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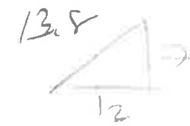
PROJECT: BOYLE			SHEET NO. 15
BY: CCF	DATE: 7/31/19	JOB NO. 17147	



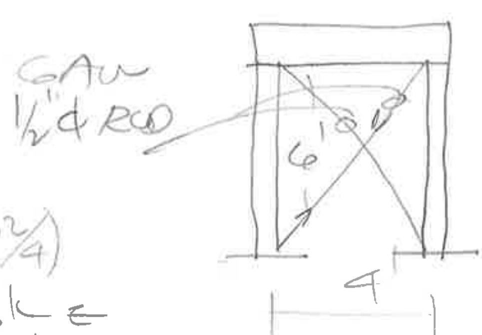
WT – GRATING – 6.3 lb/ft²

WT – HSS 12x4x1/4 – 25.8 lb/ft

WT = $(.0258(19)2 + .0063(3)16) / 3.5(19)$ = .019 ksf

WT @ LANDING = {3.5(12) + 3.5(2)}.019 = .93^k

V = .94/3.25(1.4) W = .21 W = .21(.93) = 0.2k – LOW



← V = 0.2k

M = .2(6)12 = 14.4 k"

STRESS 14.4/46(.6) – .52 in³

HSS 4x4x1/4

COL OK

T = .2(7.2/4)

= .36k ← LOW

l = 16'6"

w = (.06 + .025 + .01)1.5 = .14 k/ft

M = .14(16.5)²/8 · 12 = 57.2k"

STRESS — 57.2/46(.6) = 2.1 in³

HSS 12x4x1/4

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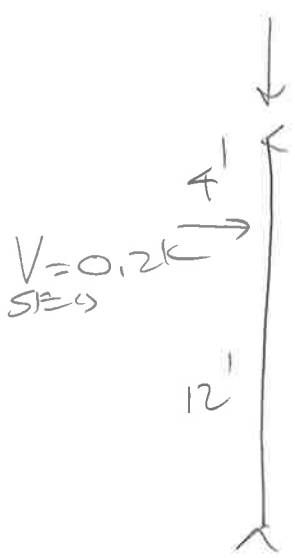
PROJECT:			SHEET NO.
BY:	DATE: 7/31/15	JOB NO. 17147	25

GARAGE COLUMN



$P_{DL} = .02(3)11(5.5) = 3.6^k$

$P_{CAD} = 15^k$

$M = .15(4)12 = 7.2^{k'}$

$S_{REQD} = 7.2/4.6(6) = .26in^3$

∴ HSS 8x8x1/4 COL WILL SUPPORT LATERAL LOAD FROM STAIR @ GARAGE CORNER

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PROJECT:			SHEET NO.
BY:	DATE: 7/31/15	JOB NO. 17147	35

$W_{DL} = .02(11)3 + .01(8) = .74k$

100 psf SURCHARGE

$W_{DL} = 10/12(.15)11.75 = 1.15k$

13'

$V_{SEIS} = .14k$

$W_{DL} = 1.25(.15)\ k = 1.15k$

1.25'

6'

6'

1'

1'

M

3pcf

6'

$V_1 = .003(6)^2/2 = .05k$

$V_2 = .08(7) = .13k$

7'

30pcf

$V_3 = .03(7)^2/2 = .74k$

.003(6) = .018

SEISMIC 10k

$V_4 = .13(13) = 1.7k$

10(13) = .13k

5.13k'

0.17k'

$M = .74(3.42) + 1.5(3.42) + 1.5(0) - .14(1.25)$

@ CENTERLINE OF GRADE BEAM

$- .05(9) - .13(3.5) - .74(2.33) - 1.7(6.5)$

13.7k'

$= -8.7k'$

P = 3.74k

$V = .14 + .05 + .13 + .74 + 1.7 = 2.0k\ (11) = 22^k/_4 = 5.5k$

PILE LOAD $= 5.5(6.1) + 8.7/6(22)/4 = 41.5k$

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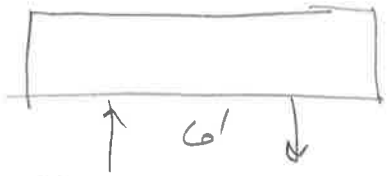
PROJECT:			SHEET NO.
BY:	DATE: 7/31/19	JOB NO. 17147	45

PILE LOAD = 41.5 LOAD = $41.5(4)/22 = 7.5$ k/ft



$M_{U_{GRADE}} = 7.5(1.6)/6\ 12 = 24$ k''

$R_U = \frac{24}{.9(12)12^2} = .015$ ksi

$A_S = .00333(12)12 = .48$ in^2/ft

#6 @ 9''

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PROJECT: BOYLE			SHEET NO. 55
BY: CF	DATE: 7/31/19	JOB NO. 17197	

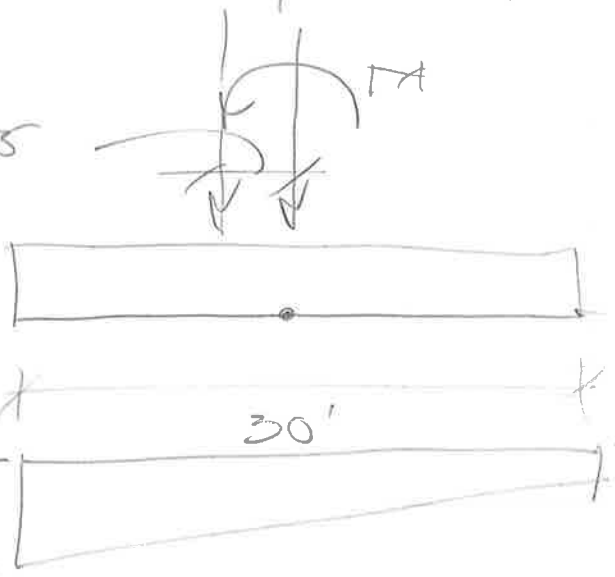
BEARING SOIL EVAL UNDER TUNNEL/ELEV

FROM SHEET "SR"

$P = 159 + 123 + 73 = 355^{k}$

$e = 481/355$

$1.35'$



$e_{SEIS} = 1561/355$

$= 4.4'$

(WITHIN KERN)

$M_{WT} = -159(9.5) + 123(4) + 73(0) + 115(0) = -1019^{k'}$

$M_{LATERAL} = 108(10) + 120(15) - 79(15) - 39(5) = 1500^{k'}$

SIDE FRICTION $= 481^{k'}$

$M_{W/SEIS} = 1500 + 72(15) = 2580$

$= 1561^{k'}$

$f_{S\,SEIS} = \frac{P}{A} \pm \frac{M}{S}$ $\quad k/ft^2$

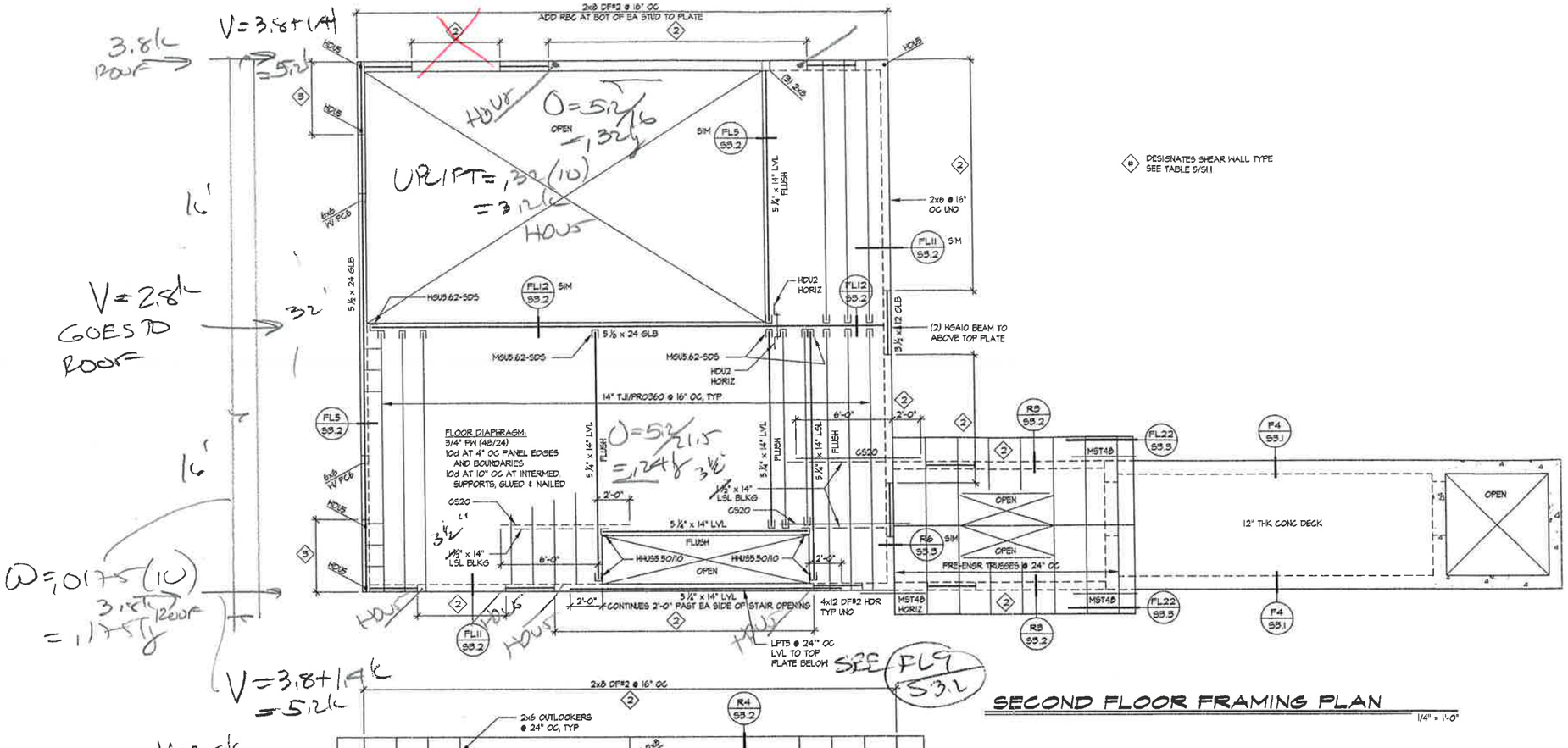
$\frac{355}{30(10)} \pm \frac{1561}{1500} = 2.2\ ksf$ $< 2.5\ ksf$

1.18 $\quad$ 1.04

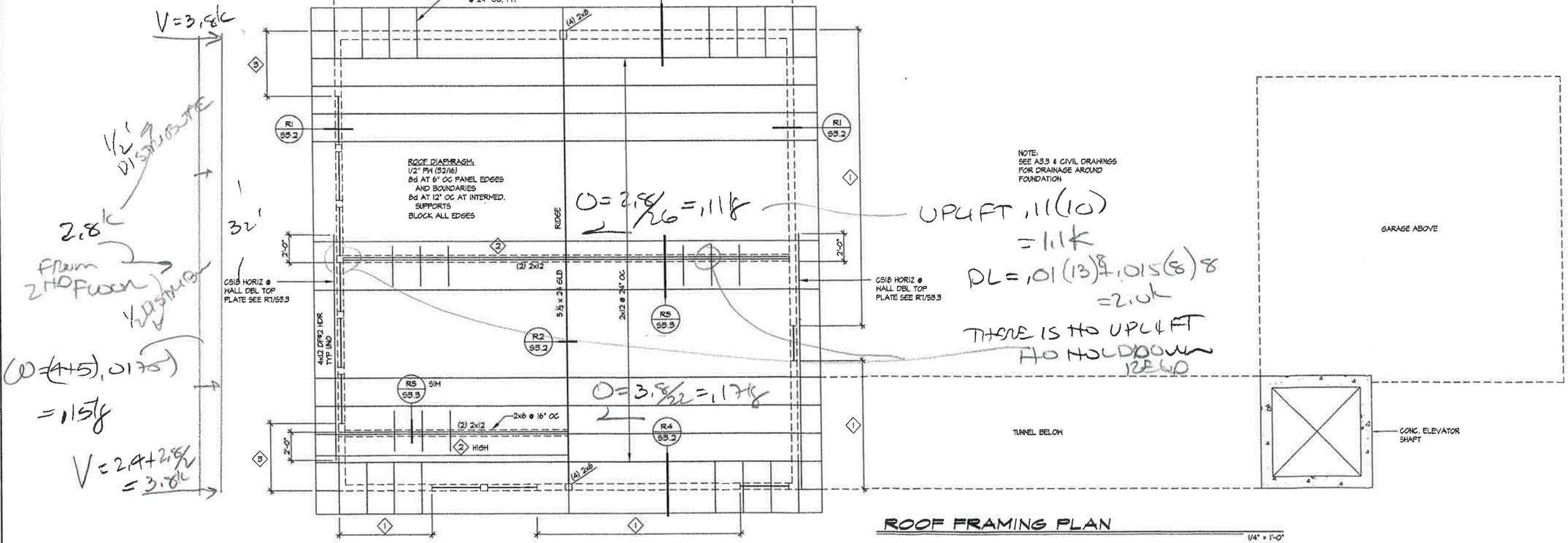
OK

1.1 ELEVATOR + TUNNEL DOES NOT EXCEED 2500psf

7/31/19 GS



SECOND FLOOR FRAMING PLAN 1/4" = 1'-0"



ROOF FRAMING PLAN 1/4" = 1'-0"

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Phone: 253/581-6000
Fax: 253/581-7239

PROJECT
BOYLE RESIDENCE
MERCER ISLAND, WA

DRAWING TITLE
SECOND FLOOR & ROOF

PERMIT SET

DATE 07/2
REVISED
1 05/31/1
2 12/11/18
3 04/22/1

SHEET NO.
S2
OF

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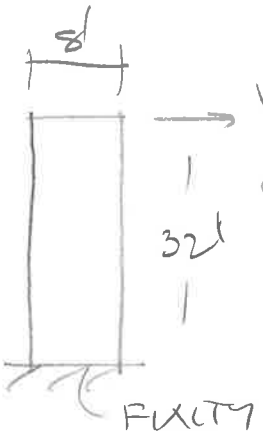
PROJECT:			SHEET NO.
BY:	DATE: 7/31/19	JOB NO. 17147	75

$h = 26'$

WT GARAGE $= (.015+.015+.015)11(22)$
$= 10.9^k$

WT OF SHAFT $= (10/12)16(26/2).15 = 26^k$



V_{SEIS} @ BASE $= .94/5\ W = .19W$
$= .19(26+10.9)$
$= 7.0^k$ (USD)

$2A_{CV}\sqrt{f'c}$ — 21.9.2.2 ACI
$2(10)96\sqrt{3000} = 105^k$

SINGLE CURTAIN OF REBAR — OK
#5 @ 10" o.c.

$V_N = A_{CV}(\alpha_c\sqrt{f'c} + \rho_n f_y)$ 21.9.4.1 ACI

$V_N = 10(96)\left(2\sqrt{3000} + \underbrace{.31(12)/10(96)}_{.23}(60)\right) = 127^k$
OK

$M_U = 133(12) = 1596^{k''}$ (HEATSHEET)

$R_U = \frac{1596}{.9(10)(92)^2} = .02$

$A_S = \frac{20}{200}(.00337)(1.5)10(92) = .46in^2$
(2) Rows #5 @ 9" VERT — OK

PILE DEFLECTION & FORCE vs DEPTH

Single Pile, Khead=1, Kbc=1

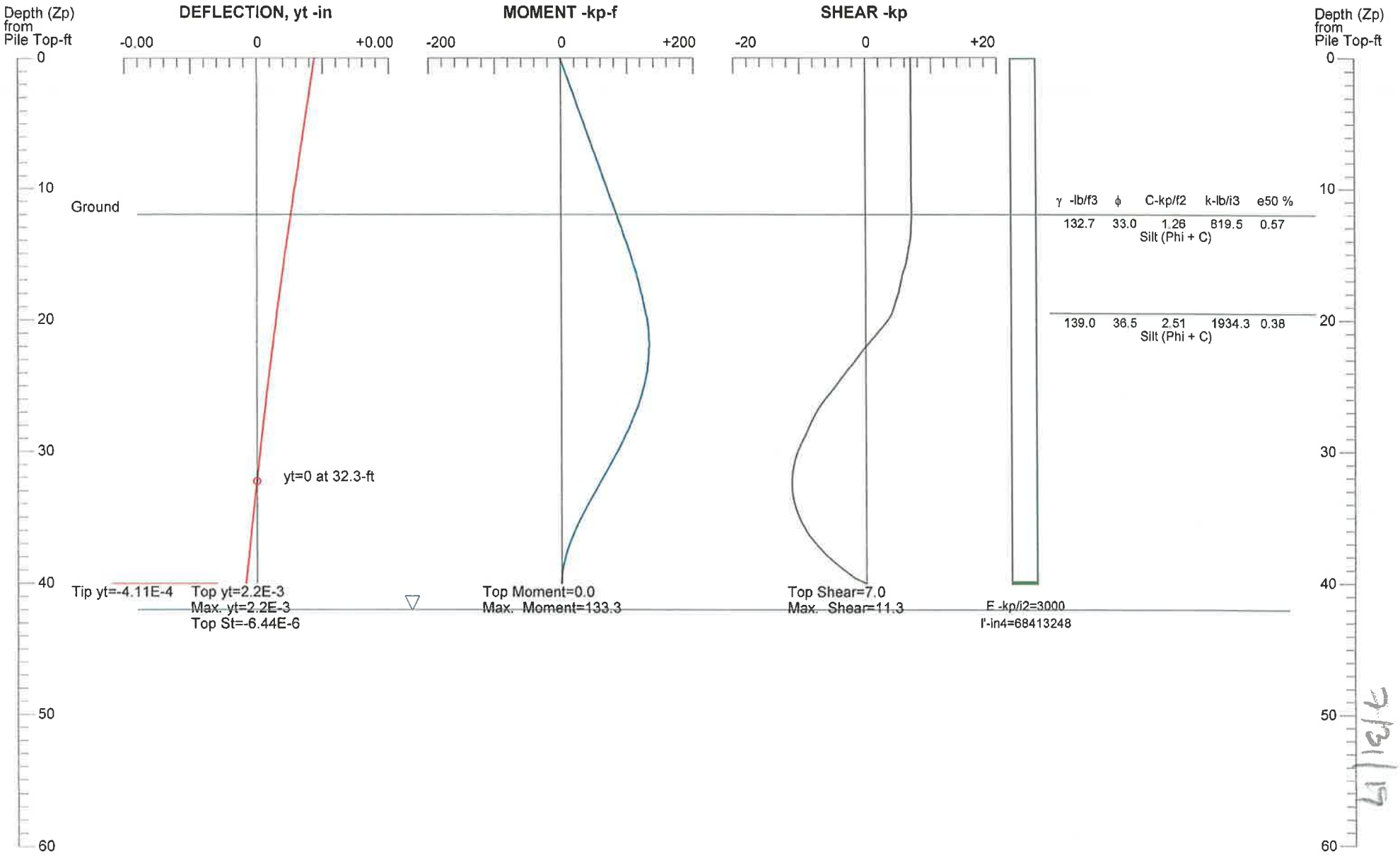


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Figure 2