CONSTRUCTION LEADERS

LETTER OF TRANSMITTAL			
DATE:	**August 5, 2015**	PCL JOB NO:	**5515002**
ATTN:	**Chris Barker**	TRANSMITTAL NO:	**085**

To: **State of Vermont Agency of Transportation**
One National Life Drive
Montpelier, VT 05633-5001
(802) 828-0053

Re: Hartford Lateral Slide
Project No.: IM 091-2(79)
Contract ID.: 12A132 County: Windsor PCL FILE NO: 5515002-052

WE ARE SENDING X Attached ____ Under separate cover via **Email & SP** the following:
____ Shop drawings ____ Prints X Plans ____ Samples ____ Specifications
____ Copy of Letter ____ Change Order ____ Other

COPIES	SPEC.	REVISION	DESCRIPTION
1	**204.01.B**		**Abutment Top SOE Walls**

TRANSMITTED for as checked below:

X For approval ____ Approved as submitted ____ Resubmit X Copies for approval
____ For your use ____ Approved as noted ____ Submit ____ Copies for distribution
____ As requested ____ Returned for corrections ____ Return ____ Corrected prints
____ For review and comment

Remarks:

The included SOE wall design will be used to retain the backfill which will allow for placement of the substructure pourback's after the slide weekend.

Please return an email of this approved submittal to Erich Heymann (ewheymann@pcl.com) and Jeremy Mackling (jmackling@pcl.com).

We request the review and return of this submittal within 5 days. Please advise if this request cannot be met so we can plan accordingly.

By: **Erich Heymann,** Project Engineer

COPY TO: Project Files

CONSTRUCTION LEADERS

SUBMITTAL NO. : 52
Abutment Top SOE Walls

Item No.	Specification	Description
1	204.01.B	Abutment Top SOE Walls

PROJECT:
HARTFORD LATERAL SLIDE
PROJECT NO.: IM 091-2(79)
CONTRACT ID.: 12A132

OWNER:
STATE OF VERMONT AGENCY OF TRANSPORTATION

ENGINEER OF RECORD:
STATE OF VERMONT AGENCY OF TRANSPORTATION

CONTRACTOR:
PCL CIVIL CONSTRUCTORS, INC.

AUGUST 5, 2015

3810 Northdale Blvd., Suite 200; Tampa, FL • (813) 264-9500 • (813) 264-6689 (fax)

Vermont Agency of Transportation

I-91
Windsor County
Project Number: IM 091-2(79)

Hartford Lateral Slide

Calculations for Temporary Structures including:

Abutment Top SOE Walls

Submitted By,

Tim Davis, P.E.
VT P.E. # 97183

André Tousignant, P.E.
VT P.E. # 100162

STATE OF VERMONT
TIMOTHY DAVIS
NO. 97183
CIVIL
LICENSED
PROFESSIONAL ENGINEER

Tim Davis, P.E.
Aug 4 2015 7:54 PM

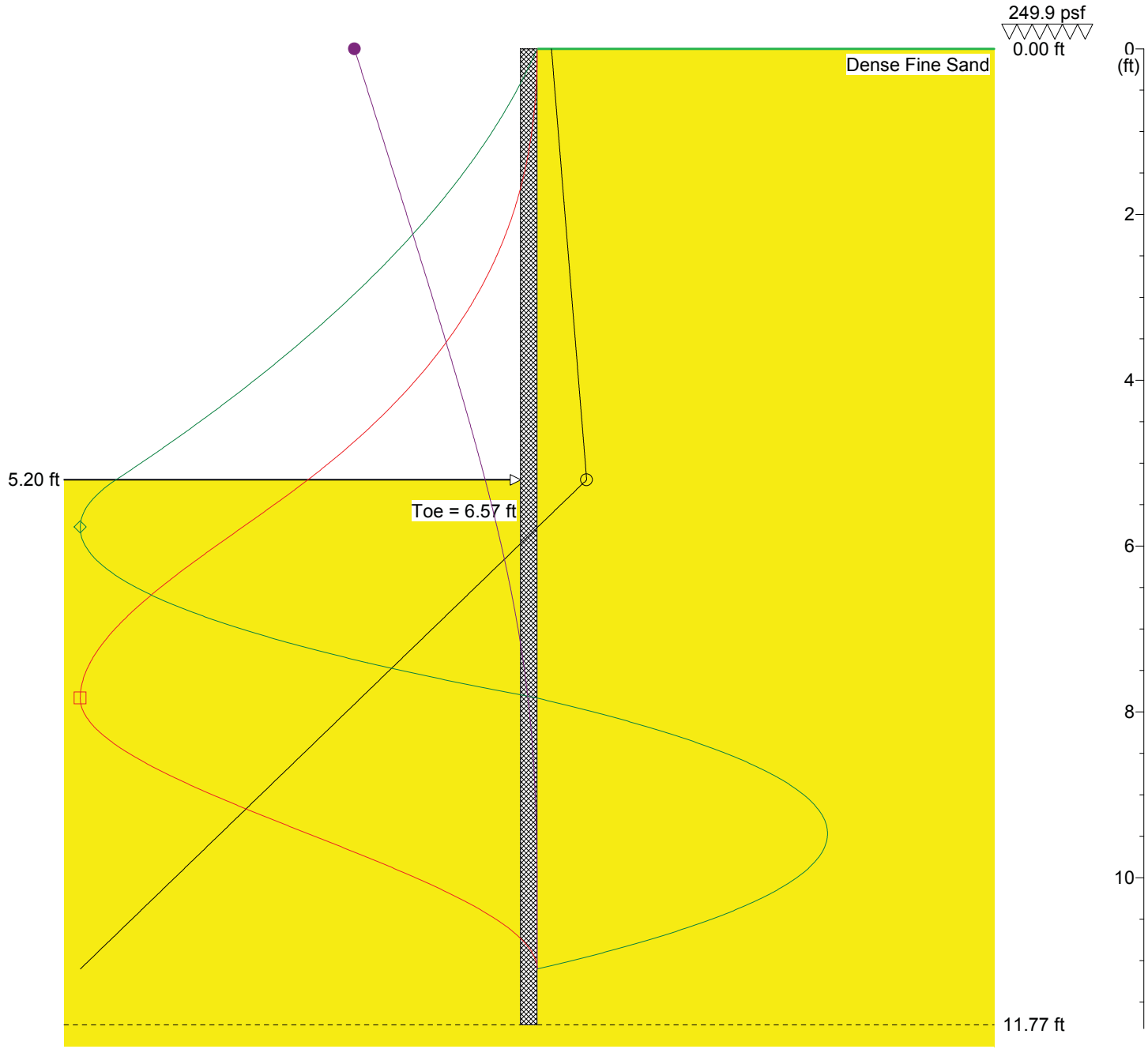
August 03, 2015

PCL Civil Constructors Inc.
3810 Northdale Blvd. Suite 200
Tampa, Florida 33624
813-264-9500

Title: I-91 Abutment Top SOE
Designer: AJT
Page: 1
Date: 8.3.15

Sheet: PZC-18
Works: Temporary
Pressure: Rankine
Analysis: Net Pressure
Toe: Cantilever

Maximum	d (ft)
○ 233.7 psf	5.20
□ 3301.3 ftlb/ft	7.83
◇ 850.8 lb/ft	5.77
● 0.0 in	0.00



PCL Civil Constructors, Inc.

SupportIT, v2.36

© 1997 - 2014, GTSoft Ltd.
Tel/Fax: +44 (0)1292 477754
Email: GTSoftLtd@aol.com
Web: www.GTSoft.org

Title: I-91 Abutment Top SOE
Designer: AJT
Page: 2
Date: 8.3.15

Sheet: PZC-18
Works: Temporary
Pressure: Rankine
Analysis: Net Pressure
Toe: Cantilever

Input Data

Depth Of Excavation = 5.20ft
Surcharge = 249.9psf

Depth Of Active Water = 40.00ft
Depth Of Passive Water = 40.00ft

Water Density = 62.43pcf
Minimum Fluid Density = 31.82pcf

Soil Profile

Depth (ft)	Soil Name	γ (pcf)	γ' (pcf)	C (psf)	C_a (psf)	ϕ (°)	δ (°)	K_a	K_{ac}	K_p	K_{pc}
0.00	Dense Fine Sand	118.37	68.73	0.0	0.0	35.0	0.0	0.27 (0.32)	0.00 (0.00)	3.69	0.00

( ) indicates factored value used in embedment calculation. Factor(s): K_ax1.2

WALL IS IN GRANULAR BACKFILL

Solution

Sheet

Sheet Name	E (psi)	I (in^4/ft)	f (psi)	Z (in^3/ft)	Allowed M_{max} (ftlb/ft)	b (in)	A (in^2/ft)	W (lb/ft)	Upstand (ft)	Toe (ft)	Length (ft)
PZC-18	3.04E+07	255.50	24966.8	33.50	69699.1	25.00	5.60	24.2	0.00	6.57	11.77

Maxima

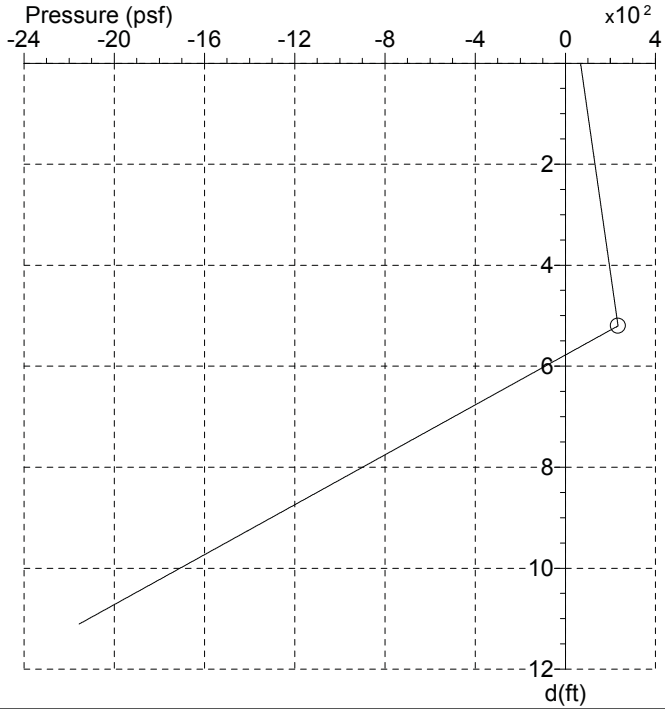
	Maximum	Depth (ft)
Pressure	233.7 psf	5.20
Bending Moment	3301.3 ftlb/ft	7.83
Deflection	0.0 in	0.00
Shear Force	850.8 lb/ft	5.77

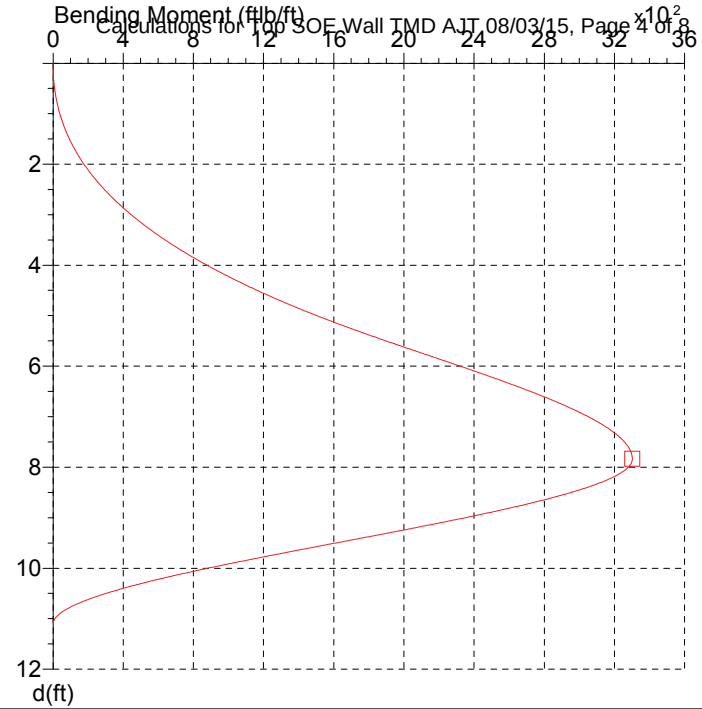
© 1997 - 2014, GTSoft Ltd.
Tel/Fax: +44 (0)1292 477754
Email: GTSoftLtd@aol.com
Web: www.GTSoft.org

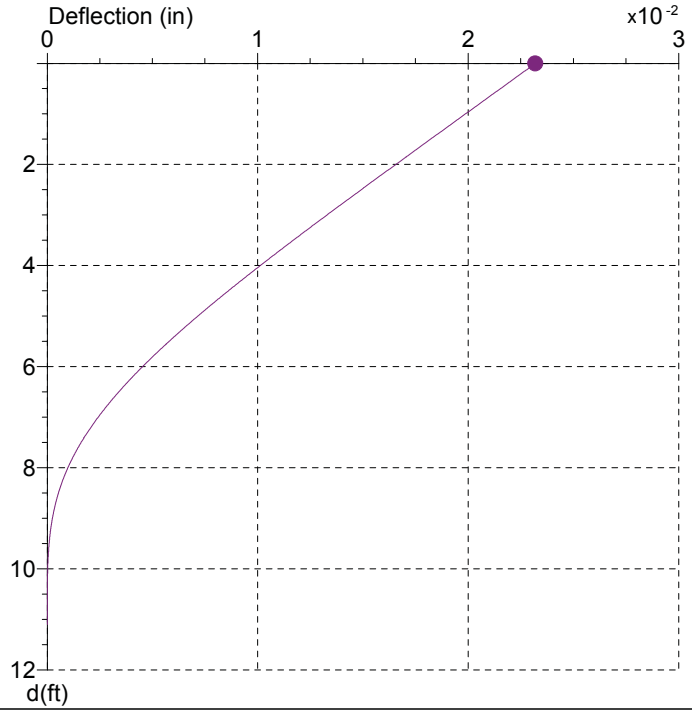
Title: I-91 Abutment Top SOE
Designer: AJT
Page: 3
Date: 8.3.15

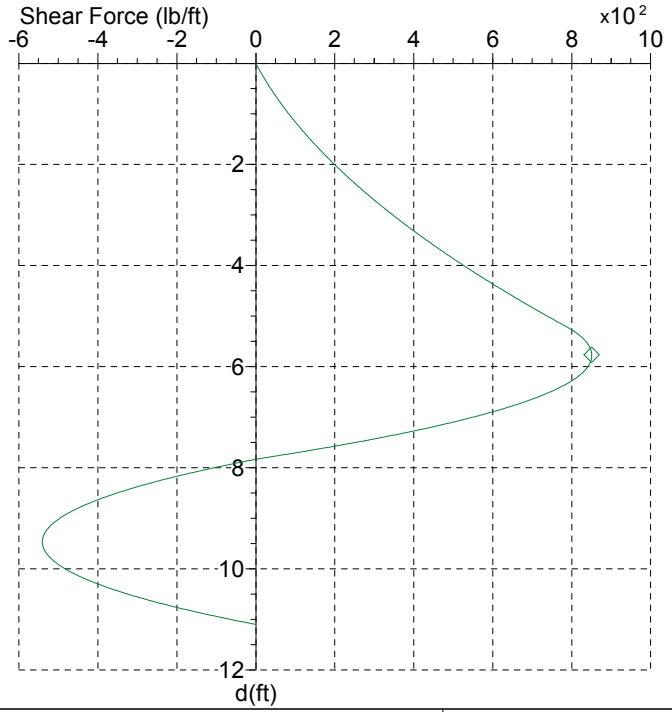
Sheet: PZC-18
Works: Temporary
Pressure: Rankine
Analysis: Net Pressure
Toe: Cantilever

Maximum	d (ft)
○ 233.7 psf	5.20
□ 3301.3 ftlb/ft	7.83
◇ 850.8 lb/ft	5.77
● 0.0 in	0.00









PCL Civil Constructors, Inc.

SupportIT, v2.36

© 1997 - 2014, GTSoft Ltd.
Tel/Fax: +44 (0)1292 477754
Email: GTSoftLtd@aol.com
Web: www.GTSoft.org

Title: I-91 Abutment Top SOE
Designer: AJT
Page: 4
Date: 8.3.15

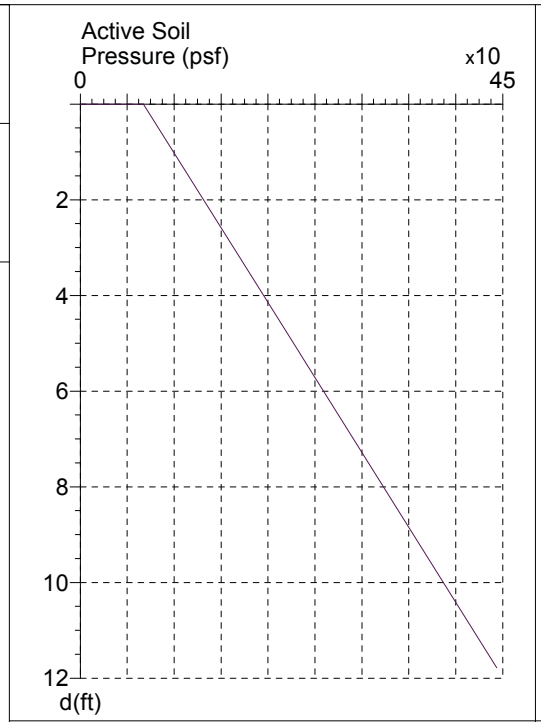
Sheet: PZC-18
Works: Temporary
Pressure: Rankine
Analysis: Net Pressure
Toe: Cantilever

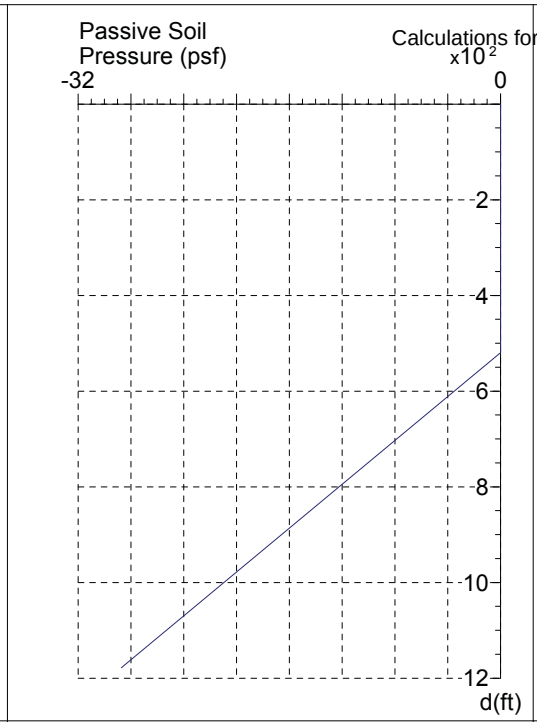
depth (ft)	P (psf)	M (ftlb/ft)	D (in)	F (lb/ft)	depth (ft)	P (psf)	M (ftlb/ft)	D (in)	F (lb/ft)	depth (ft)	P (psf)	M (ftlb/ft)	D (in)	F (lb/ft)
0.00	67.5	0.0	0.0	0.0	3.95	193.8	853.9	0.0	517.6	7.90	-858.8	3298.0	0.0	-42.0
0.08	70.1	0.2	0.0	5.7	4.03	196.2	892.7	0.0	532.0	7.98	-892.5	3282.7	0.0	-93.6
0.16	72.5	0.8	0.0	11.0	4.11	198.9	937.5	0.0	548.5	8.06	-926.3	3255.8	0.0	-142.3
0.24	75.2	1.9	0.0	17.2	4.19	201.5	983.7	0.0	565.2	8.15	-960.0	3217.7	0.0	-188.2
0.32	77.8	3.6	0.0	23.6	4.27	204.2	1031.3	0.0	582.2	8.23	-990.0	3175.1	0.0	-226.7
0.40	80.5	5.8	0.0	30.2	4.35	206.6	1074.8	0.0	597.4	8.31	-1023.7	3117.9	0.0	-267.3
0.48	82.9	8.2	0.0	36.3	4.44	209.2	1125.1	0.0	614.8	8.39	-1057.5	3051.5	0.0	-305.1
0.56	85.5	11.5	0.0	43.3	4.52	211.9	1176.9	0.0	632.3	8.47	-1087.5	2985.3	0.0	-336.4
0.65	88.2	15.4	0.0	50.6	4.60	214.3	1224.1	0.0	648.1	8.55	-1121.2	2903.3	0.0	-368.8
0.73	90.6	19.3	0.0	57.2	4.68	216.9	1278.7	0.0	666.1	8.63	-1154.9	2814.1	0.0	-398.5
0.81	93.2	24.4	0.0	64.9	4.76	219.6	1334.7	0.0	684.4	8.71	-1188.7	2718.2	0.0	-425.4
0.89	95.9	30.1	0.0	72.8	4.84	222.3	1392.3	0.0	702.8	8.79	-1218.7	2627.9	0.0	-446.9
0.97	98.6	36.4	0.0	80.9	4.92	224.6	1444.8	0.0	719.4	8.87	-1252.4	2521.2	0.0	-468.5
1.05	100.9	42.6	0.0	88.3	5.00	227.3	1505.3	0.0	738.2	8.95	-1286.1	2409.8	0.0	-487.2
1.13	103.6	50.3	0.0	96.8	5.08	230.0	1567.3	0.0	757.3	9.03	-1316.1	2307.4	0.0	-501.5
1.21	106.2	58.7	0.0	105.6	5.16	232.3	1623.8	0.0	774.4	9.11	-1349.9	2188.8	0.0	-514.9
1.29	108.6	66.7	0.0	113.6	5.24	217.0	1688.9	0.0	793.5	9.19	-1383.6	2067.4	0.0	-525.6
1.37	111.3	76.5	0.0	122.8	5.32	183.3	1755.5	0.0	810.1	9.27	-1417.3	1943.8	0.0	-533.4
1.45	113.9	87.0	0.0	132.2	5.40	149.6	1823.4	0.0	823.8	9.35	-1447.3	1832.7	0.0	-538.0
1.53	116.3	97.1	0.0	140.7	5.48	119.6	1884.6	0.0	833.6	9.44	-1481.1	1706.7	0.0	-540.5
1.61	119.0	109.1	0.0	150.5	5.56	85.8	1954.2	0.0	842.0	9.52	-1514.8	1580.5	0.0	-540.1
1.69	121.6	122.0	0.0	160.6	5.65	52.1	2024.5	0.0	847.6	9.60	-1544.8	1468.6	0.0	-537.5
1.77	124.3	135.8	0.0	170.9	5.73	22.1	2087.2	0.0	850.3	9.68	-1578.5	1343.6	0.0	-531.9
1.85	126.7	148.7	0.0	180.2	5.81	-11.6	2157.9	0.0	850.6	9.76	-1612.3	1220.2	0.0	-523.4
1.94	129.3	164.1	0.0	190.9	5.89	-45.4	2228.6	0.0	848.4	9.84	-1646.0	1099.1	0.0	-512.2
2.02	132.0	180.3	0.0	201.8	5.97	-75.3	2291.1	0.0	844.1	9.92	-1676.0	993.9	0.0	-499.8
2.10	134.4	195.6	0.0	211.6	6.05	-109.1	2361.1	0.0	836.6	10.00	-1709.7	878.8	0.0	-483.3
2.18	137.0	213.6	0.0	223.0	6.13	-142.8	2430.2	0.0	826.2	10.08	-1743.5	767.9	0.0	-463.9
2.26	139.7	232.5	0.0	234.5	6.21	-176.6	2498.5	0.0	813.1	10.16	-1773.5	673.4	0.0	-444.3
2.34	142.4	252.5	0.0	246.3	6.29	-206.5	2558.1	0.0	799.0	10.24	-1807.2	572.1	0.0	-419.7
2.42	144.7	271.0	0.0	257.0	6.37	-240.3	2623.9	0.0	780.6	10.32	-1840.9	476.9	0.0	-392.2
2.50	147.4	292.8	0.0	269.1	6.45	-274.0	2688.0	0.0	759.3	10.40	-1870.9	397.9	0.0	-365.4
2.58	150.0	315.6	0.0	281.6	6.53	-304.0	2743.4	0.0	738.0	10.48	-1904.7	315.9	0.0	-332.6
2.66	152.4	336.8	0.0	292.8	6.61	-337.7	2803.8	0.0	711.4	10.56	-1938.4	241.9	0.0	-297.0
2.74	155.1	361.6	0.0	305.6	6.69	-371.5	2861.9	0.0	682.0	10.65	-1972.1	176.5	0.0	-258.5
2.82	157.7	387.5	0.0	318.7	6.77	-405.2	2917.4	0.0	649.8	10.73	-2002.1	126.1	0.0	-222.0
2.90	160.4	414.5	0.0	332.0	6.85	-435.2	2964.4	0.0	618.8	10.81	-2035.9	78.8	0.0	-178.3
2.98	162.8	439.4	0.0	343.9	6.94	-468.9	3014.5	0.0	581.3	10.89	-2069.6	41.9	0.0	-131.7
3.06	165.4	468.5	0.0	357.6	7.02	-502.7	3061.4	0.0	541.0	10.97	-2099.6	18.5	0.0	-88.0
3.15	168.1	498.7	0.0	371.6	7.10	-532.7	3100.1	0.0	502.8	11.05	-2133.3	3.3	0.0	-36.1
3.23	170.5	526.6	0.0	384.1	7.18	-566.4	3140.3	0.0	457.1	11.13	-2155.8	0.0	0.0	0.0
3.31	173.1	559.1	0.0	398.5	7.26	-600.1	3176.5	0.0	408.7	11.21	-2155.8	0.0	0.0	0.0
3.39	175.8	592.7	0.0	413.0	7.34	-633.9	3208.6	0.0	357.4	11.29	-2155.8	0.0	0.0	0.0
3.47	178.2	623.7	0.0	426.2	7.42	-663.9	3233.5	0.0	309.5	11.37	-2155.8	0.0	0.0	0.0
3.55	180.8	659.7	0.0	441.1	7.50	-697.6	3257.1	0.0	252.9	11.45	-2155.8	0.0	0.0	0.0
3.63	183.5	696.9	0.0	456.3	7.58	-731.3	3276.0	0.0	193.5	11.53	-2155.8	0.0	0.0	0.0
3.71	186.2	735.4	0.0	471.8	7.66	-761.3	3288.5	0.0	138.4	11.61	-2155.8	0.0	0.0	0.0
3.79	188.5	770.7	0.0	485.7	7.74	-795.1	3297.6	0.0	73.7	11.69	-2155.8	0.0	0.0	0.0
3.87	191.2	811.7	0.0	501.5	7.82	-828.8	3301.2	0.0	6.2	11.77	-2155.8	0.0	0.0	0.0

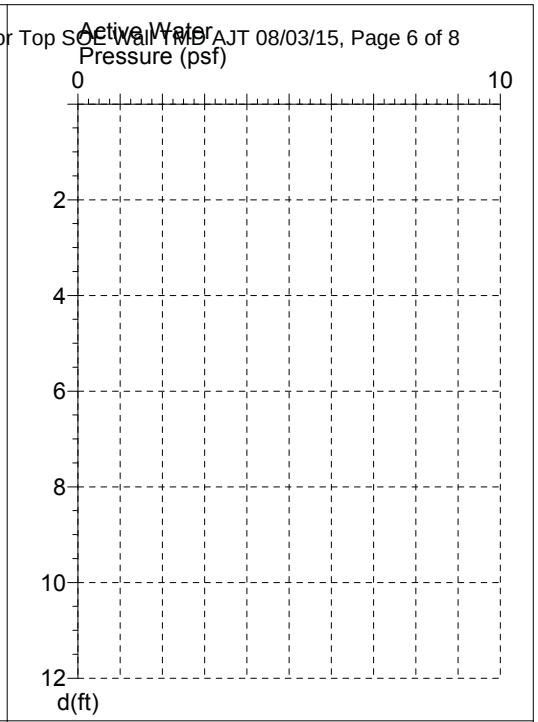
© 1997 - 2014, GTSoft Ltd.
Tel/Fax: +44 (0)1292 477754
Email: GTSoftLtd@aol.com
Web: www.GTSoft.org

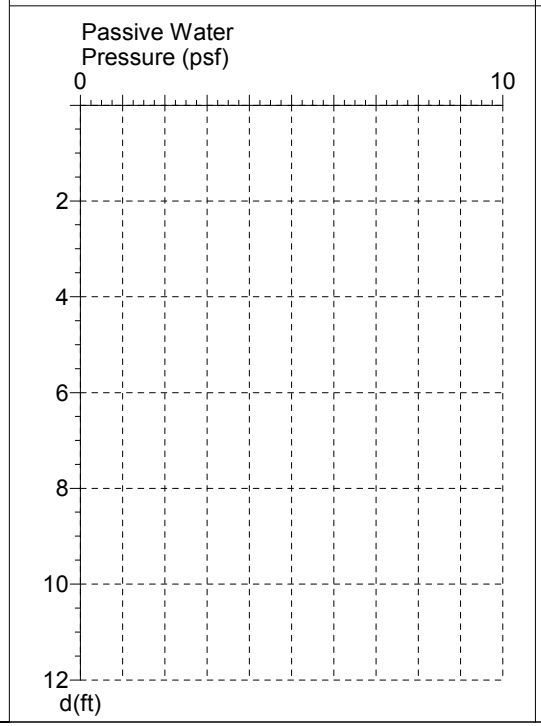
Title: I-91 Abutment Top SOE
Designer: AJT
Page: 5
Date: 8.3.15

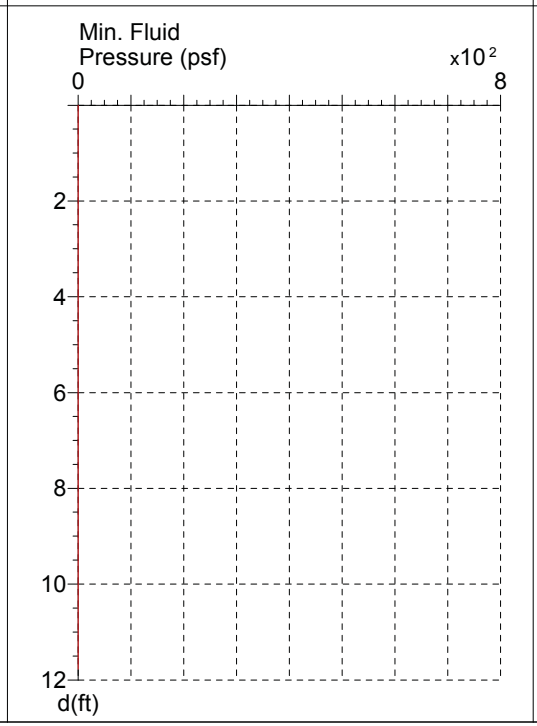
Sheet: PZC-18
Works: Temporary
Pressure: Rankine
Analysis: Net Pressure
Toe: Cantilever

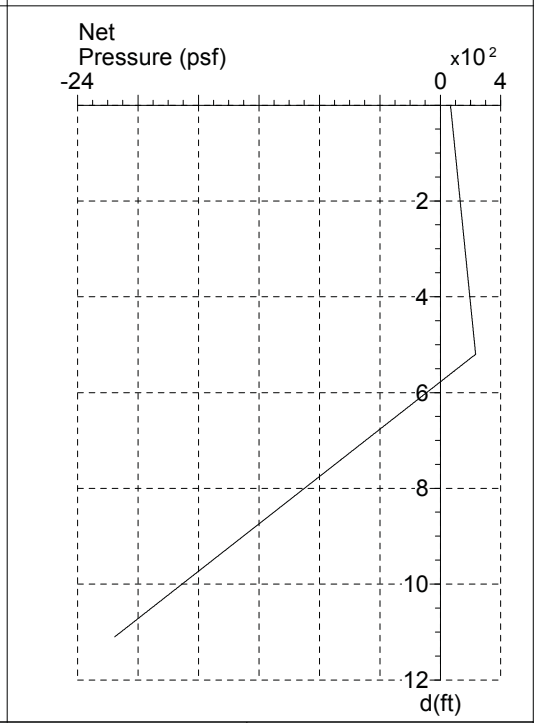












PCL Civil Constructors, Inc.

SupportIT, v2.36

© 1997 - 2014, GTSoft Ltd.
Tel/Fax: +44 (0)1292 477754
Email: GTSoftLtd@aol.com
Web: www.GTSoft.org

Design Report

1. Factor(s) applied to soil parameter(s) in the 'Wall' page, and used in the embedment calculation.
   Factor(s) used: Ka x1.2

2. Maximum bending moment = 3301.3ftlb/ft and f = 24966.8psi. MINIMUM required sheet section modulus is: Z = 1.59in³/ft (= M/f). Sheet section modulus in this design is Z = 33.50in³/ft, and is satisfactory.

3. FOS = 1.00 (Net Pressure)
   This is the factor of safety against rotation about the toe. It is calculated using the factored soil parameters (see above).
   The FOS can be changed using 'Defined FOS' or 'Manual' in the 'Wall' page.

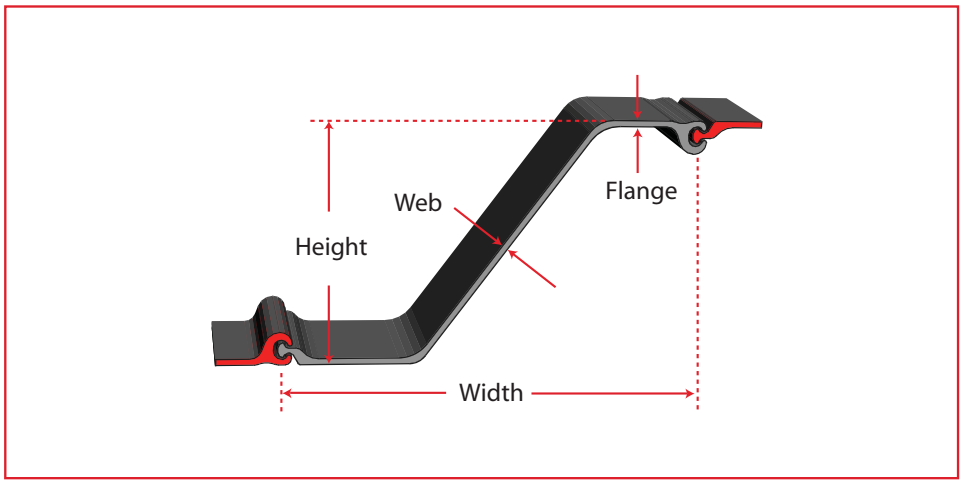
© 1997 - 2014, GTSoft Ltd.
Tel/Fax: +44 (0)1292 477754
Email: GTSoftLtd@aol.com
Web: www.GTSoft.org

LBFoster Piling

PZC™ 18

WIDER - LIGHTER - STRONGER

Hot Rolled
Domestically Produced
Ball & Socket Sheet Pile



Available Grades: ASTM A572 Gr. 50 and 60, A588 and A690

The innovative PZC series of steel sheet piling is manufactured to be wider, lighter, and stronger than the traditional PZ piling.

PZC sheet piling is made wider than PZ sections to maximize jobsite production in setting and driving. They are lighter than PZ piling to minimize the required amount of steel needed for project installation. And PZC sections are stronger per pound than PZ sections in both section modulus and moment of inertia.

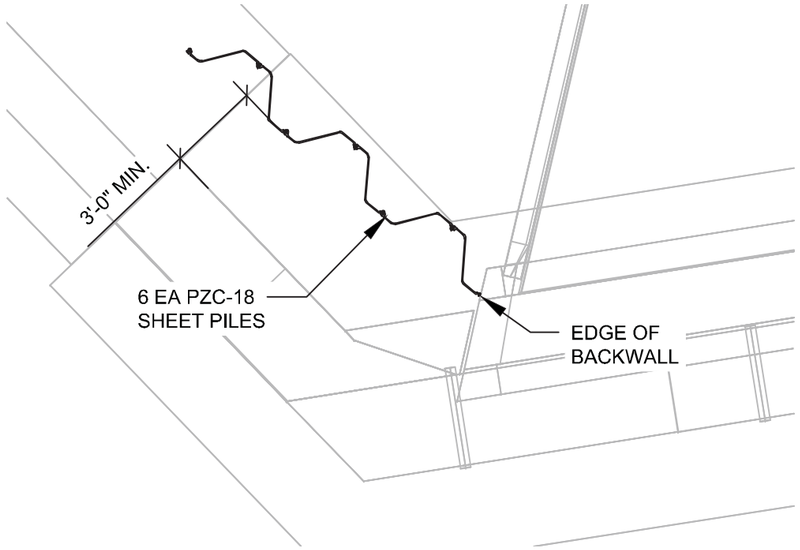
PZC 18 compared to the currently produced PZ 27:

- 39 % wider laying dimension
- 24 % stronger per pound

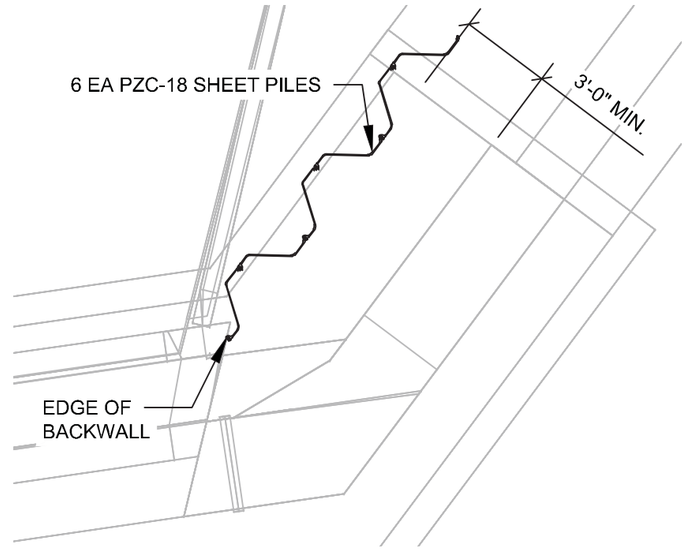
Dimensions and Properties

Section	Width	Height	Web Thickness	Flange Thickness	Weight		Moment of Inertia		Section Modulus		Nominal Coating Area
	in.	in.	in.	in.	lb / lft	lb / ft²	in⁴	in⁴ / wft	in³	in³ / wft	ft² / lft
	mm	mm	mm	mm	kg / lm	kg / m²	cm⁴	cm⁴ / wm	cm³	cm³ / wm	m² / lm
PZC 17	25.00	15.21	0.335	0.335	46.4	22.3	492.9	236.6	64.5	31.0	5.60
	635	386	8.5	8.5	69.1	108.8	20,517	32,310	1,057	1,665	1.71
PZC 18	**25.00**	**15.25**	**0.375**	**0.375**	**50.4**	**24.2**	**532.2**	**255.5**	**69.8**	**33.5**	**5.60**
	635	**387**	**9.5**	**9.5**	**75.1**	**118.2**	**22,154**	**34,888**	**1,144**	**1,801**	**1.71**
PZC 19	25.00	15.30	0.420	0.420	55.0	26.4	576.5	276.7	75.2	36.1	5.60
	635	388	10.7	10.7	81.8	128.8	23,997	37,790	1,232	1,904	1.71

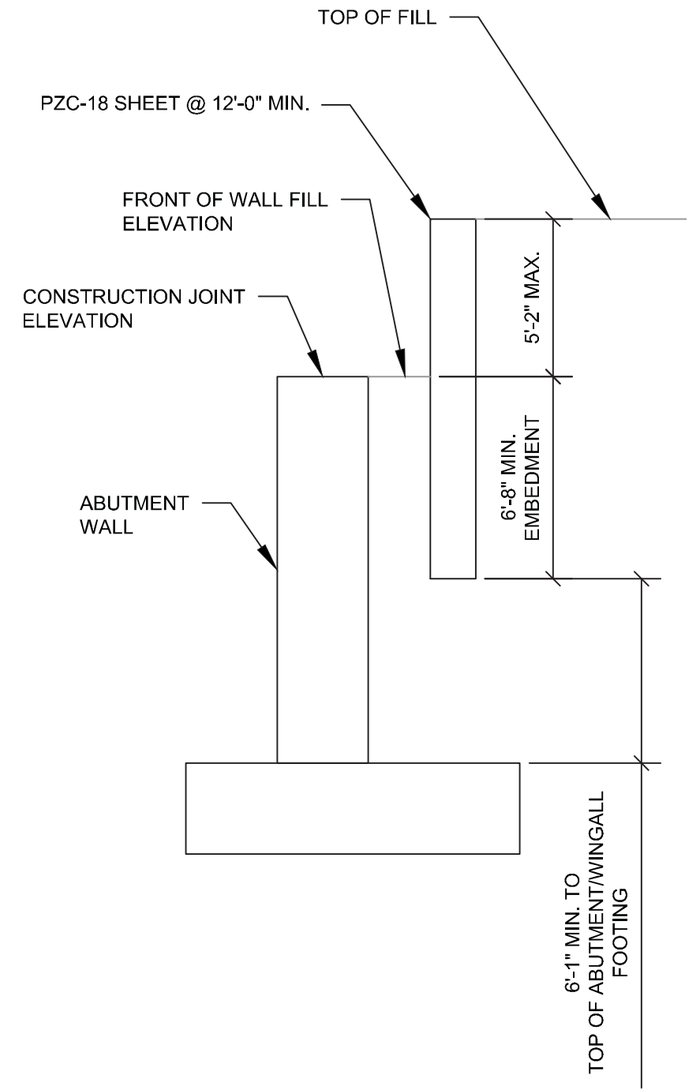
(800) 848-6249
www.fosterpiling.com



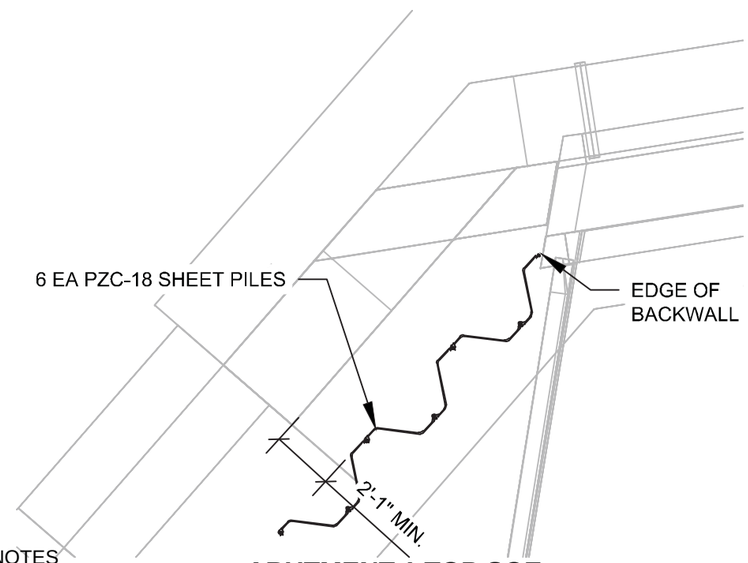
ABUTMENT 2 TOP SOE



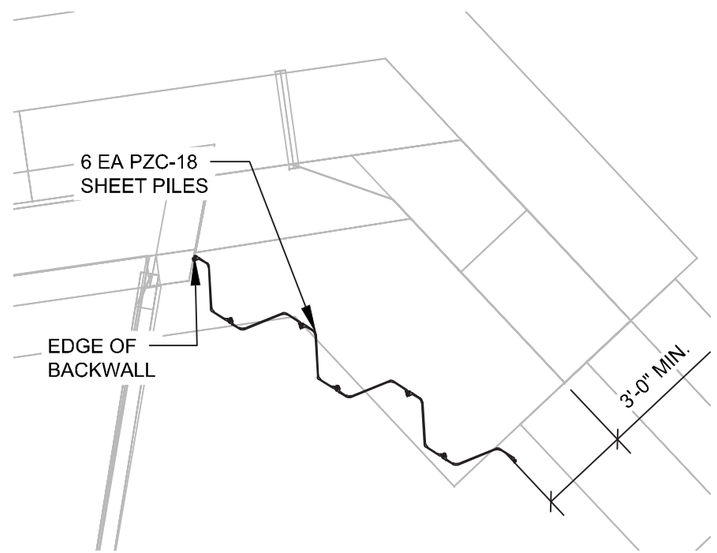
ABUTMENT 4 TOP SOE



TYPICAL SECTION



ABUTMENT 1 TOP SOE



ABUTMENT 3 TOP SOE

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED

MATERIAL PROPERTIES
- SHEETS - GR. 36, Fy = 36 KSI MIN.

Revision No. & Date	Vermont Agency of Transportation			Drawing Status		Name	Date	PCL Civil Constructors, Inc. 3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689	
				Aug 4 2015 7:55 PM FOR CONSTRUCTION	Drawn By	AJT	08/03/15		
	Road No.	County / City	Financial Project ID No.		Design By	TMD/AJT	08/03/15	Submittal ABUTMENT TOP SOE WALL	PCL Project / Job No. I-91 Hartford / 5515002
	I-91	Hartford	IM 091-2(79)		Check By	TMD	08/04/15	Drawing Title TYP. ABUTMENT TOP SOE WALL	Sheet No. 01

STATE OF VERMONT
TIMOTHY DAVIS
NO. 97183
CIVIL
LICENSED
PROFESSIONAL ENGINEER