GRL Engineers, Inc.

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TRANSMITTAL

To: Mr. Kevin Weber	From: Mark Rawlings
Company: Lunda Construction Co.	No. of Sheets: 2
E-mail: kweber@lundaconstruction.com	Date: February 12, 2015

RE: Dynamic Testing Results – USH 10 over Little Lake Butte des Morts
Structure B-70-403 - Pier 11
Winnebago County, Wisconsin

On February 10, 2015, Pier 11 #1, Pier 11 #16, Pier 11 #23, and Pier 11 #56 at the above structure were dynamically tested during initial driving. Project plans indicated the exterior row piles have a required driving resistance or ultimate capacity of 400 kips (200 tons) and the interior row piles have a required driving resistance or ultimate capacity of 350 kips (175 tons). The reference grade at the cofferdam template was reported to be at elevation El. 740.3 for Pier 11 #56 and El. 741.1 for the other three test piles. The mud line was reported to be at El. 717.6. The piles have a required minimum tip elevation of El. 658.5. The 95.9 to 96.7 foot long HP 14 x 73 H-piles were equipped with driving shoes and were driven with an APE D30-42 hammer (number PD 0256) operated on fuel setting 4.

Pier 11 #1 was driven to a depth of 88.0 feet, which corresponds to a pile tip elevation of El. 653.1. The reported pile set over the final ten blows of driving was 2.75 inches. The average hammer stroke over this increment was 7.4 feet. Pier 11 #16 was driven to a depth of 83.0 feet, which corresponds to a pile tip elevation of El. 658.1. The reported pile set over the final ten blows was 3.0 inches. The average hammer stroke over this increment was 6.8 feet. Pier 11 #23 was driven to a depth of 82.0 feet, which corresponds to a pile tip elevation of El. 659.1. The reported pile set over the final ten blows was 2.75 inches. The average hammer stroke over this increment was 7.1 feet. Pier 11 #56 was driven to a depth of 83.6 feet, which corresponds to a pile tip elevation of El. 656.8. The reported pile set over the final ten blows was 2.25 inches. The average hammer stroke over this increment was 7.6 feet.

Restrike testing was performed on these four piles on February 11. Pier 11 #1 was driven approximately 2.9 inches during the restrike testing. The reported pile set was ⅝ inch for five blows at the beginning of the restrike. Data acquisition issues prevented the collection of all of the restrike data. The average hammer stroke for the collected blows was 6.9 feet. Pier 11 #16 was driven approximately 3.4 inches during the restrike test. The reported pile set was 1.13 inches for five blows at the beginning of restrike. The average hammer stroke was 6.8 feet. Pier 11 #23 was driven approximately 2.3 inches during the restrike. The reported pile set was ¾ inch for five blows at the beginning of restrike. The average hammer stroke was 6.9 feet. Pier 11 #56 was driven

approximately 1.5 inches during the restrike. The reported pile set was ½ inch for five blows at the beginning of restrike. The average hammer stroke was 7.5 feet. Analysis of the restrike data indicated that this pile was damaged near the toe. After reviewing the initial driving data for Pier 11 #56, it has been concluded that damage likely occurred early in the driving sequence as the pile penetrated through boulders and cobbles between the approximate elevations of El. 685 and El. 670. **GRL recommends that a replacement pile be driven for Pier 11 #56.**

For the 400 and 350 kip piles driven with APE D30-42 hammer (PD 0256) in Pier 11 of the USH 10 bridge over Little Lake Butte des Morts we recommend using the following criteria:

Field Observed Hammer Stroke (feet)	Exterior Piles (400 kips) Recommended Minimum Blow Count (blows per inch)	Interior Piles (350 kips) Recommended Minimum Blow Count (blows per inch)
6.5	4	3
7.0	4	3
7.5	3	3
8.0	3	2
8.5	3	2
9.0	3	2

We recommend the above blow counts at the required stroke be maintained for **three consecutive inches** of driving. Driving should be halted if a blow count of 10 blows per inch at a 8 foot stroke or higher is achieved prior to attaining the requisite blows in the foot. We anticipate the production piles will terminate at depths similar to those of the test pile. Based on the elevation provided for the pile depth reference, Pier 11 #23 did not achieve the minimum tip requirement with a tip elevation approximately 0.6 feet above the required El. 658.5. Additional piles may meet the driving criteria above the minimum tip requirement. We recommend the design engineer be consulted on the adequacy of these piles in meeting uplift loading requirement.

Please call if you have any questions on these recommendations.

GRL Engineers, Inc.

Mark A. Rawlings

Mark Rawlings

Travis Coleman, P.E.

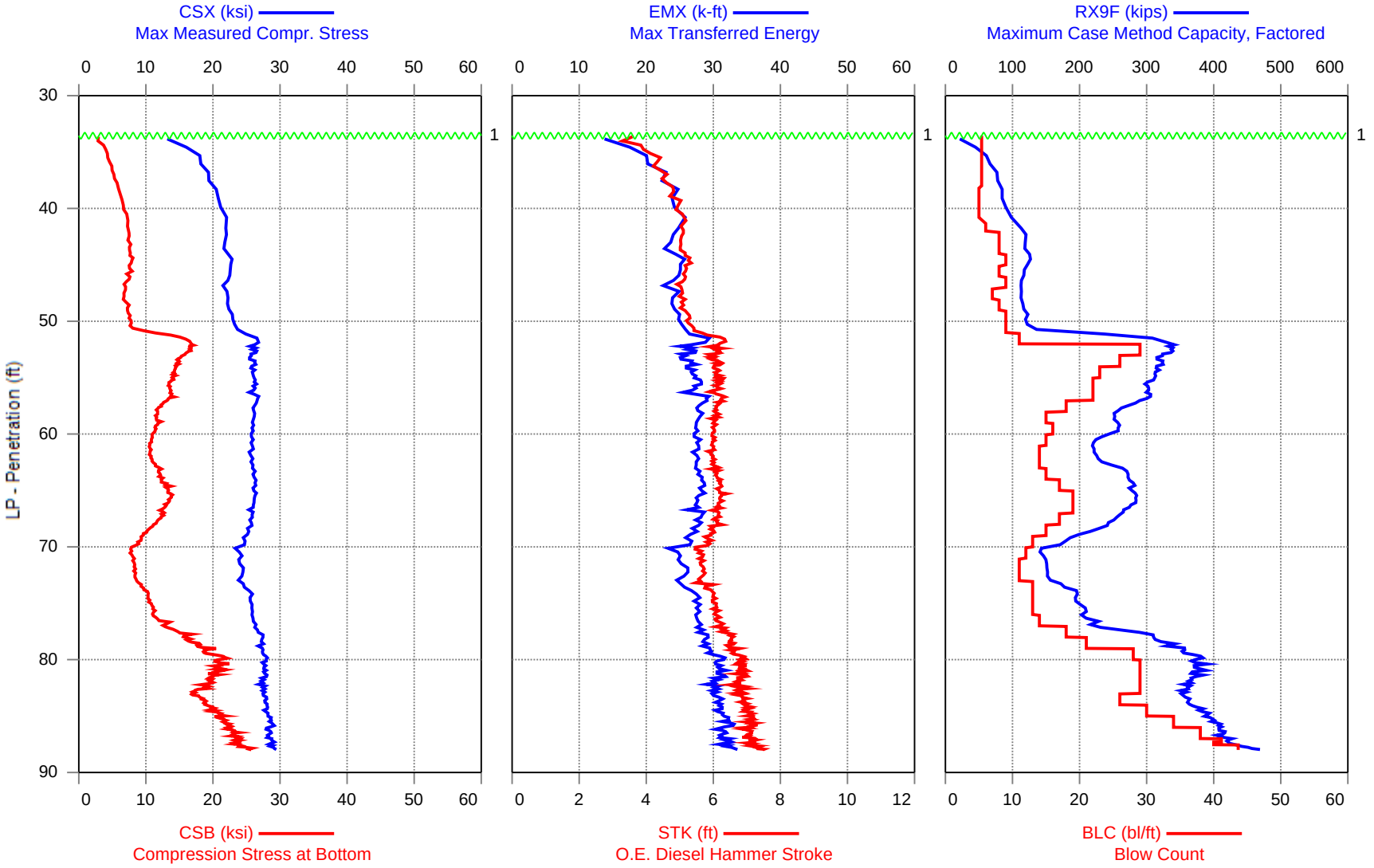
GRL Engineers, Inc. - PDIPLOT2 Ver 2014.2.48.1 - Case Method & iCAP® Results

Printed: 12-February-2015

Test started: 10-February-2015

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #1

APE D30-42, HP 14 x 73



1 - Reported reference at El. 741.1

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #1 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

AR: 21.40 in² SP: 0.492 k/ft³
LE: 93.50 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.00 []

CSX: Max Measured Compr. Stress
CSB: Compression Stress at Bottom
EMX: Max Transferred Energy
STK: O.E. Diesel Hammer Stroke
BPM: Blows per Minute
RX9F: Maximum Case Method Capacity, Factored

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
27	38.00	5	AV25	17.5	4.5	20	4.2	57.1	59
			STD	2.4	0.9	3	0.4	2.9	21
			MAX	20.2	5.9	25	4.8	64.6	87
			MIN	10.8	2.7	11	3.2	53.5	11
32	39.00	5	AV5	20.4	6.1	24	4.8	53.4	84
			STD	0.3	0.2	1	0.1	0.4	5
			MAX	20.9	6.3	25	4.9	54.1	92
			MIN	20.0	5.9	22	4.6	52.9	76
37	40.00	5	AV5	21.3	6.6	24	5.0	52.5	87
			STD	0.4	0.2	1	0.1	0.5	3
			MAX	21.8	6.7	26	5.1	53.2	91
			MIN	20.8	6.3	23	4.8	51.9	85
42	41.00	5	AV4	21.9	7.1	26	5.1	51.8	94
			STD	0.5	0.3	1	0.1	0.5	2
			MAX	22.7	7.4	27	5.3	52.5	96
			MIN	21.3	6.7	25	5.0	51.0	91
48	42.00	6	AV5	21.9	7.3	25	5.1	51.9	112
			STD	0.3	0.2	1	0.1	0.3	5
			MAX	22.4	7.6	25	5.2	52.3	119
			MIN	21.6	7.0	24	5.0	51.4	107
56	43.00	8	AV6	21.9	7.4	24	5.1	52.0	119
			STD	0.3	0.2	1	0.1	0.2	2
			MAX	22.3	7.8	25	5.1	52.4	122
			MIN	21.4	7.2	23	5.0	51.7	114
64	44.00	8	AV8	21.8	7.6	23	5.1	52.0	121
			STD	0.4	0.3	1	0.1	0.4	3
			MAX	22.4	8.1	25	5.2	52.6	125
			MIN	21.2	7.0	22	4.9	51.3	118
73	45.00	9	AV9	22.7	7.8	25	5.3	51.1	126
			STD	0.3	0.4	1	0.1	0.3	4
			MAX	23.2	8.6	26	5.4	51.5	136
			MIN	22.3	7.4	24	5.2	50.6	123
81	46.00	8	AV8	22.5	7.6	25	5.2	51.5	117
			STD	0.3	0.4	1	0.1	0.3	1
			MAX	22.9	8.2	26	5.2	52.1	119
			MIN	22.0	6.6	24	5.0	51.2	115
90	47.00	9	AV9	21.9	7.1	24	5.1	52.0	114
			STD	0.5	0.4	1	0.1	0.5	2
			MAX	22.7	7.9	26	5.2	53.1	119
			MIN	20.9	6.7	21	4.8	51.4	111
97	48.00	7	AV7	22.0	6.8	24	5.0	52.0	113
			STD	0.4	0.3	1	0.1	0.3	2
			MAX	22.5	7.4	26	5.1	52.8	116
			MIN	21.3	6.4	23	4.9	51.7	112
105	49.00	8	AV8	22.3	7.2	24	5.1	51.8	115

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #1 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
			STD	0.7	0.3	1	0.1	0.7	3
			MAX	23.3	7.6	26	5.3	52.8	119
			MIN	21.5	6.8	22	4.9	50.7	111
114	50.00	9	AV9	22.9	7.5	25	5.2	51.1	121
			STD	0.5	0.3	1	0.1	0.5	3
			MAX	23.9	8.0	27	5.5	51.6	128
			MIN	22.5	7.2	24	5.1	50.1	117
123	51.00	9	AV9	23.5	8.6	26	5.4	50.5	135
			STD	0.4	1.1	1	0.1	0.4	23
			MAX	24.1	11.0	27	5.5	51.2	188
			MIN	22.9	7.6	25	5.2	50.0	116
134	52.00	11	AV11	26.3	15.3	28	6.2	47.4	301
			STD	0.8	1.5	1	0.2	0.8	33
			MAX	27.5	16.9	31	6.5	49.1	335
			MIN	24.7	11.9	26	5.7	46.3	230
163	53.00	29	AV29	26.1	16.4	26	6.1	47.6	335
			STD	0.6	0.4	1	0.1	0.5	7
			MAX	27.5	17.2	28	6.5	48.8	345
			MIN	24.8	15.3	24	5.8	46.3	316
189	54.00	26	AV26	25.9	14.9	26	6.1	47.7	320
			STD	0.5	0.3	1	0.1	0.5	5
			MAX	26.7	15.6	28	6.3	48.6	328
			MIN	25.1	14.4	24	5.8	47.0	312
212	55.00	23	AV23	25.9	14.2	27	6.1	47.6	314
			STD	0.3	0.2	1	0.1	0.3	3
			MAX	26.7	14.5	29	6.3	48.1	321
			MIN	25.5	13.9	25	6.0	46.9	308
234	56.00	22	AV22	26.3	13.7	28	6.2	47.3	304
			STD	0.3	0.3	1	0.1	0.3	6
			MAX	26.7	14.2	30	6.3	48.0	319
			MIN	25.5	13.2	26	6.0	46.7	295
256	57.00	22	AV22	26.2	13.7	28	6.1	47.4	302
			STD	0.6	0.3	2	0.1	0.6	5
			MAX	27.0	14.5	30	6.4	49.0	310
			MIN	24.5	13.1	24	5.7	46.5	288
274	58.00	18	AV18	26.2	12.2	28	6.1	47.5	271
			STD	0.4	0.5	1	0.1	0.3	12
			MAX	27.1	13.1	30	6.4	48.0	292
			MIN	25.7	11.5	27	6.0	46.5	251
289	59.00	15	AV15	26.1	11.7	28	6.1	47.7	253
			STD	0.5	0.3	1	0.1	0.4	3
			MAX	27.0	12.7	29	6.3	48.6	258
			MIN	25.5	11.3	27	5.8	46.9	248
305	60.00	16	AV16	25.9	11.4	27	6.0	47.9	256
			STD	0.3	0.3	1	0.1	0.4	5
			MAX	26.4	12.0	28	6.1	48.7	262
			MIN	25.1	10.9	25	5.8	47.4	242
320	61.00	15	AV15	25.8	10.8	28	6.0	48.0	226
			STD	0.3	0.2	1	0.1	0.2	7
			MAX	26.3	11.2	29	6.1	48.5	242
			MIN	25.3	10.5	26	5.9	47.5	216

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #1 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM bpm	RX9F kips
334	62.00	14	AV14	25.7	10.6	28	6.0	48.1	222
			STD	0.4	0.2	1	0.1	0.4	3
			MAX	26.3	11.1	29	6.1	49.1	229
			MIN	24.6	10.4	26	5.7	47.5	216
348	63.00	14	AV14	25.9	11.2	28	6.0	47.9	240
			STD	0.4	0.4	1	0.1	0.4	14
			MAX	26.8	12.0	29	6.3	48.6	268
			MIN	25.4	10.7	26	5.8	46.9	222
363	64.00	15	AV15	26.1	12.1	28	6.1	47.6	271
			STD	0.4	0.3	1	0.1	0.4	5
			MAX	27.0	12.6	29	6.3	48.4	277
			MIN	25.2	11.5	26	5.9	46.8	261
380	65.00	17	AV17	26.2	13.0	28	6.2	47.2	278
			STD	0.3	0.5	1	0.1	0.3	5
			MAX	26.9	14.0	30	6.4	47.8	286
			MIN	25.7	12.1	27	6.0	46.6	265
399	66.00	19	AV19	26.3	13.6	28	6.2	47.1	283
			STD	0.3	0.3	1	0.1	0.3	4
			MAX	27.1	14.2	30	6.4	47.7	293
			MIN	25.7	13.1	27	6.1	46.4	278
418	67.00	19	AV19	25.9	12.8	27	6.1	47.5	273
			STD	0.5	0.4	1	0.1	0.4	8
			MAX	26.7	13.6	29	6.3	48.5	290
			MIN	24.7	12.1	25	5.9	46.9	262
435	68.00	17	AV17	25.8	12.0	28	6.1	47.5	252
			STD	0.5	0.5	1	0.1	0.4	7
			MAX	27.0	12.8	30	6.3	48.3	262
			MIN	24.9	11.3	26	5.9	46.7	237
450	69.00	15	AV15	25.3	10.3	27	6.0	48.0	220
			STD	0.5	0.5	1	0.1	0.5	16
			MAX	26.2	11.1	29	6.2	48.9	248
			MIN	24.2	9.6	25	5.8	47.2	192
463	70.00	13	AV13	24.6	9.0	26	5.8	48.7	176
			STD	0.5	0.4	1	0.1	0.5	11
			MAX	25.7	9.5	29	6.1	50.0	190
			MIN	23.5	8.2	23	5.5	47.7	149
475	71.00	12	AV12	23.8	7.9	24	5.6	49.6	143
			STD	0.5	0.2	1	0.1	0.5	3
			MAX	24.6	8.3	26	5.8	50.2	148
			MIN	23.2	7.5	23	5.4	48.8	139
486	72.00	11	AV11	24.2	8.3	26	5.7	49.3	151
			STD	0.5	0.2	1	0.1	0.4	3
			MAX	25.0	8.5	27	5.9	49.8	155
			MIN	23.2	7.9	24	5.5	48.5	146
497	73.00	11	AV11	24.2	8.4	26	5.7	49.3	153
			STD	0.5	0.2	1	0.1	0.3	3
			MAX	25.3	8.8	27	5.8	49.8	159
			MIN	23.5	8.1	24	5.5	48.6	149
510	74.00	13	AV13	24.8	9.5	26	5.8	48.8	180
			STD	1.0	0.5	2	0.2	1.0	12

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #1 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
			MAX	26.1	10.4	28	6.1	51.4	199
			MIN	22.5	8.6	22	5.2	47.7	161
523	75.00	13	AV13	25.6	10.4	27	6.0	47.9	195
			STD	0.4	0.2	1	0.1	0.4	4
			MAX	26.5	10.7	29	6.2	48.7	202
			MIN	25.0	10.2	26	5.8	47.3	189
536	76.00	13	AV13	25.8	11.1	28	6.1	47.6	206
			STD	0.4	0.2	1	0.1	0.4	5
			MAX	26.5	11.4	29	6.3	48.3	214
			MIN	25.1	10.8	26	5.9	47.0	199
550	77.00	14	AV14	26.2	12.2	28	6.2	47.3	216
			STD	0.6	0.9	1	0.1	0.5	15
			MAX	27.4	14.1	30	6.4	48.4	250
			MIN	24.8	11.1	25	5.9	46.5	196
568	78.00	18	AV18	26.9	14.8	28	6.4	46.6	276
			STD	0.6	1.2	1	0.2	0.6	31
			MAX	28.0	16.9	30	6.7	47.7	319
			MIN	25.6	12.8	26	6.1	45.6	226
589	79.00	21	AV21	27.2	17.3	29	6.5	46.1	329
			STD	0.5	1.0	1	0.1	0.5	15
			MAX	28.3	19.9	30	6.8	47.0	366
			MIN	26.3	15.7	27	6.3	45.3	307
617	80.00	28	AV28	27.7	20.2	30	6.7	45.4	368
			STD	0.5	1.3	1	0.2	0.5	13
			MAX	28.7	22.2	33	7.0	46.4	389
			MIN	26.6	18.4	28	6.4	44.4	350
646	81.00	29	AV29	27.7	20.9	31	6.8	45.0	377
			STD	0.4	0.7	1	0.1	0.4	11
			MAX	28.7	22.9	33	7.1	45.7	402
			MIN	27.0	19.7	30	6.6	44.2	360
675	82.00	29	AV29	27.6	19.9	31	6.8	45.1	369
			STD	0.5	0.5	1	0.1	0.5	8
			MAX	28.7	21.2	33	7.1	45.9	388
			MIN	26.6	19.1	29	6.6	44.3	359
704	83.00	29	AV29	27.5	18.3	30	6.8	45.2	359
			STD	0.5	1.0	1	0.1	0.4	9
			MAX	28.4	20.2	32	7.0	46.5	380
			MIN	26.1	16.8	28	6.4	44.4	345
730	84.00	26	AV26	27.8	18.3	31	6.9	44.9	360
			STD	0.4	0.7	1	0.1	0.3	6
			MAX	28.6	19.1	32	7.1	45.6	368
			MIN	27.2	16.7	29	6.7	44.3	348
760	85.00	30	AV30	28.0	20.3	31	7.0	44.4	382
			STD	0.4	0.8	1	0.1	0.3	9
			MAX	28.7	22.1	32	7.2	44.9	400
			MIN	27.4	19.1	30	6.9	43.8	363
794	86.00	34	AV34	28.7	21.8	32	7.2	44.0	402
			STD	0.4	0.7	1	0.1	0.3	8
			MAX	29.3	23.2	33	7.3	44.8	418
			MIN	28.0	20.0	31	6.9	43.6	383

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #1 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
832	87.00	38	AV38	28.3	23.1	31	7.0	44.4	412
			STD	0.4	0.6	1	0.1	0.4	8
			MAX	29.0	24.9	33	7.3	45.2	433
			MIN	27.7	21.6	29	6.8	43.7	398
844	87.29	41	AV12	28.9	23.8	32	7.2	44.0	421
			STD	0.3	0.4	1	0.1	0.4	4
			MAX	29.6	24.8	33	7.4	44.4	429
			MIN	28.4	23.2	31	7.0	43.4	416
854	87.54	40	AV10	28.7	23.5	32	7.1	44.3	425
			STD	0.4	0.5	1	0.1	0.3	7
			MAX	29.5	24.6	34	7.3	44.8	434
			MIN	28.1	22.9	30	6.9	43.6	415
864	87.77	44	AV10	28.8	24.1	32	7.2	43.9	441
			STD	0.4	0.6	1	0.1	0.3	7
			MAX	29.6	24.9	34	7.4	44.4	456
			MIN	28.2	23.0	31	7.0	43.3	430
874	88.00	44	AV10	29.2	25.6	33	7.4	43.4	461
			STD	0.3	0.4	1	0.1	0.3	8
			MAX	29.8	26.1	34	7.6	43.9	475
			MIN	28.8	24.8	32	7.2	42.9	452
			Average	26.0	14.6	28	6.2	47.4	281
			Std. Dev.	2.4	5.4	3	0.7	2.8	101
			Maximum	29.8	26.1	34	7.6	64.6	475
			Minimum	10.8	2.7	11	3.2	42.9	11

Total number of blows analyzed: 868

BL# Sensors

1-874 F3: [F607] 93.6 (1.00); F4: [D815] 93.0 (1.00); A3: [K2524] 360.0 (1.10); A4: [K3550] 360.0 (1.10)

BL# Comments

3 Reported reference at El. 741.1

Time Summary

Drive 18 minutes 44 seconds 2:17 PM - 2:36 PM BN 1 - 874

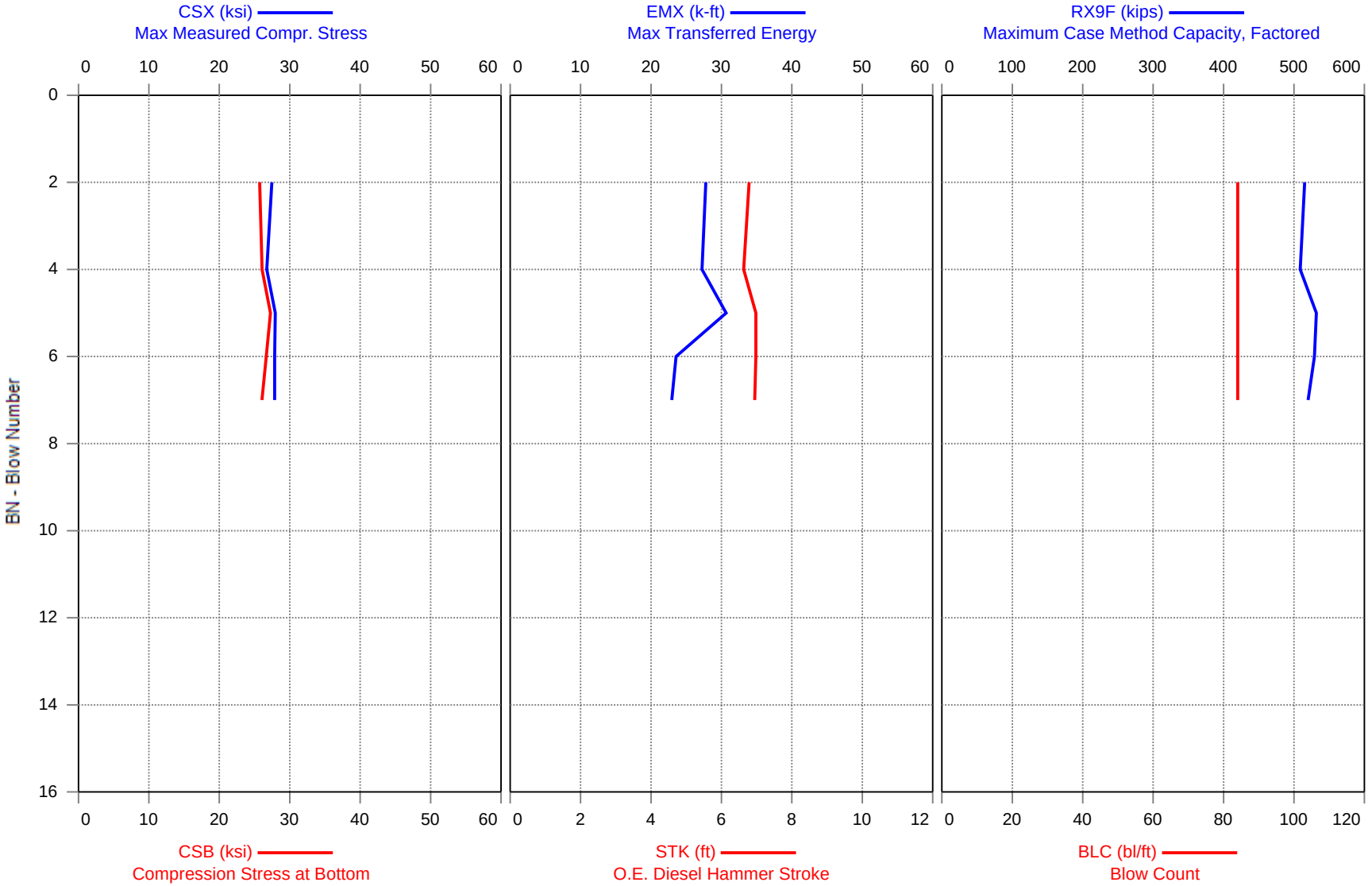
GRL Engineers, Inc. - PDIPLOT2 Ver 2014.2.48.1 - Case Method & iCAP® Results

Printed: 12-February-2015

Test started: 11-February-2015

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #1 Restrike

APE D30-42, HP 14 x 73



USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #1 Restrike APE D30-42, HP 14 x 73
OP: AM Date: 11-February-2015

AR: 21.40 in² SP: 0.492 k/ft³
LE: 93.30 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.00 []

CSX: Max Measured Compr. Stress
CSB: Compression Stress at Bottom
EMX: Max Transferred Energy
STK: O.E. Diesel Hammer Stroke
BPM: Blows per Minute
RX9F: Maximum Case Method Capacity, Factored

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
7	88.08	84	AV5	27.6	26.4	26	6.9	45.0	521
			STD	0.5	0.5	3	0.1	0.4	9
			MAX	28.0	27.3	31	7.0	45.7	532
			MIN	26.7	25.7	23	6.6	44.6	509
			Average	27.6	26.4	26	6.9	45.0	521
			Std. Dev.	0.5	0.5	3	0.1	0.4	9
			Maximum	28.0	27.3	31	7.0	45.7	532
			Minimum	26.7	25.7	23	6.6	44.6	509

Total number of blows analyzed: 5

BL# Sensors

1-7 F3: [F607] 93.6 (1.00); F4: [D815] 93.0 (1.00); A3: off; A4: [K3550] 360.0 (1.10)

Time Summary

Drive 2 minutes 38 seconds 8:54 AM - 8:57 AM BN 1 - 7

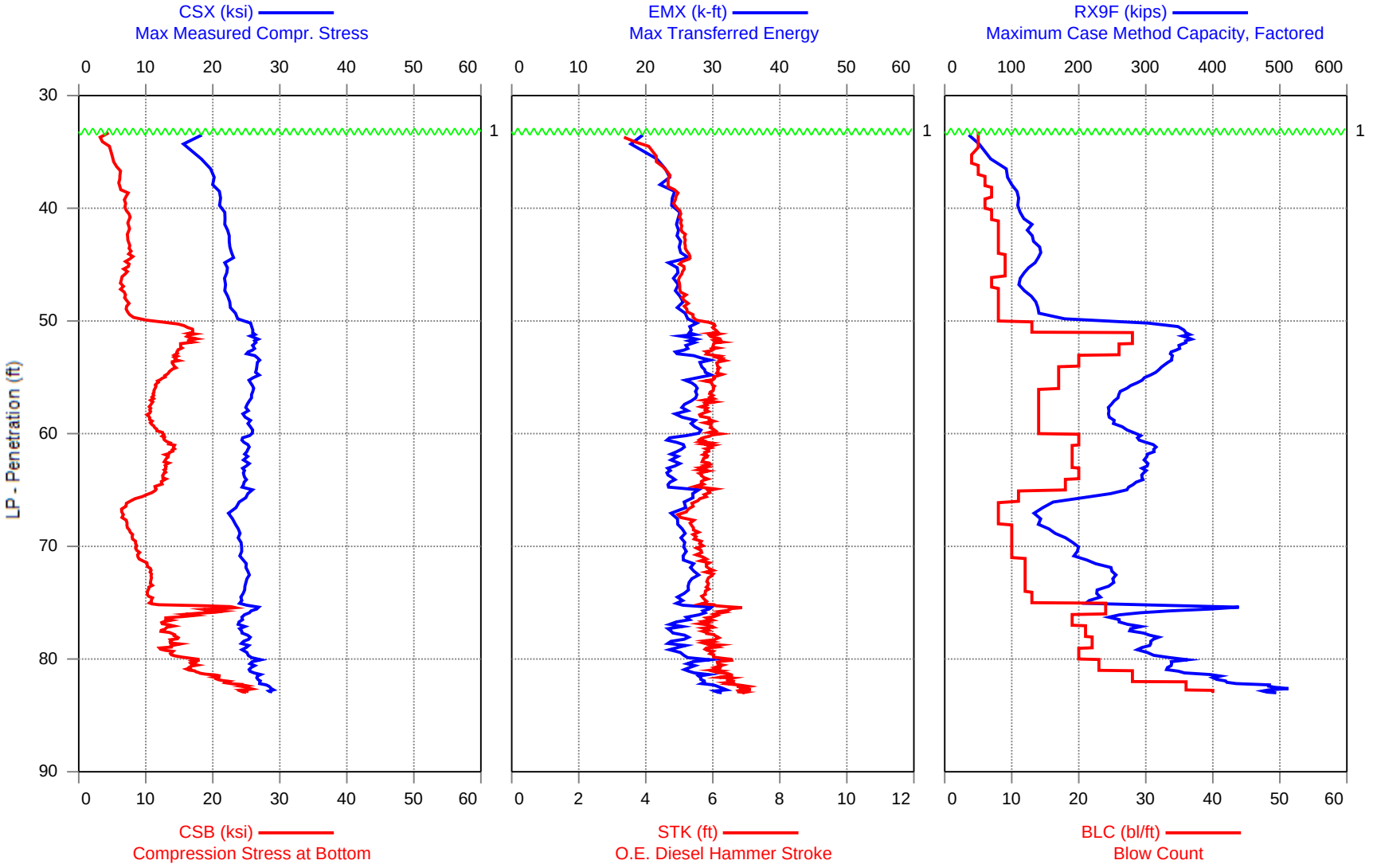
GRL Engineers, Inc. - PDIPLOT2 Ver 2014.2.48.1 - Case Method & iCAP® Results

Printed: 12-February-2015

Test started: 10-February-2015

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #16

APE D30-42, HP 14 x 73



1 - Reported Reference El. 741.1

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #16 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

AR: 21.40 in² SP: 0.492 k/ft³
LE: 93.50 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.00 []

CSX: Max Measured Compr. Stress
CSB: Compression Stress at Bottom
EMX: Max Transferred Energy
STK: O.E. Diesel Hammer Stroke
BPM: Blows per Minute
RX9F: Maximum Case Method Capacity, Factored

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
5	34.00	5	AV5	17.1	3.8	18	3.4	63.0	36
			STD	6.2	0.6	8	0.1	0.7	14
			MAX	24.7	4.5	33	3.4	63.8	57
			MIN	10.6	2.8	11	3.3	62.2	15
10	35.00	5	AV3	16.9	4.3	19	4.0	57.7	56
			STD	0.4	0.5	1	0.1	0.5	5
			MAX	17.3	4.9	20	4.1	58.2	60
			MIN	16.3	3.7	18	4.0	57.1	48
14	36.00	4	AV4	18.3	5.1	22	4.3	56.1	69
			STD	0.8	0.3	1	0.2	1.0	7
			MAX	19.3	5.4	23	4.5	57.2	73
			MIN	17.3	4.6	20	4.1	54.9	57
19	37.00	5	AV5	19.7	6.0	23	4.6	54.5	92
			STD	0.5	0.4	1	0.1	0.5	4
			MAX	20.2	6.4	24	4.7	55.5	99
			MIN	18.8	5.4	22	4.4	54.0	87
25	38.00	6	AV6	20.2	6.1	23	4.7	53.8	96
			STD	0.4	0.3	1	0.1	0.5	4
			MAX	20.9	6.6	24	4.9	54.3	102
			MIN	19.7	5.7	22	4.6	52.9	92
32	39.00	7	AV7	20.9	6.8	24	4.9	52.9	109
			STD	0.5	0.5	1	0.1	0.5	4
			MAX	21.4	7.4	25	5.0	54.1	115
			MIN	20.0	6.1	21	4.6	52.4	102
38	40.00	6	AV6	21.1	6.9	24	4.9	52.9	108
			STD	0.6	0.1	1	0.1	0.6	4
			MAX	21.7	7.1	26	5.0	54.0	116
			MIN	20.0	6.7	22	4.7	52.2	105
45	41.00	7	AV7	21.8	7.4	25	5.0	52.1	115
			STD	0.2	0.3	0	0.0	0.2	4
			MAX	22.1	7.7	25	5.1	52.5	122
			MIN	21.4	6.8	24	5.0	51.9	111
53	42.00	8	AV8	22.0	7.5	25	5.1	52.0	126
			STD	0.3	0.2	1	0.0	0.2	7
			MAX	22.5	7.8	26	5.1	52.2	141
			MIN	21.6	7.2	24	5.0	51.6	116
61	43.00	8	AV8	22.5	7.3	25	5.2	51.5	129
			STD	0.4	0.3	1	0.1	0.4	5
			MAX	23.2	7.7	26	5.3	52.2	137
			MIN	21.9	6.9	23	5.0	50.8	120
69	44.00	8	AV8	22.6	7.6	25	5.2	51.4	143
			STD	0.3	0.2	1	0.0	0.2	5
			MAX	23.1	8.0	26	5.3	51.7	149
			MIN	22.0	7.2	24	5.1	50.9	134
78	45.00	9	AV9	22.5	7.5	25	5.2	51.3	137

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #16 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
			STD	0.7	0.4	1	0.1	0.7	3
			MAX	23.3	8.3	27	5.3	52.4	143
			MIN	21.3	6.9	23	5.0	50.7	132
87	46.00	9	AV9	22.1	7.0	25	5.1	51.7	121
			STD	0.3	0.4	0	0.0	0.2	5
			MAX	22.5	7.5	25	5.2	52.2	132
			MIN	21.5	6.4	24	5.0	51.4	116
94	47.00	7	AV7	21.8	6.4	25	5.0	52.3	111
			STD	0.1	0.3	0	0.0	0.2	2
			MAX	22.0	7.1	25	5.1	52.4	114
			MIN	21.7	6.1	24	5.0	52.0	106
102	48.00	8	AV8	22.0	6.7	25	5.1	51.9	124
			STD	0.3	0.3	1	0.1	0.4	7
			MAX	22.5	7.1	26	5.2	52.5	135
			MIN	21.6	6.2	24	5.0	51.2	115
110	49.00	8	AV8	22.6	7.2	25	5.2	51.3	137
			STD	0.3	0.2	1	0.1	0.3	5
			MAX	23.1	7.6	26	5.3	51.7	146
			MIN	22.1	7.0	24	5.1	50.9	127
118	50.00	8	AV8	23.6	8.3	26	5.4	50.4	160
			STD	0.5	1.2	1	0.1	0.5	30
			MAX	24.3	10.9	28	5.6	51.3	222
			MIN	22.7	7.1	24	5.2	49.6	137
131	51.00	13	AV13	25.8	15.7	27	6.0	47.8	338
			STD	0.3	1.5	1	0.1	0.4	28
			MAX	26.3	17.7	28	6.2	48.9	361
			MIN	25.0	12.1	26	5.8	47.3	261
159	52.00	28	AV28	26.2	16.6	27	6.1	47.6	361
			STD	0.5	0.5	1	0.1	0.5	6
			MAX	27.4	17.9	29	6.4	48.8	372
			MIN	24.8	15.4	24	5.8	46.5	347
185	53.00	26	AV20	25.6	14.9	25	5.9	48.2	343
			STD	0.6	0.3	1	0.1	0.5	7
			MAX	27.3	15.6	28	6.3	49.0	357
			MIN	24.6	14.2	24	5.7	46.8	333
205	54.00	20	AV16	26.7	14.3	28	6.2	47.2	337
			STD	0.3	0.4	1	0.1	0.4	5
			MAX	27.4	15.0	31	6.4	47.9	344
			MIN	26.2	13.4	26	6.0	46.5	324
222	55.00	17	AV17	26.5	13.6	29	6.2	47.3	314
			STD	0.5	0.8	1	0.1	0.4	9
			MAX	27.5	15.2	30	6.3	48.6	325
			MIN	25.1	12.5	26	5.8	46.7	292
239	56.00	17	AV17	25.8	11.8	27	6.0	48.0	285
			STD	0.4	0.4	1	0.1	0.4	10
			MAX	26.5	12.5	28	6.1	48.9	300
			MIN	25.0	11.2	25	5.8	47.6	270
253	57.00	14	AV14	25.8	11.1	27	6.0	48.1	260
			STD	0.6	0.2	1	0.1	0.5	5
			MAX	26.7	11.3	29	6.2	49.1	269
			MIN	24.8	10.8	25	5.7	47.3	253

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #16 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM bpm	RX9F kips
267	58.00	14	AV14	25.2	10.8	26	5.8	48.7	247
			STD	0.4	0.2	1	0.1	0.5	4
			MAX	26.1	11.2	28	6.1	49.6	255
			MIN	24.5	10.4	24	5.6	47.6	240
281	59.00	14	AV14	25.0	10.6	26	5.8	48.8	248
			STD	0.7	0.3	2	0.2	0.7	5
			MAX	26.5	11.2	28	6.2	49.7	257
			MIN	24.1	10.0	23	5.6	47.2	239
295	60.00	14	AV14	25.8	11.6	28	6.0	48.0	268
			STD	0.7	0.6	2	0.2	0.7	11
			MAX	27.0	12.7	31	6.4	49.1	288
			MIN	24.7	10.8	24	5.7	46.6	248
315	61.00	20	AV20	24.8	13.0	25	5.8	48.8	294
			STD	0.6	0.4	1	0.2	0.6	7
			MAX	25.9	13.8	28	6.1	49.6	312
			MIN	24.0	12.3	22	5.6	47.7	284
334	62.00	19	AV19	25.2	13.8	25	5.9	48.5	311
			STD	0.6	0.5	1	0.1	0.5	7
			MAX	26.9	14.8	28	6.3	49.2	329
			MIN	24.5	12.8	23	5.7	46.9	299
353	63.00	19	AV15	25.0	13.1	24	5.8	48.7	300
			STD	0.6	0.4	1	0.2	0.6	5
			MAX	26.4	13.8	27	6.2	49.7	310
			MIN	23.9	12.4	23	5.6	47.3	291
373	64.00	20	AV20	24.7	12.8	24	5.7	49.2	296
			STD	0.4	0.2	1	0.1	0.5	4
			MAX	25.7	13.4	25	6.0	49.8	306
			MIN	24.1	12.4	23	5.5	48.1	290
391	65.00	18	AV18	24.9	12.0	24	5.7	49.1	281
			STD	0.7	0.6	2	0.2	0.7	9
			MAX	26.6	13.1	29	6.1	50.8	300
			MIN	23.3	11.2	21	5.3	47.4	267
402	66.00	11	AV11	25.0	9.6	27	5.7	49.0	221
			STD	0.7	1.3	1	0.2	0.8	32
			MAX	26.0	11.7	29	6.0	50.4	267
			MIN	23.9	7.5	24	5.4	47.8	170
410	67.00	8	AV8	23.3	6.7	26	5.3	50.8	144
			STD	0.5	0.4	1	0.1	0.6	7
			MAX	24.3	7.2	28	5.6	51.5	156
			MIN	22.6	6.3	25	5.2	49.7	133
418	68.00	8	AV8	22.7	6.9	24	5.2	51.4	139
			STD	0.9	0.4	2	0.2	1.0	6
			MAX	24.3	7.5	27	5.5	52.7	147
			MIN	21.4	6.2	22	4.9	49.8	131
428	69.00	10	AV10	23.9	7.6	26	5.4	50.2	157
			STD	0.5	0.3	1	0.1	0.5	9
			MAX	24.6	8.2	27	5.6	51.4	169
			MIN	22.7	7.1	24	5.2	49.4	137
438	70.00	10	AV10	24.1	8.3	26	5.6	49.6	188
			STD	0.4	0.3	1	0.1	0.5	8

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #16 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
			MAX	24.8	8.7	27	5.8	50.6	202
			MIN	23.3	7.9	24	5.4	48.9	172
448	71.00	10	AV10	24.2	8.8	26	5.6	49.5	196
			STD	0.5	0.3	1	0.1	0.6	5
			MAX	25.2	9.3	28	5.9	50.2	204
			MIN	23.4	8.4	24	5.4	48.5	186
460	72.00	12	AV12	24.8	10.0	26	5.8	48.7	228
			STD	0.5	0.6	1	0.1	0.5	16
			MAX	25.7	10.9	28	6.0	49.4	258
			MIN	24.0	8.7	25	5.6	47.8	208
472	73.00	12	AV12	25.3	10.8	27	5.9	48.3	252
			STD	0.5	0.2	1	0.1	0.5	5
			MAX	26.3	11.0	29	6.2	48.9	259
			MIN	24.6	10.5	26	5.8	47.3	246
484	74.00	12	AV12	24.8	10.6	26	5.8	48.6	241
			STD	0.4	0.3	1	0.1	0.4	12
			MAX	25.5	11.2	28	6.0	49.4	261
			MIN	24.1	10.2	25	5.6	47.9	224
497	75.00	13	AV13	24.3	10.6	25	5.8	48.9	223
			STD	0.5	0.3	1	0.1	0.5	12
			MAX	25.3	11.1	28	6.0	49.7	236
			MIN	23.4	10.1	24	5.6	48.0	196
521	76.00	24	AV24	25.6	18.4	28	6.3	47.0	336
			STD	1.1	4.2	2	0.3	1.2	76
			MAX	28.0	23.6	32	7.0	49.4	451
			MIN	23.6	10.3	24	5.6	44.6	202
540	77.00	19	AV19	24.2	13.8	26	5.9	48.4	260
			STD	0.8	1.7	2	0.2	0.9	15
			MAX	26.1	18.4	29	6.4	49.6	301
			MIN	23.0	11.9	22	5.6	46.6	240
561	78.00	21	AV21	24.6	13.4	24	5.9	48.4	291
			STD	0.7	0.8	1	0.2	0.7	14
			MAX	25.6	14.5	27	6.1	49.9	316
			MIN	23.2	12.1	22	5.5	47.4	269
583	79.00	22	AV22	25.1	14.1	25	6.0	47.9	308
			STD	0.8	0.7	2	0.2	0.8	10
			MAX	26.8	15.4	29	6.5	49.1	326
			MIN	24.1	12.5	23	5.7	46.2	284
603	80.00	20	AV18	25.2	14.2	25	6.0	48.0	311
			STD	0.9	1.6	2	0.2	0.9	23
			MAX	27.0	17.4	29	6.6	49.4	363
			MIN	23.7	11.6	22	5.6	45.9	276
626	81.00	23	AV23	26.0	16.9	27	6.2	47.1	339
			STD	0.7	0.6	1	0.2	0.6	11
			MAX	27.5	18.3	31	6.6	48.3	375
			MIN	24.7	16.0	25	5.9	45.7	324
654	82.00	28	AV28	26.6	19.9	28	6.4	46.5	391
			STD	0.8	1.6	1	0.2	0.7	27
			MAX	28.0	22.6	31	6.8	47.9	427
			MIN	25.0	17.3	25	6.0	45.3	339

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #16 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
681	82.75	36	AV27	28.1	24.2	30	6.8	45.3	473
			STD	1.0	1.4	2	0.2	0.8	32
			MAX	30.1	26.2	34	7.2	47.0	517
			MIN	26.2	21.1	27	6.3	43.9	409
691	83.00	40	AV10	28.5	24.6	31	6.8	45.1	479
			STD	0.4	0.6	1	0.1	0.3	11
			MAX	29.1	25.2	32	7.0	45.6	499
			MIN	27.8	23.8	29	6.7	44.4	462
			Average	24.8	12.8	26	5.8	48.8	270
			Std. Dev.	2.1	4.7	2	0.5	2.3	99
			Maximum	30.1	26.2	34	7.2	63.8	517
			Minimum	10.6	2.8	11	3.3	43.9	15

Total number of blows analyzed: 673

BL# Sensors

1-691 F3: [F607] 93.6 (1.00); F4: [D815] 93.0 (1.00); A3: [K2524] 360.0 (1.10); A4: [K3550] 360.0 (1.10)

BL# Comments

1 Reported Reference El. 741.1

Time Summary

Drive 14 minutes 29 seconds 1:26 PM - 1:41 PM BN 1 - 691

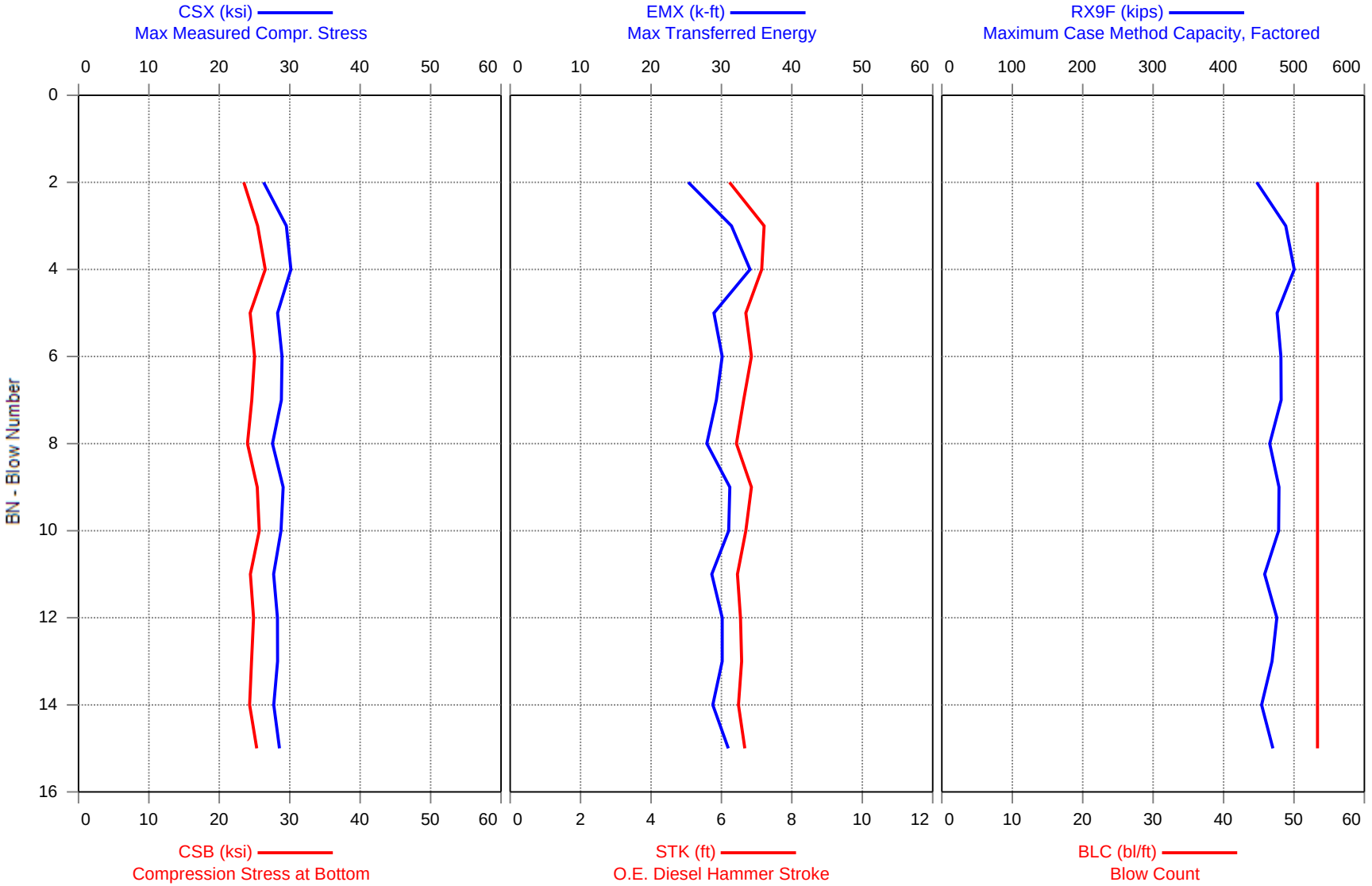
GRL Engineers, Inc. - PDIPLOT2 Ver 2014.2.48.1 - Case Method & iCAP® Results

Printed: 12-February-2015

Test started: 11-February-2015

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #16 Restrike

APE D30-42, HP 14 x 73



USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #16 Restrike APE D30-42, HP 14 x 73
OP: AM Date: 11-February-2015

AR: 21.40 in² SP: 0.492 k/ft³
LE: 93.50 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.00 []

CSX: Max Measured Compr. Stress
CSB: Compression Stress at Bottom
EMX: Max Transferred Energy
STK: O.E. Diesel Hammer Stroke
BPM: Blows per Minute
RX9F: Maximum Case Method Capacity, Factored

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
5	83.09	53	AV4	28.6	25.0	30	6.8	45.2	478
			STD	1.5	1.1	3	0.4	1.3	20
			MAX	30.2	26.5	34	7.2	47.1	500
			MIN	26.3	23.5	25	6.2	43.9	447
10	83.19	53	AV5	28.6	24.9	30	6.7	45.5	477
			STD	0.5	0.6	1	0.2	0.5	6
			MAX	29.1	25.7	31	6.8	46.4	482
			MIN	27.5	24.0	28	6.4	45.0	466
15	83.28	53	AV5	28.1	24.7	30	6.5	46.0	465
			STD	0.3	0.4	1	0.1	0.2	8
			MAX	28.5	25.3	31	6.7	46.3	476
			MIN	27.7	24.3	29	6.5	45.6	454
			Average	28.4	24.9	30	6.7	45.6	473
			Std. Dev.	0.9	0.7	2	0.3	0.8	13
			Maximum	30.2	26.5	34	7.2	47.1	500
			Minimum	26.3	23.5	25	6.2	43.9	447

Total number of blows analyzed: 14

BL# Sensors

1-15 F3: [D815] 93.0 (1.00); F4: [F607] 93.6 (1.00); A3: [K3550] 360.0 (1.10); A4: [K2524] 360.0 (1.10)

Time Summary

Drive 18 seconds 8:42 AM - 8:43 AM BN 1 - 15

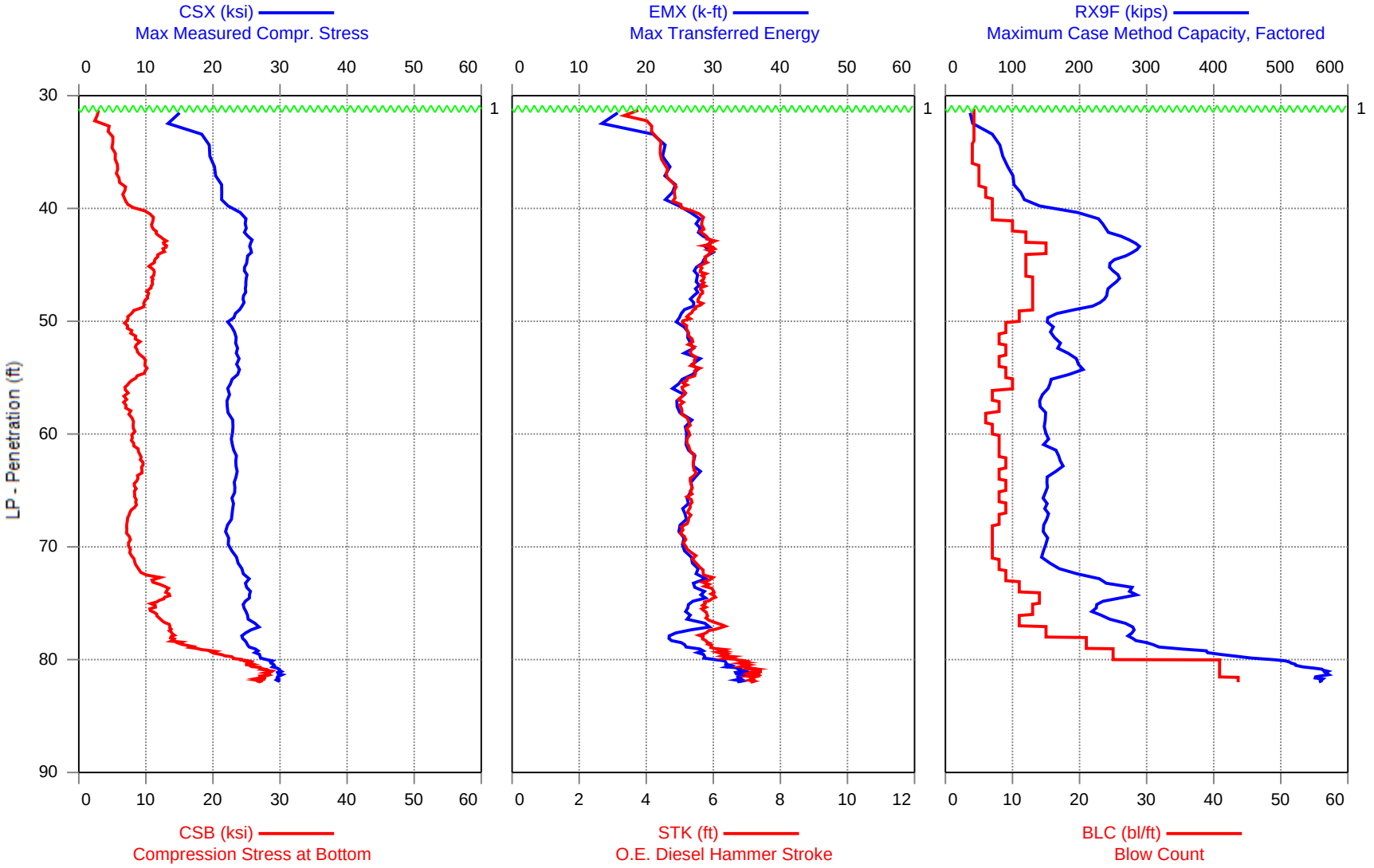
GRL Engineers, Inc. - PDIPLOT2 Ver 2014.2.48.1 - Case Method & iCAP® Results

Printed: 12-February-2015

Test started: 10-February-2015

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #23

APE D30-42, HP 14 x 73



1 - Reported Reference El. 741.1

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #23 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

AR: 21.40 in² SP: 0.492 k/ft³
LE: 93.67 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.00 []

CSX: Max Measured Compr. Stress
CSB: Compression Stress at Bottom
EMX: Max Transferred Energy
STK: O.E. Diesel Hammer Stroke
BPM: Blows per Minute
RX9F: Maximum Case Method Capacity, Factored

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
17	34.00	4	AV13	15.8	3.8	17	4.0	58.3	52
			STD	4.0	1.1	6	0.4	2.9	22
			MAX	20.0	5.6	23	4.4	63.4	90
			MIN	7.0	2.2	5	3.3	55.3	19
21	35.00	4	AV4	19.5	5.2	23	4.4	55.4	80
			STD	0.2	0.3	1	0.0	0.2	4
			MAX	19.7	5.8	24	4.5	55.5	85
			MIN	19.3	4.9	22	4.4	55.1	76
25	36.00	4	AV4	19.7	5.3	23	4.5	55.2	86
			STD	0.1	0.1	0	0.0	0.2	3
			MAX	19.8	5.5	23	4.5	55.3	91
			MIN	19.5	5.2	22	4.4	54.9	82
30	37.00	5	AV5	20.4	5.8	23	4.6	54.3	96
			STD	0.6	0.4	1	0.1	0.8	3
			MAX	21.0	6.3	25	4.8	55.4	99
			MIN	19.6	5.3	21	4.4	53.4	91
35	38.00	5	AV5	20.9	6.1	23	4.7	53.6	103
			STD	0.6	0.2	1	0.1	0.7	2
			MAX	21.5	6.4	24	4.9	54.8	107
			MIN	19.9	5.9	22	4.5	52.9	101
41	39.00	6	AV6	21.5	6.9	24	4.9	52.9	110
			STD	0.5	0.4	1	0.1	0.5	6
			MAX	22.4	7.6	26	5.0	53.4	117
			MIN	21.0	6.5	23	4.8	52.1	100
48	40.00	7	AV7	21.7	7.3	24	4.9	52.7	132
			STD	0.8	0.6	1	0.2	0.9	12
			MAX	23.0	8.6	25	5.2	53.9	148
			MIN	20.6	6.5	22	4.7	51.4	116
55	41.00	7	AV7	24.5	10.6	27	5.6	49.7	210
			STD	0.6	0.6	1	0.1	0.6	21
			MAX	25.3	11.3	29	5.7	50.9	231
			MIN	23.3	9.4	26	5.3	49.0	170
65	42.00	10	AV10	24.9	11.0	28	5.7	49.2	236
			STD	0.2	0.2	1	0.1	0.3	4
			MAX	25.2	11.4	29	5.8	49.8	243
			MIN	24.6	10.8	26	5.5	48.9	231
77	43.00	12	AV12	25.3	12.3	29	5.8	48.7	263
			STD	0.5	0.6	1	0.1	0.5	14
			MAX	26.4	13.3	31	6.1	49.5	285
			MIN	24.5	11.4	27	5.6	47.6	240
92	44.00	15	AV15	25.6	12.7	29	5.9	48.3	284
			STD	0.5	0.4	1	0.1	0.5	6
			MAX	26.6	13.7	31	6.1	49.2	296
			MIN	24.8	12.1	28	5.7	47.4	272
104	45.00	12	AV12	25.1	11.4	29	5.8	48.8	255

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #23 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
			STD	0.3	0.4	1	0.1	0.3	11
			MAX	25.5	12.0	30	5.9	49.4	276
			MIN	24.4	10.8	27	5.6	48.5	240
116	46.00	12	AV12	24.8	11.0	27	5.7	49.3	251
			STD	0.4	0.3	1	0.1	0.3	7
			MAX	25.5	11.3	29	5.8	49.9	265
			MIN	24.3	10.4	26	5.5	48.6	240
129	47.00	13	AV13	24.9	10.9	28	5.7	49.2	254
			STD	0.3	0.1	1	0.1	0.3	6
			MAX	25.5	11.3	29	5.8	49.6	262
			MIN	24.5	10.7	26	5.6	48.7	240
142	48.00	13	AV13	24.7	10.3	27	5.6	49.4	240
			STD	0.2	0.2	1	0.1	0.2	3
			MAX	25.0	10.8	28	5.7	50.0	246
			MIN	24.3	10.1	26	5.5	49.1	236
155	49.00	13	AV13	24.4	9.5	27	5.5	49.8	221
			STD	0.6	0.5	1	0.1	0.6	14
			MAX	25.2	10.0	29	5.8	50.9	238
			MIN	23.5	8.2	25	5.3	48.8	196
166	50.00	11	AV11	23.1	7.6	25	5.3	51.0	159
			STD	0.5	0.4	1	0.1	0.5	10
			MAX	23.8	8.2	26	5.4	52.2	175
			MIN	22.0	7.1	23	5.0	50.3	146
175	51.00	9	AV9	22.8	7.3	26	5.2	51.4	158
			STD	0.6	0.4	1	0.1	0.5	5
			MAX	23.5	8.1	27	5.3	52.0	167
			MIN	22.0	6.8	24	5.1	50.7	150
183	52.00	8	AV8	23.4	8.6	26	5.3	50.8	165
			STD	0.3	0.3	1	0.1	0.4	8
			MAX	23.8	9.3	27	5.4	51.4	178
			MIN	22.9	8.2	25	5.2	50.3	153
192	53.00	9	AV9	23.6	8.7	26	5.4	50.6	174
			STD	0.3	0.3	1	0.1	0.4	9
			MAX	24.3	9.2	29	5.6	51.0	192
			MIN	23.3	8.3	25	5.3	49.6	164
200	54.00	8	AV8	23.7	9.8	27	5.4	50.3	197
			STD	0.4	0.1	1	0.1	0.3	5
			MAX	24.3	10.0	29	5.5	50.8	204
			MIN	23.1	9.5	26	5.3	49.8	188
209	55.00	9	AV9	23.8	9.6	27	5.5	50.1	190
			STD	0.4	0.6	1	0.1	0.5	18
			MAX	24.4	10.3	29	5.7	50.8	209
			MIN	23.2	8.5	26	5.3	49.2	153
219	56.00	10	AV10	22.5	7.4	24	5.1	51.7	156
			STD	0.4	0.5	1	0.1	0.4	5
			MAX	23.1	8.3	26	5.3	52.3	166
			MIN	21.9	6.9	23	5.0	50.9	148
226	57.00	7	AV7	22.3	7.1	25	5.1	51.9	146
			STD	0.4	0.3	1	0.1	0.4	6
			MAX	22.7	7.4	27	5.2	52.5	158
			MIN	21.8	6.5	24	5.0	51.4	138

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #23 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM bpm	RX9F kips
234	58.00	8	AV8	22.3	7.1	25	5.1	52.0	142
			STD	0.2	0.4	0	0.0	0.2	6
			MAX	22.6	7.9	25	5.1	52.3	151
			MIN	22.0	6.6	24	5.0	51.6	135
240	59.00	6	AV6	22.7	7.9	26	5.2	51.4	149
			STD	0.4	0.3	1	0.1	0.5	3
			MAX	23.1	8.2	27	5.3	52.2	153
			MIN	22.0	7.5	25	5.0	50.9	144
247	60.00	7	AV7	23.0	8.2	26	5.3	50.9	148
			STD	0.3	0.1	1	0.1	0.4	6
			MAX	23.5	8.4	27	5.4	51.6	156
			MIN	22.6	8.0	25	5.1	50.3	141
255	61.00	8	AV8	22.8	8.0	26	5.2	51.2	150
			STD	0.3	0.2	0	0.1	0.3	4
			MAX	23.2	8.3	27	5.3	51.7	158
			MIN	22.4	7.6	25	5.1	50.8	144
263	62.00	8	AV8	23.2	8.9	27	5.3	50.7	164
			STD	0.3	0.3	1	0.1	0.3	7
			MAX	23.6	9.2	28	5.5	51.1	170
			MIN	22.7	8.2	26	5.2	50.1	147
272	63.00	9	AV9	23.4	9.4	27	5.4	50.4	173
			STD	0.2	0.2	0	0.0	0.2	3
			MAX	23.7	9.7	28	5.5	50.6	177
			MIN	23.1	9.0	26	5.4	50.1	168
280	64.00	8	AV8	23.5	9.1	28	5.4	50.4	158
			STD	0.4	0.4	1	0.1	0.4	7
			MAX	24.0	9.8	29	5.5	51.3	168
			MIN	22.7	8.6	26	5.2	49.8	147
289	65.00	9	AV9	23.3	8.4	27	5.4	50.6	152
			STD	0.4	0.2	1	0.1	0.4	3
			MAX	23.9	8.8	28	5.5	51.2	158
			MIN	22.6	8.0	26	5.2	49.9	148
297	66.00	8	AV8	22.9	8.4	26	5.3	50.9	147
			STD	0.4	0.2	1	0.1	0.4	3
			MAX	23.5	8.6	27	5.4	51.4	152
			MIN	22.2	8.1	25	5.2	50.4	141
306	67.00	9	AV9	22.9	8.1	26	5.3	50.9	151
			STD	0.3	0.4	1	0.1	0.3	4
			MAX	23.6	8.8	27	5.4	51.3	161
			MIN	22.6	7.6	25	5.2	50.2	146
314	68.00	8	AV8	22.8	7.3	26	5.3	51.0	152
			STD	0.2	0.2	0	0.0	0.2	3
			MAX	23.2	7.6	26	5.4	51.3	157
			MIN	22.3	7.0	25	5.2	50.6	148
321	69.00	7	AV7	21.9	7.2	25	5.1	51.9	146
			STD	0.3	0.2	1	0.1	0.3	8
			MAX	22.4	7.6	26	5.2	52.4	161
			MIN	21.5	6.9	23	5.0	51.3	133
328	70.00	7	AV7	22.3	7.5	25	5.1	51.6	150
			STD	0.2	0.2	1	0.1	0.2	5

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #23 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
			MAX	22.6	8.0	27	5.2	51.9	156
			MIN	22.0	7.4	25	5.1	51.2	143
335	71.00	7	AV7	23.2	7.8	26	5.4	50.6	144
			STD	0.5	0.3	1	0.1	0.5	5
			MAX	23.8	8.6	28	5.5	51.5	153
			MIN	22.3	7.4	25	5.2	50.0	138
343	72.00	8	AV8	23.8	8.5	27	5.5	49.9	159
			STD	0.4	0.3	1	0.1	0.4	9
			MAX	24.3	8.8	28	5.7	50.6	172
			MIN	23.1	7.9	25	5.4	49.2	147
352	73.00	9	AV9	24.9	10.5	28	5.8	48.7	209
			STD	0.6	1.1	1	0.2	0.6	24
			MAX	26.2	12.2	30	6.1	49.5	251
			MIN	24.1	9.2	26	5.6	47.4	176
363	74.00	11	AV11	25.1	12.5	28	5.9	48.5	263
			STD	0.6	0.9	1	0.2	0.7	21
			MAX	26.0	13.6	30	6.1	49.8	291
			MIN	24.0	11.0	25	5.5	47.6	225
377	75.00	14	AV14	25.2	12.6	28	5.9	48.3	258
			STD	0.5	0.9	1	0.1	0.6	24
			MAX	26.1	13.7	30	6.2	49.2	287
			MIN	24.3	10.6	26	5.7	47.3	212
390	76.00	13	AV13	24.8	11.1	26	5.7	48.9	225
			STD	0.3	0.4	1	0.1	0.3	10
			MAX	25.2	11.8	27	5.8	49.5	247
			MIN	24.2	10.3	25	5.6	48.6	209
401	77.00	11	AV11	25.7	12.6	27	6.0	48.1	254
			STD	0.7	0.7	2	0.2	0.7	16
			MAX	26.7	13.7	31	6.3	48.9	280
			MIN	24.9	11.5	25	5.8	47.0	232
416	78.00	15	AV15	25.3	13.8	26	5.9	48.4	278
			STD	1.0	0.3	2	0.3	1.0	5
			MAX	27.5	14.4	30	6.5	49.9	286
			MIN	23.9	13.3	22	5.5	46.3	269
437	79.00	21	AV21	25.0	15.3	25	5.8	48.6	300
			STD	0.7	1.3	1	0.2	0.6	17
			MAX	26.1	17.7	27	6.1	50.0	337
			MIN	23.7	13.3	22	5.5	47.6	271
462	80.00	25	AV25	26.9	21.1	29	6.3	46.7	414
			STD	0.8	1.8	1	0.2	0.7	36
			MAX	28.2	24.3	31	6.7	48.3	480
			MIN	25.3	17.6	25	5.9	45.4	345
525	81.54	41	AV61	29.4	26.9	33	7.1	44.3	544
			STD	0.7	1.4	1	0.2	0.6	25
			MAX	30.6	29.1	36	7.5	45.7	578
			MIN	27.8	23.8	30	6.6	43.1	502
535	81.77	44	AV10	29.6	27.3	34	7.1	44.1	556
			STD	0.3	0.4	1	0.1	0.2	8
			MAX	30.1	28.0	35	7.3	44.5	567
			MIN	29.2	26.7	32	7.0	43.7	543

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #23 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
545	82.00	44	AV10	29.7	26.9	34	7.1	44.1	559
			STD	0.2	0.3	1	0.1	0.2	7
			MAX	30.1	27.6	35	7.3	44.5	569
			MIN	29.2	26.4	33	7.0	43.7	549
			Average	24.6	12.8	27	5.7	49.3	259
			Std. Dev.	2.9	6.9	3	0.7	3.0	142
			Maximum	30.6	29.1	36	7.5	63.4	578
			Minimum	7.0	2.2	5	3.3	43.1	19

Total number of blows analyzed: 539

BL# Sensors

1-545 F3: [D815] 93.0 (1.00); F4: [F607] 93.6 (1.00); A3: [K3550] 360.0 (1.10); A4: [K2524] 360.0 (1.10)

BL# Comments

5 Reported Reference El. 741.1

Time Summary

Drive 11 minutes 37 seconds 12:58 PM - 1:09 PM BN 1 - 545

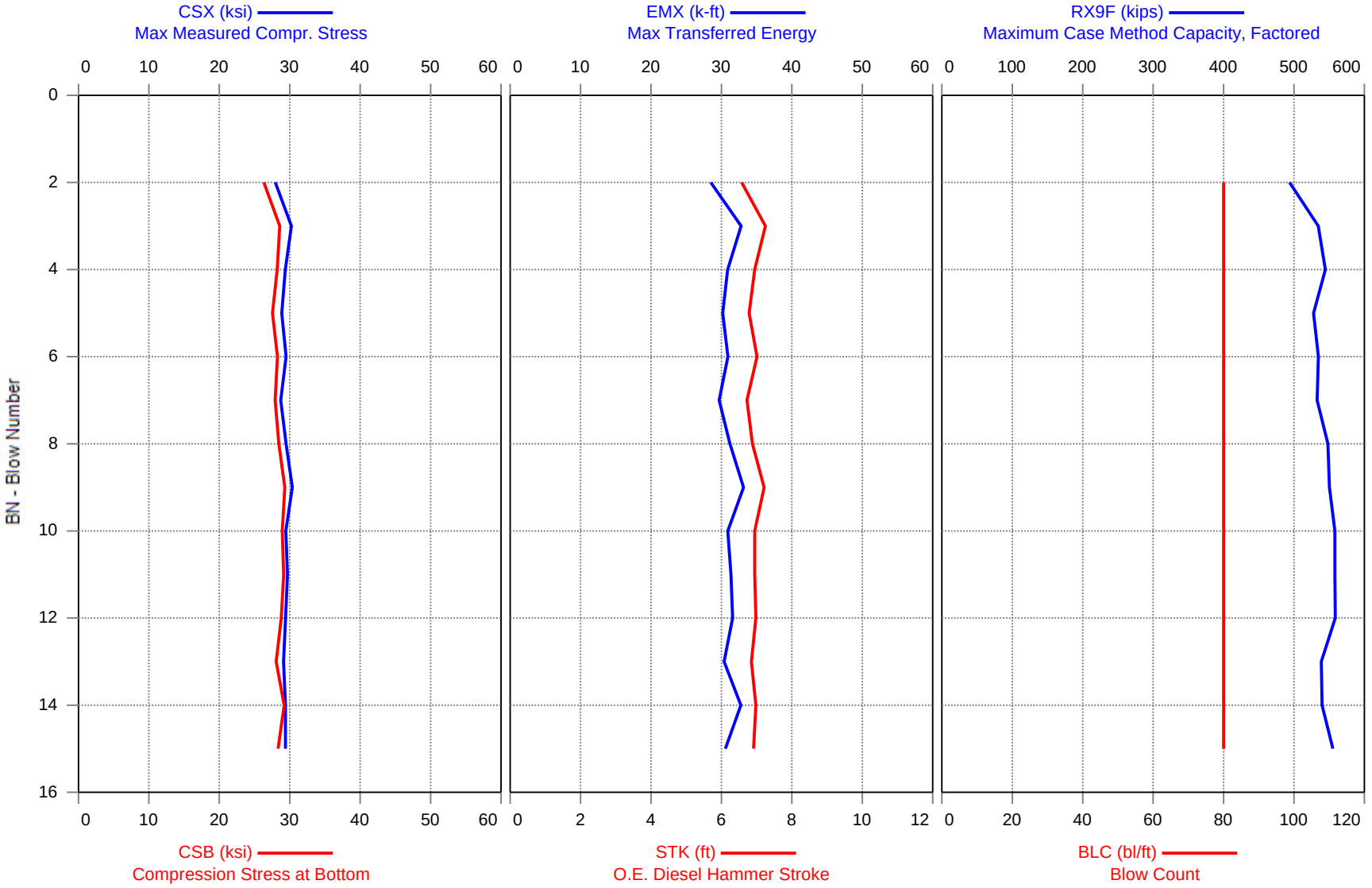
GRL Engineers, Inc. - PDIPLOT2 Ver 2014.2.48.1 - Case Method & iCAP® Results

Printed: 12-February-2015

Test started: 11-February-2015

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #23 Restrike

APE D30-42, HP 14 x 73



USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #23 Restrike APE D30-42, HP 14 x 73
OP: AM Date: 11-February-2015

AR: 21.40 in² SP: 0.492 k/ft³
LE: 93.67 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.00 []

CSX: Max Measured Compr. Stress
CSB: Compression Stress at Bottom
EMX: Max Transferred Energy
STK: O.E. Diesel Hammer Stroke
BPM: Blows per Minute
RX9F: Maximum Case Method Capacity, Factored

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9F
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm	kips
5	82.06	80	AV4	29.1	27.7	31	6.9	44.9	525
			STD	0.8	0.9	2	0.2	0.8	19
			MAX	30.2	28.6	33	7.2	45.9	544
			MIN	27.9	26.3	28	6.6	43.8	494
10	82.13	80	AV5	29.5	28.6	31	7.0	44.7	545
			STD	0.5	0.5	1	0.2	0.5	10
			MAX	30.4	29.3	33	7.2	45.4	558
			MIN	28.7	27.9	30	6.7	43.9	533
15	82.19	80	AV5	29.4	28.7	31	6.9	44.7	550
			STD	0.2	0.4	1	0.0	0.1	9
			MAX	29.7	29.2	33	7.0	45.0	559
			MIN	29.1	28.1	30	6.8	44.6	539
			Average	29.4	28.4	31	6.9	44.8	541
			Std. Dev.	0.6	0.7	1	0.2	0.5	16
			Maximum	30.4	29.3	33	7.2	45.9	559
			Minimum	27.9	26.3	28	6.6	43.8	494

Total number of blows analyzed: 14

BL# Sensors

1-15 F3: [D815] 93.0 (1.00); F4: [F607] 93.6 (1.00); A3: [K3550] 360.0 (1.10); A4: [K2524] 360.0 (1.10)

Time Summary

Drive 18 seconds 8:31 AM - 8:31 AM BN 1 - 15

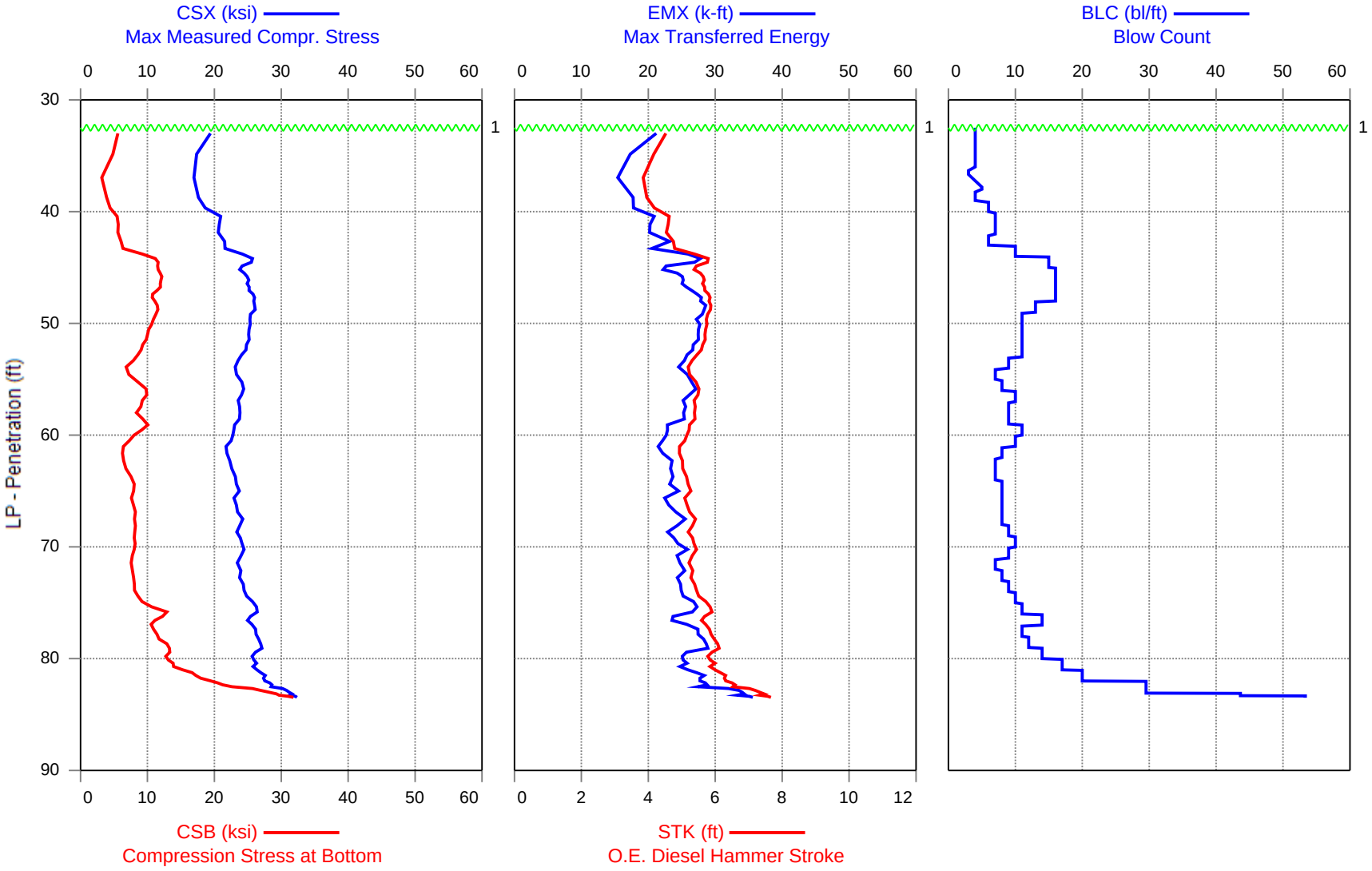
GRL Engineers, Inc. - PDIPLOT2 Ver 2014.2.48.1 - Case Method & iCAP® Results

Printed: 11-February-2015

Test started: 10-February-2015

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #56

APE D30-42, HP 14 x 73



1 - Reported reference at El. 740.3

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #56 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

AR: 21.40 in² SP: 0.492 k/ft³
LE: 92.92 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.00 []

CSX: Max Measured Compr. Stress STK: O.E. Diesel Hammer Stroke
CSB: Compression Stress at Bottom BPM: Blows per Minute
EMX: Max Transferred Energy

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm
6	32.50	4	AV1	15.4	4.5	17	3.7	59.9
			STD	0.0	0.0	0	0.0	0.0
			MAX	15.4	4.5	17	3.7	59.9
			MIN	15.4	4.5	17	3.7	59.9
8	33.00	4	AV2	24.1	6.3	31	5.4	50.3
			STD	0.6	0.2	4	0.2	0.8
			MAX	24.6	6.5	35	5.6	51.0
			MIN	23.5	6.1	27	5.3	49.5
12	34.00	4	AV4	18.2	5.5	18	4.3	56.4
			STD	2.2	0.2	5	0.4	2.4
			MAX	22.0	5.7	26	5.0	58.5
			MIN	16.3	5.2	12	3.9	52.3
13	35.25	4	AV1	19.0	4.9	18	4.3	55.8
			STD	0.0	0.0	0	0.0	0.0
			MAX	19.0	4.9	18	4.3	55.8
			MIN	19.0	4.9	18	4.3	55.8
16	36.00	4	AV3	16.8	4.1	16	4.1	57.7
			STD	3.6	0.3	5	0.6	3.7
			MAX	22.0	4.4	24	5.0	60.3
			MIN	14.2	3.6	11	3.7	52.4
19	37.00	3	AV2	16.5	2.9	15	3.8	59.5
			STD	2.7	0.4	4	0.4	3.2
			MAX	19.2	3.3	19	4.3	62.6
			MIN	13.8	2.4	11	3.4	56.3
24	38.00	5	AV2	14.9	2.9	12	3.3	63.4
			STD	1.9	0.3	2	0.1	1.0
			MAX	16.8	3.2	14	3.4	64.4
			MIN	13.0	2.6	10	3.2	62.4
28	39.00	4	AV4	17.9	3.9	19	4.0	58.2
			STD	2.4	0.6	3	0.4	2.9
			MAX	19.7	4.3	21	4.3	63.1
			MIN	13.8	2.8	13	3.3	56.1
34	40.00	6	AV6	18.3	4.3	17	4.1	57.4
			STD	1.7	0.3	3	0.3	2.0
			MAX	19.8	4.8	20	4.4	60.5
			MIN	15.6	4.0	14	3.7	55.6
41	41.00	7	AV7	21.0	5.6	21	4.6	54.2
			STD	1.5	0.3	3	0.3	1.7
			MAX	23.4	5.9	25	5.2	56.7
			MIN	18.9	5.1	17	4.2	51.5
48	42.00	7	AV7	20.4	5.6	20	4.5	54.8
			STD	0.5	0.1	1	0.1	0.5
			MAX	21.0	5.8	21	4.6	55.5
			MIN	19.9	5.4	19	4.4	54.2
54	43.00	6	AV6	21.5	6.0	23	4.7	53.6

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #56 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm
			STD	0.8	0.2	1	0.2	0.8
			MAX	22.4	6.3	24	4.9	55.4
			MIN	19.8	5.7	21	4.4	52.9
64	44.00	10	AV10	22.9	7.8	23	5.1	52.0
			STD	1.9	1.7	4	0.4	2.1
			MAX	25.4	10.8	28	5.7	55.7
			MIN	19.5	6.0	17	4.4	49.2
79	45.00	15	AV15	25.1	11.4	26	5.7	49.3
			STD	1.0	0.3	3	0.2	1.0
			MAX	26.3	11.9	29	5.9	51.3
			MIN	23.1	10.9	20	5.2	48.2
95	46.00	16	AV16	24.4	11.9	24	5.5	49.9
			STD	0.6	0.3	2	0.1	0.6
			MAX	25.6	12.4	26	5.8	51.0
			MIN	23.2	11.4	21	5.3	48.9
111	47.00	16	AV16	25.1	11.9	26	5.7	49.3
			STD	0.4	0.3	1	0.1	0.3
			MAX	25.7	12.6	27	5.8	50.0
			MIN	24.4	11.2	23	5.5	48.8
127	48.00	16	AV16	25.9	10.9	28	5.8	48.6
			STD	0.5	0.3	1	0.1	0.4
			MAX	26.7	11.7	29	6.0	49.3
			MIN	25.2	10.4	26	5.7	47.8
140	49.00	13	AV13	25.9	11.4	28	5.8	48.6
			STD	0.5	0.3	1	0.1	0.4
			MAX	26.9	12.0	31	6.1	49.4
			MIN	24.8	10.9	26	5.6	47.7
151	50.00	11	AV11	25.4	11.0	28	5.8	48.9
			STD	0.3	0.3	1	0.1	0.3
			MAX	25.9	11.4	29	5.9	49.4
			MIN	24.9	10.5	26	5.6	48.4
162	51.00	11	AV11	25.2	10.2	27	5.7	49.1
			STD	0.5	0.2	1	0.1	0.4
			MAX	25.9	10.5	29	5.9	49.7
			MIN	24.5	9.8	26	5.6	48.5
173	52.00	11	AV11	25.0	9.7	27	5.7	49.3
			STD	0.3	0.3	1	0.1	0.3
			MAX	25.4	10.1	28	5.8	49.8
			MIN	24.7	9.3	26	5.5	48.9
184	53.00	11	AV11	24.5	8.8	26	5.5	49.8
			STD	0.5	0.3	1	0.1	0.5
			MAX	25.2	9.2	28	5.7	50.7
			MIN	23.7	8.3	25	5.3	49.2
193	54.00	9	AV9	23.4	7.4	25	5.3	51.0
			STD	0.3	0.6	1	0.1	0.4
			MAX	24.1	8.3	26	5.5	51.7
			MIN	22.8	6.5	24	5.1	50.1
200	55.00	7	AV7	23.4	7.3	26	5.2	51.1
			STD	0.6	0.4	1	0.1	0.5
			MAX	24.2	7.9	27	5.4	51.7
			MIN	22.7	6.8	25	5.1	50.3

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #56
OP: TC
APE D30-42, HP 14 x 73
Date: 10-February-2015

BL#	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM bpm
208	56.00	8	AV8	24.3	9.3	27	5.5	50.0
			STD	0.3	0.7	1	0.1	0.4
			MAX	24.8	10.1	28	5.6	50.7
			MIN	23.7	8.0	25	5.3	49.4
218	57.00	10	AV10	23.8	9.6	26	5.4	50.3
			STD	0.5	0.4	1	0.1	0.5
			MAX	24.8	10.1	27	5.6	51.1
			MIN	23.1	9.0	24	5.2	49.4
227	58.00	9	AV9	23.8	8.8	25	5.4	50.4
			STD	0.5	0.4	1	0.1	0.5
			MAX	24.5	9.6	27	5.5	51.3
			MIN	23.1	8.1	23	5.2	49.8
236	59.00	9	AV9	23.6	9.3	25	5.4	50.6
			STD	0.6	0.9	1	0.1	0.6
			MAX	24.6	10.4	28	5.6	51.4
			MIN	22.6	8.3	23	5.2	49.6
247	60.00	11	AV11	22.8	9.0	23	5.2	51.4
			STD	0.2	0.9	1	0.1	0.3
			MAX	23.1	10.2	24	5.3	51.9
			MIN	22.4	7.7	21	5.1	51.0
257	61.00	10	AV10	22.4	7.2	22	5.1	52.0
			STD	1.0	0.7	2	0.2	1.0
			MAX	24.2	8.3	25	5.4	53.4
			MIN	21.1	6.2	20	4.8	50.2
265	62.00	8	AV8	21.8	6.3	22	4.9	52.6
			STD	0.4	0.2	1	0.1	0.4
			MAX	22.4	6.5	23	5.1	53.4
			MIN	21.2	6.0	21	4.8	52.0
272	63.00	7	AV7	22.6	6.6	24	5.1	52.0
			STD	0.5	0.2	1	0.1	0.4
			MAX	23.5	6.8	26	5.2	52.6
			MIN	21.8	6.1	23	4.9	51.2
279	64.00	7	AV7	22.9	7.4	23	5.1	51.8
			STD	0.6	0.4	1	0.1	0.7
			MAX	24.2	8.0	25	5.4	52.4
			MIN	22.4	7.0	22	5.0	50.5
287	65.00	8	AV8	23.4	8.0	23	5.2	51.3
			STD	0.4	0.2	1	0.1	0.3
			MAX	23.9	8.2	24	5.3	51.8
			MIN	22.8	7.8	22	5.1	50.9
295	66.00	8	AV8	23.2	7.8	23	5.1	51.6
			STD	0.6	0.3	2	0.1	0.6
			MAX	24.2	8.2	26	5.4	52.5
			MIN	22.3	7.5	21	5.0	50.6
303	67.00	8	AV8	23.4	8.1	24	5.2	51.3
			STD	0.2	0.3	1	0.1	0.3
			MAX	23.8	8.5	24	5.3	51.7
			MIN	22.9	7.6	22	5.1	50.9
311	68.00	8	AV8	24.2	8.2	25	5.4	50.4
			STD	0.5	0.3	1	0.1	0.5

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #56
OP: TC
APE D30-42, HP 14 x 73
Date: 10-February-2015

BL#	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM bpm
			MAX	25.0	8.4	28	5.6	51.2
			MIN	23.4	7.6	24	5.2	49.7
320	69.00	9	AV9	23.5	8.1	23	5.2	51.2
			STD	0.4	0.1	1	0.1	0.3
			MAX	24.0	8.3	24	5.3	51.6
			MIN	23.0	7.8	22	5.1	50.7
330	70.00	10	AV10	24.1	8.1	24	5.4	50.6
			STD	0.3	0.1	1	0.1	0.3
			MAX	24.7	8.4	26	5.5	50.9
			MIN	23.7	8.0	23	5.3	49.9
339	71.00	9	AV9	24.2	7.8	25	5.4	50.6
			STD	0.5	0.2	1	0.1	0.6
			MAX	25.1	8.1	27	5.6	51.7
			MIN	23.2	7.5	23	5.1	49.7
346	72.00	7	AV7	23.6	7.6	25	5.2	51.1
			STD	0.4	0.1	1	0.1	0.4
			MAX	24.3	7.8	26	5.4	51.9
			MIN	22.9	7.4	23	5.1	50.5
354	73.00	8	AV8	23.8	7.9	25	5.3	50.9
			STD	0.4	0.2	1	0.1	0.4
			MAX	24.3	8.3	26	5.4	51.4
			MIN	23.3	7.6	24	5.2	50.4
363	74.00	9	AV9	24.4	8.1	25	5.4	50.3
			STD	0.6	0.2	1	0.1	0.6
			MAX	25.3	8.4	26	5.6	51.3
			MIN	23.5	7.9	24	5.2	49.4
373	75.00	10	AV10	25.1	8.7	26	5.6	49.7
			STD	0.7	0.4	1	0.2	0.8
			MAX	26.2	9.3	27	5.8	51.1
			MIN	23.8	7.9	23	5.2	48.7
384	76.00	11	AV11	26.3	11.5	27	5.9	48.5
			STD	0.6	1.4	2	0.1	0.6
			MAX	27.3	13.3	30	6.1	49.2
			MIN	25.6	9.4	24	5.7	47.5
398	77.00	14	AV14	25.3	11.4	24	5.7	49.3
			STD	0.5	0.8	1	0.1	0.5
			MAX	26.4	13.1	27	5.9	50.1
			MIN	24.6	10.2	23	5.5	48.3
409	78.00	11	AV11	26.2	11.1	27	5.8	48.6
			STD	0.3	0.6	1	0.1	0.3
			MAX	26.7	12.2	28	6.0	49.1
			MIN	25.6	10.1	26	5.7	48.0
421	79.00	12	AV12	26.8	12.5	29	6.0	47.8
			STD	0.5	0.7	1	0.1	0.5
			MAX	27.5	13.3	30	6.2	48.7
			MIN	25.9	11.1	27	5.8	47.2
435	80.00	14	AV14	26.2	13.1	26	5.9	48.3
			STD	0.7	0.4	2	0.2	0.6
			MAX	27.5	13.8	29	6.2	49.5
			MIN	25.0	12.2	24	5.6	47.1

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #56 APE D30-42, HP 14 x 73
OP: TC Date: 10-February-2015

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM
	ft	bl/ft		ksi	ksi	k-ft	ft	bpm
452	81.00	17	AV17	26.1	13.9	25	5.9	48.3
			STD	0.4	0.7	1	0.1	0.4
			MAX	26.9	15.1	27	6.1	48.9
			MIN	25.5	12.6	24	5.8	47.6
472	82.00	20	AV20	27.2	17.4	28	6.2	47.1
			STD	0.5	1.1	1	0.1	0.5
			MAX	28.1	19.8	30	6.5	48.0
			MIN	26.2	15.5	26	6.0	46.3
504	83.08	30	AV32	29.5	23.9	31	6.8	45.1
			STD	1.3	3.1	3	0.4	1.2
			MAX	31.7	28.9	35	7.5	46.9
			MIN	27.5	19.3	26	6.3	43.1
514	83.31	44	AV10	31.5	29.5	34	7.4	43.4
			STD	0.3	0.4	1	0.1	0.3
			MAX	32.0	30.4	35	7.5	44.0
			MIN	30.9	28.9	32	7.2	43.0
524	83.50	53	AV10	32.2	31.4	35	7.6	42.8
			STD	0.4	0.6	1	0.1	0.3
			MAX	32.9	32.3	37	7.8	43.3
			MIN	31.8	30.4	34	7.4	42.2
			Average	24.8	11.3	26	5.6	49.8
			Std. Dev.	2.9	5.9	4	0.7	3.1
			Maximum	32.9	32.3	37	7.8	64.4
			Minimum	13.0	2.4	10	3.2	42.2

Total number of blows analyzed: 515

BL# Sensors

1-524 F3: [F607] 93.6 (0.96); F4: [D815] 93.0 (0.96); A3: [K2524] 360.0 (1.10); A4: [K3550] 360.0 (1.10)

BL# Comments

6 Reported reference at El. 740.3

Time Summary

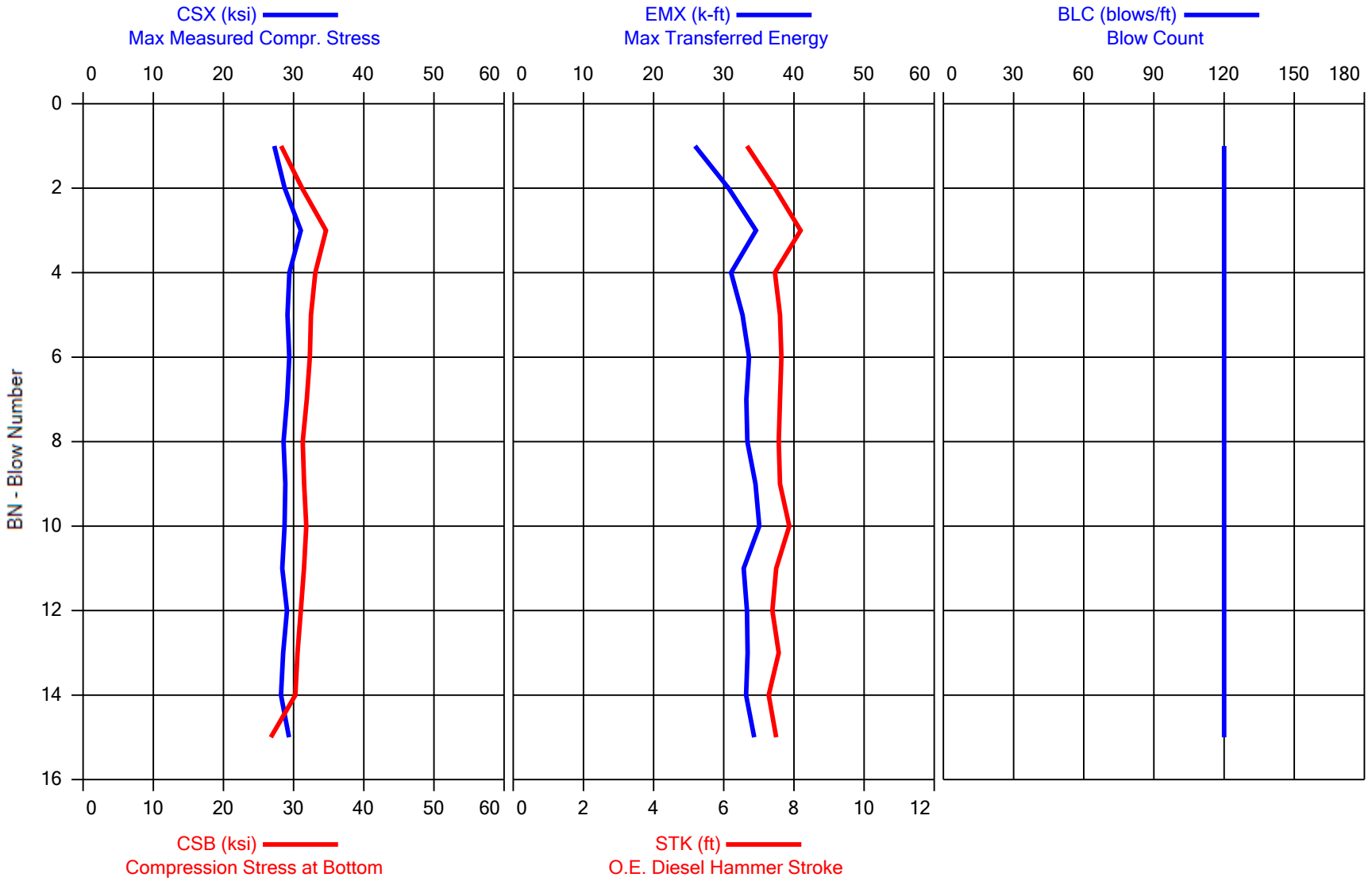
Drive 11 minutes 5 seconds 12:30 PM - 12:41 PM BN 1 - 524

GRL Engineers, Inc. - PDIPLOT2 Ver 2014.2.48.1 - Case Method & iCAP® Results

Printed: 12-February-2015 Test started: 11-February-2015

USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #56 Restrike

APE D30-42, HP 14 x 73



USH 10 over Little Lake Butte des Morts - B-70-403 - PIER 11 #56 Restrike APE D30-42, HP 14 x 73
OP: AM Date: 11-February-2015

AR: 21.40 in² SP: 0.492 k/ft³
LE: 92.92 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.00 []

CSX: Max Measured Compr. Stress STK: O.E. Diesel Hammer Stroke
CSB: Compression Stress at Bottom BPM: Blows per Minute
EMX: Max Transferred Energy

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM
	ft	blows/ft		ksi	ksi	k-ft	ft	bpm
5	83.54	120	AV5	29.1	31.9	31	7.5	43.2
			STD	1.2	2.1	3	0.5	1.4
			MAX	31.0	34.6	35	8.2	45.6
			MIN	27.2	28.2	26	6.7	41.3
10	83.58	120	AV5	28.9	31.8	34	7.7	42.7
			STD	0.3	0.3	1	0.1	0.3
			MAX	29.4	32.3	35	7.9	42.9
			MIN	28.6	31.3	33	7.6	42.1
15	83.63	120	AV5	28.7	30.0	33	7.4	43.2
			STD	0.4	1.7	1	0.1	0.3
			MAX	29.3	31.5	34	7.6	43.7
			MIN	28.2	26.8	33	7.3	42.9
			Average	28.9	31.2	33	7.5	43.0
			Std. Dev.	0.8	1.8	2	0.3	0.9
			Maximum	31.0	34.6	35	8.2	45.6
			Minimum	27.2	26.8	26	6.7	41.3

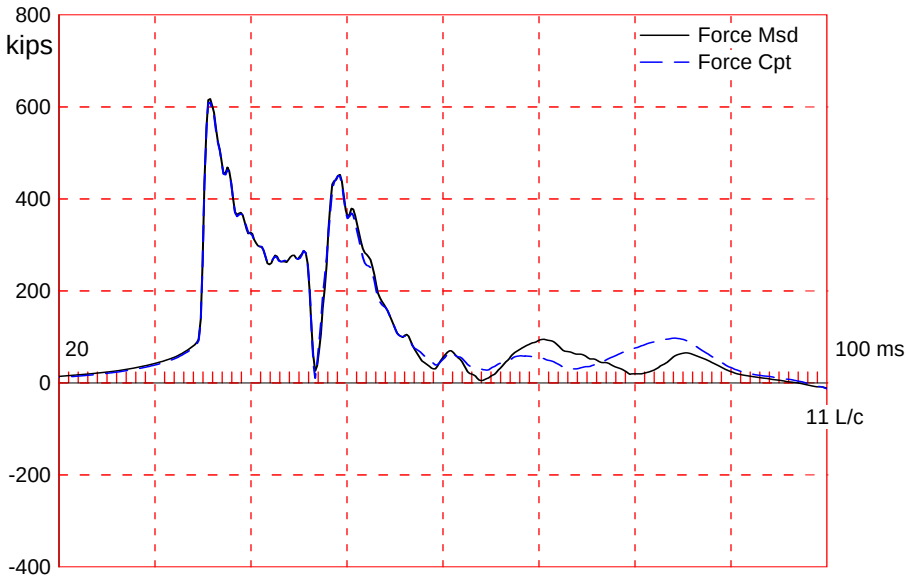
Total number of blows analyzed: 15

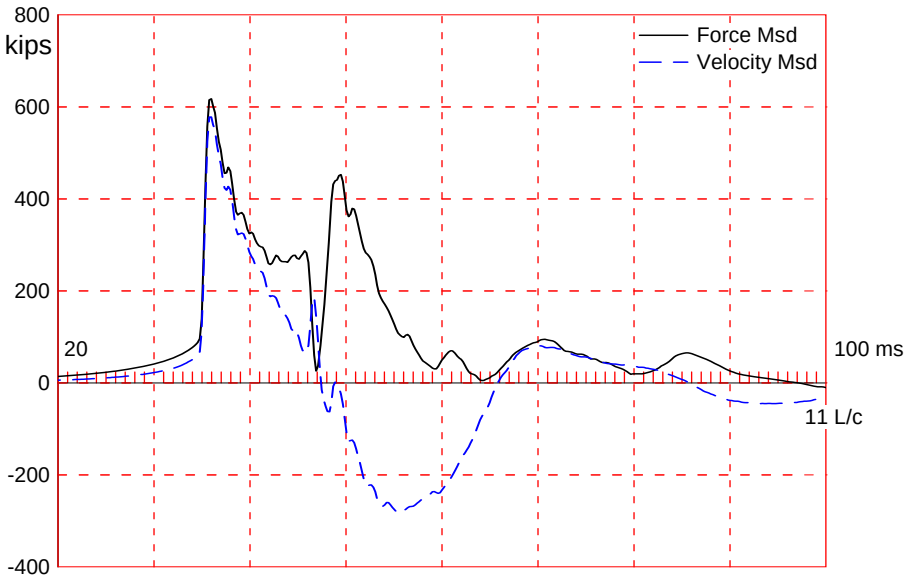
BL# Sensors

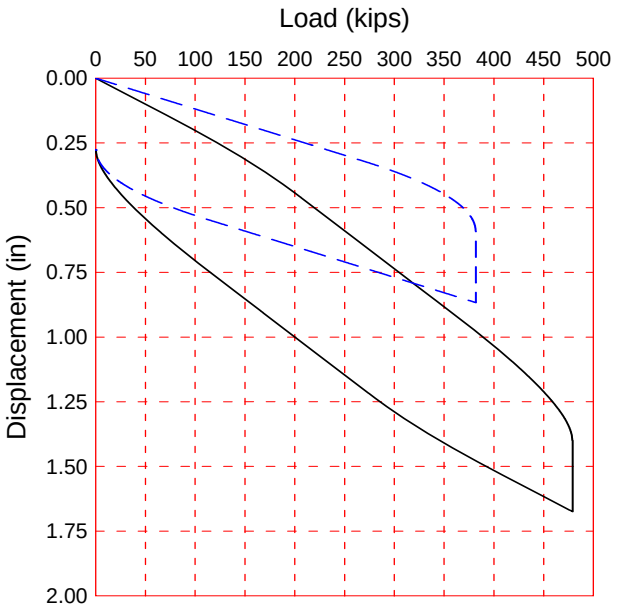
1-15 F3: [F607] 93.6 (0.96); F4: [D815] 93.0 (0.96); A3: [K2524] 360.0 (1.10); A4: [K3550] 360.0 (1.10)

Time Summary

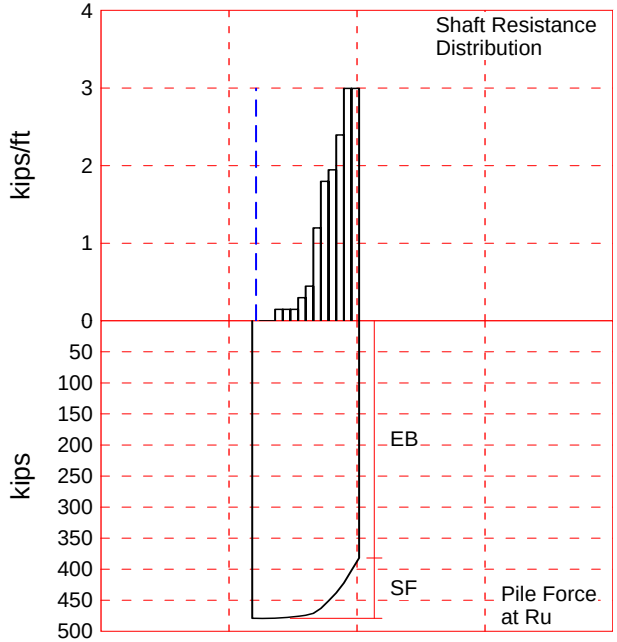
Drive 19 seconds 8:19 AM - 8:19 AM BN 1 - 15







RU =	479.0 kips
SF =	97.0 kips
EB =	382.0 kips
Dy =	1.40 in
Dx =	1.67 in
SET/Bl =	0.27 in



Length b. Sensors	93.5 ft
Embedment	88.0 ft
Top Area	21.4 in^2
End Bearing Area	198.5 in^2
Top Perimeter	4.70 ft
Top E-Modulus	29992 ksi
Top Spec. Weight	492.0 lb/ft^3
Top Wave Spd.	16808 ft/s
Overall W.S.	16808 ft/s
Match Quality	4.98
Top Compr. Stress	28.5 ksi
Max Compr. Stress	28.9 ksi
Max Tension Stress	-3.85 ksi
Avg. Shaft Quake	0.11 in
Toe Quake	0.46 in
Avg. Shaft Smith Dpg.	0.20 s/ft
Toe Smith Damping	0.11 s/ft

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 479.0; along Shaft 97.0; at Toe 382.0 kips

Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				479.0				
1	13.4	7.8	0.0	479.0	0.0	0.00	0.00	0.00
2	20.0	14.5	0.0	479.0	0.0	0.00	0.00	0.00
3	26.7	21.2	1.0	478.0	1.0	0.15	0.03	0.20
4	33.4	27.8	1.0	477.0	2.0	0.15	0.03	0.20
5	40.1	34.5	1.0	476.0	3.0	0.15	0.03	0.20
6	46.8	41.2	2.0	474.0	5.0	0.30	0.06	0.20
7	53.4	47.9	3.0	471.0	8.0	0.45	0.10	0.20
8	60.1	54.6	8.0	463.0	16.0	1.20	0.25	0.20
9	66.8	61.2	12.0	451.0	28.0	1.80	0.38	0.20
10	73.5	67.9	13.0	438.0	41.0	1.95	0.41	0.20
11	80.1	74.6	16.0	422.0	57.0	2.40	0.51	0.20
12	86.8	81.3	20.0	402.0	77.0	2.99	0.64	0.20
13	93.5	88.0	20.0	382.0	97.0	2.99	0.64	0.20
Avg. Shaft			7.5			1.10	0.23	0.20
Toe			382.0				277.12	0.11

Soil Model Parameters/Extensions		Shaft	Toe
Quake	(in)	0.11	0.46
Case Damping Factor		0.51	1.15
Damping Type		Viscous	Sm+Visc
Unloading Quake	(% of loading quake)	90	82
Reloading Level	(% of Ru)	100	100
Resistance Gap (included in Toe Quake)	(in)		0.11
Soil Plug Weight	(kips)	0.054	

CAPWAP match quality = 4.98 (Wave Up Match) ; RSA = 0
Observed: Final Set = 0.27 in; Blow Count = 44 b/ft
Computed: Final Set = 0.24 in; Blow Count = 51 b/ft
Transducer F3(F607) CAL: 93.6; RF: 1.00; F4(D815) CAL: 93.0; RF: 1.00
A3(K2524) CAL: 360; RF: 1.10; A4(K3550) CAL: 360; RF: 1.10

max. Top Comp. Stress = 28.5 ksi (T= 36.2 ms, max= 1.015 x Top)
max. Comp. Stress = 28.9 ksi (Z= 60.1 ft, T= 39.5 ms)
max. Tens. Stress = -3.85 ksi (Z= 66.8 ft, T= 63.6 ms)
max. Energy (EMX) = 33.9 kip-ft; max. Measured Top Displ. (DMX)= 1.13 in

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.3	610.4	-25.4	28.5	-1.19	33.9	15.3	1.15
2	6.7	611.0	-26.1	28.5	-1.22	33.8	15.3	1.14
4	13.4	612.3	-27.7	28.6	-1.29	33.4	15.3	1.11
6	20.0	614.1	-29.5	28.7	-1.38	32.8	15.2	1.06
8	26.7	617.0	-35.4	28.8	-1.65	32.1	15.1	1.02
10	33.4	616.0	-48.7	28.8	-2.27	31.1	15.1	0.97
12	40.1	615.6	-58.9	28.8	-2.75	30.0	14.9	0.92
14	46.8	616.8	-68.1	28.8	-3.18	28.9	14.8	0.87
15	50.1	612.4	-69.9	28.6	-3.27	28.1	14.7	0.84
16	53.4	617.0	-73.9	28.8	-3.45	27.5	14.6	0.81
17	56.8	612.7	-74.4	28.6	-3.48	26.5	14.4	0.78
18	60.1	619.4	-80.9	28.9	-3.78	26.0	14.2	0.76
19	63.4	598.7	-76.2	28.0	-3.56	24.1	13.9	0.73
20	66.8	605.8	-82.3	28.3	-3.85	23.5	13.7	0.70
21	70.1	571.0	-70.7	26.7	-3.30	21.2	13.5	0.67
22	73.5	578.3	-76.8	27.0	-3.59	20.6	14.1	0.64
23	76.8	548.5	-64.2	25.6	-3.00	18.2	14.1	0.61
24	80.1	570.1	-69.2	26.6	-3.23	17.7	14.9	0.59
25	83.5	521.3	-53.1	24.4	-2.48	15.2	16.1	0.56
26	86.8	507.4	-57.4	23.7	-2.68	14.7	17.4	0.53
27	90.2	501.0	-37.8	23.4	-1.76	11.9	18.0	0.51
28	93.5	519.0	-42.0	24.2	-1.96	10.2	16.6	0.48
Absolute	60.1			28.9			(T =	39.5 ms)
	66.8				-3.85		(T =	63.6 ms)

CASE METHOD

J =	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
RP	546.6	413.0	279.3	145.7	12.1					
RX	669.8	623.5	577.1	537.1	522.2	508.2	503.4	500.4	497.4	494.4
RU	546.6	413.0	279.3	145.7	12.1					

RAU = 471.7 (kips); RA2 = 554.4 (kips)

Current CAPWAP Ru = 479.0 (kips); Corresponding J(RP)= 0.10; matches RX20 within 5%

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips	KEB kips/in
15.4	35.96	588.1	626.6	627.7	1.13	0.33	0.27	34.0	581.5	1109

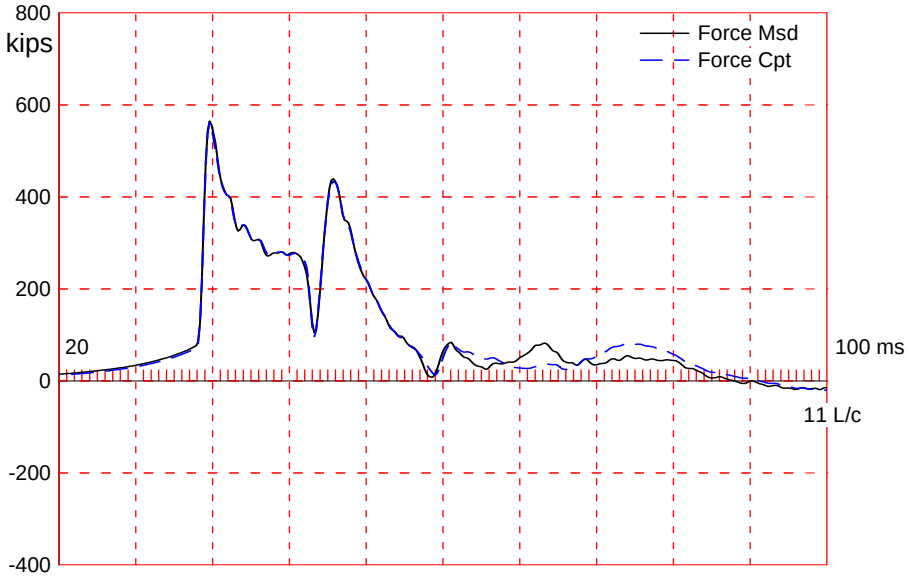
PILE PROFILE AND PILE MODEL

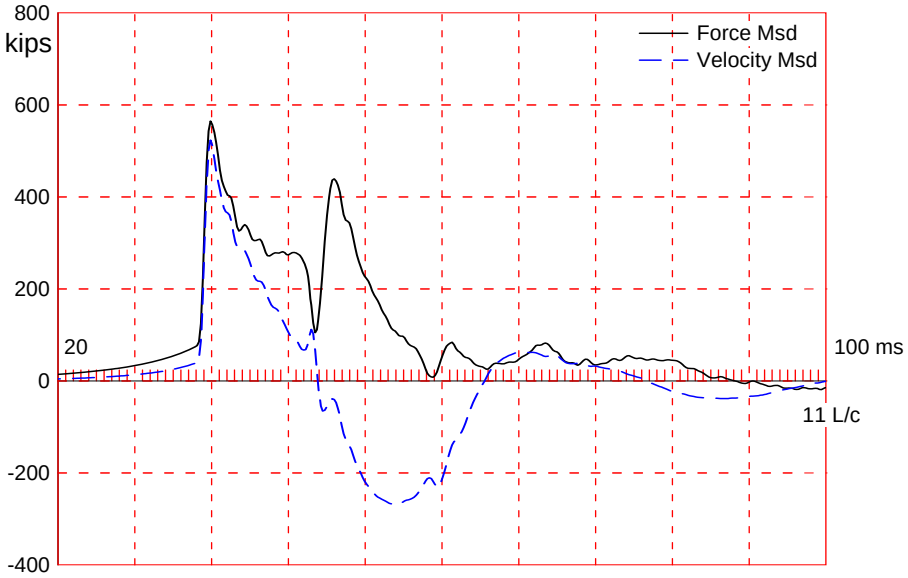
Depth ft	Area in^2	E-Modulus ksi	Spec. Weight lb/ft^3	Perim. ft
0.0	21.4	29992.2	492.000	4.70
93.5	21.4	29992.2	492.000	4.70

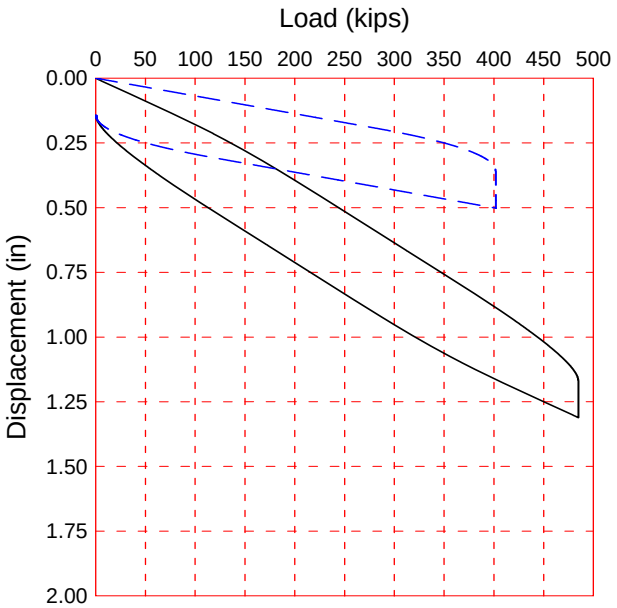
Toe Area 198.5 in^2

Segmnt Number	Dist. B.G. ft	Impedance kips/ft/s	Imped. Change %	Slack in	Tension Eff.	Slack in	Compression Eff.	Perim. ft	Wave Speed ft/s	Soil Plug kips
1	3.3	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000
26	86.8	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.054
27	90.2	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000
28	93.5	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000

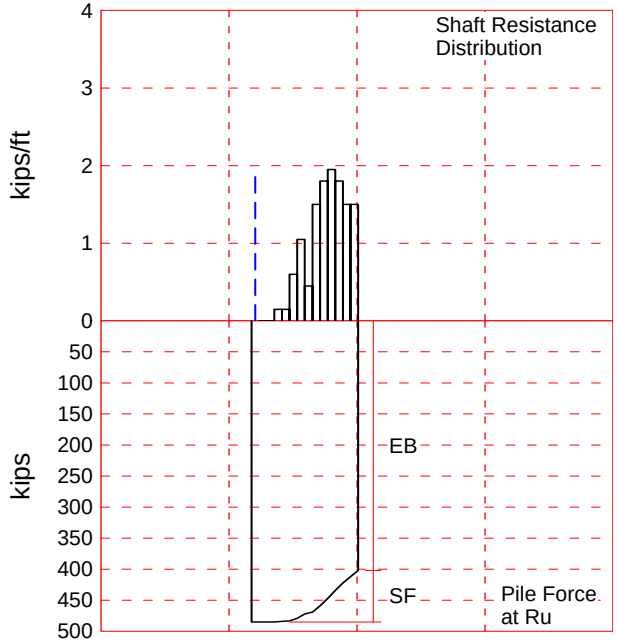
Wave Speed: Pile Top 16807.9, Elastic 16807.9, Overall 16807.9 ft/s
Pile Damping 1.00 %, Time Incr 0.199 ms, 2L/c 11.1 ms
Total volume: 13.895 ft^3; Volume ratio considering added impedance: 1.000







RU =	485.0 kips
SF =	83.0 kips
EB =	402.0 kips
Dy =	1.17 in
Dx =	1.31 in
SET/Bl =	0.14 in



Length b. Sensors	93.3 ft
Embedment	88.0 ft
Top Area	21.4 in^2
End Bearing Area	198.5 in^2
Top Perimeter	4.70 ft
Top E-Modulus	29992 ksi
Top Spec. Weight	492.0 lb/ft^3
Top Wave Spd.	16808 ft/s
Overall W.S.	16808 ft/s
Match Quality	3.84
Top Compr. Stress	26.2 ksi
Max Compr. Stress	26.8 ksi
Max Tension Stress	-4.25 ksi
Avg. Shaft Quake	0.09 in
Toe Quake	0.28 in
Avg. Shaft Smith Dpg.	0.20 s/ft
Toe Smith Damping	0.10 s/ft

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 485.0; along Shaft 83.0; at Toe 402.0 kips

Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				485.0				
1	13.3	8.1	0.0	485.0	0.0	0.00	0.00	0.00
2	20.0	14.7	0.0	485.0	0.0	0.00	0.00	0.00
3	26.7	21.4	1.0	484.0	1.0	0.15	0.03	0.20
4	33.3	28.1	1.0	483.0	2.0	0.15	0.03	0.20
5	40.0	34.7	4.0	479.0	6.0	0.60	0.13	0.20
6	46.7	41.4	7.0	472.0	13.0	1.05	0.22	0.20
7	53.3	48.1	3.0	469.0	16.0	0.45	0.10	0.20
8	60.0	54.7	10.0	459.0	26.0	1.50	0.32	0.20
9	66.6	61.4	12.0	447.0	38.0	1.80	0.38	0.20
10	73.3	68.1	13.0	434.0	51.0	1.95	0.42	0.20
11	80.0	74.7	12.0	422.0	63.0	1.80	0.38	0.20
12	86.6	81.4	10.0	412.0	73.0	1.50	0.32	0.20
13	93.3	88.0	10.0	402.0	83.0	1.50	0.32	0.20
Avg. Shaft			6.4			0.94	0.20	0.20
Toe			402.0				291.62	0.10

Soil Model Parameters/Extensions		Shaft	Toe
Quake	(in)	0.09	0.28
Case Damping Factor		0.44	1.05
Damping Type		Viscous	Sm+Visc
Unloading Quake	(% of loading quake)	100	73
Reloading Level	(% of Ru)	100	100
Soil Plug Weight	(kips)		0.008

CAPWAP match quality = 3.84 (Wave Up Match) ; RSA = 0
Observed: Final Set = 0.14 in; Blow Count = 84 b/ft
Computed: Final Set = 0.10 in; Blow Count = 116 b/ft
Transducer F3(F607) CAL: 93.6; RF: 1.00; F4(D815) CAL: 93.0; RF: 1.00
Not Active A3(K2524) CAL: 360; RF: 1.00; A4(K3550) CAL: 360; RF: 1.10

max. Top Comp. Stress = 26.2 ksi (T= 36.1 ms, max= 1.021 x Top)
max. Comp. Stress = 26.8 ksi (Z= 40.0 ft, T= 38.3 ms)
max. Tens. Stress = -4.25 ksi (Z= 60.0 ft, T= 63.0 ms)
max. Energy (EMX) = 27.7 kip-ft; max. Measured Top Displ. (DMX)= 0.96 in

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.3	561.2	-22.7	26.2	-1.06	27.7	13.8	0.98
2	6.7	561.8	-23.7	26.2	-1.11	27.6	13.8	0.97
4	13.3	563.2	-25.3	26.3	-1.18	27.2	13.7	0.93
6	20.0	565.1	-26.5	26.4	-1.24	26.6	13.6	0.89
8	26.7	568.1	-28.7	26.5	-1.34	25.9	13.5	0.84
10	33.3	568.6	-46.7	26.6	-2.18	25.0	13.4	0.80
12	40.0	573.1	-63.4	26.8	-2.96	24.0	13.1	0.75
14	46.7	568.4	-74.2	26.6	-3.47	22.5	12.9	0.69
15	50.0	546.8	-71.4	25.5	-3.34	21.0	12.8	0.67
16	53.3	551.7	-79.7	25.8	-3.72	20.5	12.6	0.64
17	56.6	549.2	-83.1	25.7	-3.88	19.7	12.4	0.61
18	60.0	557.3	-90.9	26.0	-4.25	19.1	12.2	0.59
19	63.3	533.2	-83.6	24.9	-3.90	17.4	11.9	0.56
20	66.6	541.6	-90.4	25.3	-4.22	16.9	11.7	0.53
21	70.0	512.1	-80.2	23.9	-3.75	15.1	11.4	0.50
22	73.3	520.2	-86.3	24.3	-4.03	14.5	11.2	0.47
23	76.6	487.5	-74.6	22.8	-3.48	12.8	11.0	0.44
24	80.0	494.5	-79.6	23.1	-3.72	12.3	11.1	0.42
25	83.3	469.0	-69.4	21.9	-3.24	10.8	12.2	0.39
26	86.6	486.0	-73.8	22.7	-3.45	10.4	13.3	0.36
27	90.0	485.8	-61.9	22.7	-2.89	9.2	13.7	0.34
28	93.3	496.8	-62.0	23.2	-2.89	8.8	12.5	0.31
Absolute	40.0			26.8			(T =	38.3 ms)
	60.0				-4.25		(T =	63.0 ms)

CASE METHOD

J =	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
RP	594.7	494.6	394.5	294.4	194.3					
RX	645.5	597.8	567.7	537.9	511.4	487.6	470.7	456.9	443.0	429.2
RU	594.7	494.6	394.5	294.4	194.3					

RAU = 376.6 (kips); RA2 = 526.3 (kips)

Current CAPWAP Ru = 485.0 (kips); Corresponding J(RP)= 0.22; J(RX) = 1.03

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips	KEB kips/in
13.8	35.88	526.8	568.3	568.3	0.96	0.19	0.14	27.8	604.2	1456

PILE PROFILE AND PILE MODEL

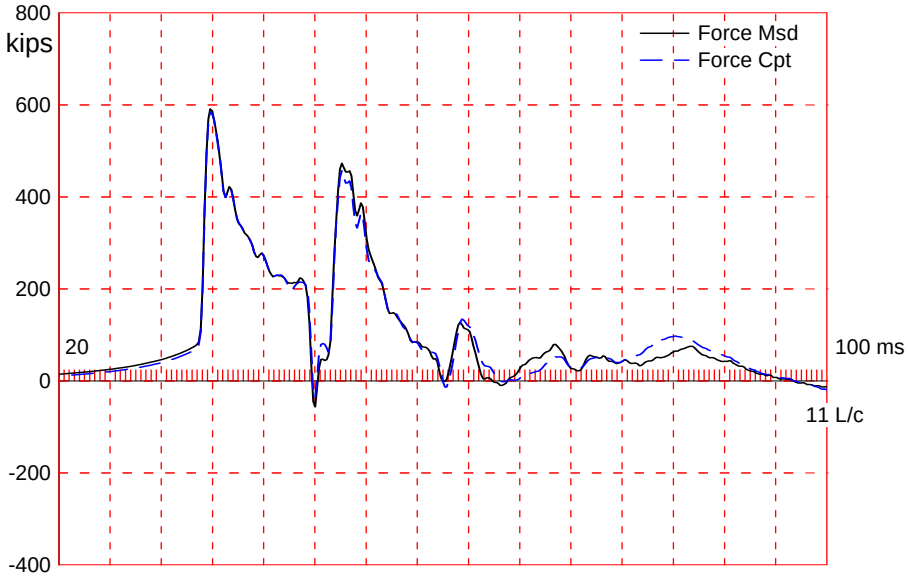
Depth ft	Area in^2	E-Modulus ksi	Spec. Weight lb/ft^3	Perim. ft
0.0	21.4	29992.2	492.000	4.70
93.3	21.4	29992.2	492.000	4.70

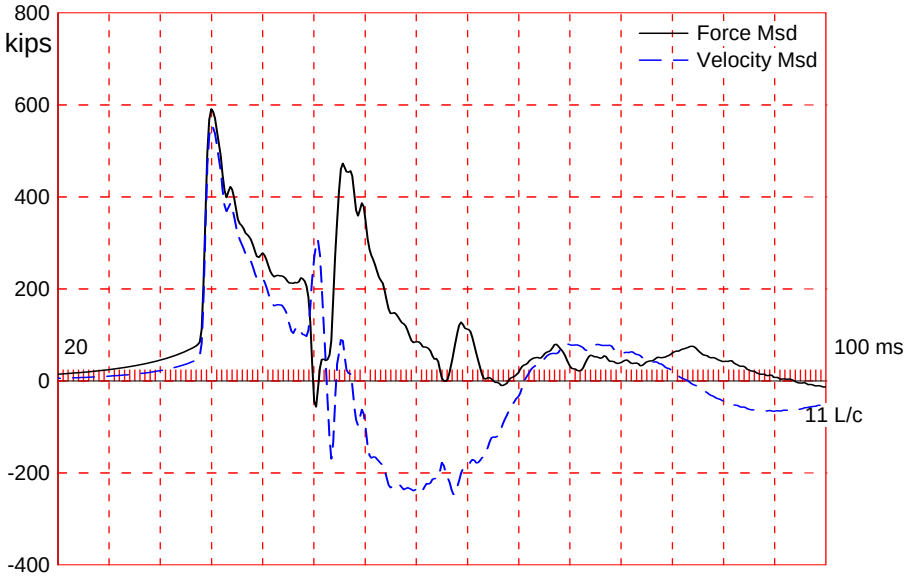
Toe Area 198.5 in^2

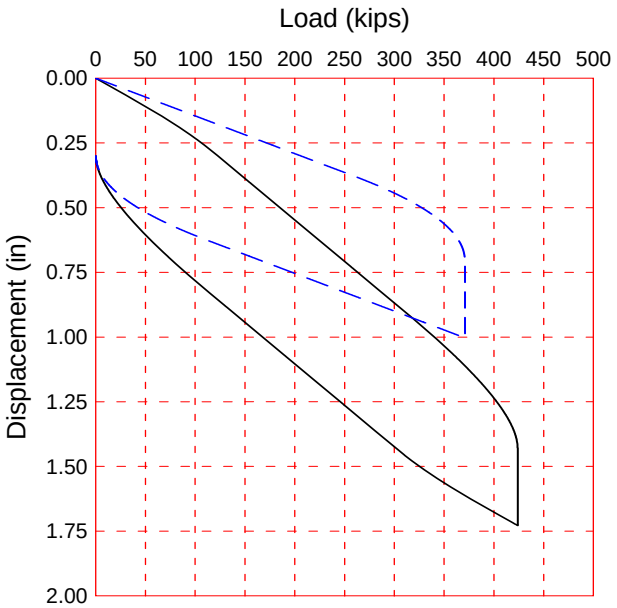
Top Segment Length 3.33 ft, Top Impedance 38 kips/ft/s

Wave Speed: Pile Top 16807.9, Elastic 16807.9, Overall 16807.9 ft/s
Pile Damping 1.00 %, Time Incr 0.198 ms, 2L/c 11.1 ms

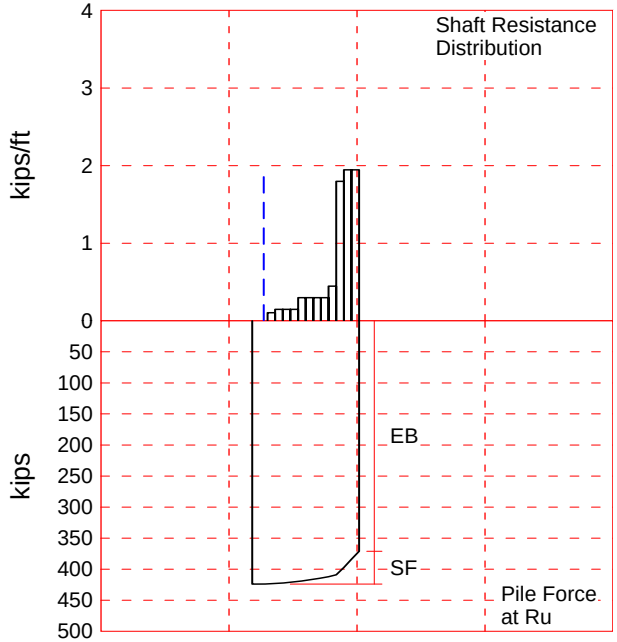
Total volume: 13.865 ft^3; Volume ratio considering added impedance: 1.000







RU =	424.0 kips
SF =	53.0 kips
EB =	371.0 kips
Dy =	1.43 in
Dx =	1.73 in
SET/Bl =	0.30 in



Length b. Sensors	93.5 ft
Embedment	82.9 ft
Top Area	21.4 in^2
End Bearing Area	198.5 in^2
Top Perimeter	4.70 ft
Top E-Modulus	29992 ksi
Top Spec. Weight	492.0 lb/ft^3
Top Wave Spd.	16808 ft/s
Overall W.S.	16808 ft/s
Match Quality	4.38
Top Compr. Stress	27.3 ksi
Max Compr. Stress	27.5 ksi
Max Tension Stress	-5.05 ksi
Avg. Shaft Quake	0.08 in
Toe Quake	0.54 in
Avg. Shaft Smith Dpg.	0.16 s/ft
Toe Smith Damping	0.07 s/ft

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 424.0; along Shaft 53.0; at Toe 371.0 kips

Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf
				424.0			
1	20.0	9.4	1.0	423.0	1.0	0.11	0.02
2	26.7	16.1	1.0	422.0	2.0	0.15	0.03
3	33.4	22.8	1.0	421.0	3.0	0.15	0.03
4	40.1	29.5	1.0	420.0	4.0	0.15	0.03
5	46.8	36.2	2.0	418.0	6.0	0.30	0.06
6	53.4	42.8	2.0	416.0	8.0	0.30	0.06
7	60.1	49.5	2.0	414.0	10.0	0.30	0.06
8	66.8	56.2	2.0	412.0	12.0	0.30	0.06
9	73.5	62.9	3.0	409.0	15.0	0.45	0.10
10	80.1	69.5	12.0	397.0	27.0	1.80	0.38
11	86.8	76.2	13.0	384.0	40.0	1.95	0.41
12	93.5	82.9	13.0	371.0	53.0	1.95	0.41
Avg. Shaft			4.4			0.64	0.14
Toe			371.0				269.14

Soil Model Parameters/Extensions		Shaft	Toe
Smith Damping Factor		0.16	0.07
Quake	(in)	0.08	0.54
Case Damping Factor		0.22	0.70
Damping Type		Viscous	Sm+Visc
Unloading Quake	(% of loading quake)	63	35
Reloading Level	(% of Ru)	100	100
Unloading Level	(% of Ru)	93	
Resistance Gap (included in Toe Quake)	(in)		0.03

CAPWAP match quality = 4.38 (Wave Up Match) ; RSA = 0
Observed: Final Set = 0.30 in; Blow Count = 40 b/ft
Computed: Final Set = 0.27 in; Blow Count = 44 b/ft
Transducer F3(F607) CAL: 93.6; RF: 0.98; F4(D815) CAL: 93.0; RF: 0.98
A3(K2524) CAL: 360; RF: 1.11; A4(K3550) CAL: 360; RF: 1.11

max. Top Comp. Stress = 27.3 ksi (T= 36.2 ms, max= 1.007 x Top)
max. Comp. Stress = 27.5 ksi (Z= 20.0 ft, T= 37.2 ms)
max. Tens. Stress = -5.05 ksi (Z= 73.5 ft, T= 65.0 ms)
max. Energy (EMX) = 30.1 kip-ft; max. Measured Top Displ. (DMX)= 1.14 in

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.3	585.1	-37.5	27.3	-1.75	30.1	14.7	1.16
2	6.7	585.7	-39.1	27.4	-1.83	29.7	14.6	1.14
4	13.4	587.0	-42.5	27.4	-1.99	29.1	14.6	1.11
6	20.0	589.1	-61.6	27.5	-2.88	28.7	14.5	1.08
8	26.7	587.8	-76.7	27.5	-3.59	28.1	14.4	1.04
10	33.4	586.5	-82.7	27.4	-3.87	27.4	14.3	1.00
12	40.1	585.4	-93.5	27.3	-4.37	26.6	14.3	0.96
14	46.8	585.4	-96.2	27.4	-4.50	25.9	14.1	0.92
15	50.1	580.8	-93.4	27.1	-4.36	25.2	14.1	0.90
16	53.4	582.8	-93.2	27.2	-4.35	24.8	14.0	0.88
17	56.8	578.2	-90.0	27.0	-4.21	24.1	14.0	0.85
18	60.1	580.2	-87.9	27.1	-4.11	23.7	13.9	0.83
19	63.4	575.7	-91.6	26.9	-4.28	23.0	13.9	0.80
20	66.8	578.2	-99.4	27.0	-4.64	22.7	13.8	0.78
21	70.1	574.7	-104.2	26.8	-4.87	21.9	13.9	0.76
22	73.5	580.9	-108.1	27.1	-5.05	21.5	14.6	0.73
23	76.8	577.8	-105.4	27.0	-4.93	20.7	14.5	0.71
24	80.1	584.3	-105.4	27.3	-4.92	20.3	15.5	0.68
25	83.5	546.5	-90.3	25.5	-4.22	18.2	17.2	0.66
26	86.8	502.1	-90.1	23.5	-4.21	18.0	18.5	0.63
27	90.2	465.5	-73.5	21.7	-3.43	16.0	19.1	0.61
28	93.5	481.0	-71.9	22.5	-3.36	15.0	18.3	0.58
Absolute	20.0			27.5			(T =	37.2 ms)
	73.5				-5.05		(T =	65.0 ms)

CASE METHOD

J =	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
RP	414.0	266.4	118.8	0.0	0.0					
RX	577.2	535.2	501.8	489.3	476.7	464.1	451.5	443.5	439.3	435.7
RU	414.0	266.4	118.8	0.0	0.0					

RAU = 395.0 (kips); RA2 = 501.9 (kips)

Current CAPWAP Ru = 424.0 (kips); Corresponding J(RP)= 0.00; matches RX20 within 5%

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips	KEB kips/in
14.6	35.96	557.7	594.3	594.3	1.14	0.31	0.30	30.0	502.1	720

PILE PROFILE AND PILE MODEL

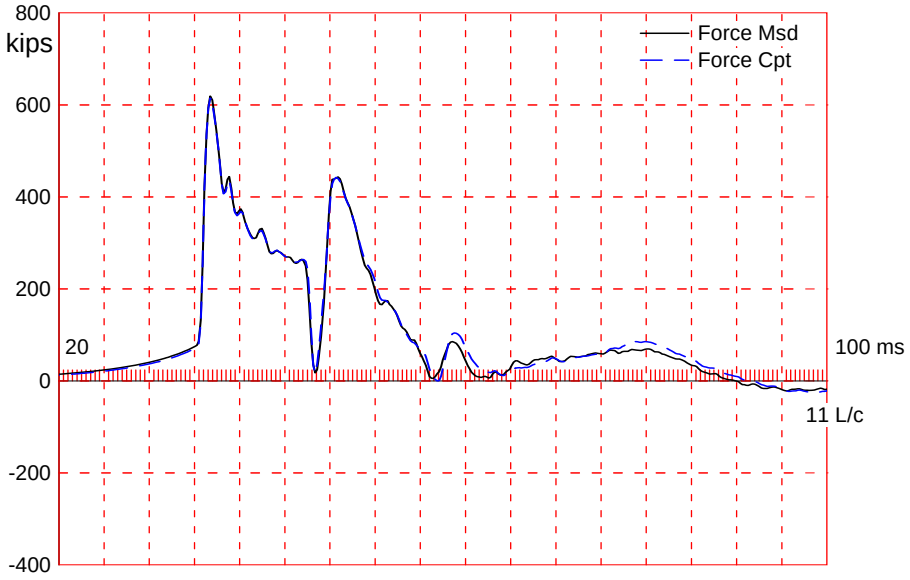
Depth ft	Area in^2	E-Modulus ksi	Spec. Weight lb/ft^3	Perim. ft
0.0	21.4	29992.2	492.000	4.70
93.5	21.4	29992.2	492.000	4.70

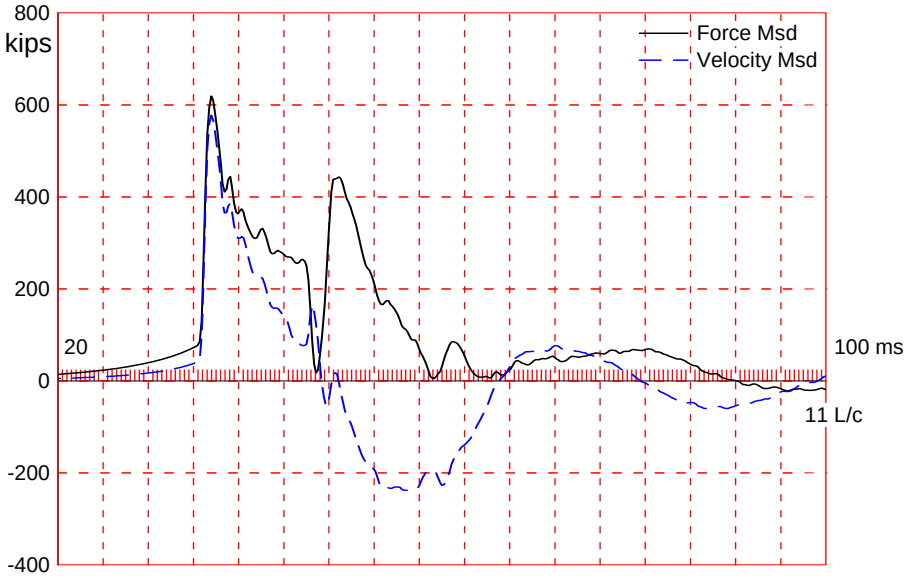
Toe Area 198.5 in^2

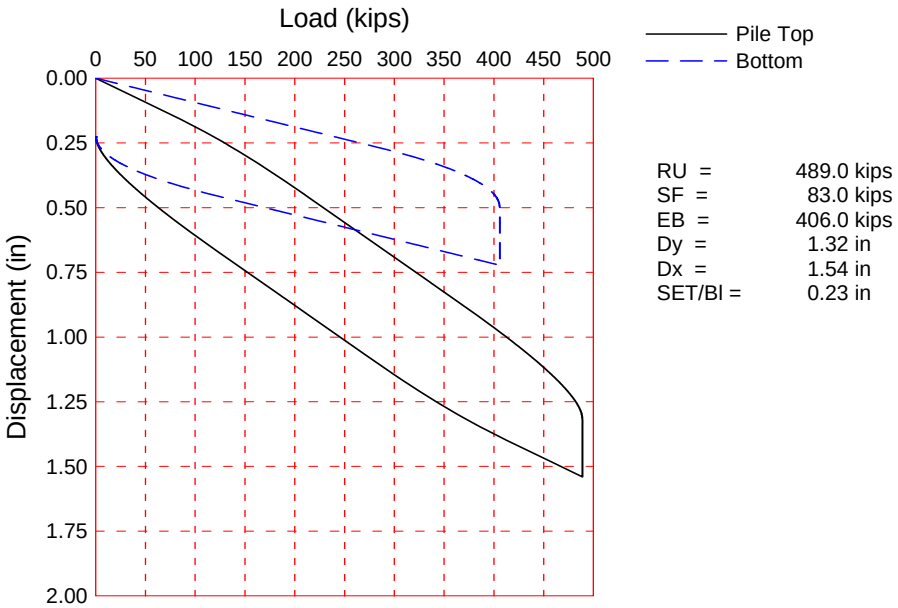
Top Segment Length 3.34 ft, Top Impedance 38 kips/ft/s

Wave Speed: Pile Top 16807.9, Elastic 16807.9, Overall 16807.9 ft/s
Pile Damping 1.00 %, Time Incr 0.199 ms, 2L/c 11.1 ms

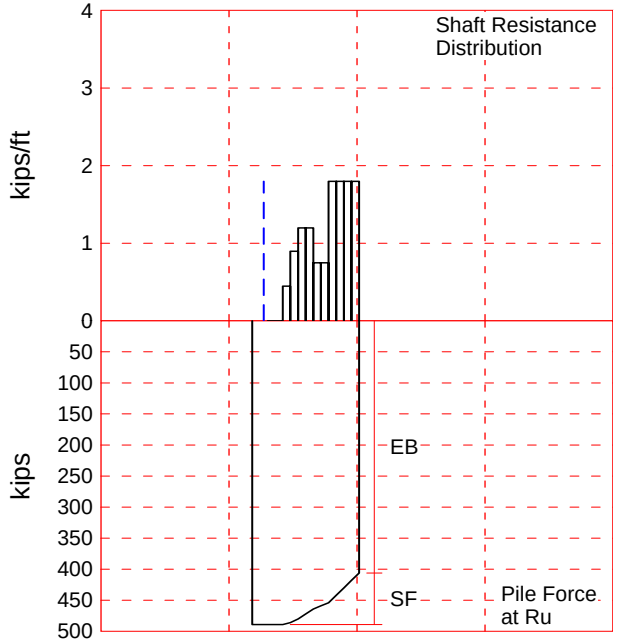
Total volume: 13.895 ft^3; Volume ratio considering added impedance: 1.000







RU =	489.0 kips
SF =	83.0 kips
EB =	406.0 kips
Dy =	1.32 in
Dx =	1.54 in
SET/Bl =	0.23 in



Length b. Sensors	93.5 ft
Embedment	83.1 ft
Top Area	21.4 in^2
End Bearing Area	198.5 in^2
Top Perimeter	4.70 ft
Top E-Modulus	29992 ksi
Top Spec. Weight	492.0 lb/ft^3
Top Wave Spd.	16808 ft/s
Overall W.S.	16808 ft/s
Match Quality	2.69
Top Compr. Stress	28.7 ksi
Max Compr. Stress	29.3 ksi
Max Tension Stress	-4.52 ksi
Avg. Shaft Quake	0.10 in
Toe Quake	0.38 in
Avg. Shaft Smith Dpg.	0.18 s/ft
Toe Smith Damping	0.07 s/ft

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 489.0; along Shaft 83.0; at Toe 406.0 kips

Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				489.0				
1	20.0	9.6	0.0	489.0	0.0	0.00	0.00	0.00
2	26.7	16.3	0.0	489.0	0.0	0.00	0.00	0.00
3	33.4	22.9	3.0	486.0	3.0	0.45	0.10	0.18
4	40.1	29.6	6.0	480.0	9.0	0.90	0.19	0.18
5	46.8	36.3	8.0	472.0	17.0	1.20	0.25	0.18
6	53.4	43.0	8.0	464.0	25.0	1.20	0.25	0.18
7	60.1	49.7	5.0	459.0	30.0	0.75	0.16	0.18
8	66.8	56.3	5.0	454.0	35.0	0.75	0.16	0.18
9	73.5	63.0	12.0	442.0	47.0	1.80	0.38	0.18
10	80.1	69.7	12.0	430.0	59.0	1.80	0.38	0.18
11	86.8	76.4	12.0	418.0	71.0	1.80	0.38	0.18
12	93.5	83.1	12.0	406.0	83.0	1.80	0.38	0.18
Avg. Shaft			6.9			1.00	0.21	0.18
Toe			406.0				294.53	0.07

Soil Model Parameters/Extensions		Shaft	Toe
Quake	(in)	0.10	0.38
Case Damping Factor		0.39	0.79
Damping Type		Viscous	Sm+Visc
Unloading Quake	(% of loading quake)	100	30
Reloading Level	(% of Ru)	100	100
Unloading Level	(% of Ru)	43	

CAPWAP match quality = 2.69 (Wave Up Match) ; RSA = 0
Observed: Final Set = 0.23 in; Blow Count = 53 b/ft
Computed: Final Set = 0.19 in; Blow Count = 65 b/ft
Transducer F3(D815) CAL: 93.0; RF: 0.99; F4(F607) CAL: 93.6; RF: 0.99
A3(K3550) CAL: 360; RF: 1.11; A4(K2524) CAL: 360; RF: 1.11

max. Top Comp. Stress = 28.7 ksi (T= 36.2 ms, max= 1.022 x Top)
max. Comp. Stress = 29.3 ksi (Z= 33.4 ft, T= 37.9 ms)
max. Tens. Stress = -4.52 ksi (Z= 66.8 ft, T= 63.8 ms)
max. Energy (EMX) = 31.3 kip-ft; max. Measured Top Displ. (DMX)= 1.04 in

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.3	614.9	-28.4	28.7	-1.33	31.3	15.2	1.06
2	6.7	615.5	-30.1	28.8	-1.40	31.2	15.2	1.05
4	13.4	616.8	-31.8	28.8	-1.48	30.9	15.1	1.02
6	20.0	618.3	-37.7	28.9	-1.76	30.4	15.1	0.98
8	26.7	621.2	-49.8	29.0	-2.32	29.7	15.0	0.93
10	33.4	628.2	-63.1	29.3	-2.95	29.1	14.8	0.89
12	40.1	627.6	-68.1	29.3	-3.18	27.7	14.5	0.84
14	46.8	618.1	-74.1	28.9	-3.46	25.9	14.1	0.79
15	50.1	596.6	-75.5	27.9	-3.53	24.2	13.9	0.76
16	53.4	600.9	-83.4	28.1	-3.89	23.7	13.8	0.74
17	56.8	577.6	-83.1	27.0	-3.88	22.1	13.7	0.71
18	60.1	581.3	-90.0	27.2	-4.21	21.7	13.6	0.69
19	63.4	568.6	-94.1	26.6	-4.39	20.5	13.4	0.66
20	66.8	576.6	-96.8	26.9	-4.52	20.0	13.3	0.63
21	70.1	568.7	-93.2	26.6	-4.36	18.8	13.0	0.60
22	73.5	577.1	-93.7	27.0	-4.38	18.3	12.8	0.58
23	76.8	546.6	-84.7	25.5	-3.96	16.4	12.5	0.55
24	80.1	554.8	-85.3	25.9	-3.99	15.9	13.1	0.52
25	83.5	518.7	-76.1	24.2	-3.56	14.2	14.9	0.49
26	86.8	487.4	-75.9	22.8	-3.55	13.7	16.4	0.47
27	90.2	487.1	-66.6	22.8	-3.11	12.0	17.0	0.44
28	93.5	498.1	-66.2	23.3	-3.09	11.3	15.7	0.42
Absolute	33.4			29.3			(T =	37.9 ms)
	66.8				-4.52		(T =	63.8 ms)

CASE METHOD

J =	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
RP	572.6	509.3	446.0	382.7	319.4	256.1	192.8	129.5	66.2	2.9
RX	629.7	608.5	588.3	568.1	547.9	529.7	515.2	504.7	495.0	485.2
RU	572.6	509.3	446.0	382.7	319.4	256.1	192.8	129.5	66.2	2.9

RAU = 379.1 (kips); RA2 = 530.6 (kips)

Current CAPWAP Ru = 489.0 (kips); Corresponding J(RP)= 0.13; J(RX) = 0.86

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips	KEB kips/in
15.2	35.96	580.2	625.4	625.4	1.04	0.23	0.23	31.4	594.3	1060

PILE PROFILE AND PILE MODEL

Depth ft	Area in^2	E-Modulus ksi	Spec. Weight lb/ft^3	Perim. ft
0.0	21.4	29992.2	492.000	4.70
93.5	21.4	29992.2	492.000	4.70

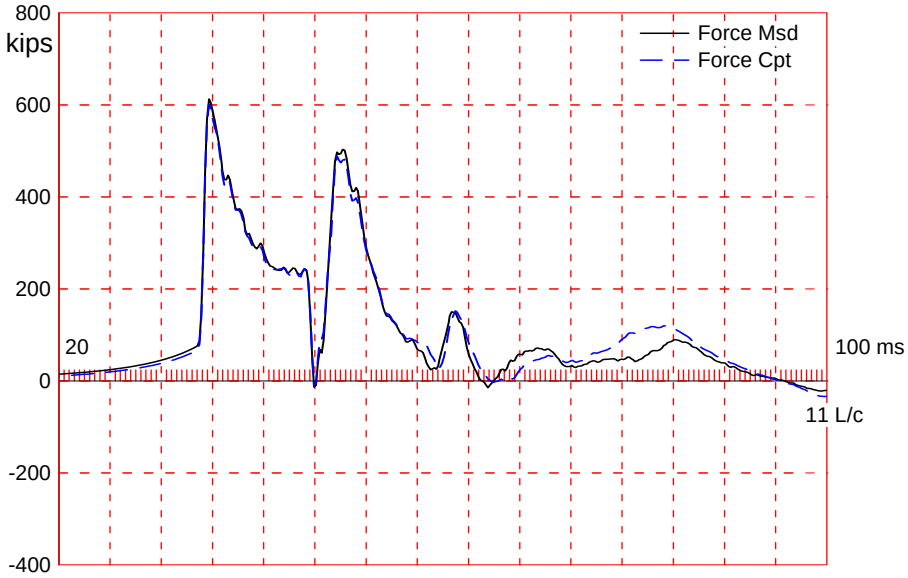
Toe Area 198.5 in^2

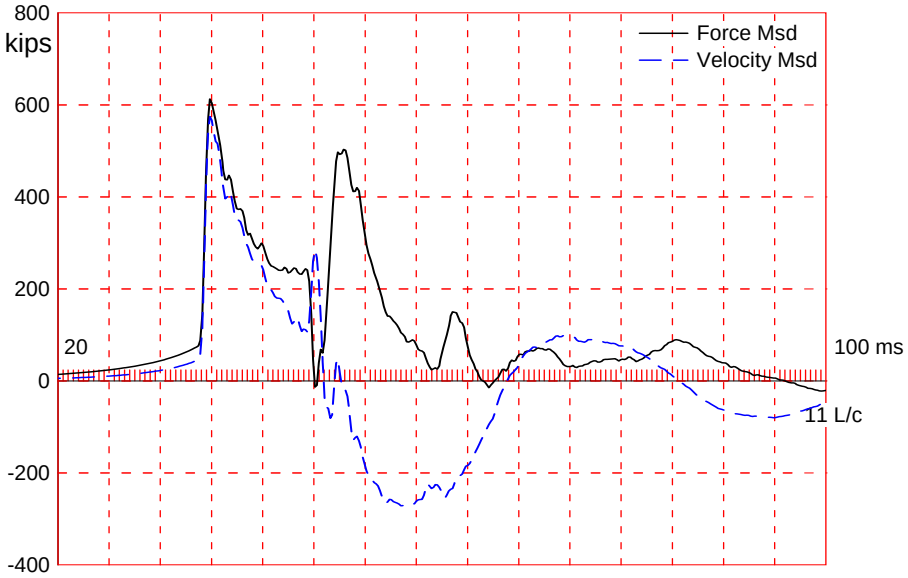
Top Segment Length 3.34 ft, Top Impedance 38 kips/ft/s

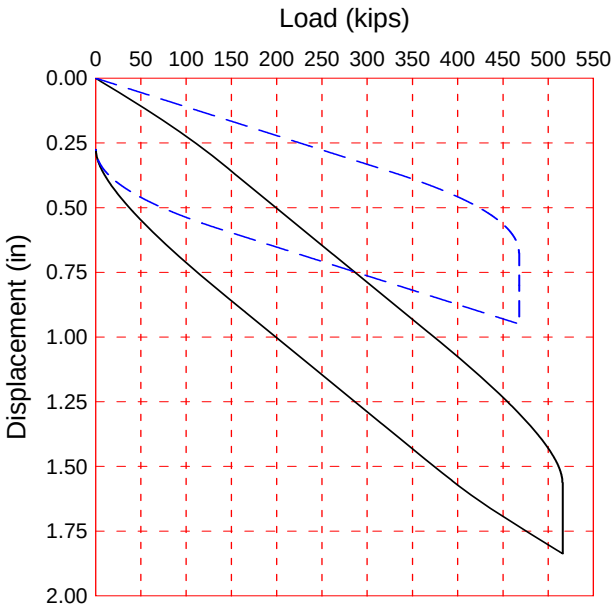
Wave Speed: Pile Top 16807.9, Elastic 16807.9, Overall 16807.9 ft/s
Pile Damping 1.00 %, Time Incr 0.199 ms, 2L/c 11.1 ms

Total volume: 13.895 ft^3; Volume ratio considering added impedance: 1.000

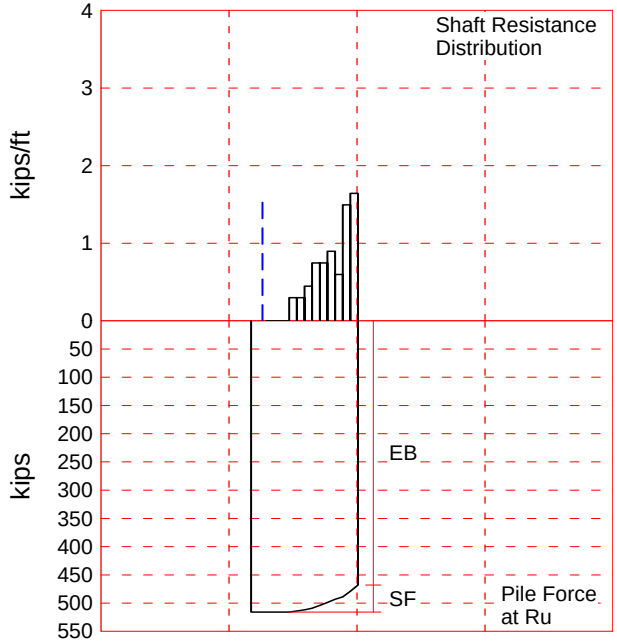
Match Quality Poor - Results May Be Unreliable!!!







RU =	516.0 kips
SF =	48.0 kips
EB =	468.0 kips
Dy =	1.56 in
Dx =	1.84 in
SET/Bl =	0.27 in



Length b. Sensors	93.7 ft
Embedment	82.0 ft
Top Area	21.4 in^2
End Bearing Area	198.5 in^2
Top Perimeter	4.70 ft
Top E-Modulus	29992 ksi
Top Spec. Weight	492.0 lb/ft^3
Top Wave Spd.	16808 ft/s
Overall W.S.	16808 ft/s
Match Quality	5.16
Top Compr. Stress	28.1 ksi
Max Compr. Stress	28.2 ksi
Max Tension Stress	-5.19 ksi
Avg. Shaft Quake	0.09 in
Toe Quake	0.52 in
Avg. Shaft Smith Dpg.	0.18 s/ft
Toe Smith Damping	0.07 s/ft

Match Quality Poor - Results May Be Unreliable!!!

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 516.0; along Shaft 48.0; at Toe 468.0 kips

Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				516.0				
1	20.1	8.4	0.0	516.0	0.0	0.00	0.00	0.00
2	26.8	15.1	0.0	516.0	0.0	0.00	0.00	0.00
3	33.5	21.8	0.0	516.0	0.0	0.00	0.00	0.00
4	40.1	28.5	2.0	514.0	2.0	0.30	0.06	0.18
5	46.8	35.2	2.0	512.0	4.0	0.30	0.06	0.18
6	53.5	41.9	3.0	509.0	7.0	0.45	0.10	0.18
7	60.2	48.5	5.0	504.0	12.0	0.75	0.16	0.18
8	66.9	55.2	5.0	499.0	17.0	0.75	0.16	0.18
9	73.6	61.9	6.0	493.0	23.0	0.90	0.19	0.18
10	80.3	68.6	4.0	489.0	27.0	0.60	0.13	0.18
11	87.0	75.3	10.0	479.0	37.0	1.49	0.32	0.18
12	93.7	82.0	11.0	468.0	48.0	1.64	0.35	0.18
Avg. Shaft			4.0			0.59	0.12	0.18
Toe			468.0				339.50	0.07

Soil Model Parameters/Extensions		Shaft	Toe
Quake	(in)	0.09	0.52
Case Damping Factor		0.22	0.92
Damping Type		Viscous	Sm+Visc
Unloading Quake	(% of loading quake)	30	30
Reloading Level	(% of Ru)	100	100
Resistance Gap (included in Toe Quake)	(in)		0.07
Soil Plug Weight	(kips)	0.025	

CAPWAP match quality = 5.16 (Wave Up Match) ; RSA = 0
Observed: Final Set = 0.27 in; Blow Count = 44 b/ft
Computed: Final Set = 0.24 in; Blow Count = 51 b/ft

Transducer F3(D815) CAL: 93.0; RF: 0.98; F4(F607) CAL: 93.6; RF: 0.98
A3(K3550) CAL: 360; RF: 1.12; A4(K2524) CAL: 360; RF: 1.12

max. Top Comp. Stress = 28.1 ksi (T= 36.0 ms, max= 1.003 x Top)
max. Comp. Stress = 28.2 ksi (Z= 40.1 ft, T= 38.2 ms)
max. Tens. Stress = -5.19 ksi (Z= 66.9 ft, T= 63.7 ms)
max. Energy (EMX) = 33.0 kip-ft; max. Measured Top Displ. (DMX)= 1.18 in

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.3	600.9	-41.4	28.1	-1.93	33.0	15.3	1.22
2	6.7	600.8	-43.4	28.1	-2.03	32.9	15.3	1.21
4	13.4	600.7	-60.1	28.1	-2.81	32.5	15.3	1.17
6	20.1	600.6	-80.8	28.1	-3.77	31.9	15.2	1.13
8	26.8	600.4	-89.6	28.1	-4.19	31.3	15.2	1.09
10	33.5	600.6	-91.4	28.1	-4.27	30.5	15.1	1.04
12	40.1	602.6	-90.9	28.2	-4.25	29.8	15.0	0.99
14	46.8	597.2	-88.5	27.9	-4.13	28.5	14.9	0.94
15	50.2	592.3	-85.4	27.7	-3.99	27.6	14.9	0.92
16	53.5	597.5	-90.9	27.9	-4.25	27.2	14.7	0.89
17	56.9	592.6	-98.0	27.7	-4.58	26.1	14.6	0.86
18	60.2	597.3	-108.0	27.9	-5.04	25.6	14.4	0.84
19	63.6	585.0	-110.2	27.3	-5.15	24.2	14.3	0.81
20	66.9	589.6	-111.2	27.5	-5.19	23.7	14.1	0.78
21	70.3	577.7	-107.1	27.0	-5.00	22.3	14.1	0.75
22	73.6	581.1	-107.7	27.1	-5.03	21.6	15.2	0.72
23	76.9	566.1	-99.7	26.4	-4.66	20.1	15.2	0.69
24	80.3	580.5	-99.4	27.1	-4.65	19.5	15.9	0.66
25	83.6	567.2	-94.5	26.5	-4.42	18.3	17.6	0.63
26	87.0	541.4	-94.6	25.3	-4.42	17.6	18.5	0.60
27	90.3	553.6	-81.2	25.9	-3.79	15.7	19.4	0.57
28	93.7	572.2	-81.1	26.7	-3.79	14.8	18.3	0.54
Absolute	40.1			28.2			(T =	38.2 ms)
	66.9				-5.19		(T =	63.7 ms)

CASE METHOD

J =	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
RP	458.4	311.2	164.0	16.8	0.0					
RX	650.3	608.5	583.2	563.3	551.4	547.4	544.6	541.8	539.0	537.1
RU	458.4	311.2	164.0	16.8	0.0					

RAU = 436.5 (kips); RA2 = 568.8 (kips)

Current CAPWAP Ru = 516.0 (kips); Corresponding J(RP)= 0.00; matches RX20 within 5%

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips	KEB kips/in
15.1	35.83	577.7	616.8	618.1	1.18	0.35	0.27	33.0	545.7	1033

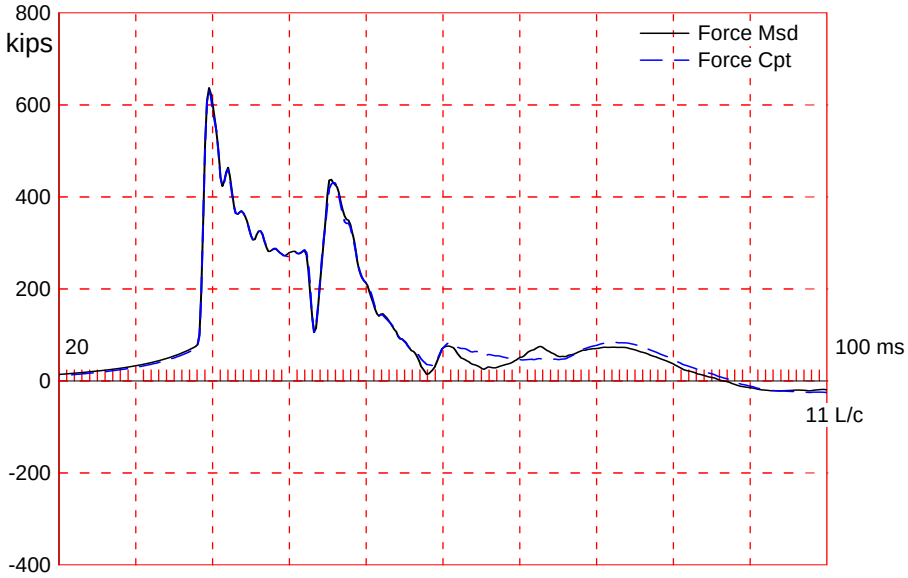
PILE PROFILE AND PILE MODEL

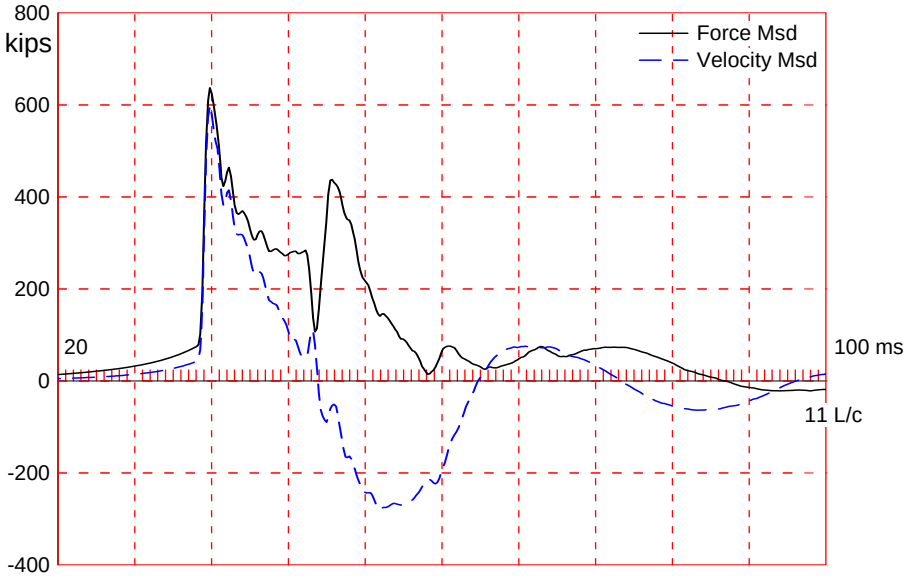
Depth ft	Area in^2	E-Modulus ksi	Spec. Weight lb/ft^3	Perim. ft
0.0	21.4	29992.2	492.000	4.70
93.7	21.4	29992.2	492.000	4.70

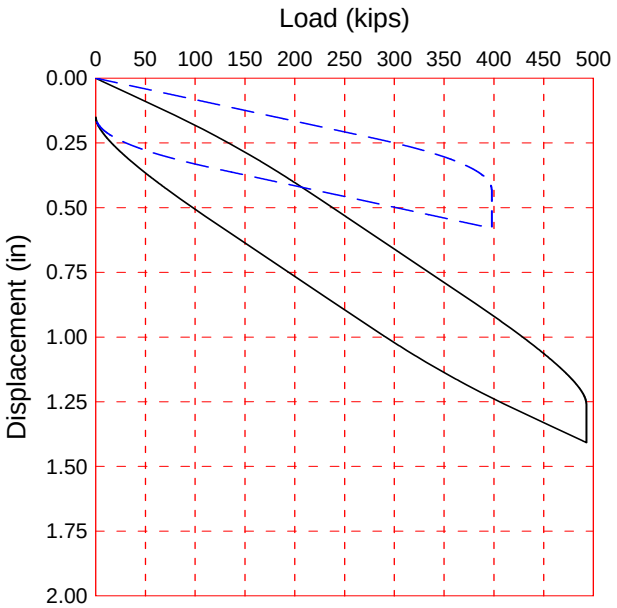
Toe Area 198.5 in^2

Segmnt Number	Dist. B.G. ft	Impedance kips/ft/s	Imped. Change %	Slack in	Tension Eff.	Slack in	Compression Eff.	Perim. ft	Wave Speed ft/s	Soil Plug kips
1	3.3	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000
26	87.0	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.025
27	90.3	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000
28	93.7	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000

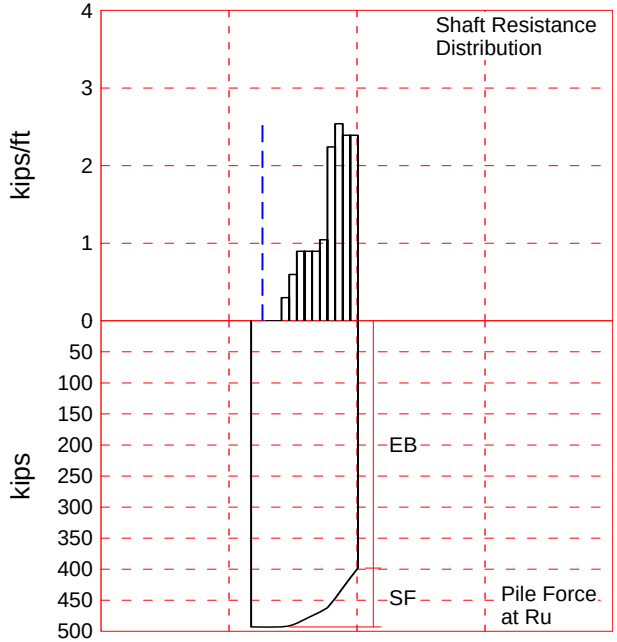
Wave Speed: Pile Top 16807.9, Elastic 16807.9, Overall 16807.9 ft/s
Pile Damping 1.00 %, Time Incr 0.199 ms, 2L/c 11.1 ms
Total volume: 13.920 ft^3; Volume ratio considering added impedance: 1.000







RU =	493.0 kips
SF =	95.0 kips
EB =	398.0 kips
Dy =	1.26 in
Dx =	1.41 in
SET/Bl =	0.15 in



Length b. Sensors	93.7 ft
Embedment	82.0 ft
Top Area	21.4 in^2
End Bearing Area	198.5 in^2
Top Perimeter	4.70 ft
Top E-Modulus	29992 ksi
Top Spec. Weight	492.0 lb/ft^3
Top Wave Spd.	16808 ft/s
Overall W.S.	16808 ft/s
Match Quality	2.45
Top Compr. Stress	29.6 ksi
Max Compr. Stress	30.1 ksi
Max Tension Stress	-3.42 ksi
Avg. Shaft Quake	0.09 in
Toe Quake	0.33 in
Avg. Shaft Smith Dpg.	0.21 s/ft
Toe Smith Damping	0.14 s/ft

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 493.0; along Shaft 95.0; at Toe 398.0 kips

Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				493.0				
1	20.1	8.4	0.0	493.0	0.0	0.00	0.00	0.00
2	26.8	15.1	0.0	493.0	0.0	0.00	0.00	0.00
3	33.5	21.8	2.0	491.0	2.0	0.30	0.06	0.21
4	40.1	28.5	4.0	487.0	6.0	0.60	0.13	0.21
5	46.8	35.2	6.0	481.0	12.0	0.90	0.19	0.21
6	53.5	41.9	6.0	475.0	18.0	0.90	0.19	0.21
7	60.2	48.6	6.0	469.0	24.0	0.90	0.19	0.21
8	66.9	55.3	7.0	462.0	31.0	1.05	0.22	0.21
9	73.6	62.0	15.0	447.0	46.0	2.24	0.48	0.21
10	80.3	68.7	17.0	430.0	63.0	2.54	0.54	0.21
11	87.0	75.3	16.0	414.0	79.0	2.39	0.51	0.21
12	93.7	82.0	16.0	398.0	95.0	2.39	0.51	0.21
Avg. Shaft			7.9			1.16	0.25	0.21
Toe			398.0				288.72	0.14

Soil Model Parameters/Extensions		Shaft	Toe
Quake	(in)	0.09	0.33
Case Damping Factor		0.52	1.41
Damping Type		Viscous	Sm+Visc
Unloading Quake	(% of loading quake)	100	89
Reloading Level	(% of Ru)	100	100
Resistance Gap (included in Toe Quake)	(in)		0.02
Soil Plug Weight	(kips)	0.010	0.018

CAPWAP match quality = 2.45 (Wave Up Match) ; RSA = 0
Observed: Final Set = 0.15 in; Blow Count = 80 b/ft
Computed: Final Set = 0.11 in; Blow Count = 105 b/ft
Transducer F3(D815) CAL: 93.0; RF: 0.99; F4(F607) CAL: 93.6; RF: 0.99
A3(K3550) CAL: 360; RF: 1.11; A4(K2524) CAL: 360; RF: 1.11

max. Top Comp. Stress = 29.6 ksi (T= 36.0 ms, max= 1.017 x Top)
max. Comp. Stress = 30.1 ksi (Z= 33.5 ft, T= 37.8 ms)
max. Tens. Stress = -3.42 ksi (Z= 73.6 ft, T= 63.7 ms)
max. Energy (EMX) = 32.5 kip-ft; max. Measured Top Displ. (DMX)= 1.04 in

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.3	634.3	-27.7	29.6	-1.29	32.5	15.7	1.05
2	6.7	635.0	-27.6	29.7	-1.29	32.4	15.7	1.04
4	13.4	636.3	-30.8	29.7	-1.44	31.9	15.6	1.00
6	20.1	637.7	-34.8	29.8	-1.62	31.3	15.6	0.96
8	26.8	640.0	-38.3	29.9	-1.79	30.6	15.5	0.91
10	33.5	645.3	-41.6	30.1	-1.94	29.8	15.3	0.86
12	40.1	645.3	-54.1	30.1	-2.53	28.5	15.1	0.81
14	46.8	639.6	-64.0	29.9	-2.99	26.8	14.7	0.76
15	50.2	621.5	-60.7	29.0	-2.84	25.3	14.5	0.73
16	53.5	626.1	-67.0	29.2	-3.13	24.8	14.4	0.70
17	56.9	608.4	-63.7	28.4	-2.98	23.3	14.2	0.67
18	60.2	613.3	-70.0	28.7	-3.27	22.7	14.1	0.64
19	63.6	596.8	-67.6	27.9	-3.16	21.3	13.9	0.61
20	66.9	604.0	-72.9	28.2	-3.40	20.7	13.7	0.58
21	70.3	590.2	-68.0	27.6	-3.17	19.2	13.3	0.55
22	73.6	601.4	-73.1	28.1	-3.42	18.6	13.0	0.52
23	76.9	562.9	-57.1	26.3	-2.67	16.3	12.6	0.49
24	80.3	576.6	-61.8	26.9	-2.89	15.7	12.2	0.46
25	83.6	527.3	-44.2	24.6	-2.06	13.6	13.4	0.43
26	87.0	533.1	-48.5	24.9	-2.26	13.1	14.5	0.41
27	90.3	522.4	-32.5	24.4	-1.52	11.2	15.2	0.38
28	93.7	541.3	-36.2	25.3	-1.69	10.3	13.9	0.35
Absolute	33.5			30.1			(T =	37.8 ms)
	73.6				-3.42		(T =	63.7 ms)

CASE METHOD

J =	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
RP	647.4	528.0	408.6	289.3	169.9					
RX	716.7	647.8	600.3	562.0	541.3	526.1	510.8	495.6	480.4	465.1
RU	647.4	528.0	408.6	289.3	169.9					

RAU = 374.2 (kips); RA2 = 545.0 (kips)

Current CAPWAP Ru = 493.0 (kips); Corresponding J(RP)= 0.26; J(RX) = 1.43

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips	KEB kips/in
15.8	35.83	603.6	640.6	640.6	1.04	0.15	0.15	32.7	661.6	1262

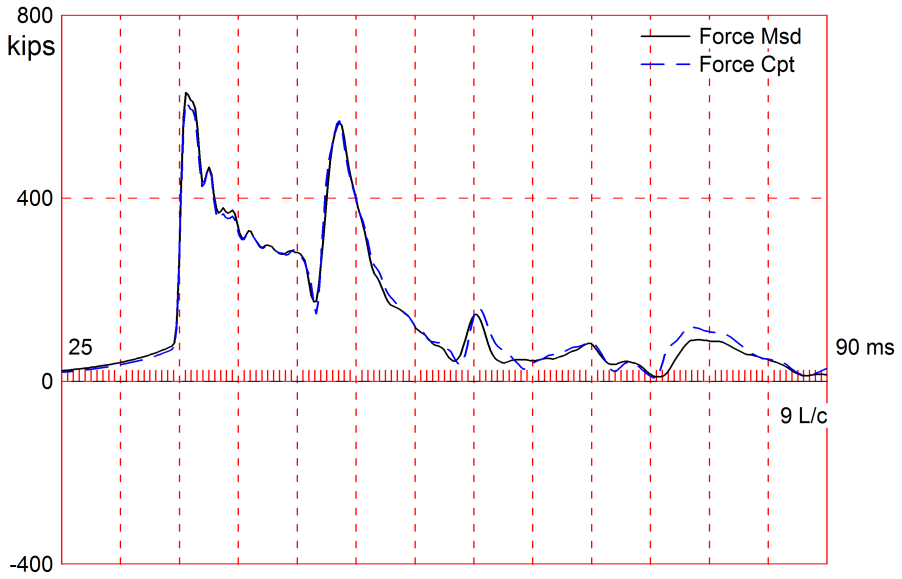
PILE PROFILE AND PILE MODEL

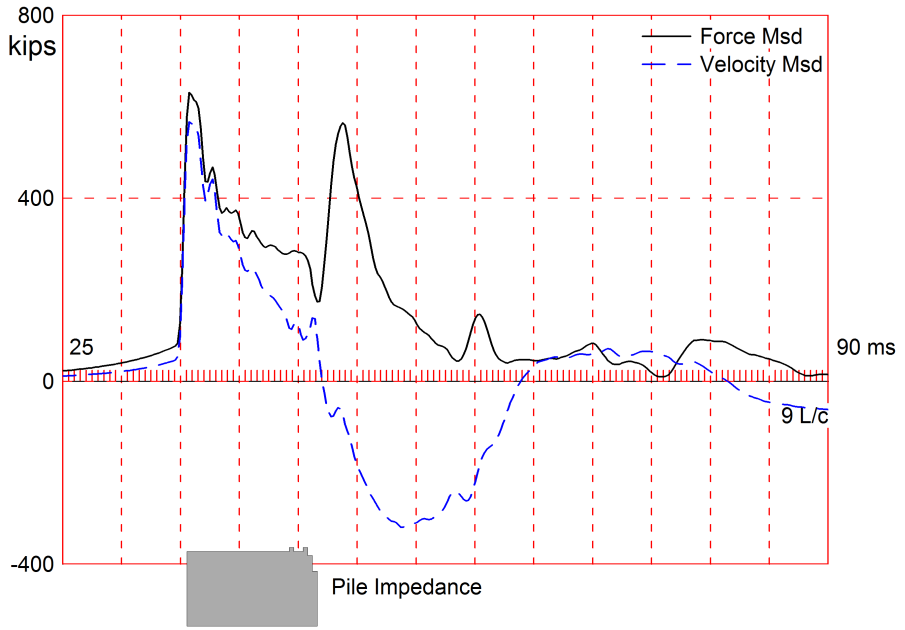
Depth ft	Area in^2	E-Modulus ksi	Spec. Weight lb/ft^3	Perim. ft
0.0	21.4	29992.2	492.000	4.70
93.7	21.4	29992.2	492.000	4.70

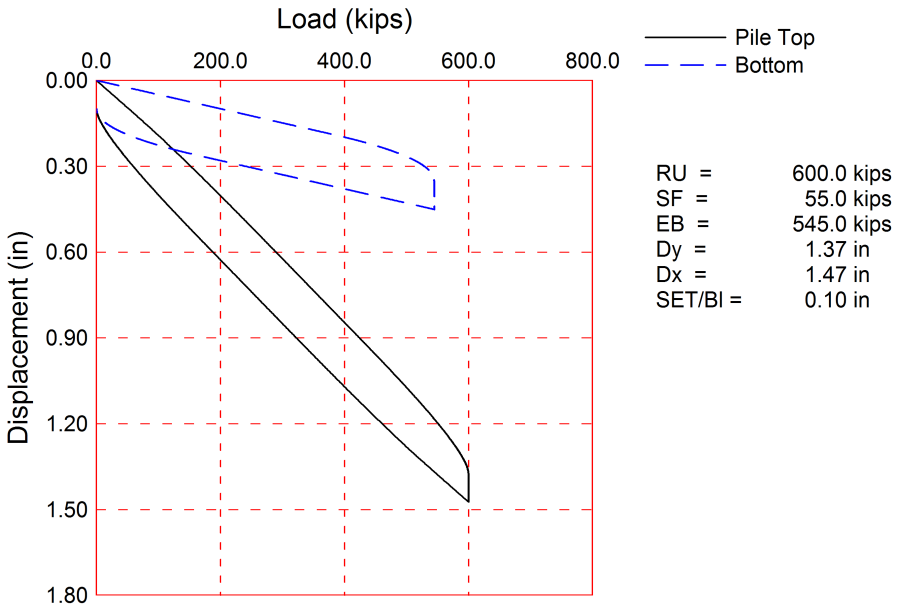
Toe Area 198.5 in^2

Segmnt Number	Dist. B.G. ft	Impedance kips/ft/s	Imped. Change %	Slack in	Tension Eff.	Slack in	Compression Eff.	Perim. ft	Wave Speed ft/s	Soil Plug kips
1	3.3	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000
26	87.0	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.010
27	90.3	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000
28	93.7	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9	0.000

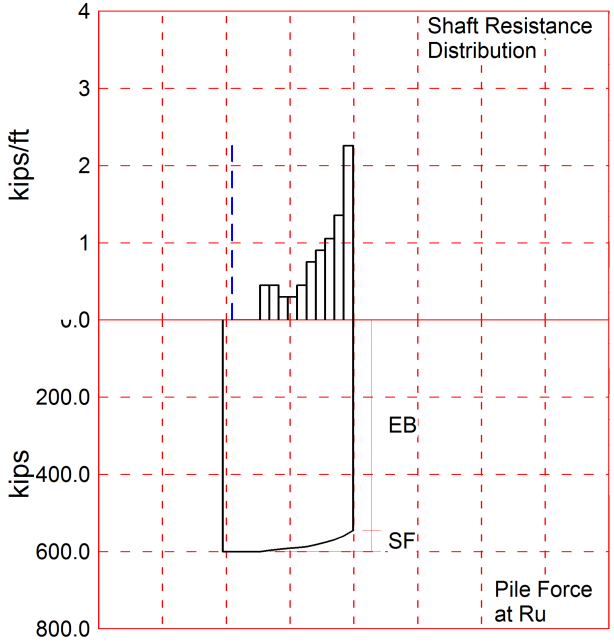
Wave Speed: Pile Top 16807.9, Elastic 16807.9, Overall 16807.9 ft/s
Pile Damping 1.00 %, Time Incr 0.199 ms, 2L/c 11.1 ms
Total volume: 13.920 ft^3; Volume ratio considering added impedance: 1.000







RU =	600.0 kips
SF =	55.0 kips
EB =	545.0 kips
Dy =	1.37 in
Dx =	1.47 in
SET/Bl =	0.10 in



Length b. Sensors	92.9 ft
Embedment	83.6 ft
Top Area	21.4 in^2
End Bearing Area	198.5 in^2
Top Perimeter	4.70 ft
Top E-Modulus	29992 ksi
Top Spec. Weight	492.0 lb/ft^3
Top Wave Spd.	16808 ft/s
Overall W.S.	16808 ft/s
Match Quality	3.90
Top Compr. Stress	28.4 ksi
Max Compr. Stress	32.3 ksi
Max Tension Stress	-4.60 ksi
Avg. Shaft Quake	0.10 in
Toe Quake	0.27 in
Avg. Shaft Smith Dpg.	0.30 s/ft
Toe Smith Damping	0.10 s/ft

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 600.0; along Shaft 55.0; at Toe 545.0 kips

Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft	Quake in
				600.0					
1	13.3	3.9	0.0	600.0	0.0	0.00	0.00	0.00	0.10
2	19.9	10.6	0.0	600.0	0.0	0.00	0.00	0.00	0.10
3	26.5	17.2	0.0	600.0	0.0	0.00	0.00	0.00	0.10
4	33.2	23.8	3.0	597.0	3.0	0.45	0.10	0.30	0.10
5	39.8	30.5	3.0	594.0	6.0	0.45	0.10	0.30	0.10
6	46.5	37.1	2.0	592.0	8.0	0.30	0.06	0.30	0.10
7	53.1	43.7	2.0	590.0	10.0	0.30	0.06	0.30	0.10
8	59.7	50.4	3.0	587.0	13.0	0.45	0.10	0.30	0.10
9	66.4	57.0	5.0	582.0	18.0	0.75	0.16	0.30	0.10
10	73.0	63.6	6.0	576.0	24.0	0.90	0.19	0.30	0.10
11	79.6	70.3	7.0	569.0	31.0	1.05	0.22	0.30	0.10
12	86.3	76.9	9.0	560.0	40.0	1.36	0.29	0.30	0.10
13	92.9	83.6	15.0	545.0	55.0	2.26	0.48	0.30	0.10
Avg. Shaft			4.2			0.66	0.14	0.30	0.10
Toe			545.0				395.36	0.10	0.27

Soil Model Parameters/Extensions		Shaft	Toe
Case Damping Factor		0.43	1.43
Damping Type		Viscous	Smith
Unloading Quake	(% of loading quake)	94	44
Reloading Level	(% of Ru)	100	100
Unloading Level	(% of Ru)	93	
Resistance Gap (included in Toe Quake)	(in)		0.05
Soil Plug Weight	(kips)		0.142

CAPWAP match quality = 3.90 (Wave Up Match) ; RSA = 0
Observed: Final Set = 0.10 in; Blow Count = 120 b/ft
Computed: Final Set = 0.05 in; Blow Count = 252 b/ft
Transducer F3(F607) CAL: 93.6; RF: 0.97; F4(D815) CAL: 93.0; RF: 0.97
A3(K2524) CAL: 360; RF: 1.13; A4(K3550) CAL: 360; RF: 1.10

max. Top Comp. Stress = 28.4 ksi (T= 35.9 ms, max= 1.137 x Top)
max. Comp. Stress = 32.3 ksi (Z= 92.9 ft, T= 42.1 ms)
max. Tens. Stress = -4.60 ksi (Z= 46.5 ft, T= 61.8 ms)
max. Energy (EMX) = 34.4 kip-ft; max. Measured Top Displ. (DMX)= 1.10 in

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.3	608.3	-27.1	28.4	-1.27	34.4	15.4	1.14
2	6.6	608.3	-29.0	28.4	-1.35	34.2	15.4	1.12
4	13.3	608.3	-32.7	28.4	-1.53	33.6	15.4	1.08
6	19.9	608.3	-39.2	28.4	-1.83	32.8	15.3	1.03
8	26.5	609.8	-40.6	28.5	-1.90	31.9	15.2	0.98
10	33.2	616.8	-44.5	28.8	-2.08	31.0	15.0	0.93
12	39.8	613.6	-80.5	28.7	-3.76	29.1	14.7	0.87
14	46.5	606.8	-98.5	28.3	-4.60	27.1	14.4	0.81
15	49.8	600.6	-95.3	28.1	-4.45	26.0	14.3	0.78
16	53.1	604.6	-92.0	28.2	-4.30	25.3	14.2	0.75
17	56.4	599.5	-86.1	28.0	-4.02	24.0	14.0	0.71
18	59.7	604.5	-89.7	28.2	-4.19	23.3	13.9	0.68
19	63.1	598.5	-88.3	28.0	-4.12	21.9	13.7	0.64
20	66.4	607.6	-87.8	28.4	-4.10	21.0	13.5	0.61
21	69.7	603.9	-77.5	28.2	-3.62	19.3	13.1	0.57
22	73.0	626.4	-73.1	29.3	-3.41	18.3	13.1	0.53
23	76.3	636.2	-61.7	29.7	-2.88	16.4	12.8	0.50
24	79.6	633.0	-59.9	29.6	-2.80	15.5	12.7	0.46
25	83.0	665.0	-45.0	31.1	-2.10	13.7	13.3	0.42
26	86.3	673.8	-45.4	31.5	-2.12	12.8	13.8	0.39
27	89.6	680.6	-30.3	31.8	-1.41	10.9	14.1	0.35
28	92.9	691.8	-28.4	32.3	-1.33	9.6	13.4	0.30
Absolute	92.9			32.3			(T =	42.1 ms)
	46.5				-4.60		(T =	61.8 ms)

CASE METHOD

J =	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
RP	673.2	565.3	457.4	349.5	241.6					
RX	800.7	756.1	730.9	705.7	680.5	655.4	635.4	617.5	599.6	587.3
RU	673.2	565.3	457.4	349.5	241.6					

RAU = 460.7 (kips); RA2 = 679.3 (kips)

Current CAPWAP Ru = 600.0 (kips); Corresponding J(RP)= 0.14; J(RX) = 1.60

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips	KEB kips/in
15.0	35.74	571.2	641.5	641.5	1.10	0.10	0.10	34.5	688.9	2477

Possible Pile Damage at 0.9 L Below Gages?

PILE PROFILE AND PILE MODEL

Depth ft	Area in^2	E-Modulus ksi	Spec. Weight lb/ft^3	Perim. ft
0.0	21.4	29992.2	492.000	4.70
92.9	21.4	29992.2	492.000	4.70

Toe Area 198.5 in^2

Segmnt Number	Dist. B.G. ft	Impedance kips/ft/s	Imped. Change %	Tension Slack in	Tension Eff.	Compression Slack in	Compression Eff.	Perim. ft	Wave Speed ft/s
1	3.3	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9
23	76.3	40.20	5.24	0.00	0.000	-0.00	0.000	4.70	16807.9
24	79.6	38.20	0.00	0.00	0.000	-0.00	0.000	4.70	16807.9
26	86.3	40.20	5.24	0.00	0.000	-0.00	0.000	4.70	16807.9
27	89.6	36.20	-5.24	0.00	0.000	-0.00	0.000	4.70	16807.9
28	92.9	28.20	-26.18	0.00	0.000	-0.00	0.000	4.70	16807.9

Wave Speed: Pile Top 16807.9, Elastic 16807.9, Overall 16807.9 ft/s
Pile Damping 1.00 %, Time Incr 0.197 ms, 2L/c 11.1 ms
Total volume: 13.705 ft^3; Volume ratio considering added impedance: 0.993