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BUILDING PLAN CHECK
★ APPROVED ★
MAY 1 6 2018
PERMIT AND RESOURCE
MANAGEMENT DEPARTMENT

150059

THESE ATTACHMENTS ARE PART
OF THE APPROVED PLANS.
* DO NOT REMOVE THEM *
MAY 2 1 2015
PERMIT AND RESOURCE
MANAGEMENT DEPARTMENT
BUILDING PLAN CHECK
PERMIT # 15-1306

STRUCTURAL CALCULATIONS FOR FOUNDATION

METAL BUILDING ROOF CANOPY
MANZANA PRODUCTS INC.
9141 GREEN VALLEY ROAD
SEBASTOPOL, CA. 95472

REGISTERED PROFESSIONAL ENGINEER
TY FISCUS
No. C 24690
Exp. Dec.31,2015
GML
STATE OF CALIFORNIA

Mar 3-2015

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Mar. 3, 2015

Project: Manzana Products Inc.
Foundation for Roof Canopy
over exterior work area

The following structural calculations are for the foundation of a manufactured metal building roof canopy to replace an existing wood structure. The building loads and reactions were supplied by "Metalic Building Company".
The foundation design is based on the Geotechnical Investigation by PJC Associates, May 12, 2014.
The existing building has a reinforced concrete slab that is to remain. New footings are designed to support the new roof canopy with the lateral thrust due to frame loads, wind and seismic loads being resisted by passive soil pressure and the adjacent concrete building foundation on the east side.

All site preparation and fill placement should be observed by a representative of PJC. It is important that during the stripping, subexcavation and grading/scarifying processes, a representative of our firm be present to observe whether any undesirable material is encountered in the construction area.

Generally, grading is most economically performed during the summer months when on-site soils are usually dry of optimum moisture content. Delays should be anticipated in site grading performed during the rainy season or early spring due to an elevated groundwater condition or excessive moisture in the on-site soils. Special and relatively expensive construction procedures should be anticipated if grading must be completed during the winter and early spring.

10. FOUNDATIONS: SPREAD FOOTINGS

a. Vertical Loads. Provided the building pad is prepared according to the earthwork section of this report, the structures may be adequately supported by conventional spread footings founded on compacted, non-expansive, engineered fill, dense native soils or bedrock. All footings should be reinforced. The recommended soil bearing pressures, depth of embedment and minimum widths of spread footings are presented in Table 3. The bearing values provided have been calculated assuming that all foundations bear on compacted engineered fill.

TABLE 3
FOUNDATION DESIGN CRITERIA

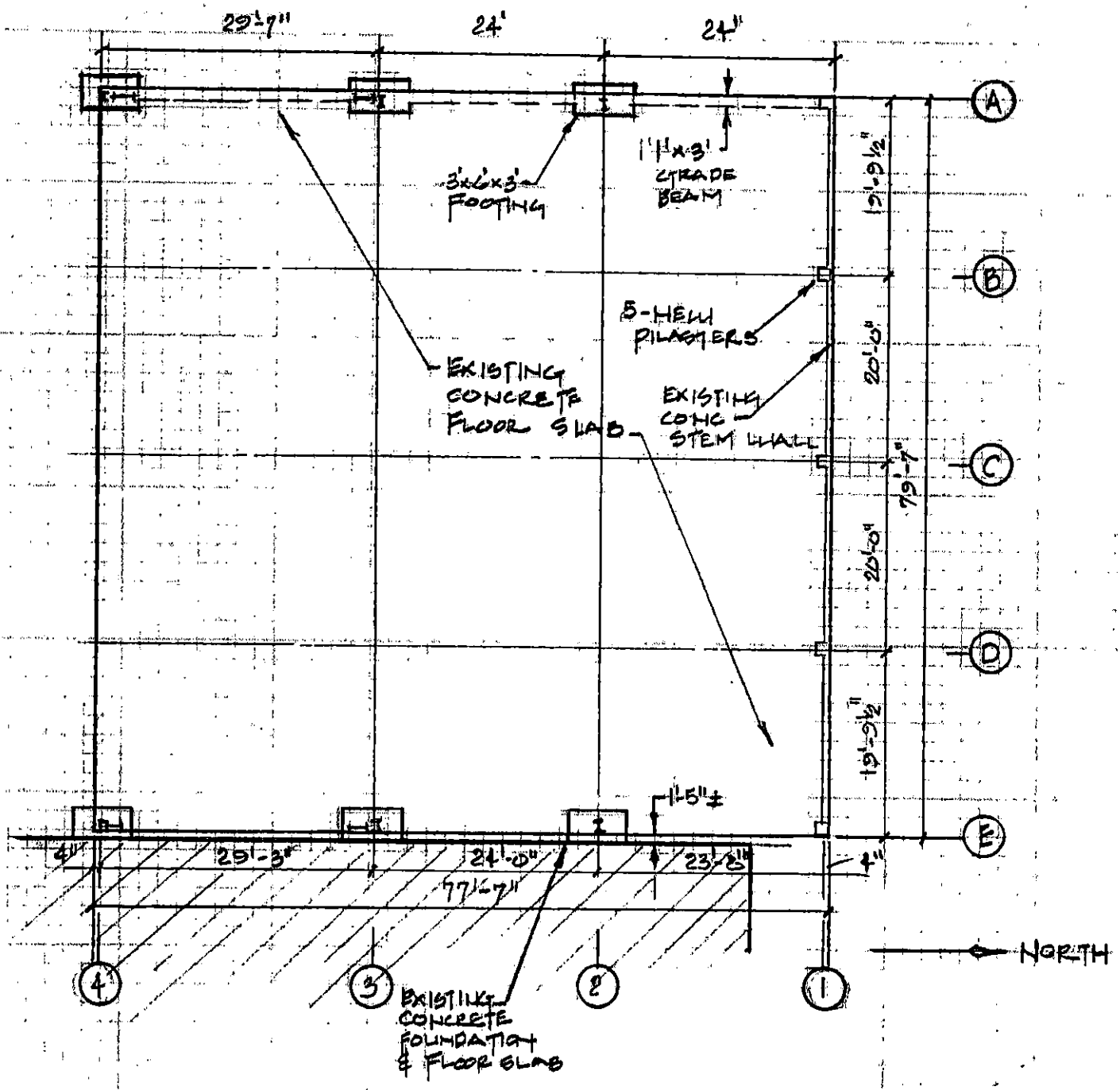
Footing Type	Bearing Pressure (psf)*	Minimum Embedment (in)**	Minimum Width (in)
Continuous Wall	2,000	18	12
Isolated Column	2,500	18	18

* Dead plus live load.

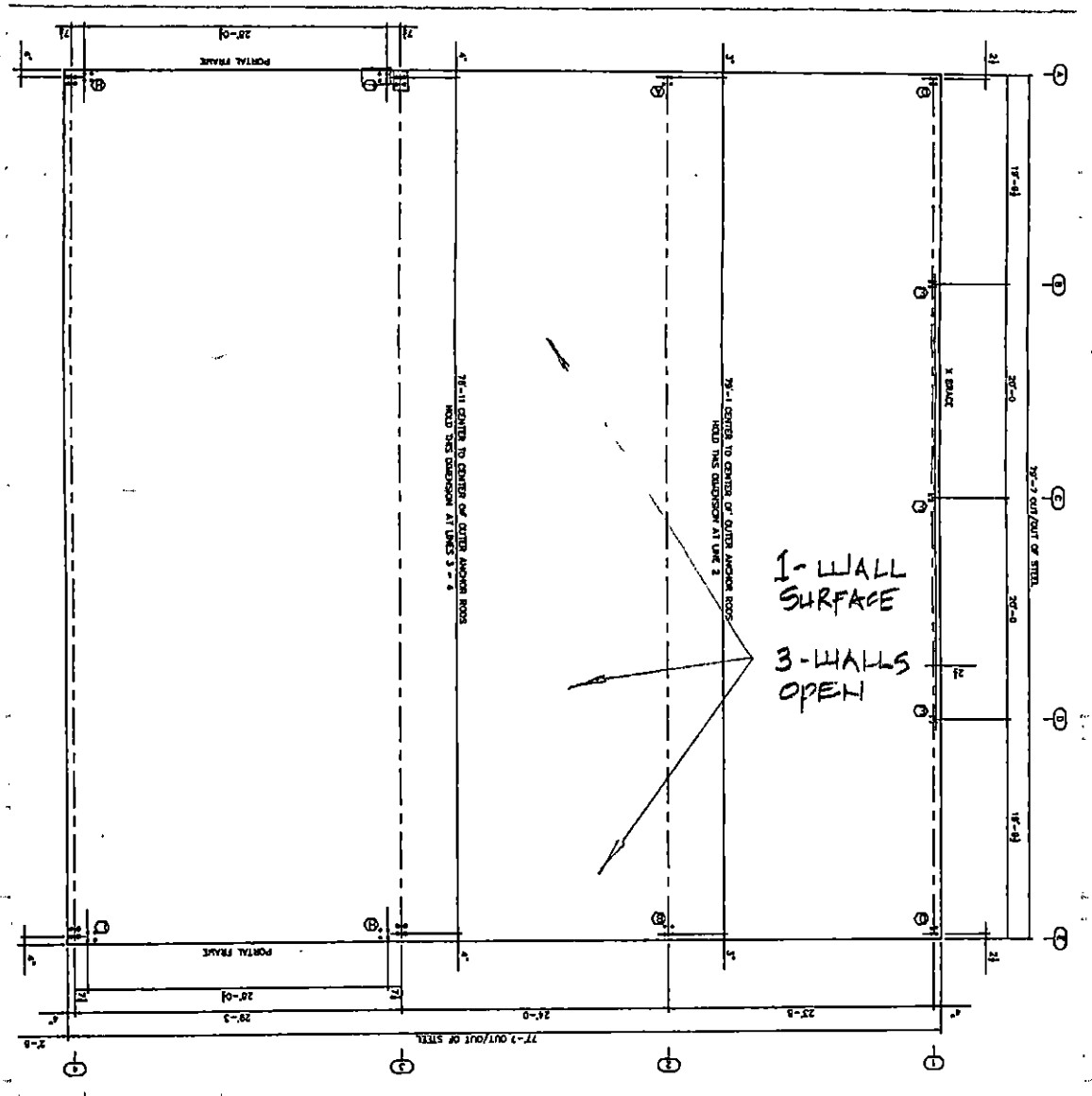
** Below the lowest adjacent finish grade.

The allowable soil bearing pressures are net values. The weight of the foundation and backfill over the foundation may be neglected when computing dead loads. Allowable soil bearing pressures may be increased by one-third for transient applications such as wind and seismic loads.

b. Lateral Loads. Resistance to lateral forces may be computed by using friction or passive pressure. A friction factor of 0.35 is considered appropriate between the bottom of the concrete structures and the compacted engineered fill. A passive pressure equivalent to that exerted by a fluid weighing 300 pounds per square foot per foot of depth (psf/ft) is recommended. Unless restrained at the surface, the top six inches should be neglected for passive resistance.



FOUNDATION PLAN



COLUMN & WALL FRAMES

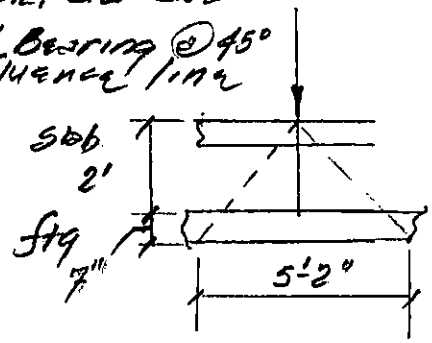
WALL LINE ①

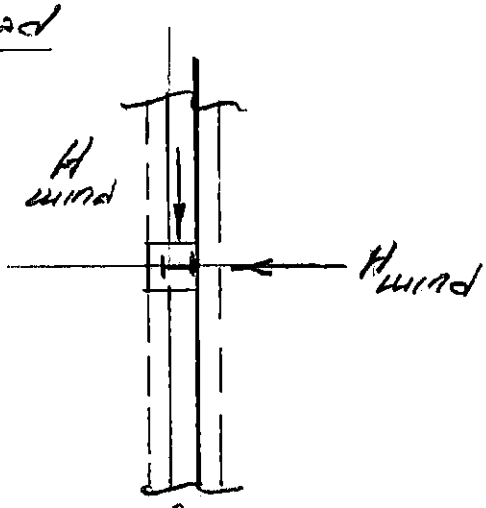
North wall has wind surface.
East West & South walls are open with-out Framing or Siding

Maximum Column Load

V = 1.5 + 1.5 + 7.0 = 10.0 k
D.L. C.L. Live

Soil Bearing @ 45° influence line



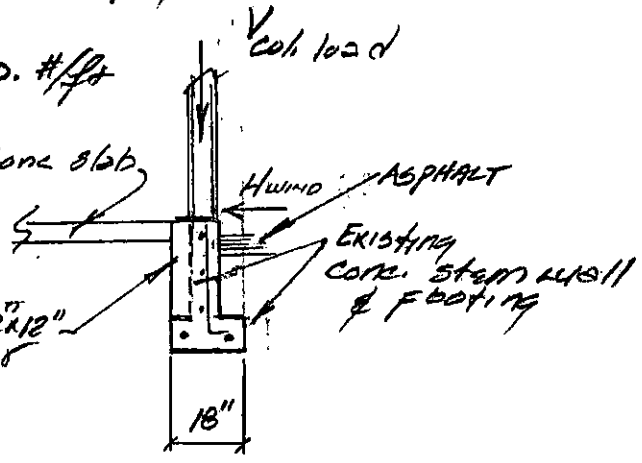


Soil Bearing = $\frac{10.0}{(1.5)(5.17)}$ = 1289 psf

Add ftg & stem wall ≅ 250. #/ft

Soil bearing = 1289 + 250
Total = 1440 psf

1440 < 2000 OK for wall ftg.



4 - 5/8" ϕ A.B. embedded 9" with 3x3 ϕ washers inside 4 - #4 rebar cage

OK for 12 k up-lift
6.5 k SHEAR

Shear on bolts V_2 = 6.5 k out-ward wind
V_1 = 5.6 k " " "

$T_{tension}$ = 15 k wind up

T = 15 - 1.5 - 1.5 = 12 k
wind D.L. C.L.

FRAME DESCRIPTION:
Endwall EWB

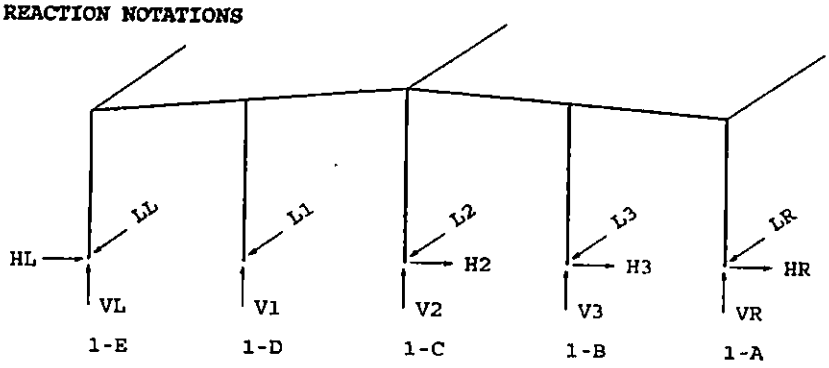
USER NAME:ldgonzal DATE: 2/05/15 PAGE: EW-1
JOB NAME:74979A FILE:REW3BLDG1

PATH: R:\Jobs\Active\ENG\14-B-74979\ver01-ldgonzalez\Bldg-A\run01\

SUPPORT REACTIONS FOR EACH LOAD GROUP
NOTE: All reactions are in kips and kip-ft.

TIME:13:23:06

REACTION NOTATIONS



LOAD GROUP REACTION TABLE

COLUMN	1-E			1-A			1-D			1-C			1-B		
LOAD GROUP	HL	VL	LL	HR	VR	LR	H1	V1	L1	H2	V2	L2	H3	V3	L3
D	0.0	0.7	0.	0.0	0.9	0.	0.	1.5	0.	0.	1.1	0.0	0.	1.5	0.
C	0.0	0.5	0.	0.0	0.5	0.	0.	1.5	0.	0.	0.9	0.0	0.	1.5	0.
L	0.0	2.2	0.	0.0	2.7	0.	0.	7.0	0.0	0.	4.3	0.0	0.	7.0	0.0
W+	-0.1	-4.2	2.7	0.1	-4.0	2.7	0.	-12.5	5.7	0.	-7.7	6.2	0.	-12.5	5.7
W-	-0.1	-4.2	-3.1	0.0	-5.3	-3.1	0.	-12.5	-6.2	0.	-7.7	-6.7	0.	-12.5	-6.2
WR	-0.1	-4.2	0.	0.0	-5.3	0.	0.	-12.5	0.0	0.	-5.2	0.0	2.2	-15.0	0.0
WL	-0.1	-4.2	0.	0.0	-5.3	0.	0.	-12.5	0.0	-2.2	-10.0	0.0	0.	-10.2	0.0
ER	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.9	0.	2.6	-2.9	0.
EL	0.	0.	0.	0.	0.	0.	0.	0.	0.	-2.6	-2.7	0.	0.	2.7	0.

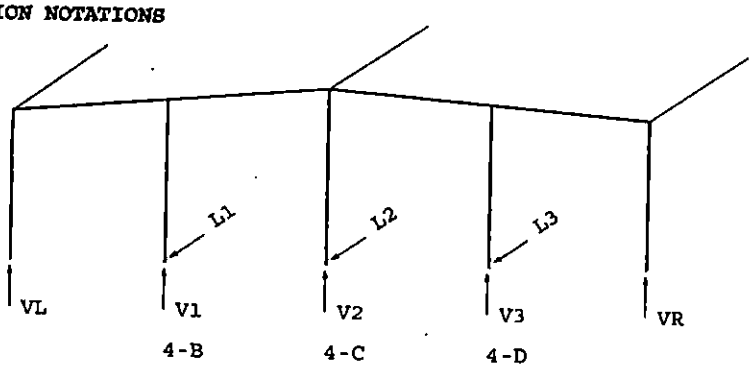
LOAD GROUP DESCRIPTION

D	:	DEAD LOAD
C	:	COLLATERAL LOAD
L	:	LIVE LOAD
W+	:	WIND LOAD AS AN INWARD ACTING PRESSURE
W-	:	WIND LOAD AS AN OUTWARD ACTING SUCTION
WR	:	WIND FORCE FROM THE RIGHT
WL	:	WIND FORCE FROM THE LEFT
ER	:	EARTHQUAKE FORCE FROM RIGHT
EL	:	EARTHQUAKE FORCE FROM LEFT

SUPPORT REACTIONS FOR EACH LOAD GROUP
NOTE: All reactions are in kips and kip-ft.

TIME:13:23:06

REACTION NOTATIONS



LOAD GROUP REACTION TABLE

COLUMN	LEFT COLUMN			RIGHT COLUMN			4-B			4-C			4-D		
LOAD GROUP	HL	VL	LL	HR	VR	LR	H1	V1	L1	H2	V2	L2	H3	V3	L3
D	0.	0.	0.	0.	0.	0.	0.	0.4	0.	0.	0.5	0.	0.	0.4	0.
W+	0.	0.	0.	0.	0.	0.	0.	0.	5.6	0.	0.	6.1	0.	0.	5.6
W-	0.	0.	0.	0.	0.	0.	0.	0.	-6.0	0.	0.	-6.5	0.	0.	-6.0

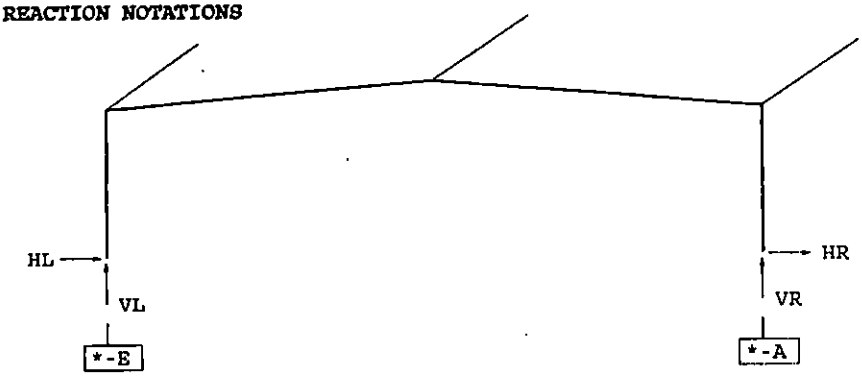
LOAD GROUP DESCRIPTION

D : DEAD LOAD
W+ : WIND LOAD AS AN INWARD ACTING PRESSURE
W- : WIND LOAD AS AN OUTWARD ACTING SUCTION

FRAME ID #12 USER NAME:ldgonzalezDATE: 2/ 3/15 PAGE: 12-3
cs 79.583/19./29.583 20./11 JOB NAME:74979A FILE:a_fl3_4.fra

SUPPORT REACTIONS FOR EACH LOAD GROUP
*LOCATION: Gridlines: 3 4
NOTE: All reactions are in kips and kip-ft. TIME:11:32:34

REACTION NOTATIONS



LOAD GROUP REACTION TABLE * = 3 4

COLUMN	*-E			*-A		
LOAD GROUP	HL	VL	LNL	HR	VR	LNR
DL	3.7	5.4	0.0	-3.7	5.6	0.0
LL	18.6	23.5	0.0	-18.6	24.7	0.0
COLL	4.7	5.9	0.0	-4.7	5.9	0.0
EQ	-3.4	-1.5	0.0	-3.4	1.5	0.0
WL1	-24.6	-33.3	0.0	16.1	-27.4	0.0
WL2	-7.8	-2.6	0.0	-0.6	3.2	0.0
LWL1	-16.6	-32.2	0.0	17.3	-28.5	0.0
LWL2	-17.3	-28.0	0.0	16.5	-33.1	0.0
LWL3	0.1	-1.5	0.0	0.7	3.7	0.0
LWL4	-0.6	2.6	0.0	-0.1	-1.0	0.0
WL3	-16.2	-26.9	0.0	24.4	-35.1	0.0
WL4	0.6	3.8	0.0	7.7	-4.4	0.0
	0.0	0.0	0.0	0.0	0.0	0.0

LOAD GROUP DESCRIPTION

DL : Roof Dead Load
LL : Roof Live Load
COLL : Roof Collateral Load
EQ : Lateral Seismic Load [parallel to plane of frame]
WL1 : Lateral Primary Wind Load
WL2 : Lateral Primary Wind Load
LWL1 : Longitudinal Primary Wind Load
LWL2 : Longitudinal Primary Wind Load
LWL3 : Longitudinal Primary Wind Load
LWL4 : Longitudinal Primary Wind Load
WL3 : Lateral Primary Wind Load
WL4 : Lateral Primary Wind Load
: User Entered Load

FRAME LINES ③ & ④

Allowable Bearing Pressure = 2500
Lateral / Passive = 300. #/ft²/ft

Skin Friction = $\frac{2500}{6}$ = 416
= $\frac{2000}{6}$ = 333

MAXIMUM COLUMN REACTIONS
MAIN FRAME LINE ③ & ④

$\overset{\downarrow}{V}$ = 5.4 + 23.5 + 5.9 = 34.8 k ↓
VERT D.L. L.L. CO.L.

$\overrightarrow{H}$ = -24.6 + 3.7 + 4.7 = 16.2 k →
Horiz WIND D.L. C.L. THRUST

$T_{\uparrow}$ = -33.3 + 5.4 + 5.9 = 22.0 k ↑
D.L. CO/L.

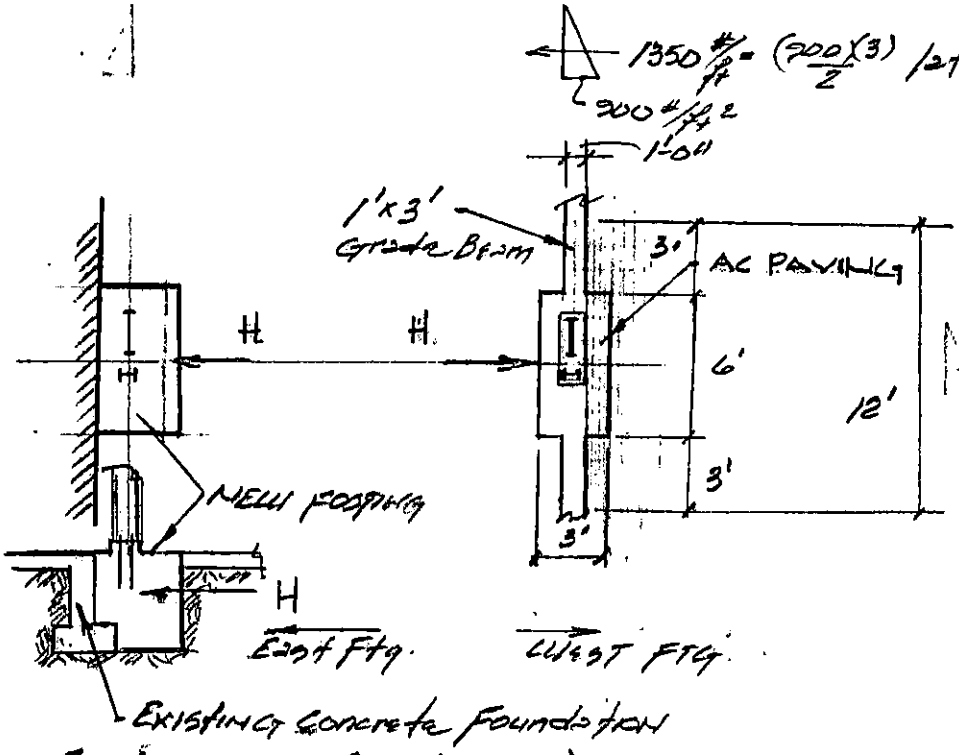
Footing D.L. = (3)(6)(3)(0.15) = 8.1 k ↓

Soil Bearing

V_{Total} = 34.8 + 8.1 = 42.1 k
ftg

Soil Bearing = $\frac{42.1}{(3)(6)}$ = 2.34 ksf

2340 < 2500 psf
OK



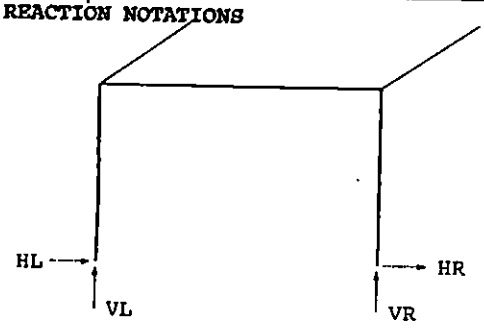
Footing Up-Lift (wind)

Footing D.L. = 8100. #
Soil Friction = $\frac{2000}{6}$ = 333 #/ft²
Area Footing walls = (3+6+6+3)(3) = 54 ft²
Up-lift resistance = (333)(54) + 8100. = 26080. #
= 26 k > 22. k

FRAME ID #23
pf 29.25/19. main building at JOB NAME:74979A USER NAME:ldgonzalez DATE: 2/ 3/15 PAGE: 23-2
FILE:a_swa_swc_pf.fra

SUPPORT REACTIONS FOR EACH LOAD GROUP
LOCATION:bays 3-(Gridline A)
NOTE: All reactions are in kips and kip-ft.
TIME:10:29:25

REACTION NOTATIONS



LOAD GROUP REACTION TABLE

COLUMN	LEFT COLUMN			RIGHT COLUMN		
LOAD GROUP	HL	VL	LNL	HR	VR	LNR
DL	0.1	1.0	0.0	-0.1	1.0	0.0
EQ	-5.4	-7.6	0.0	-5.8	7.6	0.0
WL1	-3.4	-4.7	0.0	-3.7	4.7	0.0
WL2	3.7	4.7	0.0	3.4	-4.7	0.0

LOAD GROUP DESCRIPTION

DL : Roof Dead Load
EQ : Lateral Seismic Load [parallel to plane of frame]
WL1 : Lateral Primary Wind Load
WL2 : Lateral Primary Wind Load

FRAME LINES ③ & ④

Portal Frame ② Lines Ⓔ ③ & ④

Ⓐ ③ & ④

Seismic Governs ← 5.8

↑ 7.6

V = 7.6 + 5.4 + 5.9 = 18.9 K

Soil Bearing = $\frac{18.9 + 8.1}{(3)(4)}$ = 1.50 K/ft²

1500 < 2500 OK

Lateral F = 5.8 K

Friction = (0.35)(5.4 + 5.9 + 8.1) = 6.68 K > 5.8 K OK
D.L. C.L. ftg

Anchor Bolts

4 - 5/8" ϕ A.B.

good for (4)(5,874) = 23,496

23.5K tension on A-36 bolt

23.5 > 22. wind up-lift

Embed = 12" with 3x3 plate washers OK

FRAME ID #11 USER NAME:ldgonzalez DATE: 2/ 3/15 PAGE: 11-3
cs 79.583/19./23.833 20./11 JOB NAME:74979A FILE:a_f12.fra

SUPPORT REACTIONS FOR EACH LOAD GROUP
*LOCATION: Gridlines: 2
NOTE: All reactions are in kips and kip-ft.

TIME:11:15:59

REACTION NOTATIONS

LOAD GROUP REACTION TABLE * = 2

COLUMN	*-E			*-A		
LOAD GROUP	HL	VL	LNL	HR	VR	LNR
DL	3.1	4.5	0.0	-3.1	4.7	0.0
LL	15.2	18.9	0.0	-15.2	19.9	0.0
COLL	3.8	4.7	0.0	-3.8	4.7	0.0
EQ	-2.8	-1.2	0.0	-2.8	1.2	0.0
WL1	-20.0	-26.8	0.0	13.2	-22.1	0.0
WL2	-6.4	-2.1	0.0	-0.4	2.6	0.0
LWL1	-13.5	-25.9	0.0	14.1	-23.0	0.0
LWL2	-14.1	-22.5	0.0	13.5	-26.7	0.0
LWL3	0.1	-1.2	0.0	0.6	2.9	0.0
LWL4	-0.5	2.1	0.0	-0.1	-0.8	0.0
WL3	-13.2	-21.6	0.0	19.9	-28.3	0.0
WL4	0.4	3.0	0.0	6.2	-3.6	0.0
	0.0	0.0	0.0	0.0	0.0	0.0

LOAD GROUP DESCRIPTION

DL : Roof Dead Load
LL : Roof Live Load
COLL : Roof Collateral Load
EQ : Lateral Seismic Load [parallel to plane of frame]
WL1 : Lateral Primary Wind Load
WL2 : Lateral Primary Wind Load
LWL1 : Longitudinal Primary Wind Load
LWL2 : Longitudinal Primary Wind Load
LWL3 : Longitudinal Primary Wind Load
LWL4 : Longitudinal Primary Wind Load
WL3 : Lateral Primary Wind Load
WL4 : Lateral Primary Wind Load
: User Entered Load

Frame Line ②

$V_{Vert} = 4.5_{D.L.} + 18.9_{L.L.} + 4.7_{C.L.} = 28.1\ k$

Total Load = 28.1 + 8.1 = 36.2 k

Soil Bearing = $\frac{36.2}{(3)(6)} = 2.01$ KSF

= 2010 psf < 2500 OK

Lateral Load = $20.0_{L\,Wind} + 3.1_{D.L.} + 3.8_{L.L.\ Thrust} = 13.1\ k \rightarrow$

Passive R = 16.2 on footing & Grade beam ② West

Lateral Resisted by existing concrete footing ② East.

No portal frame on line ②

Footing & Anchor Bolts are same as line ③ & ④