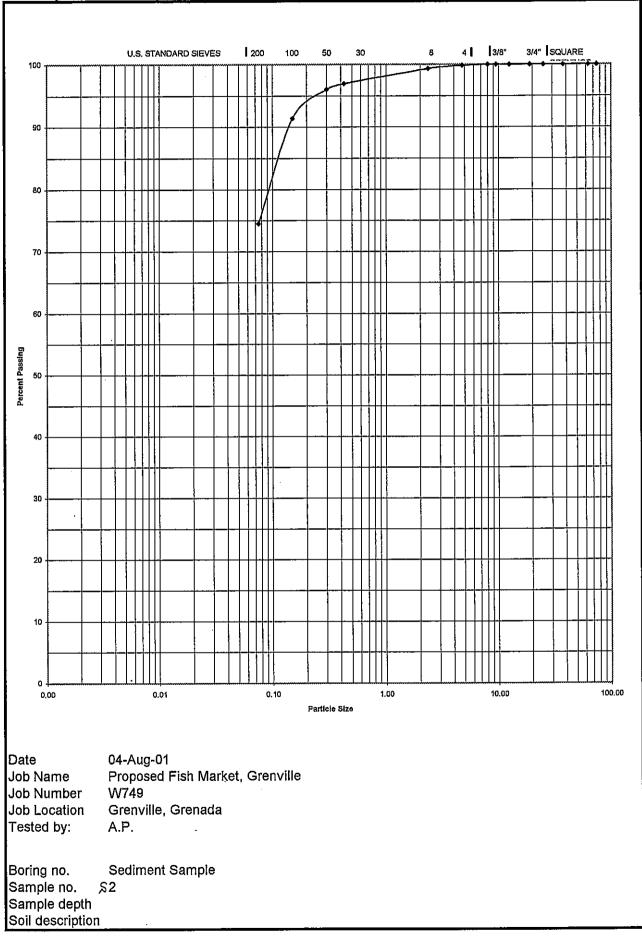
Table 1. Results of analyses performed on samples

Sample Date	Sample Description	Sample Reference number	Biochemical Oxygen Demand (mg O <sub>2</sub> /L)	Chemical Oxygen Demand (mg O <sub>2</sub> /L)
3/07/01	W1	033-005-1	4.08	5998
3/07/01	W2	033-005-2	2.74	7798
3/07/01	W3	033-005-3	<dl< td=""><td>5236</td></dl<>	5236
4/07/01	W1	033-005-4	<dl< td=""><td>7656</td></dl<>	7656
4/07/01	W2	033-005-5	<dl< td=""><td>6610</td></dl<>	6610
4/07/01	W3	033-006-6	2.00	3165

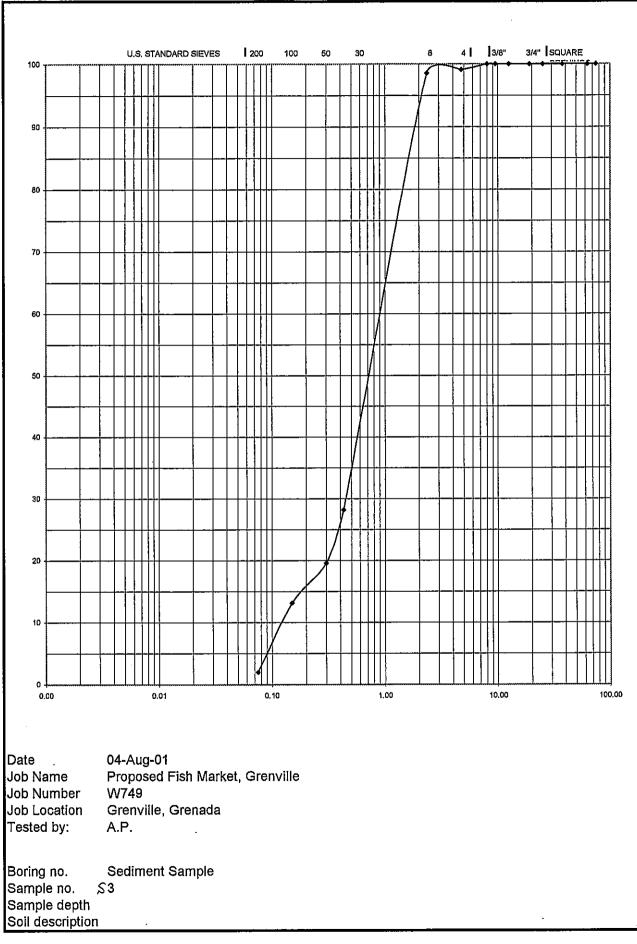
3/4" SQUARE U.S. STANDARD SIEVES 200 100 50 30 4 3/8" 8 100 90 80 70 60 Percent Passing 50 40 30 20 10 0 100,00 10.00 0.00 1.00 0.01 0.10 Particle Size Date 03-Aug-01 Job Name Proposed Fish Market, Grenville Job Number W749 Job Location Grenville, Grenada Tested by: A.P. . Sediment Sample Boring no. Sample no. <u>،</u>1 Sample depth

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Soil description



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# SPECIFIC GRAVITY TESTS ASTM D854M

PROJECT	FISHERIES	JOB No.	• • • • • • • • • • • • • • • • • • •		
LOCATION OF PR	OJECT GRENVILLE		<u> </u>		
TEST HOLE No. 51		SAMPLE	DEPTH		
DESCRIPTION OF	SAMPLE				
			·····		
<u></u>					
REMARKS	······	<u></u>			
3	·				
FLASK No.		<u> </u>	<u> </u>		
THERMOMETER		101.14	222.32		
COHESIONLESS	WT.FLASK + DRY SOIL	196.17	197.32		
SOILS ONLY	WT.FLASK WT. DRY SOIL, W <sub>S</sub>	25	25	· ·	
UET 100 05	AIR REMOVAL	BOILIN			
		681.71			
	NATER + SOIL, Wows	30	20		
	WATER, Wbw	666-85			
WI, FLASAT	EVAP. DISH NO.				
COHESIVE					
SOILS ONLY	· · · · · · · · · · · · · · · · · · ·				
	WT. DRY SOIL, Ws				
SPECIFIC G	RAVITY, G <sub>5</sub>	2.45	2.61		
	ECIFIC GRAVITY		2,53		
FORMULA:	''s ' ''p		OF SOILS		
WHEF	W <sub>s</sub> = WT.OF W <sub>bw</sub> = WT.OF `(FROM W <sub>bws</sub> = WT.OF	DRY SOIL FLASK + WA CALIBRATIO F FLASK + V		°c.	
COMPUTED	DATE DATE DATE DATE		IL MECHANICS I LEE YOUNG & PAR CONSULTING ENGIN PORT OF SP/ TRINIDAD	TNERS	

# SPECIFIC GRAVITY TESTS ASTM D854M

PROJECT 7	SHERTES J	OB No		
LOCATION OF PROV	JECT GREAVILLE			
TEST HOLE No,	<u>\$2</u> \$	AMPLE	DEP18	
DESCRIPTION OF	SAMPLE GREATSH	Gen1 - 7	INES	
······				
·				
REMARKS	······································			
		······································		
		9	10	
FLASK No.	NIA	-1		
THERMOMETER		199.11	213.80	
	WT.FLASK + DRY SOIL	174.11	188.80	
SOILS ONLY	WT. DRY SOIL , Ws	25	25	
		BOELENO	BOSHENG	
METHOD OF A		684.60	66896	
WT.FLASK + W	ATER + SOIL, Wows	30	20	
		668.30		
WT. FLASK + V	EVAP, DISH No.			
COHESIVE	WT.DRY SOIL + TARE			
	WT. TARE			
30/20 0/121	WT. DRY SOIL , Ws			
SPECIFIC GF	RAVITY, G <sub>s</sub>	2.86	0.92	
	CIFIC GRAVITY	1.89		
FORMULA: WHERE	E G <sub>S</sub> = SPECIFIC W <sub>s</sub> = WT. OF	GRAVITY OF		
	(FROM W <sub>bus</sub> = WT. OF	FLASK + WATE	CURVE FOR F R + SOIL AT T WATER AT T	°c.
COMPUTED	DATE DATE DATE		MECHANICS I E YOUNG & PAR DISULTING ENGIN PORT OF SPA TRINIDAD	TNERS

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# SPECIFIC GRAVITY TESTS ASTM D854M

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PROJECT PESH	REES	JOB No				
I OCATION OF PRO	JECT BREASHELLE					
TEST HOLE No. S 3		SAMPLE	DEPTH			
	SAMPLE					
	······					
REMARKS						
•	•					
3						
FLASK No.	······································	5	15			
THERMOMETER			1000 10			
	WT.FLASK + DRY SOIL	223-46	198-69			
SOILS ONLY	WT.FLASK + DRY SOIL	198.46	173.69			
	WT. DRY SOIL , WS	25	25			
METHOD OF A	IR REMOVAL	BOILING	BOILTMO			
the second se	ATER + SOIL Wows	708.93	684.52			
TEMP, OF SUS	PENSION, T°C.	30	20			
	WATER, W <sub>bw</sub>	693.45	671-25			
	EVAP. DISH No.					
COHESIVE	WT.DRY SOIL + TARE					
SOILS ONLY	WT. TARE					
	WT. DRY SOIL, Ws					
SPECIFIC GI		2.61	2.88			
	ECIFIC GRAVITY	7.	.745			
		W <sub>s</sub> Gt				
FORMULA	$G_s = \frac{W_s + W_s}{W_s + W_s}$	/bw -Wbws.				
	-					
WHER		IC GRAVITY OF	SOILS			
	W <sub>s</sub> = WT.O					
	w <sub>bw</sub> = WT. О	F FLASK + WATE	FLASK + WATER AT T°C.			
	(FRO	CALIBRATION	CALIBRATION CURVE FOR FLASK)			
W <sub>hure</sub> = WT. O		FLASK + WATER + SOIL AT TC.				
	G = SPECI	PIC GRAVITY OF	WATER AT T	С.		
	-1					
	<u>-</u>					
		5011	MECHANICS	ABORATORY		
TE STED	TE STED DATE		EE YOUNG & PAR	ARTNERS		
COMPUTED DATE CHECKED DATE		CONSULTING ENGINEERS PORT OF SPAIN TRINIDAD				
CHECKED			TRINIDAD			
		L	1 FUNIDAD	······		

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