PCS Structural Solutions

Seattle 1011 Western Avenue, Suite 810 | Seattle, WA 98104 | 206.292.5076
Tacoma 1250 Pacific Avenue, Suite 701 | Tacoma, WA 98402 | 253.383.2797
Portland 101 SW Main Street, Suite 280 | Portland, OR 97204 | 503.232.3746
www.pcs-structural.com

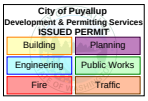
PRCTI20241601

STRUCTURAL CALCULATIONS

FOR

MULTICARE GOOD SAMARITAN HOSPITAL
REHABILITATION ROOM 28 CEILING LIFT
401 15TH AVE SE
PUYALLUP, WA 98372

PREPARED BY
PCS STRUCTURAL *SOLUTIONS*



City of Puyallup
Building
REVIEWED
FOR
COMPLIANCE
SKinnear
11/01/2024
1:14:33 PM

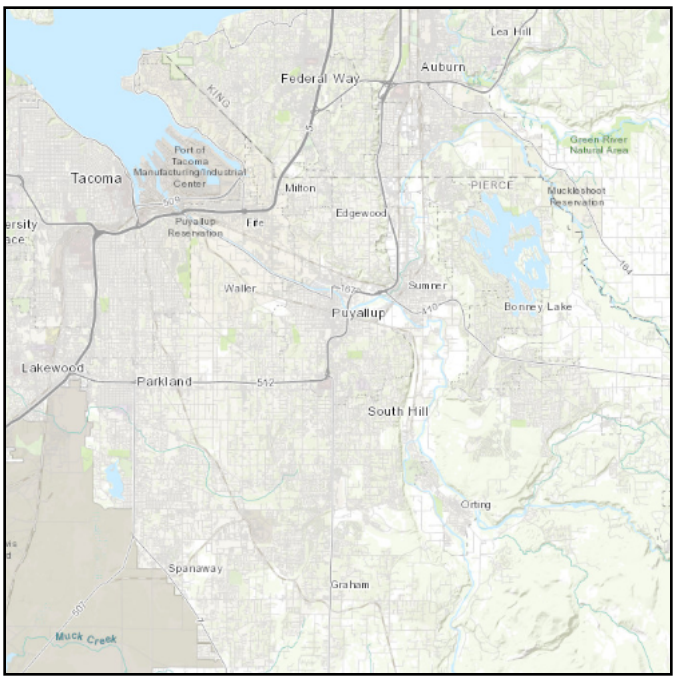
JANUARY 3, 2024
24-142

Calculations required to be provided by the Permittee on site for all Inspections

ASCE 7 Hazards Report

Address:
Multicare Good Samaritan Hospital - 401 15th Ave SE Puyallup,

Standard:	ASCE/SEI 7-16	**Latitude:**	47.17834
Risk Category:	IV	**Longitude:**	-122.28947
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	164.94791553751946 ft (NAVD 88)



Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	1.266	S_{D1} :	N/A
S_1 :	0.436	T_L :	6
F_a :	1.2	PGA :	0.5
F_v :	N/A	PGA_M :	0.6
S_{MS} :	1.52	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1.5
S_{DS} :	1.013	C_v :	1.353

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Fri Dec 22 2023

Date Source: USGS Seismic Design Maps

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Design Criteria

Dead Load

Lift wt, $W_{Lift} := 40 \cdot lbf$

Track wt, $W_{Track} := 10 \cdot lbf$ Trib. to (1) hanger

Total wt, $W_D := W_{Lift} + W_{Track} = 50\ lbf$

Live Load

Lift capacity, $W_L := 1000 \cdot lbf$

Lateral Forces

During operation

Transverse, $V_{Trans} := 0.2 \cdot (W_D + W_L) = 210\ lbf$ 20% of gravity load

Longitudinal, $V_{Long} := 0.1 \cdot (W_D + W_L) = 105\ lbf$ 10% of gravity load

Seismic

$S_S := 1.266$ $S_{DS} := 1.013$

$S_1 := 0.436$ $S_{D1} := 0.542$

Seismic forces

$a_p := 2.5$

ASCE 7-16 T13.5-1 for flexible components w/ high deformability

$R_p := 3.5$

$\Omega_o := 2.5$

$I_p := 1.5$

$z := 37.3\ ft$

$h := 61.5\ ft$

$$F_{ph} := \frac{0.4 \cdot a_p \cdot S_{DS} \cdot W_D}{\frac{R_p}{I_p}} \cdot \left(1 + 2 \cdot \left(\frac{z}{h}\right)\right) = 48\ lbf$$

$F_{p\_min} := 0.3 \cdot S_{DS} \cdot I_p \cdot W_D = 22.8\ lbf$

$F_{p\_max} := 1.6 \cdot S_{DS} \cdot I_p \cdot W_D = 121.6\ lbf$

$$F_p := \begin{cases} \text{if } F_{p\_min} > F_{ph} \\ \quad F_{p\_min} \\ \text{else if } F_{p\_max} < F_{ph} \\ \quad F_{p\_max} \\ \text{else} \\ \quad F_{ph} \end{cases} = 48\ lbf$$

$F_{pv} := 0.2 \cdot S_{DS} \cdot W_D = 10.1\ lbf$

Threaded Rod Hanger

Load in tension

$$T_{R1} := W_D + W_L + 0.7 \cdot \left(F_{pv} + \frac{F_p \cdot \tan\left(\frac{60 \cdot \pi}{180}\right)}{2} \right) = 1086.2 \ \textit{lbf}$$

$$T_{R2} := W_D + W_L + V_{Trans} \cdot \frac{\tan\left(\frac{60 \cdot \pi}{180}\right)}{2} = 1231.9 \ \textit{lbf}$$

$$T_R := \max\left(T_{R1}, T_{R2}\right) = 1231.9 \ \textit{lbf}$$

Try 1/2" dia. threaded rod

$F_y := 36 \ \textit{ksi}$

$A_g := 0.126 \ \textit{in}^2$ root area

$\Omega := 1.67$

$$T_a := \frac{F_y \cdot A_g}{\Omega} = 2716.2 \ \textit{lbf}$$

$$Design := \left\| \begin{array}{l} \text{if } T_a > T_R \\ \quad \| \text{“OK”} \\ \text{else} \\ \quad \| \text{“NG”} \end{array} \right\| = \text{“OK”}$$

.:Use 1/2" dia. threaded rod

Try (2) 1/2" dia. Hilti KB-TZ to concrete deck

$$T_{U1} := 1.2\ W_D + W_L + F_{pv} + \frac{F_p \cdot \Omega_o \cdot \tan\left(\frac{60 \cdot \pi}{180}\right)}{2} = 1174.1\ \textit{lbf}$$

$$T_{U2} := 1.2 \cdot W_D + 1.6\ W_L + \frac{1.6 \cdot V_{Trans} \cdot \tan\left(\frac{60 \cdot \pi}{180}\right)}{2} = 1951\ \textit{lbf}$$

$$T_U := \max\left(T_{U1}, T_{U2}\right) = 1951\ \textit{lbf}$$

Per Hilti Profis

$$DCR_{max} := 0.69$$

$$Design := \left\| \begin{array}{l} \text{if } DCR_{max} < 1 \\ \quad \| \text{“OK”} \\ \text{else} \\ \quad \| \text{“NG”} \end{array} \right\| = \text{“OK”}$$

.:Use (2) 1/2" dia. Hilti KB-TZ (2 1/2" embed min)

Load in compression

$$C_{R1} := 0.6 \cdot W_D - 0.7 \cdot \left(F_{pv} + \frac{F_p \cdot \tan\left(\frac{60 \cdot \pi}{180}\right)}{2} \right) = -6.2 \ lbf$$

$$C_{R2} := 0.6 \cdot W_D - V_{Trans} \cdot \frac{\tan\left(\frac{60 \cdot \pi}{180}\right)}{2} = -151.9 \ lbf$$

$$C_R := min\left(C_{R1}, C_{R2}\right) = -151.9 \ lbf$$

Try P1000 w/ P2486 @ 21" o.c.

Per Unistrut

$f_a := 3745 \ psi$

$A_g := 0.126 \ in^2$ root area

$C_a := f_a \cdot A_g = 471.87 \ lbf$

$$Design := \left\| \begin{array}{l} \text{if } C_a > C_R \\ \quad \text{“OK”} \\ \text{else} \\ \quad \text{“NG”} \end{array} \right\| = \text{“OK”}$$

.:Use 1/2" dia. threaded rod w/ P1000 & P2486 @ 21" o.c.

Unistrut Trapeze

Loads (from previous calculations)

$T_{R\_Trap} := \max\left(T_R, 1.25 \cdot W_L\right) = 1250\ \textit{lbf}$

Try Unistrut channels

P1000T

$M_{a\_Unfactored} := 5070\ \textit{in} \cdot \textit{lbf}$

$I_x := 0.185\ \textit{in}^4$

$E := 29 \cdot 10^6\ \textit{psi}$

$L := 13 \cdot \textit{in}$ Maximum span

$C_{Unbr} := 1$ Unbraced length factor

$C_{Pierce} := 0.85$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 4309.5\ \textit{in} \cdot \textit{lbf}$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 4062.5\ \textit{in} \cdot \textit{lbf}$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.01\ \textit{in}$

$\Delta_{max} := 0.25 \cdot \textit{in}$

$$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$$

.:Use P1000T for L=13in max

P1000

Same as P1000T, except

$L := 16 \cdot in$ Maximum span

$C_{Unbr} := 1$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 5070\ in \cdot lbf$$

$$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 5000\ in \cdot lbf$$

$$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.02\ in$$

$$\Delta_{max} := 0.25 \cdot in$$

$$Design := \begin{array}{l} \text{if } M_a > M_R \\ \quad \text{if } \Delta < \Delta_{max} \\ \quad\quad \text{“OK”} \\ \quad \text{else} \\ \quad\quad \text{“NG”} \\ \text{else} \\ \quad \text{“NG”} \end{array} = \text{“OK”}$$

.:Use P1000 for L=16in max

P5500T

$M_{a\_Unfactored} := 9820\ in \cdot lbf$

$I_x := 0.522\ in^4$

$L := 25 \cdot in$ Maximum span

$C_{Unbr} := 0.98$ Unbraced length factor

$C_{Pierce} := 0.85$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 8180.1\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 7812.5\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.03\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design :=$ if $M_a > M_R$ → (if $\Delta < \Delta_{max}$ → "OK" else → "NG") else → "NG" $=$ "OK"

.:Use P5500T for L=25in max

P5500

Same as P5500T, except

$L := 29 \cdot in$ Maximum span

$C_{Unbr} := 0.95$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 9329\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 9062.5\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.04\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design :=$ if $M_a > M_R$ → (if $\Delta < \Delta_{max}$ → "OK"; else → "NG"); else → "NG" $=$ "OK"

.:Use P5500 for L=29in max

P5000T

$M_{a\_Unfactored} := 15770\ in \cdot lbf$

$I_x := 1.098\ in^4$

$L := 36 \cdot in$ Maximum span

$C_{Unbr} := 0.85$ Unbraced length factor

$C_{Pierce} := 0.85$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 11393.8\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 11250\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.04\ in$

$\Delta_{max} := 0.25 \cdot in$

$$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$$

.:Use P5000T for L=36in max

P5000

Same as P5000T, except

$L := 40 \cdot in$ Maximum span

$C_{Unbr} := 0.80$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 12616\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 12500\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.05\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{“OK”} \right. \\ \text{else} \\ \quad \left\| \text{“NG”} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{“NG”} \right. \end{array} \right. = \text{“OK”}$

.:Use P5000 for L=40in max

P1001

$M_{a\_Unfactored} := 14360\ in \cdot lbf$

$I_x := 0.928\ in^4$

$L := 45 \cdot in$ Maximum span

$C_{Unbr} := 1$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 14360\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 14062.5\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.09\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right\| = \text{"OK"}$

.:Use P1001 for L=45in max

P5501

$M_{a\_Unfactored} := 28940\ in \cdot lbf$

$I_x := 2.805\ in^4$

$L := 77 \cdot in$ Maximum span

$C_{Unbr} := 0.85$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 24599\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 24062.5\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.15\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$

.:Use P5501 for L=77in max

P5001

$M_{a\_Unfactored} := 48180\ in \cdot lbf$

$I_x := 6.227\ in^4$

$L := 100 \cdot in$ Maximum span

$C_{Unbr} := 0.66$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 31798.8\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 31250\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.14\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$

.:Use P5001 for L=100in max

Brace

Load in tension/compression

$$P_{R1} := \frac{0.7 \cdot F_p}{\cos\left(\frac{60 \cdot \pi}{180}\right) \cdot 2} = 33.6 \ lbf$$

$$P_{R2} := \frac{V_{Trans}}{\cos\left(\frac{60 \cdot \pi}{180}\right) \cdot 2} = 210 \ lbf$$

$$P_R := \max\left(P_{R1}, P_{R2}\right) = 210 \ lbf$$

Check capacity at min brace angle = 30° as worst case

Try Unistrut P1000 for L=(4.4ft)/cos(30) = 5.1ft max

Per Unistrut

$$P_a := 2380 \ lbf$$

$$Design := \left\| \begin{array}{l} \text{if } P_a > P_R \\ \quad \| \text{“OK”} \\ \text{else} \\ \quad \| \text{“NG”} \end{array} \right\| = \text{“OK”}$$

.:Use P1000 brace

Check brace anchorage

$V_R := P_R = 210$ ***lbf***

Try Unistrut channel nut to brace

Per Unistrut

$V_a := 800$ ***lbf***

$$Design := \left| \begin{array}{l} \text{if } V_a > V_R \\ \quad \text{"OK"} \\ \text{else} \\ \quad \text{"NG"} \end{array} \right| = \text{"OK"}$$

.:Use Unistrut channel nut

Try (1) 1/2" dia. Hilti KB-TZ to concrete deck

$$V_{U1} := \frac{F_p \cdot \Omega_o}{2} = 60 \ \textit{lbf}$$

$$V_{U2} := \frac{1.6 \cdot V_{Trans}}{2} = 168 \ \textit{lbf}$$

$$V_U := \max\left(V_{U1}, V_{U2}\right) = 168 \ \textit{lbf}$$

$$T_U := V_U \cdot \tan\left(\frac{60 \cdot \pi}{180}\right) = 291 \ \textit{lbf}$$

Per Hilti Profis

$$DCR_{max} := 0.11$$

$$Design := \left\| \begin{array}{l} \text{if } DCR_{max} < 1 \\ \quad \| \text{“OK”} \\ \text{else} \\ \quad \| \text{“NG”} \end{array} \right\| = \text{“OK”}$$

.:Use (1) 1/2" dia. Hilti KB-TZ (2 1/2" embed min)

Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Concrete - Oct 8, 2024	Date:	10/8/2024
Fastening point:			

Specifier's comments:

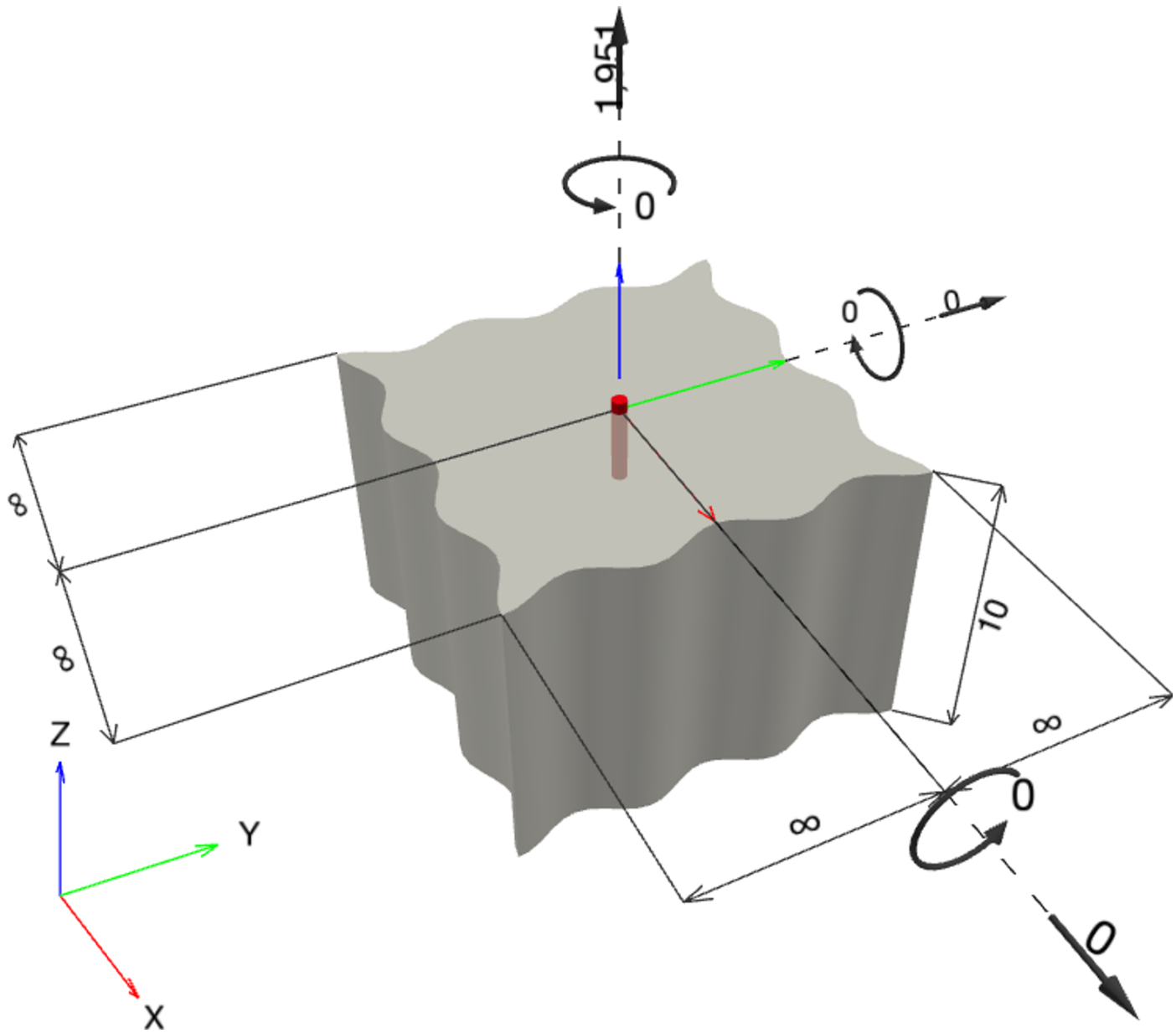
1 Input data

safe set

Anchor type and diameter:	**Kwik Bolt TZ2 - CS 1/2 (2 1/2) hnom3**
Item number:	2210254 KB-TZ2 1/2x3 3/4
Specification text:	Hilti KB-TZ2 stud anchor with 3 in embedment, 1/2 (2 1/2) hnom3, Carbon steel, installation per ESR-4266
Effective embedment depth:	$h_{ef,act}$ = 2.500 in., h_{nom} = 3.000 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-4266
Issued I Valid:	12/1/2023 | 12/1/2025
Proof:	Design Method ACI 318-19 / Mech
Stand-off installation:	
Profile:	
Base material:	cracked concrete, 5000, f_c' = 5,000 psi; h = 10.000 in.
Installation:	**Hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: not present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Concrete - Oct 8, 2024	Date:	10/8/2024
Fastening point:			

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Concrete - Oct 8, 2024	Date:	10/8/2024
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 1,951; V_x = 0; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	yes	69

2 Load case/Resulting anchor forces

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	1,951	0	0	0

3 Tension load

	Load N_{ua} [lb]	Capacity ϕ N_n [lb]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	1,951	8,433	24	OK
Pullout Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	1,951	2,861	69	OK

* highest loaded anchor **anchor group (anchors in tension)

Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Concrete - Oct 8, 2024	Date:	10/8/2024
Fastening point:			

3.1 Steel Strength

N_{sa} = ESR value — refer to ICC-ES ESR-4266

$\phi\ N_{sa} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.10	114,004

Calculations

N_{sa} [lb]
11,244

Results

N_{sa} [lb]	ϕ_{steel}	$\phi_{nonductile}$	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
11,244	0.750	1.000	8,433	1,951

3.2 Concrete Breakout Failure

$N_{cb} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ — ACI 318-19 Eq. (17.6.2.1a)

$\phi\ N_{cb} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ — ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = k_c\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{1.5}$ — ACI 318-19 Eq. (17.6.2.2.1)

Variables

h_{ef} [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
2.500	∞	1.000	6.750	21	1.000	5,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
56.25	56.25	1.000	1.000	5,870

Results

N_{cb} [lb]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{cb}$ [lb]	N_{ua} [lb]
5,870	0.650	0.750	1.000	2,861	1,951

Company:		Page:	5
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Concrete - Oct 8, 2024	Date:	10/8/2024
Fastening point:			

4 Shear load

	Load V_{ua} [lb]	Capacity ϕ V_n [lb]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

5 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- "An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-19, Chapter 17, Section 17.10.5.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.10.5.3 (b), Section 17.10.5.3 (c), or Section 17.10.5.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.10.6.3 (a), Section 17.10.6.3 (b), or Section 17.10.6.3 (c)."
- Section 17.10.5.3 (b) / Section 17.10.6.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.10.5.3 (c) / Section 17.10.6.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.10.5.3 (d) / Section 17.10.6.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- Hilti post-installed anchors shall be installed in accordance with the Hilti Manufacturer's Printed Installation Instructions (MPII). Reference ACI 318-19, Section 26.7.

Fastening meets the design criteria!

Company:		Page:	6
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Concrete - Oct 8, 2024	Date:	10/8/2024
Fastening point:			

6 Installation data

Anchor type and diameter: Kwik Bolt TZ2 - CS 1/2 (2 1/2) hnom3

Profile: -

Item number: 2210254 KB-TZ2 1/2x3 3/4

Hole diameter in the fixture: -

Maximum installation torque: 602 in.lb

Plate thickness (input): -

Hole diameter in the base material: 0.500 in.

Hole depth in the base material: 3.250 in.

Drilling method: Hammer drilled

Minimum thickness of the base material: 5.000 in.

Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Hilti KB-TZ2 stud anchor with 3 in embedment, 1/2 (2 1/2) hnom3, Carbon steel, installation per ESR-4266

6.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Manual blow-out pump	• Torque controlled cordless impact tool • Torque wrench • Hammer

Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.000	0.000	-	-	-	-

7 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Brace Anchorage	Date:	10/8/2024
Fastening point:			

Specifier's comments:

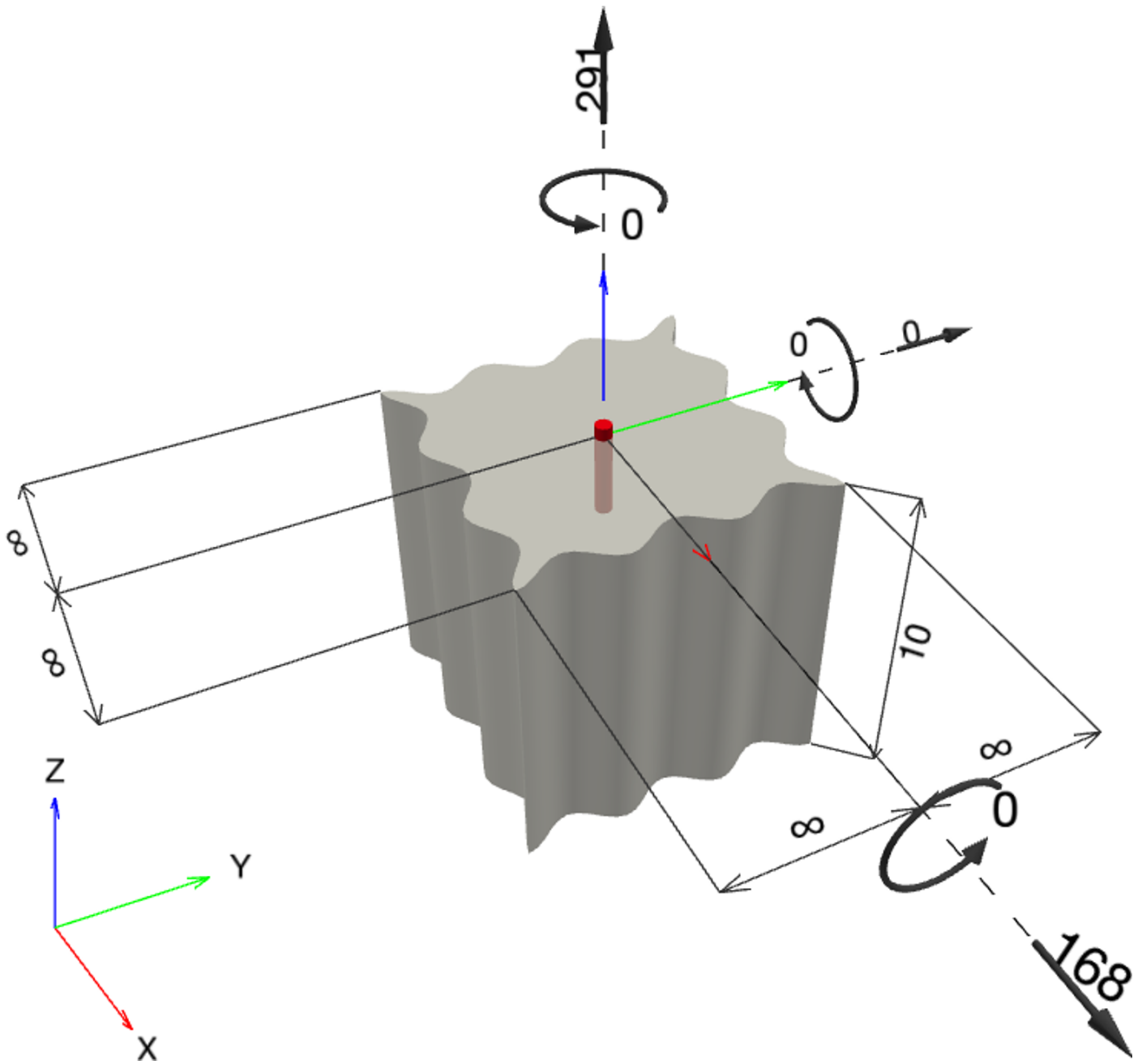
1 Input data

safe set

Anchor type and diameter:	**Kwik Bolt TZ2 - CS 1/2 (2 1/2) hnom3**
Item number:	2210254 KB-TZ2 1/2x3 3/4
Specification text:	Hilti KB-TZ2 stud anchor with 3 in embedment, 1/2 (2 1/2) hnom3, Carbon steel, installation per ESR-4266
Effective embedment depth:	$h_{ef,act}$ = 2.500 in., h_{nom} = 3.000 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-4266
Issued I Valid:	12/1/2023 | 12/1/2025
Proof:	Design Method ACI 318-19 / Mech
Stand-off installation:	
Profile:	
Base material:	cracked concrete, 5000, f_c' = 5,000 psi; h = 10.000 in.
Installation:	**Hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: not present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Brace Anchorage	Date:	10/8/2024
Fastening point:			

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Brace Anchorage	Date:	10/8/2024
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 291; V_x = 168; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	yes	11

2 Load case/Resulting anchor forces

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	291	168	168	0

3 Tension load

	Load N_{ua} [lb]	Capacity ϕ N_n [lb]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	291	8,433	4	OK
Pullout Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	291	2,861	11	OK

* highest loaded anchor **anchor group (anchors in tension)

Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Brace Anchorage	Date:	10/8/2024
Fastening point:			

3.1 Steel Strength

N_{sa} = ESR value — refer to ICC-ES ESR-4266
$\phi\ N_{sa} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.10	114,004

Calculations

N_{sa} [lb]
11,244

Results

N_{sa} [lb]	ϕ_{steel}	$\phi_{nonductile}$	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
11,244	0.750	1.000	8,433	291

3.2 Concrete Breakout Failure

$N_{cb} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ — ACI 318-19 Eq. (17.6.2.1a)
$\phi\ N_{cb} \geq N_{ua}$ — ACI 318-19 Table 17.5.2
A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)
$A_{Nc0} = 9\ h_{ef}^2$ — ACI 318-19 Eq. (17.6.2.1.4)
$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.4.1b)
$\psi_{cp,N} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.6.1b)
$N_b = k_c\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{1.5}$ — ACI 318-19 Eq. (17.6.2.2.1)

Variables

h_{ef} [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
2.500	∞	1.000	6.750	21	1.000	5,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
56.25	56.25	1.000	1.000	5,870

Results

N_{cb} [lb]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{cb}$ [lb]	N_{ua} [lb]
5,870	0.650	0.750	1.000	2,861	291

Company:		Page:	5
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Brace Anchorage	Date:	10/8/2024
Fastening point:			

4 Shear load

	Load V_{ua} [lb]	Capacity ϕ V_n [lb]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	168	4,471	4	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	168	8,218	3	OK
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

$V_{sa,eq}$ = ESR value refer to ICC-ES ESR-4266
ϕ $V_{steel} \geq V_{ua}$ ACI 318-19 Table 17.5.2

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]	$\alpha_{V,seis}$
0.10	114,004	1.000

Calculations

$V_{sa,eq}$ [lb]
6,878

Results

$V_{sa,eq}$ [lb]	ϕ steel	$\phi_{nonductile}$	ϕ $V_{sa,eq}$ [lb]	V_{ua} [lb]
6,878	0.650	1.000	4,471	168

4.2 Pryout Strength

$V_{cp} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \right]$ ACI 318-19 Eq. (17.7.3.1a)

$\phi V_{cp} \geq V_{ua}$ ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9 h_{ef}^2$ ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ ACI 318-19 Eq. (17.6.2.2.1)

Variables

k_{cp}	h_{ef} [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
2	2.500	∞	1.000

c_{ac} [in.]	k_c	λ_a	f'_c [psi]
6.750	21	1.000	5,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
56.25	56.25	1.000	1.000	5,870

Results

V_{cp} [lb]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	ϕV_{cp} [lb]	V_{ua} [lb]
11,739	0.700	1.000	1.000	8,218	168

5 Combined tension and shear loads, per ACI 318-19 section 17.8

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.102	0.038	5/3	3	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

Company:		Page:	7
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Brace Anchorage	Date:	10/8/2024
Fastening point:			

6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- "An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-19, Chapter 17, Section 17.10.5.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.10.5.3 (b), Section 17.10.5.3 (c), or Section 17.10.5.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.10.6.3 (a), Section 17.10.6.3 (b), or Section 17.10.6.3 (c)."
- Section 17.10.5.3 (b) / Section 17.10.6.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.10.5.3 (c) / Section 17.10.6.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.10.5.3 (d) / Section 17.10.6.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- Hilti post-installed anchors shall be installed in accordance with the Hilti Manufacturer's Printed Installation Instructions (MPII). Reference ACI 318-19, Section 26.7.

Fastening meets the design criteria!

Company:		Page:	8
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Brace Anchorage	Date:	10/8/2024
Fastening point:			

7 Installation data

Anchor type and diameter: Kwik Bolt TZ2 - CS 1/2 (2 1/2) hnom3

Profile: -

Item number: 2210254 KB-TZ2 1/2x3 3/4

Hole diameter in the fixture: -

Maximum installation torque: 602 in.lb

Plate thickness (input): -

Hole diameter in the base material: 0.500 in.

Hole depth in the base material: 3.250 in.

Drilling method: Hammer drilled

Minimum thickness of the base material: 5.000 in.

Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Hilti KB-TZ2 stud anchor with 3 in embedment, 1/2 (2 1/2) hnom3, Carbon steel, installation per ESR-4266

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Manual blow-out pump	• Torque controlled cordless impact tool • Torque wrench • Hammer

Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.000	0.000	-	-	-	-

8 Remarks; Your Cooperation Duties

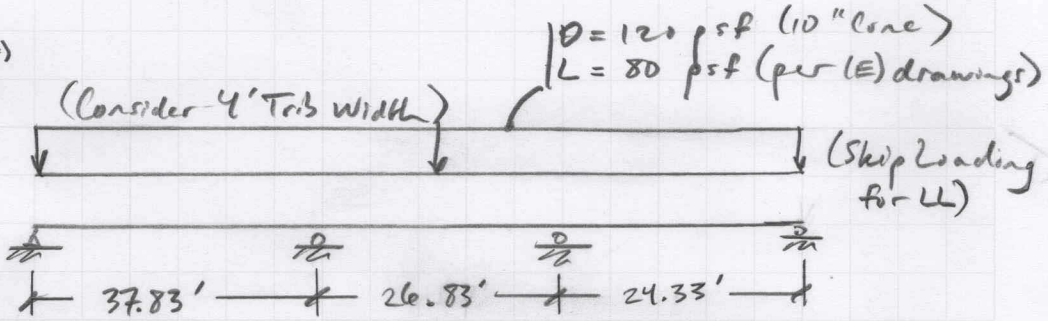
- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

Existing Floor - Ceiling Lift Support

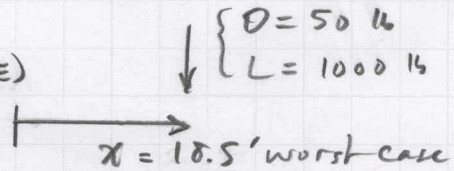
- Check unit strips in N/S + E/W directions
  - Compare (E) loading versus (N) loading

E/W Strip

- (E) Loading =>

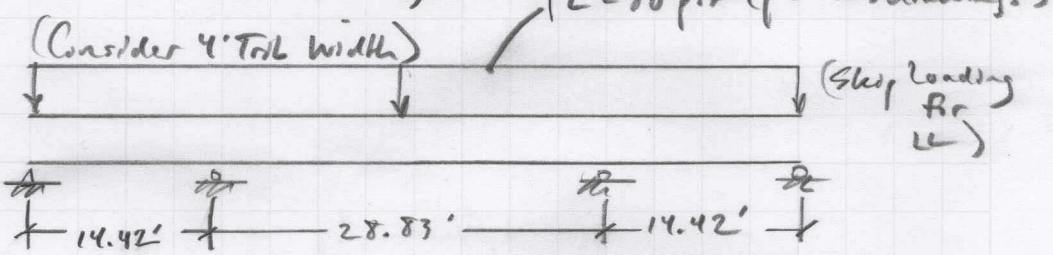


- (N) Loading => In addition to (E)

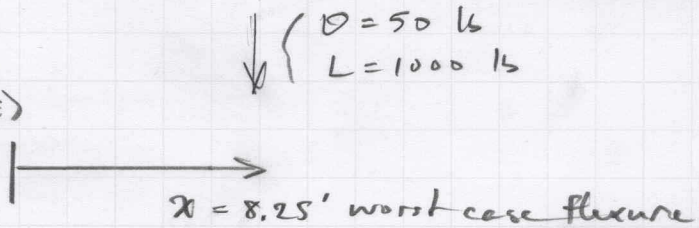


N/S Strip

- (E) Loading =>



- (N) Loading => In addition to (E)



* See Enercalc for Analysis

Per Enercalc.

E/W: % Increase M = $\frac{154.9\ k\text{-}ft}{147.67\ k\text{-}ft} - 1 = 4.9\% < 5.0\%$ OK

N/S: % Increase M = $\frac{67\ k\text{-}ft}{65.25\ k\text{-}ft} - 1 = 2.7\% < 5.0\%$ OK

- Check Max Shear @ (E)+(N) Loading

$V_u = 25.5\ k$ ($f_c' = 5000$ psi per (E) drawings)

$V_c = 2\sqrt{f_c'}\ b_w d$

$= 2\sqrt{5000\ psi} \cdot 48" \cdot (10" - 2"\ clr)$

$= 54.3\ k$

$\phi V_n = 0.6 \cdot 54.3\ k = 32.6\ k > V_u$ OK

∴ Slab OK for New Loading, M + V

Structural Solutions

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

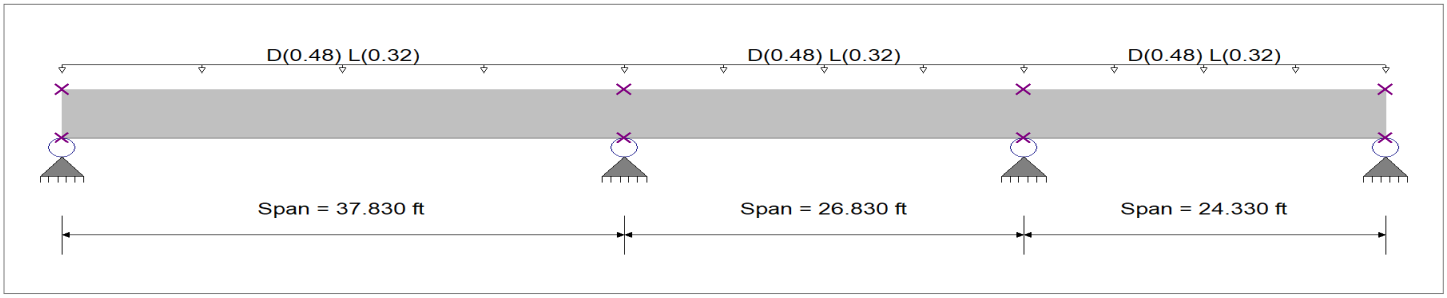
Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: E/W Strip - Existing Loading

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	37.830 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	26.830 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #3	Span Length =	24.330 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

Load for Span Number 2
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

Load for Span Number 3
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

DESIGN SUMMARY

Maximum Bending =	147.670 k-ft	Maximum Shear =	24.483 k
Load Combination	+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)	Load Combination	+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	37.830 ft	Location of maximum on span	37.830 ft
Maximum Deflection			
Max Downward Transient Deflection	3.422 in	132	
Max Upward Transient Deflection	-1.003 in	320	
Max Downward Total Deflection	7.821 in	58	
Max Upward Total Deflection	-1.485 in	216	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 37.83 ft	1			135.56	-147.67	147.67					24.48		
Dsgn. L = 26.83 ft	2			29.72	-147.67	147.67					18.87		
Dsgn. L = 24.33 ft	3			65.43	-66.80	66.80					15.98		
+1.40D+1.60H													
Dsgn. L = 37.83 ft	1			79.92	-88.77	88.77					15.06		
Dsgn. L = 26.83 ft	2			3.36	-88.77	88.77					11.13		
Dsgn. L = 24.33 ft	3			34.98	-32.08	34.98					9.49		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			70.12	-72.13	72.13					12.80		
Dsgn. L = 26.83 ft	2			-0.00	-72.13	72.13					15.15		
Dsgn. L = 24.33 ft	3			58.91	-46.55	58.91					15.15		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			62.56	-91.00	91.00					16.21		
Dsgn. L = 26.83 ft	2			29.72	-91.00	91.00					16.21		
Dsgn. L = 24.33 ft	3			22.08	-47.75	47.75					8.97		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			64.11	-87.05	87.05					15.35		
Dsgn. L = 26.83 ft	2			21.22	-87.05	87.05					15.98		
Dsgn. L = 24.33 ft	3			50.56	-66.80	66.80					15.98		
+1.20D+0.50Lr+1.60L+1.60H, LL C													

General Beam Analysis

DESCRIPTION: E/W Strip - Existing Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 37.83 ft	1			133.91	-132.75	133.91					24.09		
Dsgn. L = 26.83 ft	2			-0.00	-132.75	132.75					12.20		
Dsgn. L = 24.33 ft	3			36.53	-12.64	36.53					7.53		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			135.56	-128.80	135.56					23.98		
Dsgn. L = 26.83 ft	2			-0.00	-128.80	128.80					14.54		
Dsgn. L = 24.33 ft	3			65.43	-31.69	65.43					14.54		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			127.80	-147.67	147.67					24.48		
Dsgn. L = 26.83 ft	2			16.03	-147.67	147.67					18.87		
Dsgn. L = 24.33 ft	3			27.76	-32.89	32.89					8.36		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			129.40	-143.72	143.72					24.38		
Dsgn. L = 26.83 ft	2			5.44	-143.72	143.72					18.02		
Dsgn. L = 24.33 ft	3			56.63	-51.94	56.63					15.37		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			70.12	-72.13	72.13					12.80		
Dsgn. L = 26.83 ft	2			-0.00	-72.13	72.13					15.15		
Dsgn. L = 24.33 ft	3			58.91	-46.55	58.91					15.15		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			62.56	-91.00	91.00					16.21		
Dsgn. L = 26.83 ft	2			29.72	-91.00	91.00					16.21		
Dsgn. L = 24.33 ft	3			22.08	-47.75	47.75					8.97		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			64.11	-87.05	87.05					15.35		
Dsgn. L = 26.83 ft	2			21.22	-87.05	87.05					15.98		
Dsgn. L = 24.33 ft	3			50.56	-66.80	66.80					15.98		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			133.91	-132.75	133.91					24.09		
Dsgn. L = 26.83 ft	2			-0.00	-132.75	132.75					12.20		
Dsgn. L = 24.33 ft	3			36.53	-12.64	36.53					7.53		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			135.56	-128.80	135.56					23.98		
Dsgn. L = 26.83 ft	2			-0.00	-128.80	128.80					14.54		
Dsgn. L = 24.33 ft	3			65.43	-31.69	65.43					14.54		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			127.80	-147.67	147.67					24.48		
Dsgn. L = 26.83 ft	2			16.03	-147.67	147.67					18.87		
Dsgn. L = 24.33 ft	3			27.76	-32.89	32.89					8.36		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			129.40	-143.72	143.72					24.38		
Dsgn. L = 26.83 ft	2			5.44	-143.72	143.72					18.02		
Dsgn. L = 24.33 ft	3			56.63	-51.94	56.63					15.37		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			69.51	-73.61	73.61					12.84		
Dsgn. L = 26.83 ft	2			-0.00	-73.61	73.61					12.52		
Dsgn. L = 24.33 ft	3			48.05	-39.41	48.05					12.52		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			64.75	-85.41	85.41					13.71		
Dsgn. L = 26.83 ft	2			19.43	-85.41	85.41					13.71		
Dsgn. L = 24.33 ft	3			24.91	-40.16	40.16					8.66		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			65.73	-82.94	82.94					13.17		
Dsgn. L = 26.83 ft	2			13.86	-82.94	82.94					13.17		
Dsgn. L = 24.33 ft	3			42.82	-52.06	52.06					13.04		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			109.37	-111.50	111.50					19.90		
Dsgn. L = 26.83 ft	2			-0.00	-111.50	111.50					11.20		
Dsgn. L = 24.33 ft	3			34.00	-18.21	34.00					7.76		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			110.40	-109.03	110.40					19.83		
Dsgn. L = 26.83 ft	2			-0.00	-109.03	109.03					12.14		
Dsgn. L = 24.33 ft	3			52.09	-30.12	52.09					12.14		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			105.56	-120.83	120.83					20.14		
Dsgn. L = 26.83 ft	2			11.04	-120.83	120.83					15.37		
Dsgn. L = 24.33 ft	3			28.58	-30.87	30.87					8.28		
+1.20D+1.60Lr+L+1.60H, LL Comb													

General Beam Analysis

DESCRIPTION: E/W Strip - Existing Loading

Load Combination		Max Stress Ratios		Summary of Moment Values (k-ft)							Shear Values (k)		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 37.83 ft	1			106.56	-118.35	118.35					20.08		
Dsgn. L = 26.83 ft	2			4.48	-118.35	118.35					14.84		
Dsgn. L = 24.33 ft	3			46.63	-42.78	46.63					12.66		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.51	-76.09	76.09					12.91		
Dsgn. L = 26.83 ft	2			2.88	-76.09	76.09					9.54		
Dsgn. L = 24.33 ft	3			29.98	-27.50	29.98					8.14		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.51	-76.09	76.09					12.91		
Dsgn. L = 26.83 ft	2			2.88	-76.09	76.09					9.54		
Dsgn. L = 24.33 ft	3			29.98	-27.50	29.98					8.14		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.51	-76.09	76.09					12.91		
Dsgn. L = 26.83 ft	2			2.88	-76.09	76.09					9.54		
Dsgn. L = 24.33 ft	3			29.98	-27.50	29.98					8.14		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.51	-76.09	76.09					12.91		
Dsgn. L = 26.83 ft	2			2.88	-76.09	76.09					9.54		
Dsgn. L = 24.33 ft	3			29.98	-27.50	29.98					8.14		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.51	-76.09	76.09					12.91		
Dsgn. L = 26.83 ft	2			2.88	-76.09	76.09					9.54		
Dsgn. L = 24.33 ft	3			29.98	-27.50	29.98					8.14		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.51	-76.09	76.09					12.91		
Dsgn. L = 26.83 ft	2			2.88	-76.09	76.09					9.54		
Dsgn. L = 24.33 ft	3			29.98	-27.50	29.98					8.14		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.51	-76.09	76.09					12.91		
Dsgn. L = 26.83 ft	2			2.88	-76.09	76.09					9.54		
Dsgn. L = 24.33 ft	3			29.98	-27.50	29.98					8.14		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			69.51	-73.61	73.61					12.84		
Dsgn. L = 26.83 ft	2			-0.00	-73.61	73.61					12.52		
Dsgn. L = 24.33 ft	3			48.05	-39.41	48.05					12.52		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			64.75	-85.41	85.41					13.71		
Dsgn. L = 26.83 ft	2			19.43	-85.41	85.41					13.71		
Dsgn. L = 24.33 ft	3			24.91	-40.16	40.16					8.66		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			65.73	-82.94	82.94					13.17		
Dsgn. L = 26.83 ft	2			13.86	-82.94	82.94					13.17		
Dsgn. L = 24.33 ft	3			42.82	-52.06	52.06					13.04		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			109.37	-111.50	111.50					19.90		
Dsgn. L = 26.83 ft	2			-0.00	-111.50	111.50					11.20		
Dsgn. L = 24.33 ft	3			34.00	-18.21	34.00					7.76		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			110.40	-109.03	110.40					19.83		
Dsgn. L = 26.83 ft	2			-0.00	-109.03	109.03					12.14		
Dsgn. L = 24.33 ft	3			52.09	-30.12	52.09					12.14		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			105.56	-120.83	120.83					20.14		
Dsgn. L = 26.83 ft	2			11.04	-120.83	120.83					15.37		
Dsgn. L = 24.33 ft	3			28.58	-30.87	30.87					8.28		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			106.56	-118.35	118.35					20.08		
Dsgn. L = 26.83 ft	2			4.48	-118.35	118.35					14.84		
Dsgn. L = 24.33 ft	3			46.63	-42.78	46.63					12.66		
+1.20D+1.60S+0.50W+1.60H													
Dsgn. L = 37.83 ft	1			68.51	-76.09	76.09					12.91		
Dsgn. L = 26.83 ft	2			2.88	-76.09	76.09					9.54		
Dsgn. L = 24.33 ft	3			29.98	-27.50	29.98					8.14		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			69.51	-73.61	73.61					12.84		
Dsgn. L = 26.83 ft	2			-0.00	-73.61	73.61					12.52		
Dsgn. L = 24.33 ft	3			48.05	-39.41	48.05					12.52		
+1.20D+0.50Lr+L+W+1.60H, LL C													

General Beam Analysis

DESCRIPTION: E/W Strip - Existing Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 37.83 ft	1			64.75	-85.41	85.41					13.71		
Dsgn. L = 26.83 ft	2			19.43	-85.41	85.41					13.71		
Dsgn. L = 24.33 ft	3			24.91	-40.16	40.16					8.66		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			65.73	-82.94	82.94					13.17		
Dsgn. L = 26.83 ft	2			13.86	-82.94	82.94					13.17		
Dsgn. L = 24.33 ft	3			42.82	-52.06	52.06					13.04		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			109.37	-111.50	111.50					19.90		
Dsgn. L = 26.83 ft	2			-0.00	-111.50	111.50					11.20		
Dsgn. L = 24.33 ft	3			34.00	-18.21	34.00					7.76		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			110.40	-109.03	110.40					19.83		
Dsgn. L = 26.83 ft	2			-0.00	-109.03	109.03					12.14		
Dsgn. L = 24.33 ft	3			52.09	-30.12	52.09					12.14		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			105.56	-120.83	120.83					20.14		
Dsgn. L = 26.83 ft	2			11.04	-120.83	120.83					15.37		
Dsgn. L = 24.33 ft	3			28.58	-30.87	30.87					8.28		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			106.56	-118.35	118.35					20.08		
Dsgn. L = 26.83 ft	2			4.48	-118.35	118.35					14.84		
Dsgn. L = 24.33 ft	3			46.63	-42.78	46.63					12.66		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 37.83 ft	1			69.51	-73.61	73.61					12.84		
Dsgn. L = 26.83 ft	2			-0.00	-73.61	73.61					12.52		
Dsgn. L = 24.33 ft	3			48.05	-39.41	48.05					12.52		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 37.83 ft	1			64.75	-85.41	85.41					13.71		
Dsgn. L = 26.83 ft	2			19.43	-85.41	85.41					13.71		
Dsgn. L = 24.33 ft	3			24.91	-40.16	40.16					8.66		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 37.83 ft	1			65.73	-82.94	82.94					13.17		
Dsgn. L = 26.83 ft	2			13.86	-82.94	82.94					13.17		
Dsgn. L = 24.33 ft	3			42.82	-52.06	52.06					13.04		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 37.83 ft	1			109.37	-111.50	111.50					19.90		
Dsgn. L = 26.83 ft	2			-0.00	-111.50	111.50					11.20		
Dsgn. L = 24.33 ft	3			34.00	-18.21	34.00					7.76		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 37.83 ft	1			110.40	-109.03	110.40					19.83		
Dsgn. L = 26.83 ft	2			-0.00	-109.03	109.03					12.14		
Dsgn. L = 24.33 ft	3			52.09	-30.12	52.09					12.14		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 37.83 ft	1			105.56	-120.83	120.83					20.14		
Dsgn. L = 26.83 ft	2			11.04	-120.83	120.83					15.37		
Dsgn. L = 24.33 ft	3			28.58	-30.87	30.87					8.28		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 37.83 ft	1			106.56	-118.35	118.35					20.08		
Dsgn. L = 26.83 ft	2			4.48	-118.35	118.35					14.84		
Dsgn. L = 24.33 ft	3			46.63	-42.78	46.63					12.66		
+0.90D+W+1.60H													
Dsgn. L = 37.83 ft	1			51.38	-57.06	57.06					9.68		
Dsgn. L = 26.83 ft	2			2.16	-57.06	57.06					7.15		
Dsgn. L = 24.33 ft	3			22.48	-20.62	22.48					6.10		
+1.20D+L+0.20S+E+1.60H, LL Col													
Dsgn. L = 37.83 ft	1			69.51	-73.61	73.61					12.84		
Dsgn. L = 26.83 ft	2			-0.00	-73.61	73.61					12.52		
Dsgn. L = 24.33 ft	3			48.05	-39.41	48.05					12.52		
+1.20D+L+0.20S+E+1.60H, LL Col													
Dsgn. L = 37.83 ft	1			64.75	-85.41	85.41					13.71		
Dsgn. L = 26.83 ft	2			19.43	-85.41	85.41					13.71		
Dsgn. L = 24.33 ft	3			24.91	-40.16	40.16					8.66		
+1.20D+L+0.20S+E+1.60H, LL Col													
Dsgn. L = 37.83 ft	1			65.73	-82.94	82.94					13.17		
Dsgn. L = 26.83 ft	2			13.86	-82.94	82.94					13.17		
Dsgn. L = 24.33 ft	3			42.82	-52.06	52.06					13.04		
+1.20D+L+0.20S+E+1.60H, LL Col													

Structural Solutions

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: E/W Strip - Existing Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 37.83 ft	1			109.37	-111.50	111.50					19.90		
Dsgn. L = 26.83 ft	2			-0.00	-111.50	111.50					11.20		
Dsgn. L = 24.33 ft	3			34.00	-18.21	34.00					7.76		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			110.40	-109.03	110.40					19.83		
Dsgn. L = 26.83 ft	2			-0.00	-109.03	109.03					12.14		
Dsgn. L = 24.33 ft	3			52.09	-30.12	52.09					12.14		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			105.56	-120.83	120.83					20.14		
Dsgn. L = 26.83 ft	2			11.04	-120.83	120.83					15.37		
Dsgn. L = 24.33 ft	3			28.58	-30.87	30.87					8.28		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			106.56	-118.35	118.35					20.08		
Dsgn. L = 26.83 ft	2			4.48	-118.35	118.35					14.84		
Dsgn. L = 24.33 ft	3			46.63	-42.78	46.63					12.66		
+1.20D+L+0.20S+E+1.60H, MAX E													
Dsgn. L = 37.83 ft	1			135.56	-147.67	147.67					24.48		
Dsgn. L = 26.83 ft	2			29.72	-147.67	147.67					18.87		
Dsgn. L = 24.33 ft	3			65.43	-66.80	66.80					15.98		
+0.90D+E+0.90H													
Dsgn. L = 37.83 ft	1			51.38	-57.06	57.06					9.68		
Dsgn. L = 26.83 ft	2			2.16	-57.06	57.06					7.15		
Dsgn. L = 24.33 ft	3			22.48	-20.62	22.48					6.10		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	7.8207	17.718		0.0000	0.000
	2	0.0000	17.718	+D+L+H	-1.4853	10.189
+D+L+H	3	1.6415	12.935		0.0000	10.189

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	12.585	31.774	21.567	8.682
Overall MINimum	-0.181	-0.601	-2.048	-0.138
+D+H	7.403	18.704	11.711	4.897
+D+L+H, LL Comb Run (**L)	7.468	18.102	16.629	8.301
+D+L+H, LL Comb Run (*L*)	7.157	23.118	16.648	4.377
+D+L+H, LL Comb Run (*LL)	7.222	22.517	21.567	7.780
+D+L+H, LL Comb Run (L**)	12.520	27.359	9.663	5.279
+D+L+H, LL Comb Run (L*L)	12.585	26.758	14.581	8.682
+D+L+H, LL Comb Run (LL*)	12.273	31.774	14.600	4.759
+D+L+H, LL Comb Run (LLL)	12.339	31.173	19.519	8.162
+D+Lr+H, LL Comb Run (**L)	7.403	18.704	11.711	4.897
+D+Lr+H, LL Comb Run (*L*)	7.403	18.704	11.711	4.897
+D+Lr+H, LL Comb Run (*LL)	7.403	18.704	11.711	4.897
+D+Lr+H, LL Comb Run (L**)	7.403	18.704	11.711	4.897
+D+Lr+H, LL Comb Run (L*L)	7.403	18.704	11.711	4.897
+D+Lr+H, LL Comb Run (LL*)	7.403	18.704	11.711	4.897
+D+Lr+H, LL Comb Run (LLL)	7.403	18.704	11.711	4.897
+D+S+H	7.403	18.704	11.711	4.897
+D+0.750Lr+0.750L+H, LL Comb	7.452	18.253	15.400	7.450
+D+0.750Lr+0.750L+H, LL Comb	7.218	22.015	15.414	4.507
+D+0.750Lr+0.750L+H, LL Comb	7.267	21.564	19.103	7.060
+D+0.750Lr+0.750L+H, LL Comb	12.241	25.195	10.175	5.184
+D+0.750Lr+0.750L+H, LL Comb	12.290	24.744	13.864	7.736
+D+0.750Lr+0.750L+H, LL Comb	12.056	28.506	13.878	4.793
+D+0.750Lr+0.750L+H, LL Comb	12.105	28.055	17.567	7.346
+D+0.750L+0.750S+H, LL Comb	7.452	18.253	15.400	7.450
+D+0.750L+0.750S+H, LL Comb	7.218	22.015	15.414	4.507
+D+0.750L+0.750S+H, LL Comb	7.267	21.564	19.103	7.060
+D+0.750L+0.750S+H, LL Comb	12.241	25.195	10.175	5.184
+D+0.750L+0.750S+H, LL Comb	12.290	24.744	13.864	7.736
+D+0.750L+0.750S+H, LL Comb	12.056	28.506	13.878	4.793
+D+0.750L+0.750S+H, LL Comb	12.105	28.055	17.567	7.346
+D+0.60W+H	7.403	18.704	11.711	4.897

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: E/W Strip - Existing Loading

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+0.750Lr+0.750L+0.450W+H, L	7.452	18.253	15.400	7.450
+D+0.750Lr+0.750L+0.450W+H, L	7.218	22.015	15.414	4.507
+D+0.750Lr+0.750L+0.450W+H, L	7.267	21.564	19.103	7.060
+D+0.750Lr+0.750L+0.450W+H, L	11.241	25.195	10.175	5.184
+D+0.750Lr+0.750L+0.450W+H, L	11.290	24.744	13.864	7.736
+D+0.750Lr+0.750L+0.450W+H, L	11.056	28.506	13.878	4.793
+D+0.750Lr+0.750L+0.450W+H, L	11.105	28.055	17.567	7.346
+D+0.750L+0.750S+0.450W+H, L	7.452	18.253	15.400	7.450
+D+0.750L+0.750S+0.450W+H, L	7.218	22.015	15.414	4.507
+D+0.750L+0.750S+0.450W+H, L	7.267	21.564	19.103	7.060
+D+0.750L+0.750S+0.450W+H, L	11.241	25.195	10.175	5.184
+D+0.750L+0.750S+0.450W+H, L	11.290	24.744	13.864	7.736
+D+0.750L+0.750S+0.450W+H, L	11.056	28.506	13.878	4.793
+D+0.750L+0.750S+0.450W+H, L	11.105	28.055	17.567	7.346
+0.60D+0.60W+0.60H	4.442	11.222	7.027	2.938
+D+0.70E+0.60H	7.403	18.704	11.711	4.897
+D+0.750L+0.750S+0.5250E+H, L	7.452	18.253	15.400	7.450
+D+0.750L+0.750S+0.5250E+H, L	7.218	22.015	15.414	4.507
+D+0.750L+0.750S+0.5250E+H, L	7.267	21.564	19.103	7.060
+D+0.750L+0.750S+0.5250E+H, L	11.241	25.195	10.175	5.184
+D+0.750L+0.750S+0.5250E+H, L	11.290	24.744	13.864	7.736
+D+0.750L+0.750S+0.5250E+H, L	11.056	28.506	13.878	4.793
+D+0.750L+0.750S+0.5250E+H, L	11.105	28.055	17.567	7.346
+0.60D+0.70E+H	4.442	11.222	7.027	2.938
D Only	7.403	18.704	11.711	4.897
Lr Only, LL Comb Run (**L)				
Lr Only, LL Comb Run (*L*)				
Lr Only, LL Comb Run (*LL)				
Lr Only, LL Comb Run (L**)				
Lr Only, LL Comb Run (L*L)				
Lr Only, LL Comb Run (LL*)				
Lr Only, LL Comb Run (LLL)				
L Only, LL Comb Run (**L)	0.065	-0.601	4.918	3.403
L Only, LL Comb Run (*L*)	-0.246	4.415	4.937	-0.520
L Only, LL Comb Run (*LL)	-0.181	3.814	9.855	2.883
L Only, LL Comb Run (L**)	5.117	8.655	-2.048	0.382
L Only, LL Comb Run (L*L)	5.182	8.054	2.870	3.785
L Only, LL Comb Run (LL*)	4.870	13.070	2.889	-0.138
L Only, LL Comb Run (LLL)	4.935	12.469	7.807	3.265
S Only				
W Only				
E Only				
H Only				

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

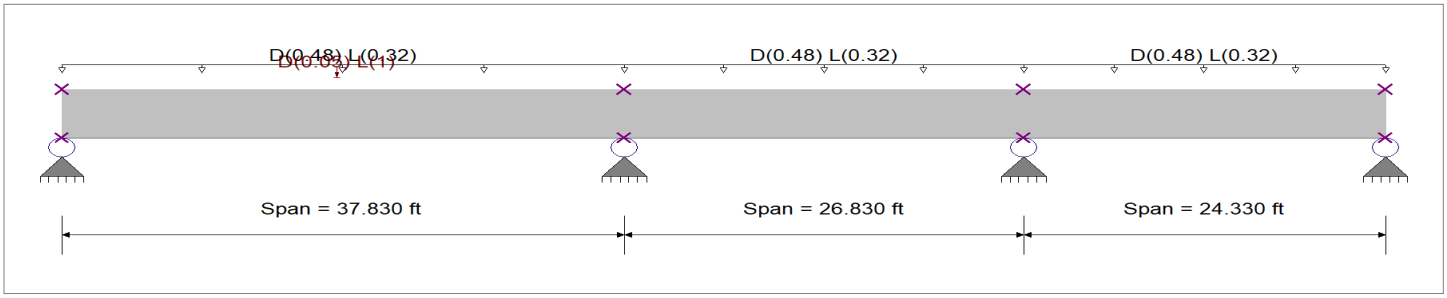
Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: E/W Strip - Existing Loading + New Loading

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	37.830 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	26.830 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #3	Span Length =	24.330 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

Point Load : D = 0.050, L = 1.0 k @ 18.50 ft

Load for Span Number 2
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

Load for Span Number 3
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

DESIGN SUMMARY

Maximum Bending =	154.898 k-ft	Maximum Shear =	25.486 k
Load Combination	+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)	Load Combination	+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	37.830 ft	Location of maximum on span	37.830 ft

Maximum Deflection

Max Downward Transient Deflection	3.873 in	117	
Max Upward Transient Deflection	-1.098 in	293	
Max Downward Total Deflection	8.294 in	54	
Max Upward Total Deflection	-1.586 in	203	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 37.83 ft	1			146.12	-154.90	154.90					25.49		
Dsgn. L = 26.83 ft	2			29.64	-154.90	154.90					19.21		
Dsgn. L = 24.33 ft	3			66.29	-66.73	66.73					15.98		
+1.40D+1.60H													
Dsgn. L = 37.83 ft	1			80.35	-89.07	89.07					15.10		
Dsgn. L = 26.83 ft	2			3.30	-89.07	89.07					11.14		
Dsgn. L = 24.33 ft	3			35.01	-32.00	35.01					9.49		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			70.49	-72.39	72.39					12.84		
Dsgn. L = 26.83 ft	2			-0.00	-72.39	72.39					15.15		
Dsgn. L = 24.33 ft	3			58.94	-46.48	58.94					15.15		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			62.91	-91.26	91.26					16.22		
Dsgn. L = 26.83 ft	2			29.64	-91.26	91.26					16.22		
Dsgn. L = 24.33 ft	3			22.11	-47.68	47.68					8.97		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			64.46	-87.31	87.31					15.36		
Dsgn. L = 26.83 ft	2			21.14	-87.31	87.31					15.98		

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: E/W Strip - Existing Loading + New Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 24.33 ft	3			50.59	-66.73	66.73					15.98		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			144.42	-139.98	144.42					25.09		
Dsgn. L = 26.83 ft	2			-0.00	-139.98	139.98					12.54		
Dsgn. L = 24.33 ft	3			37.42	-10.74	37.42					7.45		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			146.12	-136.03	146.12					24.99		
Dsgn. L = 26.83 ft	2			-0.00	-136.03	136.03					14.46		
Dsgn. L = 24.33 ft	3			66.29	-29.80	66.29					14.46		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			138.06	-154.90	154.90					25.49		
Dsgn. L = 26.83 ft	2			14.75	-154.90	154.90					19.21		
Dsgn. L = 24.33 ft	3			28.53	-30.99	30.99					8.28		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 37.83 ft	1			139.71	-150.95	150.95					25.38		
Dsgn. L = 26.83 ft	2			3.90	-150.95	150.95					18.36		
Dsgn. L = 24.33 ft	3			57.42	-50.05	57.42					15.29		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			70.49	-72.39	72.39					12.84		
Dsgn. L = 26.83 ft	2			-0.00	-72.39	72.39					15.15		
Dsgn. L = 24.33 ft	3			58.94	-46.48	58.94					15.15		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			62.91	-91.26	91.26					16.22		
Dsgn. L = 26.83 ft	2			29.64	-91.26	91.26					16.22		
Dsgn. L = 24.33 ft	3			22.11	-47.68	47.68					8.97		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			64.46	-87.31	87.31					15.36		
Dsgn. L = 26.83 ft	2			21.14	-87.31	87.31					15.98		
Dsgn. L = 24.33 ft	3			50.59	-66.73	66.73					15.98		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			144.42	-139.98	144.42					25.09		
Dsgn. L = 26.83 ft	2			-0.00	-139.98	139.98					12.54		
Dsgn. L = 24.33 ft	3			37.42	-10.74	37.42					7.45		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			146.12	-136.03	146.12					24.99		
Dsgn. L = 26.83 ft	2			-0.00	-136.03	136.03					14.46		
Dsgn. L = 24.33 ft	3			66.29	-29.80	66.29					14.46		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			138.06	-154.90	154.90					25.49		
Dsgn. L = 26.83 ft	2			14.75	-154.90	154.90					19.21		
Dsgn. L = 24.33 ft	3			28.53	-30.99	30.99					8.28		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 37.83 ft	1			139.71	-150.95	150.95					25.38		
Dsgn. L = 26.83 ft	2			3.90	-150.95	150.95					18.36		
Dsgn. L = 24.33 ft	3			57.42	-50.05	57.42					15.29		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			69.87	-73.88	73.88					12.88		
Dsgn. L = 26.83 ft	2			-0.00	-73.88	73.88					12.52		
Dsgn. L = 24.33 ft	3			48.08	-39.34	48.08					12.52		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			65.11	-85.67	85.67					13.72		
Dsgn. L = 26.83 ft	2			19.36	-85.67	85.67					13.72		
Dsgn. L = 24.33 ft	3			24.93	-40.09	40.09					8.65		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			66.09	-83.20	83.20					13.18		
Dsgn. L = 26.83 ft	2			13.78	-83.20	83.20					13.18		
Dsgn. L = 24.33 ft	3			42.85	-51.99	51.99					13.04		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			116.02	-116.12	116.12					20.54		
Dsgn. L = 26.83 ft	2			-0.00	-116.12	116.12					11.42		
Dsgn. L = 24.33 ft	3			34.54	-17.00	34.54					7.71		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			117.08	-113.65	117.08					20.47		
Dsgn. L = 26.83 ft	2			-0.00	-113.65	113.65					12.09		
Dsgn. L = 24.33 ft	3			52.63	-28.91	52.63					12.09		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			112.10	-125.44	125.44					20.78		
Dsgn. L = 26.83 ft	2			10.18	-125.44	125.44					15.59		

PCS Structural Solutions

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2023

DESCRIPTION: E/W Strip - Existing Loading + New Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 24.33 ft	3			29.08	-29.66	29.66					8.23		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			113.14	-122.97	122.97					20.72		
Dsgn. L = 26.83 ft	2			3.48	-122.97	122.97					15.05		
Dsgn. L = 24.33 ft	3			47.14	-41.57	47.14					12.61		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.87	-76.35	76.35					12.94		
Dsgn. L = 26.83 ft	2			2.83	-76.35	76.35					9.55		
Dsgn. L = 24.33 ft	3			30.01	-27.43	30.01					8.13		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.87	-76.35	76.35					12.94		
Dsgn. L = 26.83 ft	2			2.83	-76.35	76.35					9.55		
Dsgn. L = 24.33 ft	3			30.01	-27.43	30.01					8.13		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.87	-76.35	76.35					12.94		
Dsgn. L = 26.83 ft	2			2.83	-76.35	76.35					9.55		
Dsgn. L = 24.33 ft	3			30.01	-27.43	30.01					8.13		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.87	-76.35	76.35					12.94		
Dsgn. L = 26.83 ft	2			2.83	-76.35	76.35					9.55		
Dsgn. L = 24.33 ft	3			30.01	-27.43	30.01					8.13		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.87	-76.35	76.35					12.94		
Dsgn. L = 26.83 ft	2			2.83	-76.35	76.35					9.55		
Dsgn. L = 24.33 ft	3			30.01	-27.43	30.01					8.13		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.87	-76.35	76.35					12.94		
Dsgn. L = 26.83 ft	2			2.83	-76.35	76.35					9.55		
Dsgn. L = 24.33 ft	3			30.01	-27.43	30.01					8.13		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 37.83 ft	1			68.87	-76.35	76.35					12.94		
Dsgn. L = 26.83 ft	2			2.83	-76.35	76.35					9.55		
Dsgn. L = 24.33 ft	3			30.01	-27.43	30.01					8.13		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			69.87	-73.88	73.88					12.88		
Dsgn. L = 26.83 ft	2			-0.00	-73.88	73.88					12.52		
Dsgn. L = 24.33 ft	3			48.08	-39.34	48.08					12.52		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			65.11	-85.67	85.67					13.72		
Dsgn. L = 26.83 ft	2			19.36	-85.67	85.67					13.72		
Dsgn. L = 24.33 ft	3			24.93	-40.09	40.09					8.65		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			66.09	-83.20	83.20					13.18		
Dsgn. L = 26.83 ft	2			13.78	-83.20	83.20					13.18		
Dsgn. L = 24.33 ft	3			42.85	-51.99	51.99					13.04		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			116.02	-116.12	116.12					20.54		
Dsgn. L = 26.83 ft	2			-0.00	-116.12	116.12					11.42		
Dsgn. L = 24.33 ft	3			34.54	-17.00	34.54					7.71		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			117.08	-113.65	117.08					20.47		
Dsgn. L = 26.83 ft	2			-0.00	-113.65	113.65					12.09		
Dsgn. L = 24.33 ft	3			52.63	-28.91	52.63					12.09		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			112.10	-125.44	125.44					20.78		
Dsgn. L = 26.83 ft	2			10.18	-125.44	125.44					15.59		
Dsgn. L = 24.33 ft	3			29.08	-29.66	29.66					8.23		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 37.83 ft	1			113.14	-122.97	122.97					20.72		
Dsgn. L = 26.83 ft	2			3.48	-122.97	122.97					15.05		
Dsgn. L = 24.33 ft	3			47.14	-41.57	47.14					12.61		
+1.20D+1.60S+0.50W+1.60H													
Dsgn. L = 37.83 ft	1			68.87	-76.35	76.35					12.94		
Dsgn. L = 26.83 ft	2			2.83	-76.35	76.35					9.55		
Dsgn. L = 24.33 ft	3			30.01	-27.43	30.01					8.13		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			69.87	-73.88	73.88					12.88		
Dsgn. L = 26.83 ft	2			-0.00	-73.88	73.88					12.52		

General Beam Analysis

DESCRIPTION: E/W Strip - Existing Loading + New Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 24.33 ft	3			48.08	-39.34	48.08					12.52		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			65.11	-85.67	85.67					13.72		
Dsgn. L = 26.83 ft	2			19.36	-85.67	85.67					13.72		
Dsgn. L = 24.33 ft	3			24.93	-40.09	40.09					8.65		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			66.09	-83.20	83.20					13.18		
Dsgn. L = 26.83 ft	2			13.78	-83.20	83.20					13.18		
Dsgn. L = 24.33 ft	3			42.85	-51.99	51.99					13.04		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			116.02	-116.12	116.12					20.54		
Dsgn. L = 26.83 ft	2			-0.00	-116.12	116.12					11.42		
Dsgn. L = 24.33 ft	3			34.54	-17.00	34.54					7.71		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			117.08	-113.65	117.08					20.47		
Dsgn. L = 26.83 ft	2			-0.00	-113.65	113.65					12.09		
Dsgn. L = 24.33 ft	3			52.63	-28.91	52.63					12.09		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			112.10	-125.44	125.44					20.78		
Dsgn. L = 26.83 ft	2			10.18	-125.44	125.44					15.59		
Dsgn. L = 24.33 ft	3			29.08	-29.66	29.66					8.23		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 37.83 ft	1			113.14	-122.97	122.97					20.72		
Dsgn. L = 26.83 ft	2			3.48	-122.97	122.97					15.05		
Dsgn. L = 24.33 ft	3			47.14	-41.57	47.14					12.61		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			69.87	-73.88	73.88					12.88		
Dsgn. L = 26.83 ft	2			-0.00	-73.88	73.88					12.52		
Dsgn. L = 24.33 ft	3			48.08	-39.34	48.08					12.52		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			65.11	-85.67	85.67					13.72		
Dsgn. L = 26.83 ft	2			19.36	-85.67	85.67					13.72		
Dsgn. L = 24.33 ft	3			24.93	-40.09	40.09					8.65		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			66.09	-83.20	83.20					13.18		
Dsgn. L = 26.83 ft	2			13.78	-83.20	83.20					13.18		
Dsgn. L = 24.33 ft	3			42.85	-51.99	51.99					13.04		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			116.02	-116.12	116.12					20.54		
Dsgn. L = 26.83 ft	2			-0.00	-116.12	116.12					11.42		
Dsgn. L = 24.33 ft	3			34.54	-17.00	34.54					7.71		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			117.08	-113.65	117.08					20.47		
Dsgn. L = 26.83 ft	2			-0.00	-113.65	113.65					12.09		
Dsgn. L = 24.33 ft	3			52.63	-28.91	52.63					12.09		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			112.10	-125.44	125.44					20.78		
Dsgn. L = 26.83 ft	2			10.18	-125.44	125.44					15.59		
Dsgn. L = 24.33 ft	3			29.08	-29.66	29.66					8.23		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			113.14	-122.97	122.97					20.72		
Dsgn. L = 26.83 ft	2			3.48	-122.97	122.97					15.05		
Dsgn. L = 24.33 ft	3			47.14	-41.57	47.14					12.61		
+0.90D+W+1.60H													
Dsgn. L = 37.83 ft	1			51.65	-57.26	57.26					9.71		
Dsgn. L = 26.83 ft	2			2.12	-57.26	57.26					7.16		
Dsgn. L = 24.33 ft	3			22.51	-20.57	22.51					6.10		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			69.87	-73.88	73.88					12.88		
Dsgn. L = 26.83 ft	2			-0.00	-73.88	73.88					12.52		
Dsgn. L = 24.33 ft	3			48.08	-39.34	48.08					12.52		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			65.11	-85.67	85.67					13.72		
Dsgn. L = 26.83 ft	2			19.36	-85.67	85.67					13.72		
Dsgn. L = 24.33 ft	3			24.93	-40.09	40.09					8.65		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			66.09	-83.20	83.20					13.18		
Dsgn. L = 26.83 ft	2			13.78	-83.20	83.20					13.18		

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: E/W Strip - Existing Loading + New Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 24.33 ft	3			42.85	-51.99	51.99					13.04		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			116.02	-116.12	116.12					20.54		
Dsgn. L = 26.83 ft	2			-0.00	-116.12	116.12					11.42		
Dsgn. L = 24.33 ft	3			34.54	-17.00	34.54					7.71		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			117.08	-113.65	117.08					20.47		
Dsgn. L = 26.83 ft	2			-0.00	-113.65	113.65					12.09		
Dsgn. L = 24.33 ft	3			52.63	-28.91	52.63					12.09		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			112.10	-125.44	125.44					20.78		
Dsgn. L = 26.83 ft	2			10.18	-125.44	125.44					15.59		
Dsgn. L = 24.33 ft	3			29.08	-29.66	29.66					8.23		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 37.83 ft	1			113.14	-122.97	122.97					20.72		
Dsgn. L = 26.83 ft	2			3.48	-122.97	122.97					15.05		
Dsgn. L = 24.33 ft	3			47.14	-41.57	47.14					12.61		
+1.20D+L+0.20S+E+1.60H, MAX E													
Dsgn. L = 37.83 ft	1			146.12	-154.90	154.90					25.49		
Dsgn. L = 26.83 ft	2			29.64	-154.90	154.90					19.21		
Dsgn. L = 24.33 ft	3			66.29	-66.73	66.73					15.98		
+0.90D+E+0.90H													
Dsgn. L = 37.83 ft	1			51.65	-57.26	57.26					9.71		
Dsgn. L = 26.83 ft	2			2.12	-57.26	57.26					7.16		
Dsgn. L = 24.33 ft	3			22.51	-20.57	22.51					6.10		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	8.2942	17.718		0.0000	0.000
	2	0.0000	17.718	+D+L+H	-1.5858	10.189
+D+L+H	3	1.6684	12.935		0.0000	10.189

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	13.001	32.623	21.554	8.732
Overall MINimum	-0.181	-0.601	-2.300	-0.092
+D+H	7.423	18.744	11.699	4.900
+D+L+H, LL Comb Run (**L)	7.488	18.143	16.617	8.303
+D+L+H, LL Comb Run (*L*)	7.177	23.159	16.636	4.379
+D+L+H, LL Comb Run (*LL)	7.242	22.558	21.554	7.783
+D+L+H, LL Comb Run (L**)	12.935	28.208	9.399	5.328
+D+L+H, LL Comb Run (L*L)	13.001	27.607	14.317	8.732
+D+L+H, LL Comb Run (LL*)	12.689	32.623	14.336	4.808
+D+L+H, LL Comb Run (LLL)	12.754	32.022	19.254	8.211
+D+Lr+H, LL Comb Run (**L)	7.423	18.744	11.699	4.900
+D+Lr+H, LL Comb Run (*L*)	7.423	18.744	11.699	4.900
+D+Lr+H, LL Comb Run (*LL)	7.423	18.744	11.699	4.900
+D+Lr+H, LL Comb Run (L**)	7.423	18.744	11.699	4.900
+D+Lr+H, LL Comb Run (L*L)	7.423	18.744	11.699	4.900
+D+Lr+H, LL Comb Run (LL*)	7.423	18.744	11.699	4.900
+D+Lr+H, LL Comb Run (LLL)	7.423	18.744	11.699	4.900
+D+S+H	7.423	18.744	11.699	4.900
+D+0.750Lr+0.750L+H, LL Comb	7.472	18.293	15.387	7.452
+D+0.750Lr+0.750L+H, LL Comb	7.238	22.055	15.402	4.510
+D+0.750Lr+0.750L+H, LL Comb	7.287	21.604	19.090	7.062
+D+0.750Lr+0.750L+H, LL Comb	11.557	25.842	9.974	5.221
+D+0.750Lr+0.750L+H, LL Comb	11.606	25.391	13.662	7.774
+D+0.750Lr+0.750L+H, LL Comb	11.372	29.153	13.677	4.831
+D+0.750Lr+0.750L+H, LL Comb	11.421	28.702	17.365	7.384
+D+0.750L+0.750S+H, LL Comb	7.472	18.293	15.387	7.452
+D+0.750L+0.750S+H, LL Comb	7.238	22.055	15.402	4.510
+D+0.750L+0.750S+H, LL Comb	7.287	21.604	19.090	7.062
+D+0.750L+0.750S+H, LL Comb	11.557	25.842	9.974	5.221
+D+0.750L+0.750S+H, LL Comb	11.606	25.391	13.662	7.774
+D+0.750L+0.750S+H, LL Comb	11.372	29.153	13.677	4.831

Structural Solutions

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: E/W Strip - Existing Loading + New Loading

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+0.750L+0.750S+H, LL Comb Run (**L)	11.421	28.702	17.365	7.384
+D+0.60W+H	7.423	18.744	11.699	4.900
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run (**L)	11.472	18.293	15.387	7.452
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run (*L*)	11.238	22.055	15.402	4.510
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run (*LL)	11.287	21.604	19.090	7.062
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run (L**)	11.557	25.842	9.974	5.221
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run (L*L)	11.606	25.391	13.662	7.774
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run (LL*)	11.372	29.153	13.677	4.831
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run (LLL)	11.421	28.702	17.365	7.384
+D+0.750L+0.750S+0.450W+H, LL Comb Run (**L)	11.472	18.293	15.387	7.452
+D+0.750L+0.750S+0.450W+H, LL Comb Run (*L*)	11.238	22.055	15.402	4.510
+D+0.750L+0.750S+0.450W+H, LL Comb Run (*LL)	11.287	21.604	19.090	7.062
+D+0.750L+0.750S+0.450W+H, LL Comb Run (L**)	11.557	25.842	9.974	5.221
+D+0.750L+0.750S+0.450W+H, LL Comb Run (L*L)	11.606	25.391	13.662	7.774
+D+0.750L+0.750S+0.450W+H, LL Comb Run (LL*)	11.372	29.153	13.677	4.831
+D+0.750L+0.750S+0.450W+H, LL Comb Run (LLL)	11.421	28.702	17.365	7.384
+0.60D+0.60W+0.60H	4.454	11.246	7.019	2.940
+D+0.70E+0.60H	7.423	18.744	11.699	4.900
+D+0.750L+0.750S+0.5250E+H, LL Comb Run (**L)	11.472	18.293	15.387	7.452
+D+0.750L+0.750S+0.5250E+H, LL Comb Run (*L*)	11.238	22.055	15.402	4.510
+D+0.750L+0.750S+0.5250E+H, LL Comb Run (*LL)	11.287	21.604	19.090	7.062
+D+0.750L+0.750S+0.5250E+H, LL Comb Run (L**)	11.557	25.842	9.974	5.221
+D+0.750L+0.750S+0.5250E+H, LL Comb Run (L*L)	11.606	25.391	13.662	7.774
+D+0.750L+0.750S+0.5250E+H, LL Comb Run (LL*)	11.372	29.153	13.677	4.831
+D+0.750L+0.750S+0.5250E+H, LL Comb Run (LLL)	11.421	28.702	17.365	7.384
+0.60D+0.70E+H	4.454	11.246	7.019	2.940
D Only	7.423	18.744	11.699	4.900
Lr Only, LL Comb Run (**L)				
Lr Only, LL Comb Run (*L*)				
Lr Only, LL Comb Run (*LL)				
Lr Only, LL Comb Run (L**)				
Lr Only, LL Comb Run (L*L)				
Lr Only, LL Comb Run (LL*)				
Lr Only, LL Comb Run (LLL)				
L Only, LL Comb Run (**L)	0.065	-0.601	4.918	3.403
L Only, LL Comb Run (*L*)	-0.246	4.415	4.937	-0.520
L Only, LL Comb Run (*LL)	-0.181	3.814	9.855	2.883
L Only, LL Comb Run (L**)	5.512	9.464	-2.300	0.429
L Only, LL Comb Run (L*L)	5.578	8.863	2.618	3.832
L Only, LL Comb Run (LL*)	5.266	13.879	2.637	-0.092
L Only, LL Comb Run (LLL)	5.331	13.278	7.556	3.312
S Only				
W Only				
E Only				
H Only				

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

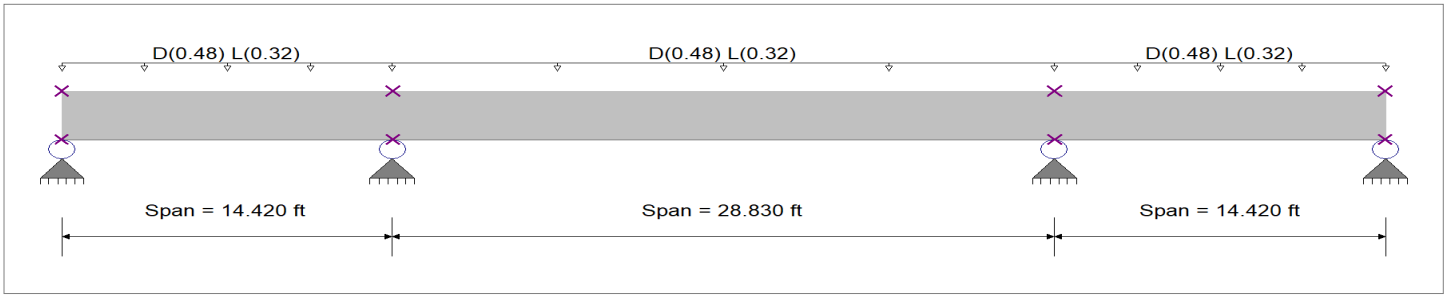
Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	14.420 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	28.830 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #3	Span Length =	14.420 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

Load for Span Number 2
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

Load for Span Number 3
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

DESIGN SUMMARY

Maximum Bending =	65.250 k-ft	Maximum Shear =	15.914 k
Load Combination	+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)	Load Combination	+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	14.420 ft	Location of maximum on span	14.420 ft
Maximum Deflection			
Max Downward Transient Deflection	0.695 in	497	
Max Upward Transient Deflection	-0.136 in	1267	
Max Downward Total Deflection	1.539 in	224	
Max Upward Total Deflection	-0.211 in	820	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 14.42 ft	1			12.80	-65.25	65.25					15.91		
Dsgn. L = 28.83 ft	2			52.76	-65.25	65.25					15.91		
Dsgn. L = 14.42 ft	3			12.80	-65.25	65.25					12.37		
+1.40D+1.60H													
Dsgn. L = 14.42 ft	1			3.35	-39.27	39.27					9.69		
Dsgn. L = 28.83 ft	2			30.53	-39.27	39.27					9.69		
Dsgn. L = 14.42 ft	3			3.35	-39.27	39.27					7.57		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			3.24	-32.00	32.00					8.07		
Dsgn. L = 28.83 ft	2			24.56	-38.65	38.65					10.53		
Dsgn. L = 14.42 ft	3			12.25	-38.65	38.65					10.53		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1				-60.26	60.26					15.68		
Dsgn. L = 28.83 ft	2			52.76	-60.26	60.26					15.68		
Dsgn. L = 14.42 ft	3				-60.26	60.26					8.33		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			0.01	-58.59	58.59					15.45		
Dsgn. L = 28.83 ft	2			51.14	-65.25	65.25					15.91		
Dsgn. L = 14.42 ft	3			5.06	-65.25	65.25					12.37		
+1.20D+0.50Lr+1.60L+1.60H, LL C													

General Beam Analysis

DESCRIPTION: N/S Strip - Existing Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.42 ft	1			12.25	-38.65	38.65					10.53		
Dsgn. L = 28.83 ft	2			24.56	-38.65	38.65					8.53		
Dsgn. L = 14.42 ft	3			3.24	-32.00	32.00					6.37		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			12.80	-36.99	36.99					10.41		
Dsgn. L = 28.83 ft	2			22.84	-36.99	36.99					10.41		
Dsgn. L = 14.42 ft	3			12.80	-36.99	36.99					10.41		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			5.06	-65.25	65.25					15.91		
Dsgn. L = 28.83 ft	2			51.14	-65.25	65.25					15.91		
Dsgn. L = 14.42 ft	3			0.01	-58.59	58.59					8.22		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			5.42	-63.59	63.59					15.68		
Dsgn. L = 28.83 ft	2			49.43	-63.59	63.59					15.68		
Dsgn. L = 14.42 ft	3			5.42	-63.59	63.59					12.25		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			3.24	-32.00	32.00					8.07		
Dsgn. L = 28.83 ft	2			24.56	-38.65	38.65					10.53		
Dsgn. L = 14.42 ft	3			12.25	-38.65	38.65					10.53		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1				-60.26	60.26					15.68		
Dsgn. L = 28.83 ft	2			52.76	-60.26	60.26					15.68		
Dsgn. L = 14.42 ft	3				-60.26	60.26					8.33		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			0.01	-58.59	58.59					15.45		
Dsgn. L = 28.83 ft	2			51.14	-65.25	65.25					15.91		
Dsgn. L = 14.42 ft	3			5.06	-65.25	65.25					12.37		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			12.25	-38.65	38.65					10.53		
Dsgn. L = 28.83 ft	2			24.56	-38.65	38.65					8.53		
Dsgn. L = 14.42 ft	3			3.24	-32.00	32.00					6.37		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			12.80	-36.99	36.99					10.41		
Dsgn. L = 28.83 ft	2			22.84	-36.99	36.99					10.41		
Dsgn. L = 14.42 ft	3			12.80	-36.99	36.99					10.41		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			5.06	-65.25	65.25					15.91		
Dsgn. L = 28.83 ft	2			51.14	-65.25	65.25					15.91		
Dsgn. L = 14.42 ft	3			0.01	-58.59	58.59					8.22		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			5.42	-63.59	63.59					15.68		
Dsgn. L = 28.83 ft	2			49.43	-63.59	63.59					15.68		
Dsgn. L = 14.42 ft	3			5.42	-63.59	63.59					12.25		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			3.10	-32.62	32.62					8.16		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.78	36.78					9.01		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			0.38	-50.29	50.29					12.92		
Dsgn. L = 28.83 ft	2			42.79	-50.29	50.29					12.92		
Dsgn. L = 14.42 ft	3			0.38	-50.29	50.29					7.64		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			0.47	-49.25	49.25					12.77		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.40	53.40					10.16		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			8.53	-36.78	36.78					9.01		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					8.45		
Dsgn. L = 14.42 ft	3			3.10	-32.62	32.62					6.42		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			8.84	-35.74	35.74					8.94		
Dsgn. L = 28.83 ft	2			24.09	-35.74	35.74					8.94		
Dsgn. L = 14.42 ft	3			8.84	-35.74	35.74					8.94		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			4.24	-53.40	53.40					13.06		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			0.47	-49.25	49.25					7.57		
+1.20D+1.60Lr+L+1.60H, LL Comb													

Project Title:	MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer:	JMB
Project ID:	24142
Project Descr:	

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2023

DESCRIPTION: N/S Strip - Existing Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.42 ft	1			4.46	-52.37	52.37					12.92		
Dsgn. L = 28.83 ft	2			40.71	-52.37	52.37					12.92		
Dsgn. L = 14.42 ft	3			4.46	-52.37	52.37					10.09		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.87	-33.66	33.66					8.30		
Dsgn. L = 28.83 ft	2			26.17	-33.66	33.66					8.30		
Dsgn. L = 14.42 ft	3			2.87	-33.66	33.66					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.87	-33.66	33.66					8.30		
Dsgn. L = 28.83 ft	2			26.17	-33.66	33.66					8.30		
Dsgn. L = 14.42 ft	3			2.87	-33.66	33.66					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.87	-33.66	33.66					8.30		
Dsgn. L = 28.83 ft	2			26.17	-33.66	33.66					8.30		
Dsgn. L = 14.42 ft	3			2.87	-33.66	33.66					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.87	-33.66	33.66					8.30		
Dsgn. L = 28.83 ft	2			26.17	-33.66	33.66					8.30		
Dsgn. L = 14.42 ft	3			2.87	-33.66	33.66					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.87	-33.66	33.66					8.30		
Dsgn. L = 28.83 ft	2			26.17	-33.66	33.66					8.30		
Dsgn. L = 14.42 ft	3			2.87	-33.66	33.66					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.87	-33.66	33.66					8.30		
Dsgn. L = 28.83 ft	2			26.17	-33.66	33.66					8.30		
Dsgn. L = 14.42 ft	3			2.87	-33.66	33.66					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.87	-33.66	33.66					8.30		
Dsgn. L = 28.83 ft	2			26.17	-33.66	33.66					8.30		
Dsgn. L = 14.42 ft	3			2.87	-33.66	33.66					6.49		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			3.10	-32.62	32.62					8.16		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.78	36.78					9.01		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			0.38	-50.29	50.29					12.92		
Dsgn. L = 28.83 ft	2			42.79	-50.29	50.29					12.92		
Dsgn. L = 14.42 ft	3			0.38	-50.29	50.29					7.64		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			0.47	-49.25	49.25					12.77		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.40	53.40					10.16		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			8.53	-36.78	36.78					9.01		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					8.45		
Dsgn. L = 14.42 ft	3			3.10	-32.62	32.62					6.42		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			8.84	-35.74	35.74					8.94		
Dsgn. L = 28.83 ft	2			24.09	-35.74	35.74					8.94		
Dsgn. L = 14.42 ft	3			8.84	-35.74	35.74					8.94		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			4.24	-53.40	53.40					13.06		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			0.47	-49.25	49.25					7.57		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			4.46	-52.37	52.37					12.92		
Dsgn. L = 28.83 ft	2			40.71	-52.37	52.37					12.92		
Dsgn. L = 14.42 ft	3			4.46	-52.37	52.37					10.09		
+1.20D+1.60S+0.50W+1.60H													
Dsgn. L = 14.42 ft	1			2.87	-33.66	33.66					8.30		
Dsgn. L = 28.83 ft	2			26.17	-33.66	33.66					8.30		
Dsgn. L = 14.42 ft	3			2.87	-33.66	33.66					6.49		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			3.10	-32.62	32.62					8.16		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.78	36.78					9.01		
+1.20D+0.50Lr+L+W+1.60H, LL C													

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.42 ft	1			0.38	-50.29	50.29					12.92		
Dsgn. L = 28.83 ft	2			42.79	-50.29	50.29					12.92		
Dsgn. L = 14.42 ft	3			0.38	-50.29	50.29					7.64		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			0.47	-49.25	49.25					12.77		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.40	53.40					10.16		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			8.53	-36.78	36.78					9.01		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					8.45		
Dsgn. L = 14.42 ft	3			3.10	-32.62	32.62					6.42		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			8.84	-35.74	35.74					8.94		
Dsgn. L = 28.83 ft	2			24.09	-35.74	35.74					8.94		
Dsgn. L = 14.42 ft	3			8.84	-35.74	35.74					8.94		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			4.24	-53.40	53.40					13.06		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			0.47	-49.25	49.25					7.57		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			4.46	-52.37	52.37					12.92		
Dsgn. L = 28.83 ft	2			40.71	-52.37	52.37					12.92		
Dsgn. L = 14.42 ft	3			4.46	-52.37	52.37					10.09		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 14.42 ft	1			3.10	-32.62	32.62					8.16		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.78	36.78					9.01		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 14.42 ft	1			0.38	-50.29	50.29					12.92		
Dsgn. L = 28.83 ft	2			42.79	-50.29	50.29					12.92		
Dsgn. L = 14.42 ft	3			0.38	-50.29	50.29					7.64		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 14.42 ft	1			0.47	-49.25	49.25					12.77		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.40	53.40					10.16		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 14.42 ft	1			8.53	-36.78	36.78					9.01		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					8.45		
Dsgn. L = 14.42 ft	3			3.10	-32.62	32.62					6.42		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 14.42 ft	1			8.84	-35.74	35.74					8.94		
Dsgn. L = 28.83 ft	2			24.09	-35.74	35.74					8.94		
Dsgn. L = 14.42 ft	3			8.84	-35.74	35.74					8.94		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 14.42 ft	1			4.24	-53.40	53.40					13.06		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			0.47	-49.25	49.25					7.57		
+1.20D+L+0.50S+W+1.60H, LL Cc													
Dsgn. L = 14.42 ft	1			4.46	-52.37	52.37					12.92		
Dsgn. L = 28.83 ft	2			40.71	-52.37	52.37					12.92		
Dsgn. L = 14.42 ft	3			4.46	-52.37	52.37					10.09		
+0.90D+W+1.60H													
Dsgn. L = 14.42 ft	1			2.15	-25.25	25.25					6.23		
Dsgn. L = 28.83 ft	2			19.63	-25.25	25.25					6.23		
Dsgn. L = 14.42 ft	3			2.15	-25.25	25.25					4.87		
+1.20D+L+0.20S+E+1.60H, LL Col													
Dsgn. L = 14.42 ft	1			3.10	-32.62	32.62					8.16		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.78	36.78					9.01		
+1.20D+L+0.20S+E+1.60H, LL Col													
Dsgn. L = 14.42 ft	1			0.38	-50.29	50.29					12.92		
Dsgn. L = 28.83 ft	2			42.79	-50.29	50.29					12.92		
Dsgn. L = 14.42 ft	3			0.38	-50.29	50.29					7.64		
+1.20D+L+0.20S+E+1.60H, LL Col													
Dsgn. L = 14.42 ft	1			0.47	-49.25	49.25					12.77		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.40	53.40					10.16		
+1.20D+L+0.20S+E+1.60H, LL Col													

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.42 ft	1			8.53	-36.78	36.78					9.01		
Dsgn. L = 28.83 ft	2			25.16	-36.78	36.78					8.45		
Dsgn. L = 14.42 ft	3			3.10	-32.62	32.62					6.42		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			8.84	-35.74	35.74					8.94		
Dsgn. L = 28.83 ft	2			24.09	-35.74	35.74					8.94		
Dsgn. L = 14.42 ft	3			8.84	-35.74	35.74					8.94		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			4.24	-53.40	53.40					13.06		
Dsgn. L = 28.83 ft	2			41.78	-53.40	53.40					13.06		
Dsgn. L = 14.42 ft	3			0.47	-49.25	49.25					7.57		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			4.46	-52.37	52.37					12.92		
Dsgn. L = 28.83 ft	2			40.71	-52.37	52.37					12.92		
Dsgn. L = 14.42 ft	3			4.46	-52.37	52.37					10.09		
+1.20D+L+0.20S+E+1.60H, MAX E													
Dsgn. L = 14.42 ft	1			12.80	-65.25	65.25					15.91		
Dsgn. L = 28.83 ft	2			52.76	-65.25	65.25					15.91		
Dsgn. L = 14.42 ft	3			12.80	-65.25	65.25					12.37		
+0.90D+E+0.90H													
Dsgn. L = 14.42 ft	1			2.15	-25.25	25.25					6.23		
Dsgn. L = 28.83 ft	2			19.63	-25.25	25.25					6.23		
Dsgn. L = 14.42 ft	3			2.15	-25.25	25.25					4.87		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+L+H	-0.2051	9.309
+D+L+H	2	1.5395	14.597		0.0000	9.309
	3	0.0000	14.597	+D+L+H	-0.2110	5.293

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	3.678	20.759	20.759	3.678
Overall MINimum	-1.081	-0.216	-0.216	-1.081
+D+H	1.515	12.325	12.325	1.515
+D+L+H, LL Comb Run (**L)	1.587	12.109	14.993	3.606
+D+L+H, LL Comb Run (*L*)	0.363	18.091	18.091	0.363
+D+L+H, LL Comb Run (*LL)	0.435	17.875	20.759	2.454
+D+L+H, LL Comb Run (L**)	3.606	14.993	12.109	1.587
+D+L+H, LL Comb Run (L*L)	3.678	14.777	14.777	3.678
+D+L+H, LL Comb Run (LL*)	2.454	20.759	17.875	0.435
+D+L+H, LL Comb Run (LLL)	2.526	20.542	20.542	2.526
+D+Lr+H, LL Comb Run (**L)	1.515	12.325	12.325	1.515
+D+Lr+H, LL Comb Run (*L*)	1.515	12.325	12.325	1.515
+D+Lr+H, LL Comb Run (*LL)	1.515	12.325	12.325	1.515
+D+Lr+H, LL Comb Run (L**)	1.515	12.325	12.325	1.515
+D+Lr+H, LL Comb Run (L*L)	1.515	12.325	12.325	1.515
+D+Lr+H, LL Comb Run (LL*)	1.515	12.325	12.325	1.515
+D+Lr+H, LL Comb Run (LLL)	1.515	12.325	12.325	1.515
+D+S+H	1.515	12.325	12.325	1.515
+D+0.750Lr+0.750L+H, LL Comb	1.569	12.163	14.326	3.084
+D+0.750Lr+0.750L+H, LL Comb	0.651	16.650	16.650	0.651
+D+0.750Lr+0.750L+H, LL Comb	0.705	16.487	18.650	2.219
+D+0.750Lr+0.750L+H, LL Comb	3.084	14.326	12.163	1.569
+D+0.750Lr+0.750L+H, LL Comb	3.138	14.164	14.164	3.138
+D+0.750Lr+0.750L+H, LL Comb	2.219	18.650	16.487	0.705
+D+0.750Lr+0.750L+H, LL Comb	2.273	18.488	18.488	2.273
+D+0.750L+0.750S+H, LL Comb	1.569	12.163	14.326	3.084
+D+0.750L+0.750S+H, LL Comb	0.651	16.650	16.650	0.651
+D+0.750L+0.750S+H, LL Comb	0.705	16.487	18.650	2.219
+D+0.750L+0.750S+H, LL Comb	3.084	14.326	12.163	1.569
+D+0.750L+0.750S+H, LL Comb	3.138	14.164	14.164	3.138
+D+0.750L+0.750S+H, LL Comb	2.219	18.650	16.487	0.705
+D+0.750L+0.750S+H, LL Comb	2.273	18.488	18.488	2.273
+D+0.60W+H	1.515	12.325	12.325	1.515

Structural Solutions

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+0.750Lr+0.750L+0.450W+H, 1	1.569	12.163	14.326	3.084
+D+0.750Lr+0.750L+0.450W+H, 0	1.651	16.650	16.650	0.651
+D+0.750Lr+0.750L+0.450W+H, 0	1.705	16.487	18.650	2.219
+D+0.750Lr+0.750L+0.450W+H, 3	1.084	14.326	12.163	1.569
+D+0.750Lr+0.750L+0.450W+H, 3	1.138	14.164	14.164	3.138
+D+0.750Lr+0.750L+0.450W+H, 2	1.219	18.650	16.487	0.705
+D+0.750Lr+0.750L+0.450W+H, 2	1.273	18.488	18.488	2.273
+D+0.750L+0.750S+0.450W+H, 1	1.569	12.163	14.326	3.084
+D+0.750L+0.750S+0.450W+H, 0	1.651	16.650	16.650	0.651
+D+0.750L+0.750S+0.450W+H, 0	1.705	16.487	18.650	2.219
+D+0.750L+0.750S+0.450W+H, 3	1.084	14.326	12.163	1.569
+D+0.750L+0.750S+0.450W+H, 3	1.138	14.164	14.164	3.138
+D+0.750L+0.750S+0.450W+H, 2	1.219	18.650	16.487	0.705
+D+0.750L+0.750S+0.450W+H, 2	1.273	18.488	18.488	2.273
+0.60D+0.60W+0.60H	0.909	7.395	7.395	0.909
+D+0.70E+0.60H	1.515	12.325	12.325	1.515
+D+0.750L+0.750S+0.5250E+H, 1	1.569	12.163	14.326	3.084
+D+0.750L+0.750S+0.5250E+H, 0	1.651	16.650	16.650	0.651
+D+0.750L+0.750S+0.5250E+H, 0	1.705	16.487	18.650	2.219
+D+0.750L+0.750S+0.5250E+H, 3	1.084	14.326	12.163	1.569
+D+0.750L+0.750S+0.5250E+H, 3	1.138	14.164	14.164	3.138
+D+0.750L+0.750S+0.5250E+H, 2	1.219	18.650	16.487	0.705
+D+0.750L+0.750S+0.5250E+H, 2	1.273	18.488	18.488	2.273
+0.60D+0.70E+H	0.909	7.395	7.395	0.909
D Only	1.515	12.325	12.325	1.515
Lr Only, LL Comb Run (**L)				
Lr Only, LL Comb Run (*L*)				
Lr Only, LL Comb Run (*LL)				
Lr Only, LL Comb Run (L**)				
Lr Only, LL Comb Run (L*L)				
Lr Only, LL Comb Run (LL*)				
Lr Only, LL Comb Run (LLL)				
L Only, LL Comb Run (**L)	0.072	-0.216	2.668	2.091
L Only, LL Comb Run (*L*)	-1.153	5.766	5.766	-1.153
L Only, LL Comb Run (*LL)	-1.081	5.549	8.433	0.938
L Only, LL Comb Run (L**)	2.091	2.668	-0.216	0.072
L Only, LL Comb Run (L*L)	2.163	2.451	2.451	2.163
L Only, LL Comb Run (LL*)	0.938	8.433	5.549	-1.081
L Only, LL Comb Run (LLL)	1.010	8.217	8.217	1.010
S Only				
W Only				
E Only				
H Only				

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

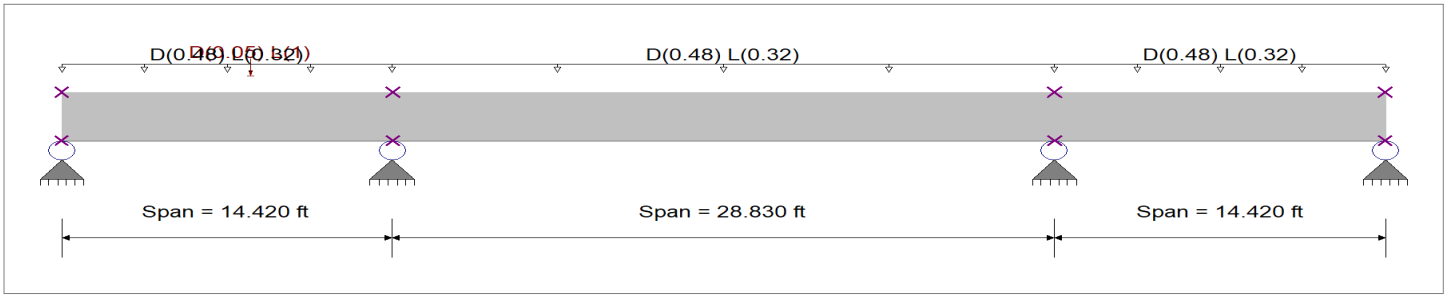
Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading + New Loading

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	14.420 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	28.830 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #3	Span Length =	14.420 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

Point Load : D = 0.050, L = 1.0 k @ 8.250 ft

Load for Span Number 2
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

Load for Span Number 3
Uniform Load : D = 0.120, L = 0.080 ksf, Tributary Width = 4.0 ft

DESIGN SUMMARY

Maximum Bending =	66.978 k-ft	Maximum Shear =	15.994 k
Load Combination	+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)	Load Combination	+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	14.420 ft	Location of maximum on span	14.420 ft

Maximum Deflection

Max Downward Transient Deflection	0.695 in	497	
Max Upward Transient Deflection	-0.136 in	1267	
Max Downward Total Deflection	1.538 in	224	
Max Upward Total Deflection	-0.211 in	820	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 14.42 ft	1			15.83	-66.98	66.98					15.99		
Dsgn. L = 28.83 ft	2			52.74	-66.98	66.98					15.99		
Dsgn. L = 14.42 ft	3			13.00	-65.23	65.23					12.37		
+1.40D+1.60H													
Dsgn. L = 14.42 ft	1			3.43	-39.35	39.35					9.69		
Dsgn. L = 28.83 ft	2			30.51	-39.35	39.35					9.69		
Dsgn. L = 14.42 ft	3			3.35	-39.25	39.25					7.57		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			3.32	-32.06	32.06					8.08		
Dsgn. L = 28.83 ft	2			24.53	-38.63	38.63					10.52		
Dsgn. L = 14.42 ft	3			12.26	-38.63	38.63					10.52		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1				-60.32	60.32					15.69		
Dsgn. L = 28.83 ft	2			52.74	-60.32	60.32					15.69		
Dsgn. L = 14.42 ft	3				-60.24	60.24					8.33		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			0.01	-58.66	58.66					15.46		
Dsgn. L = 28.83 ft	2			51.12	-65.23	65.23					15.91		

General Beam Analysis

DESCRIPTION: N/S Strip - Existing Loading + New Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.42 ft	3			5.07	-65.23	65.23					12.37		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			15.22	-40.38	40.38					11.59		
Dsgn. L = 28.83 ft	2			24.02	-40.38	40.38					8.61		
Dsgn. L = 14.42 ft	3			3.38	-31.42	31.42					6.33		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			15.83	-38.72	38.72					11.48		
Dsgn. L = 28.83 ft	2			22.28	-38.72	38.72					10.37		
Dsgn. L = 14.42 ft	3			13.00	-36.42	36.42					10.37		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			7.02	-66.98	66.98					15.99		
Dsgn. L = 28.83 ft	2			50.58	-66.98	66.98					15.99		
Dsgn. L = 14.42 ft	3			0.01	-58.02	58.02					8.18		
+1.20D+0.50Lr+1.60L+1.60H, LL C													
Dsgn. L = 14.42 ft	1			7.45	-65.31	65.31					15.76		
Dsgn. L = 28.83 ft	2			48.87	-65.31	65.31					15.76		
Dsgn. L = 14.42 ft	3			5.54	-63.01	63.01					12.21		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			3.32	-32.06	32.06					8.08		
Dsgn. L = 28.83 ft	2			24.53	-38.63	38.63					10.52		
Dsgn. L = 14.42 ft	3			12.26	-38.63	38.63					10.52		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1				-60.32	60.32					15.69		
Dsgn. L = 28.83 ft	2			52.74	-60.32	60.32					15.69		
Dsgn. L = 14.42 ft	3				-60.24	60.24					8.33		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			0.01	-58.66	58.66					15.46		
Dsgn. L = 28.83 ft	2			51.12	-65.23	65.23					15.91		
Dsgn. L = 14.42 ft	3			5.07	-65.23	65.23					12.37		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			15.22	-40.38	40.38					11.59		
Dsgn. L = 28.83 ft	2			24.02	-40.38	40.38					8.61		
Dsgn. L = 14.42 ft	3			3.38	-31.42	31.42					6.33		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			15.83	-38.72	38.72					11.48		
Dsgn. L = 28.83 ft	2			22.28	-38.72	38.72					10.37		
Dsgn. L = 14.42 ft	3			13.00	-36.42	36.42					10.37		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			7.02	-66.98	66.98					15.99		
Dsgn. L = 28.83 ft	2			50.58	-66.98	66.98					15.99		
Dsgn. L = 14.42 ft	3			0.01	-58.02	58.02					8.18		
+1.20D+1.60L+0.50S+1.60H, LL C													
Dsgn. L = 14.42 ft	1			7.45	-65.31	65.31					15.76		
Dsgn. L = 28.83 ft	2			48.87	-65.31	65.31					15.76		
Dsgn. L = 14.42 ft	3			5.54	-63.01	63.01					12.21		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			3.17	-32.69	32.69					8.16		
Dsgn. L = 28.83 ft	2			25.14	-36.76	36.76					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.76	36.76					9.01		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			0.41	-50.35	50.35					12.92		
Dsgn. L = 28.83 ft	2			42.77	-50.35	50.35					12.92		
Dsgn. L = 14.42 ft	3			0.39	-50.26	50.26					7.64		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			0.50	-49.31	49.31					12.77		
Dsgn. L = 28.83 ft	2			41.76	-53.38	53.38					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.38	53.38					10.16		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			10.25	-37.89	37.89					9.69		
Dsgn. L = 28.83 ft	2			24.80	-37.89	37.89					8.50		
Dsgn. L = 14.42 ft	3			3.19	-32.26	32.26					6.39		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			10.60	-36.85	36.85					9.62		
Dsgn. L = 28.83 ft	2			23.73	-36.85	36.85					8.91		
Dsgn. L = 14.42 ft	3			8.96	-35.38	35.38					8.91		
+1.20D+1.60Lr+L+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			5.48	-54.51	54.51					13.11		
Dsgn. L = 28.83 ft	2			41.42	-54.51	54.51					13.11		

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading + New Loading

Load Combination		Max Stress Ratios		Summary of Moment Values (k-ft)							Shear Values (k)		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.42 ft	3			0.51	-48.88	48.88					7.54		
+1.20D+1.60Lr+L+1.60H, LL Comt													
Dsgn. L = 14.42 ft	1			5.73	-53.47	53.47					12.97		
Dsgn. L = 28.83 ft	2			40.35	-53.47	53.47					12.97		
Dsgn. L = 14.42 ft	3			4.54	-52.00	52.00					10.07		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.94	-33.73	33.73					8.31		
Dsgn. L = 28.83 ft	2			26.15	-33.73	33.73					8.31		
Dsgn. L = 14.42 ft	3			2.87	-33.64	33.64					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.94	-33.73	33.73					8.31		
Dsgn. L = 28.83 ft	2			26.15	-33.73	33.73					8.31		
Dsgn. L = 14.42 ft	3			2.87	-33.64	33.64					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.94	-33.73	33.73					8.31		
Dsgn. L = 28.83 ft	2			26.15	-33.73	33.73					8.31		
Dsgn. L = 14.42 ft	3			2.87	-33.64	33.64					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.94	-33.73	33.73					8.31		
Dsgn. L = 28.83 ft	2			26.15	-33.73	33.73					8.31		
Dsgn. L = 14.42 ft	3			2.87	-33.64	33.64					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.94	-33.73	33.73					8.31		
Dsgn. L = 28.83 ft	2			26.15	-33.73	33.73					8.31		
Dsgn. L = 14.42 ft	3			2.87	-33.64	33.64					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.94	-33.73	33.73					8.31		
Dsgn. L = 28.83 ft	2			26.15	-33.73	33.73					8.31		
Dsgn. L = 14.42 ft	3			2.87	-33.64	33.64					6.49		
+1.20D+1.60Lr+0.50W+1.60H, LL													
Dsgn. L = 14.42 ft	1			2.94	-33.73	33.73					8.31		
Dsgn. L = 28.83 ft	2			26.15	-33.73	33.73					8.31		
Dsgn. L = 14.42 ft	3			2.87	-33.64	33.64					6.49		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			3.17	-32.69	32.69					8.16		
Dsgn. L = 28.83 ft	2			25.14	-36.76	36.76					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.76	36.76					9.01		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			0.41	-50.35	50.35					12.92		
Dsgn. L = 28.83 ft	2			42.77	-50.35	50.35					12.92		
Dsgn. L = 14.42 ft	3			0.39	-50.26	50.26					7.64		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			0.50	-49.31	49.31					12.77		
Dsgn. L = 28.83 ft	2			41.76	-53.38	53.38					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.38	53.38					10.16		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			10.25	-37.89	37.89					9.69		
Dsgn. L = 28.83 ft	2			24.80	-37.89	37.89					8.50		
Dsgn. L = 14.42 ft	3			3.19	-32.26	32.26					6.39		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			10.60	-36.85	36.85					9.62		
Dsgn. L = 28.83 ft	2			23.73	-36.85	36.85					8.91		
Dsgn. L = 14.42 ft	3			8.96	-35.38	35.38					8.91		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			5.48	-54.51	54.51					13.11		
Dsgn. L = 28.83 ft	2			41.42	-54.51	54.51					13.11		
Dsgn. L = 14.42 ft	3			0.51	-48.88	48.88					7.54		
+1.20D+L+1.60S+1.60H, LL Comb													
Dsgn. L = 14.42 ft	1			5.73	-53.47	53.47					12.97		
Dsgn. L = 28.83 ft	2			40.35	-53.47	53.47					12.97		
Dsgn. L = 14.42 ft	3			4.54	-52.00	52.00					10.07		
+1.20D+1.60S+0.50W+1.60H													
Dsgn. L = 14.42 ft	1			2.94	-33.73	33.73					8.31		
Dsgn. L = 28.83 ft	2			26.15	-33.73	33.73					8.31		
Dsgn. L = 14.42 ft	3			2.87	-33.64	33.64					6.49		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			3.17	-32.69	32.69					8.16		
Dsgn. L = 28.83 ft	2			25.14	-36.76	36.76					9.01		

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading + New Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.42 ft	3			8.53	-36.76	36.76					9.01		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			0.41	-50.35	50.35					12.92		
Dsgn. L = 28.83 ft	2			42.77	-50.35	50.35					12.92		
Dsgn. L = 14.42 ft	3			0.39	-50.26	50.26					7.64		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			0.50	-49.31	49.31					12.77		
Dsgn. L = 28.83 ft	2			41.76	-53.38	53.38					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.38	53.38					10.16		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			10.25	-37.89	37.89					9.69		
Dsgn. L = 28.83 ft	2			24.80	-37.89	37.89					8.50		
Dsgn. L = 14.42 ft	3			3.19	-32.26	32.26					6.39		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			10.60	-36.85	36.85					9.62		
Dsgn. L = 28.83 ft	2			23.73	-36.85	36.85					8.91		
Dsgn. L = 14.42 ft	3			8.96	-35.38	35.38					8.91		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			5.48	-54.51	54.51					13.11		
Dsgn. L = 28.83 ft	2			41.42	-54.51	54.51					13.11		
Dsgn. L = 14.42 ft	3			0.51	-48.88	48.88					7.54		
+1.20D+0.50Lr+L+W+1.60H, LL C													
Dsgn. L = 14.42 ft	1			5.73	-53.47	53.47					12.97		
Dsgn. L = 28.83 ft	2			40.35	-53.47	53.47					12.97		
Dsgn. L = 14.42 ft	3			4.54	-52.00	52.00					10.07		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			3.17	-32.69	32.69					8.16		
Dsgn. L = 28.83 ft	2			25.14	-36.76	36.76					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.76	36.76					9.01		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			0.41	-50.35	50.35					12.92		
Dsgn. L = 28.83 ft	2			42.77	-50.35	50.35					12.92		
Dsgn. L = 14.42 ft	3			0.39	-50.26	50.26					7.64		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			0.50	-49.31	49.31					12.77		
Dsgn. L = 28.83 ft	2			41.76	-53.38	53.38					13.06		
Dsgn. L = 14.42 ft	3			4.24	-53.38	53.38					10.16		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			10.25	-37.89	37.89					9.69		
Dsgn. L = 28.83 ft	2			24.80	-37.89	37.89					8.50		
Dsgn. L = 14.42 ft	3			3.19	-32.26	32.26					6.39		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			10.60	-36.85	36.85					9.62		
Dsgn. L = 28.83 ft	2			23.73	-36.85	36.85					8.91		
Dsgn. L = 14.42 ft	3			8.96	-35.38	35.38					8.91		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			5.48	-54.51	54.51					13.11		
Dsgn. L = 28.83 ft	2			41.42	-54.51	54.51					13.11		
Dsgn. L = 14.42 ft	3			0.51	-48.88	48.88					7.54		
+1.20D+L+0.50S+W+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			5.73	-53.47	53.47					12.97		
Dsgn. L = 28.83 ft	2			40.35	-53.47	53.47					12.97		
Dsgn. L = 14.42 ft	3			4.54	-52.00	52.00					10.07		
+0.90D+W+1.60H													
Dsgn. L = 14.42 ft	1			2.20	-25.29	25.29					6.23		
Dsgn. L = 28.83 ft	2			19.61	-25.29	25.29					6.23		
Dsgn. L = 14.42 ft	3			2.16	-25.23	25.23					4.86		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			3.17	-32.69	32.69					8.16		
Dsgn. L = 28.83 ft	2			25.14	-36.76	36.76					9.01		
Dsgn. L = 14.42 ft	3			8.53	-36.76	36.76					9.01		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			0.41	-50.35	50.35					12.92		
Dsgn. L = 28.83 ft	2			42.77	-50.35	50.35					12.92		
Dsgn. L = 14.42 ft	3			0.39	-50.26	50.26					7.64		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			0.50	-49.31	49.31					12.77		
Dsgn. L = 28.83 ft	2			41.76	-53.38	53.38					13.06		

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading + New Loading

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.42 ft	3			4.24	-53.38	53.38					10.16		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			10.25	-37.89	37.89					9.69		
Dsgn. L = 28.83 ft	2			24.80	-37.89	37.89					8.50		
Dsgn. L = 14.42 ft	3			3.19	-32.26	32.26					6.39		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			10.60	-36.85	36.85					9.62		
Dsgn. L = 28.83 ft	2			23.73	-36.85	36.85					8.91		
Dsgn. L = 14.42 ft	3			8.96	-35.38	35.38					8.91		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			5.48	-54.51	54.51					13.11		
Dsgn. L = 28.83 ft	2			41.42	-54.51	54.51					13.11		
Dsgn. L = 14.42 ft	3			0.51	-48.88	48.88					7.54		
+1.20D+L+0.20S+E+1.60H, LL Co													
Dsgn. L = 14.42 ft	1			5.73	-53.47	53.47					12.97		
Dsgn. L = 28.83 ft	2			40.35	-53.47	53.47					12.97		
Dsgn. L = 14.42 ft	3			4.54	-52.00	52.00					10.07		
+1.20D+L+0.20S+E+1.60H, MAX E													
Dsgn. L = 14.42 ft	1			15.83	-66.98	66.98					15.99		
Dsgn. L = 28.83 ft	2			52.74	-66.98	66.98					15.99		
Dsgn. L = 14.42 ft	3			13.00	-65.23	65.23					12.37		
+0.90D+E+0.90H													
Dsgn. L = 14.42 ft	1			2.20	-25.29	25.29					6.23		
Dsgn. L = 28.83 ft	2			19.61	-25.29	25.29					6.23		
Dsgn. L = 14.42 ft	3			2.16	-25.23	25.23					4.86		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+L+H	-0.2038	9.309
+D+L+H	2	1.5384	14.597		0.0000	9.309
	3	0.0000	14.597	+D+L+H	-0.2109	5.293

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	4.052	21.486	20.755	3.704
Overall MINimum	-1.081	-0.216	-0.289	-1.057
+D+H	1.533	12.360	12.322	1.517
+D+L+H, LL Comb Run (**L)	1.605	12.144	14.990	3.607
+D+L+H, LL Comb Run (*L*)	0.380	18.126	18.087	0.364
+D+L+H, LL Comb Run (*LL)	0.453	17.909	20.755	2.455
+D+L+H, LL Comb Run (L**)	3.980	15.720	12.033	1.613
+D+L+H, LL Comb Run (L*L)	4.052	15.504	14.701	3.704
+D+L+H, LL Comb Run (LL*)	2.827	21.486	17.799	0.460
+D+L+H, LL Comb Run (LLL)	2.899	21.269	20.467	2.551
+D+Lr+H, LL Comb Run (**L)	1.533	12.360	12.322	1.517
+D+Lr+H, LL Comb Run (*L*)	1.533	12.360	12.322	1.517
+D+Lr+H, LL Comb Run (*LL)	1.533	12.360	12.322	1.517
+D+Lr+H, LL Comb Run (L**)	1.533	12.360	12.322	1.517
+D+Lr+H, LL Comb Run (L*L)	1.533	12.360	12.322	1.517
+D+Lr+H, LL Comb Run (LL*)	1.533	12.360	12.322	1.517
+D+Lr+H, LL Comb Run (LLL)	1.533	12.360	12.322	1.517
+D+S+H	1.533	12.360	12.322	1.517
+D+0.750Lr+0.750L+H, LL Comb	1.587	12.198	14.323	3.085
+D+0.750Lr+0.750L+H, LL Comb	0.669	16.684	16.646	0.652
+D+0.750Lr+0.750L+H, LL Comb	0.723	16.522	18.647	2.220
+D+0.750Lr+0.750L+H, LL Comb	3.368	14.880	12.105	1.589
+D+0.750Lr+0.750L+H, LL Comb	3.422	14.718	14.106	3.157
+D+0.750Lr+0.750L+H, LL Comb	2.504	19.204	16.429	0.724
+D+0.750Lr+0.750L+H, LL Comb	2.558	19.042	18.430	2.292
+D+0.750L+0.750S+H, LL Comb	1.587	12.198	14.323	3.085
+D+0.750L+0.750S+H, LL Comb	0.669	16.684	16.646	0.652
+D+0.750L+0.750S+H, LL Comb	0.723	16.522	18.647	2.220
+D+0.750L+0.750S+H, LL Comb	3.368	14.880	12.105	1.589
+D+0.750L+0.750S+H, LL Comb	3.422	14.718	14.106	3.157
+D+0.750L+0.750S+H, LL Comb	2.504	19.204	16.429	0.724

Structural Solutions

Project Title: MHS Good Sam Rehab Rm 28 Ceiling Lift
Engineer: JMB
Project ID: 24142
Project Descr:

General Beam Analysis

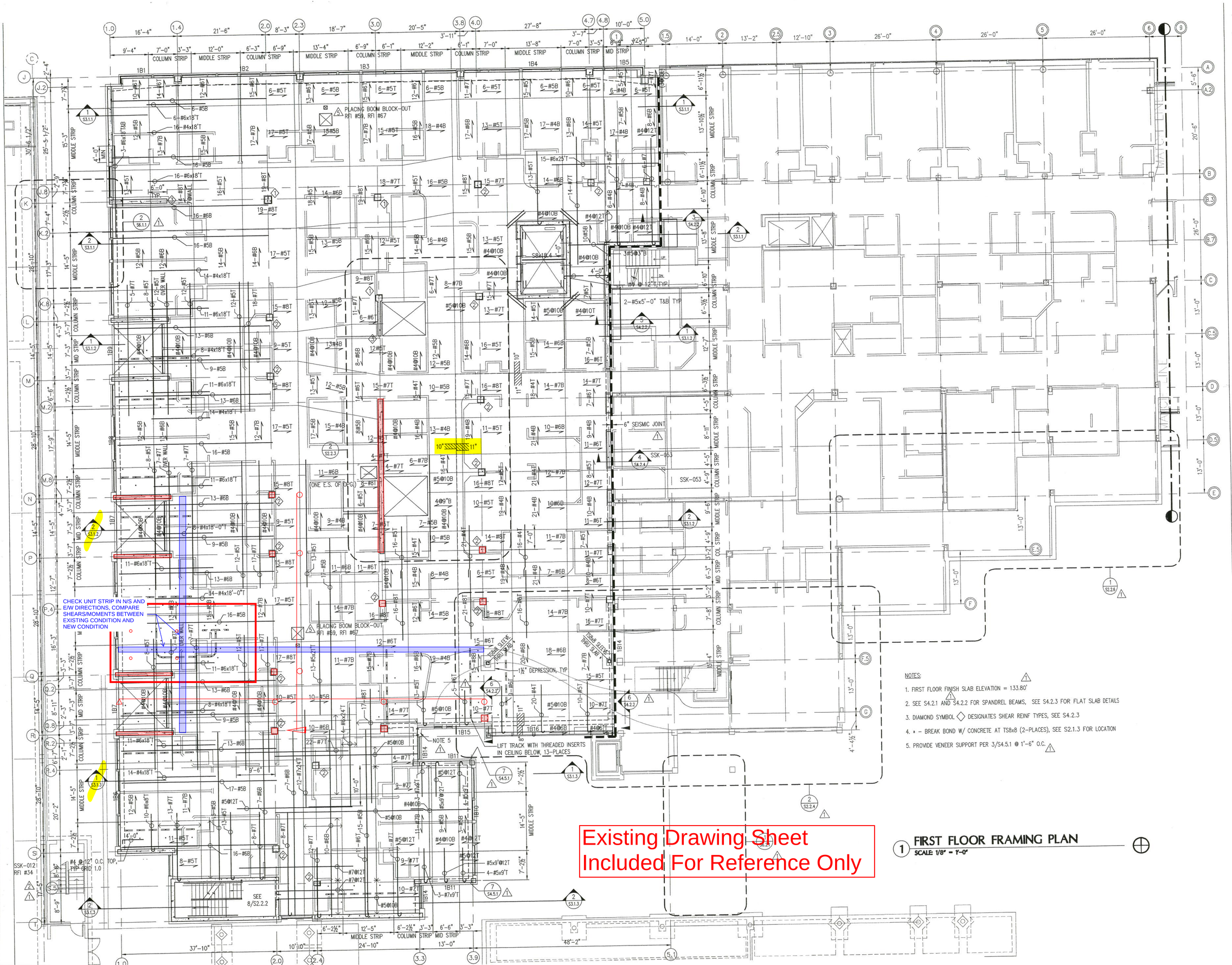
Project File: 24142 enercalc 2023-12-27 jmb.ec6

DESCRIPTION: N/S Strip - Existing Loading + New Loading

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+0.750L+0.750S+H, LL Comb 2	1.558	19.042	18.430	2.292
+D+0.60W+H	1.533	12.360	12.322	1.517
+D+0.750Lr+0.750L+0.450W+H, 1	1.587	12.198	14.323	3.085
+D+0.750Lr+0.750L+0.450W+H, 0	1.669	16.684	16.646	0.652
+D+0.750Lr+0.750L+0.450W+H, 0	1.723	16.522	18.647	2.220
+D+0.750Lr+0.750L+0.450W+H, 3	1.368	14.880	12.105	1.589
+D+0.750Lr+0.750L+0.450W+H, 3	1.422	14.718	14.106	3.157
+D+0.750Lr+0.750L+0.450W+H, 2	1.504	19.204	16.429	0.724
+D+0.750Lr+0.750L+0.450W+H, 2	1.558	19.042	18.430	2.292
+D+0.750L+0.750S+0.450W+H, 1	1.587	12.198	14.323	3.085
+D+0.750L+0.750S+0.450W+H, 0	1.669	16.684	16.646	0.652
+D+0.750L+0.750S+0.450W+H, 0	1.723	16.522	18.647	2.220
+D+0.750L+0.750S+0.450W+H, 3	1.368	14.880	12.105	1.589
+D+0.750L+0.750S+0.450W+H, 3	1.422	14.718	14.106	3.157
+D+0.750L+0.750S+0.450W+H, 2	1.504	19.204	16.429	0.724
+D+0.750L+0.750S+0.450W+H, 2	1.558	19.042	18.430	2.292
+0.60D+0.60W+0.60H	0.920	7.416	7.393	0.910
+D+0.70E+0.60H	1.533	12.360	12.322	1.517
+D+0.750L+0.750S+0.5250E+H, 1	1.587	12.198	14.323	3.085
+D+0.750L+0.750S+0.5250E+H, 0	1.669	16.684	16.646	0.652
+D+0.750L+0.750S+0.5250E+H, 0	1.723	16.522	18.647	2.220
+D+0.750L+0.750S+0.5250E+H, 3	1.368	14.880	12.105	1.589
+D+0.750L+0.750S+0.5250E+H, 3	1.422	14.718	14.106	3.157
+D+0.750L+0.750S+0.5250E+H, 2	1.504	19.204	16.429	0.724
+D+0.750L+0.750S+0.5250E+H, 2	1.558	19.042	18.430	2.292
+0.60D+0.70E+H	0.920	7.416	7.393	0.910
D Only	1.533	12.360	12.322	1.517
Lr Only, LL Comb Run (**L)				
Lr Only, LL Comb Run (*L*)				
Lr Only, LL Comb Run (*LL)				
Lr Only, LL Comb Run (L**)				
Lr Only, LL Comb Run (L*L)				
Lr Only, LL Comb Run (LL*)				
Lr Only, LL Comb Run (LLL)				
L Only, LL Comb Run (**L)	0.072	-0.216	2.668	2.091
L Only, LL Comb Run (*L*)	-1.153	5.766	5.766	-1.153
L Only, LL Comb Run (*LL)	-1.081	5.549	8.433	0.938
L Only, LL Comb Run (L**)	2.447	3.360	-0.289	0.096
L Only, LL Comb Run (L*L)	2.519	3.144	2.379	2.187
L Only, LL Comb Run (LL*)	1.294	9.126	5.477	-1.057
L Only, LL Comb Run (LLL)	1.366	8.909	8.145	1.034
S Only				
W Only				
E Only				
H Only				



NOTES:

1. FIRST FLOOR FINISH SLAB ELEVATION = 133.80'
2. SEE S4.2.1 AND S4.2.2 FOR SPANDREL BEAMS, SEE S4.2.3 FOR FLAT SLAB DETAILS
3. DIAMOND SYMBOL ◇ DESIGNATES SHEAR REINF TYPES, SEE S4.2.3
4. * – BREAK BOND W/ CONCRETE AT TS8x8 (2-PLACES), SEE S2.1.3 FOR LOCATION
5. PROVIDE VENEER SUPPORT PER 3/S4.5.1 @ 1'-6" O.C.

1 FIRST FLOOR FRAMING PLAN
SCALE 1/8" = 1'-0"

GOOD SAMARITAN HOSPITAL

WEST WING ADDITION

MARTENS CONSULTING ENGINEERS CHAN
Martens/Chan Inc.
400 Mercer, Suite 410
Seattle, WA 98109-4641
TEL (206) 298-9818
FAX (206) 298-9876

MAHLUM architects

2505 Third ave. SUITE 219 Seattle, WA 98121
206 441.4151
206 441.0478 f

1231 NW Hoyt SUITE 102 Portland, OR 97209
503 224.4032
503 224.0918 f

RANDOLF G. MARTENS — STATE OF WASHINGTON — 19454 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 5/15/01

02-15-00 100% CD DOCUMENTS

Project Number: 98119.00
Date: 10/15/99
Drawn: EQ
Checked: RM

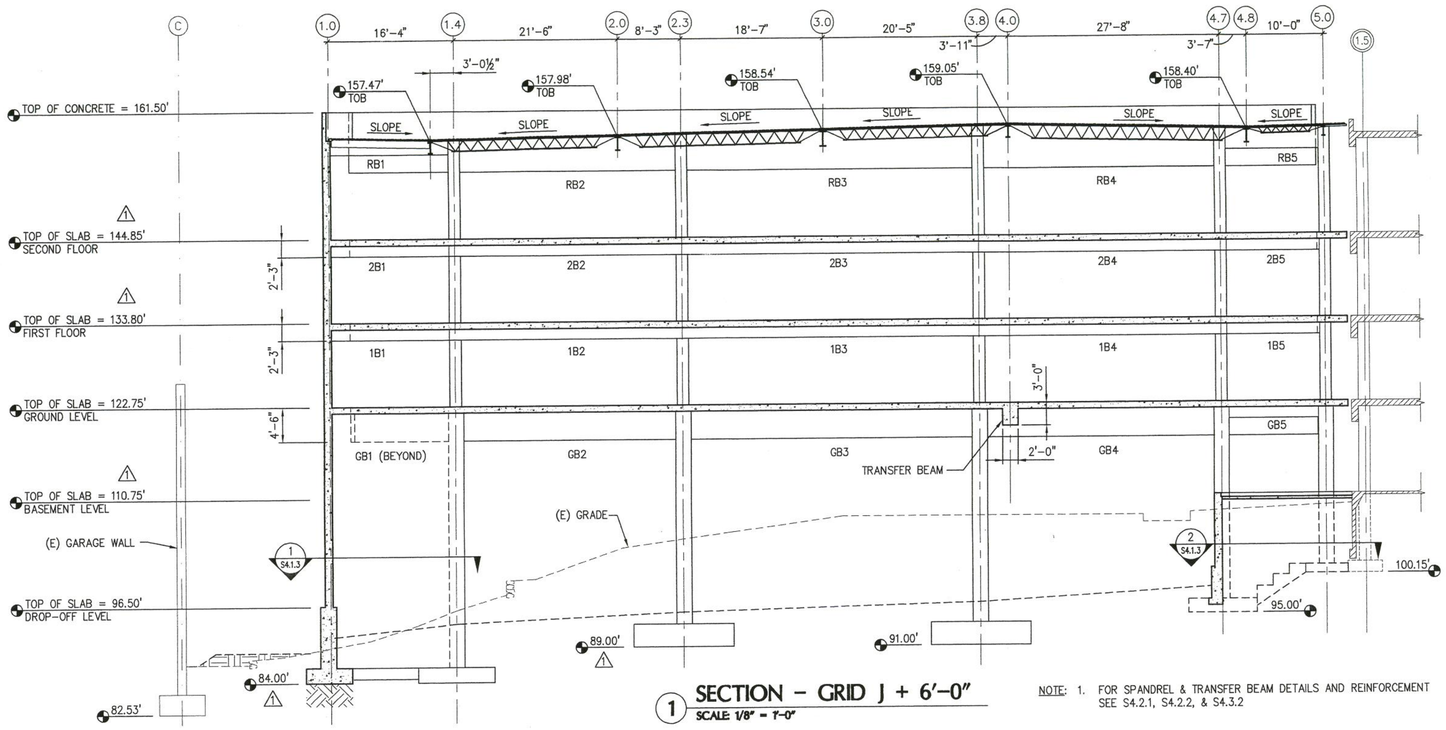
100% Bid Documents

Revisions:
1 10/15/99
2 11/08/99 ADDENDUM 1
3 2/23/00

KEY PLAN

FIRST FLOOR FRAMING PLAN

S2.1.4

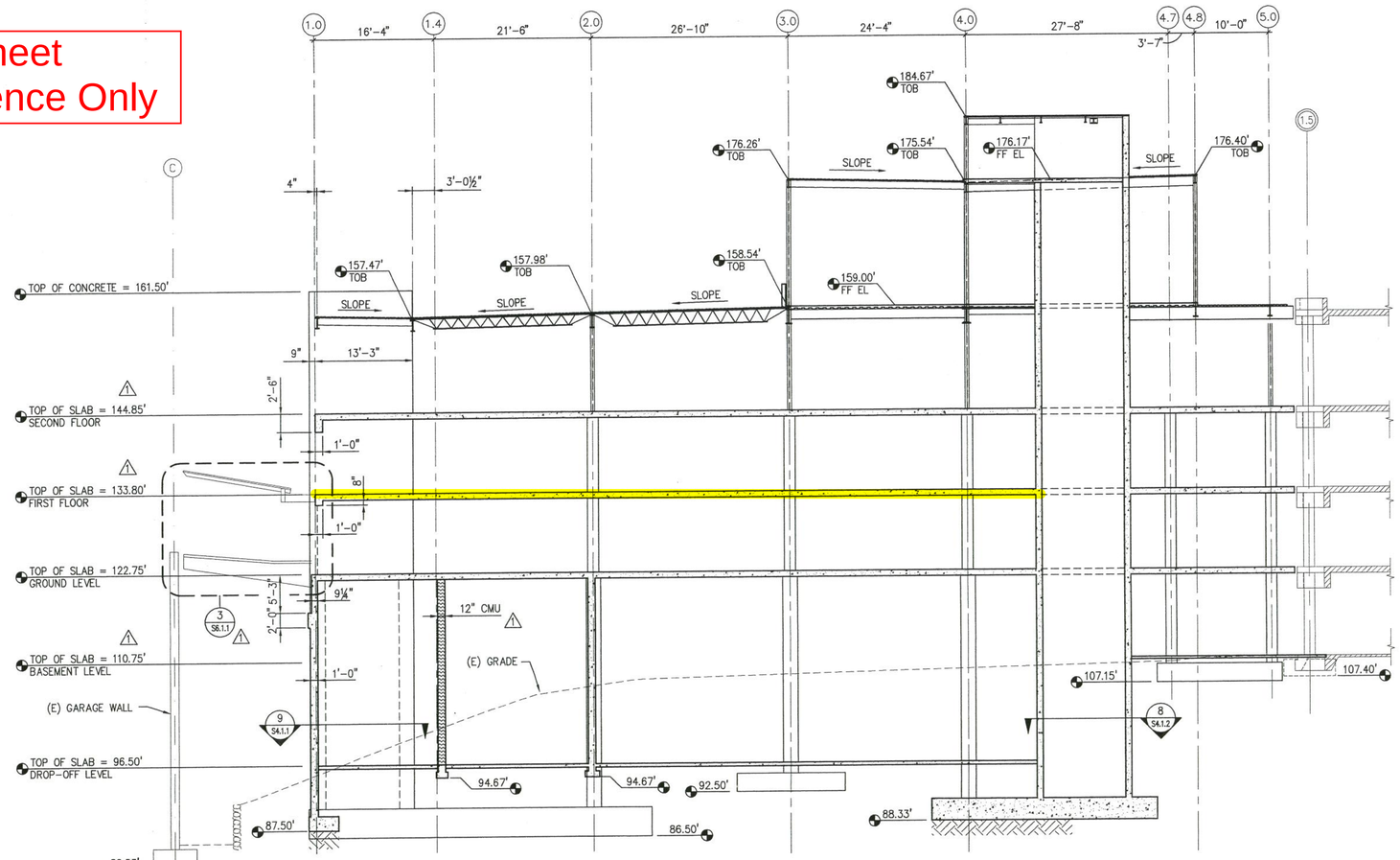


1 SECTION – GRID J + 6'-0"

SCALE: 1/8" = 1'-0"

NOTE: 1. FOR SPANDREL & TRANSFER BEAM DETAILS AND REINFORCEMENT SEE S4.2.1, S4.2.2, & S4.3.2

Existing Drawing Sheet
Included For Reference Only



2 SECTION – GRID K + 12'-0"

SCALE: 1/8" = 1'-0"

GOOD SAMARITAN HOSPITAL

WEST WING ADDITION

MARTENS CONSULTING ENGINEERS CHAN

Martens/Chan Inc.
400 Mercer, Suite 410
Seattle, WA 98109-4641
TEL (206) 298-9818
FAX (206) 298-9876

M A H L U M
architects

2505 Third ave. SUITE 219 Seattle, WA 98121 206 441.4151 206 441.0478 f

1231 NW Hoyt SUITE 102 Portland, OR 97209 503 224.4032 503 224.0918 f

RANDOLF G. MARX REGISTERED PROFESSIONAL ENGINEER
EXPIRES 5/15/01

02-15-00 100% CD DOCUMENTS

Project Number:	98119.00
Date:	10/15/99
Drawn:	LA
Checked:	RM

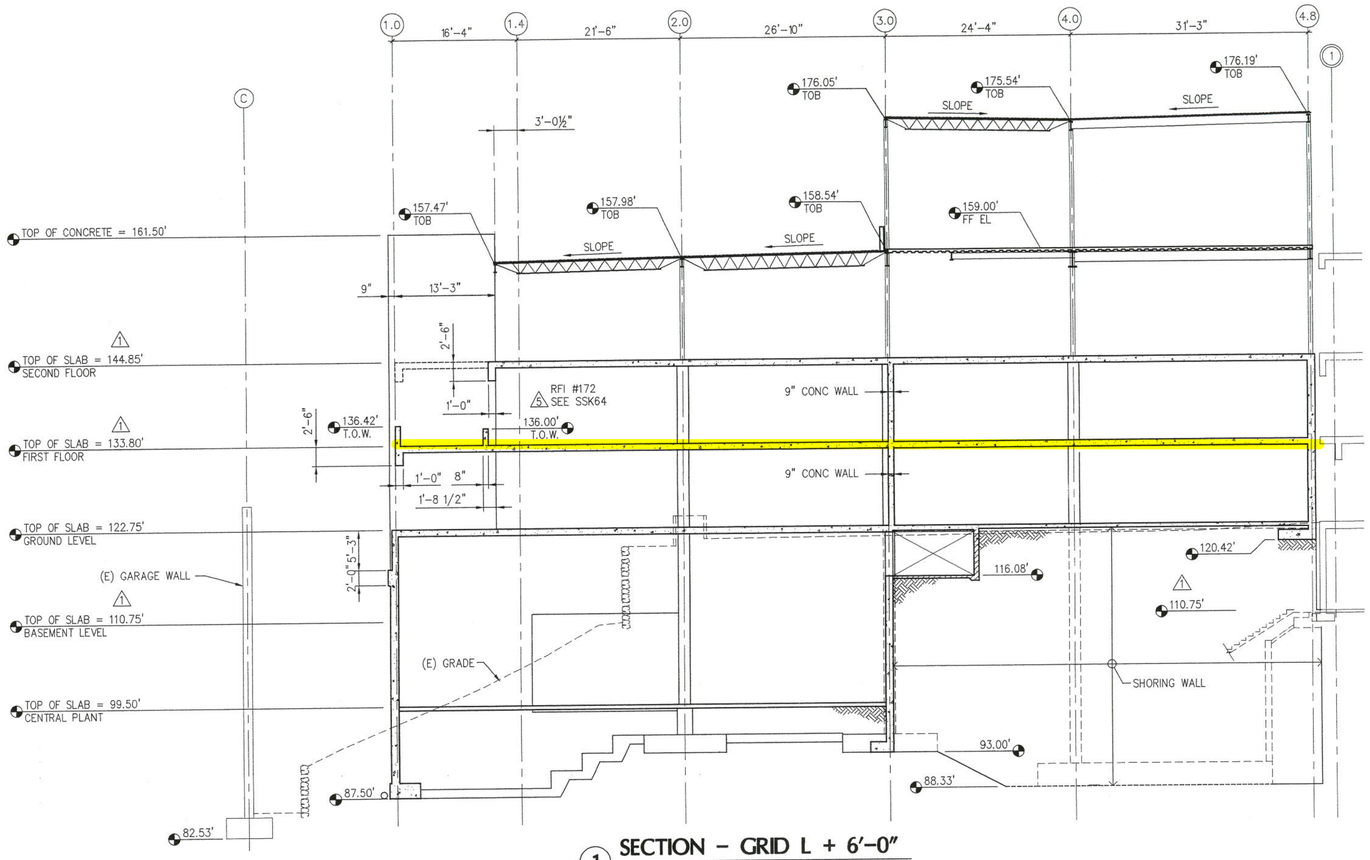
100% Bid Documents

Revisions:
1 10/15/99

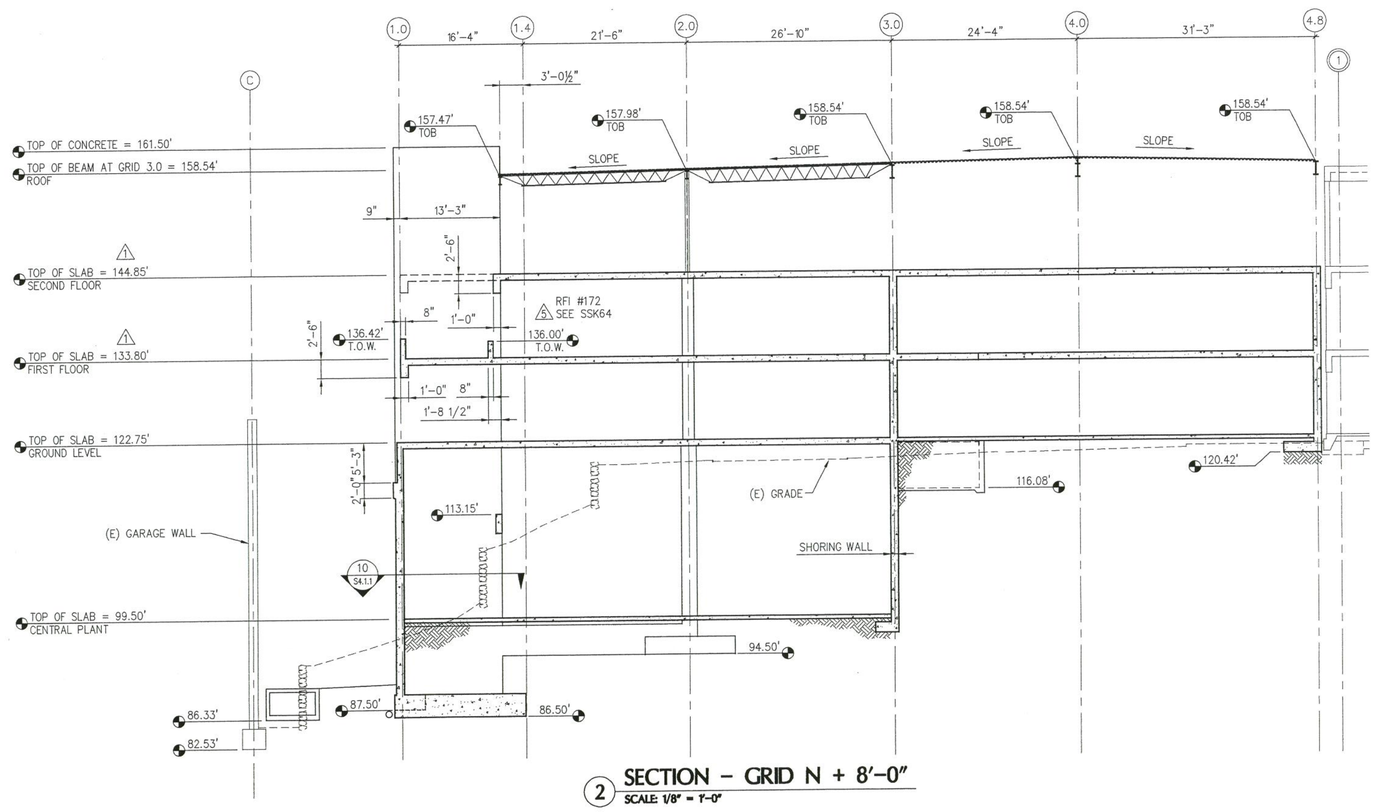
KEY PLAN

BUILDING SECTIONS & ELEVATIONS

S3.1.1



1 SECTION – GRID L + 6'-0"
SCALE: 1/8" = 1'-0"



2 SECTION – GRID N + 8'-0"
SCALE: 1/8" = 1'-0"

Existing Drawing Sheet
Included For Reference Only

GOOD SAMARITAN HOSPITAL

WEST WING ADDITION

MARTENS CONSULTING ENGINEERS CHAN

Martens/Chan Inc.
400 Mercer, Suite 410
Seattle, WA 98109-4641
TEL (206) 298-9818
FAX (206) 298-9876

M A H L U M
architects

2505 Third ave. SUITE 219 Seattle, WA 98121
206 441.4151
206 441.0478 f

1231 NW Hoyt SUITE 102 Portland, OR 97209
503 224.4032
503 224.0918 f

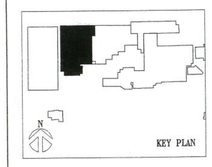
RANDOLF G. MARTENS
STATE OF WASHINGTON
16933
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 5/15/01

02-15-00 100% CD DOCUMENTS

Project Number: 98119.00
Date: 10/15/99
Drawn: LA
Checked: RM

100% Bid Documents

Revisions:
1 10/15/99
2 2/23/00



BUILDING SECTIONS & ELEVATIONS

S3.1.2

Existing Drawing Sheet
Included For Reference Only

NOTE: DIMENSIONS IN ARCHITECTURAL PLANS AND DETAILS GOVERN, FOR EXAMPLE: THE FACE OF FOUNDATION WALLS SUPPORTING VENEER, ALL EXPOSED CONCRETE, SLAB AND BEAM EDGES, AND TOP ELEVATION OF CONCRETE WALLS. ⚠1

GENERAL STRUCTURAL NOTES

THE FOLLOWING NOTES APPLY UNLESS INDICATED OTHERWISE:

CODE

UNIFORM BUILDING CODE, 1997 EDITION (U.B.C.)
AMERICAN CONCRETE INSTITUTE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE," ACI 318–95
AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC. "MANUAL OF STEEL CONSTRUCTION", NINTH EDITION
STRUCTURAL WELDING CODE – STEEL ANSI/AWS D1.1–99
STRUCTURAL WELDING CODE – SHEET STEEL ANSI/AWS D1.3–89
STRUCTURAL WELDING CODE – REINFORCING STEEL ANSI/AWS D1.4–92

LOADS

WIND. . . . . 80 MPH, EXPOSURE C, I = 1.15
ROOF: SNOW LOAD . . . . . .25 PSF + DRIFT
FLOOR: DL PARTITIONS. . . . . 20 PSF
LL – PUBLIC AREAS, EXIT CORRIDORS . . . . . .100 PSF
LL – STORAGE ROOMS. . . . . .125 PSF
LL – CENTRAL PLANT. . . . . .100 PSF OR EQUIPMENT WEIGHT
LL – PENTHOUSE FLOOR. . . . . 70 PSF
LL – OTHER . . . . . 80 PSF
FULL LIVE LOAD REDUCTION TAKEN

EQUIVALENT FLUID PRESSURE. . . . . PER GEOTECHNICAL REPORT
SEISMIC . . . . . ZONE III
Ca=0.36, R=4.5, I=1.25
V=(2.5 Ca/R) IW=0.25W
BASE AT GROUND LEVEL 122.75'

GENERAL

SPECIAL INSPECTIONS IN ACCORDANCE WITH U.B.C. SECTION 1701. REFER TO ARCHITECTURAL DRAWINGS FOR OPENINGS, ARCHITECTURAL REQUIREMENTS AND DIMENSIONS. LOCATION AND SIZE OF ANCHOR BOLTS FOR EQUIPMENT AS SPECIFIED ON VENDOR'S DRAWINGS. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.

EXISTING CONDITIONS

VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE STARTING WORK. REPORT ALL DISCREPANCIES FROM THE DRAWINGS.

FOUNDATIONS

SPREAD FOOTINGS

DESIGN SOIL BEARING PRESSURE 5,000 PSF. REFER TO GEOTECHNICAL ENGINEERING SERVICES REPORTS BY GEO ENGINEERS, DATED JUNE 30, 1998 AND JUNE 9, 1999. BASE FOOTINGS 1'–6" MINIMUM BELOW FINISHED GRADE. ESTIMATED BOTTOM OF FOOTING ELEVATIONS ARE SHOWN THUS: ( ). ALL FOOTINGS MUST REST ON UNDISTURBED EARTH.

SLAB ON GRADE

ALL FLOOR SLABS SHALL BE SUPPORTED ON AT LEAST 4 INCHES OF CLEAN, FREE–DRAINING COARSE SAND AND GRAVEL CONTAINING LESS THAN 3 PERCENT FINES (MATERIAL PASSING THE U.S. STANDARD NO. 200 SIEVE). THE SAND AND GRAVEL SHOULD BE COMPACTED TO AT LEAST 95 PERCENT MDD.

CONCRETE REINFORCEMENT

GENERAL

DEFORMED BARS
ASTM A615, GRADE 60 MIN LAP 40 BAR DIA
REINFORCEMENT TO BE WELDED ASTM A706, GRADE 60

SLABS ON GRADE

REINFORCE WITH #3 @ 14" O.C. EACH WAY. SUPPORT ON CONTINUOUS HIGH CHAIRS. ADD 2–#4 x 4'–0" AT OPENINGS LARGER THAN 2'–0" AND AT EACH INTERIOR CORNER.

WELDING

PERMITTED ONLY UPON APPROVAL BY THE ENGINEER SUBMIT LOCATION AND PROPOSED WELDING PROCEDURES FOR APPROVAL.

CONCRETE

MINIMUM ULTIMATE 28–DAY COMPRESSIVE STRENGTH (F'c) SHALL BE 5000 PSI FOR STRUCTURAL FLAT SLAB FLOORS, 3,000 PSI FOR FOOTINGS AND 4000 PSI FOR ALL OTHERS. SUBMIT MIX DESIGN FOR APPROVAL.

USE AN APPROVED AIR ENTRAINING ADMIXTURE IN ALL CONCRETE (STRUCTURAL AND NON–STRUCTURAL) WHERE EXPOSED TO WEATHER. AN APPROVED WATER REDUCING ADMIXTURE SHALL BE USED IN ALL CONCRETE EXCEPT FOOTINGS. SEE SPECIFICATIONS.

CONCRETE COVER OVER REINFORCEMENT

ONE BAR DIAMETER MINIMUM AND AS FOLLOWS:
FOOTINGS . . . . . 3.0"
FORMED SURFACES EXPOSED TO WEATHER OR GROUND. . . . . 2.0"
BEAMS AND COLUMNS TO TIES . . . . . 1.5"
INTERIOR SLABS, INTERIOR FACES OF WALLS . . . . . 1.0"
SLABS ON GRADE, TOP AND BOTTOM MINIMUM . . . . . 1.0"

CAMBER, CONCRETE BEAMS & SLABS

UNLESS NOTED OTHERWISE, CAMBER REINFORCED CONCRETE BEAMS AND FLAT SLAB COLUMN STRIPS 1/32 INCH PER 12 INCHES OF SPAN CENTER–TO–CENTER OF COLUMNS. FLAT SLAB CAMBER AT THE CENTER OF THE BAY SHALL BE EQUAL TO THE SUM OF THE AMOUNTS PROVIDED FOR THE COLUMN STRIPS IN BOTH SPAN DIRECTIONS.

MINIMUM WALL REINFORCEMENT

PROVIDE THE FOLLOWING MINIMUM REINFORCEMENT IN ALL WALLS WHERE REINFORCEMENT IS NOT OTHERWISE NOTED:

THICKNESS	VERTICAL	HORIZONTAL	LOCATION IN WALL
6"	#4 @ 18" O.C.	#4 @ 12" O.C.	CENTER
8"	#4 @ 16" O.C.	#4 @ 10" O.C.	CENTER
10"	#4 @ 18" O.C.	#4 @ 16" O.C.	EACH FACE
12"	#5 @ 18" O.C.	#4 @ 12" O.C.	EACH FACE

SHOTCRETE

MINIMUM ULTIMATE 28–DAY COMPRESSIVE STRENGTH (F'c) SHALL BE 4,000 PSI, SEE SHORING WALL PLANS.

STEEL TUBE BRACING FILL

SHRINKAGE COMPENSATING FLOWABLE GROUT WITH A MINIMUM 28–DAY ULTIMATE COMPRESSIVE STRENGTH OF 2,500 PSI.

LEDGER ANGLES

⚠4 LEDGER ANGLES SHALL BE HOT–DIP GALVANIZED. GRIND–OFF GALVANIZING AT POINTS TO BE WELDED. AFTER CONNECTION HAS BEEN COMPLETED, CLEAN AND TOUCH–UP WELDS AND BASE METAL METAL WITH PROTECTIVE FINISH PER SPECIFICATIONS.

STRUCTURAL STEEL

MATERIAL ⚠1

STEEL: ASTM A36, MINIMUM, Fy = 36 KSI UNLESS NOTED OTHERWISE.
STEEL PIPE: ASTM A501 OR ASTM A53 TYPE E OR S, GRADE B, Fy = 36 KSI.
STRUCTURAL TUBING: ASTM A500, GRADE C, Fy = 46 KSI.
BOLTS: ASTM A325–N BOLTS FOR BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS.
ANCHOR BOLTS: ASTM A307, MINIMUM 3/4" DIAMETER UNLESS NOTED OTHERWISE.

FABRICATION

FABRICATE AND ERECT IN ACCORDANCE WITH AISC "SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS", JUNE 1, 1989. ALL WELDING BY W.A.B.O. CERTIFIED WELDERS. MINIMUM WELD 3/16" X 2" LONG FILLET. HOT DIP GALVANIZE AFTER FABRICATION ALL ITEMS INDICATED GALVANIZED OR PERMANENTLY EXPOSED TO WEATHER. WELDING SHALL BE IN ACCORDANCE WITH THE PROVISIONS OF ANSI/AWS D1.1.

CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES IS AMENDED BY THE DELETION OF THE FOLLOWING SENTENCE IN PARAGRAPH 4.2.1: "THIS APPROVAL CONSTITUTES THE OWNER'S ACCEPTANCE OF ALL RESPONSIBILITY FOR THE DESIGN ADEQUACY OF ANY DETAIL CONFIGURATION OF CONNECTIONS DEVELOPED BY THE FABRICATOR AS PART OF HIS PREPARATION OF THESE SHOP DRAWINGS."

STEEL DECK

MATERIAL, FABRICATION, AND ERECTION SHALL BE IN CONFORMANCE WITH THE LATEST STANDARD SPECIFICATIONS OF THE STEEL DECK INSTITUTE AND THE AISC.

WELDING

WELDING SHALL MEET THE QUALIFICATIONS AS SPECIFIED IN ANSI/AWS D1.3. PRACTICE WELDS SHALL BE MADE PRIOR TO ACTUAL JOB WELDING FOR EACH TYPE AND GAGE OF DECK USED. THE PRACTICE WELDS SHALL DETERMINE THE ADEQUACY OF WELDING ROD, AMPERAGE AND BURN–OFF RATE TO PRODUCE SATISFACTORY FUSION FOR THE DIFFERENT WELDS REQUIRED. BOTH THE PRACTICE WELDS AND ACTUAL JOB WELDS SHALL BE INSPECTED AS TO SIZE AND SPACING, AND TESTED TO ASSURE METAL–TO–METAL FUSION. THE INSPECTION OF WELDING SHALL BE IN ACCORDANCE WITH THE PROVISIONS OF ANSI/AWS D1.3.

OPEN WEB STEEL JOISTS

MATERIAL, FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARD SPECIFICATIONS ADOPTED BY THE STEEL JOIST INSTITUTE AND THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION. PROVISION SHALL BE MADE FOR THE FIELD BOLTING OF THE STEEL JOISTS TO THE SUPPORTS FOR ERECTION PURPOSES IN ACCORDANCE WITH GOOD CONSTRUCTION PRACTICE AND OSHA REQUIREMENTS. FINAL CONNECTION TO SUPPORTS SHALL BE A FIELD WELD EACH SIDE OF BEARING PLATE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE STEEL JOIST INSTITUTE. EXTEND TOP AND BOTTOM CHORDS AS REQUIRED PER DETAILS. THE STEEL JOIST MANUFACTURER SHALL SUBMIT FOR APPROVAL SHOP DRAWINGS AND CALCULATIONS FOR JOISTS SUPPORTING CONCENTRATED LOADS. WELDING SHALL BE IN ACCORDANCE WITH PROVISIONS OF ANSI/AWS D1.1 AND ANSI/AWS D1.3 AS APPLICABLE.

MASONRY

HOLLOW CONCRETE MASONRY UNITS, GRADE N, F'm = 1,500 PSI. MORTAR, TYPE S, F'c = 1,800 PSI. MORTAR PROPORTION SHALL BE AS PER TABLE NO. 21–A, U.B.C. ALLOWABLE STRESSES FOR DESIGN SHALL BE AS PER SECT. 2107, U.B.C., NO SPECIAL INSPECTION. REINFORCEMENT SHALL BE DEFORMED BARS AS PER "CONCRETE REINFORCEMENT". ALL MASONRY CELLS CONTAINING REINFORCEMENT OR ANCHOR BOLTS, ALL BEAMS AND LINTELS SHALL BE GROUTED SOLID WITH A PEA GRAVEL CONCRETE. PEA GRAVEL CONCRETE GROUT: 7 SACKS TYPE I CEMENT PER CU. YD. OF CONCRETE. MINIMUM F'c AT 28 DAYS = 2,500 PSI. THE SLUMP SHALL BE SUFFICIENT TO COMPENSATE FOR WATER LOST TO AND THROUGH THE MASONRY BUT SHALL NOT EXCEED 10 INCHES. MAXIMUM LIFT FOR GROUTING CELLS IS 4'–0". GROUTING OF CELLS WILL REQUIRE CONTINUOUS INSPECTION. NO OTHER "SPECIAL INSPECTION" REQUIRED UNLESS SPECIFICALLY NOTED ON DRAWINGS. "GROUT SOLID" INDICATES GROUT ALL CELLS OF WALL.

SHOP DRAWINGS

ALL SHOP DRAWINGS SHALL BE REVIEWED AND APPROVED BY THE GENERAL CONTRACTOR PRIOR TO SUBMISSION TO THE ENGINEER. FABRICATION SHALL NOT PROCEED UNTIL ALL CONCERNED PARTIES HAVE COMPLETED THEIR REVIEW OF THE FOLLOWING SHOP DRAWING:
CONCRETE REINFORCEMENT
STRUCTURAL STEEL
STEEL DECK
OPEN WEB STEEL JOISTS

RESHORING

RESHORE TO SLAB ON GRADE BELOW A NEW POUR. SUPPORTING STRUCTURE MUST HAVE REACHED ITS 28–DAY MINIMUM COMPRESSIVE STRENGTH.

SPECIAL INSPECTIONS

PROVIDE SPECIAL INSPECTION BY LOCAL AUTHORITY CERTIFIED SPECIAL INSPECTORS FOR THE FOLLOWING WORK:
A. MATERIALS TESTING AND INSPECTION LABORATORY
1. ALL REINFORCED CONCRETE AND CONCRETE PLACEMENT, SHOTCRETE
2. BOLTS INSTALLED IN CONCRETE
3. FABRICATION AND ERECTION OF STRUCTURAL STEEL INCLUDING STRUCTURAL WELDING AND HIGH STRENGTH BOLTING
4. INSTALLATION OF STEEL DECKING INCLUDING WELDING AND CONCRETE TOPPING PLACEMENT
5. SHEAR CONNECTOR STUDS
6. REINFORCED MASONRY: UNIT, GROUT, AND REINFORCING STEEL PLACEMENT
7. STRENGTH TESTING OF ALL CONCRETE INCLUDING CONCRETE TOPPING ON STEEL DECK
8. REINFORCEMENT
B. GEOTECHNICAL ENGINEERS
1. VERIFICATION OF SOIL BEARING CAPACITY
2. PLACEMENT AND COMPACTION OF STRUCTURAL FILL AND FOUNDATION WALL BACKFILL
3. INSTALLATION OF PERMANENT EXCAVATION SHORING, PIN PILES AND GEOPIERS
C. SUPPLIER OF PREFABRICATED ITEMS INCLUDING STEEL STAIRS, GLAZING SYSTEM, AND CURTAIN WALLS SHALL SUBMIT DRAWINGS WITH WASHINGTON STATE STRUCTURAL ENGINEER'S SEAL TO ARCHITECT
⚠4 D. SPRAY–ON FIREPROOFING

STRUCTURAL OBSERVATION ⚠1

STRUCTURAL OBSERVATION SHALL BE PERFORMED PER U.B.C. SECTION 1702.

EXCAVATION SHORING AND UNDERPINNING

ALL SHORING AND UNDERPINNING BY OTHERS.

PRE–ENGINEERED, PREFABRICATED STAIRS

METAL STAIRS SHALL BE PRE–ENGINEERED AND PREFABRICATED IN ACCORDANCE WITH SPECIFICATION SECTION 05510. THE STAIR DESIGN SHALL INCLUDE STRINGERS. INTERMEDIATE LANDING, LANDING BEAMS, HANGERS AND OTHER SUPPORT DETAILS. SEE ARCHITECTURAL PLANS AND DETAILS FOR SPECIAL REQUIREMENTS.

PRE–ENGINEERED, PREFABRICATED SKYLIGHTS AND CANOPIES

SKYLIGHTS AND CANOPIES SHALL BE PRE–ENGINEERED AND PREFABRICATED IN ACCORDANCE WITH THE PERFORMANCE REQUIREMENTS OF SPECIFICATION SECTION 08955. DESIGN WIND AND SNOW LOADS SHALL BE AS PRESCRIBED BY THE UNIFORM BUILDING CODE. PRE–ENGINEERED ASSEMBLIES SHALL HAVE AN I.C.B.O. EVALUATION. ⚠1

ABBREVIATIONS

A.B.	ANCHOR BOLT	FAB	FABRICATE	R.B.	RAISER BAR
ADJ	ADJACENT	F.A.	FRAMING ANCHOR	RECOM	RECOMMEND
ADDL	ADDITIONAL	FDN	FOUNDATION	REM	REMAINING
ALT	ALTERNATE	FD	FLOOR DRAIN	REINF	REINFORCE (ING)
ARCH	ARCHITECT(URAL)	FIN	FINISHED	REQD	REQUIRED
		FLG	FLANGE	RM	ROOM
B.B.	BOND BEAM	FLR	FLOOR	R.O.	ROUGH OPENING
BETW	BETWEEN	F.O.C.	FACE OF CONCRETE	RT	RIGHT
BLDG	BUILDING	F.O.S.	FACE OF STUD		
BM	BEAM	FT	FOOT	S	SOUTH
BOT	BOTTOM	FTG	FOOTING	S.O.G.	SLAB ON GRADE
BRG	BEARING			S.W.	SHORT WAY
BSMT	BASEMENT	GA	GAGE	SCHED	SCHEDULE
		GALV	GALVANIZED	SECT	SECTION
C	CAMBER	G.S.N.	GENERAL STRUCTURAL NOTES	SHT	SHEET
CANT	CANTILEVER			SHTG	SHEATHING
C.J.	CONTROL JOINT	GWB	GYPSUM WALL BOARD	SIM	SIMILAR
CIP	CAST–IN–PLACE			SLV	SHORT LEG VERTICAL
CLG	CEILING	HORIZ	HORIZONTAL	SPEC	SPECIFICATION
CLR	CLEAR	HT	HEIGHT	SQ	SQUARE
CMU	CONCRETE MASONRY UNIT	ID	INSIDE DIAMETER	S.S.	SINGLE STIRRUP
		I.F.	INSIDE FACE	SST	STAINLESS STEEL
CNTR	CENTER	INFO	INFORMATION	STD	STANDARD
COL	COLUMN	INSUL	INSULATION	STIR	STIRRUP
CONC	CONCRETE	INT	INTERIOR	STL	STEEL
CONN	CONNECTION	INTER	INTERMEDIATE	STRUCT	STRUCTURAL
CONST	CONSTRUCTION			SUPT	SUPPORT
CONT	CONTINUOUS	JST	JOIST	SYMM	SYMMETRY
CONTR	CONTRACTOR	JT	JOINT		
				T&B	TOP AND BOTTOM
DBL	DOUBLE	LL	LIVE LOAD	TCX	TOP CHORD EXTENSION
DET	DETAIL	LLV	LONG LEG VERTICAL	TEMP	TEMPORARY
DIA	DIAMETER	LSH	LONG SLOTTED HOLES	THK	THICK
DIAG	DIAGONAL	L.W.	LONG WAY	THRU	THROUGH
D.I.C.A.	DRILLED–IN CONCRETE ANCHOR			T.O.B.	TOP OF BEAM
		MATL	MATERIAL	T.O.C.	TOP OF COLUMN
DIM	DIMENSION	MAX	MAXIMUM	T.O.S.	TOP OF STEEL
DL	DEAD LOAD	MECH	MECHANICAL	TS	TRIPLE STIRRUP
DN	DOWN	MFR	MANUFACTURER	T.O.W.	TOP OF WALL
DP	DEEP	MID	MIDDLE	TYP	TYPICAL
DS	DOUBLE STIRRUP	MIN	MINIMUM		
DWG	DRAWING			U.N.O.	UNLESS NOTED OTHERWISE
DWL	DOWEL	N.T.S.	NOT TO SCALE		
E	EAST	O.C.	ON CENTER	VENT	VENTILATION
(E)	EXISTING	OD	OUTSIDE DIAMETER	VERT	VERTICAL
EA	EACH	O.F.	OUTSIDE FACE	VMC	VERT MOVEMENT CLIP
E.B.	EXPANSION BOLT	OFC	OUTSIDE FACE OF CONCRETE		
E.F.	EACH FACE			W	WIDE
E.J.	EXPANSION JOINT	OFV	OUTSIDE FACE VENEER	WF	WIDE FLANGE
EL.	ELEVATION	OPNG	OPENING	W/	WITH
ELEC	ELECTRICAL	OPP	OPPOSITE	W/O	WITHOUT
ELEV	ELEVATOR	OPT	OPTIONAL	W.W.F.	WELDED WIRE FABRIC
EMB	EMBEDMENT			WP	WATERPROOF(ING)
EQ	EQUAL	PCF	POUNDS PER CUBIC FT		
EQUIP	EQUIPMENT	PERP	PERPENDICULAR	**SYMBOLS**	
E.S.	EACH SIDE	PLCS	PLACES	&	AND
E.W.	EACH WAY	PLF	POUNDS PER LINEAL FT	℄	CENTER LINE
EXIST	EXISTING	PLY	PLYWOOD	Ø	DIAMETER
EXT	EXTERIOR	PSI	POUNDS PER SQ INCH	ℙ	PLATE
EXP	EXPANSION	PSF	POUNDS PER SQ FOOT	⊡	SQUARE
EXT	EXTERIOR			⊥	PERPENDICULAR

GOOD SAMARITAN HOSPITAL

WEST WING ADDITION

MARTENS CONSULTING ENGINEERS CHAN
Martens/Chan Inc.
400 Mercer, Suite 410
Seattle, WA 98109–4641
TEL (206) 298–9818
FAX (206) 298–9876

M A H L U M
architects

2505 Third ave. SUITE 219 Seattle, WA 98121
206 441.4151
206 441.0478 f

1231 NW Hoyt SUITE 102 Portland, OR 97209
503 224.4032
503 224.0918 f

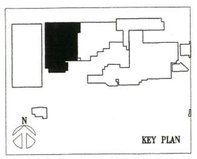
RANDOLF G. MARTENS — STATE OF WASHINGTON — 20402 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 5/15/01

02–15–00 100% CD DOCUMENTS

Project Number: 98119.00
Date: 10/15/99
Drawn: EQ
Checked: RM

100% Bid Documents

Revisions:
⚠1 10/15/99
⚠4 12/22/99 ADDENDUM 3



GENERAL STRUCTURAL NOTES

S1.0.1