Structural Clarification Item

8-02-2022

Date: **August 2, 2022**

Project: **StruXure - McArthur**
8609 SE 78th St
Mercer Island, WA 98040

Project Number: **22-07-090**

To: **Brandy Tucker**
StruXure Outdoor

From: **Sean Smith, E.I.T.**

Re: Building Jurisdiction Comments

Reference signed and sealed aluminum pergola design dated May 27,2022:

1.) Eclipse Engineering, P.C. (EEPC), has provided fastener calculations for a 2" distance between blocking and the screw head.

1. *Provide Max distance between blocking and head of screw to be considered in design*

2.) EEPC has provided calculations for a new ledger/blocking with a minimum thickness of 1-1/2".

2. *Verify that there is a 3" of embed depth in ledger of the house to comply w/the detail and designed and calculated.*

3.) EEPC has analyzed the existing structure for the additional loading of the host structure.

3. *An analysis of host structure applied loads provide justification that house structure can properly handle design load referenced on last page of structural package.*

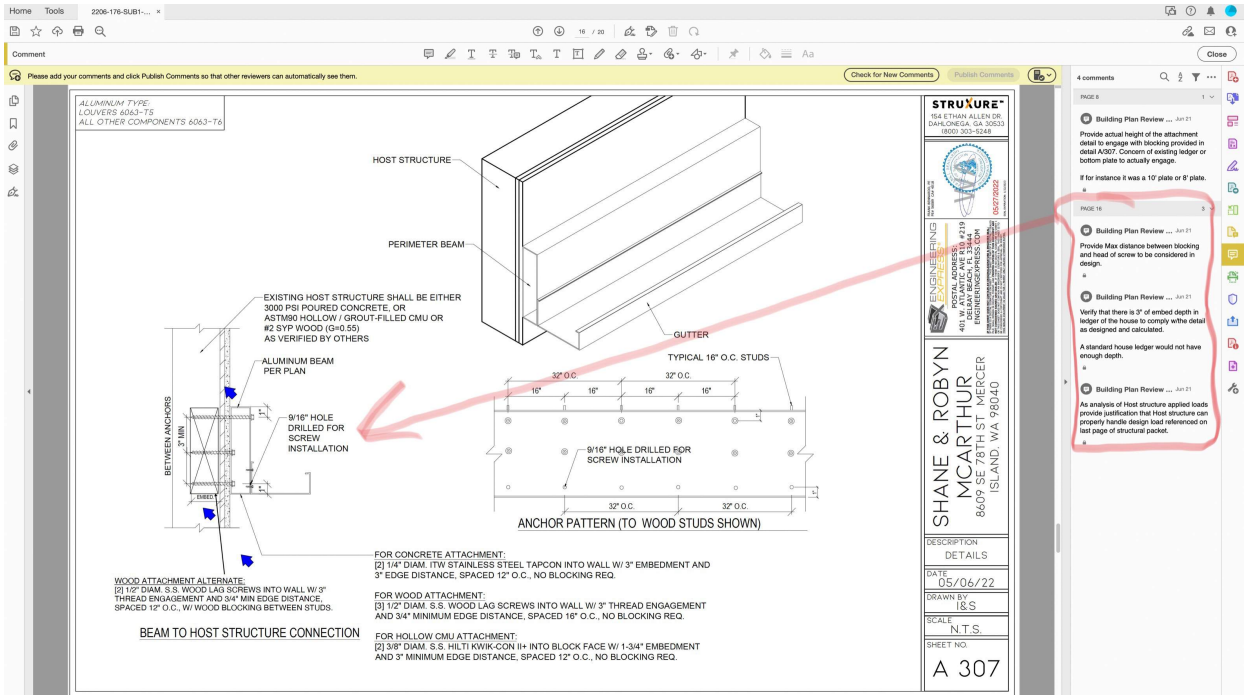
4.) EEPC determined new blocking must be installed between host studs to provide ledger connections at the proposed pergola height of 10'-0".

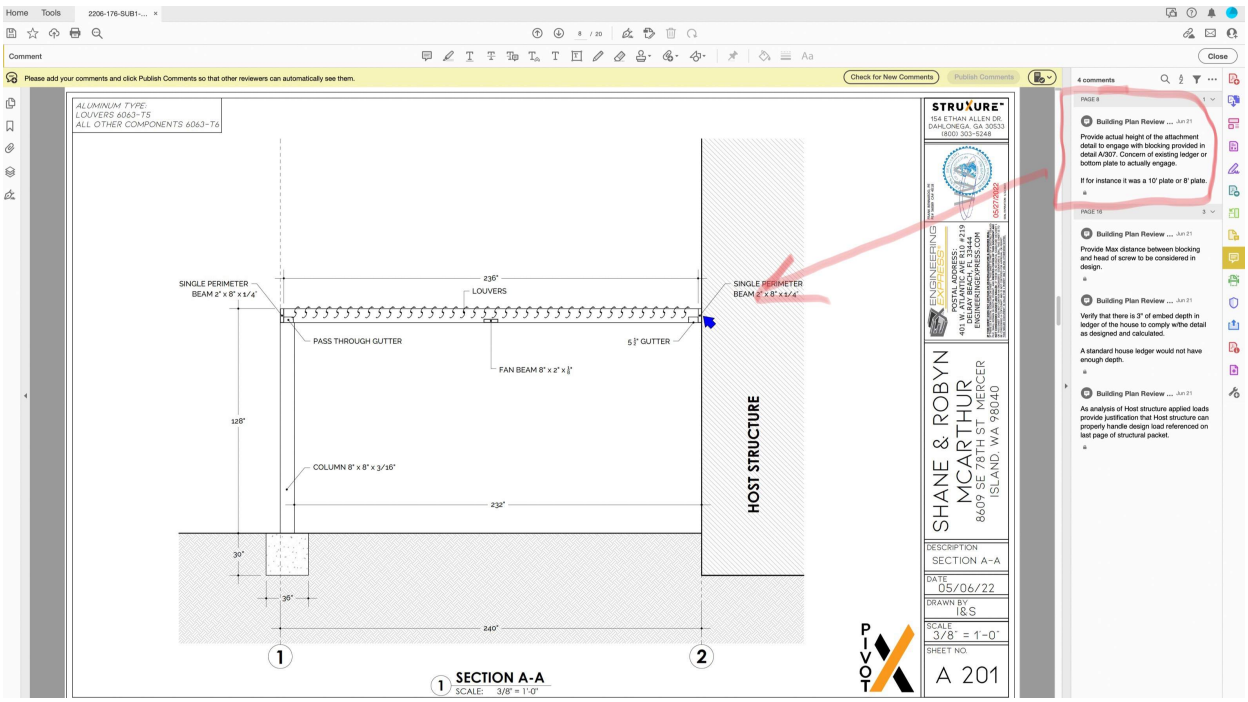
4. *Provide actual height of the attachment detail to engage with blocking provided in detail A/307. Concern of existing ledger or bottom plate to actually engage.*

Attachment: *Building Jurisdiction Comments, Assumed Plan Dimensions, Redlined Detail, Existing Calculations, Fastener Calculations*

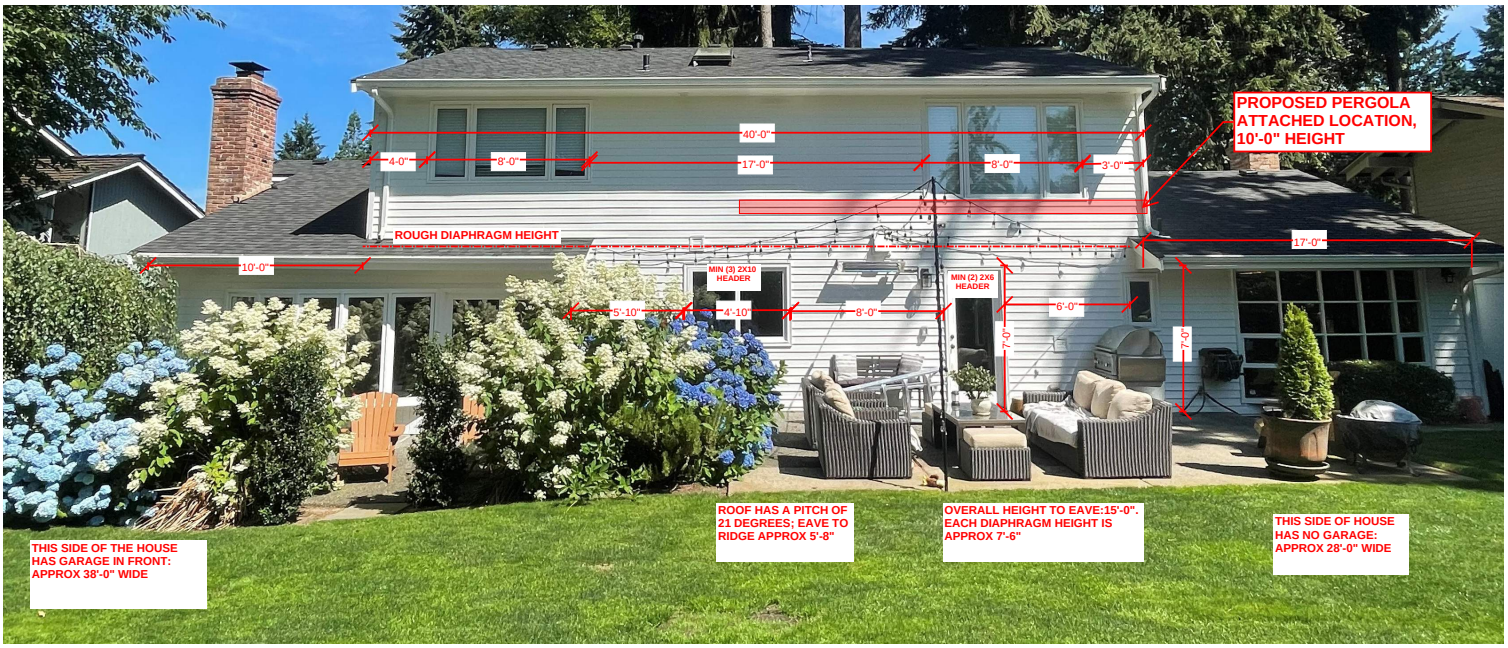
END OF STRUCTURAL CLARIFICATION ITEM

BUILDING JURISDICTION COMMENTS



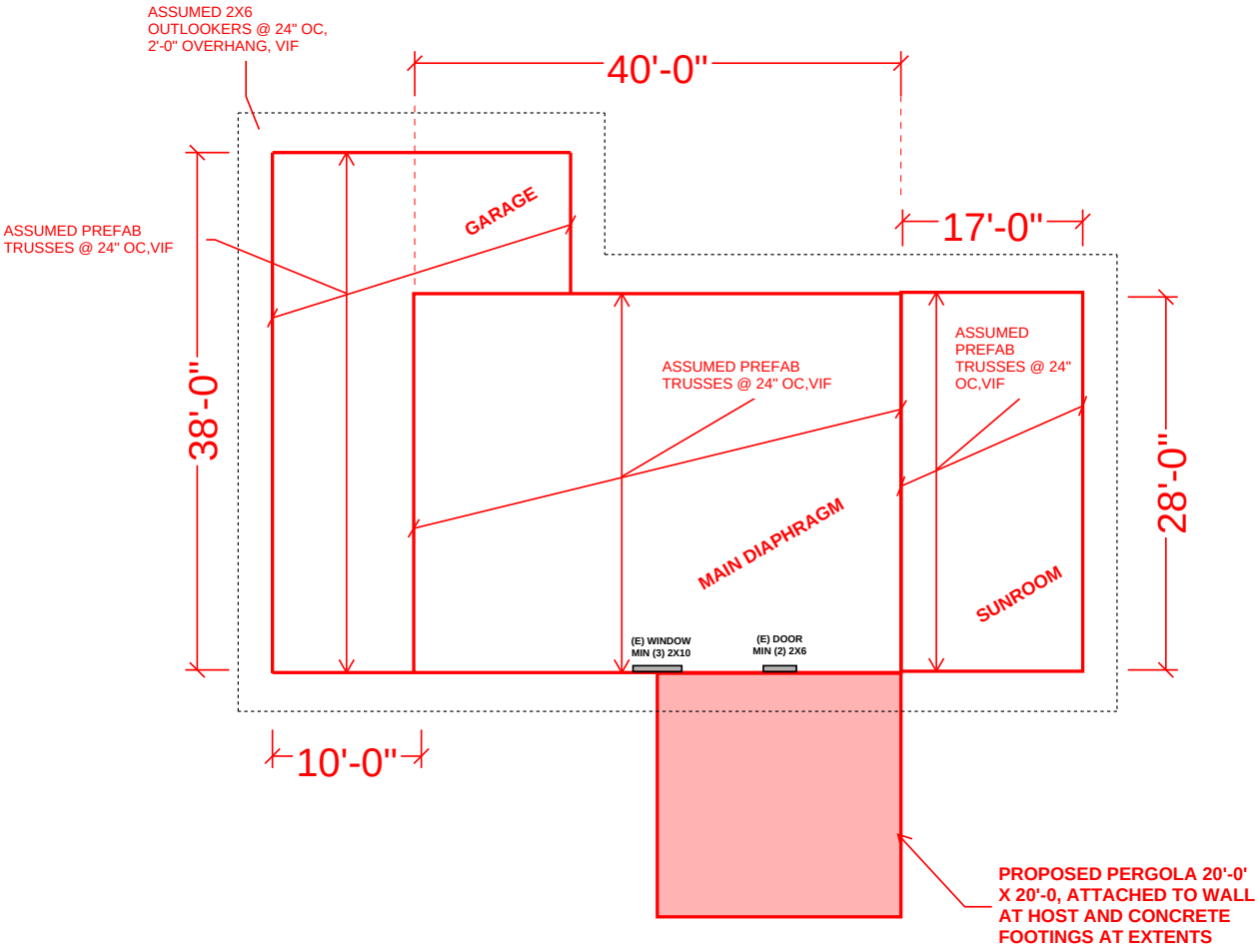


HOUSE ELEVATION WITH DIMENSIONS

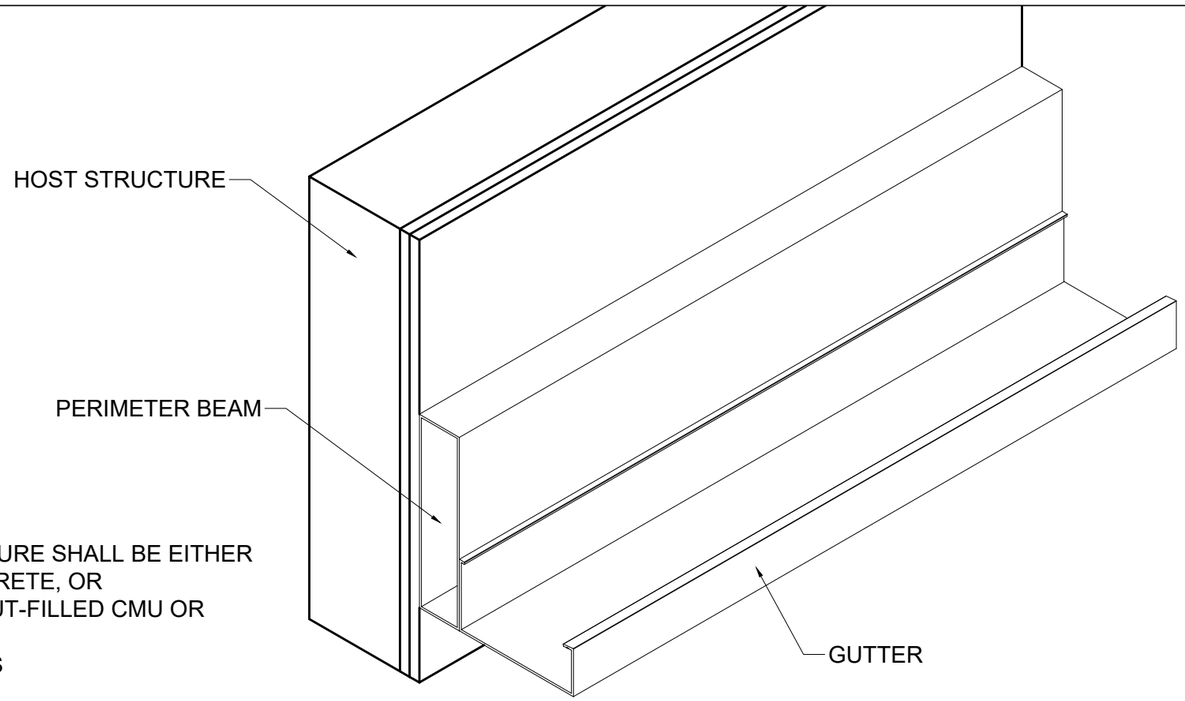


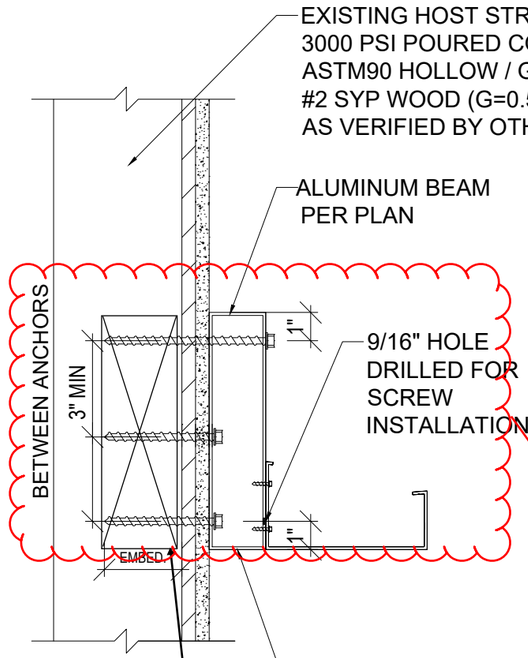
ASSUMED HOUSE PLAN & DIMENSIONS

TYPICAL NOTE: CONTRACTOR TO VERIFY IN FIELD (VIF)



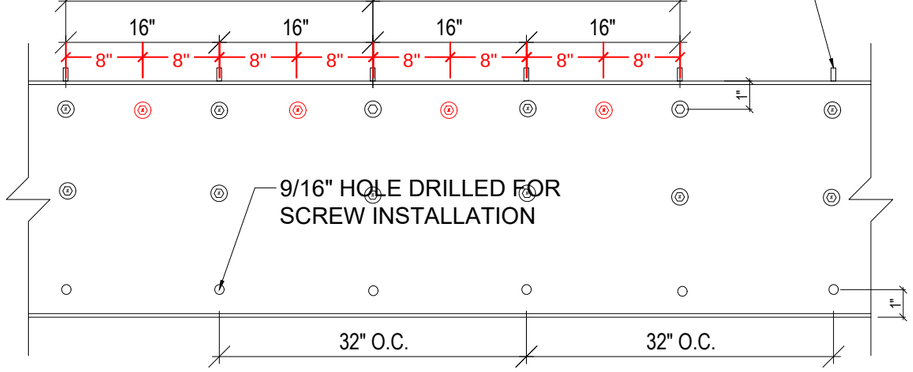
ALUMINUM TYPE:
LOUVERS 6063-T5
ALL OTHER COMPONENTS 6063-T6





WOOD ATTACHMENT ALTERNATE:
[2] 1/2" DIAM. S.S. WOOD LAG SCREWS INTO WALL W/ 3" THREAD ENGAGEMENT AND 3/4" MIN EDGE DISTANCE, SPACED 12" O.C., W/ WOOD BLOCKING BETWEEN STUDS.

BEAM TO HOST STRUCTURE CONNECTION



ANCHOR PATTERN (TO WOOD STUDS SHOWN)

FOR CONCRETE ATTACHMENT:
[2] 1/4" DIAM. ITW STAINLESS STEEL TAPCON INTO WALL W/ 3" EMBEDMENT AND 3" EDGE DISTANCE, SPACED 12" O.C., NO BLOCKING REQ.

FOR WOOD ATTACHMENT:
[3] 1/2" DIAM. S.S. WOOD LAG SCREWS INTO WALL W/ 3" THREAD ENGAGEMENT AND 3/4" MINIMUM EDGE DISTANCE, SPACED 16" O.C., NO BLOCKING REQ.

FOR HOLLOW CMU ATTACHMENT:
[2] 3/8" DIAM. S.S. HILTI KWIK-CON II+ INTO BLOCK FACE W/ 1-3/4" EMBEDMENT AND 3" MINIMUM EDGE DISTANCE, SPACED 12" O.C., NO BLOCKING REQ.

STRUXURE™
154 ETHAN ALLEN DR.
DAHLONEGA, GA 30533
(800) 303-5248

FRANK BENNARDO, PE
PE# 56089 CA# 4018

05/27/2022

SEAL EXPIRATION: 1/27/2023

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SHANE & ROBYN MCARTHUR
8609 SE 78TH ST MERCER ISLAND, WA 98040

DESCRIPTION	DETAILS
DATE	05/06/22
DRAWN BY	I&S
SCALE	N.T.S.
SHEET NO.	A 307

Struxure- McAthur Existing Conditions

Governing Conditions

$DL_p := 5\ psf$	Dead Load of Pergola	$trib_p := 10\ ft$	Pergola tributary Length
$DL_r := 18\ psf$	Dead Load of Roof (Assumed)	$w_{D1} := 28\ ft$	Width of Main Diaphragm (Assumed)
$DL_f := 15\ psf$	Dead Load of Floor (Assumed)	$l_{D1} := 40\ ft$	Length of Main Diaphragm (Assumed)
$DL_w := 15\ psf$	Dead Load of Wall (Assumed)	$h_w := 7.5\ ft$	Height of Wall (Assumed)
$SL := 30\ psf$	Snow Load	$h_e := 5.67\ ft$	Height from Eave to Ridge (Assumed)
$h_p := 10.67\ ft$	Height of Pergola	$WL_w := 18\ psf$	ASD Roof Wind Load (Assumed)
$S_{DS} := 1.169$	Design Resp. Acceleration	$WL_r := 5\ psf$	ASD Wind Load (Assumed)

Vertical Loading

Loading on House **Assuming Trusses, Contractor to Verify**

Struxure to verify Pergola bears on roof line , REF attch'd drawing

$w_{D1} := 28\ ft$ Width of House Diaphragm

$trib_w := \frac{w_{D1}}{2} = 14\ ft$ Tributary width of house

$w_{exst} := trib_w \cdot (DL_r + SL + DL_f) = 882\ plf$ Existing loading on Wall Line

$w_{new} := trib_p \cdot (DL_p + SL) = 350\ plf$ New Imposed Vertical Loading due to Pergola

Refer to Enercalc for Header sizing

Lateral Loading

Attaching to House

$h_w = 7.5\ ft$ Height of Wall (Assumed)

$h_e = 5.7\ ft$ Height from Eave to Ridge (Assumed)

Wind Development

Pergola Wind Load

$WL_p := 19.6\ psf$ Service Pergola Wind Load (from provided calcs)

$WL_{ASD} := 0.6 \cdot WL_p = 11.8\ psf$ ASD Pergola Wind Load

$A_p := 8\ in \cdot h_p = 7.1\ ft^2$ Pergola Wind Profile

$F_{plf} := WL_{ASD} \cdot \frac{A_p}{20\ ft} = 4.2\ plf$ Additional Perogal Loading

Existing Structure Code Check (Assumed Loading, pergola to increase load into lower story diaphragm)

$A_W := \frac{w_{D1}}{2} \cdot \left(\frac{1}{2} h_e + h_w \right) = 144.7 \ ft^2$ Wall Wind Profile

$Lat_W := WL_w \cdot A_W = 2604.4 \ lbf$ Concentrated Wind Load into Wall Line in Question

$Line_1 := 20 \ ft$ Assumed Total Segment Lengths

$WL_1 := \frac{Lat_W}{Line_1} = 130.2 \ plf$ Assumed Wind Loading on Wall Line

$Result_1 := \text{if}\left(F_{plf} \le 0.1 \cdot WL_1, \text{“Okay, w/i 10\% Allowable”}, \text{“NG”}\right) = \text{“Okay, w/i 10\% Allowable”}$

$Result_1 = \text{“Okay, w/i 10\% Allowable”}$

Seismic Development

Assumed House Seismic Base Shear

Three Main Diaphragms of existing structure - Main (w/ Upper and Lower story), Sunroom, Garage)

Main ---

$w_{D1} = 28 \ ft$ Width of Main

$l_{D1} = 40 \ ft$ Length Main

$h_{D1} := 11.25 \ ft$ Trib wall Height accounting for both stories

$A_{D1} := w_{D1} \cdot l_{D1} = 1120 \ ft^2$ Main Diaphragm Plan Area

$A_{w1} := h_{D1} \cdot 2 \left(w_{D1} + l_{D1} \right) = 1530 \ ft^2$ Main Diaphragm Wall Area

$W_{D1} := A_{D1} \cdot \left(0.2 \ SL + DL_r + DL_f \right) + A_{w1} \cdot DL_w = 66.6 \ kip$ Total Base Weight of Main Daiphragm (Includes Roof, 20% Snow, Floor, and Walls)

Sunroom ---

$w_{D2} := 28\ ft$ Width of Sunroom
$l_{D2} := 17\ ft$ Length of Sunroom
$h_{D2} := 3.75\ ft$ Trib Wall Height

$A_{D2} := w_{D2} \cdot l_{D2} = 476\ ft^2$ Sunroom Diaphragm Plan Area

$A_{w2} := h_{D2} \cdot 2\ (w_{D2} + l_{D2}) = 337.5\ ft^2$ Sunroom Diaphragm Wall Area

$W_{D2} := A_{D2} \cdot (0.2\ SL + DL_r) + A_{w2} \cdot DL_w = 16.5\ kip$ Total Base Weight of Sunroom Daiphragm (Includes Roof, 20% Snow, and Walls)

Garage ---

$w_{D3} := 38\ ft$ Width of Garage
$l_{D3} := 10\ ft$ Length of Garage
$h_{D3} := 3.75\ ft$ Trib Height of Garage

$A_{D3} := w_{D3} \cdot l_{D3} = 380\ ft^2$ Garage Diaphragm Plan Area

$A_{w3} := h_{D3} \cdot 2\ (w_{D3} + l_{D3}) = 360\ ft^2$ Garage Diaphragm Wall Area

$W_{D3} := A_{D3} \cdot (0.2\ SL + DL_r) + A_{w3} \cdot DL_w = 14.5\ kip$ Total Base Weight of Garage Daiphragm (Includes Roof, 20% Snow, and Walls)

Seismic Factor

$\rho := 1.3$ Seismic Redundancy Factor

$C_s := \frac{S_{DS}}{\left(\frac{6.5}{1}\right)} \cdot (\rho)\ 0.7 = 0.1637$ ASD Seismic Factor for existing structure (Typ Wood Shear Wall)

Existing Structure Code Check

$E_h := C_s \cdot (W_{D1} + W_{D2} + W_{D3}) = 15979.2\ lbf$ Total Seismic Base Shear

$Lat_E := \frac{E_h \cdot 14\ ft}{w_{D1}} = 8\ kip$ Concentrated Seismic Load for Wall Line in Question

$EL_1 := \frac{Lat_E}{Line_1} = 399.5\ plf$ Assumed Seimsic Loading into Wall Line

$E_p := 4.7\ psf$ Pergola Seismic Deisign (per attached calculations)

$P_{ASD} := 0.7 \cdot E_p = 3.3\ psf$ ASD Seismic Loading

$trib_p = 10\ ft$ Pergola Trib Length

$F_{plf1} := P_{ASD} \cdot trib_p = 32.9\ plf$ Additional Load put into Shear Wall

$Result_1 := \text{if}\left(F_{plf1} \le 0.1 \cdot EL_1, \text{“Okay, w/i 10\% Allowable”}, \text{“NG”}\right) = \text{“Okay, w/i 10\% Allowable”}$

$Result_1 = \text{“Okay, w/i 10\% Allowable”}$

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Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 27 JUL 2022, 12:02PM

Wood Beam

File: McArthur.ec6

Lic. # : KW-06015235

ECLIPSE ENGINEERING, P.C.

DESCRIPTION: BM-01 (Door)

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

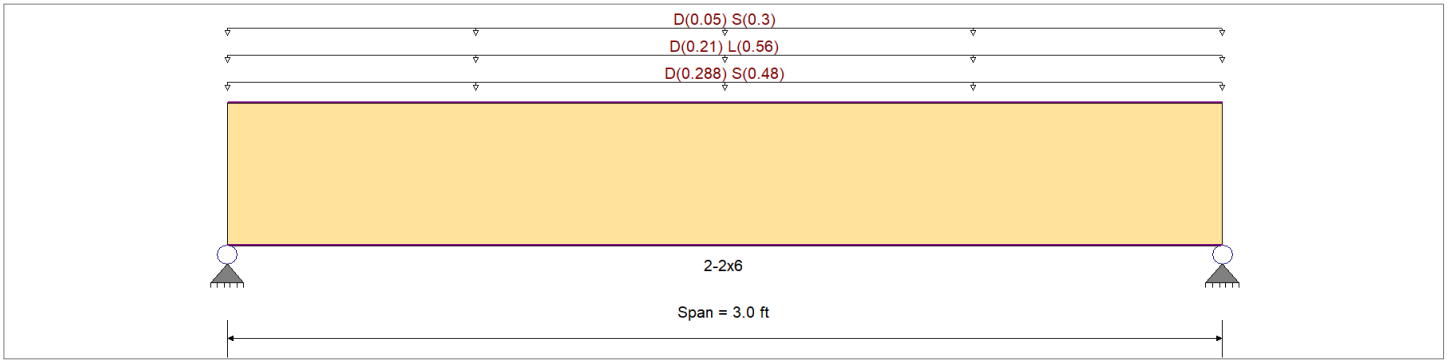
Wood Species : Douglas Fir-Larch
Wood Grade : No.2

Fb +	900 psi
Fb -	900 psi
Fc - Prll	1350 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	575 psi

E : Modulus of Elasticity

Ebend- xx	1600 ksi
Eminbend - xx	580 ksi
Density	31.21 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling



Applied Loads

Service loads entered. Load Factors will be applied for calculations

Uniform Load : D = 0.0180, S = 0.030 ksf, Tributary Width = 16.0 ft, (Existing Roof)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 14.0 ft, (Existing Floor)
Uniform Load : D = 0.0050, S = 0.030 ksf, Tributary Width = 10.0 ft, (New Pergola)

W/IN 5%, OKAY

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	1.030 : 1	Maximum Shear Stress Ratio	=	0.717 : 1
Section used for this span		2-2x6	Section used for this span		2-2x6
fb: Actual	=	1,386.15 psi	fv: Actual	=	148.40 psi
Fb: Allowable	=	1,345.50 psi	Fv: Allowable	=	207.00 psi
Load Combination		+D+0.750L+0.750S	Load Combination		+D+0.750L+0.750S
Location of maximum on span	=	1.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.021 in	Ratio =	1675 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.043 in	Ratio =	841 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.465	0.323	0.90							0.62	489.12	1053.00	0.58	52.36	162.00
+D+L					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.845	0.588	1.00							1.25	988.96	1170.00	1.16	105.87	180.00
+D+S					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.881	0.613	1.15							1.49	1,185.32	1345.50	1.40	126.90	207.00
+D+0.750L					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.591	0.411	1.25							1.09	864.00	1462.50	1.02	92.50	225.00
+D+0.750L+0.750S					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	1.030	0.717	1.15							1.75	1,386.15	1345.50	1.63	148.40	207.00
+0.60D					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.157	0.109	1.60							0.37	293.47	1872.00	0.35	31.42	288.00

Wood Beam

DESCRIPTION: BM-01 (Door)

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0428	1.511		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.330	2.330
Overall MINimum	1.170	1.170
D Only	0.822	0.822
+D+L	1.662	1.662
+D+S	1.992	1.992
+D+0.750L	1.452	1.452
+D+0.750L+0.750S	2.330	2.330
+0.60D	0.493	0.493
L Only	0.840	0.840
S Only	1.170	1.170

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Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 27 JUL 2022, 12:06PM

Wood Beam

File: McArthur.ec6

Lic. # : KW-06015235

ECLIPSE ENGINEERING, P.C.

DESCRIPTION: BM-02 (Window)

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

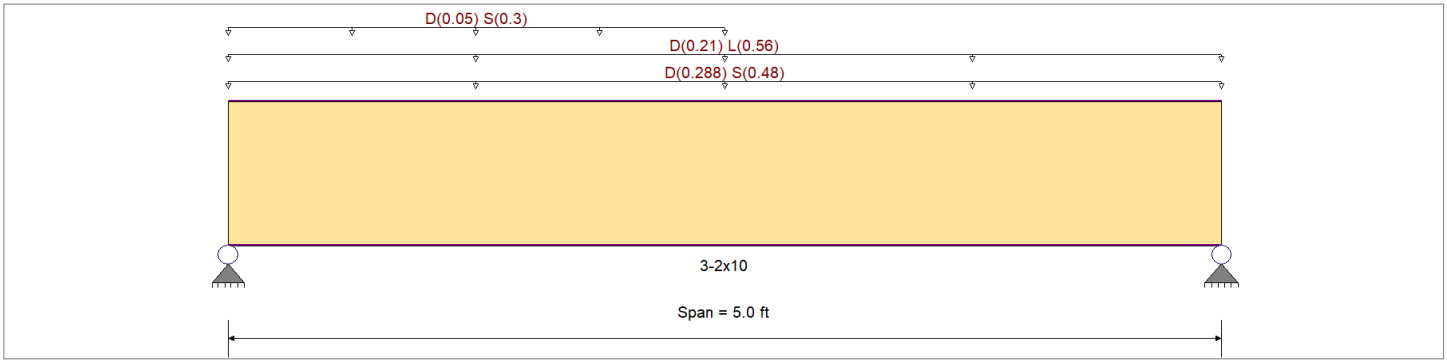
Wood Species : Douglas Fir-Larch
Wood Grade : No.2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	900.0 psi
Fb -	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations

Uniform Load : D = 0.0180, S = 0.030 ksf, Tributary Width = 16.0 ft, (Existing Roof)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 14.0 ft, (Existing Floor)
Uniform Load : D = 0.0050, S = 0.030 ksf, Extent = 0.0 -->> 2.50 ft, Tributary Width = 10.0 ft, (New Pergola)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.728 : 1	Maximum Shear Stress Ratio	=	0.439 : 1
Section used for this span		3-2x10	Section used for this span		3-2x10
fb: Actual	=	828.95 psi	fv: Actual	=	90.82 psi
Fb: Allowable	=	1,138.50 psi	Fv: Allowable	=	207.00 psi
Load Combination		+D+0.750L+0.750S	Load Combination		+D+0.750L+0.750S
Location of maximum on span	=	2.391 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

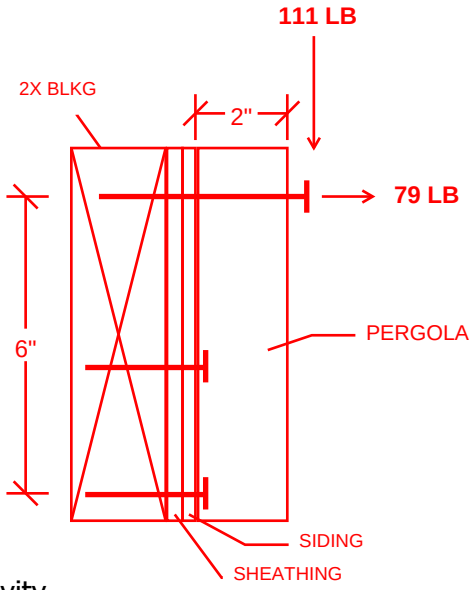
Maximum Deflection

Max Downward Transient Deflection	0.019 in	Ratio =	3195 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.042 in	Ratio =	1422 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.343	0.204	0.90	1.100	1.00	1.00	1.00	1.00	1.00	1.64	305.79	891.00	0.92	33.11	162.00
+D+L					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.639	0.378	1.00	1.100	1.00	1.00	1.00	1.00	1.00	3.38	632.95	990.00	1.89	68.09	180.00
+D+S					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.595	0.363	1.15	1.100	1.00	1.00	1.00	1.00	1.00	3.62	677.15	1138.50	2.08	75.08	207.00
+D+0.750L					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.445	0.264	1.25	1.100	1.00	1.00	1.00	1.00	1.00	2.95	551.15	1237.50	1.65	59.35	225.00
+D+0.750L+0.750S					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.728	0.439	1.15	1.100	1.00	1.00	1.00	1.00	1.00	4.43	828.95	1138.50	2.52	90.82	207.00
+0.60D					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.116	0.069	1.60	1.100	1.00	1.00	1.00	1.00	1.00	0.98	183.47	1584.00	0.55	19.86	288.00

Eccentric Fastening into Host



$l := 20\ ft$ Length of Pergola
$w_V := 500\ plf$ Distributed Vertical Load (per provided calcs)
$w_T := 188\ plf$ Distributed Lateral Load (per provided calcs)
$V_t := w_V \cdot l = 10\ kip$ Concentrated Vertical Load
$T_t := w_T \cdot l = 3760\ lbf$ Concetrated Lateral Load
$l_{UB} := 8\ in$ New Unbraced Length

$n := 3$ Number of fasteners
$d := 2\ in$ Eccentricity Distance
$s := 6\ in$ Distance between fasteners

$V_M := w_V \cdot \frac{l_{UB}}{n} = 111.1\ lbf$ Shear Loading due to Gravity

$T_M := w_T \cdot \frac{l_{UB}}{n} = 41.8\ lbf$ Tension Loading due Lateral

$T_{add} := V_M \cdot \frac{d}{s} = 37\ lbf$ Additional Tension due to fastener eccentricity

$T_{new\_M} := T_M + T_{add} = 78.8\ lbf$ New Withdrawal Value of eccentric screw

$C_D := 1.15$ Snow Load Duration Factor

Per ESR-2236

$T_A := 172\ \frac{lbf}{in}$ Withdrawal Capacity

$l_{embed} := 1.25\ in$ SDS25134 thread length

$V_A := 250\ lbf$ Shear Capacity

$T_{A\_new} := T_A \cdot C_D \cdot l_{embed} = 247.3\ lbf$ Allowable Withdrawal

$V_{A\_new} := V_A \cdot C_D = 287.5\ lbf$ Allowable Shear

$\frac{V_M}{V_{A\_new}} + \frac{T_M + T_{new\_M}}{T_{A\_new}} = 0.87$ Unity Check

RECOMMENDED: (2) SIMSPON SDS25134 SCREWS @ 16" OC, BTM & (1) SIMSPON SDS25134 SCREW @ 8" OC, TOP W/ BLKG BETWEEN STUDS

TABLE 2—REFERENCE LATERAL DESIGN VALUES (*Z*) FOR SINGLE SHEAR STEEL-TO-WOOD CONNECTIONS WITH SDS SCREWS[1,2,5,6,7,8]

SCREW LENGTH (inches)	STEEL SIDE MEMBER DESIGN THICKNESS[3, 4], t_s (inches)					
	0.0584 (No. 16 gage)	0.0721 (No. 14 gage)	0.1026 (No. 12 gage)	0.1342 (No. 10 gage)	0.1795 (No. 7 gage)	0.2405 (No. 3 gage)
	Lateral Design Value (*Z*) (lbf)					
1 1/2	250	250	250	250	250	250
1 3/4	250	250	250	250	250	250
2	250	290	290	290	290	290
2 1/2	250	390	390	420	420	420
3	250	420	420	420	420	420
3 1/2	250	420	420	420	420	420
4 1/2	250	420	420	420	420	420
5	250	420	420	420	420	420
6	250	420	420	420	420	420
8	250	420	420	420	420	420

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 ksi = 6.89 MPa.

[1]The side member must be steel having a minimum tensile strength (F_u) equal to 45 ksi when the steel member design thickness is from 0.0584 inch to 0.1795 inch, and a minimum F_u equal to 52 ksi when the steel member design thickness is 0.2405 inch.
[2]The main member must be wood having a minimum assigned specific gravity of 0.50, such as Douglas fir–larch, and must be sufficiently sized to accommodate the screw length less the thickness of the side member. Values are also applicable for fasteners installed into the face of engineered wood described in Section 3.2.2 and having a minimum equivalent specific gravity of 0.50.
[3]The uncoated minimum steel thickness of the cold-formed product delivered to the jobsite must not be less than 95 percent of the tabulated design thickness, t_s.
[4]Holes in the steel side member must be predrilled or prepunched. Hole diameter must comply with Section 3.2.3 of this report.
[5]Tabulated lateral design values (*Z*) must be multiplied by all applicable adjustment factors included in the NDS for dowel-type fasteners to determine allowable loads for use with ASD and/or design loads for use with LRFD.
[6]Tabulated values are applicable to screws installed perpendicular to the faces of the wood member with the screw axis perpendicular to wood fibers.
[7]Minimum fastener penetration must be equal to the screw length less the thickness of the metal side plate.
[8]See Table 4A for connection geometry requirements.

TABLE 3—REFERENCE LATERAL DESIGN VALUES (*Z*) FOR SINGLE SHEAR WOOD-TO-WOOD CONNECTIONS WITH SDS SCREWS[2,3,4,5,6]

SCREW LENGTH (inches)	WOOD SIDE MEMBER ACTUAL THICKNESS[1], t_s (inches)	
	1 1/2	1 3/4
	Lateral Design Value (*Z*) (lbf)	
2 1/2	190	—
3	280	—
3 1/2	340	340
4 1/2	350	340
5	350	340
6	350	340
8	350	340

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]The actual thickness of the wood side member, t_s, must be either 1 1/2 or 1 3/4 inches, as specified in the table. The wood side member thickness is an absolute value, and is not a minimum or maximum value.
[2]The tabulated lateral design values (*Z*) are based on wood members having a minimum assigned specific gravity of 0.50, such as Douglas fir–larch. Values are also applicable for fasteners installed into the face of engineered wood described in Section 3.2.2 and having a minimum equivalent specific gravity of 0.50.
[3]The thickness of the wood main member must be equal to or greater than the screw length less the thickness of the wood side member.
[4]Tabulated lateral design values (*Z*) must be multiplied by all applicable adjustment factors included in the NDS for dowel-type fasteners to determine allowable loads for use with ASD and/or design loads for use with LRFD.
[5]Screws must be installed into the side grain of the wood members with the screw axis perpendicular to wood fibers.
[6]See Table 4A for connection geometry requirements.

TABLE 5—REFERENCE WITHDRAWAL DESIGN VALUE FOR SDS SCREWS INSTALLED PERPENDICULAR TO THE FACE OF A WOOD MAIN MEMBER[1,3]

SDS SCREW DIMENSIONS (in.)		MINIMUM EMBEDDED THREAD LENGTH[2] (inches)	REFERENCE WITHDRAWAL DESIGN VALUE, *W* (lbf/inch)
Screw Length, *L1*	Thread Length, *T*		
1 1/2	1	1	172
1 3/4	1 1/4		
2	1 1/4		
2 1/2	1 1/2		
3	2		
3 1/2	2 1/4		
4 1/2	2 3/4		
5	2 3/4		
6	3 1/4		
8	3 1/4		

For **SI:** 1 inch = 25.4 mm, 1 lbf/inch = 175 N/m, 1 lbf = 4.45N.

[1]The tabulated reference withdrawal design value must be multiplied by all applicable adjustment factors included in the NDS for dowel-type fasteners to determine allowable loads for use with ASD and/or design loads for use with LRFD.
[2]Embedded thread length is that portion held in the main member including the screw tip.
[3]The tabulated withdrawal design value (*W*) is based on wood members having a minimum assigned specific gravity of 0.50, such as Douglas fir–larch. Values are also applicable for fasteners installed into the face of engineered wood described in Section 3.2.2 which have a minimum equivalent specific gravity of 0.50.

TABLE 6— EVALUATED EXPOSURE CONDITIONS FOR SIMPSON STRONG-TIE SDS FASTENERS WITH DOUBLE BARRIER COATING

EXPOSURE CONDITION	TYPICAL APPLICATIONS	USE LIMITATIONS
1	Treated Wood in dry use applications	Limited to use where equilibrium moisture content of the chemically treated wood meets the dry services condition as described in the NDS
3	General construction	Limited to freshwater and chemically treated wood exposure, e.g., no saltwater exposure

Wood Beam

DESCRIPTION: BM-02 (Window)

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0422	2.482		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.711	3.367
Overall MINimum	1.763	1.388
D Only	1.339	1.276
+D+L	2.739	2.676
+D+S	3.101	2.664
+D+0.750L	2.389	2.326
+D+0.750L+0.750S	3.711	3.367
+0.60D	0.803	0.766
L Only	1.400	1.400
S Only	1.763	1.388