

**ANALISIS DAYA DUKUNG FONDASI TIANG PANCANG
BERDASARKAN HASIL N-SPT DIBANDINGKAN DENGAN
HASIL PDA TEST PADA PROYEK JALAN TOL
RUAS KUALA TANJUNG - INDRAPURA**

SKRIPSI

*Diajukan Untuk Melengkapi Persyaratan Dalam Menyelesaikan
Pendidikan Program Sarjana Strata Satu (S1)
Program Studi Teknik Sipil Fakultas Teknik
Universitas Islam Sumatera Utara*

OLEH :

WAHYU EKO SYAHPUTRA
NPM. 71200913003



**PROGRAM STUDI TEKNIK SIPIL
FAKULTAS TEKNIK
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MEDAN
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**PROGRAM STUDI TEKNIK SIPIL
FAKULTAS TEKNIK
UNIVERSITAS ISLAM SUMATERA UTARA
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2025**

KATA PENGANTAR

Puji Syukur kehadiran Allah SWT, Karena atas Rahmat dan Karunia-Nya, Skripsi dengan judul **Analisis Daya Dukung Fondasi Tiang Pancang Berdasarkan Hasil N-SPT Dibandingkan Dengan Hasil PDA Test Pada Proyek Jalan Tol Ruas Kuala Tanjung - Indrapura** dapat diselesaikan dengan baik. Shalawat beriring salam penulis hadiahkan kepada Nabi Muhammad SAW yang telah membawa kita dari zaman jahiliyah ke zaman yang penuh ilmu pengetahuan seperti sekarang ini.

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(Wahyu Eko Syahputra)

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DAFTAR NOTASI DAN ISTILAH

Ak	: Keliling tiang pancang (cm)
Ap	: Luas penampang tiang pancang (cm ²)
As	: Luas permukaan/sisi tiang yang tertanam
D	: Diameter tiang
FK1	: Faktor keamanan daya dukung ujung tiang
FK2	: Faktor keamanan hambatan lekat tiang
Li	: Panjang tiang yang tertanam didalam tanah
Nk	: Nilai N rata-rata sepanjang tiang yang tertanam.
Nr	: Nilai “N” rata-rata 4 D keatas dan 4 D kebawah
Qi	: Daya dukung izin tiang pancang (ton)
Qu	: Daya dukung ultimate tiang pancang (ton)
Fondasi	: Bagian paling bawah pada sebuah bangunan atau struktural yang berfungsi untuk menyalurkan beban dari struktur ke tanah dengan aman.
N-SPT	: Salah satu metode yang digunakan untuk menganalisis daya dukung tanah.
PDA Test	: Metode pengujian dinamis untuk mengevaluasi kapasitas daya dukung tiang pancang, integritas struktur tiang, serta karakteristik tanah di sekitar tiang.
STA (Station)	: Penanda yang biasanya digunakan untuk menunjukkan posisi atau lokasi tertentu disepanjang jalur proyek.

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PT. HUTAMA MARGA WASKITA		DRILLING LOG				Coordinate X	: 543609.715								
Bore No.	: BH - 3	Project	: PEMBANGUNAN JALAN TOL			Coordinate Y	: 369894.396								
Beginning	: 26 April 2022				Depth of Drill	: 66.50	m								
Ending	: 29 April 2022				Bore Master	: Partogu Sitompul									
					Description By	: Partogu Sitompul									
					Drilling Rig	: ZT 100									
GWL	: -1.00	Location	: Sta. 4 + 150 Tebing Tinggi - Indrapura - Kuala Tanjung			Engine	: Donfleng								
Elevation	: 3.411				Checked by	: Ir. Janner Napitupulu									
					Standart Penetration Test (SPT)										
Scafa (m)	Depth (m)	Thickness (m)	Ground Water Level (m)	Symbol	Description	Cone Recovery (%)	Methods of sample UDS, SPT	Thickness (m)	Depth (m)	Elevation	Blows Penetration Each 15 cm			N Blows N2-N3 30 cm	N. Value Graph
											N1	N2	N3		
0	0.00	0.00			Description : Sandy Clay Colour : Dark Brown Consistency : Soft Plasticity : Low Plastic Moisture Content : Medium to High		SPT	0.45	2.00	3.41					
1					Description : Coarse Sand Colour : Gray Consistency : Very Loose to Medium Dense Plasticity : Non Plastic Moisture Content : High		SPT	0.45	4.00	-0.59					
2	2.00	2.00			Description : Clay Colour : Dark Gray Consistency : Very Soft Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	4.45	-1.04					
3					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	6.00	-2.59					
4					Description : Clay Colour : Gray Consistency : Very Soft Plasticity : Very Low Plastic Moisture Content : High		UDS	0.50	7.50	-4.09					
5					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	8.00	-4.59					
6	6.50	4.50			Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	8.45	-5.04					
7					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	10.00	-6.59					
8					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	10.45	-7.04					
9					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	12.00	-8.59					
10	12.10	5.00			Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	12.45	-9.04					
11					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	14.00	-10.59					
12					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	14.45	-11.04					
13					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	16.00	-12.59					
14	17.00	4.90			Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	16.45	-13.04					
15					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	18.00	-14.59					
16					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	18.45	-15.04					
17					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	20.00	-16.59					
18					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	20.45	-17.04					
19					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	22.00	-18.59					
20	23.40	6.40			Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	22.45	-19.04					
21					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	24.00	-20.59					
22					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	24.45	-21.04					
23					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	26.00	-22.59					
24					Description : Sandy Clay Colour : Dark Grayish Brown Consistency : Very Soft Plasticity : Very Low to Low Plastic Moisture Content : High		SPT	0.45	26.45	-23.04					
25					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	28.00	-24.59					
26					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	28.45	-25.04					
27					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	30.00	-26.59					
28					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	30.45	-27.04					
29					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	32.00	-28.59					
30	34.00	10.60			Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	32.45	-29.04					
31					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	34.00	-30.59					
32					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	34.45	-31.04					
33					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	36.00	-32.59					
34					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	36.45	-33.04					
35					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	38.00	-34.59					
36					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	38.45	-35.04					
37					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	40.00	-36.59					
38					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	40.45	-37.04					
39					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	42.00	-38.59					
40					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	42.45	-39.04					
41					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	44.00	-40.59					
42					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	44.45	-41.04					
43					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	46.00	-42.59					
44					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	46.45	-43.04					
45	45.00	11.00			Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	48.00	-44.59					
46					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	48.45	-45.04					
47					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	50.00	-46.59					
48					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	50.45	-47.04					
49					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	52.00	-48.59					
50					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	52.45	-49.04					
51					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	54.00	-50.59					
52					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	54.45	-51.04					
53					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	56.00	-52.59					
54					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	56.45	-53.04					
55					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	58.00	-54.59					
56					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	58.45	-55.04					
57					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	60.00	-56.59					
58	59.70	14.70			Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	60.45	-57.04					
59					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	62.00	-58.59					
60					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	62.45	-59.04					
61					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	64.00	-60.59					
62					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	64.45	-61.04					
63					Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	66.00	-62.59					
64	66.50	6.80			Description : Silty Fine Sand Colour : Dark Gray Consistency : Loose to Medium Dense Plasticity : Very Low Plastic Moisture Content : High		SPT	0.45	66.45	-63.04					

Legend :

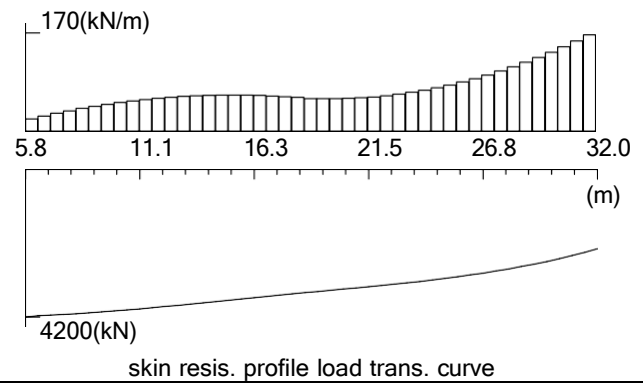
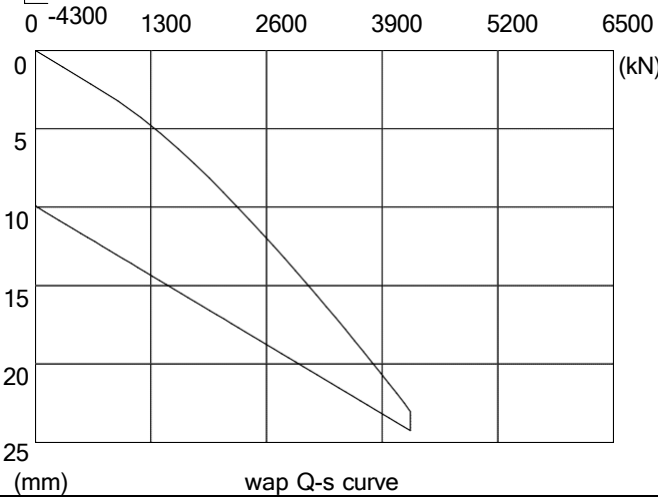
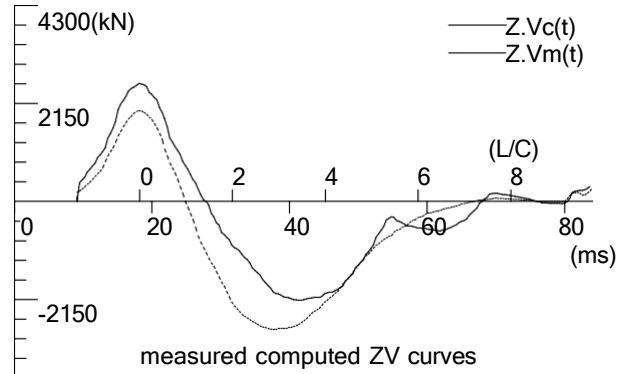
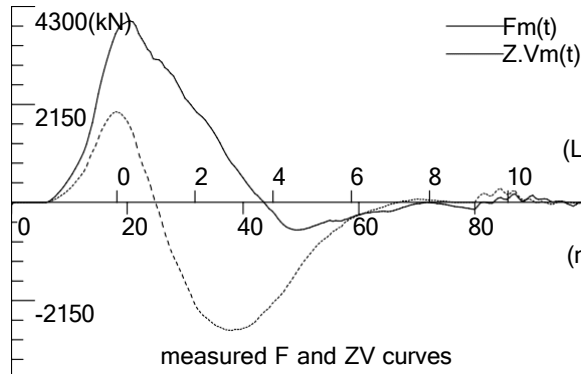
	Clay		Undisturbed Sample (UDS)		Ground Water Level		Peat Soil
	Silt		Disturbed Sample (DS)		Gravel		Fossil / Organic
	Sand		SPT		Tuff Rock		Reef

**Tabel Daya Dukung Izin Pondasi Tiang Pancang Dari Data "N" SPT
Titik Bor: BH-3**

Kedalaman (m)	Nilai SPT		Li (m)	□ =25 cm	D=30 cm	D=35 cm	D=40 cm	D=45 cm	D=50 cm	D=55 cm	D=60 cm
	N	Nk		Qi (Ton)	Qi (Ton)	Qi (Ton)	Qi (Ton)	Qi (Ton)	Qi (Ton)	Qi (Ton)	Qi (Ton)
2.45	3	3.0	2.05	2.75	3.06	4.12	5.34	6.71	13.48	16.27	19.32
4.45	11	7.0	4.05	10.30	11.44	15.36	19.86	24.94	26.66	32.07	37.97
6.45	13	9.0	6.05	13.01	14.31	19.08	24.53	30.66	27.65	33.08	38.99
8.45	0	6.8	8.05	2.17	2.05	2.39	2.73	3.07	11.93	14.06	16.36
10.45	0	5.4	10.05	2.17	2.05	2.39	2.73	3.07	4.07	4.54	5.04
12.45	1	4.7	12.05	3.08	3.06	3.76	4.50	5.30	6.15	7.06	8.01
14.45	2	4.3	14.05	4.08	4.16	5.22	6.38	7.65	8.37	9.71	11.14
16.45	2	4.0	16.05	4.23	4.31	5.39	6.58	7.87	9.93	11.57	13.33
18.45	3	3.9	18.05	5.31	5.48	6.94	8.56	10.34	12.27	14.36	16.61
20.45	4	3.9	20.05	6.46	6.72	8.57	10.64	12.91	16.05	18.88	21.93
22.45	6	4.1	22.05	8.61	9.06	11.67	14.59	17.83	21.38	25.25	29.43
24.45	8	4.4	24.05	10.92	11.55	14.94	18.75	22.98	27.63	32.70	38.18
26.45	10	4.8	26.05	13.38	14.19	18.39	23.11	28.36	30.85	36.46	42.52
28.45	7	5.0	28.05	11.44	11.89	15.15	18.79	22.78	29.11	34.26	39.81
30.45	7	5.1	30.05	12.00	12.42	15.77	19.49	23.58	29.99	35.23	40.86
32.45	10	5.4	32.05	15.30	16.00	20.50	25.53	31.07	36.49	42.95	49.92
34.45	12	5.8	34.05	17.93	18.79	24.12	30.09	36.67	47.82	56.49	65.87
36.45	20	6.6	36.05	26.20	27.85	36.15	45.51	55.91	64.09	75.90	88.69
38.45	23	7.5	38.05	30.54	32.41	42.03	52.85	64.88	74.84	88.59	103.48
40.45	21	8.2	40.05	30.56	32.11	41.31	51.61	63.02	78.14	92.29	107.59
42.45	23	8.9	42.05	34.06	35.73	45.90	57.28	69.86	83.65	98.64	114.84
44.45	25	9.6	44.05	37.73	39.50	50.67	63.15	76.94	88.76	104.48	121.44
46.45	22	10.1	46.05	36.99	38.34	48.76	60.33	73.06	86.94	101.97	118.16
48.45	19	10.5	48.05	36.01	36.94	46.58	57.22	68.85	82.13	95.89	110.66
50.45	17	10.8	50.05	35.71	36.34	45.51	55.58	66.53	82.30	95.86	110.39
52.45	21	11.2	52.05	40.72	41.70	52.49	64.39	77.39	88.22	102.73	118.28
54.45	20	11.5	54.05	41.49	42.26	52.97	64.73	77.54	90.73	105.50	121.29
56.45	18	11.7	56.05	41.26	41.73	51.99	63.19	75.33	95.62	111.16	127.78
58.45	27	12.2	58.05	50.92	52.26	65.92	80.99	97.48	129.79	152.13	176.17
60.45	58	13.8	60.05	81.40	85.86	110.81	138.79	169.81	184.88	217.99	253.76
62.45	60	15.3	62.05	87.87	92.28	118.66	148.18	180.85	215.34	254.02	295.81
64.45	60	16.7	64.05	92.67	96.81	123.94	154.22	187.64	224.20	263.91	306.76
66.45	60	18.0	66.05	97.48	101.33	129.22	160.26	194.43	231.75	272.21	315.81

Project : KTIP STA 4+200		Dept. Testing : GSEC		Date Testing : 12/10/2022	
PileID : PH29_01	TotalLen : 32.00m	Area : 0.1571m ²	Speed : 3869m/s		
FMX : 4196.12kN	VMX : 1.41m/s	EMX : 40.45kN*m	Case Jc : 0.14		
TotalUltimate : 4173kN	ShaftResist : 1911kN	EndBearing : 2262kN	QualityFactor : 64.6		
Qs : 4.08mm	Qt : 5.56mm	Ss : 1.1s/m	St : 0.1s/m		

RSM High-Strain Match Analysis Results



No.	Depth (m)	Area (m ²)	Skin Fric. (kPa)	Skin Resist. (kN)	Sum Skin Resist. (kN)	No.	Depth (m)	Area (m ²)	Skin Fric. (kPa)	Skin Resist. (kN)	Sum Skin Resist. (kN)
1	0.58	0.1571	11.6382	12.76	12.76	24	13.96	0.1571	30.3069	33.24	734.35
2	1.16	0.1571	14.3233	15.71	28.47	25	14.54	0.1571	30.3175	33.25	767.59
3	1.75	0.1571	16.8347	18.46	46.93	26	15.13	0.1571	30.6102	33.57	801.16
4	2.33	0.1571	19.1724	21.02	67.96	27	15.71	0.1571	31.1850	34.20	835.36
5	2.91	0.1571	21.3363	23.40	91.35	28	16.29	0.1571	32.0419	35.14	870.50
6	3.49	0.1571	23.3265	25.58	116.94	29	16.87	0.1571	33.1809	36.39	906.88
7	4.07	0.1571	25.1430	27.57	144.51	30	17.45	0.1571	34.6020	37.95	944.83
8	4.65	0.1571	26.7857	29.37	173.88	31	18.04	0.1571	36.3052	39.81	984.64
9	5.24	0.1571	28.2547	30.98	204.87	32	18.62	0.1571	38.2905	41.99	1026.63
10	5.82	0.1571	29.5499	32.41	237.27	33	19.20	0.1571	40.5580	44.48	1071.11
11	6.40	0.1571	30.6714	33.64	270.91	34	19.78	0.1571	43.1075	47.27	1118.38
12	6.98	0.1571	31.6192	34.67	305.58	35	20.36	0.1571	45.9391	50.38	1168.76
13	7.56	0.1571	32.3933	35.52	341.10	36	20.94	0.1571	49.0528	53.79	1222.55
14	8.14	0.1571	32.9936	36.18	377.29	37	21.53	0.1571	52.4486	57.52	1280.07
15	8.73	0.1571	33.4202	36.65	413.94	38	22.11	0.1571	56.1265	61.55	1341.62
16	9.31	0.1571	33.6730	36.93	450.86	39	22.69	0.1571	60.0865	65.89	1407.51
17	9.89	0.1571	33.7521	37.01	487.88	40	23.27	0.1571	64.3287	70.54	1478.06
18	10.47	0.1571	33.6575	36.91	524.79	41	23.85	0.1571	68.8529	75.51	1553.56
19	11.05	0.1571	33.3891	36.62	561.40	42	24.43	0.1571	73.6592	80.78	1634.34
20	11.64	0.1571	32.9471	36.13	597.53	43	25.02	0.1571	78.7476	86.36	1720.70
21	12.22	0.1571	32.3312	35.46	632.99	44	25.60	0.1571	84.1181	92.25	1812.94
22	12.80	0.1571	31.5417	34.59	667.58	45	26.18	0.1571	89.7708	98.45	1911.39
23	13.38	0.1571	30.5784	33.53	701.11						

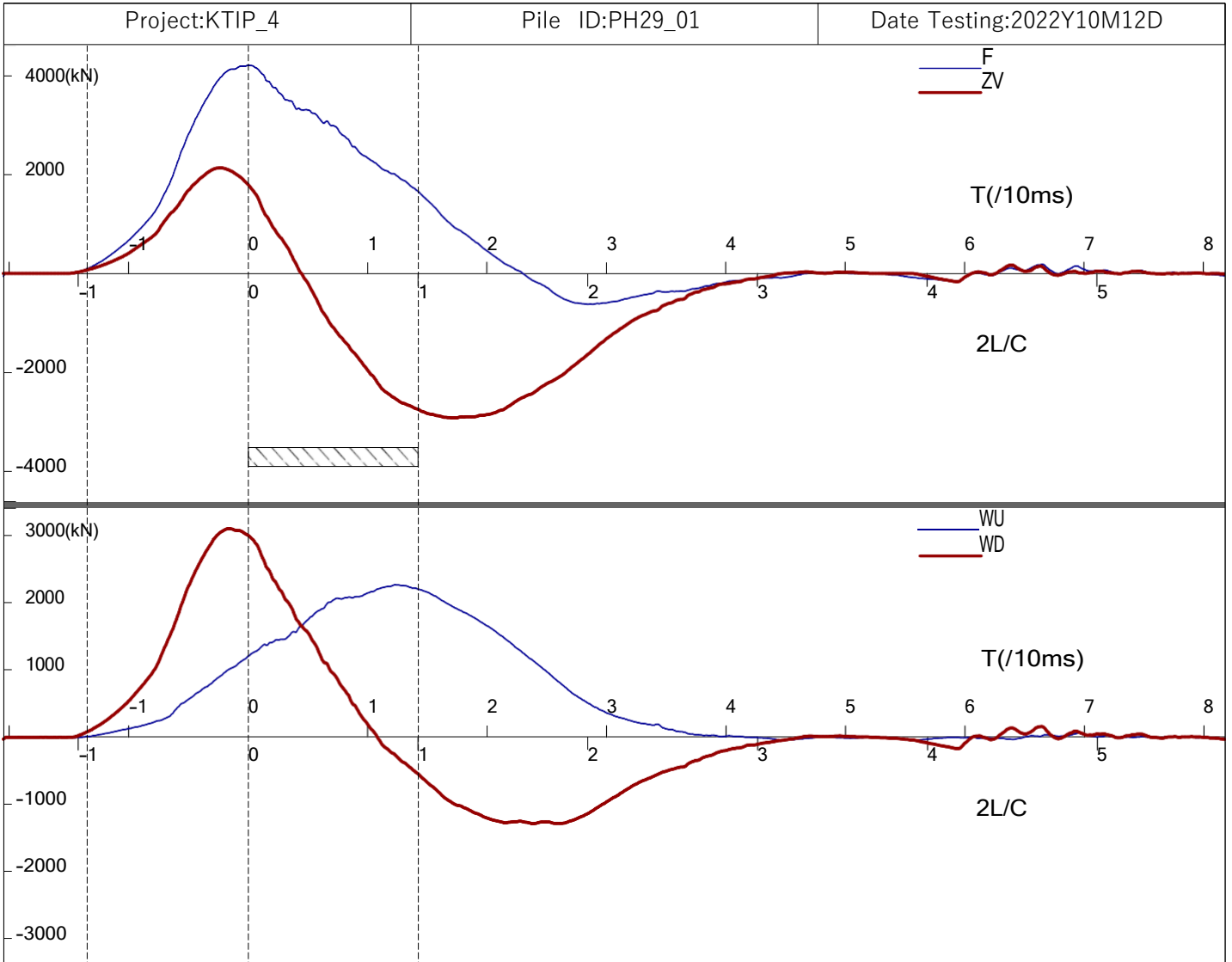
CAPWAP FINAL RESULTS STA 4 +200

Total CAPWAP Capacity:4173.1 along Shaft:1911.4 at Toe:2261.7 kN

Soil Sgmt No.	Dist. Below Gages m	Depth Below Grade m	Ru kN	Force in Pile at Ru kN	Sum of Ru kN	Unit w.Respect to Depth kN/m	Resist. Area kPa	Smith Damping Factor s/m	Quake mm
				4173.1					
1	0.58	6.40	12.8	4160.3	12.8	21.9	11.6	1.495	2.389
2	1.16	6.98	15.7	4144.6	28.5	27.0	14.3	1.492	2.473
3	1.75	7.57	18.5	4126.2	46.9	31.7	16.8	1.488	2.557
4	2.33	8.15	21.0	4105.2	68.0	36.1	19.2	1.483	2.640
5	2.91	8.73	23.4	4081.8	91.4	40.2	21.3	1.477	2.723
6	3.49	9.31	25.6	4056.2	116.9	44.0	23.3	1.470	2.805
7	4.07	9.89	27.6	4028.6	144.5	47.4	25.1	1.463	2.887
8	4.65	10.47	29.4	3999.2	173.9	50.5	26.8	1.454	2.969
9	5.24	11.06	31.0	3968.2	204.9	53.3	28.3	1.445	3.050
10	5.82	11.64	32.4	3935.8	237.3	55.7	29.5	1.435	3.131
11	6.40	12.22	33.6	3902.2	270.9	57.8	30.7	1.423	3.211
12	6.98	12.80	34.7	3867.5	305.6	59.6	31.6	1.411	3.291
13	7.56	13.38	35.5	3832.0	341.1	61.1	32.4	1.398	3.371
14	8.14	13.96	36.2	3795.8	377.3	62.2	33.0	1.384	3.450
15	8.73	14.55	36.6	3759.2	413.9	63.0	33.4	1.369	3.529
16	9.31	15.13	36.9	3722.2	450.9	63.5	33.7	1.354	3.608
17	9.89	15.71	37.0	3685.2	487.9	63.6	33.8	1.337	3.686
18	10.47	16.29	36.9	3648.3	524.8	63.4	33.7	1.320	3.764
19	11.05	16.87	36.6	3611.7	561.4	62.9	33.4	1.301	3.841
20	11.64	17.46	36.1	3575.6	597.5	62.1	32.9	1.282	3.919
21	12.22	18.04	35.5	3540.1	633.0	60.9	32.3	1.261	3.995
22	12.80	18.62	34.6	3505.5	667.6	59.5	31.5	1.240	4.072
23	13.38	19.20	33.5	3472.0	701.1	57.6	30.6	1.218	4.148
24	13.96	19.78	33.2	3438.8	734.3	57.1	30.3	1.195	4.223
25	14.54	20.36	33.2	3405.5	767.6	57.1	30.3	1.171	4.299
26	15.13	20.95	33.6	3372.0	801.2	57.7	30.6	1.147	4.373
27	15.71	21.53	34.2	3337.8	835.4	58.8	31.2	1.121	4.448
28	16.29	22.11	35.1	3302.6	870.5	60.4	32.0	1.094	4.522
29	16.87	22.69	36.4	3266.2	906.9	62.5	33.2	1.067	4.596
30	17.45	23.27	37.9	3228.3	944.8	65.2	34.6	1.038	4.669
31	18.04	23.86	39.8	3188.5	984.6	68.4	36.3	1.009	4.742
32	18.62	24.44	42.0	3146.5	1026.6	72.2	38.3	0.979	4.815
33	19.20	25.02	44.5	3102.0	1071.1	76.5	40.6	0.948	4.887
34	19.78	25.60	47.3	3054.7	1118.4	81.3	43.1	0.916	4.959
35	20.36	26.18	50.4	3004.3	1168.8	86.6	45.9	0.883	5.030
36	20.94	26.76	53.8	2950.6	1222.6	92.5	49.1	0.849	5.101
37	21.53	27.35	57.5	2893.0	1280.1	98.9	52.4	0.814	5.172
38	22.11	27.93	61.5	2831.5	1341.6	105.8	56.1	0.779	5.242
39	22.69	28.51	65.9	2765.6	1407.5	113.3	60.1	0.742	5.312
40	23.27	29.09	70.5	2695.1	1478.1	121.3	64.3	0.705	5.382
41	23.85	29.67	75.5	2619.5	1553.6	129.8	68.9	0.666	5.451
42	24.43	30.25	80.8	2538.8	1634.3	138.8	73.7	0.627	5.520
43	25.02	30.84	86.4	2452.4	1720.7	148.4	78.7	0.587	5.588
44	25.60	31.42	92.2	2360.2	1812.9	158.6	84.1	0.546	5.657
45	26.18	32.00	98.4	2261.7	1911.4	169.2	89.8	0.504	5.724

Average Skin Values 42.5 73.0 38.7 1.142 4.116
 Toe 2261.7 8000.4 0.254 5.564

case Damping Factor/Extensions Skin Toe
 Unloading Quake (% of loading quake) 1.466 0.136
 Reloading Level (% of Ru) 97 100
 Unloading Level (% of Ru) 100 100
 20



Project	Sensitivity
Project:KTIP_4	$\epsilon 1(uv/u \epsilon)$:7.34
Pile ID:PH29_01	$\epsilon 2(uv/u \epsilon)$:7.33
Drop Height(m):2.00	$\epsilon 1/ \epsilon 2$:1.00
File Name:PH29_01.RPD3	A1(mv/g):3.05
Time Testing:6/9	A2(mv/g):2.99
	A1/A2:1.02
Pile Information	Calculation results
Pile Len(m):32.00	RMX(kN):4956.12
Density(kg/m ³):2450	VMX(m/s):1.43
Elastic Modulus(GPa):36.67	CSX(MPa):26.72
PileD(mm):600	DMX(mm):13.10
AR(m ²):0.1571	DFN(mm):-28.26
JC:0.30	TSX(MPa):8.06
Date Const.:2022Y10M12D	FMX(kN):4198.47
WS(m/s):3869	EMX(kN.m):41.57
Wave Impedance(kN.s/m):1489.16	BETA:1.00

Case Result Summary Table

Case	Jc=0.00	Jc=0.10	Jc=0.20	Jc=0.30	Jc=0.40	Jc=0.50	Jc=0.60	Jc=0.70	Jc=0.80	Jc=0.90	Jc=1.00
RSP(kN)	5195.15	5115.48	5035.80	4956.12	4876.44	4796.77	4717.09	4637.41	4557.74	4478.06	4398.38
RSP(MPa)	33.07	32.56	32.05	31.55	31.04	30.53	30.03	29.52	29.01	28.50	28.00
RMX(kN)	4956.12	5115.48	5035.80	4956.12	4876.44	4796.77	4717.09	4637.41	4557.74	4478.06	4398.38
RMX(MPa)	31.55	32.56	32.05	31.55	31.04	30.53	30.03	29.52	29.01	28.50	28.00
RSU(kN)	6394.13	6129.99	6142.54	6155.09	6167.65	6180.20	6192.75	6205.30	6217.85	6230.40	6242.95
RSU(MPa)	40.70	39.02	39.10	39.18	39.26	39.34	39.42	39.50	39.58	39.66	39.74

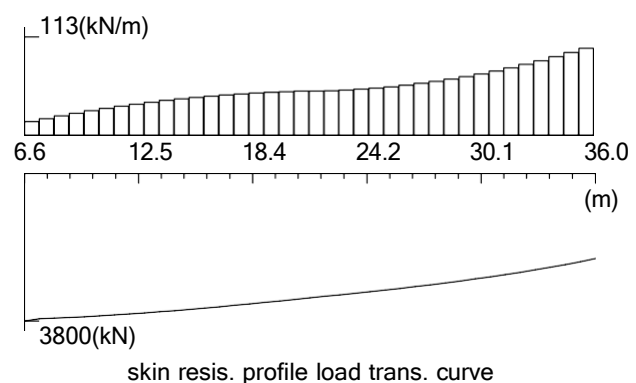
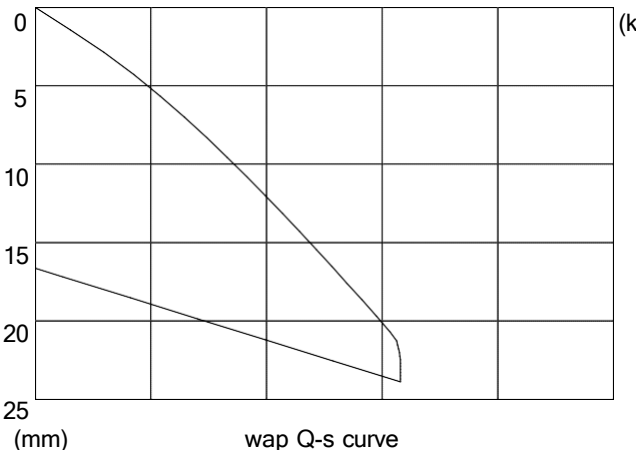
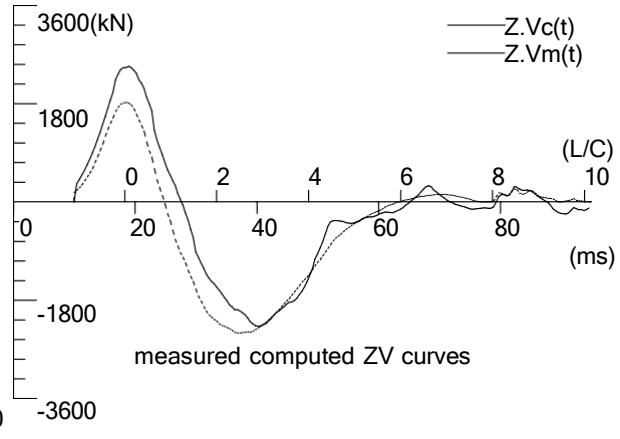
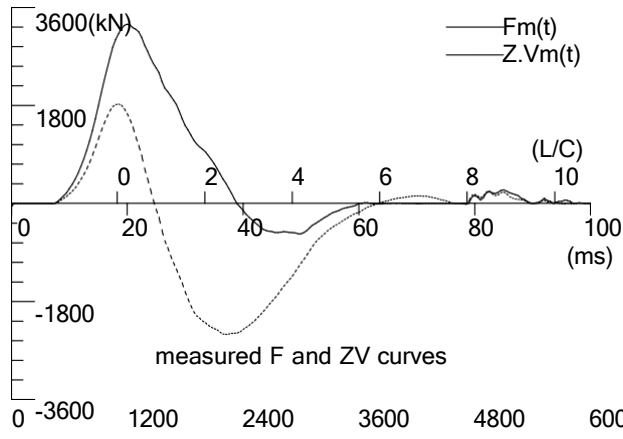
RAU(kN)	RA2(kN)	RSW(kN)	RMN(kN)	CFB	SFT
3508.16	-52.40	4893.25	4633.55	239.03	4398.38

VMX	VMN	FMX	DMX	DFN	EMX	EFN	CSX	TSX	AMX
m/s	m/s	kN	mm	mm	kN.m	kN.m	MPa	MPa	m/s^2
1.43	-1.96	4198.47	13.10	-28.26	41.57	10.45	26.72	8.06	0.00
ft/s	ft/s	kips	inch	inch	kipft	kipft	kip/ft^2	kip/ft^2	ft/s^2
4.69	-6.42	988.76	5.20	-11.22	30.66	7.70	3.88	1.17	0.01

PEMBANGUNAN JALAN TOL RIJAS KUALA TANJUNGG - INDRAPURBA

Project : KTIP STA 4+250		Dept. Testing : GSEC		Date Testing : 12/10/2022	
PileID : PH32_01	TotalLen : 36.00m		Area : 0.1571m ²		Speed : 3869m/s
FMX : 3473.53kN	VMX : 1.29m/s		EMX : 29.36kN*m		Case Jc : 0.17
TotalUltimate : 3756kN	ShaftResist : 1561kN		EndBearing : 2195kN		QualityFactor : 40.1
Qs : 4.18mm	Qt : 3.48mm		Ss : 1.2s/m		St : 0.1s/m

RSM High-Strain Match Analysis Results



No.	Depth (m)	Area (m ²)	Skin Fric. (kPa)	Skin Resist. (kN)	Sum Skin Resist. (kN)	No.	Depth (m)	Area (m ²)	Skin Fric. (kPa)	Skin Resist. (kN)	Sum Skin Resist. (kN)
1	0.77	0.1571	8.3029	12.11	12.11	20	15.47	0.1571	27.0561	39.46	590.71
2	1.55	0.1571	10.1009	14.73	26.84	21	16.25	0.1571	27.2827	39.79	630.49
3	2.32	0.1571	11.8088	17.22	44.06	22	17.02	0.1571	27.6533	40.33	670.82
4	3.09	0.1571	13.4266	19.58	63.64	23	17.79	0.1571	28.1682	41.08	711.90
5	3.87	0.1571	14.9543	21.81	85.45	24	18.57	0.1571	28.8272	42.04	753.94
6	4.64	0.1571	16.3919	23.91	109.36	25	19.34	0.1571	29.6304	43.21	797.16
7	5.42	0.1571	17.7393	25.87	135.23	26	20.12	0.1571	30.5777	44.59	841.75
8	6.19	0.1571	18.9967	27.70	162.93	27	20.89	0.1571	31.6692	46.19	887.93
9	6.96	0.1571	20.1639	29.41	192.34	28	21.66	0.1571	32.9048	47.99	935.92
10	7.74	0.1571	21.2410	30.98	223.31	29	22.44	0.1571	34.2846	50.00	985.92
11	8.51	0.1571	22.2281	32.42	255.73	30	23.21	0.1571	35.8086	52.22	1038.14
12	9.28	0.1571	23.1250	33.72	289.46	31	23.98	0.1571	37.4767	54.65	1092.80
13	10.06	0.1571	23.9318	34.90	324.36	32	24.76	0.1571	39.2890	57.30	1150.09
14	10.83	0.1571	24.6484	35.95	360.30	33	25.53	0.1571	41.2454	60.15	1210.25
15	11.61	0.1571	25.2750	36.86	397.16	34	26.31	0.1571	43.3460	63.21	1273.46
16	12.38	0.1571	25.8114	37.64	434.81	35	27.08	0.1571	45.5907	66.49	1339.95
17	13.15	0.1571	26.2578	38.29	473.10	36	27.85	0.1571	47.9797	69.97	1409.92
18	13.93	0.1571	26.6140	38.81	511.91	37	28.63	0.1571	50.5127	73.67	1483.59
19	14.70	0.1571	26.9738	39.34	551.25	38	29.40	0.1571	53.1900	77.57	1561.16

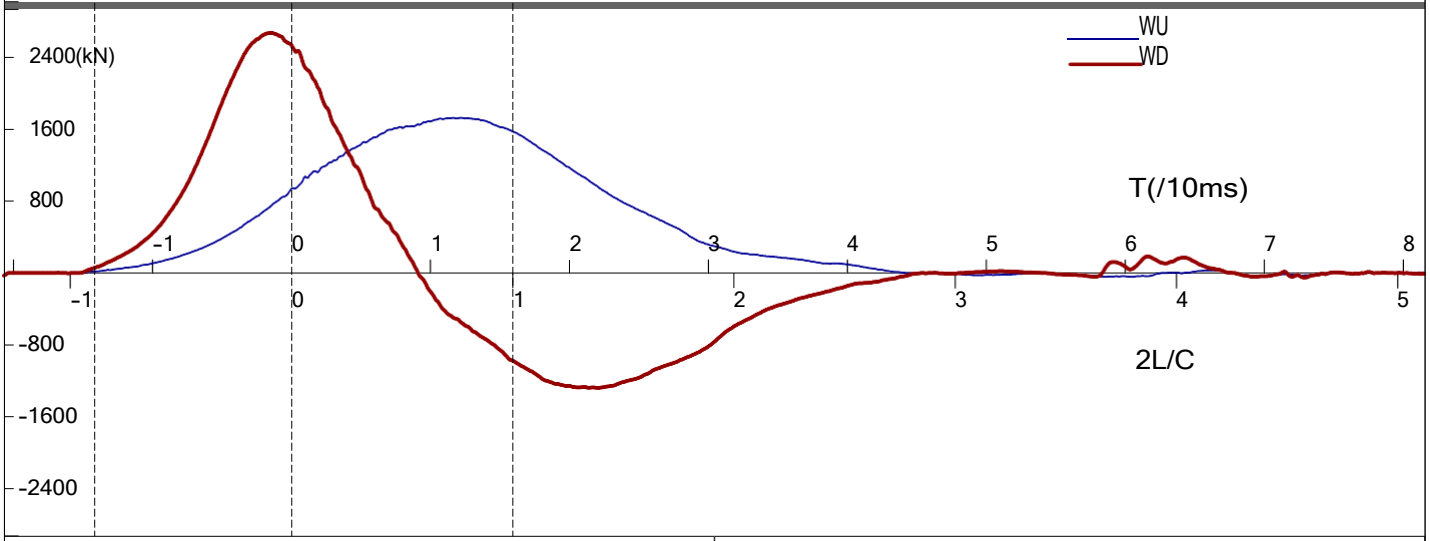
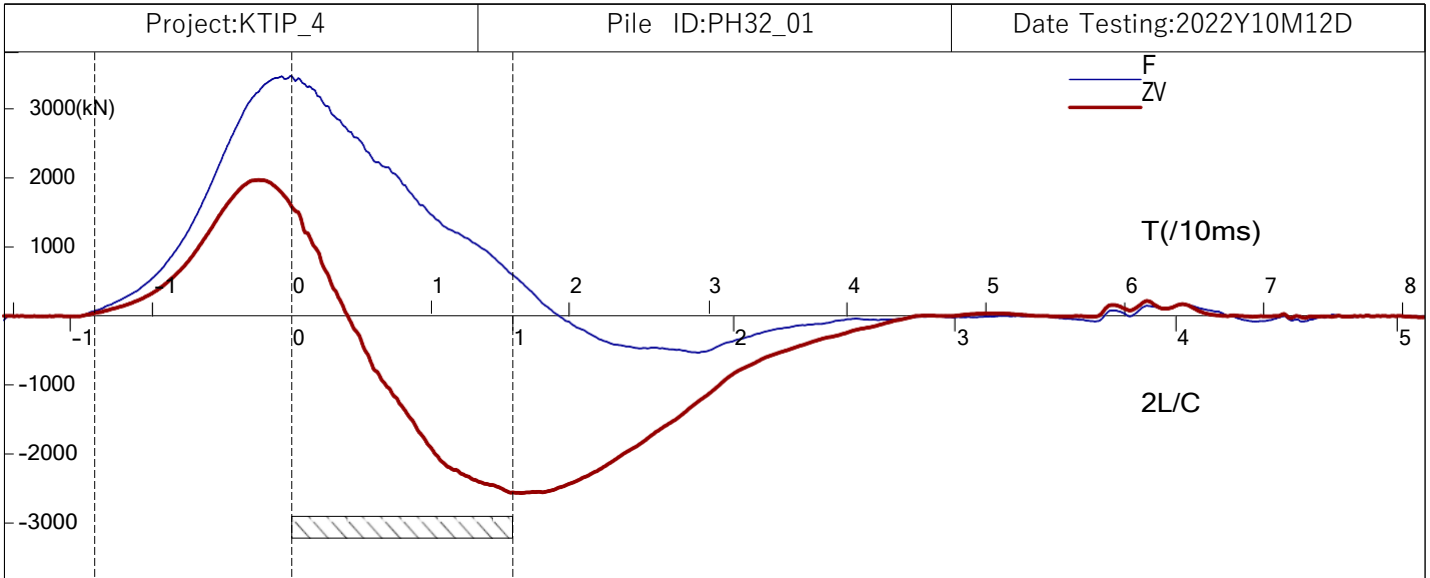
CAPWAP FINAL RESULTS STA 4 + 250

Total CAPWAP Capacity:3756.0 along Shaft:1561.2 at Toe:2194.8 kN

Soil Sgmnt No.	Dist. Below Gages m	Depth Below Grade m	Ru kN	Force in Pile at Ru kN	Sum of Ru kN	Unit w.Respect to Depth kN/m	Resist. Area kPa	Smith Damping Factor s/m	Quake mm
1	0.77	7.37	12.1	3743.9	12.1	15.7	8.3	1.481	1.753
2	1.55	8.15	14.7	3729.1	26.8	19.0	10.1	1.492	1.988
3	2.32	8.92	17.2	3711.9	44.1	22.3	11.8	1.501	2.215
4	3.09	9.69	19.6	3692.3	63.6	25.3	13.4	1.507	2.433
5	3.87	10.47	21.8	3670.5	85.5	28.2	15.0	1.512	2.643
6	4.64	11.24	23.9	3646.6	109.4	30.9	16.4	1.514	2.845
7	5.42	12.02	25.9	3620.8	135.2	33.4	17.7	1.514	3.039
8	6.19	12.79	27.7	3593.1	162.9	35.8	19.0	1.512	3.224
9	6.96	13.56	29.4	3563.6	192.3	38.0	20.2	1.508	3.400
10	7.74	14.34	31.0	3532.7	223.3	40.0	21.2	1.502	3.569
11	8.51	15.11	32.4	3500.3	255.7	41.9	22.2	1.494	3.729
12	9.28	15.88	33.7	3466.5	289.5	43.6	23.1	1.484	3.880
13	10.06	16.66	34.9	3431.6	324.4	45.1	23.9	1.471	4.023
14	10.83	17.43	35.9	3395.7	360.3	46.5	24.6	1.457	4.158
15	11.61	18.21	36.9	3358.8	397.2	47.6	25.3	1.440	4.285
16	12.38	18.98	37.6	3321.2	434.8	48.7	25.8	1.421	4.403
17	13.15	19.75	38.3	3282.9	473.1	49.5	26.3	1.400	4.513
18	13.93	20.53	38.8	3244.1	511.9	50.2	26.6	1.377	4.614
19	14.70	21.30	39.3	3204.7	551.2	50.8	27.0	1.352	4.707
20	15.47	22.07	39.5	3165.3	590.7	51.0	27.1	1.325	4.792
21	16.25	22.85	39.8	3125.5	630.5	51.4	27.3	1.296	4.868
22	17.02	23.62	40.3	3085.2	670.8	52.1	27.7	1.264	4.936
23	17.79	24.39	41.1	3044.1	711.9	53.1	28.2	1.230	4.996
24	18.57	25.17	42.0	3002.0	753.9	54.3	28.8	1.195	5.047
25	19.34	25.94	43.2	2958.8	797.2	55.9	29.6	1.157	5.090
26	20.12	26.72	44.6	2914.2	841.7	57.6	30.6	1.117	5.124
27	20.89	27.49	46.2	2868.0	887.9	59.7	31.7	1.075	5.150
28	21.66	28.26	48.0	2820.1	935.9	62.0	32.9	1.031	5.168
29	22.44	29.04	50.0	2770.1	985.9	64.6	34.3	0.984	5.177
30	23.21	29.81	52.2	2717.8	1038.1	67.5	35.8	0.936	5.178
31	23.98	30.58	54.7	2663.2	1092.8	70.6	37.5	0.885	5.171
32	24.76	31.36	57.3	2605.9	1150.1	74.1	39.3	0.833	5.155
33	25.53	32.13	60.2	2545.7	1210.2	77.7	41.2	0.778	5.131
34	26.31	32.91	63.2	2482.5	1273.5	81.7	43.3	0.721	5.099
35	27.08	33.68	66.5	2416.0	1339.9	85.9	45.6	0.662	5.058
36	27.85	34.45	70.0	2346.1	1409.9	90.4	48.0	0.601	5.009
37	28.63	35.23	73.7	2272.4	1483.6	95.2	50.5	0.538	4.951
38	29.40	36.00	77.6	2194.8	1561.2	100.3	53.2	0.472	4.885

Average Skin Values 41.1 53.1 28.2 1.212 4.248
 Toe 2194.8 7763.8 0.335 3.478

case Damping Factor/Extensions	Skin	Toe
Unloading Quake (% of loading quake)	1.270	0.174
Reloading Level (% of Ru)	20	100
Unloading Level (% of Ru)	100	100
	20	



Project	Sensitivity
Project:KTIP_4	$\epsilon 1(uv/u \epsilon):7.34$
Pile ID:PH32_01	$\epsilon 2(uv/u \epsilon):7.33$
Drop Height(m):2.00	$\epsilon 1/ \epsilon 2:1.00$
File Name:PH32_01.RPD3	A1(mv/g):3.05
Time Testing:6/8	A2(mv/g):2.99
	A1/A2:1.02
Pile Information	Calculation results
Pile Len(m):36.00	RMX(kN):3819.26
Density(kg/m ³):2450	VMX(m/s):1.32
Elastic Modulus(GPa):36.67	CSX(MPa):22.08
PileD(mm):600	DMX(mm):11.65
AR(m ²):0.1571	DFN(mm):-24.31
JC:0.30	TSX(MPa):7.43
Date Const.:2022Y10M12D	FMX(kN):3469.10
WS(m/s):3869	EMX(kN.m):30.79
Wave Impedance(kN.s/m):1489.16	BETA:1.00

Case Result Summary Table

Case	Jc=0.00	Jc=0.10	Jc=0.20	Jc=0.30	Jc=0.40	Jc=0.50	Jc=0.60	Jc=0.70	Jc=0.80	Jc=0.90	Jc=1.00
RSP(kN)	4106.25	4010.59	3914.93	3819.26	3723.60	3627.94	3532.28	3436.62	3340.95	3245.29	3149.63
RSP(MPa)	26.14	25.53	24.92	24.31	23.70	23.09	22.48	21.88	21.27	20.66	20.05
RMX(kN)	3819.26	4010.59	3914.93	3819.26	3723.60	3627.94	3532.28	3436.62	3340.95	3245.29	3149.63
RMX(MPa)	24.31	25.53	24.92	24.31	23.70	23.09	22.48	21.88	21.27	20.66	20.05
RSU(kN)	5116.27	4865.22	4847.26	4829.29	4811.32	4793.35	4775.38	4757.42	4739.45	4721.48	4703.51
RSU(MPa)	32.57	30.97	30.85	30.74	30.63	30.51	30.40	30.28	30.17	30.05	29.94

STA 4+250

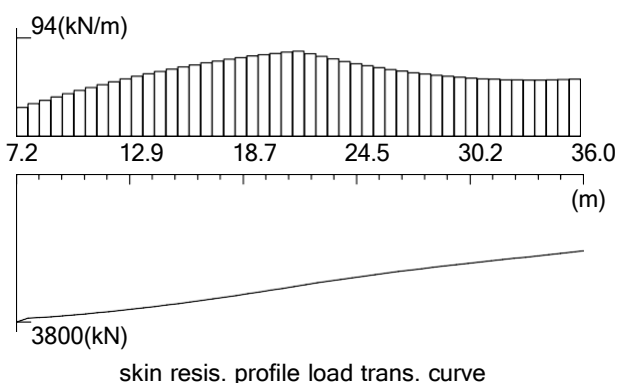
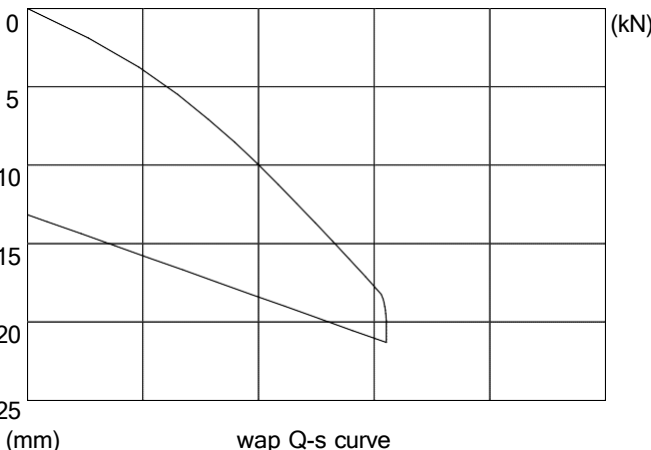
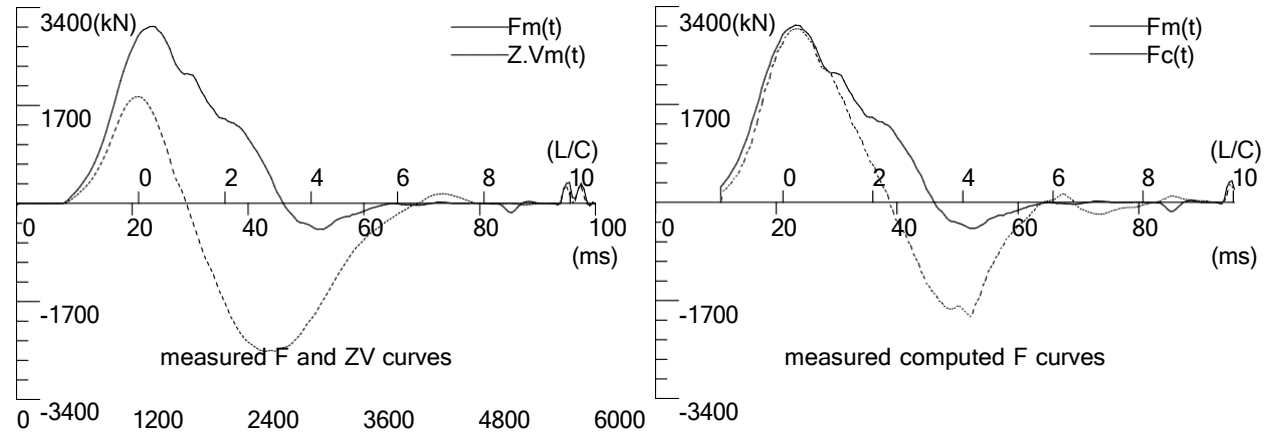
PEMBANGUNAN JALAN TOL RUAS KUALA TANJUNG - INDRAPURA

RAU(kN)	RA2(kN)	RSW(kN)	RMN(kN)	CFB	SFT
2483.86	-746.14	3746.28	3422.94	286.99	3149.63

VMX	VMN	FMX	DMX	DFN	EMX	EFN	CSX	TSX	AMX
m/s	m/s	kN	mm	mm	kN.m	kN.m	MPa	MPa	m/s^2
1.32	-1.72	3469.10	11.65	-24.31	30.79	17.77	22.08	7.43	0.00
ft/s	ft/s	kips	inch	inch	kipft	kipft	kip/ft^2	kip/ft^2	ft/s^2
4.33	-5.63	708.04	4.63	-9.65	22.71	13.11	3.20	1.08	0.01

Project : KTIP STA 4+275		Dept. Testing : GSEC		Date Testing : 12/10/2022	
PileID : PH40_01	TotalLen : 36.00m		Area : 0.1571m ²		Speed : 3869m/s
FMX : 3238.44kN	VMX : 1.31m/s		EMX : 34.90kN*m		Case Jc : 0.21
TotalUltimate : 3719kN	ShaftResist : 1750kN		EndBearing : 1969kN		QualityFactor : 51.2
Qs : 3.27mm	Qt : 2.61mm		Ss : 0.6s/m		St : 0.2s/m

RSM High-Strain Match Analysis Results



No.	Depth (m)	Area (m ²)	Skin Fric. (kPa)	Skin Resis. (kN)	Sum Skin Resis. (kN)	No.	Depth (m)	Area (m ²)	Skin Fric. (kPa)	Skin Resis. (kN)	Sum Skin Resis. (kN)
1	0.59	0.1571	14.8028	16.42	16.42	26	15.30	0.1571	42.1757	46.77	927.03
2	1.18	0.1571	16.6392	18.45	34.87	27	15.89	0.1571	40.8219	45.27	972.30
3	1.77	0.1571	18.4202	20.43	55.30	28	16.47	0.1571	39.5402	43.85	1016.15
4	2.35	0.1571	20.1459	22.34	77.64	29	17.06	0.1571	38.3306	42.51	1058.66
5	2.94	0.1571	21.8163	24.20	101.84	30	17.65	0.1571	37.1932	41.25	1099.91
6	3.53	0.1571	23.4313	25.99	127.82	31	18.24	0.1571	36.1279	40.07	1139.98
7	4.12	0.1571	24.9910	27.72	155.54	32	18.83	0.1571	35.1347	38.97	1178.94
8	4.71	0.1571	26.4953	29.38	184.93	33	19.42	0.1571	34.2136	37.94	1216.89
9	5.30	0.1571	27.9443	30.99	215.92	34	20.00	0.1571	33.3646	37.00	1253.89
10	5.88	0.1571	29.3379	32.54	248.45	35	20.59	0.1571	32.5878	36.14	1290.03
11	6.47	0.1571	30.6762	34.02	282.48	36	21.18	0.1571	31.8831	35.36	1325.39
12	7.06	0.1571	31.9592	35.44	317.92	37	21.77	0.1571	31.2505	34.66	1360.05
13	7.65	0.1571	33.1868	36.81	354.73	38	22.36	0.1571	30.6900	34.04	1394.09
14	8.24	0.1571	34.3591	38.11	392.83	39	22.95	0.1571	30.2017	33.50	1427.58
15	8.83	0.1571	35.4760	39.34	432.18	40	23.53	0.1571	29.7855	33.03	1460.62
16	9.41	0.1571	36.5376	40.52	472.70	41	24.12	0.1571	29.4414	32.65	1493.27
17	10.00	0.1571	37.5439	41.64	514.34	42	24.71	0.1571	29.1694	32.35	1525.62
18	10.59	0.1571	38.4948	42.69	557.03	43	25.30	0.1571	28.9696	32.13	1557.75
19	11.18	0.1571	39.3904	43.69	600.71	44	25.89	0.1571	28.8419	31.99	1589.73
20	11.77	0.1571	40.2306	44.62	645.33	45	26.48	0.1571	28.7863	31.93	1621.66
21	12.36	0.1571	41.0155	45.49	690.82	46	27.06	0.1571	28.8028	31.94	1653.60
22	12.94	0.1571	41.7450	46.30	737.12	47	27.65	0.1571	28.8914	32.04	1685.65
23	13.53	0.1571	42.4192	47.05	784.16	48	28.24	0.1571	29.0522	32.22	1717.87
24	14.12	0.1571	43.0381	47.73	831.89	49	28.83	0.1571	29.2851	32.48	1750.34
25	14.71	0.1571	43.6016	48.36	880.25						

CAPWAP FINAL RESULTS

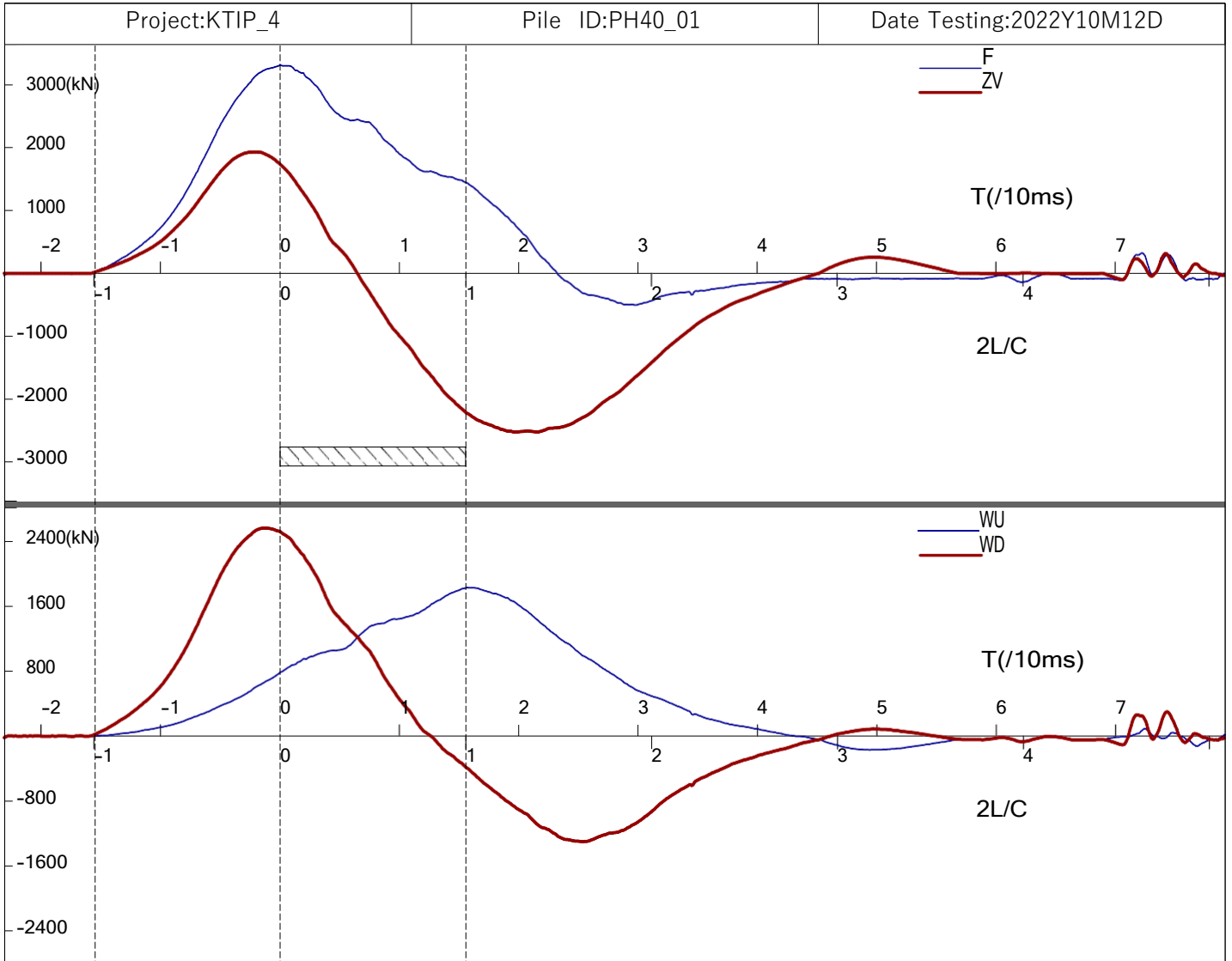
Total CAPWAP Capacity:3719.3 along Shaft:1750.3 at Toe:1969.0 kN

Soil Sgmnt No.	Dist. Below Gages m	Depth Below Grade m	Ru kN	Force in Pile at Ru kN	Sum of Ru kN	Unit w.Respect to Depth kN/m	Resist. Area kPa	Smith Damping Factor s/m	Quake mm
				3719.3					
1	0.59	7.76	16.4	3702.9	16.4	27.9	14.8	1.511	1.770
2	1.18	8.35	18.5	3684.5	34.9	31.4	16.6	1.460	1.860
3	1.77	8.94	20.4	3664.0	55.3	34.7	18.4	1.409	1.947
4	2.35	9.52	22.3	3641.7	77.6	38.0	20.1	1.359	2.034
5	2.94	10.11	24.2	3617.5	101.8	41.1	21.8	1.310	2.118
6	3.53	10.70	26.0	3591.5	127.8	44.2	23.4	1.262	2.201
7	4.12	11.29	27.7	3563.8	155.5	47.1	25.0	1.216	2.282
8	4.71	11.88	29.4	3534.4	184.9	49.9	26.5	1.170	2.362
9	5.30	12.47	31.0	3503.4	215.9	52.7	27.9	1.125	2.440
10	5.88	13.05	32.5	3470.9	248.5	55.3	29.3	1.080	2.516
11	6.47	13.64	34.0	3436.9	282.5	57.8	30.7	1.037	2.591
12	7.06	14.23	35.4	3401.4	317.9	60.2	32.0	0.995	2.664
13	7.65	14.82	36.8	3364.6	354.7	62.6	33.2	0.954	2.735
14	8.24	15.41	38.1	3326.5	392.8	64.8	34.4	0.914	2.805
15	8.83	16.00	39.3	3287.2	432.2	66.9	35.5	0.875	2.873
16	9.41	16.58	40.5	3246.6	472.7	68.9	36.5	0.836	2.939
17	10.00	17.17	41.6	3205.0	514.3	70.8	37.5	0.799	3.004
18	10.59	17.76	42.7	3162.3	557.0	72.6	38.5	0.762	3.067
19	11.18	18.35	43.7	3118.6	600.7	74.2	39.4	0.727	3.129
20	11.77	18.94	44.6	3074.0	645.3	75.8	40.2	0.692	3.189
21	12.36	19.53	45.5	3028.5	690.8	77.3	41.0	0.659	3.247
22	12.94	20.11	46.3	2982.2	737.1	78.7	41.7	0.626	3.304
23	13.53	20.70	47.0	2935.2	784.2	80.0	42.4	0.595	3.359
24	14.12	21.29	47.7	2887.4	831.9	81.1	43.0	0.564	3.412
25	14.71	21.88	48.4	2839.1	880.3	82.2	43.6	0.534	3.464
26	15.30	22.47	46.8	2792.3	927.0	79.5	42.2	0.505	3.514
27	15.89	23.06	45.3	2747.0	972.3	76.9	40.8	0.477	3.562
28	16.47	23.64	43.9	2703.2	1016.2	74.5	39.5	0.451	3.609
29	17.06	24.23	42.5	2660.7	1058.7	72.3	38.3	0.425	3.654
30	17.65	24.82	41.2	2619.4	1099.9	70.1	37.2	0.400	3.698
31	18.24	25.41	40.1	2579.4	1140.0	68.1	36.1	0.376	3.740
32	18.83	26.00	39.0	2540.4	1178.9	66.2	35.1	0.352	3.780
33	19.42	26.59	37.9	2502.4	1216.9	64.5	34.2	0.330	3.819
34	20.00	27.17	37.0	2465.4	1253.9	62.9	33.4	0.309	3.855
35	20.59	27.76	36.1	2429.3	1290.0	61.4	32.6	0.289	3.891
36	21.18	28.35	35.4	2393.9	1325.4	60.1	31.9	0.270	3.925
37	21.77	28.94	34.7	2359.3	1360.1	58.9	31.3	0.251	3.957
38	22.36	29.53	34.0	2325.2	1394.1	57.8	30.7	0.234	3.987
39	22.95	30.12	33.5	2291.8	1427.6	56.9	30.2	0.218	4.016
40	23.53	30.70	33.0	2258.7	1460.6	56.1	29.8	0.202	4.043
41	24.12	31.29	32.7	2226.1	1493.3	55.5	29.4	0.188	4.068
42	24.71	31.88	32.4	2193.7	1525.6	55.0	29.2	0.174	4.092
43	25.30	32.47	32.1	2161.6	1557.7	54.6	29.0	0.161	4.114
44	25.89	33.06	32.0	2129.6	1589.7	54.4	28.8	0.150	4.135
45	26.48	33.65	31.9	2097.7	1621.7	54.3	28.8	0.139	4.154
46	27.06	34.23	31.9	2065.7	1653.6	54.3	28.8	0.129	4.171
47	27.65	34.82	32.0	2033.7	1685.6	54.5	28.9	0.121	4.187
48	28.24	35.41	32.2	2001.5	1717.9	54.8	29.1	0.113	4.201
49	28.83	36.00	32.5	1969.0	1750.3	55.2	29.3	0.106	4.213

Average Skin Values 35.7 60.7 32.2 0.629 3.300
 Toe 1969.0 6964.9 0.460 2.614

case Damping Factor/Extensions Skin Toe
 Unloading Quake (% of loading quake) 0.740 0.214
 Reloading Level (% of Ru) 51 100
 Unloading Level (% of Ru) 100 100
 20

PEMBANGUNAN JALAN TOL RUAS KUALA TANJUNG - INDRAPURA



Project	Sensitivity
Project:KTIP_4	$\epsilon 1(uv/u \epsilon)$:7.34
Pile ID:PH40_01	$\epsilon 2(uv/u \epsilon)$:7.33
Drop Height(m):2.00	$\epsilon 1/ \epsilon 2$:1.00
File Name:PH40_01.RPD3	A1(mv/g):3.05
Time Testing:6/8	A2(mv/g):2.99
	A1/A2:1.02
Pile Information	Calculation results
Pile Len(m):36.00	RMX(kN):4133.44
Density(kg/m ³):2450	VMX(m/s):1.29
Elastic Modulus(GPa):36.67	CSX(MPa):21.01
PileD(mm):600	DMX(mm):14.28
AR(m ²):0.1571	DFN(mm): 20.13
JC:0.30	TSX(MPa):7.91
Date Const.:2022Y10M12D	FMX(kN):3300.01
WS(m/s):3869	EMX(kN.m):36.02
Wave Impedance(kN.s/m):1489.16	BETA:1.00

Case Result Summary Table

Case	Jc=0.00	Jc=0.10	Jc=0.20	Jc=0.30	Jc=0.40	Jc=0.50	Jc=0.60	Jc=0.70	Jc=0.80	Jc=0.90	Jc=1.00
RSP(kN)	4341.81	4272.35	4202.90	4133.44	4063.98	3994.52	3925.06	3855.60	3786.14	3716.68	3647.22
RSP(MPa)	27.64	27.20	26.75	26.31	25.87	25.43	24.98	24.54	24.10	23.66	23.22
RMX(kN)	4133.44	4272.35	4202.90	4133.44	4063.98	3994.52	3925.06	3856.04	3787.79	3719.55	3651.30
RMX(MPa)	26.31	27.20	26.75	26.31	25.87	25.43	24.98	24.55	24.11	23.68	23.24
RSU(kN)	5178.67	4980.47	4975.38	4970.30	4965.21	4960.13	4955.04	4949.96	4944.87	4939.79	4934.70
RSU(MPa)	32.96	31.70	31.67	31.64	31.61	31.57	31.54	31.51	31.48	31.44	31.41

RAU(kN)	RA2(kN)	RSW(kN)	RMN(kN)	CFB	SFT
2660.32	95.04	4069.92	3840.16	208.38	3647.22

VMX	VMN	FMX	DMX	DFN	EMX	EFN	CSX	TSX	AMX
m/s	m/s	kN	mm	mm	kN.m	kN.m	MPa	MPa	m/s^2
1.29	-1.69	3300.01	14.28	-20.13	36.02	19.07	21.01	7.91	0.00
ft/s	ft/s	kips	inch	inch	kipft	kipft	kip/ft^2	kip/ft^2	ft/s^2
4.24	-5.55	819.90	5.67	-7.99	26.57	14.06	3.05	1.15	0.01

STA 4+275

PEMBANGUNAN JALAN TOL RUAS KUALA TANJUNG - INDRAPURA

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Pengujian Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150



Pengujian Bor Mesin Titik - 3 (BH-3)

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Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Pengujian Bor Mesin Titik - 3 (BH-3)



Pengujian Bor Mesin Titik - 3 (BH-3)

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Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	2

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Pengujian Bor Mesin Titik - 3 (BH-3)



Pengujian Bor Mesin Titik - 3 (BH-3)

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	3

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Pengujian Bor Mesin Titik - 3 (BH-3)



Pengujian Bor Mesin Titik - 3 (BH-3)

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	4

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Pengujian Bor Mesin Titik - 3 (BH-3)



Pengujian Bor Mesin Titik - 3 (BH-3)

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	5

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Pengujian Bor Mesin Titik - 3 (BH-3)



Pengujian Bor Mesin Titik - 3 (BH-3)

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	Tebing Tinggi - Indrapura - Kuala Tanjung	6

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Pengujian Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 0.00 - 5.00 m

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	7

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 5.00 - 10.00 m



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 10.00 - 15.00 m

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	8

**Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura**



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 15.00 - 20.00 m



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 20.00 - 25.00 m

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	9

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 25.00 - 30.00 m



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 30.00 - 35.00 m

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	10

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 35.00 - 40.00 m



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 40.00 - 45.00 m

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	11

Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 45.00 - 50.00 m



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 50.00 - 55.00 m

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	12

**Project Soil Investigation
Pembangunan Jalan Tol Kuala Tanjung - Indrapura**



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 55.00 - 60.00 m



Sample Bor Mesin Titik - 3 (BH-3) Sta. 4 + 150 Kedalaman 60.00 - 65.00 m

Project :	Location :	Page :
Pembangunan Jalan Tol Kuala Tanjung - Indrapura	STA 4 + 150	13

Project PDA Test:
Pembangunan Jalan Tol Ruas Kuala Tanjung - Indrapura



Pile Name : PH29.01



Pile Name : PH29.01

Location :

STA 4+200

Page 1

Project PDA Test :
Pembangunan Jalan Tol Ruas Tebing Tinggi - Indrapura



Pile Name :PH32



Pile Name : PH32

Location :

STA 4+250

