City of Puyallup
Building
ACCEPTED

JMontgomery
03/01/2024
2:22:59 PM

PRMH20240272

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

FULL SIZED LEDGIBLE COLOR REPORT IS REQUIRED TO BE PROVIDED BY THE PERMITTEE ON SITE FOR ALL INSPECTIONS

QUANTUM
CONSULTING ENGINEERS

February 2, 2024

STRUCTURAL CALCULATIONS
(Permit Submittal)

CENTERIS DATA CENTER MEP T+I
1023 39th Avenue SE
Puyallup, WA 98374

Quantum Job Number: 23444.01

SCOTT H. TINKER
STATE OF WASHINGTON
36098
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

Prepared for:
CENTERIS
18300 Cascade Ave. S
Suite 220
Seattle, WA 98188

Prepared by:
QUANTUM CONSULTING ENGINEERS
1511 Third Avenue, Suite 323
Seattle, WA 98101
TEL 206.957.3900
FAX 206.957.3901

PRMH20240272

Structural Design Criteria

Building Code: 2018 International Building Code
Building Department: City of Puyallup

Seismic Criteria

S_s:	1.26	I_e:	1.25
S_1:	0.43	Seismic Soil Site Class:	D
S_{ds}:	1.01	Seismic Design Category:	D
S_{d1}:	0.50		
Rp:	2.50	Interior Non-Structural Walls and Partitions	
ap:	1.00		
W:	12.00 psf	(Accounts for Fans and Framing)	
z:	25.00		
h:	70.00		

X	Fp =	4.13	psf	ASCE 7-16 EQ 13.3-1	Controls
	Fpmin =	1.81	kips	ASCE 7-16 EQ 13.3-2	
	Fpmax =	9.65	kips	ASCE 7-16 EQ 13.3-3	

Structural Steel:

Wide-Flange Sections: A-992	Fy= 50,000 PSI
Miscellaneous Sections: A-36	Fy= 36,000 PSI
Tube Sections: A-500	Fy= 46,000 PSI
Pipe Sections: A-53	Fy= 35,000 PSI
Welding	Fy= 70,000 PSI

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Hazards by Location

Search Information

Address:	1015 39th Ave SE Puyallup, WA 98374
Coordinates:	47.1590004, -122.2794422
Elevation:	489 ft
Timestamp:	2023-12-01T15:14:56.409Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	III
Site Class:	D-default

Basic Parameters

Name	Value	Description
S_S	1.257	MCE_R ground motion (period=0.2s)
S_1	0.433	MCE_R ground motion (period=1.0s)
S_{MS}	1.508	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.005	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.914	Coefficient of risk (0.2s)
CR_1	0.898	Coefficient of risk (1.0s)
PGA	0.5	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.6	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	1.257	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.375	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.433	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.483	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

EBM-PAPST – ECM Axial Fans

Qty. (120) W3 Series Axial Fans, Sized for 16,250CFM @ .50" TSP EACH

- 1070 RPM
- 460V/3Ph
- Weight: 120.38 lbs/each
- Operation and alarm display with LED
- External 15-50 VDC input (parameterization)
- Alarm relay
- Integrated PI controller
- Configurable inputs/outputs(I/O)
- Motor current limitation
- RS-485 MODBUS Connectivity
- **Soft start internal to fan motor control**
- Voltage output 3.3-24 VDC, Pmax=800mW
- Thermal overload protection for electronics/motor
- Line undervoltage/phase failure detection

Notes:

- Fans shipped lose for field mounting, wiring and control. Please see adder below for Johnson Barrow provided master controller for each fan array. Note – electrical will need to be provided by others regardless of control option selected.
- Mounting frame required for fan array (by others). Please refer to dimensional drawing provided for mounting dimensions. Mounting holes roughly 40" center to center.
- Note that each fan is capable of up to 18,181CFM @ .50" TSP
- **Pricing includes up to two days of on-site training, assistance for fan start-up by Johnson Barrow. Thereafter, fan start-up by contractor.**
- **Fan lead time is currently 13 weeks plus transit, ARO – Lead time subject to change based upon stock at time of order.**

Fan Array Rating Sheet - Typ. of QTY (40) Fans (3 Total Arrays Submitted)

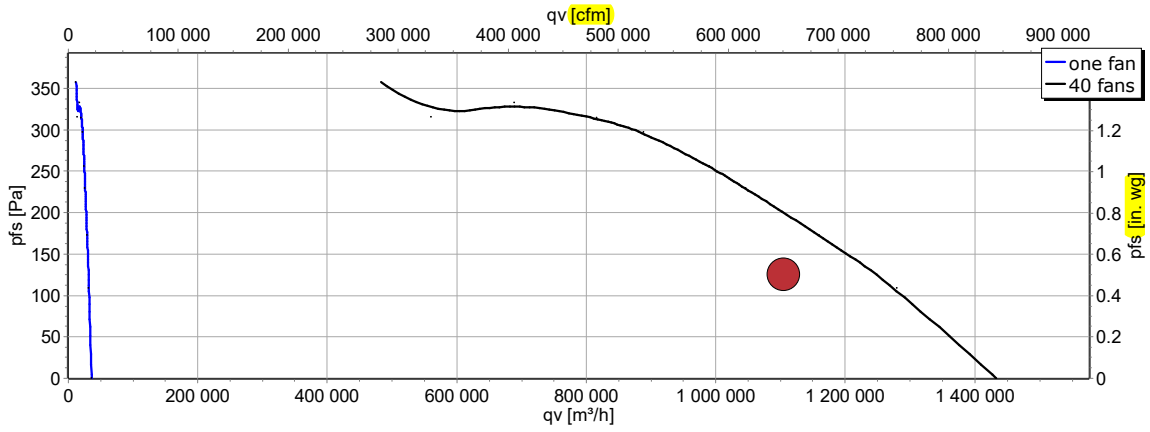
FanGrid data			Input		
Type (mId=190226)		W3G910LV1203	Redundant fans		0
Type code		VWA0910BTTRS	Max. FanGrid width	in.	
Number of fans		40	Max. FanGrid height	in.	
Energy consumption	kWh	85847	with backward flow		no
Phase / Voltage	Ph/V	3~ 380-480	Calc. method air power loss		No
Speed factor	%	92			

Nominal fan data			Ambient conditions		
Voltage	VAC	3~ 380-480	ρ calculated to	lbm/ft³	0.0715
Frequency	Hz	50/60	ρ measured at	lbm/ft³	0.0715
Speed	1/min	1070	Available installation space		
Power input	W	3250	Width per fan	mm	
Current draw	A	5.0 FLA = 5A	Height per fan	mm	
Minimal temperature	°F	-40 MCA = 7.6A	Fan size (nominal/average)	in.	37.48
Maximal temperature	°F	140 MOP = 15A	with intake finger guard		no

Operating points of FanGrid

OP	qv [cfm]	pfs[in. wg]	t [h]	ηes[%]	ηed[%]	Ped [W]	n[rpm]	SFP	Uctrl. [V]	pd [in. wg]	I [A]	E[kWh]	Pv[W]	ηm[%]	ηr[%]	ηsr[%]
1	650000	.5	1000	45	73	85847	985	0.132	-	0.318	132.1	85847	0.0	89	82	50
p.a.			1000									85847				

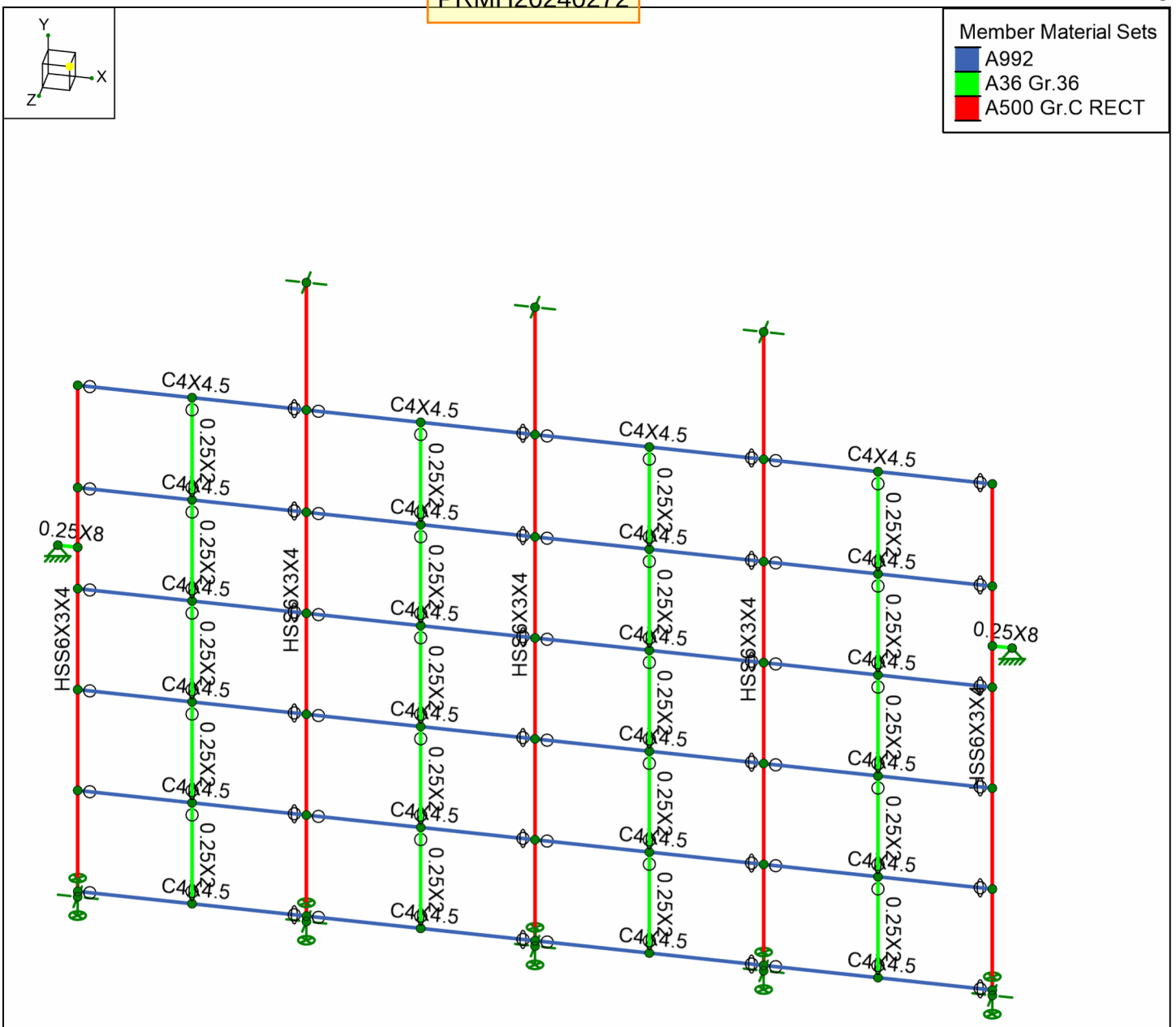
Air performance



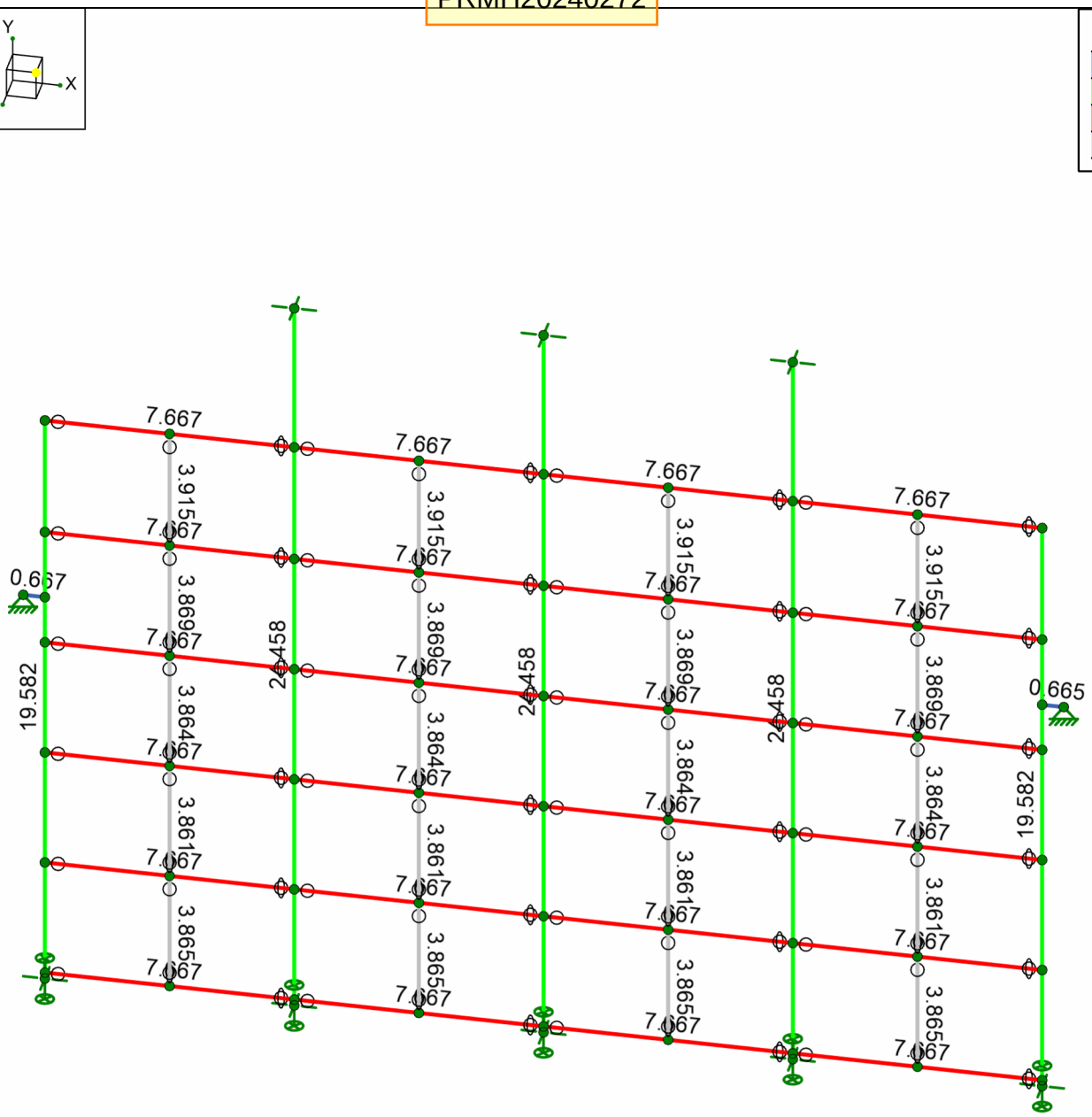
0.5 in wg = 2.6 psf
Apply 5 psf to frame.

q_v = air flow
p_{fs} = static pressure
t = Operating time [h]
U_{ctrl} = control voltage
η_{es} = overall static efficiency - includes fan, motor, drive (W2A)
η_{ed} = overall total efficiency - includes fan, motor, drive (W2A)
P_{ed} = electrical input power - includes fan, motor, drive (W2A)
n = fan speed
E = energy consumption
I = current
pd = dynamic pressure (pd=Rho·vm²/2)
Pv [W] = Power loss due to installation
SFP = specific fan power [SFP/(W/cfm)]
ηr = efficiency total fan impeller
ηsr = efficiency static fan impeller
ηm = efficiency motor

ebm-papst Mulfingen GmbH & Co. KG · Bachmühle 2 · D-74673 Mulfingen · Phone +49 (0) 7938 81-0 · Fax +49 (0) 7938 81-110 · info1@de.ebmpapst.com · www.ebmpapst.com

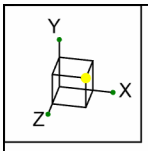


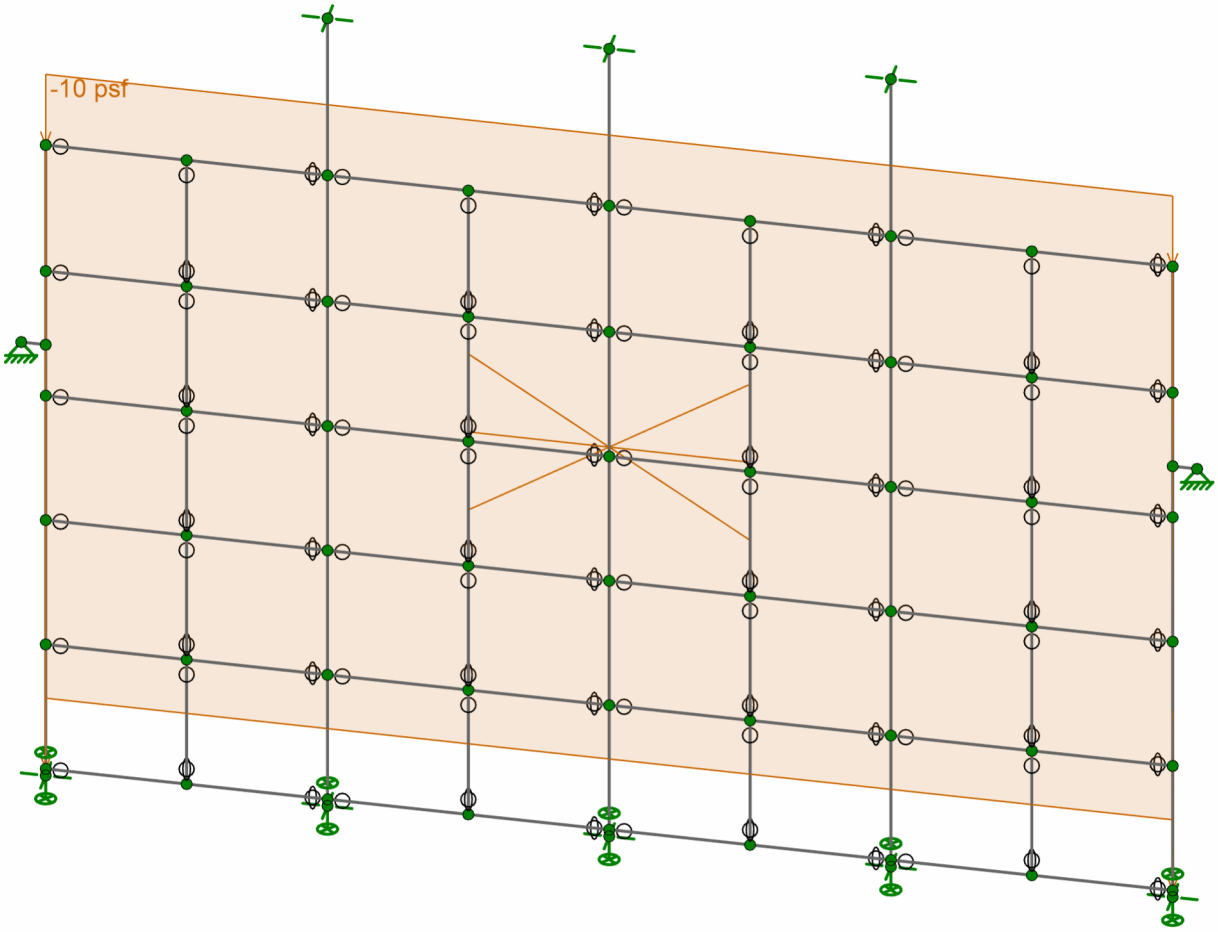
Quantun Consulting E…	Centeris Fan Wall	SK-1
tmichaud		Feb 01, 2024 at 06:13 AM
23444.01		24-01-29 - Fan Wall Fra…



Member Length (ft) Displayed

Quantun Consulting E…	Centeris Fan Wall	SK-2
tmichaud		Feb 01, 2024 at 06:26 AM
23444.01		24-01-29 - Fan Wall Fra…





Loads: BLC 1, Dead

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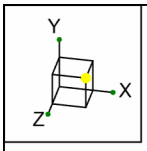
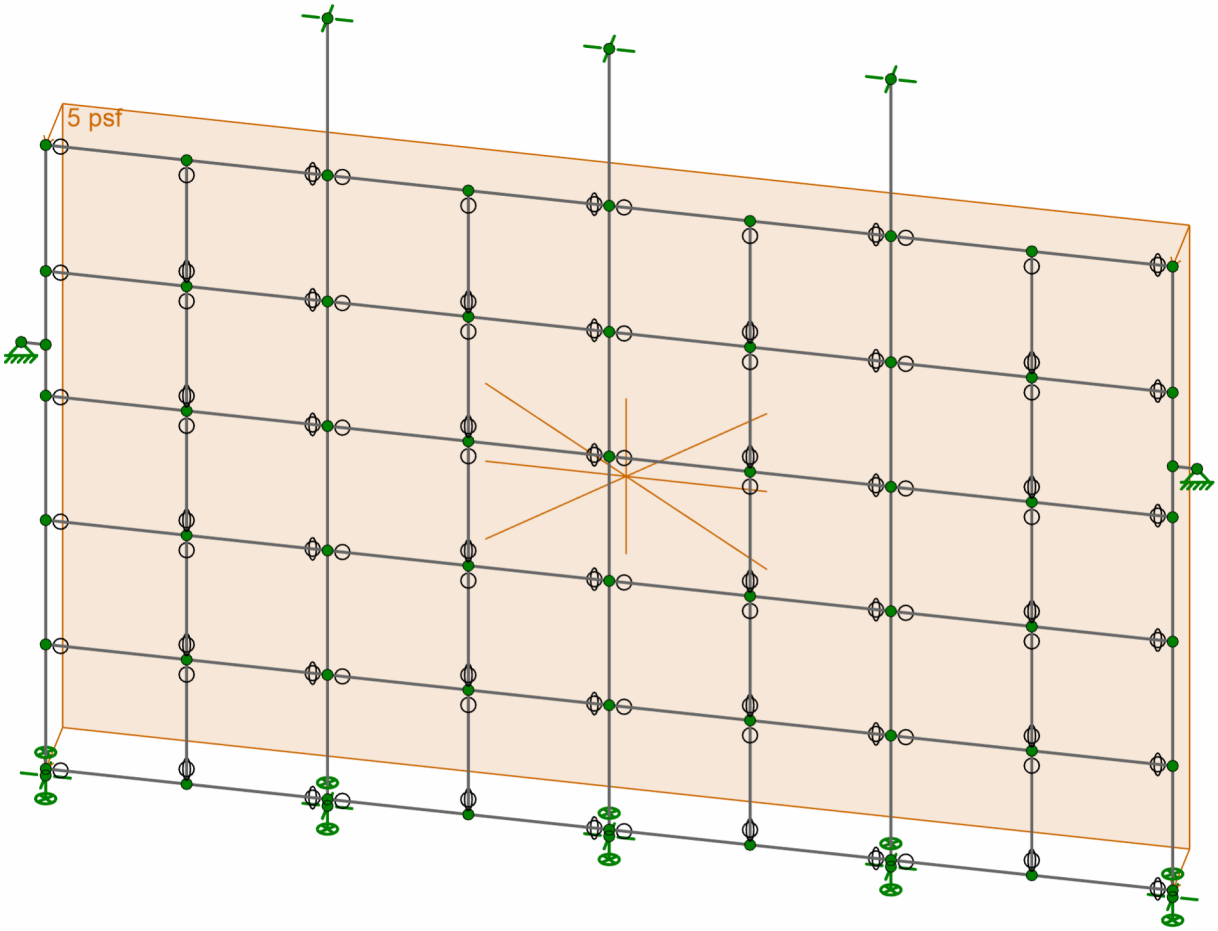
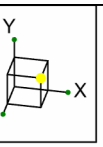
tmichaud		Feb 01, 2024 at 06:27 AM
23444.01		24-01-29 - Fan Wall Fra…

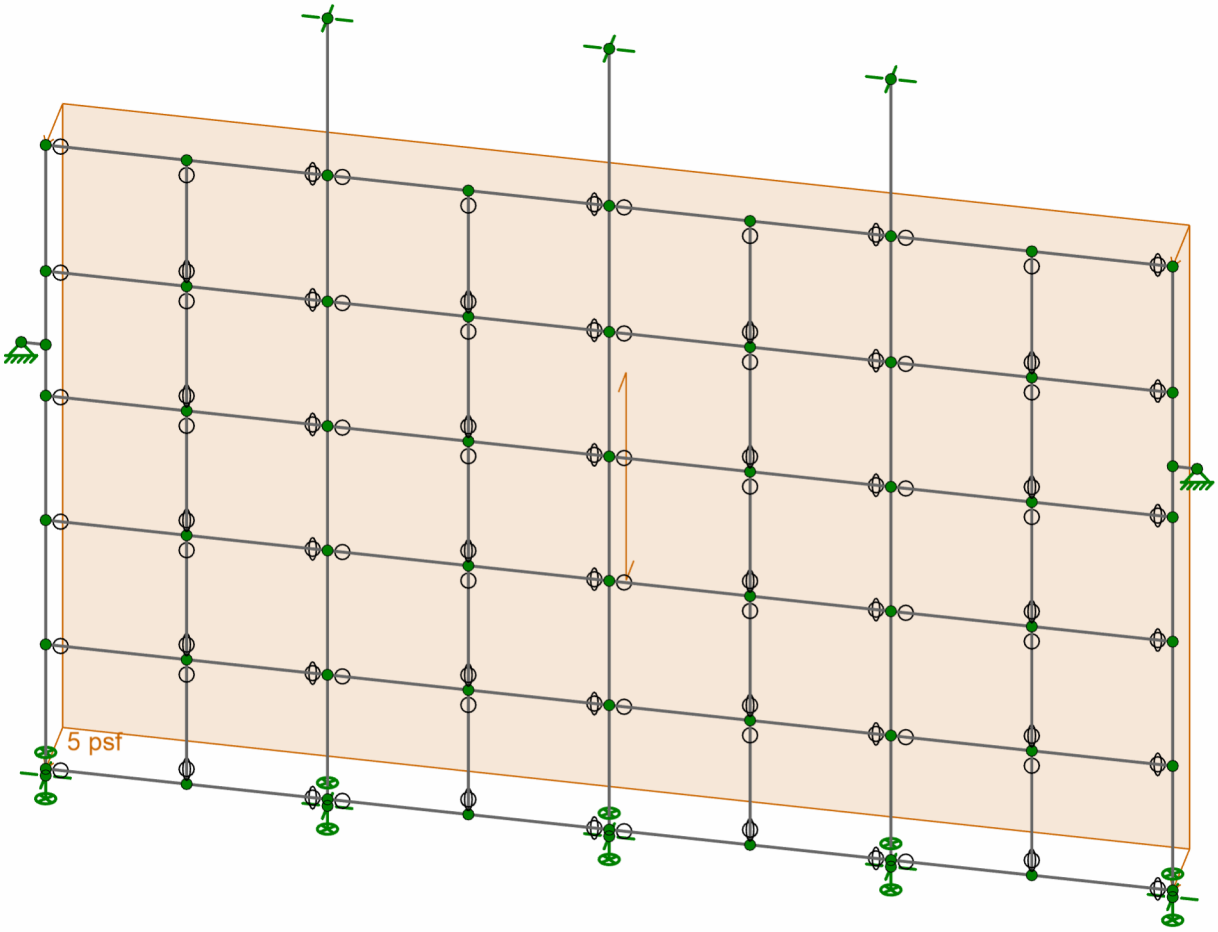




Loads: BLC 2, EQ

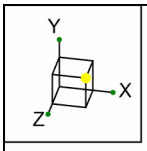
Quantun Consulting E…	Centeris Fan Wall	SK-5
tmichaud		Feb 01, 2024 at 06:30 AM
23444.01		24-01-29 - Fan Wall Fra…



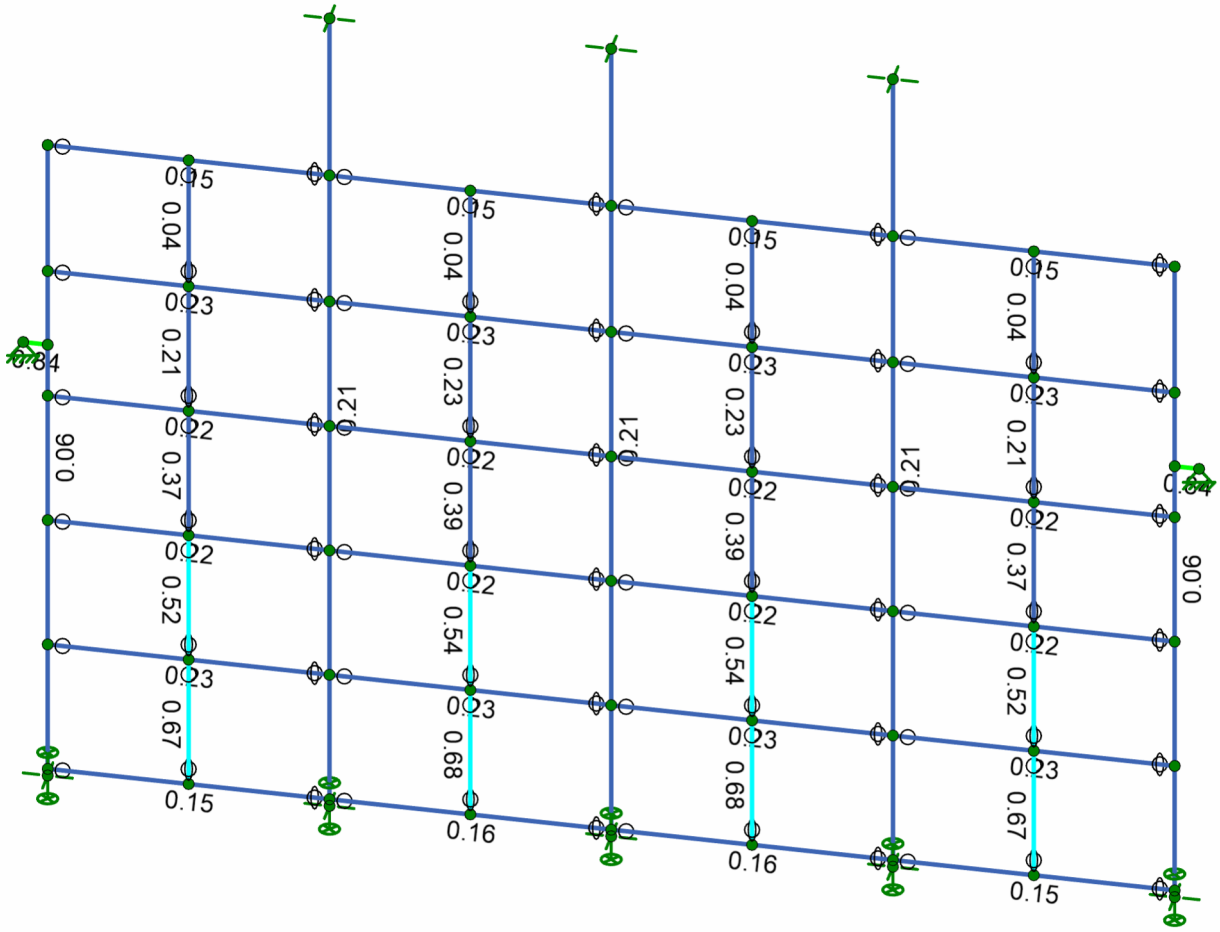


Loads: BLC 3, Fan Pressure

Quantun Consulting E…	Centeris Fan Wall	SK-6
tmichaud		Feb 01, 2024 at 06:30 AM
23444.01		24-01-29 - Fan Wall Fra…



Code Check
(LC 1)
No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50



Member Code Checks Displayed
Results for LC 1, DL+FAN

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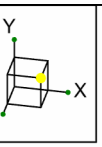
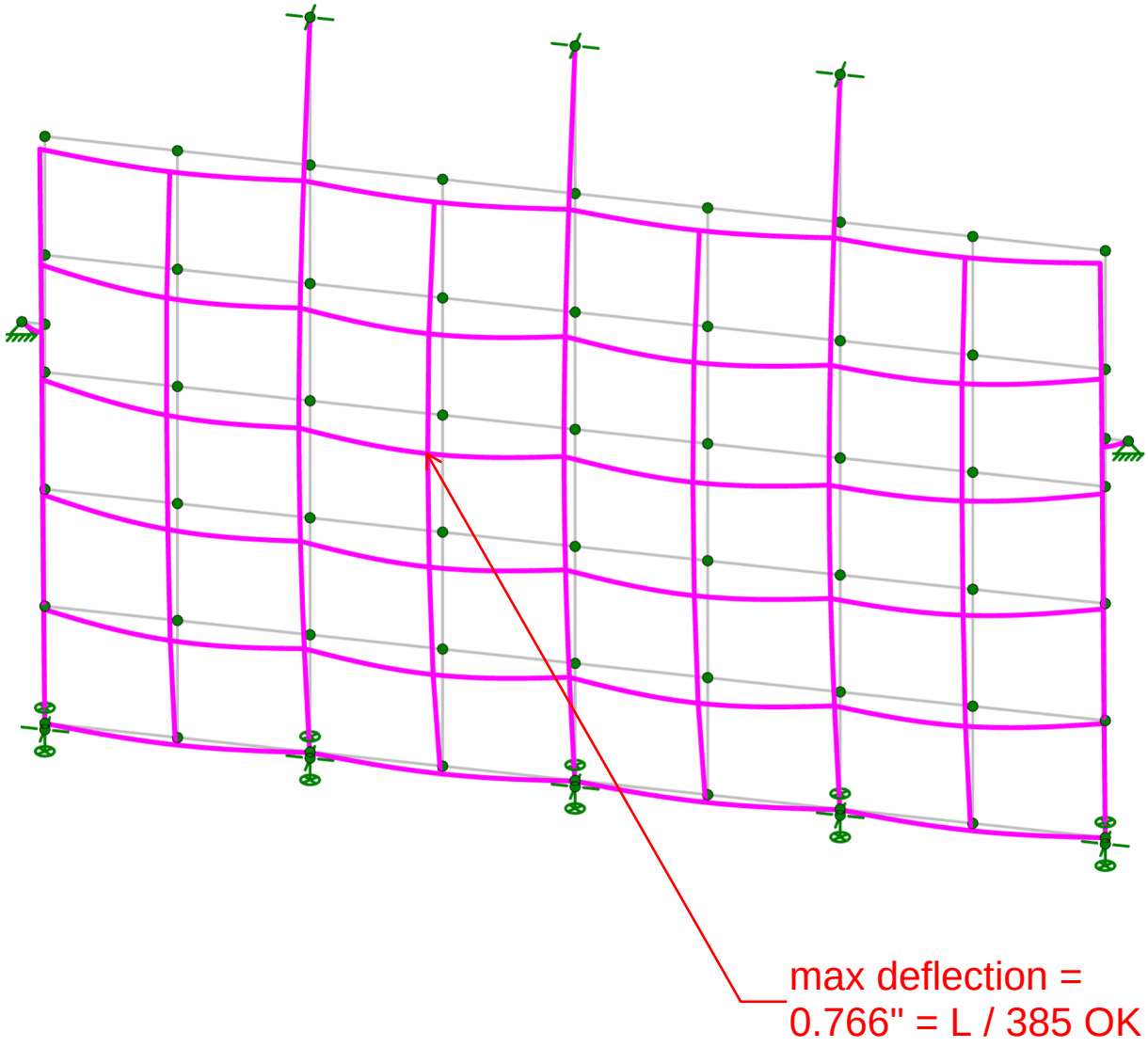
tmichaud		Feb 01, 2024 at 06:31 AM
23444.01		24-01-29 - Fan Wall Fra…

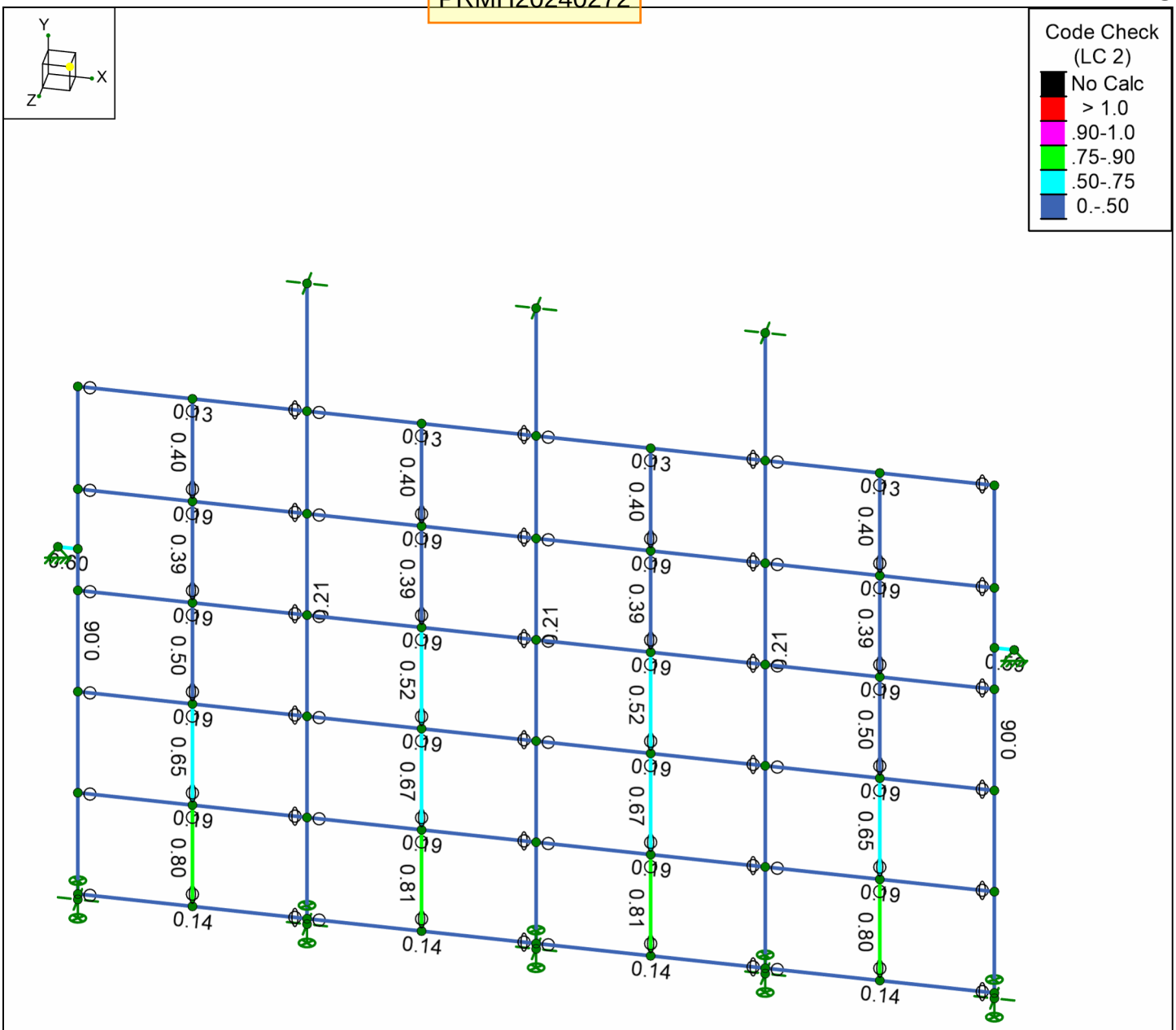




max deflection =
0.766" = L / 385 OK

Results for LC 1, DL+FAN

Quantun Consulting E…	Centeris Fan Wall	SK-8
tmichaud		Feb 01, 2024 at 06:31 AM
23444.01		24-01-29 - Fan Wall Fra…



Member Code Checks Displayed
Results for LC 2, DL+0.7EL

Quantun Consulting E…	Centeris Fan Wall	SK-9
tmichaud		Feb 01, 2024 at 06:33 AM
23444.01		24-01-29 - Fan Wall Fra…

SIMPSON Strong-Tie®

Anchor Designer™ Software
Version 3.0.7947.0

Company:		Date:	12/7/2023
Engineer:		Page:	1/5
Project:			
Address:			
Phone:			
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description: Top of Column Anchorage
Location:
Fastening description:

2. Input Data & Anchor Parameters

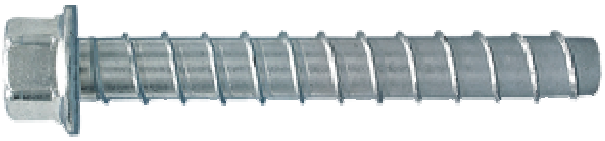
General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Concrete screw
Material: Carbon Steel
Diameter (inch): 0.500
Nominal Embedment depth (inch): 3.250
Effective Embedment depth, h_{ef} (inch): 2.350
Code report: ICC-ES ESR-2713
Anchor category: 1
Anchor ductility: No
h_{min} (inch): 5.00
c_{ac} (inch): 3.56
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 6.50
State: Uncracked
Compressive strength, f'_c (psi): 3000
$\Psi_{c,V}$: 1.4
Reinforcement condition: B tension, B shear
Supplemental reinforcement: No
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 6.00 x 15.00 x 0.25

Recommended Anchor
Anchor Name: Titen HD® - 1/2"Ø Titen HD, hnom:3.25" (83mm)
Code Report: ICC-ES ESR-2713



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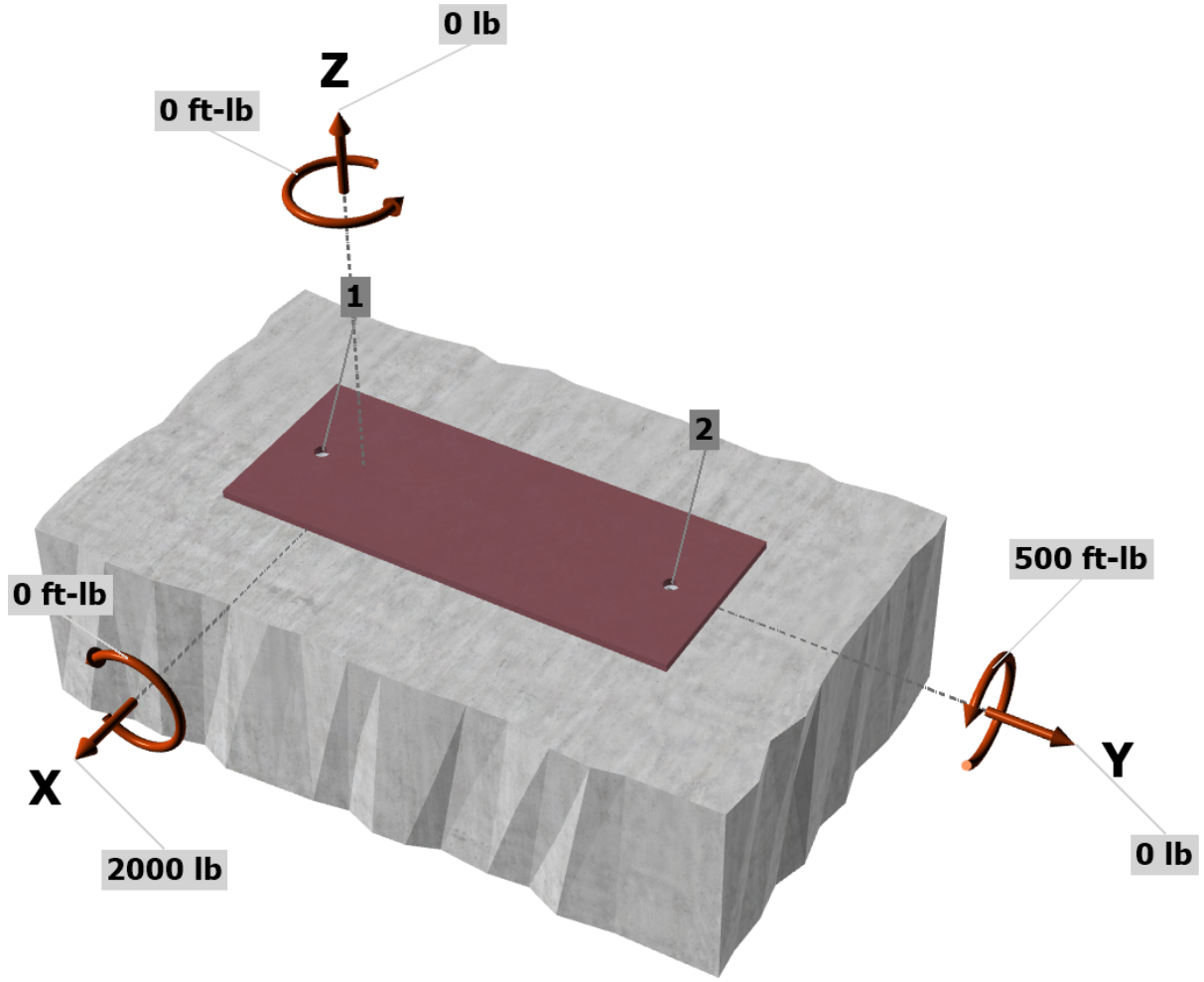
Company:		Date:	12/7/2023
Engineer:		Page:	2/5
Project:			
Address:			
Phone:			
E-mail:			

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Strength level loads:

N_{ua} [lb]: 0
V_{uax} [lb]: 2000
V_{uay} [lb]: 0
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 500
M_{uz} [ft-lb]: 0

<Figure 1>



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Company:		Date:	12/7/2023
Engineer:		Page:	3/5
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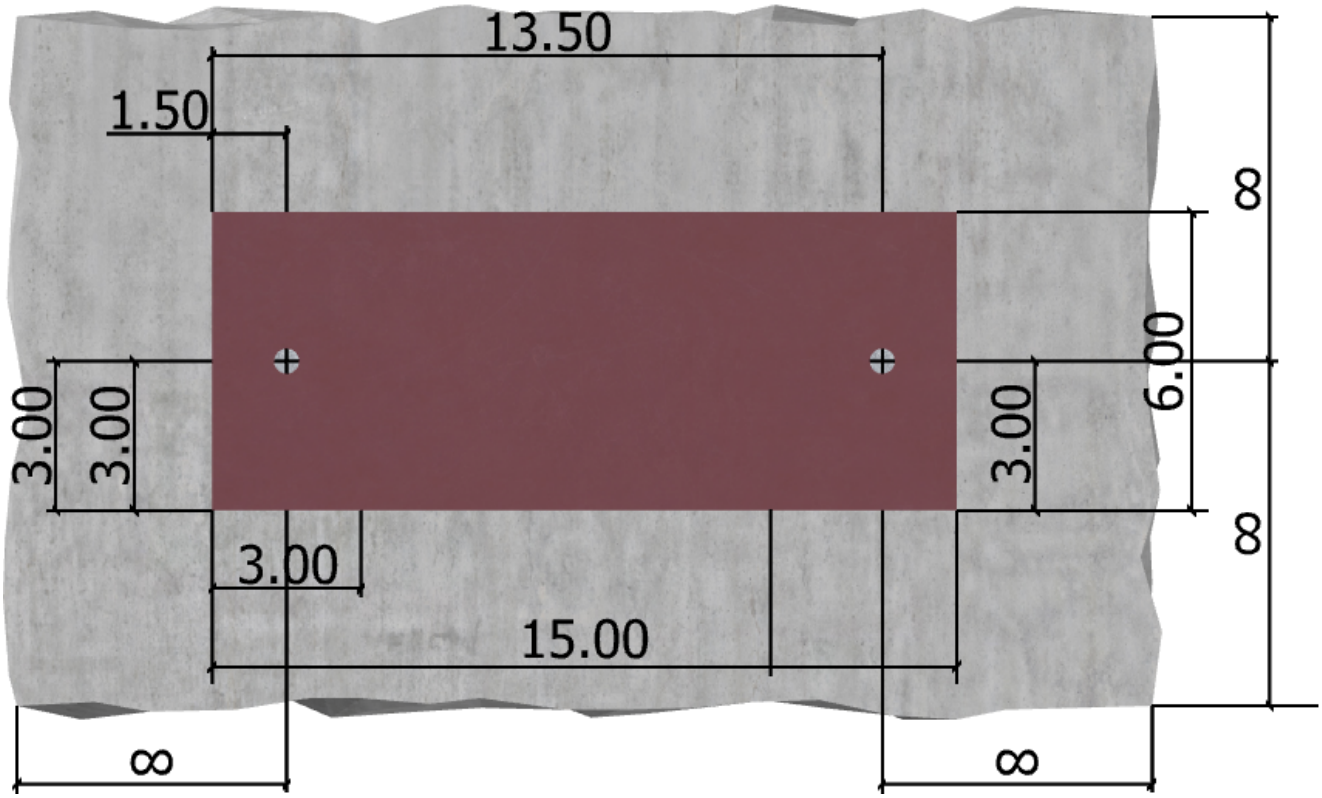
Address:			
Phone:			
E-mail:			

<Figure 2>



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Company:		Date:	12/7/2023
Engineer:		Page:	4/5
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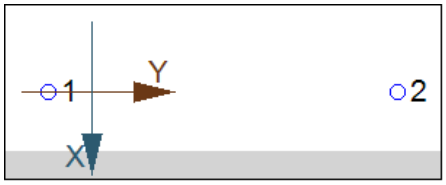
Phone:			
E-mail:			

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1119.7	1750.0	0.0	1750.0
2	1119.7	250.0	0.0	250.0
Sum	2239.3	2000.0	0.0	2000.0

Maximum concrete compression strain (‰): 0.07
Maximum concrete compression stress (psi): 311
Resultant tension force (lb): 2239
Resultant compression force (lb): 2239
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 4.50
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
20130	0.65	13085

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
24.0	1.00	3000	2.350	4736

$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1b)

A_{Nc} (in²)	A_{Nco} (in²)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
99.41	49.70	-	1.000	1.000	1.00	1.000	4736	0.65	6156

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
7455	1.0	0.60	4473

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cpg} = \phi k_{cp} N_{cbg} = \phi k_{cp} (A_{Nc} / A_{Nco}) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.5.3.1b)

k_{cp}	A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cpg} (lb)
1.0	99.41	49.70	0.439	1.000	1.000	1.000	4736	0.70	2912

11. Results

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Version 3.0.7947.0

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E-mail:			

Interaction of Tensile and Shear Forces (Sec. R17.6)

Tension	Factored Load, N_{ua} (lb)	Design Strength, øN_n (lb)	Ratio	Status
Steel	1120	13085	0.09	Pass
Concrete breakout	**2239**	**6156**	**0.36**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	1750	4473	0.39	Pass
Pryout	**2000**	**2912**	**0.69**	**Pass (Governs)**

Interaction check	$(N_{ua}/\phi N_{ua})^{5/3}$	$(V_{ua}/\phi V_{ua})^{5/3}$	Combined Ratio	Permissible	Status
Sec. R17.6	0.19	0.53	72.0%	1.0	Pass

1/2"Ø Titen HD, hnom:3.25" (83mm) meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

# Design Loads for Third Floor Openings
DL = 80 psf
LL = 150 psf

PRMH20240272

Project Title: Centeris
Engineer:
Project ID:
Project Descr: Third Floor Opening

Printed: 8 JAN 2024, 6:13AM

Steel Beam

File: Floor Openings.ec6

Lic. # : KW-06005835

QUANTUM CONSULTING ENGINEERS

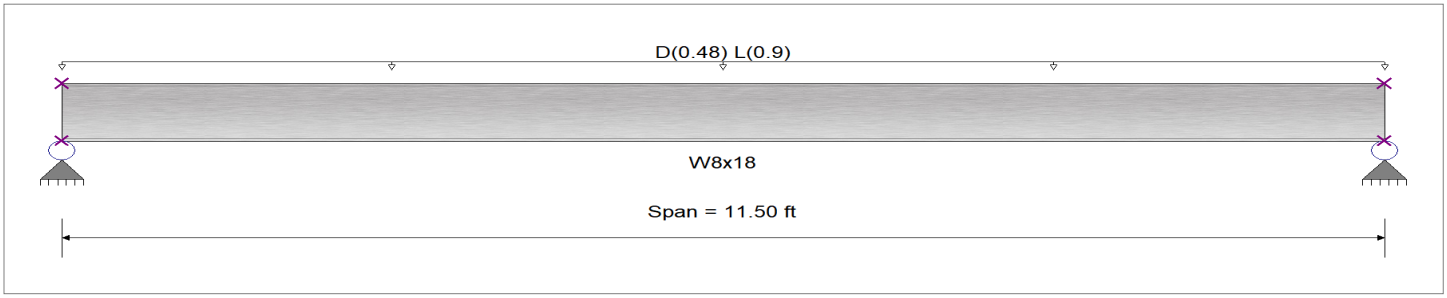
DESCRIPTION: Opening Header Beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.080, L = 0.150 ksf, Tributary Width = 6.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.669 : 1	Maximum Shear Stress Ratio =	0.212 : 1
Section used for this span	W8x18	Section used for this span	W8x18
Ma : Applied	22.813 k-ft	Va : Applied	7.935 k
Mn / Omega : Allowable	34.105 k-ft	Vn/Omega : Allowable	37.444 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	5.750 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	0.198 in	Ratio =	696 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.304 in	Ratio =	454 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 11.50 ft	1	0.233	0.074	7.94		7.94	56.96	34.11	1.14	1.00	2.76	56.17	37.44
+D+L													
Dsgn. L = 11.50 ft	1	0.669	0.212	22.81		22.81	56.96	34.11	1.14	1.00	7.94	56.17	37.44
+D+0.750L													
Dsgn. L = 11.50 ft	1	0.560	0.177	19.09		19.09	56.96	34.11	1.14	1.00	6.64	56.17	37.44
+0.60D													
Dsgn. L = 11.50 ft	1	0.140	0.044	4.76		4.76	56.96	34.11	1.14	1.00	1.66	56.17	37.44

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.3039	5.783		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	7.935	7.935
Overall MINimum	1.656	1.656
D Only	2.760	2.760
+D+L	7.935	7.935
+D+0.750L	6.641	6.641
+0.60D	1.656	1.656
L Only	5.175	5.175

Steel Beam

DESCRIPTION: Opening Header Beam

Steel Section Properties : W8x18

Depth	=	8.140	in	I xx	=	61.90	in^4	J	=	0.172	in^4
Web Thick	=	0.230	in	S xx		15.20	in^3	Cw	=	122.00	in^6
Flange Width	=	5.250	in	R xx	=	3.430	in				
Flange Thick	=	0.330	in	Zx	=	17.000	in^3				
Area	=	5.260	in^2	I yy	=	7.970	in^4				
Weight	=	17.905	plf	S yy	=	3.040	in^3	Wno	=	10.300	in^2
Kdesign	=	0.630	in	R yy	=	1.230	in	Sw	=	4.440	in^4
K1	=	0.563	in	Zy	=	4.660	in^3	Qf	=	3.230	in^3
rts	=	1.430	in					Qw	=	8.370	in^3
Ycg	=	4.070	in								

Steel Beam

DESCRIPTION: Opening Jamb Beam

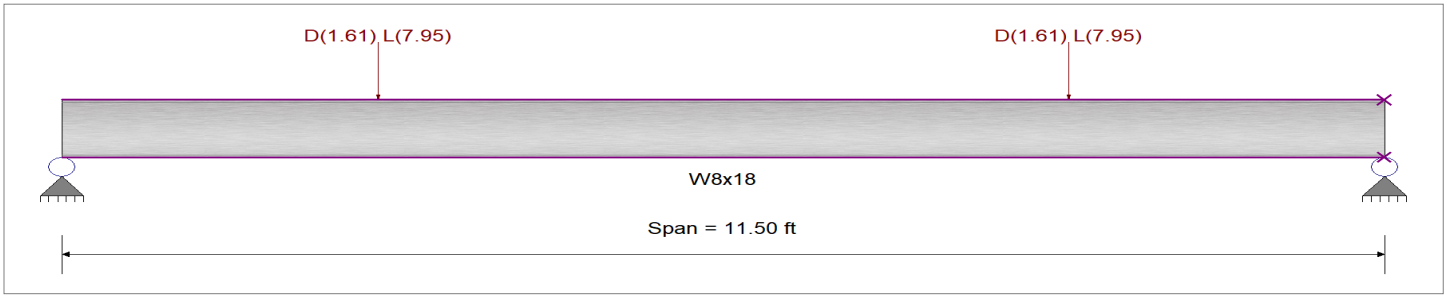
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : D = 1.610, L = 7.950 k @ 2.750 ft
Point Load : D = 1.610, L = 7.950 k @ 8.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.620 : 1	Maximum Shear Stress Ratio =	0.255 : 1
Section used for this span	W8x18	Section used for this span	W8x18
Ma : Applied	26.290 k-ft	Va : Applied	9.560 k
Mn / Omega : Allowable	42.415 k-ft	Vn/Omega : Allowable	37.444 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	4.863 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	0.323 in	Ratio =	427 >=360.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Max Downward Total Deflection	0.388 in	Ratio =	355 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 11.50 ft	1	0.104	0.043	4.43		4.43	70.83	42.42	1.00	1.00	1.61	56.17	37.44
+D+L													
Dsgn. L = 11.50 ft	1	0.620	0.255	26.29		26.29	70.83	42.42	1.00	1.00	9.56	56.17	37.44
+D+0.750L													
Dsgn. L = 11.50 ft	1	0.491	0.202	20.82		20.82	70.83	42.42	1.00	1.00	7.57	56.17	37.44
+0.60D													
Dsgn. L = 11.50 ft	1	0.063	0.026	2.66		2.66	70.83	42.42	1.00	1.00	0.97	56.17	37.44

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.3883	5.783		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	9.560	9.560
Overall MINimum	0.966	0.966
D Only	1.610	1.610
+D+L	9.560	9.560

Steel Beam

DESCRIPTION: Opening Jamb Beam

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L	7.573	7.573
+0.60D	0.966	0.966
L Only	7.950	7.950

Steel Section Properties : W8x18

Depth	=	8.140	in	I xx	=	61.90	in^4	J	=	0.172 in^4
Web Thick	=	0.230	in	S xx		15.20	in^3	Cw	=	122.00 in^6
Flange Width	=	5.250	in	R xx	=	3.430	in			
Flange Thick	=	0.330	in	Zx	=	17.000	in^3			
Area	=	5.260	in^2	I yy	=	7.970	in^4			
Weight	=	17.905	plf	S yy	=	3.040	in^3	Wno	=	10.300 in^2
Kdesign	=	0.630	in	R yy	=	1.230	in	Sw	=	4.440 in^4
K1	=	0.563	in	Zy	=	4.660	in^3	Qf	=	3.230 in^3
rts	=	1.430	in					Qw	=	8.370 in^3
Ycg	=	4.070	in							