R E C A
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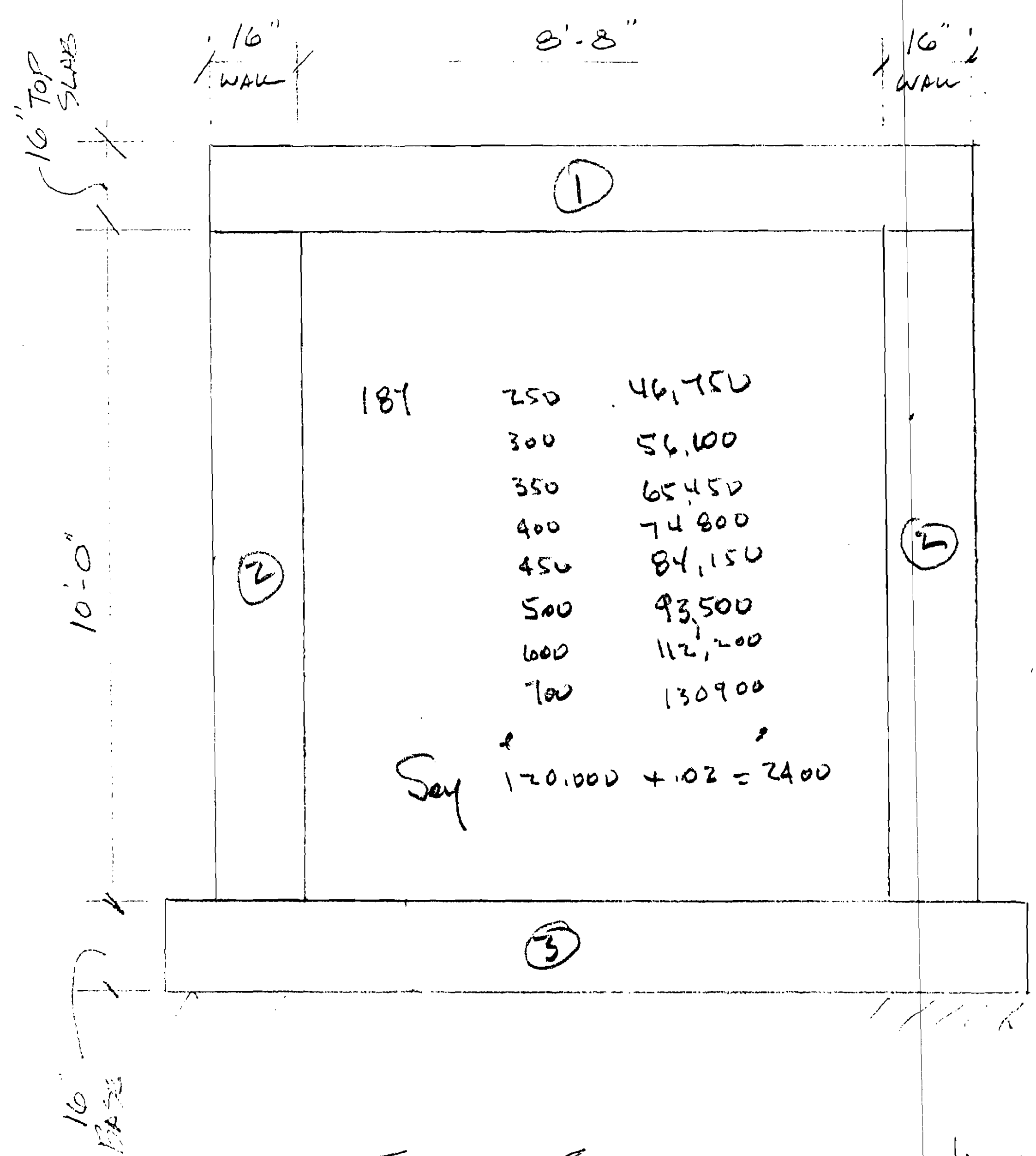
Sheet Number ______ of ______
Date ______
J. O. Number ______ – ___
by ______
Checked by ______

Name of Client ______
Project ______
Description ______



187	250	46,750
	300	56,100
	350	65450
	400	74800
	450	84,150
	500	93,500
	600	112,200
	700	130900

Say \$120,000 × .02 = \$2400

TUNNEL SECTION
3/8" = 1'-0"

Length of Tunnel

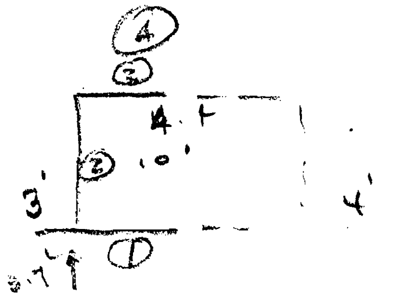
10'
8
68
86'

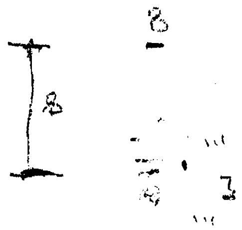
(1) 11.34 × 1.33 = 15.08

(2) 2 (10 × 1.33) = 26.60

(3) 12.68 × 1.33 = 16.86

58.64 ft^2/1 × 86 = 5043/27 = 186.78 y^3





(1)	D.L	$\frac{1}{2}$ 1.8 =	.9 k
(2)			1.5
(3)			.93
(4)	Earth	.1 × 3	.30
			3.7 k'

wheel ld

.2.7 wheel ld $\frac{8^k}{3'}$ = 2.7 k/' distribution

6.4 k'

Tunnel no wheel ld

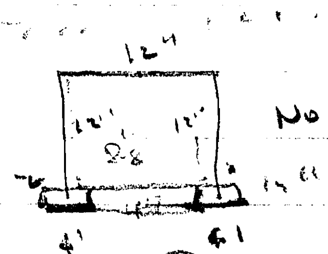
Earth	.1 × 3 =	.3
16" slab		.2
Sandlay fill		.35
		.85 Say 1 k/'

$M = \frac{1}{8}\, 1 \times 8.67^2 = 9.4^{'k}$

T = 4.3

16" top $A_s = \frac{9.4}{1.76 \times 13.5} = .43\ in^2/'$

$A_s = \frac{9.4}{1.76 \times 9.5} = .56\ in^2/'$

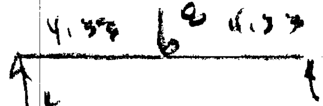


No H2O

(14-8)

4
2
8-8
14'-8

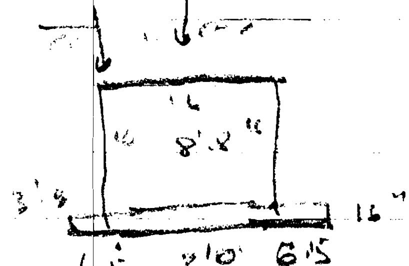
Tunnel with wheel ld



M = 4 × 4.33 = 17.32

+ 26.73 'k

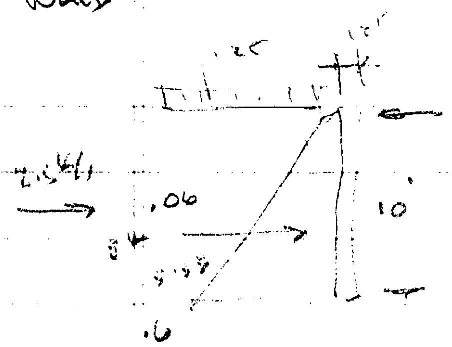
$A_s = \frac{26.73}{1.76 \times 13.5} = 1.12\ in^2/'$



9.67
1.33
1.33
3.33
3.33
18'

(18.0)

Walls — No Wheel Load



$1.25 + 1'' = 2.25$

$1.25 + 2 = 3.25$

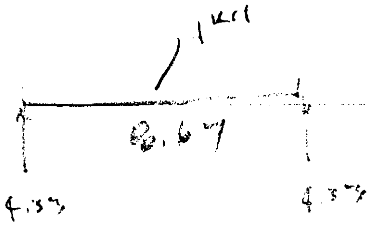
$M = 1.25 \times 5 = 6.25$

$M = .1283 \cdot 3 \times 10 = 3.85$

10.10

$A_s = \frac{10.10}{1.76 \times 9.5} = .604 \text{ in}^2/'$

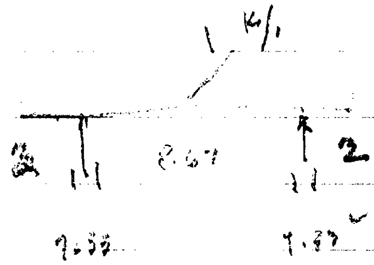
Roof



$M = \frac{1}{8} \cdot 1 \times 8.67^2 = 9.4$

$A_s = \frac{9.4}{1.76 \times 9.5} = .562$

Relief Slab

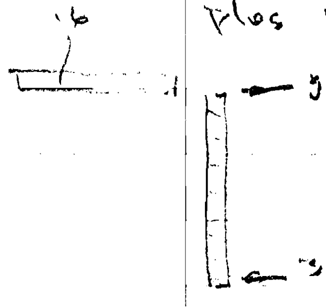


$M = \frac{1}{2} \cdot 1 \times 2^2 = 2$

$M = \frac{1}{8} \cdot 1 \times 8.67^2 = 9.4$

$A_s = \frac{11.4}{1.76 \times 9.5} = .69 \text{ in}^2/'$

Wheel Ld Surcharge Plus Normal



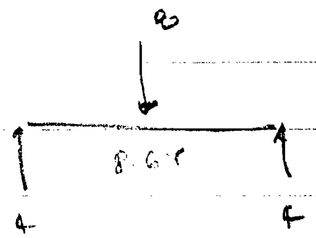
$M = 3 \times 5 = 15$

3.85

18.85

$A_s = \frac{18.85}{1.76 \times 13.5} = .793 \text{ in}^2/'$

Roof

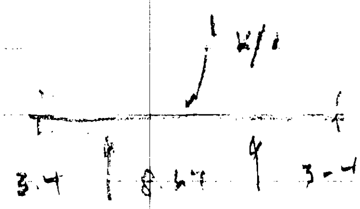


$M = 4 \times 4.33 = 17.32$

9.4

26.72

$A_s = \frac{26.72}{1.76 \times 13.5} = 1.12 \text{ in}^2/'$



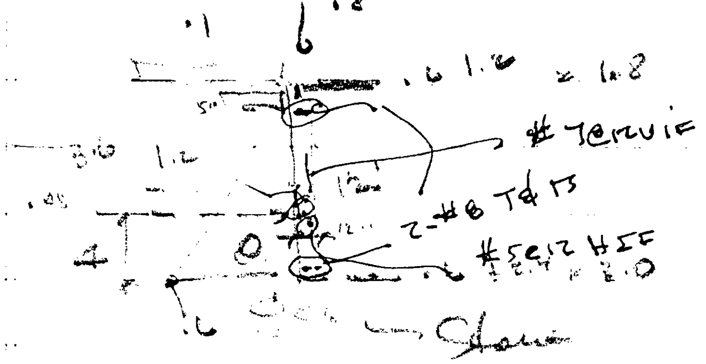
$M = \frac{1}{2} \cdot 1 \times 3.33^2 = 11.1$

$M = 9.4$

20.5

$A_s = \frac{20.5}{1.76 \times 13.5} = .86 \text{ in}^2/'$

F-2 Wall Line (G)



Surcharge M = 6 × 6 × 3.6
Dry wall/ex H=10 M = .128 × 3.6 × 12 = 5.54

9.14

As = 9.14 / (1.76 × 9.5) = .55 in²/, #7@12

Atemp = .36, .18 #5@12

.150 × 12 = 1.8
× .8
2.4 k/ft

M = 2.4 × 30 / 8 = 270

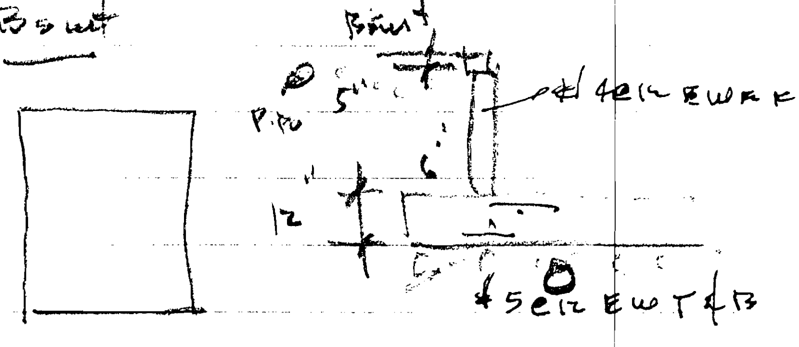
As = 270 / (1.76 × 120) = 1.28

12.5
1.76
10.75
d = 10' = 120

F-1 Line (1), (2), (H)

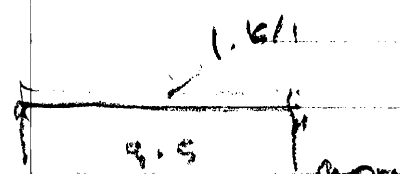
As = 9.14 / (1.76 × 13.5) = .38 #6@12 VIF
#5@12 HIF
#5@12 HOF

Elevator Pit



17.6
4
17.6

.0025 × 12 × 12 = .36 .18

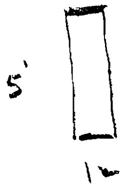


M = 1 × 8.5² / 8 = 11.28

9.03

As = 11.28 / (1.76 × 8.5) = .75
.603

Grade Beam Around Perimeter
No Slab Contribution



wt. Gr. Beam 5 × 1 × .15 = .75 k/l
wall Load 10 × .05 = .50 k/l
1.25

R =

Supported: Slab Load 16' × (.15 + .1) = 4 k/l Estimated
(.25)
5.25

L = 30
R = 5.25 × 15 = 78.8 ≈ 79
(2 × 79)

Spandrel 281 + 158 = 439
19
Total Load on Piles **458** k

Say 50T Pile **5 piles**
Pile Cab 6.75 + 6.75 + 2.75 = 19.1

No Slab Support
R = 1.25 × 30 = 37.5
281 + 38 + 12.1 = **331**

50T. Pile **4 piles**
H-piles

Interior Col. P = 438
12.1
450

5 pile Cap

Supported Slab .250 × 30 × 30 = 225
438
225
663

7 piles

Slab $L = 16$ $w = .25$

$\frac{1}{8}$ $M = 8$

$A_s = \frac{8}{1.76 \times 6} = .075$

$.0025 \times 12 \times 8 = .24$

$M_+ \; \frac{1}{14} \; .25 \times \overline{12.79}^2 = 2.92$

$A_s = \frac{2.92}{1.76 \times 5.5} = .31$ #5@12

$M_- = \frac{1}{10} \; .25 \times \overline{12.79}^2 = 4.1$

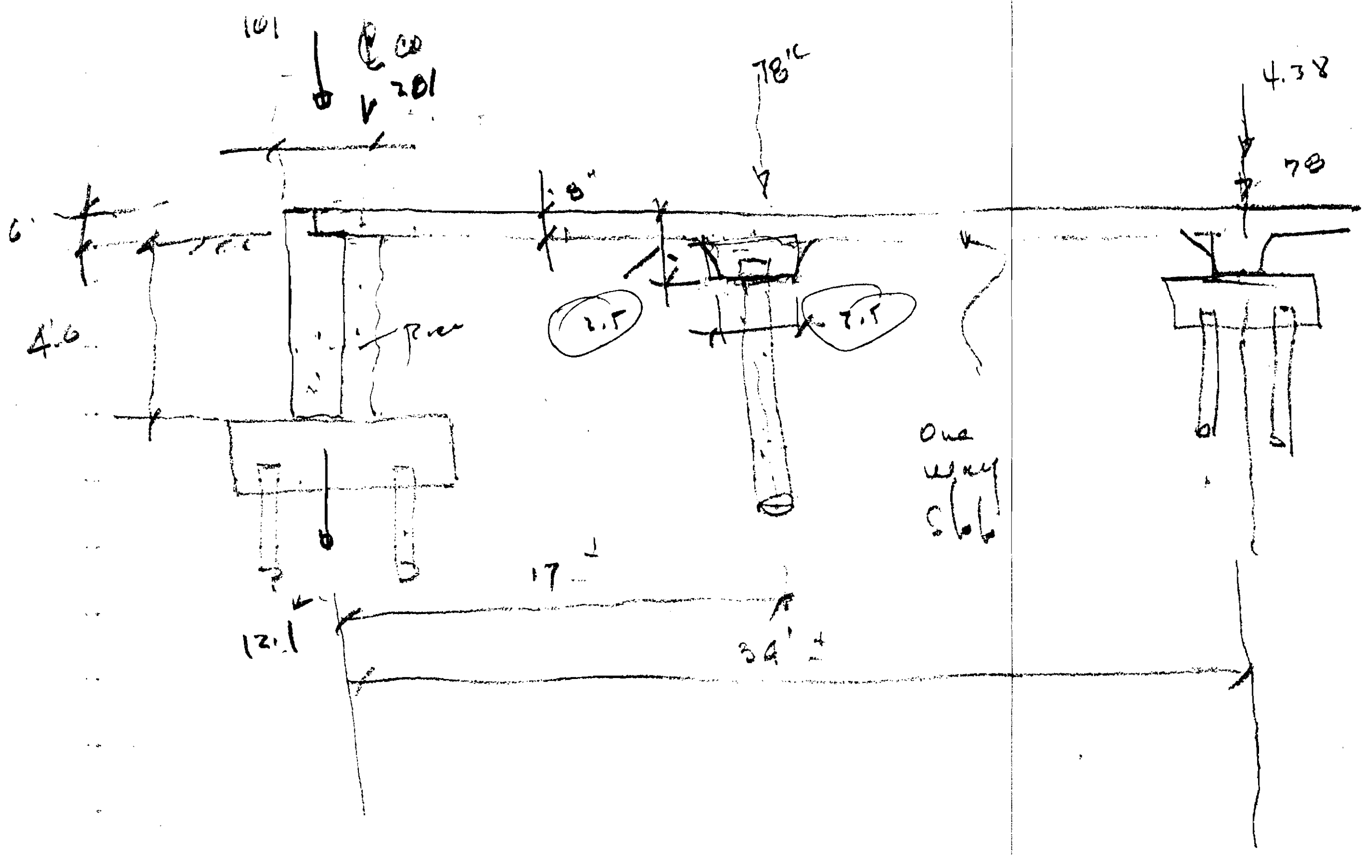
$A_s = \frac{4.084}{1.76 \times 6} = .39$ #5@8

$A_T = .0025 \times 8 \times 12 = .24$ #4@10"

$\frac{6'\cdot 2''}{3} = \frac{30.58}{2} = 15.29$

$- 2.5$

$L = 12.79$



wt. of Gr. Bm. $5 \times 1 \times .15 = .75$

wall lp $10' \times .05 = .50$

Floor Slab $8.5' \times .25 = 2.13$

$3.375 \approx 3.4^{k/l}$

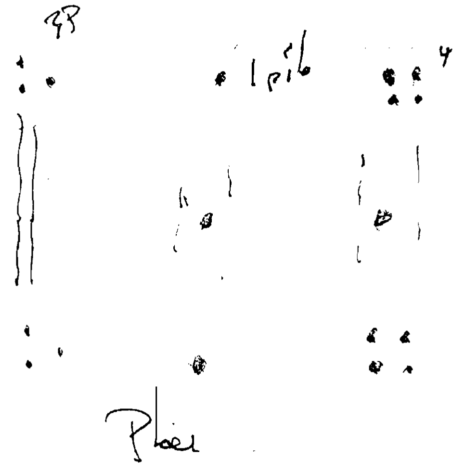
wt of Pile Col 12.1

Total Load $101 + 281 + 12 = 394$ 3 piles P = 441

Slab $17 \times .25$ 4.25

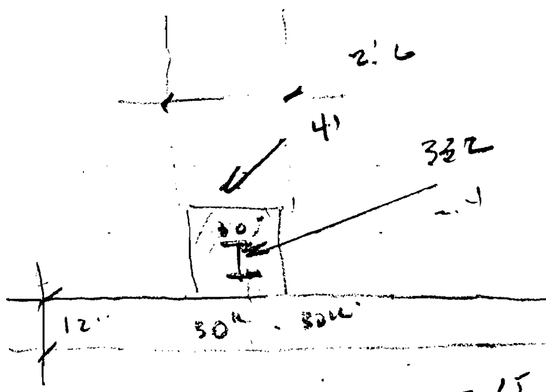
Gr Bm $2.5 \times 2.5 \times .15 = .94^{k/l}$

$5.2^{k/l} \times 15 = 78^{k}$



HP 10457

T H



I 83.2

5.2 k/'

I 41

Col Ld	331.8	G.B	2.5 × 3.33 × .150 = 1.25
Pier	2.4	Slab founda	.33 × 2.5 × .150 = .12
Pile Cap	15.0	Supported Slab	.25 × 15 = 3.45
G.B Reaction Exterior	60.0		5.12 ✓
Interior GB	41.0		5.2 k/'

450.2 + 41 = 491

GB-3

Interior GB L = 16' W = 5.2

$M = \frac{1}{8}\, 5.2 \times 16^2 = 166$

$A_s = \frac{166}{1.76 \times 2}= 3.63$

$R = 8 \times 5.2 = 41.6$

$V_c = .06 \times 30'' \times 26$

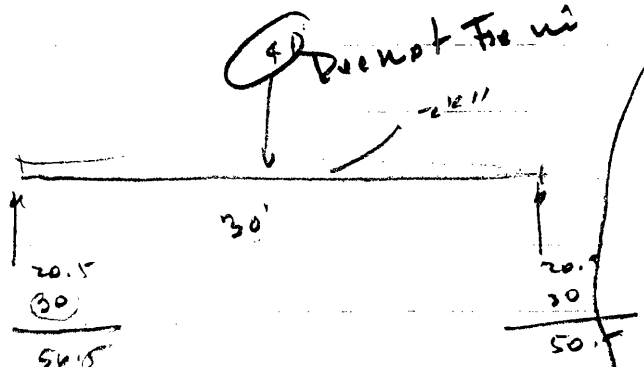
4 #9 T & B

4 TIES

4 @ 12" Rem @ 18"

Exterior G.B.

GB-1

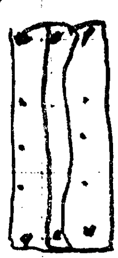


$M = \frac{1}{8}\, 2 \times 30^2 = 225$

$20.5 \times 15 = 307.5$

532.5

3-#9 T & B



#4

$A_s = \frac{532.5}{1.76 \times 50} = 6.1$ 2.55

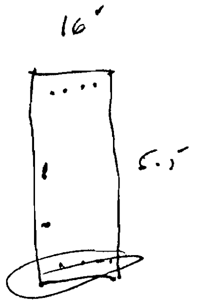
6 #9

#4 Ties 4 @ 12 & Rem 18

Col Ld	442
Pile Cap	15
Interior Gbs	83
	540 ÷ 150 = 3.6

4 piles

Exterior G.B Line A & H.



4-#9 Top/Bot

#4 @ 12 6'

Rem @ 18"

GB-2

Gr. Bm $1.37 \times 5.5 \times .15 = 1.1$

Wall $10 \times .050 = .5$

$4 \times .25 = 1.0$

$2.6 \approx 3^k$

$M = \frac{1}{8}\ 3 \times 31.2^2 = 316$

$As = \frac{316.4}{1.76 \times 47} = 3.8^2$

4-#9

Fr = 46.8

$Vc = .06 \times 16 \times 47 = 44.9$

5-6
1-4
4.2 50"

Typ Interior Pile Cap

Col Load		438	
Cap	5.6 x 5.6 x 3' x .150	13.6	
Grad Beam	2.5 x 3.5 x .15 x 15	19.7	98.3 Check
8" Slab	15 x 15 x .1	22.5	
Live load	15 x 15 x .1	22.5	
		516.3	÷ 150 = 3.442 4 piles

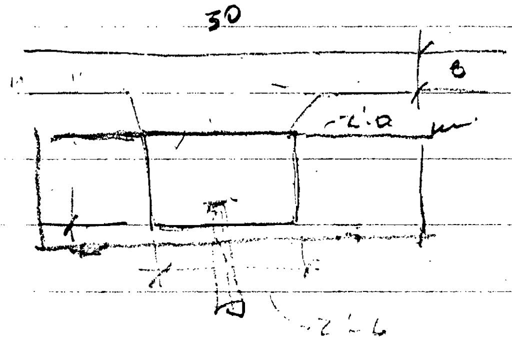
H.P 10.57 P=150k

Typical Exterior Pile Cap

Col Load		281
Pile Cap		13.6
Interior Grbm	2.5 x 3.5 x 8 x .15 =	10.5
8" Slab	8 x 15 x .1	12
LL.	8 x 15 x .1 =	12
Exterior Grbm	1 x 5 + .15 x 30	22.5
Pier	2 x 2 x .15 x 5	3
		354

÷ 150 = 2.36 = 3

Use 4 piles For Detail



Line (1) & (4) (A) to (D) 11-14-06 4/S3.1

G.B.-1 M = 3.4 x 50² / 8 = 38?

K = 51" Vc = 124 x 54 x .06 = 38.8 Need Stirrup.

As = 882 / (1.76 x 54 (50)) = 4.02 in² (4.34)

Int. Grade L = 15' w = 5.2

M = 1/8 5.2 15² = 146.3

K = 39k Vc = 30 x 26 x .06 = 46.8k

As = 146.3 / (1.76 x 26) = 3.2 in

Check Clear Span

GB-1 5k/'

30' (35)

(390)

M = ~~562.5~~

As = ~~562.5~~ / 1.76 x ~~63~~ (50) (62)

30'-0
5.5
24.5

Use (25)

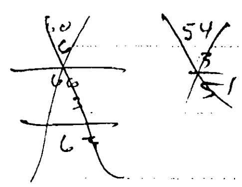
G.B. 1 x 5.5 x .150 = .83

Wall ld .06 x ~~50~~ 15 .9

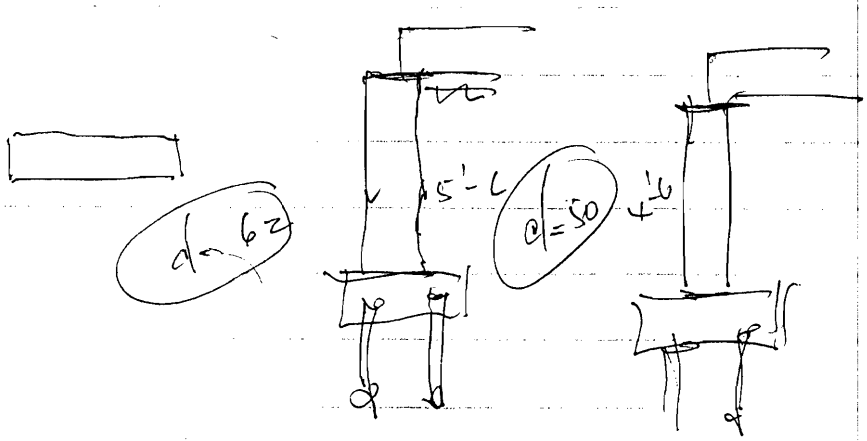
Slab Supt. .25 x 4 = 1 k/'

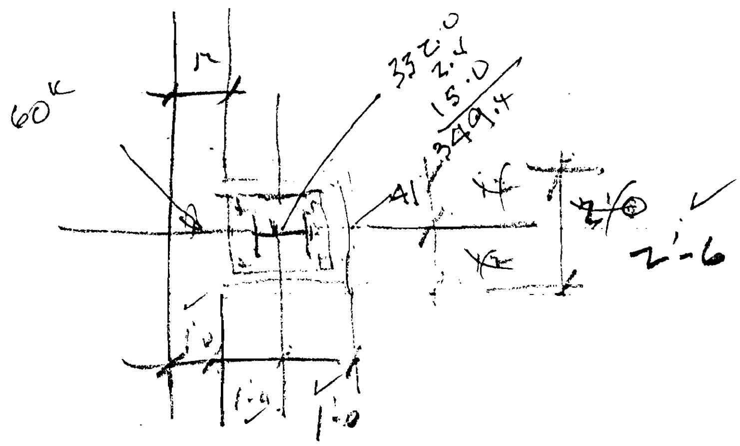
(2.73) ~~4.83~~ = 5 k/'

Use (3.4)

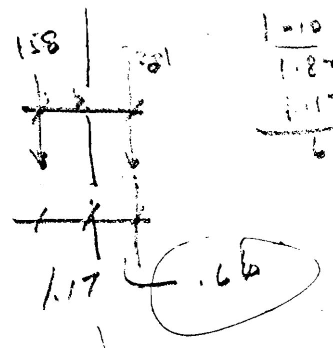


66 54
4 4
62 (50)





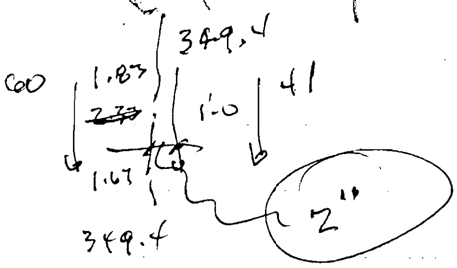
$\frac{12}{2}$: 6 2 3 2 3



1.10
1.83
1.17
.66

281 × 1.23
439

Pile Cap.



349.4
101.0
450.4

755.4

116.03

639.4

41 × 2.83 + 349.4 + 1.83 = 1.67

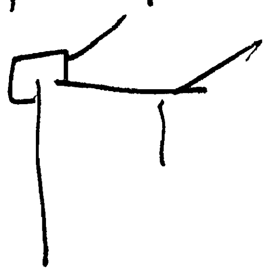
450.4

331
60
17.4

G-3

501 ⁱᶜ

7.8



~~8×1.5~~

8×2.8

8 48 . 130

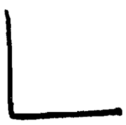
3.2 ⁱⁿ/₁

× 8

501
7.8
15
25.6
25.6
8.2

583

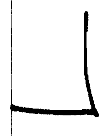
G-1



331
7.8
15
25.6
25.6
8.2

413

H-1



243
7.8 P.ec
15.0 P.c
25.6 wall
25.6 wall
8.2 Fc

325.3

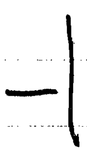
H-2

343
7.8 P.ec
15.0 P.c
51.2 Wall
33.3 Fc.Lo

450.3

16×16×.13

H-3



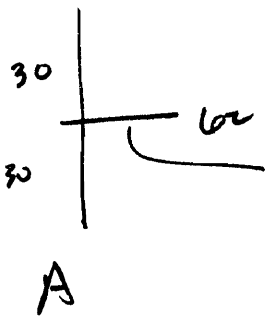
306.2

306
7.8
15
51.2
33.3

413
83

496

235
41
30
2.4
12



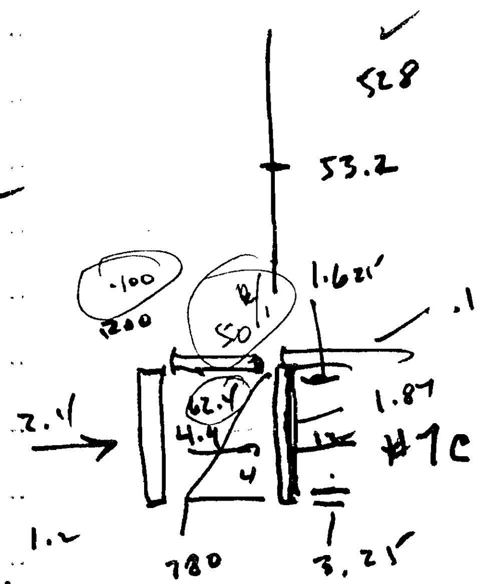
.25 ÷ 48 ÷ 31

327
60
62
2.4
12
453

528
.53
2.4
12
595.5
7.8
603.3

Red. 242 × .15 × 13'
7.8

6 H.2



.130 × 4 = .52

12.5 × .2 2.5

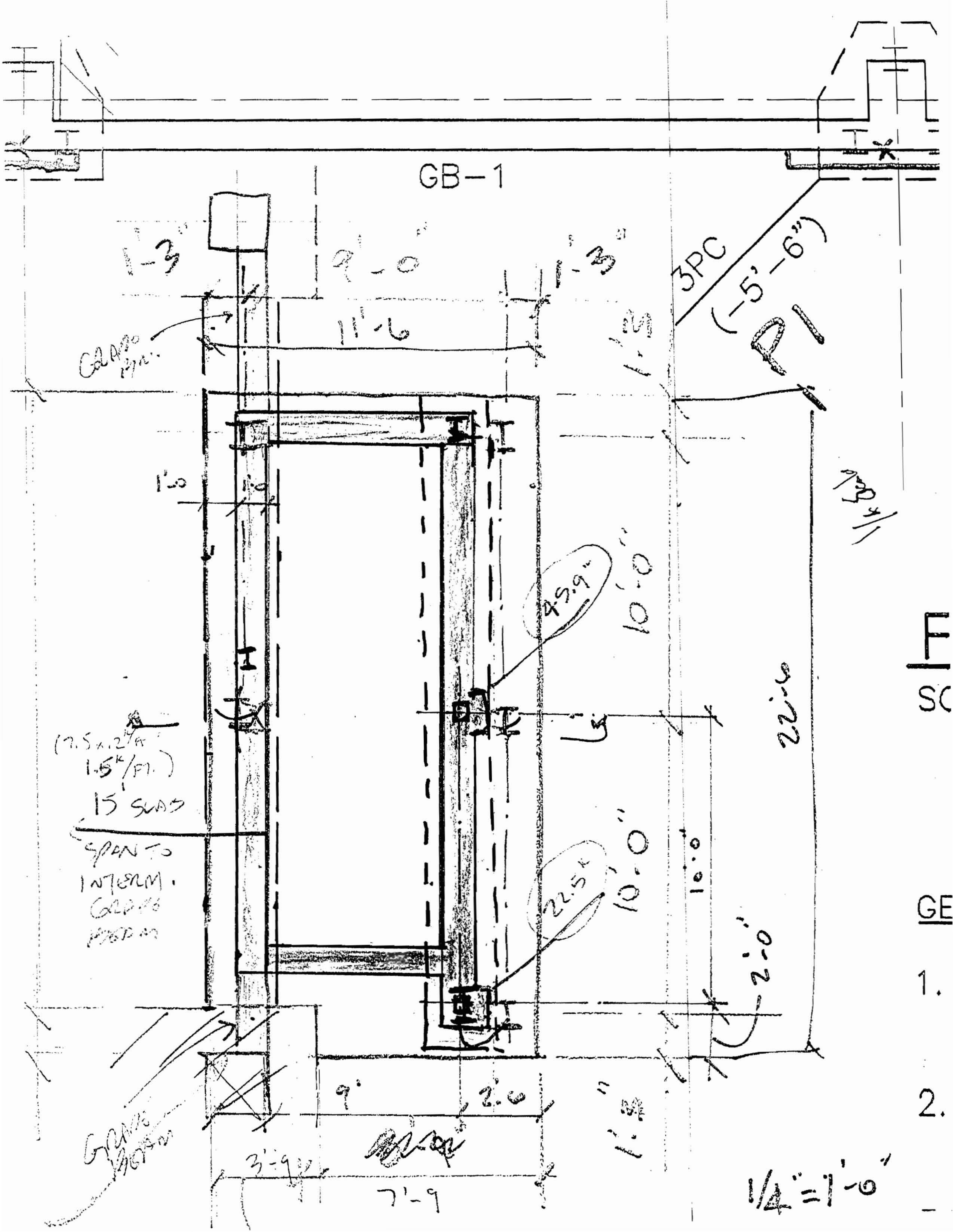
12.5 × .15 = 1.87
.52
2.4 k/1
302

16 × 12.5 × 14
2.8 k/1 wall
.52 F
3.32 k/1

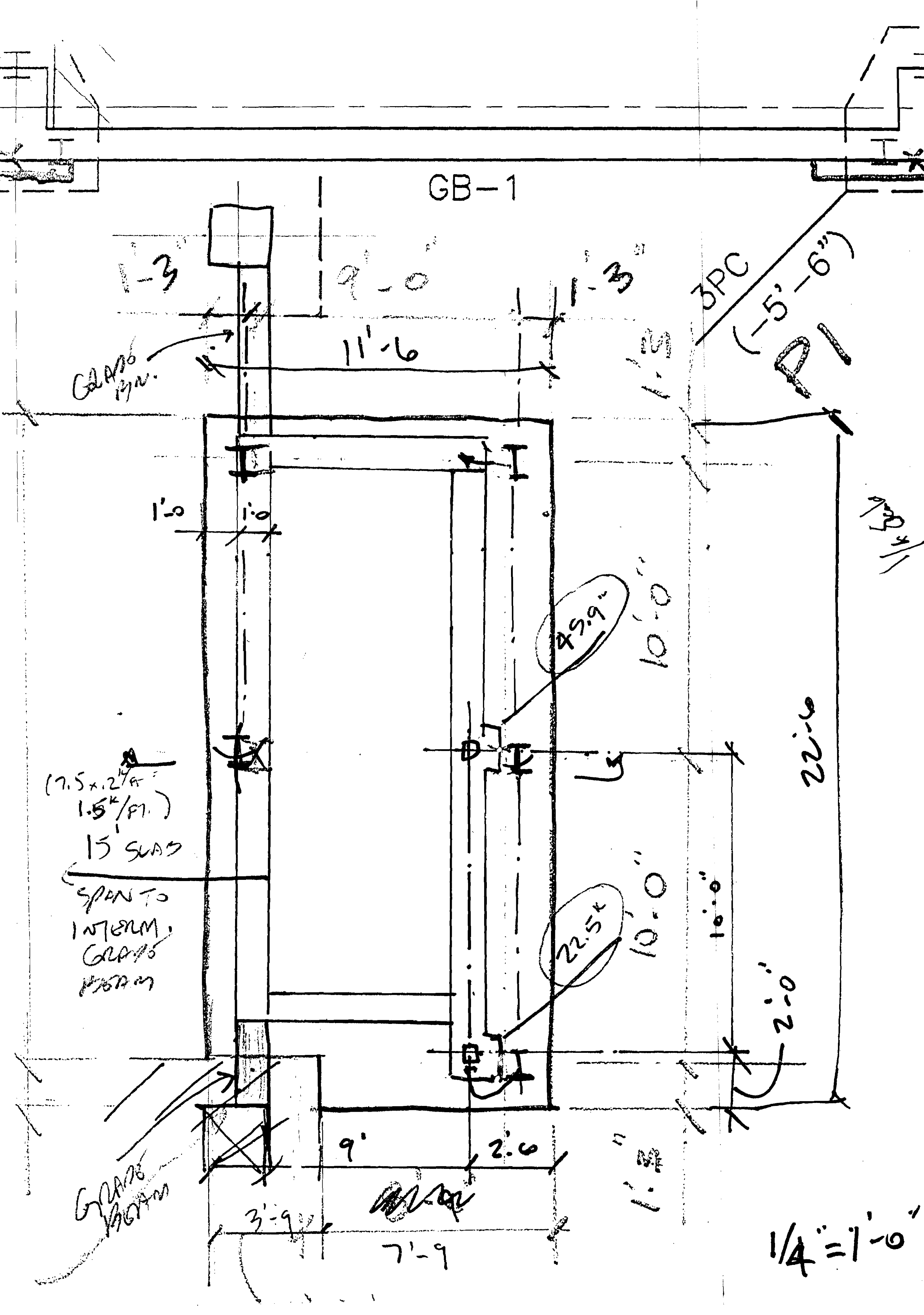
M = 3.25 × 4 = 13
1.2 × 6 = 7.2
20.2

As = 20.2 / 1.76 9 = 1.27 in²/1 @ 12"

20.2 / 1.76 × 13 = .88 in²/1 @ 16"



GB-1
3PC
(-5'-6")
P1
1'-3"
9'-0"
11'-6
1'-0
10'-0"
10'-0"
10'-0
22'-6
49.9k
22.5k
2'-0"
15' SLAB
SPAN TO INTERM. GRADE BEAM
9"
2'-0
3'-9
7'-9
1/4"=1'-0"



GB-1
3PC
(-5'-6")
P1
1'-3"
9'-0"
1'-3"
11'-6
GRADE BM.
1'-0
1'-0
10'-0"
10'-0"
22.5k
22'-6
2'-0"
15' SLAB
SPAN TO INTERM. GRADE BEAM
GRADE BEAM
9'
2'-6
3'-9
7'-9
1/4"=1'-0"

F

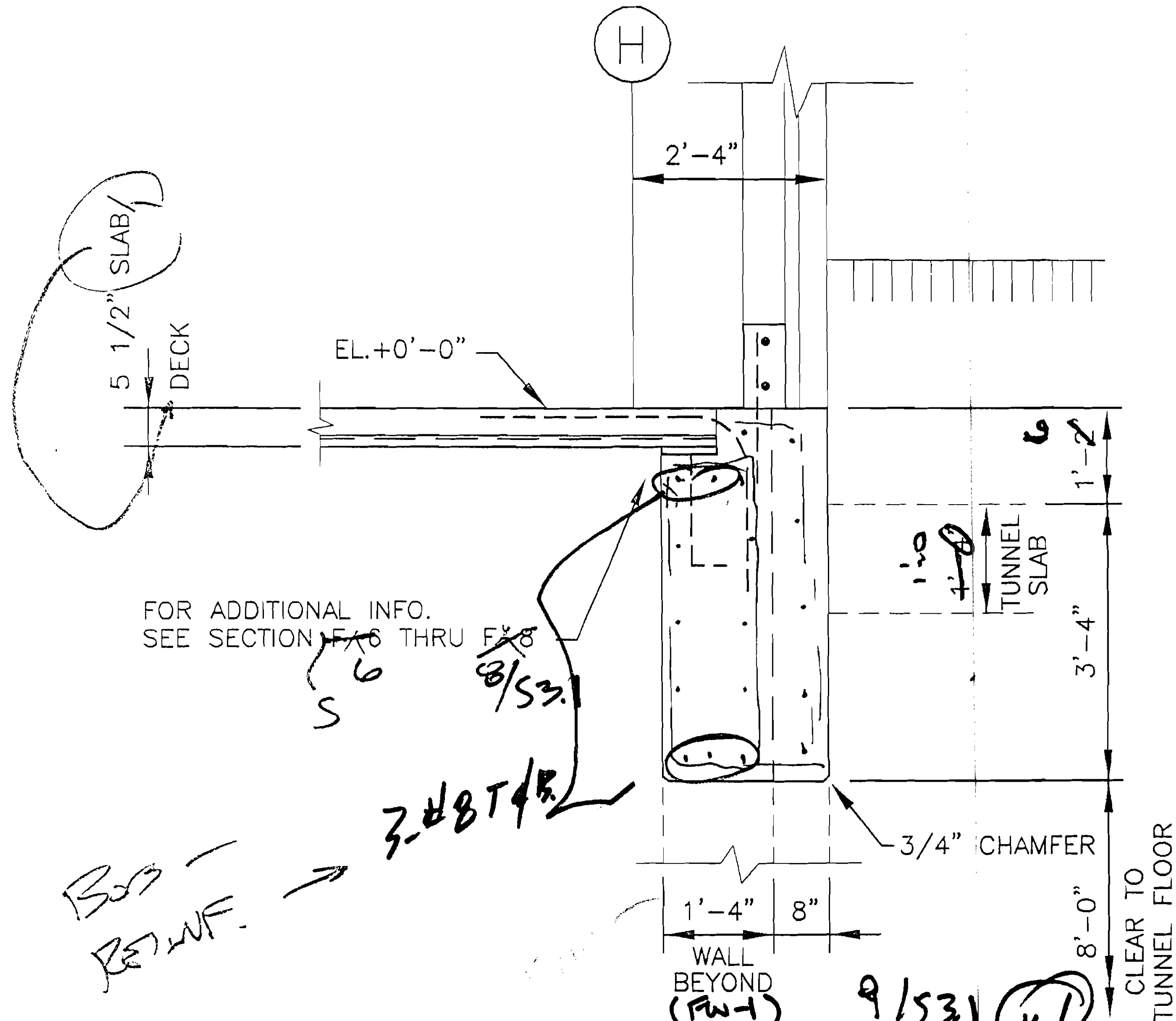
SC

GE

1.

2.

3.



9/S31

SECTION F-9

SCALE: 1/2"=1'-0"

1K/1 ↓ wall

1st Fl. Slab

44.13

(.52)

.08 + 14

4.5 + 1.33

.15

(.89)

(2.41)

Say 2.5

$L = 8'-8 \quad w = 2.5$

$M = \frac{1}{8} 2.5 \times \overline{8.67}^2 = 23.5$

$A_s = \frac{23.5}{1.76 \times 36"} = .37$

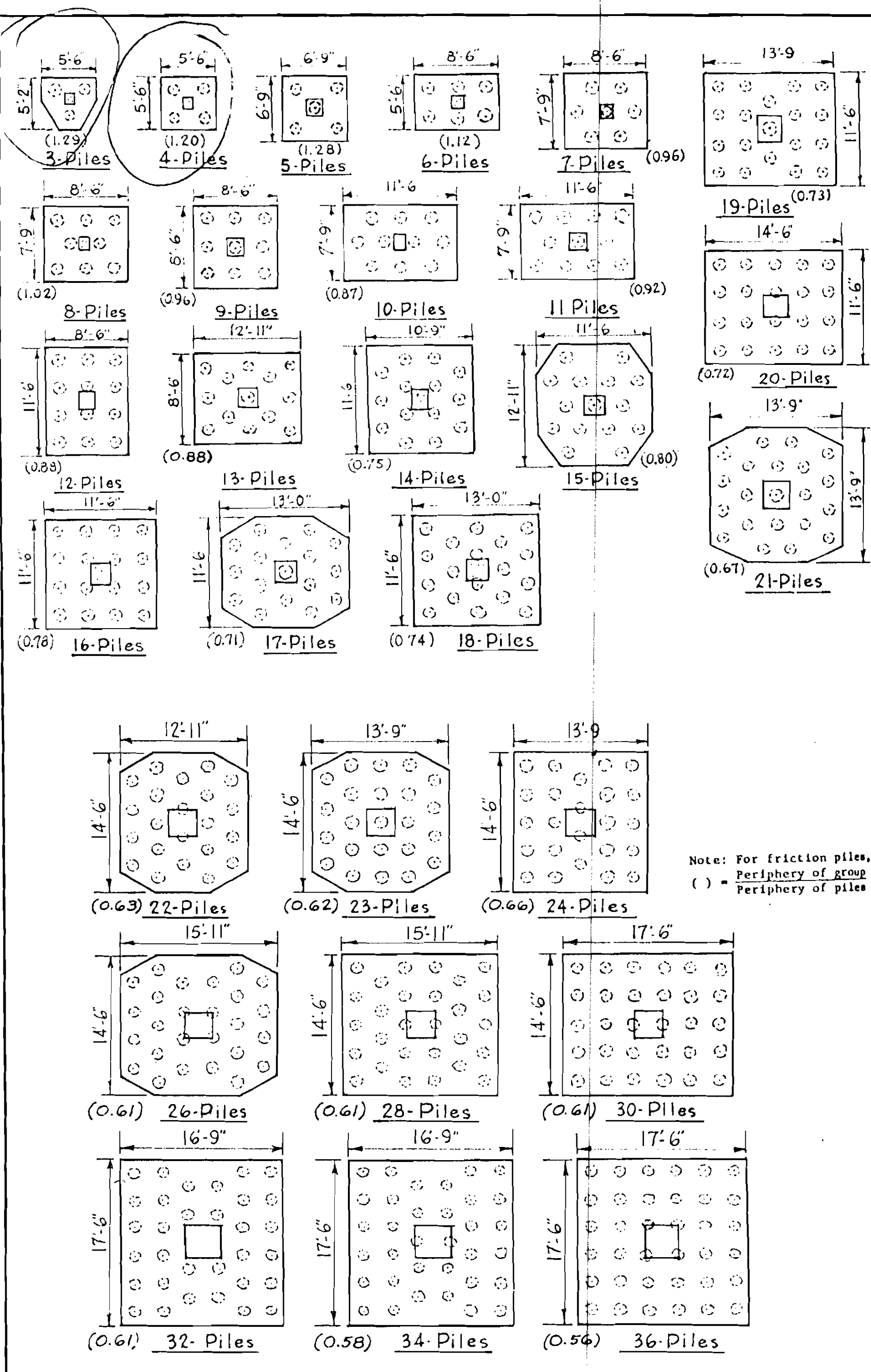
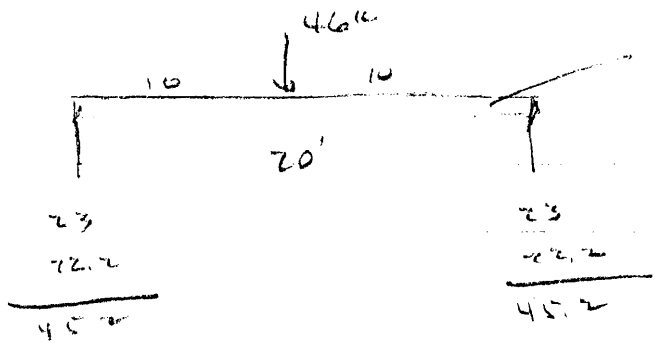


Fig. 13-3 Pile Cap Layout Patterns and Plan Dimensions

El. Pit Ground Fl

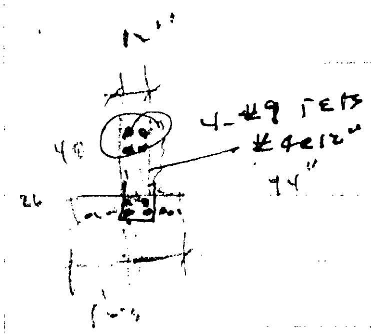


tile Em .94
G.W. Em .6
Slab 4.5 p.s.f .68
2.22

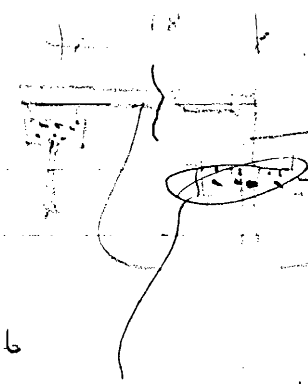
M = 23 × 10 = 230
M = 1/8 × 2.22 × 20² = 111
341

As = 341 / (1.76 × 26) = 7.45

74" 62 (312)



As = 2.61

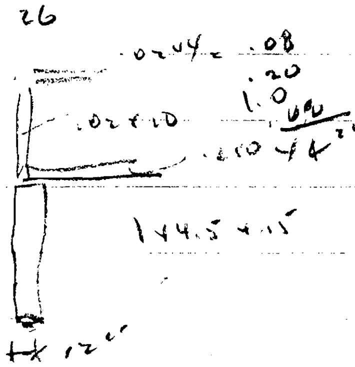


M = 3.62 × 16² / 8 = 116

4-#9 T&Bott. Like CGB-3

As = 116 / (1.76 × 26) = 2.53

Canopy Fram



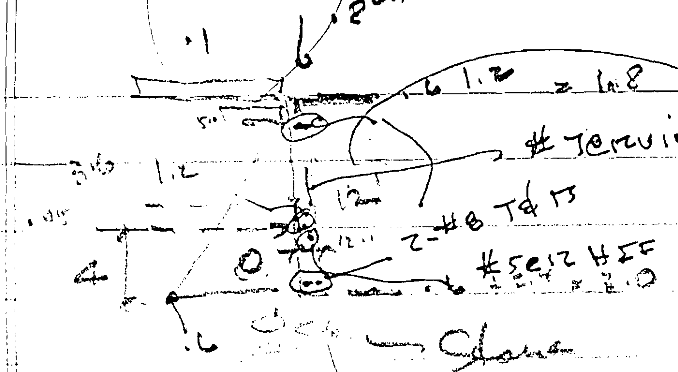
L = 20' w = 2k/l

M = 192

As = 192.1 / (1.76 × 49") = 2.27

3 - #8 T&B

Wall Line (G)



M = 6 x .6 x 3.6

M = .1283 3.6 x 12 = 5.54

9.14

As = 9.14 / (1.76 x 9.5) = .55 in²/' #7@12

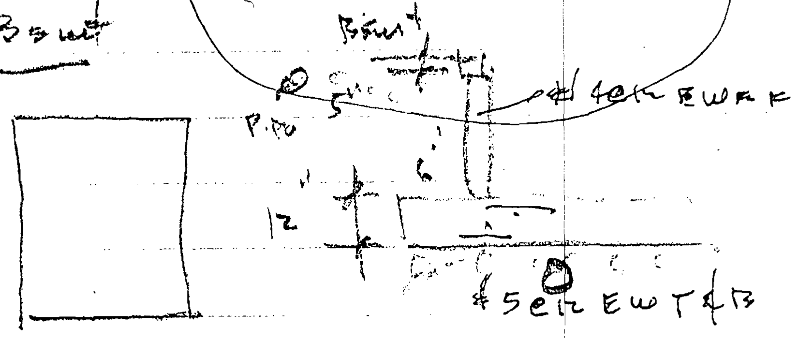
As = .36 .18 #5@12

Line (1), (2), (H)

As = 9.14 / (1.76 x 13.5) = .38

#6@12 VIF
#5@12 HIF
#5@12 HVOF

Elevator Bsmt



.0025 x 12 x 12 = .36 .18

.150 x 12 = 1.8

= .8

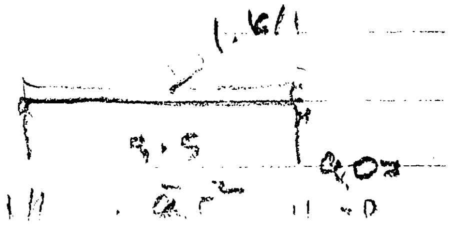
2.6 k/ft

M = 2.4 x 30 / 8 = 270

As = 270 / (1.76 x 120) = 1.28

12.5
1.76
10.75
d = 10' x 120

17.6
1
14.6



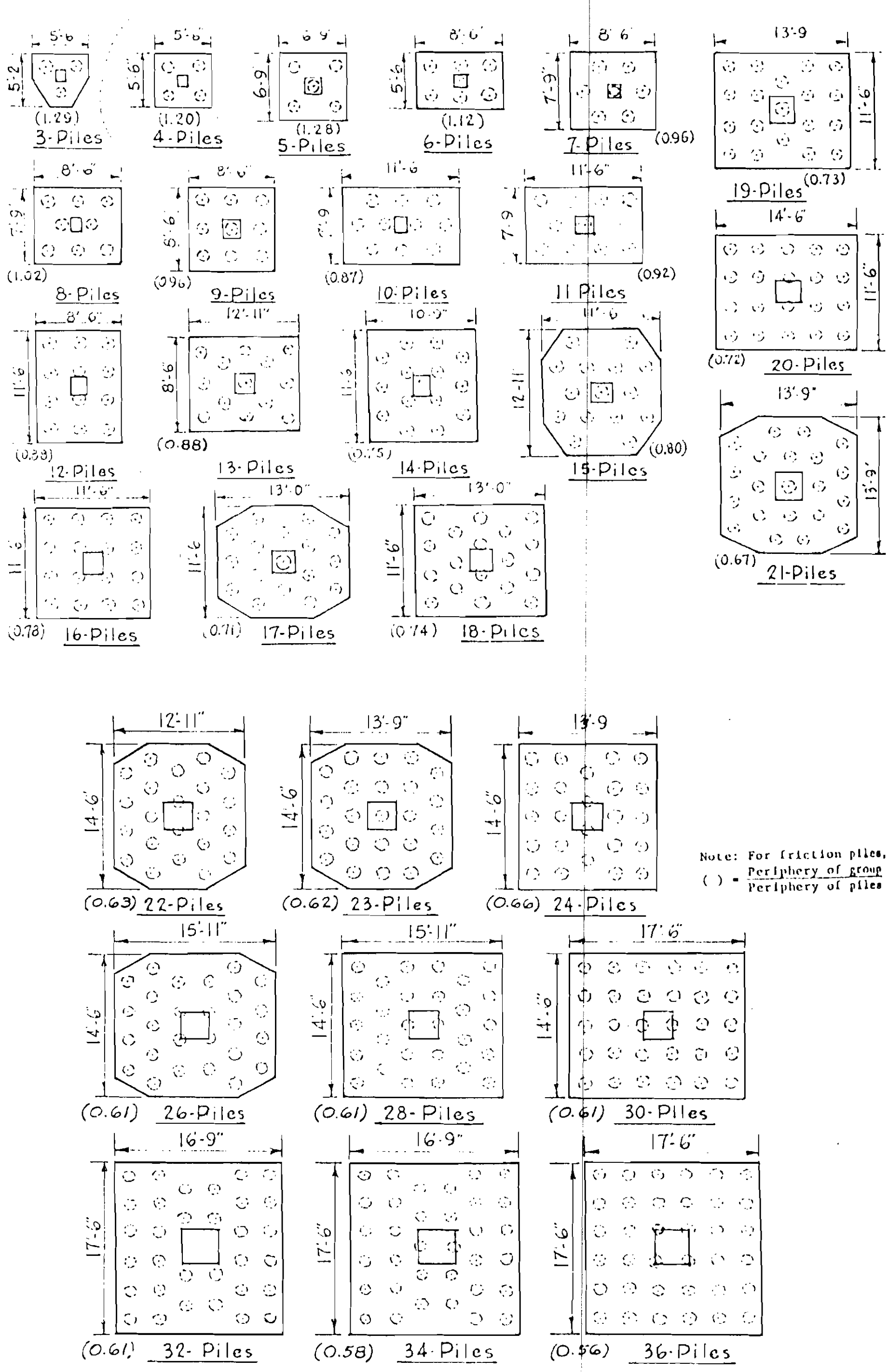
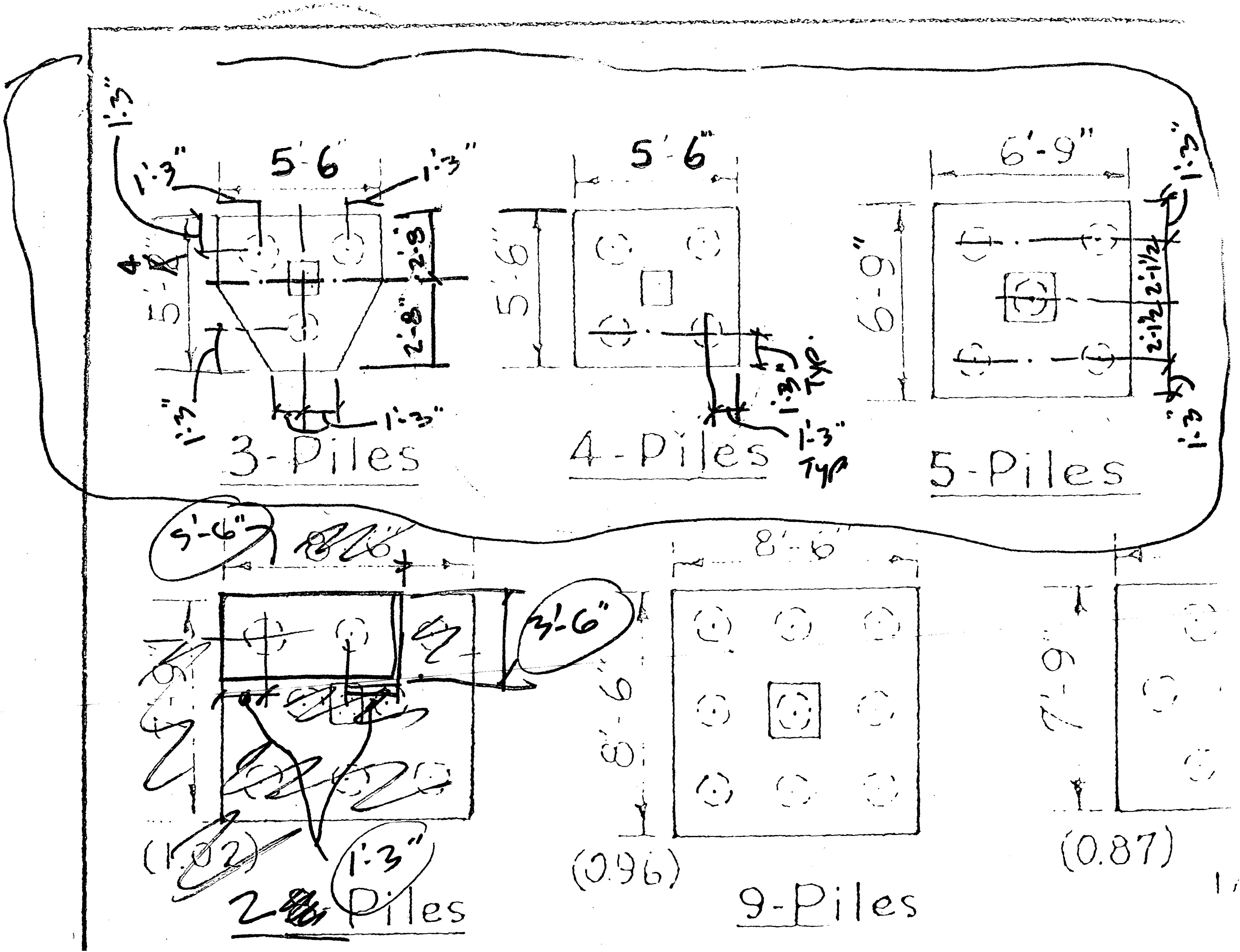


Fig. 13-3 Pile Cap Layout Patterns and Plan Dimensions


5'-6"
1'-3"
2'-8"
3-Piles
5'-6"
1'-3" TYP.
4-Piles
6'-9"
2'-1½
5-Piles
5'-6"
3'-6"
(1.02)
2-Piles
8'-6"
(0.96)
9-Piles
7'-9"
(0.87)

f'_c = 3 ksi; w = 150 pcf
f_y = 60 ksi

50 TON PILES (1)

Min. Pile Dia. = 12 in.
Max. Pile Spacing = 3′-0″

No. of Piles	Column Load (D + L) k	Column Load 1.6x (D + L) k	Cap Size A (A) ‡ ft.-in.	Cap Size B (B) ‡ ft.-in.	Cap Size D in.	Col. Size (2) in.	Grade 60 Rebars Long A-Bars No.-Size	Grade 60 Rebars Short B-Bars No.-Size	Quantities Concrete c.y.	Quantities Steel (3) tons	Quantities Form s.f.	Max. Size (4) Column Dowel	c. s. (5) No.
2	194	311	6-6	3-6	32	9	7-#5	5-#4	2.2	0.027	53	#8	1
3	292	467	5-6 (1-6)	5-1 (1-7)	29	11	7-#5	3 WAYS	1.8	0.054	44	#7	1
4	387	620	5-6	5-6	32	12	12-#5	12-#5	2.9	0.062	58	#8	1
5	481	769	6-9	6-9	33	14	6-#8	6-#8	4.6	0.100	74	#8	1
6	577	924	8-6	5-6	38	15	6-#9	12-#7	5.4	0.142	88	#10	2
7	667	1068	8-6	7-9	39	16	7-#9	7-#9	7.9	0.181	105	#10	1
8	768	1229	8-6	7-9	38	18	8-#8	10-#8	7.7	0.182	102	#10	1
9	861	1377	8-6	8-6	43	19	8-#9	8-#9	9.5	0.217	121	#11	1
10	953	1525	11-6	7-9	42	20	6-#11	13-#8	11.5	0.301	134	#11	1
11	1049	1679	11-6	7-9	45	20	7-#11	14-#8	12.3	0.340	144	#11	1
12	1138	1822	11-6	8-6	50	21	7-#11	13-#9	15.0	0.381	166	#14	2
13	1223	1957	12-11	8-6	56	22	8-#11	16-#9	18.9	0.481	199	#14	2
14	1330	2128	11-6	10-9	45	23	8-#11	10-#10	17.1	0.454	166	#11	1
15	1417	2268	12-11 (5-11)	11-6 (7-6)	49	24	10-#10	11-#10	20.3	0.527	175	#14	1
16	1519	2430	11-6	11-6	49	25	11-#10	11-#10	20.0	0.520	187	#14	1
17	1610	2577	12-11 (5-11)	11-6 (7-6)	53	25	10-#11	12-#10	22.0	0.613	189	#14	2
18	1697	2716	12-11	11-6	55	26	11-#11	12-#10	25.2	0.646	223	#14	2
19	1785	2856	13-9	11-6	58	27	11-#11	14-#10	28.3	0.718	244	#14	2
20	1881	3009	14-6	11-6	57	27	13-#11	14-#10	29.3	0.814	247	#14	2
21	1977	3164	13-9 (11-0)	13-9 (3-5)	56	28	11-#11	12-#11	30.2	0.809	234	#14	3
22	2080	3329	14-6 (10-6)	12-11 (5-11)	55	29	12-#11	12-#11	29.4	0.842	224	#14	1
23	2167	3468	14-6 (10-6)	13-9 (6-9)	57	29	13-#11	13-#11	32.6	0.941	240	#14	1
24	2257	3612	14-6	13-9	57	30	14-#11	14-#11	35.0	1.013	268	#14	1
26	2429	3886	15-11 (8-11)	14-6 (10-6)	63	31	11-#14	14-#11	42.1	1.169	288	#18	1
28	2618	4189	15-11	14-6	63	32	11-#14	14-#11	44.8	1.169	319	#18	1
30	2793	4470	17-6	14-6	65	33	13-#14	17-#11	50.9	1.477	346	#18	1

‡ Clipped Corner Cap Dimensions. See detail drawing.
(1) Pile capacity is for (D + L).
(2) For concrete column, minimum side dimension. For steel column, minimum b or t plus ½ sum of overhangs to edges of steel base plate.
(3) Total steel, long plus short bars.
(4) Maximum size compression dowel that can develop Grade 60 in depth available.
(5) c. s. No. = critical shear section; see Fig. 13-7.

f'_c = 3 ksi; w = 150 pcf
f_y = 60 ksi

80 TON PILES (1)

Min. Pile Dia. = 12 in.
Max. Pile Spacing = 3′-0″

No. of Piles	Column Load (D + L) k	Column Load 1.6x (D + L) k	Cap Size A (A) ‡ ft.-in.	Cap Size B (B) ‡ ft.-in.	Cap Size D in.	Col. Size (2) in.	Grade 60 Rebars Long A-Bars No.-Size	Grade 60 Rebars Short B-Bars No.-Size	Quantities Concrete c.y.	Quantities Steel (3) tons	Quantities Form s.f.	Max. Size (4) Column Dowel	c. s. (5) No.
2	314	502	6-6	3-6	34	11	7-#6	5-#4	2.4	0.037	57	#9	1
3	471	754	5-6 (1-6)	5-1 (1-7)	32	14	8-#5	3 WAYS	2.0	0.062	48	#8	1
4	626	1002	5-6	5-6	36	16	7-#7	7-#7	3.3	0.071	66	#9	4
5	778	1245	6-9	6-9	38	18	7-#8	13-#6	5.3	0.119	85	#10	1
6	936	1498	8-6	5-6	40	19	9-#9	17-#6	5.7	0.186	93	#11	5
7	1083	1734	8-6	7-9	44	21	12-#7	10-#8	8.9	0.194	119	#11	1
8	1243	1990	8-6	7-9	44	22	8-#9	12-#8	8.9	0.224	119	#11	1
9	1394	2231	8-6	8-6	50	24	9-#9	9-#9	11.1	0.244	141	#14	1
10	1547	2476	11-6	7-9	47	25	10-#10	15-#8	12.9	0.381	150	#14	1
11	1705	2728	11-6	7-9	49	26	11-#10	15-#8	13.4	0.405	157	#14	2
12	1856	2970	11-6	8-6	52	27	12-#10	16-#8	15.6	0.454	173	#14	1
13	2001	3202	12-11	8-6	57	28	12-#11	20-#8	19.3	0.609	203	#14	2
14	2155	3448	11-6	10-9	55	29	10-#10	11-#10	20.9	0.479	203	#14	1
15	2310	3697	12-11 (5-11)	11-6 (7-6)	53	30	11-#11	14-#10	22.0	0.694	189	#14	1
16	2460	3937	11-6	11-6	60	31	12-#10	12-#10	24.4	0.567	230	#18	1
17	2625	4201	12-11 (5-11)	11-6 (7-6)	56	32	13-#11	12-#10	23.2	0.712	200	#14	1
18	2776	4441	12-11	11-6	56	33	15-#11	13-#10	25.6	0.802	227	#14	1

600 - 15 = 585
5.5+5.5+3.334·150 = 15k 4 Piles
750 - 22.8 = 727
6.75+6.75+3.334·150 = 22.8 5 Piles

‡ Clipped Corner Cap Dimensions. See detail drawing.
(1) Pile capacity is for (D + L).
(2) For concrete column, minimum side dimension. For steel column, minimum b or t plus ½ sum of overhangs to edges of steel base plate.
(3) Total steel, long plus short bars.
(4) Maximum size compression dowel that can develop Grade 60 in depth available.
(5) c. s. No. = critical shear section; see Fig. 13-7.

Table 3a. Areas and Perimeters of Bars in Sections 1 Ft. Wide (Slabs)

Areas A_s (or A'_s) (top) sq. in., Perimeters Σo, (bottom) in.

Enter table with values of A_s (or A'_s) and $\Sigma o = \frac{V}{7/8\, du}$ (V: lb; d: in.; u: psi)

Coefficients $a = \frac{f_s}{12,000} \times j$ inserted in table are for use in $A_s = \frac{M}{ad}$ or $A_s = \frac{NE}{ad}$

Spacing	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	Spacing
2	0.30 4.7	0.66 7.1	1.20 9.4	1.86 11.8	2.64 14.2						2
2-1/2	0.24 3.8	0.53 5.7	0.96 7.5	1.49 9.4	2.11 11.3	2.88 13.2	3.79 15.1				2-1/2
3	0.20 3.1	0.44 4.7	0.80 6.3	1.24 7.8	1.76 9.4	2.40 11.0	3.16 12.6	4.00 14.2			3
3-1/2	0.17 2.7	0.38 4.0	0.69 5.4	1.06 6.7	1.51 8.1	2.06 9.4	2.71 10.8	3.43 12.2	4.36 13.7		3-1/2
4	0.15 2.4	0.33 3.5	0.60 4.7	0.93 5.9	1.32 7.1	1.80 8.3	2.37 9.4	3.00 10.6	3.81 12.0	4.68 13.3	4
4-1/2	0.13 2.1	0.29 3.1	0.53 4.2	0.83 5.2	1.17 6.3	1.60 7.3	2.11 8.4	2.67 9.5	3.39 10.6	4.16 11.8	4-1/2
5	0.12 1.9	0.26 2.8	0.48 3.8	0.74 4.7	1.06 5.7	1.44 6.6	1.90 7.5	2.40 8.5	3.05 9.6	3.74 10.6	5
5-1/2	0.11 1.7	0.24 2.6	0.44 3.4	0.68 4.3	0.96 5.1	1.31 6.0	1.72 6.9	2.18 7.7	2.77 8.7	3.40 9.7	5-1/2
6	0.10 1.6	0.22 2.4	0.40 3.1	0.62 3.9	0.88 4.7	1.20 5.5	1.58 6.3	2.00 7.1	2.54 8.0	3.12 8.9	6
6-1/2	0.09 1.4	0.20 2.2	0.37 2.9	0.57 3.6	0.81 4.4	1.11 5.1	1.46 5.8	1.85 6.5	2.35 7.4	2.88 8.2	6-1/2
7	0.09 1.3	0.19 2.0	0.34 2.7	0.53 3.4	0.75 4.0	1.03 4.7	1.35 5.4	1.71 6.1	2.18 6.8	2.67 7.6	7
7-1/2	0.08 1.3	0.18 1.9	0.32 2.5	0.50 3.1	0.70 3.8	0.96 4.4	1.26 5.0	1.60 5.7	2.03 6.4	2.50 7.1	7-1/2
8	0.08 1.2	0.17 1.8	0.30 2.4	0.47 2.9	0.66 3.5	0.90 4.1	1.19 4.7	1.50 5.3	1.91 6.0	2.34 6.6	8
8-1/2	0.07 1.1	0.16 1.7	0.28 2.2	0.44 2.8	0.62 3.3	0.85 3.9	1.12 4.4	1.41 5.0	1.79 5.6	2.20 6.2	8-1/2
9	0.07 1.0	0.15 1.6	0.27 2.1	0.41 2.6	0.59 3.1	0.80 3.7	1.05 4.2	1.33 4.7	1.69 5.3	2.08 5.9	9
9-1/2	0.06 1.0	0.14 1.5	0.25 2.0	0.39 2.5	0.56 3.0	0.76 3.5	1.00 4.0	1.26 4.5	1.60 5.0	1.97 5.6	9-1/2
10	0.06 0.9	0.13 1.4	0.24 1.9	0.37 2.4	0.53 2.8	0.72 3.3	0.95 3.8	1.20 4.3	1.52 4.8	1.87 5.3	10
10-1/2	0.06 0.9	0.13 1.3	0.23 1.8	0.35 2.2	0.50 2.7	0.69 3.1	0.90 3.6	1.14 4.0	1.45 4.6	1.78 5.1	10-1/2
11	0.05 0.9	0.12 1.3	0.22 1.7	0.34 2.2	0.48 2.6	0.65 3.0	0.86 3.4	1.09 3.9	1.39 4.4	1.70 4.8	11
11-1/2	0.05 .08	0.11 1.2	0.21 1.6	0.32 2.0	0.46 2.5	0.63 2.9	0.82 3.3	1.04 3.7	1.33 4.2	1.63 4.6	11-1/2
12	0.05 0.8	0.11 1.2	0.20 1.6	0.31 2.0	0.44 2.4	0.60 2.8	0.79 3.1	1.00 3.5	1.27 4.0	1.56 4.4	12
13	f_s	a	0.18 1.4	0.29 1.8	0.41 2.2	0.55 2.5	0.73 2.9	0.92 3.3	1.17 3.7	1.44 4.1	13
14	16,000 18,000	1.13 1.29	0.17 1.3	0.27 1.7	0.38 2.0	0.51 2.4	0.68 2.7	0.86 3.0	1.09 3.4	1.34 3.8	14
15	20,000 22,000	1.44 1.60	0.16 1.3	0.25 1.6	0.35 1.9	0.48 2.2	0.63 2.5	0.80 2.8	1.02 3.2	1.25 3.5	15
16	24,000 27,000	1.76 2.00	0.15 1.2	0.23 1.5	0.33 1.8	0.45 2.1	0.59 2.4	0.75 2.7	0.95 3.0	1.17 3.3	16
17	30,000 33,000	2.24 2.48	0.14 1.1	0.22 1.4	0.31 1.7	0.42 1.9	0.56 2.2	0.71 2.5	0.90 2.8	1.10 3.1	17
18			0.13 1.0	0.21 1.3	0.29 1.6	0.40 1.8	0.53 2.1	0.67 2.4	0.85 2.7	1.04 3.0	18

Table 3b. Properties of Steel Reinforcing Bars

	Nominal dimensions— round sections											
	Bar designation No.											
	2	3	4	5	6	7	8	9	10	11	14S	18S
Unit Weight per ft., lb	0.167	0.376	0.668	1.043	1.502	2.044	2.670	3.400	4.303	5.313	7.65	13.60
Diameter in.	0.250	0.375	0.500	0.625	0.750	0.875	1.000	1.128	1.270	1.410	1.693	2.257
Cross-sectional area, sq. in.	0.05	0.11	0.20	0.31	0.44	0.60	0.79	1.00	1.27	1.56	[illegible]	[illegible]
Perimeter, in.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

From: Jean Fraser
To: Dobson, Lannie
Date: 12/19/2006 5:31:52 PM
Subject: Landmark Trust request for Permit for Mercy site MOB

Lannie,

Please continue to hold on this- there are legal isues but Penny was ill today so I could not establish where that has got to.

In addition, I need to check re the conditions and Performance Guarantee on this and have not been able to reach all the relevant parties. Revised site plans have not been submitted.

Are they asking for a building permit or foundation permit?

I will get back to you asap.

Thanks
Jean

CC: Alex Jaegerman ; Bourke, Jeanie; Reynolds, Jay

Special Inspections Program
(2003 International Building Code)

In accordance with the provisions of Chapter 17 of the 2003 International Building Code, this form is to list the special inspections as required for the proposed construction located at:

PROPERTY ADDRESS (print): **Fore River Medical Pavilion, Portland, Maine**

OWNER'S NAME (print): **Landmark Healthcare Facilities, LLC**

The design professional(s) of record shall indicate by a checkmark which of the special inspections listed below are required for the above mentioned construction site:

VERIFICATION & INSPECTION ITEM	REQUIRED
Fabrication of structural load-bearing members and assemblies (1704.2) (Refer to Table 1704.3)	☐
Steel: (1704.3) (Refer to Table 1704.3)	☑
Concrete: (1704.4) (Refer to Table 1704.4)	☑
Masonry: (1704.5) (Refer to Table 1704.5.1 & 1704.5.3)	☐
Fabrication process of prefabricated wood structural elements and assemblies (1704.6)	☐
Existing site soil conditions, Fill placement, load bearing requirements (1704.7)	☑
Pile/ Caisson/ Pier Foundations (1704.8 & 1704.9)	☑
Wall panels and Veneers (*Seismic design category "E" or "F" buildings only)* (1704.10)	☐
Sprayed Fire-Resistant Materials (1704.11)	☐
Exterior Insulation and Finish Systems (EIFS) (1704.12)	☐
Special Cases (Attach separate sheet, if necessary) (1704.13)	☐
Smoke control systems (1704.14)	☐
Seismic resistance (1707)	☐

As Structural Engineer of Record, we are identifying structural items to be inspected and to be administered by the Architect, Design Professional, Francis Cauffman Foley Hoffmann (Responsible for maintaining records of all inspections; furnishing reports to the Building Inspector; and verifying that the special inspector for each required item above is qualified to perform that inspection).

Structural Engineer of Record:
Robert E. Chester Associates
Consulting Engineers
119 Coulter Avenue, Suite 175
Ardmore, PA 19003
(610) 645-9570

Special Inspections Administrator:
Francis Cauffman Foley Hoffmann
Architects, Ltd.
2120 Arch Street
Philadelphia, PA 19103
(215) 568-8250

Table 1704.3
Required Verification and Inspection of Steel Construction

Yes	No	Verification & Inspection	Continuous	Periodic
☑	☐	**1. Material verification of high-strength bolts, nuts and washers:**		
☑	☐	a. Identification markings to conform to ASTM standards specified in the approved construction documents	☐	☑
☐	☑	b. Manufacturer's certificate of compliance required	☐	☑
☐	☑	**2. Inspection of high-strength bolting:**		
☐	☐	a. Bearing-type connections	☐	☑
☐	☐	b. Slip-critical connections	☑	☑
☑	☐	**3. Material verification of structural steel:**		
☑	☐	a. Identification markings to conform to ASTM standards in the approved construction documents	☐	☑
☐	☑	b. Manufacturer's certified mill test reports	☐	☐
☑	☐	**4. Material verification of weld filler materials:**		
☑	☐	a. Identification markings to conform to AWS specification in the approved construction documents	☐	☑
☐	☑	b. Manufacturer's certificate of compliance required	☐	☐
☑	☐	**5. Inspection of welding:**		
☑	☐	a. Structural steel	☐	☐
☑	☐	1) Complete and partial penetration groove welds	☑	☐
☑	☐	2) Multipass fillet welds	☑	☐
☑	☐	3) Single-pass fillet welds > 5/16"	☑	☐
☑	☐	4) Single-pass fillet welds ≤ 5/16"	☐	☑
☑	☐	5) Floor and deck welds	☐	☑
☐	☑	b. Reinforcing steel	☐	☐
☐	☐	1) Verification of weldability of reinforcing steel other than ASTM A 706.	☐	☑
☐	☐	2) Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement	☑	☐
☐	☐	3) Shear reinforcement	☑	☐
☐	☐	4) Other reinforcing steel	☐	☑
☑	☐	**6. Inspection of steel frame joint details for compliance with approved construction documents:**	☐	☑
☑	☐	a. Details such as bracing and stiffening	☐	☐
☐	☑	b. Member locations	☐	☐
☐	☑	c. Application of joint details at each connection	☐	☐

Table 1704.4 Required Verification and Inspection of Concrete Construction				
Yes	**No**	**Verification & Inspection**	**Continuous**	**Periodic**
☑	☐	1. Inspection of reinforcing steel, including prestressing tendons, and placement	☐	☑
☐	☑	2. Inspection of reinforcing steel, welding in accordance with Table 1704.3, Item 5B	☐	☐
☑	☐	3. Inspect bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased	☑	☐
☑	☐	4. Verifying use of required design mix	☐	☑
☑	☐	5. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete	☑	☐
☐	☑	6. Inspection of concrete and shotcrete placement for proper application techniques	☑	☐
☑	☐	7. Inspection for maintenance of specified curing temperature and techniques	☐	☑
☐	☑	8. Inspection of prestressed concrete:		
☐	☐	a. Application of prestressing forces	☑	☐
☐	☐	b. Grouting of bonded prestressing tendons in the seismic-force-resisting system	☑	☐
☐	☑	9. Erection of precast concrete members	☐	☑
☐	☑	10. Verification of in-situ concrete strength, prior to stressing of tendons in posttensioned concrete and prior to removal of shores and forms from beams and structural slabs	☐	☑

RECA
Robert E. Chester Associates, Consulting Engineers
119 Coulter Avenue, Suite 175, Ardmore, PA 19003 - Phone: 610-645-9570 - Fax: 610-645-9572

January 17, 2007

Mr. J. Thomas Hyde, AIA
Francis, Cauffman, Foley, Hoffmann, Architects, Ltd.
The Can Company, Signature Building
2400 Boston Street, Suite 402
Baltimore, MD 21224

Re: Landmark Healthcare Facilities, LLC – Fore River Medical Pavilion, Portland, ME – FCFH project no. F06-5103, RECA job no. 049-06

Dear Tom:

We have received several questions or comments via email or phone in the past several days, arising out of the Portland, Maine permit review process for the above-referenced project. We have reviewed the questions and comments, and offer the following response

Comment: Please provide a fully executed statement of Special Inspections and Seismic Quality assurance plan.
Responses: A certificate of special inspections was issued previously to FCFH Architects for the permit submission. A copy of the expanded form is enclosed (see below); Seismic quality assurance plan (Reference: IBC 2003 Section 1705) - This refers to specific seismic force resisting systems in seismic design categories C thru F. Systems of higher ductility (R>3) require special detailing in accordance with AISC 341 ("Seismic provisions"). The quality assurance plan covers inspections and testing of this work during construction. However, the use of structural steel systems not specifically detailed for seismic resistance is permitted by IBC 2003, for buildings in design category C (R=3, Table 1617.6.2). This is the case for our project, and the appropriate design criteria is listed on drawing S4.2. Therefore, a seismic quality assurance plan is not applicable.

Comment: The Steel Standards referenced on Page SG0001 of the plans and in Section 5120 of the spec book are slightly different, and neither seem to match the referenced standards in Sections 2205 of the 2003 IBC. Can you provide a comparison that demonstrates that the referenced standard in the construction documents meets or exceeds the code.
Response: The structural specifcation notes are listed on drawing S4.2 (reference to page SG0001 is unknown). These steel notes refer only to the latest edition of the AISC specifications. The project specifications, Section 05120 makes specific reference to AISC "Specification for Structural Steel Buildings - Allowable Stress Design and Plastic

Design". AISC has adopted a new numbering system for their publications, and the number for the above mentioned specification is "AISC-335". AISC-335 is listed in Section 2205 of IBC 2003, so the reference in the project specs and IBC refer to the same AISC "Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design".

Comment: Please review Section 1808 and 1809 of the 2003 IBC. Please provide information that established compliance with all of the applicable sub sections.
Response: Drawings and specifications submitted comply with Section 1808 - Pier and Pile Foundations and Section 1809 - Driven Pile Foundations (1809.3 – Steel Piles applicable only). Driving criteria and testing required are specified in the specification and addendum under section 02365 – Driven Piles, and in the Geotechnical report (supplied by Owner).

Comment: The Statement of Special Inspections submitted does not comply with Section 1704, 1705, 1707, 1708, 1709 and 1710.
Response: An expanded statement, including accompanying checklist tables is included with this letter. The overall checklist and tables are in direct relation to applicable portions of Section 1704, and covers structural items only. Architectural and MEP sections shall be as designated by the those specific Design Professionals. Sections 1705, 07, and 09 relate to special seismic inspections and testing, which has been addressed in a previous response. The requirements of Section 1709 "Structural Observations" do not apply to this project. The conformance to standards, per section 1710 are covered in the Statement of Special Inspections.

If there are further questions or comments regarding the enclosed responses and attachments, please have the governing authority clarify specific areas of concern, so we may address them and offer a prompt response. Otherwise, we trust that these responses will comply.

Respectfully Submitted,

Robert E. Chester, PE
Robert E. Chester Associates

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January 17, 2007

Mr. J. Thomas Hyde, AIA
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2400 Boston Street, Suite 402
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Re: Landmark Healthcare Facilities, LLC – Fore River Medical Pavilion, Portland, ME
FCFH project no. F06-5103, RECA job no. 049-06

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Respectfully Submitted,

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