

# BORING LOG

P.T. SOILENS

PROJECT : VESSEL TRAFIC SERVICE	DATE : May 13 to May 14, 2007
CLIENT : PACIFIC CONSULTANT INTERNATIONAL	BORING METHOD : Coring, Sampling
LOCATION : HIU KECIL ISLAND, RIAU	SAMPLING METHOD : Thin walled (Shelby) Tube
BORE HOLE NO. : BH-3	SPT : Automatic Hammer
ELEVATION : +28.572	DRILLER : A.Zubaedi
COORDINATES : E=316.671.024 N=131.665.892	LOGGER : Djumhani
DEPTH : 3.10 m	REVIEWED BY : None
WATER TABLE : -	DRAWN BY : Nick <span style="float: right;">Page 1 of 1</span>

SAMPLE	DEPTH (meter)	USCS CHART	GRAPH SYMBOL	ROCK/SOIL DESCRIPTION	DEPTH (meter)	qu (kg/cm <sup>2</sup> )	SPT - N value		RECOVERY (%)
							Depth (m)	BLOWS PER CM	
	0.00		+++++	GRANITE, greenish gray colour, faneitic, mostly quartz, hard, weakly weathered to fresh rock. from 0.00 to 1.00 RQD 80% SCR 80% TCR 100% from 1.00 to 2.00 RQD 90% SCR 100% TCR 100% from 2.00 to 3.00 RQD 90% SCR 100% TCR 100%					40 80
	3.10		+++++	END OF THIS BORING NO CASING.					

BH3.TXT - AvantiGarde-Demi

# BORING LOG

P.T. SOILENS

**PROJECT :** VESSEL TRAFIC SERVICE  
**CLIENT :** PACIFIC CONSULTANT INTERNATIONAL  
**LOCATION :** TAKONG ISLAND, RIAU  
**BORE HOLE NO. :** BH-2  
**ELEVATION :** +15.857  
**COORDINATES :** E=357.406.867 N=122212.616  
**DEPTH :** 20.45 m  
**WATER TABLE :** -8.70 m

**DATE :** May 08 to May 09, 2007  
**BORING METHOD :** Coring, Sampling  
**SAMPLING METHOD :** Thin walled (Shelby) Tube  
**SPT :** Automatic Hammer  
**DRILLER :** A.Zubaedi  
**LOGGER :** Djumhani  
**REVIEWED BY :** -  
**DRAWN BY :** Nick

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SAMPLE	DEPTH (meter)	USCS CHART	GRAPH SYMBOL	ROCK/SOIL DESCRIPTION	DEPTH (meter)	qu (kg/cm2)	SPT - N value		RECOVERY (%)		
							Depth (m)	BLOWS PER CM		N PER FOOT	
										40	80
	8.88	GP		GRAVEL with SAND, yellowish brown colour.							
		GC		CLAYEY GRAVEL, reddish brown colour, loose. Some limonitic gravels, highly to completely weathered with residual soils.			1.15	7/30			
	3.00	CL		GRAVELLY CLAY, reddish gray colour, low plasticity, medium stiff.			2.15	8/30			
	3.45	CL		CLAYEY SILT, light gray colour, low plasticity, medium stiff to stiff.	3.45	1.75	3.15	6/30			
		ML			4.00	1.50	4.15	8/30			
	5.00	CH		CLAY, reddish gray colour, high plasticity, stiff. Trace limonitic fines.	5.00	1.50					
	5.50	CH		CLAY, light gray with brown mottled colour, high plasticity, stiff. Trace limonitic fines.	5.50	1.75	5.65	12/30			
		CH		CLAY, light gray colour, high plasticity, stiff to very stiff.	5.95	2.75	6.50	16/30			
	6.50	CH			6.95	3.00	7.50	14/30			
		CH		CLAY, light gray with red mottled colour, high plasticity, medium stiff to stiff. Trace limonitic fines.	7.50	2.75	7.95	2.75			
	7.95	CH			8.50	0.75	8.65	6/30			
		CH			8.95	0.75					
		CH			9.50	2.00	9.65	16/30			
	10.30	CL		SILTY CLAY, gray colour, low plasticity, very stiff to hard. Few limonitic gravels, highly to completely weathered from 12.00 meters to ward the depth.	9.95	3.00	10.30	2.75			
	10.75	CL			10.75	3.00	10.90	13/30			
		CL			11.20	3.00					
	13.45	CL		SILTY CLAY, some gravels, yellowish gray colour, low plasticity, hard.	12.00	4.00	12.15	36/30			
	14.00	CL		GRAVELLY CLAY, dark gray colour, low plasticity, hard. Some moderately to highly decomposed gravels.	12.45	>4.5	13.00	>4.5			
		CL			13.00	>4.5	13.15	36/30			
		CL			14.00	>4.5	14.15	58/30			
		CL			15.00	>4.5	15.15	21/30			
		CL			16.00	>4.5	16.15	27/30			
		CL			17.00	>4.5	17.15	67/30			
		CL			18.00	>4.5	18.15	70/30			
		CL			19.00	>4.5	19.15	50/15	N > 100		
	20.45			END OF THIS BORING CASING DOWN TO 13.00 METERS IN DEPTH.	20.00	>4.5	20.15	73/30			

BH2.TXT - AvantiGarde-Demi

Appendix B.1.2







# BORING LOG

P.T. SOILENS

PROJECT : VESSEL TRAFIC SERVICE  
 CLIENT : PACIFIC CONSULTANT INTERNATIONAL  
 LOCATION : BATU AMPAR, BATAM ISLAND, RIAU  
 BORE HOLE NO. : BH-1  
 ELEVATION : +64.552  
 COORDINATES : E=390.402.707 N=130.583.256  
 DEPTH : 14.39 m  
 WATER TABLE : -

DATE : May 04 to May 05, 2007  
 BORING METHOD : Coring, Sampling  
 SAMPLING METHOD : Thin walled (Shelby) Tube  
 SPT : Automatic Hammer  
 DRILLER : A.Zubaedi  
 LOGGER : Djumhani  
 REVIEWED BY : None  
 DRAWN BY : Nick

Page 1 of 1

SAMPLE	DEPTH (meter)	USCS CHART	GRAPH SYMBOL	ROCK/SOIL DESCRIPTION	DEPTH (meter)	qu (kg/cm2)	SPT - N value		RECOVERY (%)
							Depth (m)	BLOWS PER CM	
							40	80	40 80
0.70	0.00	CL		SANDY CLAY, brownish yellow colour, low plasticity, medium stiff to stiff, Trace coarse grained limonitic sands at the bottom, completely decomposed.	0.70	1.25			
1.30	1.30			1.45	5/30				
2.00	2.00	SM		SILTY SAND, brownish yellow colour, loose. Fine grained sands, highly weathered.	1.30	1.25			
2.45	2.45			1.75	6/30				
3.45	3.45	SM		SILTY SAND, yellowish light gray colour, loose. Fine grained sands, highly weathered.	2.00	1.25			
3.45	3.45			3.15	6/30				
5.00	5.00	SM		SILTY SAND, reddish brown colour, loose. Fine grained limonitic sands, highly weathered.	3.45				
5.00	5.00			4.15	9/30				
6.00	6.00	SM		SILTY SAND, yellowish white colour, loose. Fine grained sands, highly weathered.	5.00				
6.00	6.00			5.15	19/30				
9.45	9.45	SM		SILTY SAND, reddish brown colour, medium dense to dense. Fine grained limonitic sands.	6.00				
				6.15	15/30				
				7.15	13/30				
				8.15	11/30				
				9.15	54/30				
				10.15	63/30				
		11.15	55/30						
		12.15	80/25						
		13.15	83/25						
				N > 100					
14.39	14.39			END OF THIS BORING CASING DOWN TO 12.00 METERS IN DEPTH.					

BH1.TXT - AvaniGarde-Demi

Appendix B.1.1

# DRILLING LOG

## THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF VESEL TRAFFIC SERVICE IN MALACCA AND SINGAPORE STRAITS IN REPUBLIK OF INDONESIA

Project : PCI	Coordinate x : 425.958,390	Drilling Machine : YSO 1
Location : Tanjung Berakit	Coordinate y : 134.850,060	Bor Master : Samsuhadi
Number of bor hole : BH. 1	Sheet Number : 1	Description by : Samsuhadi
GWL elevation : - m	Day/Date : (04/08-07/08) 2007	Check by : Irawan

Elevation from MSL (m)	Depth from ground level (m)	Bor Profile	Description of Strata	Number of Blow			Sum of Blow	SPT - N Graphic						Remarks	
				N1	N2	N3		0	10	20	30	40	50		60
+ 38.475	0.00		Silt, clay, sand, gravel, redish brown												
+ 37.475	-1.00			7 / 15	10 / 15	13 / 15	23 / 30								SPT-1 : (1.00-1.45)
+ 36.475	-2.00			8 / 15	11 / 15	14 / 15	25 / 30								SPT-2 : (2.00-2.45)
+ 35.475	-3.00		Undisturbed sample (2.50-3.00 m.) Clay, redish brown	6 / 15	9 / 15	12 / 15	21 / 30								SPT-3 : (3.00-3.45)
+ 34.475	-4.00			9 / 15	12 / 15	15 / 15	27 / 30								SPT-4 : (4.00-4.45)
+ 33.475	-5.00			18 / 15	60 / 15	-	>60 / 15								SPT-5 : (5.00-5.25)
+ 32.475	-6.00		Clay, coarse sand, redish brown	6 / 15	13 / 15	15 / 15	28 / 30								SPT-6 : (6.00-6.45)
+ 31.475	-7.00			8 / 15	12 / 15	20 / 15	32 / 30								SPT-7 : (7.00-7.45)
+ 30.475	-8.00			7 / 15	10 / 15	13 / 15	23 / 30								SPT-8 : (8.00-8.45)
+ 29.475	-9.00		Clay, brown - grey	5 / 15	8 / 15	11 / 15	19 / 30								SPT-9 : (9.00-9.45)
+ 28.475	-10.00			15 / 15	23 / 15	15 / 15	38 / 30								SPT-10 : (10.00-10.45)
+ 27.475	-11.00			6 / 15	11 / 15	16 / 15	27 / 30								SPT-11 : (11.00-11.45)
+ 26.475	-12.00			9 / 15	18 / 15	25 / 15	43 / 30								SPT-12 : (12.00-12.45)
+ 25.475	-13.00			15 / 15	25 / 15	40 / 15	>60 / 30								SPT-13 : (13.00-13.45)
+ 24.475	-14.00		Clay, brownish grey	10 / 15	15 / 15	21 / 15	36 / 30								SPT-14 : (14.00-14.45)
+ 23.475	-15.00			9 / 15	17 / 15	21 / 15	38 / 30								SPT-15 : (15.00-15.45)
+ 22.475	-16.00			15 / 15	25 / 15	40 / 15	>60 / 30								SPT-16 : (16.00-16.45)
+ 21.475	-17.00			20 / 15	26 / 15	45 / 15	>60 / 30								SPT-17 : (17.00-17.45)
+ 20.475	-18.00			20 / 15	30 / 15	40 / 15	>60 / 30								SPT-18 : (18.00-18.45)
+ 19.475	-19.00		Clay, silt, grey - brown	60 / 5	-	-	>60 / 5								SPT-19 : (19.00-19.05)
+ 18.475	-20.00														
+ 17.475	-21.00														
+ 16.475	-22.00														
+ 15.475	-23.00														
+ 14.475	-24.00														
+ 13.475	-25.00														
+ 12.475	-26.00														
+ 11.475	-27.00														
+ 10.475	-28.00														
+ 9.475	-29.00														
+ 8.475	-30.00														
+ 7.475	-31.00														
+ 6.475	-32.00														

UDS Sample	SPT Test	Clay	Sand	Shell fragment
DS Sample	Silt	Gravel	Andesit rock	

# DRILLING LOG

## THE BASIC STUDY ON THE PROJECT FOR DEVELOPMENT VESSEL TRAFFIC SERVICE IN MALACCA AND SINGAPORE STRAITS IN THE REPUBLIC OF INDONESIA

Project : PCI	Coordinate x : 795.379,0340	Drilling Machine : YSO 1
Location : Tanjung Medang	Coordinate y : 235.051,3820	Bor Master : Dadang Somantri
Number of bor hole : BH. 1	Sheet Number : 1	Description by : Dadang Somantri
GWL elevation : + 1.558 m	Day/Date : (20/08-24/08) 2007	Check by : Irawan

Elevation from MSL (m)	Depth from ground level (m)	Bor Profile	Description of Strata	Number of Blow			Sum of Blow	SPT - N Graphic							Remarks				
				N1	N2	N3		0	10	20	30	40	50	60					
+ 3.558	0.00																		
+ 2.558	- 1.00																SPT-1 : (1.00-1.45)		
+ 1.558	- 2.00																SPT-2 : (2.00-2.45)		
+ 0.558	- 3.00																SPT-3 : (3.00-3.45)		
- 0.442	- 4.00		Clay, Silt, fine sand, grey.	3 / 15	3 / 15	4 / 15	7 / 30										SPT-4 : (4.00-4.45)		
- 1.442	- 5.00			5 / 15	5 / 15	8 / 15	13 / 15											SPT-5 : (5.00-5.45)	
- 2.442	- 6.00			1 / 15	2 / 15	2 / 15	4 / 30											SPT-6 : (6.00-6.45)	
- 3.442	- 7.00			5 / 15	7 / 15	7 / 15	14 / 30											SPT-7 : (7.00-7.45)	
- 4.442	- 8.00			4 / 15	5 / 15	7 / 15	12 / 30											SPT-8 : (8.00-8.45)	
- 5.442	- 9.00			2 / 15	6 / 15	9 / 15	15 / 30											SPT-9 : (9.00-9.45)	
- 6.442	- 10.00			3 / 15	6 / 15	12 / 15	18 / 30											SPT-10 : (10.00-10.45)	
- 7.442	- 11.00			5 / 15	8 / 15	11 / 15	19 / 30											SPT-11 : (11.00-11.45)	
- 8.442	- 12.00			6 / 15	12 / 15	17 / 15	29 / 30											SPT-12 : (12.00-12.45)	
- 9.442	- 13.00			4 / 15	9 / 15	13 / 15	22 / 30											SPT-13 : (13.00-13.45)	
- 10.442	- 14.00			Clay, Silt, fine sand, grey.	7 / 15	11 / 15	18 / 15	29 / 30										SPT-14 : (14.00-14.45)	
- 11.442	- 15.00				9 / 15	12 / 15	19 / 15	31 / 30											SPT-15 : (15.00-15.45)
- 12.442	- 16.00		4 / 15		6 / 15	9 / 15	15 / 30											SPT-16 : (16.00-16.45)	
- 13.442	- 17.00		6 / 15		7 / 15	12 / 15	19 / 30											SPT-17 : (17.00-17.45)	
- 14.442	- 18.00		Undisturbed sample 18.45 - 19.00			7 / 15	9 / 15	14 / 15	23 / 30									SPT-18 : (18.00-18.45)	
- 15.442	- 19.00		5 / 15		8 / 15	13 / 15	21 / 30											SPT-19 : (19.00-19.45)	
- 16.442	- 20.00		7 / 15		12 / 15	19 / 15	31 / 30											SPT-20 : (20.00-20.45)	
- 17.442	- 21.00		4 / 15		6 / 15	9 / 15	15 / 30											SPT-21 : (21.00-21.45)	
- 18.442	- 22.00		5 / 15		9 / 15	12 / 15	21 / 30											SPT-22 : (22.00-22.45)	
- 19.442	- 23.00		Clay, silt, grey.																
- 20.442	- 24.00		Undisturbed sample (24.00-24.60 m.)			6 / 15	17 / 15	35 / 15	52 / 30									SPT-23 : (24.60-25.05)	
- 21.442	- 25.00						9 / 15	28 / 15	47 / 15	>60 / 30									SPT-24 : (25.50-25.95)
- 22.442	- 26.00		Clay, Silt, fine sand, grey.	18 / 15	34 / 15	57 / 15	>60 / 30											SPT-25 : (26.50-26.95)	
- 23.442	- 27.00			14 / 15	25 / 15	45 / 15	>60 / 30											SPT-26 : (27.50-27.95)	
- 24.442	- 28.00			5 / 15	15 / 15	32 / 15	47 / 30											SPT-27 : (28.50-28.95)	
- 25.442	- 29.00			8 / 15	17 / 15	35 / 15	52 / 30											SPT-28 : (29.50-29.95)	
- 26.442	- 30.00		Undisturbed sample (30.00-30.50 m.)			7 / 15	15 / 15	34 / 15	49 / 30									SPT-29 : (30.50-30.95)	
- 27.442	- 31.00					9 / 15	21 / 15	42 / 15	>60 / 30									SPT-30 : (31.50-31.95)	
- 28.442	- 32.00		Clay, grey.	11 / 15	25 / 15	45 / 15	>60 / 30											SPT-31 : (32.50-32.95)	
- 29.442	- 33.00			12 / 15	27 / 15	43 / 15	>60 / 30											SPT-32 : (33.00-33.45)	
- 30.442	- 34.00			9 / 15	20 / 15	35 / 15	55 / 30											SPT-33 : (34.00-34.45)	
- 31.442	- 35.00			11 / 15	23 / 15	44 / 15	>60 / 30											SPT-34 : (35.00-35.45)	
- 32.442	- 36.00			7 / 15	19 / 15	30 / 15	49 / 30											SPT-35 : (36.00-36.45)	
- 33.442	- 37.00			8 / 15	21 / 15	34 / 15	55 / 30											SPT-36 : (37.00-37.45)	
- 34.442	- 38.00			10 / 15	35 / 15	43 / 15	>60 / 30											SPT-37 : (38.00-38.45)	
- 35.442	- 39.00			10 / 15	22 / 15	40 / 15	>60 / 30											SPT-38 : (39.00-39.45)	
- 36.442	- 40.00																		

UDS Sample	SPT Test	Silt	Sand	Shell fragment/Organic matter.
DS Sample	Gravel	Andesit rock		

# DRILLING LOG

## THE BASIC STUDY ON THE PROJECT FOR DEVELOPMENT VESSEL TRAFFIC SERVICE IN MALACCA AND SINGAPORE STRAITS IN THE REPUBLIC OF INDONESIA

Project : PCI	Coordinate x : 214.601,2663	Drilling Machine : YSO 1
Location : Tanjung Parit	Coordinate y : 168.719,2605	Bor Master : Samsuhadi
Number of bor hole : BH. 1	Sheet Number : 1/2	Description by : Samsuhadi
GWL elevation : + 2.090 m.	Day/Date : (25/08-02/09) 2007	Check by : Irawan

Elevation from MSL (m)	Depth from ground level (m)	Bor Profile	Description of Strata	Number of Blow			Sum of Blow	SPT - N Graphic						Remarks	
				N1	N2	N3		0	10	20	30	40	50		60
+ 4.549	0.00														
+ 3.549	- 1.00		<i>Silty clay, organic matter, brownish grey.</i>	1 / 15	1 / 15	1 / 15	2 / 30	2							SPT-1 : (1.00-1.45)
+ 2.549	- 2.00			1 / 15	1 / 15	1 / 15	2 / 30	2							SPT-2 : (2.00-2.45)
+ 1.549	- 3.00			1 / 15	1 / 15	1 / 15	2 / 30	2							SPT-3 : (3.00-3.45)
+ 0.549	- 4.00		Undisturbed sample (4.50-5.00 m.)	1 / 15	1 / 15	2 / 15	3 / 30	3							SPT-4 : (4.00-4.45)
- 0.451	- 5.00		<i>Clay, grey.</i>	1 / 15	1 / 15	1 / 15	2 / 30	2						SPT-5 : (5.00-5.45)	
- 1.451	- 6.00			1 / 15	1 / 15	2 / 15	3 / 30	3						SPT-6 : (6.00-6.45)	
- 2.451	- 7.00			1 / 15	1 / 15	2 / 15	3 / 30	3						SPT-7 : (7.00-7.45)	
- 3.451	- 8.00		<i>Clay, grey.</i>	1 / 15	1 / 15	1 / 15	2 / 30	2						SPT-8 : (8.00-8.45)	
- 4.451	- 9.00			1 / 15	1 / 15	2 / 15	3 / 30	3						SPT-9 : (9.00-9.45)	
- 5.451	- 10.00			1 / 15	2 / 15	1 / 15	3 / 30	3						SPT-10 : (10.00-10.45)	
- 6.451	- 11.00		Undisturbed sample (9.50-10.00 m.)	1 / 15	2 / 15	2 / 15	4 / 30	4						SPT-11 : (11.00-11.45)	
- 7.451	- 12.00		<i>Clay, grey.</i>	1 / 15	2 / 15	3 / 15	5 / 30	5						SPT-12 : (12.00-12.45)	
- 8.451	- 13.00			1 / 15	2 / 15	2 / 15	4 / 30	4						SPT-13 : (13.00-13.45)	
- 9.451	- 14.00			1 / 15	2 / 15	3 / 15	5 / 30	5						SPT-14 : (14.00-14.45)	
- 10.451	- 15.00		Undisturbed sample (14.50-15.00 m.)	1 / 15	2 / 15	2 / 15	4 / 30	4						SPT-15 : (15.00-15.45)	
- 11.451	- 16.00		<i>Clay, grey.</i>	2 / 15	2 / 15	2 / 15	4 / 30	4						SPT-16 : (16.00-16.45)	
- 12.451	- 17.00			2 / 15	2 / 15	3 / 15	5 / 30	5						SPT-17 : (17.00-17.45)	
- 13.451	- 18.00			1 / 15	2 / 15	2 / 15	4 / 30	4						SPT-18 : (18.00-18.45)	
- 14.451	- 19.00		<i>Clay, grey.</i>	2 / 15	2 / 15	3 / 15	5 / 30	5						SPT-19 : (19.00-19.45)	
- 15.451	- 20.00			2 / 15	2 / 15	2 / 15	4 / 30	4						SPT-20 : (20.00-20.45)	
- 16.451	- 21.00			2 / 15	2 / 15	3 / 15	5 / 30	5						SPT-21 : (21.00-21.45)	
- 17.451	- 22.00		<i>Clay, grey.</i>	2 / 15	3 / 15	3 / 15	6 / 30	6						SPT-22 : (22.00-22.45)	
- 18.451	- 23.00			3 / 15	3 / 15	2 / 15	5 / 30	5						SPT-23 : (23.00-23.45)	
- 19.451	- 24.00			2 / 15	3 / 15	3 / 15	6 / 30	6						SPT-24 : (24.00-24.45)	
- 20.451	- 25.00		Undisturbed sample (24.50-25.00 m.)	2 / 15	2 / 15	3 / 15	5 / 30	5						SPT-25 : (25.40-25.45)	
- 21.451	- 26.00		<i>Clay, grey.</i>	2 / 15	2 / 15	3 / 15	5 / 30	5						SPT-26 : (26.00-26.45)	
- 22.451	- 27.00			2 / 15	2 / 15	2 / 15	4 / 30	4						SPT-27 : (27.00-27.45)	
- 23.451	- 28.00			2 / 15	2 / 15	3 / 15	5 / 30	5						SPT-28 : (28.00-28.45)	
- 24.451	- 29.00		<i>Clay, grey.</i>	2 / 15	3 / 15	3 / 15	6 / 30	6						SPT-29 : (29.00-29.45)	
- 25.451	- 30.00			2 / 15	2 / 15	3 / 15	5 / 30	5						SPT-30 : (30.00-30.45)	

UDS Sample	SPT Test	Clay	Sand	Shell fragment/Organic matter
DS Sample	Silt	Gravel	Andesit rock	

# DRILLING LOG

## THE BASIC STUDY ON THE PROJECT FOR DEVELOPMENT VESSEL TRAFFIC SERVICE IN MALACCA AND SINGAPORE STRAITS IN THE REPUBLIC OF INDONESIA

Project : PCI	Coordinate x : 214.601,2663	Drilling Machine : YSO 1
Location : Tanjung Parit	Coordinate y : 168.719,2605	Bor Master : Samsuhadi
Number of bor hole : BH. 1	Sheet Number : 2/2	Description by : Samsuhadi
GWL elevation : + 2.09 m.	Day/Date : (25/08-02/09) 2007	Check by : Irawan

Elevation from MSL (m)	Depth from ground level (m)	Bor Profile	Description of Strata	Number of Blow			Sum of Blow	SPT - N Graphic							Remarks			
				N1	N2	N3		0	10	20	30	40	50	60				
- 25.451	- 30.00		Clay, grey.	2 / 15	2 / 15	3 / 15	5 / 30	5								SPT-30 : (30.00-30.45)		
- 26.451	- 31.00			2 / 15	3 / 15	3 / 15	6 / 30	6										SPT-31 : (31.00-31.45)
- 27.451	- 32.00			2 / 15	2 / 15	3 / 15	5 / 30	5										SPT-32 : (32.00-32.45)
- 28.451	- 33.00			2 / 15	3 / 15	3 / 15	6 / 30	6										SPT-33 : (33.00-33.45)
- 29.451	- 34.00			2 / 15	3 / 15	3 / 15	6 / 30	6										SPT-34 : (34.00-34.45)
- 30.451	- 35.00			2 / 15	2 / 15	3 / 15	5 / 30	5										SPT-35 : (35.00-35.45)
- 31.451	- 36.00			2 / 15	3 / 15	3 / 15	6 / 30	6										SPT-36 : (36.00-36.45)
- 32.451	- 37.00			2 / 15	2 / 15	3 / 15	5 / 30	5										SPT-37 : (37.00-37.45)
- 33.451	- 38.00			2 / 15	3 / 15	3 / 15	6 / 30	6										SPT-38 : (38.00-38.45)
- 34.451	- 39.00			2 / 15	3 / 15	3 / 15	6 / 30	6										SPT-39 : (39.00-39.45)
- 35.451	- 40.00			2 / 15	3 / 15	3 / 15	6 / 30	6										SPT-40 : (40.00-40.45)
- 36.451	- 41.00			2 / 15	2 / 15	4 / 15	6 / 30	6										SPT-41 : (41.00-41.45)
- 37.451	- 42.00			2 / 15	2 / 15	7 / 15	9 / 30	9										SPT-42 : (42.00-42.45)
- 38.451	- 43.00			2 / 15	3 / 15	2 / 15	5 / 30	5										SPT-43 : (43.00-43.45)
- 39.451	- 44.00			2 / 15	4 / 15	4 / 15	8 / 30	8										SPT-44 : (44.00-44.45)
- 40.451	- 45.00			8 / 15	16 / 15	19 / 15	35 / 30	35										SPT-45 : (45.00-45.45)
- 41.451	- 46.00			6 / 15	13 / 15	19 / 15	32 / 30	32										SPT-46 : (46.00-46.45)
- 42.451	- 47.00			7 / 15	17 / 15	21 / 15	38 / 30	38										SPT-47 : (47.00-47.45)
- 43.451	- 48.00			7 / 15	15 / 15	19 / 15	34 / 30	34										SPT-48 : (48.00-48.45)
- 44.451	- 49.00			8 / 15	18 / 15	19 / 15	37 / 30	37										SPT-49 : (49.00-49.45)
- 45.451	- 50.00			8 / 15	16 / 15	19 / 15	35 / 30	35										SPT-50 : (50.00-50.45)

- |            |          |        |              |                               |
|------------|----------|--------|--------------|-------------------------------|
| UDS Sample | SPT Test | Clay   | Sand         | Shell fragment/Organic matter |
| DS Sample  | Silt     | Gravel | Andesit rock |                               |

# DRILLING LOG

## THE BASIC STUDY ON THE PROJECT FOR DEVELOPMENT VESSEL TRAFFIC SERVICE IN MALACCA AND SINGAPORE STRAITS IN THE REPUBLIC OF INDONESIA

Project	: PCI	Coordinate x	: 181.587,008	Drilling Machine	: YSO 1
Location	: Bengkalis Coastal Radio Station	Coordinate y	: 161.100,735	Bor Master	: Samsuhadi
Number of bor hole	: BH. 1	Sheet Number	: 1/2	Description by	: Samsuhadi
GWL elevation	: + 2.215 m	Day/Date	: (18/08-24/08) 2007	Check by	: Irawan

Elevation from MSL (m)	Depth from ground level (m)	Bor Profile	Description of Strata	Number of Blow			Sum of Blow	SPT - N Graphic	Remarks
				N1	N2	N3			
+ 4.215	0.00						0		
+ 3.215	- 1.00		<i>Silty clay, organic matter, brownish grey.</i>	1 / 15	1 / 15	1 / 15	2 / 30	2	SPT-1 : (1.00-1.45)
+ 2.215	- 2.00			1 / 15	1 / 15	1 / 15	2 / 30	3	SPT-2 : (2.00-2.45)
+ 1.215	- 3.00			1 / 15	1 / 15	1 / 15	2 / 30	2	SPT-3 : (3.00-3.45)
+ 0.215	- 4.00		Undisturbed sample (4.50-5.00 m.)	1 / 15	1 / 15	2 / 15	3 / 30	2	SPT-4 : (4.00-4.45)
- 0.785	- 5.00			1 / 15	1 / 15	1 / 15	2 / 15	2	SPT-5 : (5.00-5.45)
- 1.785	- 6.00		<i>Clay, grey.</i>	1 / 15	1 / 15	2 / 15	3 / 30	3	SPT-6 : (6.00-6.45)
- 2.785	- 7.00			1 / 15	1 / 15	1 / 15	2 / 30	2	SPT-7 : (7.00-7.45)
- 3.785	- 8.00		Undisturbed sample (9.50-10.00 m.)	1 / 15	1 / 15	2 / 15	3 / 30	3	SPT-8 : (8.00-8.45)
- 4.785	- 9.00			1 / 15	2 / 15	2 / 15	4 / 30	4	SPT-9 : (9.00-9.45)
- 5.785	- 10.00		<i>Clay, grey.</i>	1 / 15	2 / 15	3 / 15	5 / 30	5	SPT-10 : (10.00-10.45)
- 6.785	- 11.00			1 / 15	2 / 15	3 / 15	5 / 30	5	SPT-11 : (11.00-11.45)
- 7.785	- 12.00		Undisturbed sample (14.50-15.00 m.)	1 / 15	2 / 15	2 / 15	4 / 30	4	SPT-12 : (12.00-12.45)
- 8.785	- 13.00			1 / 15	2 / 15	2 / 15	4 / 30	4	SPT-13 : (13.00-13.45)
- 9.785	- 14.00		<i>Clay, grey.</i>	2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-14 : (14.00-14.45)
- 10.785	- 15.00			2 / 15	2 / 15	2 / 15	4 / 30	4	SPT-15 : (15.00-15.45)
- 11.785	- 16.00		Undisturbed sample (19.50-20.00 m.)	2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-16 : (16.00-16.45)
- 12.785	- 17.00			2 / 15	3 / 15	3 / 15	6 / 30	6	SPT-17 : (17.00-17.45)
- 13.785	- 18.00		<i>Clay, grey.</i>	2 / 15	3 / 15	4 / 15	7 / 30	7	SPT-18 : (18.00-18.45)
- 14.785	- 19.00			2 / 15	3 / 15	3 / 15	5 / 30	5	SPT-19 : (19.00-19.45)
- 15.785	- 20.00		Undisturbed sample (24.50-25.00 m.)	2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-20 : (20.00-20.45)
- 16.785	- 21.00			2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-21 : (21.00-21.45)
- 17.785	- 22.00		<i>Clay, grey.</i>	2 / 15	2 / 15	2 / 15	4 / 30	4	SPT-22 : (22.00-22.45)
- 18.785	- 23.00			2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-23 : (23.00-23.45)
- 19.785	- 24.00		Undisturbed sample (24.50-25.00 m.)	2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-24 : (24.00-24.45)
- 20.785	- 25.00			2 / 15	3 / 15	3 / 15	6 / 30	6	SPT-25 : (25.00-25.45)
- 21.785	- 26.00		<i>Clay, grey.</i>	3 / 15	3 / 15	3 / 15	6 / 30	6	SPT-26 : (26.00-26.45)
- 22.785	- 27.00			2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-27 : (27.00-27.45)
- 23.785	- 28.00		Undisturbed sample (24.50-25.00 m.)	2 / 15	3 / 15	3 / 15	6 / 30	6	SPT-28 : (28.00-28.45)
- 24.785	- 29.00			2 / 15	2 / 15	4 / 15	6 / 30	6	SPT-29 : (29.00-29.45)
- 25.785	- 30.00		<i>Clay, grey.</i>	2 / 15	3 / 15	4 / 15	7 / 30	7	SPT-30 : (30.00-30.45)

 UDS Sample	 SPT Test	 Clay	 Sand	 Shell fragment/Organic matter.
 DS Sample	 Silt	 Gravel	 Andesit rock	



# DRILLING LOG

## THE BASIC STUDY ON THE PROJECT FOR DEVELOPMENT VESSEL TRAFFIC SERVICE IN MALACCA AND SINGAPORE STRAITS IN THE REPUBLIC OF INDONESIA

Project : PCI	Coordinate x : 181.587,008	Drilling Machine : YSO 1
Location : Bengkalis Coastal Radio Station	Coordinate y : 161.100,735	Bor Master : Samsuhadi
Number of bor hole : BH. 1	Sheet Number : 2/2	Description by : Samsuhadi
GWL elevation : + 2.215 m	Day/Date : (18/08-24/08) 2007	Check by : Irawan

Elevation from MSL (m)	Depth from ground level (m)	Bor Profile	Description of Strata	Number of Blow			Sum of Blow	SPT - N Graphic	Remarks
				N1	N2	N3			
-25.785	-30.00	30	Clay, grey.	2 / 15	3 / 15	4 / 15	7 / 30	7	SPT-30 : (30.00-30.45)
-26.785	-31.00	31		2 / 15	3 / 15	3 / 15	6 / 30	6	SPT-31 : (31.00-31.45)
-27.785	-32.00	32		2 / 15	3 / 15	4 / 15	7 / 30	7	SPT-32 : (32.00-32.45)
-28.785	-33.00	33		2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-33 : (33.00-33.45)
-29.785	-34.00	34		3 / 15	3 / 15	3 / 15	6 / 30	6	SPT-34 : (34.00-34.45)
-30.785	-35.00	35		3 / 15	2 / 15	3 / 15	5 / 30	5	SPT-35 : (35.00-35.45)
-31.785	-36.00	36		2 / 15	3 / 15	4 / 15	7 / 30	7	SPT-36 : (36.00-36.45)
-32.785	-37.00	37		3 / 15	3 / 15	4 / 15	7 / 30	7	SPT-37 : (37.00-37.45)
-33.785	-38.00	38		2 / 15	3 / 15	3 / 15	6 / 30	6	SPT-38 : (38.00-38.45)
-34.785	-39.00	39		3 / 15	3 / 15	3 / 15	6 / 30	6	SPT-39 : (39.00-39.45)
-35.785	-40.00	40		2 / 15	2 / 15	3 / 15	5 / 30	5	SPT-40 : (40.00-40.45)
-36.785	-41.00	41		3 / 15	4 / 15	5 / 15	9 / 30	9	SPT-41 : (41.00-41.45)
-37.785	-42.00	42		5 / 15	6 / 15	6 / 15	12 / 30	12	SPT-42 : (42.00-42.45)
-38.785	-43.00	43		3 / 15	4 / 15	7 / 15	11 / 30	11	SPT-43 : (43.00-43.45)
-39.785	-44.00	44		4 / 15	6 / 15	9 / 15	15 / 30	15	SPT-44 : (44.00-44.45)
-40.785	-45.00	45	5 / 15	8 / 15	9 / 15	17 / 30	17	SPT-45 : (45.00-45.45)	
-41.785	-46.00	46	6 / 15	9 / 15	13 / 15	22 / 30	22	SPT-46 : (46.00-46.45)	
-42.785	-47.00	47	8 / 15	12 / 15	10 / 15	22 / 30	22	SPT-47 : (47.00-47.45)	
-43.785	-48.00	48	8 / 15	9 / 15	13 / 15	22 / 30	22	SPT-48 : (48.00-48.45)	
-44.785	-49.00	49	7 / 15	10 / 15	14 / 15	24 / 30	24	SPT-49 : (49.00-49.45)	
-45.785	-50.00	50	7 / 15	12 / 15	17 / 15	29 / 30	29	SPT-50 : (50.00-50.45)	
-46.785	-51.00	51	6 / 15	9 / 15	15 / 15	24 / 30	24	SPT-51 : (51.00-51.45)	
-47.785	-52.00	52	8 / 15	15 / 15	17 / 15	32 / 30	32	SPT-52 : (52.00-52.45)	
-48.785	-53.00	53	8 / 15	16 / 15	18 / 15	34 / 30	34	SPT-53 : (53.00-53.45)	
-49.785	-54.00	54	10 / 15	17 / 15	19 / 15	36 / 30	36	SPT-54 : (54.00-54.45)	
-55.00									

- |            |          |        |              |                                |
|------------|----------|--------|--------------|--------------------------------|
| UDS Sample | SPT Test | Clay   | Sand         | Shell fragment/Organic matter. |
| DS Sample  | Silt     | Gravel | Andesit rock |                                |

# DRILLING LOG

THE BASIC STUDY ON THE PROJECT FOR DEVELOPMENT VESSEL TRAFFIC SERVICE  
IN MALACCA AND SINGAPORE STRAITS IN THE REPUBLIC OF INDONESIA

Project : PCI	Coordinate x : 771.164,970	Drilling Machine : YSO 1
Location : Dumai Coastal Radio Station	Coordinate y : 183.612,820	Bor Master : Dadang Somantri
Number of bor hole : BH. 1	Sheet Number : 1	Description by : Dadang Somantri
GWL elevation : + 2.340 m	Day/Date : (09/08-15/08) 2007	Check by : Irawan

Elevation from MSL (m)	Depth from ground level (m)	Bor Profile	Description of Strata	Number of Blow			Sum of Blow	S P T - N Graphic							Remarks	
				N1	N2	N3		0	10	20	30	40	50	60		
+ 3.840	0.00							0								
+ 2.840	- 1.00		Organic matter, black-brown.	1 / 15	1 / 15	1 / 15	2 / 30	2								SPT-1 : (1.00-1.45)
+ 1.840	- 2.00			1 / 15	1 / 15	2 / 15	3 / 30	3								
+ 0.840	- 3.00		Undisturbed sample (3.00-3.50 m.)													
- 0.160	- 4.00		Clay, dark grey, very soft.	1 / 15	1 / 15	1 / 15	2 / 30	2								SPT-3 : (3.50-3.95)
- 1.160	- 5.00			1 / 15	1 / 15	2 / 15	3 / 15	3								
- 2.160	- 6.00		Clay, dark grey, very soft.	1 / 15	1 / 15	2 / 15	3 / 15	3								SPT-5 : (5.50-5.95)
- 3.160	- 7.00			1 / 15	1 / 15	1 / 15	2 / 30	2								
- 4.160	- 8.00		Undisturbed sample (8.00-8.50 m.)													
- 5.160	- 9.00		Clay, organic matter, brownish black.	2 / 15	2 / 15	3 / 15	5 / 30	5								SPT-7 : (7.50-7.95)
- 6.160	- 10.00			7 / 15	7 / 15	7 / 15	14 / 30	14								
- 7.160	- 11.00		Silt, fine sand, grey.	1 / 15	18 / 15	45 / 15	>60 / 30	>60								SPT-9 : (10.00-10.45)
- 8.160	- 12.00			6 / 15	35 / 15	51 / 15	>60 / 30	>60								
- 9.160	- 13.00		Fine sand, light grey.	5 / 15	24 / 15	41 / 15	>60 / 30	>60								SPT-11 : (12.00-12.45)
- 10.160	- 14.00			7 / 15	32 / 15	45 / 15	>60 / 30	>60								
- 11.160	- 15.00		Fine sand, organic matter, grey-black.	6 / 15	11 / 15	14 / 15	25 / 30	25								SPT-13 : (14.00-14.45)
- 12.160	- 16.00			8 / 15	17 / 15	22 / 15	39 / 30	39								
- 13.160	- 17.00		Fine sand, dark grey.	7 / 15	11 / 15	14 / 15	25 / 30	25								SPT-15 : (16.00-16.45)
- 14.160	- 18.00			5 / 15	11 / 15	14 / 15	25 / 30	25								
- 15.160	- 19.00		Clay, grey. Undisturbed sample (19.00-19.50 m.)													
- 16.160	- 20.00		Fine sand, silt, grey.	5 / 15	7 / 15	9 / 15	16 / 30	16								SPT-17 : (18.00-18.45)
- 17.160	- 21.00			6 / 15	8 / 15	10 / 15	18 / 30	18								
- 18.160	- 22.00		Fine sand, silt, grey.	5 / 15	6 / 15	9 / 15	15 / 30	15								SPT-19 : (20.50-20.95)
- 19.160	- 23.00			8 / 15	11 / 15	19 / 15	30 / 30	30								
- 20.160	- 24.00		Clay, fine sand, grey.	6 / 15	7 / 15	9 / 15	16 / 30	16								SPT-22 : (23.00-23.45)
- 21.160	- 25.00			9 / 15	11 / 15	12 / 15	23 / 30	23								
- 22.160	- 26.00		Clay, grey, stiff.	7 / 15	9 / 15	14 / 15	23 / 30	23								SPT-24 : (25.00-25.45)
- 23.160	- 27.00			10 / 15	15 / 15	19 / 15	34 / 30	34								
- 24.160	- 28.00		Clay, grey, stiff.	9 / 15	14 / 15	18 / 15	32 / 30	32								SPT-26 : (27.00-27.45)
- 25.160	- 29.00			12 / 15	18 / 15	22 / 15	40 / 30	40								
- 26.160	- 30.00		Silt, fine sand, grey, dense.	10 / 15	13 / 15	19 / 15	32 / 30	32								SPT-28 : (29.00-29.45)
- 27.160	- 31.00			12 / 15	18 / 15	28 / 15	46 / 30	46								
- 28.160	- 32.00		Clay, grey, stiff.	15 / 15	25 / 15	40 / 15	>60 / 30	>60								SPT-30 : (31.00-31.45)
- 29.160	- 33.00			14 / 15	28 / 15	43 / 15	>60 / 30	>60								
- 30.160	- 34.00		Clay, grey, stiff.	17 / 15	35 / 15	42 / 15	>60 / 30	>60								SPT-32 : (33.00-33.45)
- 31.160	- 35.00			16 / 15	31 / 15	40 / 15	>60 / 30	>60								
- 32.160	- 36.00		Clay, grey, stiff.	8 / 15	17 / 15	22 / 15	39 / 30	39								SPT-34 : (35.00-35.45)
- 33.160	- 37.00			11 / 15	21 / 15	22 / 15	43 / 30	43								
- 34.160	- 38.00		Clay, grey, stiff.	13 / 15	25 / 15	45 / 15	>60 / 30	>60								SPT-36 : (37.00-37.45)
- 35.160	- 39.00			14 / 15	35 / 15	51 / 15	>60 / 30	>60								
- 36.160	- 40.00		Clay, grey, stiff.	16 / 15	37 / 15	55 / 15	>60 / 30	>60								SPT-38 : (39.00-39.45)
				14 / 15	42 / 15	58 / 15	>60 / 30	>60								

	UDS Sample		DS Sample		Clay		Silt		Sand		Gravel		Shell fragment/Organic matter		Andesit rock
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## **Appendix 5-4 Vessel Traffic Survey**

### **Vessel Traffic Survey**

#### **1 Purpose of the Survey**

Ocular traffic survey was conducted for the candidate sites in Tg. Parit (Bengkalis Island) and Tg. Berakit (Bintang Island), to determine the necessity of establishing VTS sensor stations.

The target vessel for surveillance is 100 GT steel vessel minimum.

#### **2 Survey Location and Method**

##### **(1) Survey Location**

The survey was conducted in the two lighthouses operated and managed by the Directorate of Navigation of the Directorate General of Sea Transportation, as listed below.

1) Tg. Parit, Bengkalis Island

2) Tg. Berakit, Bintan Island

Due to the short period for ocular survey, the survey was supplemented with at random interviews from ports and fishing ports near the sites.

##### **(2) Survey Station and Ship Tallying Method**

The ocular survey was conducted in one station for inland and two stations on sea for each site. Survey reference lines as shown in Figs. 2-1 and 2-2 were established for ship tallying.

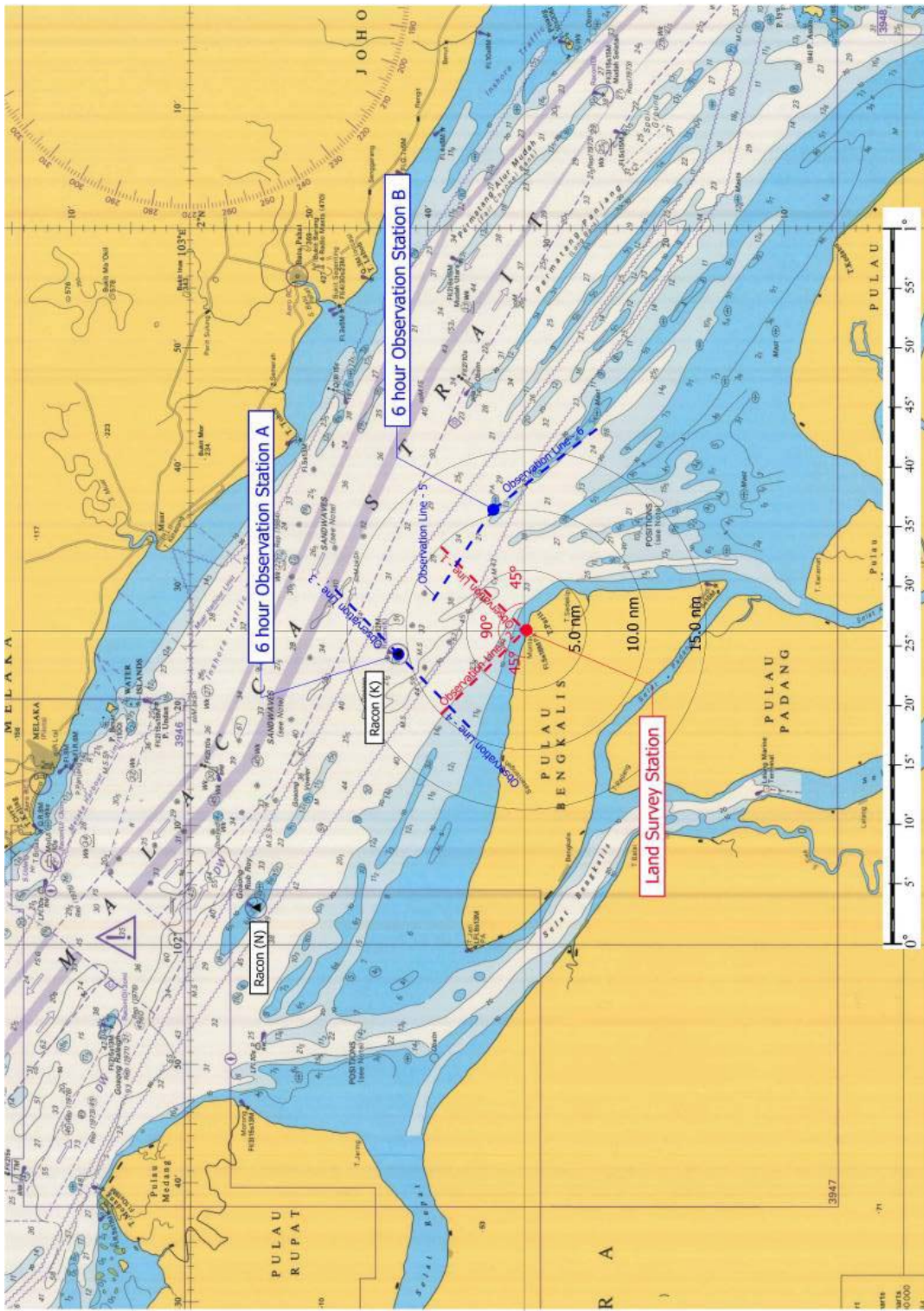


Fig. 2-1 Survey Stations for Tallying of Vessel Traffic in Tg. Parit





### 3 Observation Method

#### (1) Line Cross Survey (Number of ships crossing the reference survey lines)

Described hereunder are the parameters used for the line cross surveys.

##### 1) Survey Duration

###### a On-land Station for Lines 1 and 2

Ocular survey was conducted continuously for one week from sun rise to sun set, and also for 24 hours for 2 days during the survey period. (Accumulated survey time: 108 hours)

###### b Ocular Survey on Sea for Lines 3 to 6

Two (2) Surveys was continuously conducted for 6 hours for each station for an accumulated time of 24 hours.

##### 2) Survey Records

Records were taken on ships crossing the survey line for: i) passing time, ii) distance from the observation post, iii) direction of movement, iv) type of ships and v) ship size. Ten (10) to fifteen (15) powers of binoculars were used for the ocular surveys on sea simultaneously with theodolite on land. All ships which crossed the survey lines were recorded by digital camera to the extent possible.

#### (2) Area Survey for Ship Positions at Fixed Time

In addition to the line cross survey, area survey was conducted at every hour. The ships positions were recorded together with the time, on the charts based on the following method.

##### 1) Survey Period

The survey was conducted at every one hour for both land and sea stations.

##### 2) Survey Records

Record were taken on i) observation time, ii) bearing and iii) ships movement directions reckoned from the stations and, iv) type and size of ships. Ten (10) to fifteen (15) powers of binoculars were used for the ocular surveys on sea simultaneously with theodolite on land. The survey boat was provided with radar for surveys carried out

on sea. Digital camera was used to the extent practicable for the survey records.

(3) Interview Survey of Ship Crews and Local Inhabitants

In parallel with the above survey, interview survey of ship crews was conducted for 100GT ships in several ports and the local inhabitants in fishing villages and the surrounding areas of the site. The interview survey is complemented with ocular survey and gathering of information on vessel traffic movement in the subject areas. The ports where survey was conducted are listed as follows.

1) Interview survey for collection of information in the waters around Tg. Parit

Dumai port, Bengkalis port, Pekanbaru Port, and fishing villages proximate to the station

2) Interview survey for collection of information in the waters around Tg. Berakit

Kijang Port, Batu Ampar port, Tg. Uban Port and fishing villages near the observation site

#### 4 Ship Classifications

The ships were classified according to size and type as follows:

(1) Size

- 1 0~20GT
- 2 20GT~100GT
- 3 100GT~300GT
- 4 300GT~10,000GT
- 5 10,000GT 以上
- 6 Not determined (difficult to evaluate)

(2) Type

- 1 Cargo Ships
- 2 Passenger Ships (Speed craft were classified to the extent possible)
- 3 Fishing Vessels
- 4 Others
- 5 Not determined (difficult to evaluate)

## 5 Location & Duration of Survey

### (1) Tg. Parit, Bengkalis Island

#### 1) Survey On land

Survey was conducted for 7 days from August 23 (Thursday) to 29 (Wednesday). Survey was also carried out for 24 hours, i.e., twice from 25 (Saturday) to 26 (Sunday) and from 27 (Monday) to 28 (Tuesday).

#### 2) Survey on Sea

Survey Station A: August 24 (10:00 to 16:00) and August 25 (6:00 to 12:00)

Survey Station B: August 26 (7:00 to 13:00), and August 27 (7:00 to 13:00)

#### 3) Survey Stations

##### a Survey On-land

A stage about 4m high was constructed near shore as shown in Photo 5-1. Binoculars and theodolite were used for the survey.



Photo 5-1: Survey Stage



Photo 5-2: Ocular Survey

##### b Survey On-sea

A wooden boat with FURUNO radar as shown in Photos 5-3 and 5-4 was used for the survey on sea.





Photo 5-3: Wooden Survey Boat



Photo 5-4: FURUNO Radar

(2) Tg. Berakit in Bintan Island

1) Survey On-land

Survey was conducted for 7 days from August 24 (Friday) to August 31 (Saturday), 2007. Twenty four (24)-hour survey was also carried out twice from August 26 (Sunday) & 27 (Monday) and August 28 (Tuesday) & 29 (Wednesday).

2) Survey On-sea

Survey Station A: August 23, (13:00 to 17:00) and August 24 (8:00 to 17:00)

Survey Station B: August 25, (7:00 to 11:00) and August 26 (9:00 to 15:00)

3) Survey Stations

a Survey On-land

A stage about 6m high was constructed near shore as shown in Photo 5-5. Binoculars and theodolite were used for the survey.

b Survey On-sea

A wooden boat with FURUNO radar as shown in Photos 5-6 and 5-7 was used for the survey on sea.



Photo 5-5: Survey Stage



Photo 5-6: Wooden Survey Boat



Photo 5-7: FURUNO Radar



Photo 5-8: Radar Scanner installed on the Wooden Boat

## 6 Survey Results

The following results were gathered from the foregoing surveys.

### (1) Tg. Parit

#### 1) Number of Ships

The number and type of ships which crossed the survey line is summarized in Tables 6-1. Reference survey lines (1&2) for on-land survey is shown in Fig. 2-1. Reference survey lines 3 &4 on sea are for Station A and 5 & 6 on sea are for Station B.

**Table 6-1 Number of Ships Crossing the Reference Survey Line in Tg. Parit**

**(1) By Size**

Category	Ship Size	Survey Line					
		1	2	3	4	5	6
1	0 -20 GT	0	266	0	1	19	13
2	20 - 100	0	0	3	0	1	1
3	100 - 300	0	0	0	0	3	1
4	300- 10,000	0	0	0	0	0	0
5	> 10,000	0	0	33	3	3	5
6	Unknown	0	0	7	5	0	1
	Total	0	266	43	9	26	21
Accumulated Observed Hour		108	108	12	12	12	12

**(2) By Type**

Category	Ship Type	Survey Line					
		1	2	3	4	5	6
1	Carge Ship	0	12	41	3	7	7
2	Passenger Ship	0	0	0	0	0	0
3	Fishing Vessel	0	0	0	1	19	13
4	Others	0	0	2	0	0	0
5	Unknown	0	0	0	5	0	1
	Total	0	12	43	9	26	21
Accumulated Observed Hour		108	108	12	12	12	12

Based on Table 6-2, ship traffic is categorized as follows.

- a Fishing vessels less than 20 GT are predominant.
- b Steel vessels about 100 GT which are the target size for surveillance emerge a couple of times a day.
- c Thirty three (33) ships greater than 10,000 GT have crossed survey line 3. The vessels could have been navigation in the TSS considering the estimated distance between the survey station and the location of the ships.

2) Classification of Ships/Boats

- a Survey On-land
  - i 7 to 8 m long fishing boats of local inhabitants as shown in Photo 6-1 are predominant.

- ii Several wooden cargo ships about 30m long were surveyed as shown in Photo 6-7.
- iii High speed passenger crafts as shown in Photo 6-3 has passed the survey area. Based on information from local inhabitants, the regular route of passenger ships is the south side of Bengkalis Island. However, in some instances, passenger ship also passes the northern side of the Island as in this case.
- iv Cargo barge about 3,000 GT being pulled by a tug boat as shown in Photo 6-4 was observed although very low in frequency. The ship was obviously passing outside the TSS based on the estimated distance between the survey station and the subject vessel.



Photo 6-1 Fishing Boat of Local Inhabitants



Photo 6-2 Wooden Cargo Boat



Photo 6-3 High Speed Passenger Craft



Photo 6-4 Barge Towed by Tug Boat

b Survey On-sea

- i Large ships passing the TSS are predominant as shown in Photos 6-5 and 6-6.
- ii Ships passing outside the TSS were also observed as shown in Photo 6-8.



Photo 6-5 Ship passing the TSS



Photo 6-6 Ship passing the TSS



Photo 6-7 Ship crossing Line 5  
TSS



Photo 6-8 Ship Passing outside the

(2) Tg. Berakit

1) Number of Ships

The number and type of ships crossing the survey line is summarized in Tables 6-2 (1) and (2). Survey lines 3 and 4 are for Station A while survey lines 5 and 6 are for

station B both is on sea.

**Table 6-2 Number of Ships Crossing the Survey Line in Tg. Berakit**

**(1) By Size**

Category	Ship Size	Survey Line					
		1	2	3	4	5	6
1	0 -20 GT	26	14	2	3	5	2
2	20 - 100	0	0	0	0	1	2
3	100 - 300	0	2	0	0	0	3
4	300- 10,000	0	4	3	4	1	0
5	> 10,000	0	35	3	8	6	10
6	Unkown	0	0	0	0	0	0
	Total	26	55	8	15	13	17
Accumlated Observed Hour		108	108	12	12	12	12

**(2) By Ship**

Category	Ship Type	Survey Line					
		1	2	3	4	5	6
1	Carge Ship	36	37	6	12	3	3
2	Passenger Ship	0	0	0	0	0	0
3	Fishing Vessel	0	14	2	3	8	8
4	Others	0	4	0	0	0	0
5	Unknown	0	0	0	0	0	0
	Total	36	55	8	15	11	11
Accumlated Observed Hour		108	108	12	12	12	12

Based on Table 6-2, vessel traffic is categorized as follows:

- a Five to ten ships greater than 10,000 GT were observed from the survey on land. From the estimated distance, the ships were obviously passing out side the TSS.
- b Wooden fishing boats of less than 20 GT were also observed rather frequently. The number of fishing vessels and large ships are almost the same.

2) Survey of Ships

a Survey On-land

- i Ships greater than 10,000GT are predominant as shown in Photos 6-9 up to

6-11.

ii The presence 300GT ships are rather rare. (Photo 6-12)



Photo 6-9 Ships Crossing Line-1



Photo 6-10 Ship Crossing Line-1



Photo 6-11 Ship Crossing Line-2



Photo 6-12 Ship Crossing Line-2

b Survey On-sea

i Ship crossing line 4 as shown in Photos 6-13 and 6-14 appears to be using the TSS.



Photo 6-13 Ship Crossing Line-3



Photo 6-14 Ship Crossing Line-4

