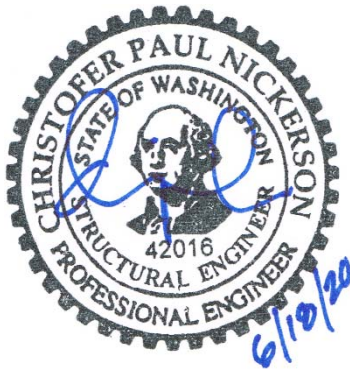


Structural Calculations for:

Temporary Excavation Shoring Wall

Project Address:
7431E Mercer Way
Mercer Island, WA 98040



Structural Engineering by:

Nickerson Engineering
2221 Everett Ave, #202
Everett, WA 98201

Design per:
2015 International Building Code

lagging design

50% of active , piles spaced @ 8' o.c.

PT 4x12 HF #2

$$F_b' = 1.1(1.1)(0.8)(0.9)850 \text{ psi} = 0.871(850) = 740 \text{ psi}$$

Cm Cf C_t C_d

PT 6x12 HF #2

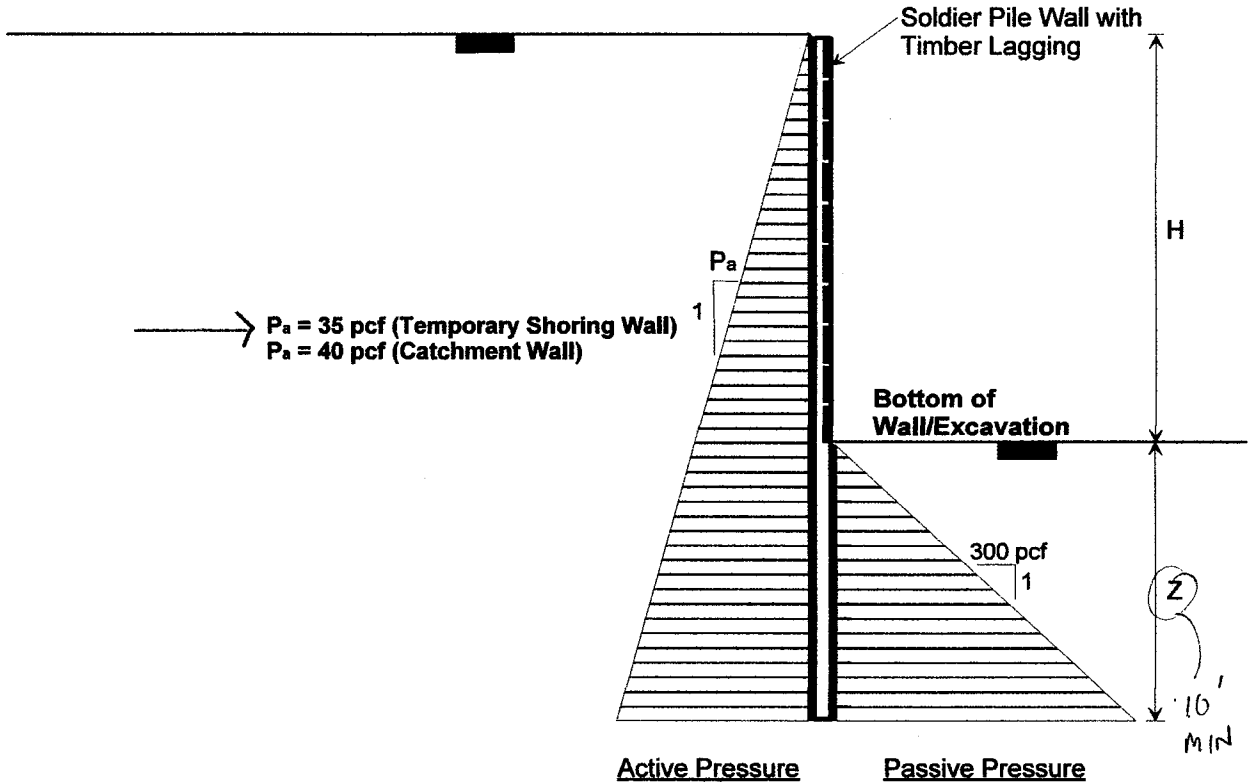
$$F_b' = 0.9(0.9)(675) = 546 \text{ psi}$$

$$@ 10' = H, P.S.P_{ax} = 0.5(35)(10) = 175 \text{ psf}$$

→ PT 4x12 HF #2

$$F_b = 731 \text{ psi} < 740 \text{ psi} \checkmark$$

FROM GEO TECH REPORT:



Notes:

1. Embedment (Z) should be determined by summation of moments at the bottom of the soldier piles. Minimum embedment should be at least 10 feet.
2. A factor of safety of 1.5 has been applied to the recommended passive earth pressure value. No factor of safety has been applied to the recommended active earth pressure values.
3. Spacers (1/8 inch) should be provided between timber lagging to promote drainage.
4. Active and surcharge pressures should be applied over the full width of the pile spacing above the base of the excavation, and over one pile diameter below the base of the excavation.
5. Passive pressure should be applied to two times the diameter of the soldier piles.
6. Lagging can be used with 50% of the earth pressure.
7. Refer to report text for additional discussions.

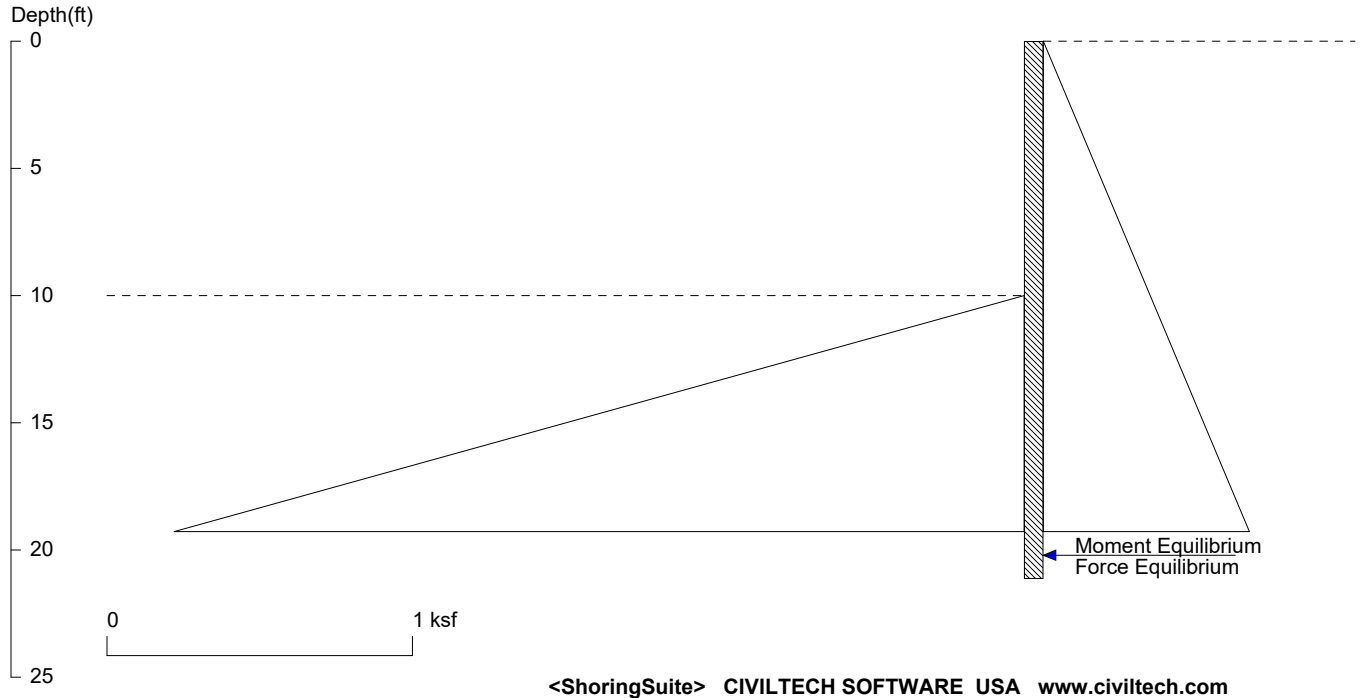
Soldier Pile EP.grf 10/25/19 (07:49) TEA2

Cascade GeotechNW	Proposed Residence 7431 E Mercer Way Mercer Island, WA	DESIGN LATERAL PRESSURES CANTILEVERED SOLDIER PILE WALL	
		Project No. 2018-015	Figure No. 3

TS2

Yang Residence

End Piles (P1 & P8)



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 File: N:_PROJECTS\2019\19-065 Yang Residence\2. Calculations\Shoring\temp shoring.sh8

Wall Height=10.0 Pile Diameter=2.0 Pile Spacing=8.0 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=11.13 Min. Pile Length=21.13
 MOMENT IN PILE: Max. Moment=48.59 per Pile Spacing=8.0 at Depth=14.82

PILE SELECTION:

Request Min. Section Modulus = 17.7 in³/pile=289.57 cm³/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
 W14X38 has Section Modulus = 54.6 in³/pile=894.73 cm³/pile. It is greater than Min. Requirements!
 Top Deflection = 0.33(in) based on E (ksi)=29000.00 and I (in⁴)/pile=385.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	800	0.000	.035

PASSIVE PRESSURES: Pressures below will be divided by a Factor of Safety =1.25

Z1	P1	Z2	P2	Slope
10	0	800	237.0	.3

ACTIVE SPACING:

No.	Z depth	Spacing
1	0.00	4.00
2	10.00	2.00

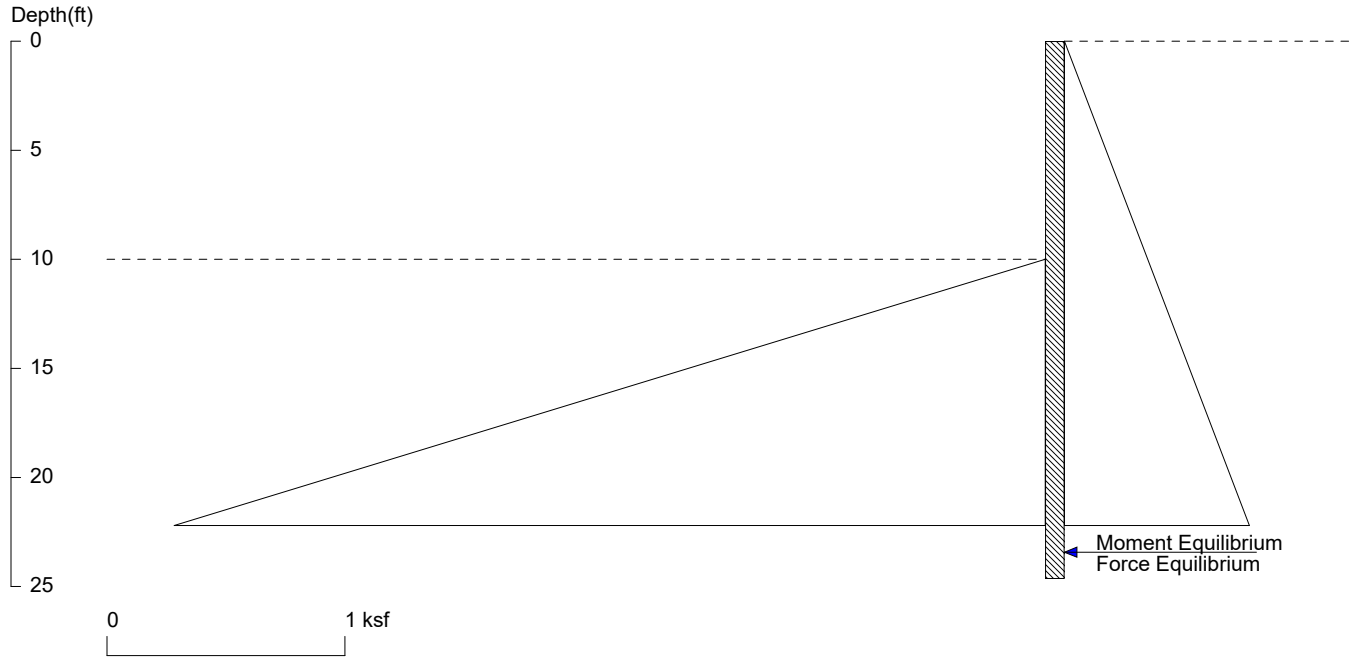
PASSIVE SPACING:

No.	Z depth	Spacing
1	10.00	4.00

UNITS: Width, Spacing, Diameter, Length, and Depth - ft; Force - kip; Moment - kip-ft
 Friction, Bearing, and Pressure - ksf; Pres. Slope - kip/ft³; Deflection - in

Yang Residence

Temp Shoring Wall P2-P7



<ShoringSuite> CIVILTECH SOFTWARE USA www.civiltech.com

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 File: N:_PROJECTS\2019\19-065 Yang Residence\2. Calculations\Shoring\temp shoring.sh8

Wall Height=10.0 Pile Diameter=2.0 Pile Spacing=8.0 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=14.65 Min. Pile Length=24.65
 MOMENT IN PILE: Max. Moment=111.72 per Pile Spacing=8.0 at Depth=16.45

PILE SELECTION:

Request Min. Section Modulus = 40.6 in³/pile=665.75 cm³/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
 W14X38 has Section Modulus = 54.6 in³/pile=894.73 cm³/pile. It is greater than Min. Requirements!
 Top Deflection = 0.89(in) based on E (ksi)=29000.00 and I (in⁴)/pile=385.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	800	0.000	.035

PASSIVE PRESSURES: Pressures below will be divided by a Factor of Safety =1.25

Z1	P1	Z2	P2	Slope
10	0	800	237.0	.3

ACTIVE SPACING:

No.	Z depth	Spacing
1	0.00	8.00
2	10.00	2.00

PASSIVE SPACING:

No.	Z depth	Spacing
1	10.00	4.00

UNITS: Width, Spacing, Diameter, Length, and Depth - ft; Force - kip; Moment - kip-ft
 Friction, Bearing, and Pressure - ksf; Pres. Slope - kip/ft³; Deflection - in