Sonoma Valley Fire District

Board of Directors Meeting

November 10, 2020

Sonoma Valley Fire District

Board of Directors Meeting

November 10, 2020

TABLE OF CONTENTS

MEETING AGENDA
SONOMA VALLEY FIRE DISTRICT
BOARD OF DIRECTORS

Tuesday, November 10, 2020 at 6:00 P.M.
Location: Glen Ellen Fire Station 1
13445 Arnold Drive, Glen Ellen, CA 95442

Due to COVID-19 precautions, board meetings will be open to the public via phone-in conference calls only. No public gatherings will be held at this site until further notice. Agendas and board packets are available at the following website: http://svfra.org

Join by phone: 1-669-900-9128

Meeting ID: 914 153 1767

1. Call to Order

2. Roll Call and Determination of a Quorum

Board of Directors: President William Norton, Vice President John (Matt) Atkinson, Treasurer Mark Johnson, Brian Brady, Raymond Brunton, Mark Emery, Terrence Leen.

3. Pledge of Allegiance

4. Confirmation of Agenda

Opportunity for the Board to reorder agenda items.

5. Comments from the Public

(At this time, members of the public may comment on any item not appearing on the agenda. It is recommended that you keep your comments to three minutes or less. Under State Law, matters presented under this item cannot be discussed or acted upon by the Board at this time. For items appearing on the agenda, the public will be invited to make comments at the time the item comes up for consideration by the Board of Directors.)

6. Presentations

a) Fire Marshal, Trevor Smith will give a presentation and overview of Sonoma Valley Fire District's new drone program.

7. Consent Calendar

Approval of minutes from the regular meeting, held on October 13, 2020. **Action Item**

8. Fire Chief's Monthly Report

Chief's activity report for October 2020

9. Old Business

a) Station 5 structural evaluation and improvements. Former GE Board President Peter van Fleet will present the Structural Engineering report and recommendations from MKM Associates to the Board for information, discussion and possible action.

10. New Business

a) Resolution 2020/2021-12. Update of the SVFD's Deferred Compensation Plan (Bidwell) Trustees. **Action item**

b) Approval of grant funding and the new Unmanned Aerial System (UAS) program. **Action item**

11. Other Business to Come before the Board

a) Special District Representative positions for LAFCO

12. Comments from the Floor

13. Comments/Reports from the Board

14. Closed Session

15. Adjournment

This meeting will be adjourned to the regular Board meeting on December 8, 2020 at 6:00 p.m. Meeting access will be determined based on COVID-19 restrictions in place at that time.

Copies of all staff reports and documents subject to disclosure that relate to any item of business referred to on the agenda are available at the following website at http://svfra.org.

Sonoma Valley Fire District

Board of Directors Meeting

Agenda Item Summary

November 10, 2020

Agenda Item No.	Staff Contact
7	Maci Jerry, Clerk to the Board of Directors

Agenda Item Title

Approval of minutes for the regular meeting held on October 13, 2020

Recommended Actions

Approve the minutes

Executive Summary

The minutes have been prepared for Board review and approval.

Alternative Actions

Correct or amend minutes prior to approval

Fiscal Summary – FY 20/21

Expenditures		Funding Source(s)	
Budgeted Amount	$	District General Fund	$
Add. Appropriations Reqd.	$	Fees/Other	$
	$	Use of Fund Balance	$
	$	Contingencies	$
		Grants	$
Total Expenditure	**$**	**Total Sources**	**$**

Narrative Explanation of Fiscal Impacts (if required)

Not Required

Attachments

1. Minutes for October 13, 2020 meeting

SONOMA VALLEY FIRE DISTRICT

BOARD OF DIRECTORS MEETING MINUTES
Tuesday, October 13, 2020 at 6:00 P.M.

1. Call to Order

President Norton called the meeting to order at 6:01 p.m. via phone-in conference call.

2. Roll Call and Determination of a Quorum

Board of Directors: President William Norton, Vice President John (Matt) Atkinson, Treasurer Mark Johnson, Brian Brady, Mark Emery, Terrence Leen. Director Brunton was absent.

3. Pledge of Allegiance

The Pledge of Allegiance was led by Director Leen and recited by all.

4. Confirmation of Agenda

The Chief requested that President Norton reorganize the agenda to allow the opening of the public meeting for the Fire Impact Fee and move into item 10a for the presentation by, Blair Aas with SCI Consulting. President Norton and the Board agreed.

5. Comments from the Public

President Norton called to order the public meeting and opened for public comments regarding the draft Nexus Study for the Fire Impact Fee. There was no comments from the public and the public meeting was closed. It should be noted that a public notice was placed in the Press Democrat and ran on September 30 and October 7, 2020.

6. Presentations

Blair Aas with SCI Consulting presented a PowerPoint on the key items of the Fire Impact Fee Nexus Study report to the Board. He gave a thorough presentation allowing for the members of the Board and attendees of the meeting to ask questions about the proposed new fees and the impact they could have on the District.

7. Consent Calendar

M/S/P Emery/Leen approved the meeting minutes from the special board meeting held on September 29, 2020 **Passed 6 ayes, 1 absent**

8. Fire Chief's Monthly Report

Chief Akre gave the Board an updated on the Glass Fire. The District had nine (9) pieces of equipment on the line with five (5) members assigned as overhead to the incident. He cited the new County All Call system with making a huge difference in engine response to incidents since 2017. Chief could not express more to the Board how

proud he was of the Organization, everyone gave above and beyond keeping full staffing levels without a single mandatory assignment.

The Chief then gave a brief updated on the District's budget. He stating that a collective effort by the Administrative Staff enabled lingering items for the budget to be buttoned up. Cash flow has become more stable with the first SAFER grant payment on quarter one payroll and the City release VOM reserve funds they were holding on our behalf.

Covid continues to make an impact on Sonoma County. The SVFD continues to practice the highest level of safety precautions to protect not only our members, but the community at large.

His final update was on the new Station 8 Type 6 engine. We are expecting its arrival in the coming days.

9. Old Business

None

10. New Business

a) Approved Resolution 2020/21-10, with an addendum to include any excluded or future apparatus to Figure 14 included on page 29 of the Nexus Study which could increase the fee amounts listed in the Resolution. **M/S/P Johnson/Leen, Passed 6 ayes and 1 absent**

b) Approved the purchase of a new SVFD command vehicle. **M/S/P Johnson/Brady, Passed 6 ayes and 1 absent**

c) Approved Resolution 2020/21-11 to accept grant funding for structural turnouts. **M/S/P Norton/Leen, Passed 6 ayes and 1 absent**

11. Other Business to Come before the Board

None

12. Comments from the Floor

None

13. Comments/Reports from the Board

Director Emery wanted to express to the Board and the Chief that in doing his own research on other fees accessed by the County. The new Fire Impact Fees proposed are a much smaller figure then those of the County.

Director Emery asked the Chief if the District had a policy in place regarding accommodations for those SVFD members that go above and beyond to better the District, like those who apply and receive grant awards. The Chief informed the Board that, yes, the District has a policy in place and he will share it with the Board. President Norton would like to bring this matter up at the next Board meeting.

Director Leen asked the Chief to please extend his thanks to all staff members and their families for their service and support.

Chief Akre made mention of the upcoming Sonoma County Fire District Association meeting on October 22nd. President Norton is a candidate for Vice President. The meeting will be held via Zoom and the link can forward if needed.

14. Closed Session

None

15. Adjournment

M/S Norton/Leen with 6 ayes and 1 absent
This meeting was adjourned at 7:55 p.m. to a regular Board meeting on November 10, 2020 at 6:00 p.m. Meeting access will be determined based on COVID-19 restrictions in place at that time.

Copies of all staff reports and documents subject to disclosure that relate to any item of business referred to on the agenda are available at the following website at http://svfra.org

Respectfully submitted,

Maci Jerry

Sonoma Valley Fire District

Board of Directors Meeting

Agenda Item Summary

November 10, 2020

Agenda Item No.	Staff Contact
9a	Stephen Akre, Fire Chief

Agenda Item Title

Receive a report and recommendations form MKM Associates on the structural engineering condition of Fire Station 5. Board discussion and possible action.

Recommended Actions

Receive Structural Engineering report and recommendations, Board discussion and possible action.

Executive Summary

In 2019, the Glen Ellen Fire District Board requested a structural engineering evaluation of the Glen Ellen Fire Station 5. This report has been completed and delivered to the former GE Board President, Peter van Fleet. Former President van Fleet will present the findings and recommendations of the engineering report.

The Board is being asked to receive the report and recommendations, and discuss and possibly take action on these recommendations.

Alternative Actions

Receive report and recommendations, take no action, request additional information, or take action.

Strategic Plan Alignment

This effort is in alignment with Goal 3. Continue to provide well-maintained facilities, equipment, and technology to enable personnel to perform their jobs safely and efficiently.

Fiscal Summary – FY 20/21

Expenditures		Funding Source(s)	
Budgeted Amount	$	District General Fund	$
Add. Appropriations Reqd.	$	Fees/Other	$
	$	Use of Fund Balance	$
		Contingencies	$
		Grants	$
Total Expenditure	**$**	**Total Sources**	**$**

Narrative Explanation of Fiscal Impacts (if required)

The SVFD has reserve funds available from both the former Districts to fund these improvements.

Attachments

1. MKM Associates Report

August 3, 2020 **File # 190076**

STRUCTURAL CALCULATIONS

for

GEFD Seismic Upgrade

13445 Arnold Drive

Glen Ellen, CA 95442

MKM PROJECT MANAGER:

John Cook

08/03/2020

CS200803RHB_190076 BUILDING PERMIT SUBMITTAL

MKM & Associates
structural engineering
5880 Commerce Blvd., Suite 105, Rohnert Park, CA 94928 • (707)578-8185

GEFD Seismic Upgrade

13445 Arnold Drive, Glen Ellen, CA

Job #	190076	
Date	11/20/2019	
PE	RHB	PM JMC
1	of	49

DESIGN CRITERIA

CALIFORNIA BUILDING CODE 2016 EDITION

VERTICAL LOADS

		Dead		Live	
Roof	( )	16	psf	20*	psf
Roof	( )		psf		psf
Floor	(Conc)	75	psf	100	psf
Floor	(Wood)	15	psf	100	psf
Deck	( )		psf		psf
Exterior Walls	(CMU)	75	psf		
Exterior Walls	( )		psf		
Interior Walls	(Wood)	10	psf		

* Reducible for roof pitch and tributary area.

LATERAL LOADS

Wind: Envelope Procedure

Speed: V_{ult}= 110 mph Exposure B

Earthquake: Equivalent Lateral Force Procedure

SDC= D (California Building Code)

$V = C_S W$ = W*0.429 (Strength Level)

$E_v = 0.2 S_{DS} D$ = D*0.200 (Strength Level)

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 10/2019
PE RHS 2 of

Building Weights

Roof

Roofing	6.0
Insulation	1.0
Shtg	1.2
Joists	2.2
Beams	3.1
Misc	2.5
	16.0 psf

CMU Walls

75 psf

Wood Walls

10 psf

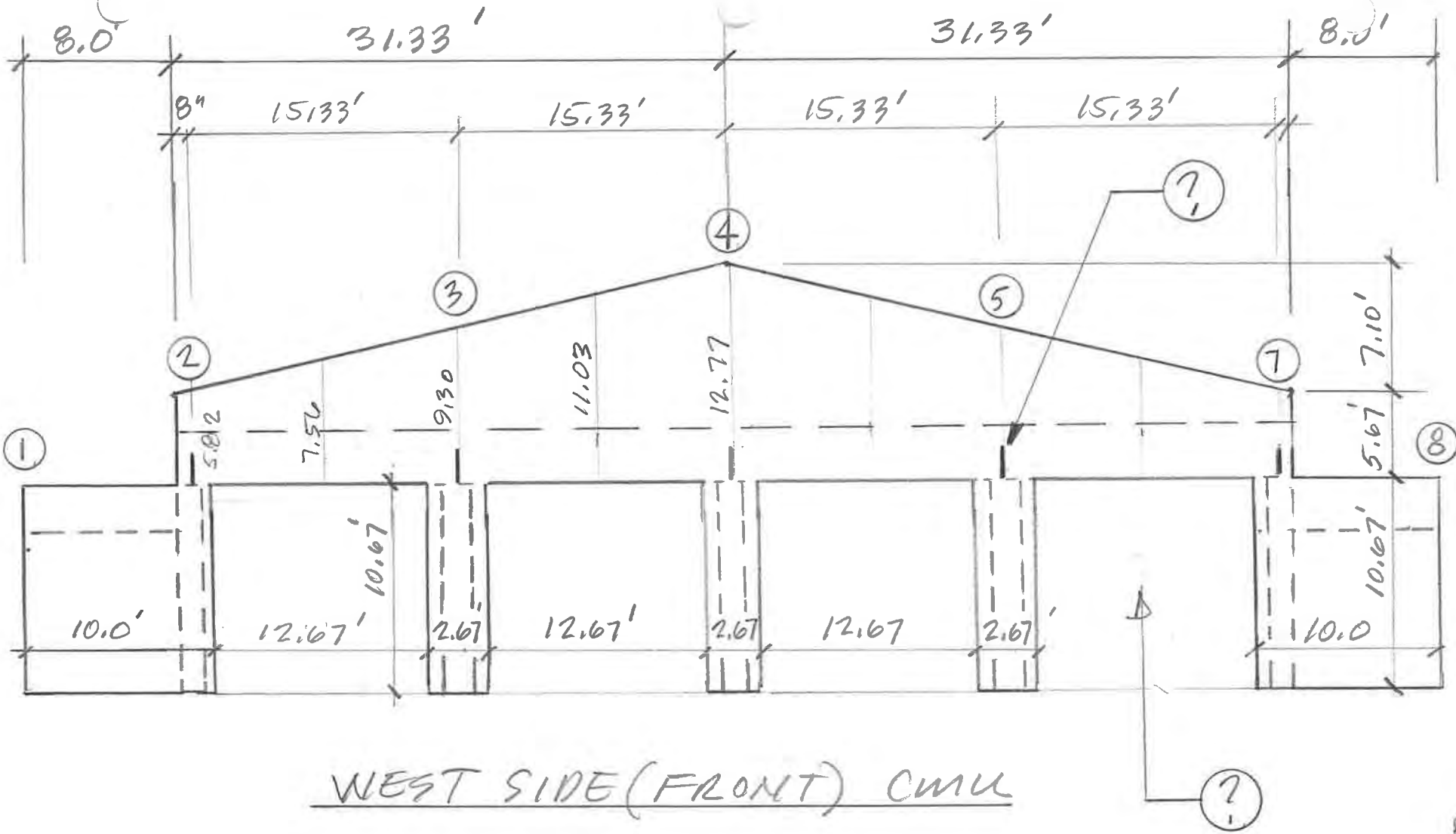
Roof Area = 11.0' × 66.58' = 732 ft²
70.67 × 76.25' = 5389
3.0 × 63.58' = 191
6312 ft²
× 16.0 psf
101 k

Roof W = 101 k

Wall west = 54.2
East = 32.6 } 89.8
North = 31.6
South = 27.9 } 59.5 k
Tower = 10.9
261 k

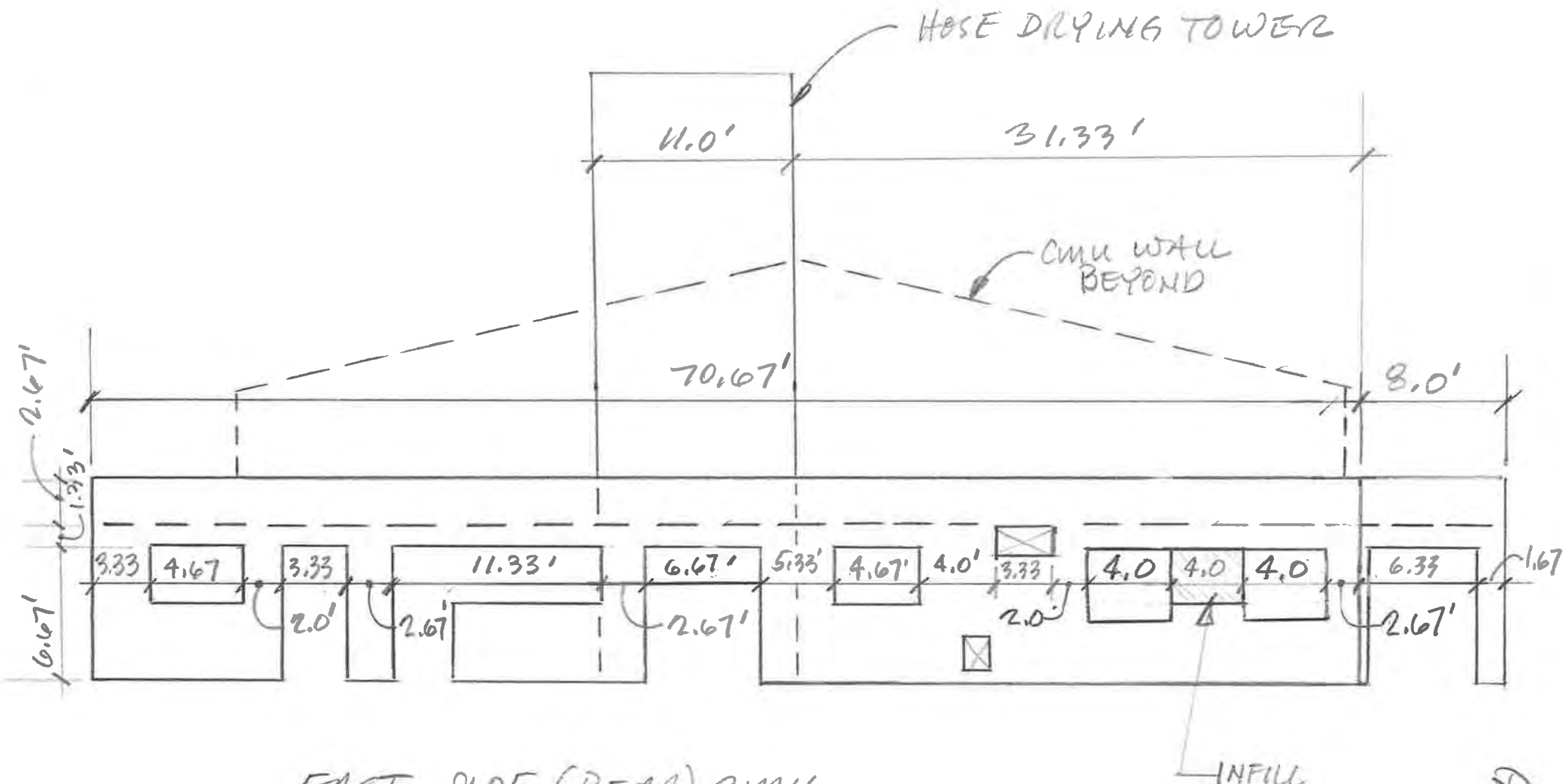
W(N-S) = 101 + 59.5 + 10.9 = 171 k

W(E-W) = 101 + 89.8 + 10.9 = 202 k



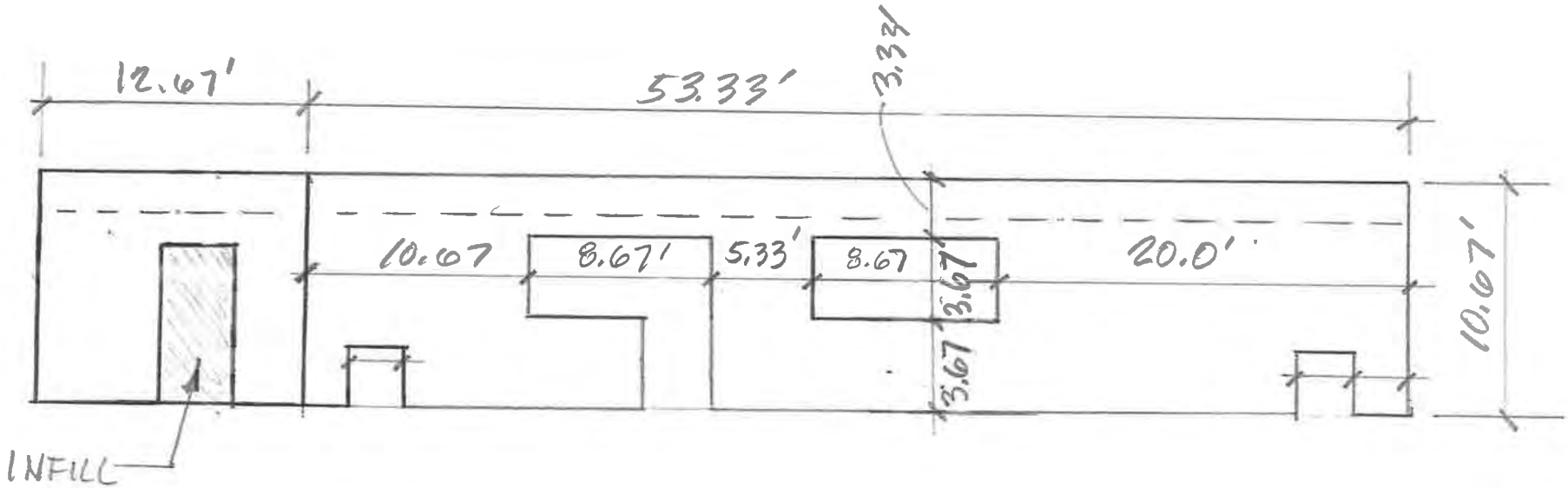
WEST SIDE (FRONT) CMU

GCFD 1900710
10/2019
PMB
3



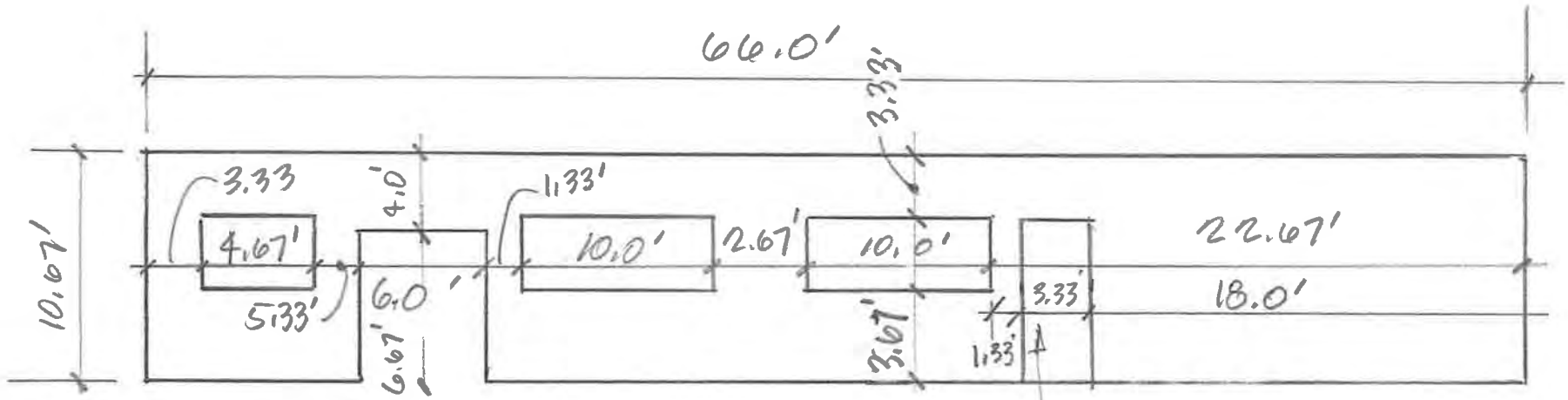
EAST SIDE (REAR) CMU

GFED
1900716
10/2019
Rae
4



NORTH SIDE CMU

GEFD
1900716
10/2019
KMB
5



SOUTH SIDE CMU

GEFD
1900746
10/2019
RHB
6

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 10/2019
PE RWB | 7 of

Bldg Weights, Cont

West Wall (Front) Trib A = 62.67' × 5.67' = 355 ft²
62.67 × 7.10' × ½ = 222
10.0 × 5.33' × 2 = 107
2.67 × 5.33' × 3 = 43
1.33 × 5.33 × 5 = 35
762 ft²

Trib W = 75 psf × 762 = 57.2 k

East Wall (Rear) Trib A = 78.67' × 4' = 315 ft²
30.0' × 4' = 120
435 ft²

Trib W = 75 psf × 435 ft² = 32.6 k

North Wall (Side) Trib A = 66.0' × 3.67' = 242
48.67 × 3.67' = 179
421 ft²

196
132
328

Trib W = 75 × 421 = 31.6 k
① + ②

24.6
①

South Wall (Side) A = 66.0 × 3.67' = 242 ft²
35.33 × 3.67' = 130
372 ft²

W = 372 × 75 = 27.9 k

Tower Walls A = (11.0 + 12.67)'/2 × (33.67 - 10.67)' = 1089 ft²

W = 10 psf × 1089 = 10.9 k

GEFD 190076 11/2019 KHS 8

OSHPD

13445 Arnold Dr, Glen Ellen, CA 95442, USA

Latitude, Longitude: 38.3675756, -122.52383650000001

Date	10/22/2019, 10:16:19 AM
Design Code Reference Document	ASCE7-10
Risk Category	IV
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.5	MCE_R ground motion. (for 0.2 second period)
S_1	0.6	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.5	Site-modified spectral acceleration value
S_{M1}	0.9	Site-modified spectral acceleration value
S_{DS}	1	Numeric seismic design value at 0.2 second SA
S_{D1}	0.6	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	1.5	Site amplification factor at 1.0 second
PGA	0.537	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.537	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.945	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.904	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.736	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.729	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.537	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	1.022	Mapped value of the risk coefficient at short periods

Code(s) Used: 2016 CBC, ASCE 7-10

Risk Category =	IV		(CBC, Tables 1604.5)
Importance Factor, I =	1.50		(ASCE 7, Table 1.5-2)
Seismic Force Resisting System	Intermediate reinforced CMU walls		
Response Modification Coefficient, R =	3.5		(ASCE 7, Table 12.2-1)
Max ground acceleration for 0.2 spectral response, S_s =	1.500g		(CBC, Figure 1613.3.1(1))
Site Class =	D		(ASCE 7, Table 20.3-1)
Site Coefficient, $F_a = S_{MS} / S_S$ =	1.00		(ASCE 7, Table 11.4-1)
S_{MS} =	1.500g		(ASCE 7, Eq. 11.4-1)
$S_{DS} = 2/3(S_{MS})$ =	1.000g		(ASCE 7, Eq. 11.4-3)
Seismic Response Coefficient, $C_s = S_{DS}/(R/I)$ =	0.429		(ASCE 7, Eq. 12.8-2)
S_1 =	0.600g		(CBC, Figure 1613.3.1(2))
$F_v = S_{M1} / S_1$ =	1.50		(ASCE 7, Table 11.4-2)
S_{M1} =	0.900g		(ASCE 7, Eq. 11.4-2)
$S_{D1} = 2/3(S_{M1})$ =	0.600g		(ASCE 7, Eq. 11.4-4)
h_n =	16	ft	
C_t =	0.020		(ASCE 7, Table 12.8-2)
x =	0.75		(ASCE 7, Table 12.8-2)
$T_a = C_t h_n^x$ =	0.160	sec	(ASCE 7, Eq. 12.8-7)
T_L =	8	sec	(ASCE 7, Figure 22-12)
Cs need not exceed the following			(ASCE 7, 12.8.1.1)
$C_s = S_{D1}/(T^*R/I)$ (for $Ta \le T_L$) =	1.61		(ASCE 7, Eq. 12.8-3)
$C_s = (S_{D1}*T_L)/(T^{2*}R/I)$ (for $T_a > T_L$) =			(ASCE 7, Eq. 12.8-4)
C_s shall not be less than the following			
$C_s = 0.044S_{DS}I \ge 0.01$ =	0.07		(ASCE 7, Eq. 12.8-5)
$C_s = 0.5*S_1/(R/I)$ (for $S_1 \ge 0.6g$) =	0.1286		(ASCE 7, Eq. 12.8-6)
Base Shear			Strength Design Level
$V = C_s * W$ =	0.429	W	(ASCE 7, Eq. 12.8-1)
Vertical Seismic Load Effect			Strength Design Level
$E_v = 0.2S_{DS}D$ =	0.200	D	(ASCE 7, Eq. 12.4-4)

Seismic Design Category (CBC) D (ASCE 7, Tables 11.6)

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 10/2019
PE RKB | 10 of

Reinf cmu walls — STACK BOND

8" cmu w/ #5 @ 32" o.c. vert > 24"
(2)#4 @ 48" o.c. horiz > 24"

Vert $\rho = \frac{0.31}{32 \times 7.625} = 0.00127 > 0.0007$

Horiz $\rho = \frac{0.40}{48 \times 7.625} = 0.00109 < 0.0015$

$0.00236 > 0.002$

→ Int. reinf cmu walls (rehab only) $R = 3.5$

$\Omega_0 = 2.5$

$C_d = 2.25$

$V_u = C_s W = \frac{S_{DS}}{R/I_e} W = \frac{1.0}{3.5/1.5} W = 0.429\,W$

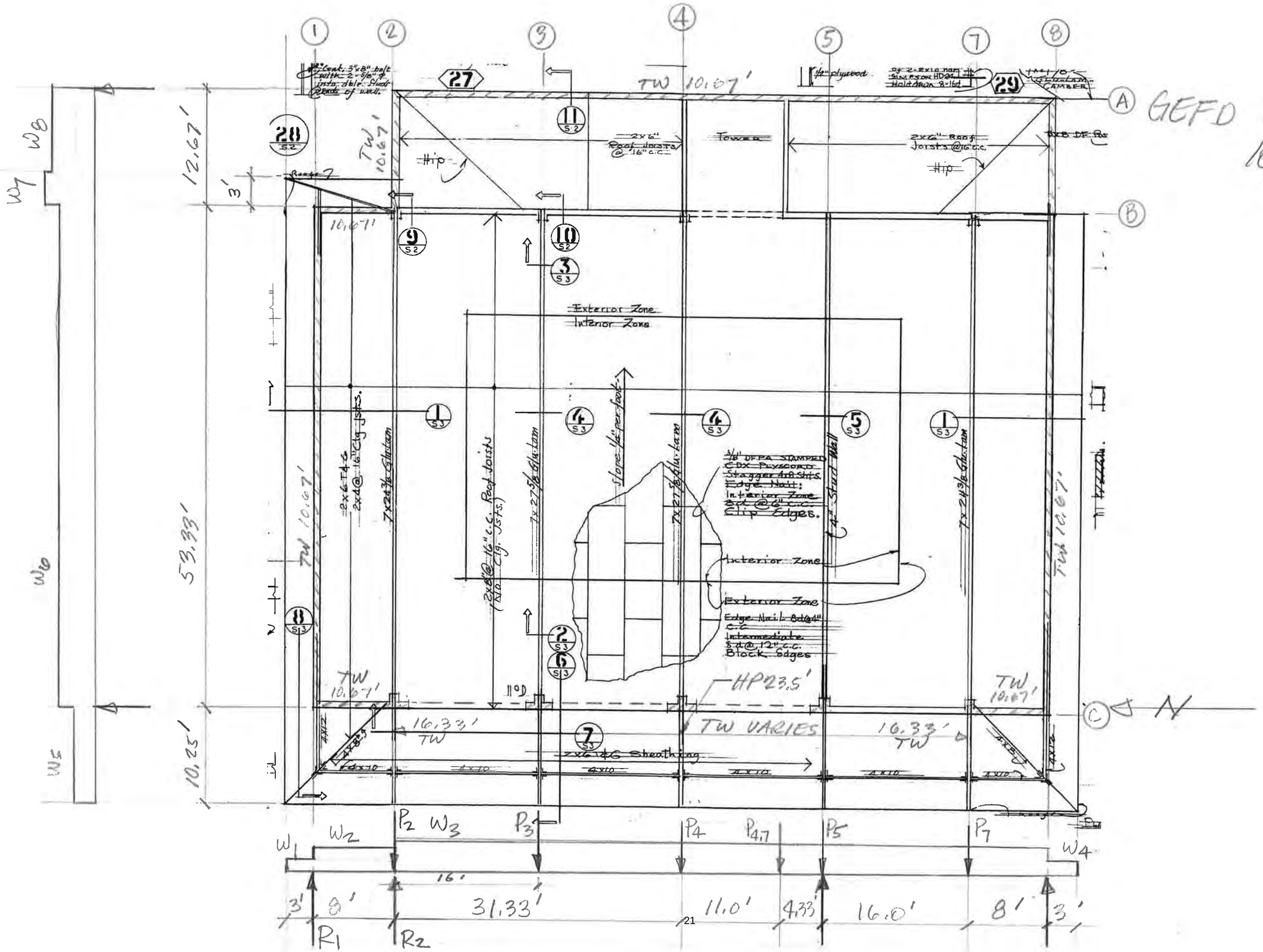
Base Shear = $0.429 \times 261^k = 112^k$

Diaphragm N-S = $0.43 \times 171 = 73.3^k$

" E-W = $0.43 \times 202 = 86.6^k$

$0.7\,V_u = 0.30\,W$ (ASD)

GEFD 190076
10/2019
RHB
11



E-W Loads @1.0g

W_2 = 16 psf × 66.58' = 1065 plf roof
75 psf × 5.33' = 400 west
32,600# / 78.67' = 414 east
1879 plf

W_1 = 1065 plf roof

W_3 = 16 psf × 76.25' = 1220 plf roof
414 east
1634 plf

W_4 = 16 × 63.58' = 1017 plf

P_2 = 75 psf × (2' + 1.33') × 5.33' = 1330
75 × 8.33' × (5.67 + 7.56) ½ = 4130
5460# = 5.46k

P_3 = 75 × (2.67 + 1.33)' 5.33' = 1,600
75 × 15.33' × (7.56 + 11.03)' ½ = 10,690#
12,290# = 12.3k

P_4 = 75 × 15.33 (11.03 + 12.77) ½ = 13,680#
10,900# × ½ (tower) = 1,000#
5,450#
20,730# = 20.7k

$P_{4.7}$ = 5450# (tower)

$P_5 = P_3 = 12.3^k$

$P_7 = P_2 = 5.46^k$

$\Sigma = 198^k \sim 202^k$

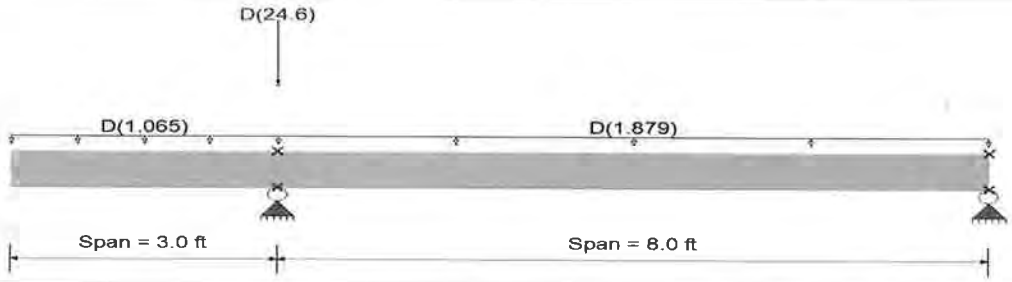
General Beam

DESCRIPTION: All Loads 1-2 @ 1.0g E-W

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	3.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	8.0 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 = 1.065 k/ft, Tributary Width = 1.0 ft, (w1)

Load for Span Number 2
Uniform Load : D = 1.879 k/ft, Tributary Width = 1.0 ft, (w2)

Point Load : D = 24.60 k @ 0.0 ft, (Wall 1)

DESIGN SUMMARY

Maximum Bending =	12.731 k-ft	Maximum Shear =	8.115 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 1
Location of maximum on span	4.308 ft	Location of maximum on span	3.000 ft

Maximum Deflection

Max Downward Transient Deflection	0.000 in	0
Max Upward Transient Deflection	0.000 in	0
Max Downward Total Deflection	0.049 in	1965
Max Upward Total Deflection	-0.042 in	1700

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		35.910	6.917
Overall MINimum			
D Only		35.910	6.917
+0.60D		21.546	4.150
		(1)	(2)

$\Sigma = 42.8^k$
139
75.6
257k ~ 26k ✓

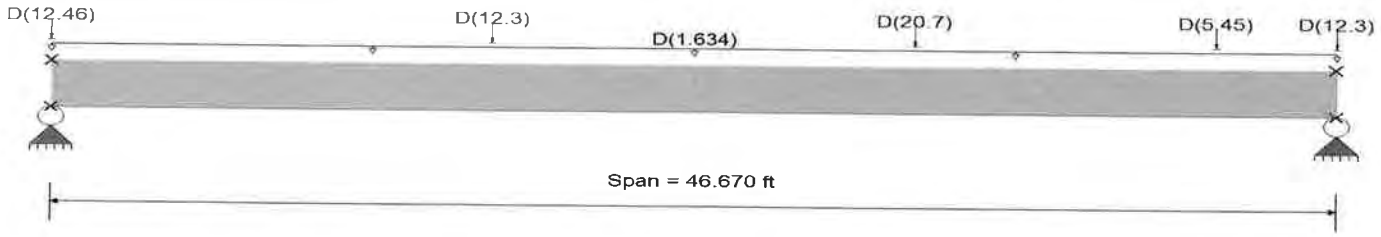
General Beam

DESCRIPTION: All Loads 2-5 @ 1.0g E-W

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 46.670 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(s) for Span Number 1

Point Load : D = 12.460 k @ 0.0 ft, (P2 + wall 2)

Point Load : D = 12.30 k @ 16.0 ft, (P3)

Point Load : D = 20.70 k @ 31.330 ft, (P4)

Point Load : D = 5.450 k @ 42.330 ft, (P4.7)

Point Load : D = 12.30 k @ 46.670 ft, (P5)

Uniform Load : D = 1.634 k/ft, Tributary Width = 1.0 ft, (w3)

DESIGN SUMMARY

Maximum Bending =	716.799 k-ft	Maximum Shear =	73.486 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	25.202 ft	Location of maximum on span	46.670 ft
Maximum Deflection			
Max Downward Transient Deflection	0.000 in	0	
Max Upward Transient Deflection	0.000 in	0	
Max Downward Total Deflection	98.328 in	5	
Max Upward Total Deflection	0.915 in	611	

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	65.983	73.486
Overall MINimum		
D Only	65.983	73.486 → $\Sigma = 139$ k
+0.60D	39.590	44.091

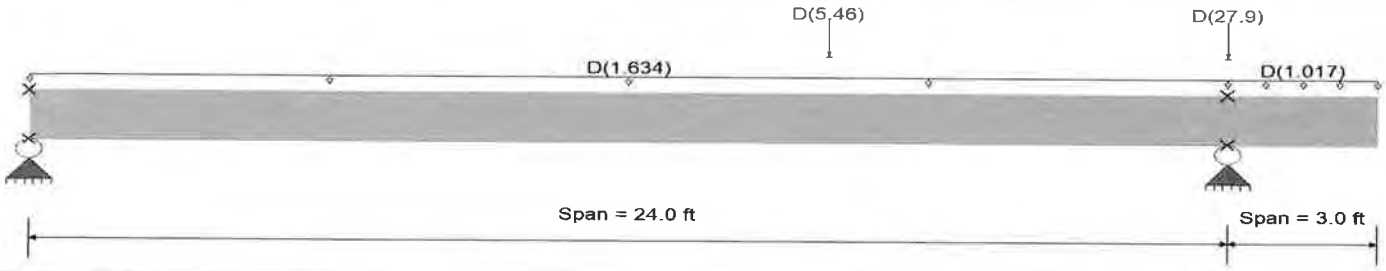
(2) (5)

General Beam

DESCRIPTION: All Loads 5-8 @ 1.0g E-W

General Beam Properties

Elastic Modulus	29,000.0 ksi						
Span #1	Span Length =	24.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	3.0 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 = 1.634 k/ft, Tributary Width = 1.0 ft, (w3)

Point Load : D = 5.460 k @ 16.0 ft, (P7)

Point Load : D = 27.90 k @ 24.0 ft, (Wall 8)

Load for Span Number 2
Uniform Load : D = 1.017 k/ft, Tributary Width = 1.0 ft, (w4)

DESIGN SUMMARY

Maximum Bending =	138.008 k-ft	Maximum Shear =	23.439 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	12.923 ft	Location of maximum on span	24.000 ft
Maximum Deflection			
Max Downward Transient Deflection	0.000 in	0	
Max Upward Transient Deflection	0.000 in	0	
Max Downward Total Deflection	4.966 in	57	
Max Upward Total Deflection	-1.958 in	36	

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	21.237	54.390	
Overall MINimum			
D Only	21.237	54.390	
+0.60D	12.742	32.634	

→ E = 75.6k

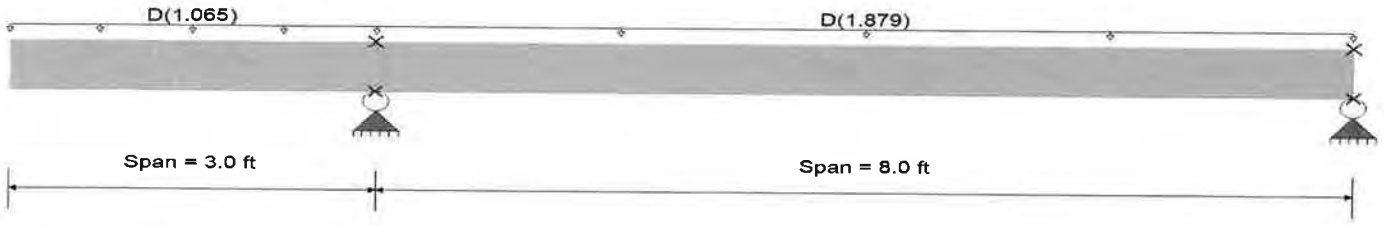
(5) (9)

General Beam

DESCRIPTION: Diaphragm 1-2 @ 1.0g E-W

General Beam Properties

Elastic Modulus	29,000.0 ksi						
Span #1	Span Length =	3.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	8.0 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 = 1.065 k/ft, Tributary Width = 1.0 ft, (w1)

Load for Span Number 2
Uniform Load : D = 1.879 k/ft, Tributary Width = 1.0 ft, (w2)

DESIGN SUMMARY

Maximum Bending =	12.731 k-ft	Maximum Shear =	8.115 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 1
Location of maximum on span	4.308 ft	Location of maximum on span	3.000 ft
Maximum Deflection			
Max Downward Transient Deflection	0.000 in	0	
Max Upward Transient Deflection	0.000 in	0	
Max Downward Total Deflection	0.049 in	1965	
Max Upward Total Deflection	-0.042 in	1700	

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		11.310	6.917
Overall MINimum			
D Only		11.310	6.917
+0.60D		6.786	4.150

(1) (2)

→ Σ = 18.2k

132
47.7
198k ~ 202k ✓

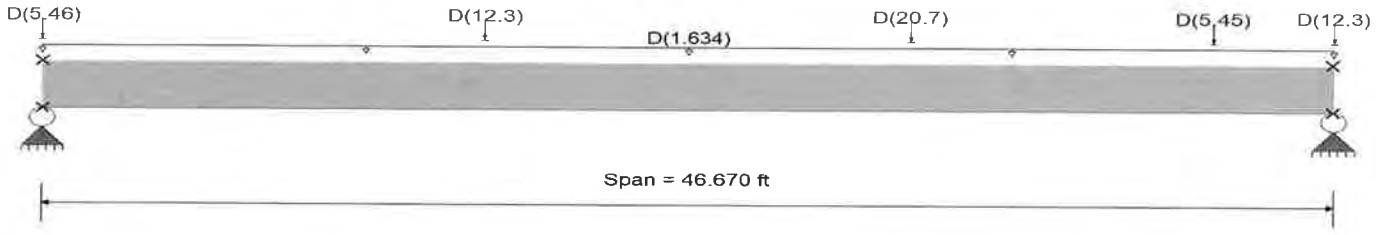
General Beam

DESCRIPTION: Diaphragm 2-5 @ 1.0g E-W

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 46.670 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(s) for Span Number 1

Point Load : D = 5.460 k @ 0.0 ft, (P2)

Point Load : D = 12.30 k @ 16.0 ft, (P3)

Point Load : D = 20.70 k @ 31.330 ft, (P4)

Point Load : D = 5.450 k @ 42.330 ft, (P4.7)

Point Load : D = 12.30 k @ 46.670 ft, (P5)

Uniform Load : D = 1.634 k/ft, Tributary Width = 1.0 ft, (w3)

DESIGN SUMMARY

Maximum Bending =	716.799 k-ft	Maximum Shear =	73.486 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	25.202 ft	Location of maximum on span	46.670 ft
Maximum Deflection			
Max Downward Transient Deflection	0.000 in	0	
Max Upward Transient Deflection	0.000 in	0	
Max Downward Total Deflection	98.328 in	5	
Max Upward Total Deflection	0.915 in	611	

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	58.983	73.486
Overall MINimum		
D Only	58.983	73.486
+0.60D	35.390	44.091

(2) (5)

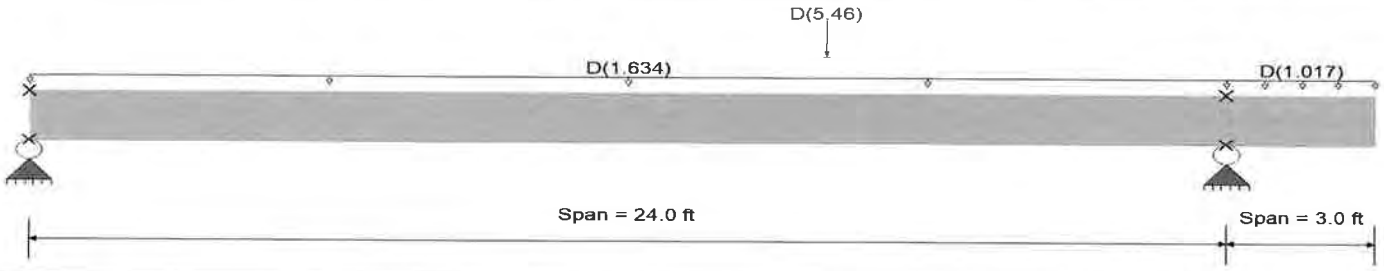
→ E = 132 k

General Beam

DESCRIPTION: Diaphragm 5-8 @ 1.0g E-W

General Beam Properties

Elastic Modulus	29,000.0 ksi						
Span #1	Span Length =	24.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	3.0 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 = 1.634 k/ft, Tributary Width = 1.0 ft, (w3)

Point Load : D = 5.460 k @ 16.0 ft, (P7)

Load for Span Number 2
Uniform Load : D = 1.017 k/ft, Tributary Width = 1.0 ft, (w4)

DESIGN SUMMARY

Maximum Bending =	138.008 k-ft	Maximum Shear =	23.439 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	12.923 ft	Location of maximum on span	24.000 ft

Maximum Deflection

Max Downward Transient Deflection	0.000 in	0
Max Upward Transient Deflection	0.000 in	0
Max Downward Total Deflection	4.966 in	57
Max Upward Total Deflection	-1.958 in	36

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	21.237	26.490	
Overall MINimum			
D Only	21.237	26.490	
+0.60D	12.742	15.894	

$\Sigma = 47.7^k$

(5) (8)

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 10/2019
PE RHB 19 of

N-S Loads @ 1.0 g

W_5 = 16 psf x 84.67' = 1355 plf

W_6 = 31.6k / 66' = 479 plf north
27.9 / 66' = 423 South
1355 roof
2257 plf

W_7 = 10.9k / 12.67' (tower) = 860 plf tower
16 psf x 81.67' = 1307 roof
479
423
3069 plf

W_8 = 16 psf x 70.67' = 1131
860
479
423
2893 plf

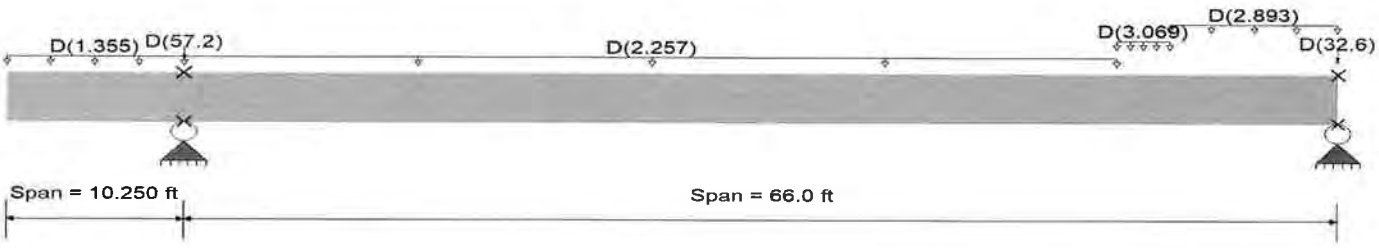
Σ = 171k ✓

General Beam

DESCRIPTION: All Loads A-C @ 1.0g N-S

General Beam Properties

Elastic Modulus	29,000.0 ksi						
Span #1	Span Length =	10.250 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	66.0 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 = 1.355 k/ft, Tributary Width = 1.0 ft, (w5)

Point Load : D = 57.20 k @ 10.250 ft, (Wall C)

Load for Span Number 2
Uniform Load : D = 2.257 k/ft, Extent = 0.0 -->> 53.330 ft, Tributary Width = 1.0 ft, (w6)

Uniform Load : D = 3.069 k/ft, Extent = 53.330 -->> 56.330 ft, Tributary Width = 1.0 ft, (w7)

Uniform Load : D = 2.893 k/ft, Extent = 56.330 -->> 66.0 ft, Tributary Width = 1.0 ft, (w8)

Point Load : D = 32.60 k @ 66.0 ft, (Wall A)

DESIGN SUMMARY

Maximum Bending =	1,222.627 k-ft	Maximum Shear =	113.726 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2
Location of maximum on span	34.015 ft	Location of maximum on span	66.000 ft
Maximum Deflection			
Max Downward Transient Deflection	0.000 in	0	
Max Upward Transient Deflection	0.000 in	0	
Max Downward Total Deflection	333.717 in	2	
Max Upward Total Deflection	-158.196 in	0	

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		147.511	113.726
Overall MINimum			
D Only		147.511	113.726
+0.60D		88.507	68.235

General Beam

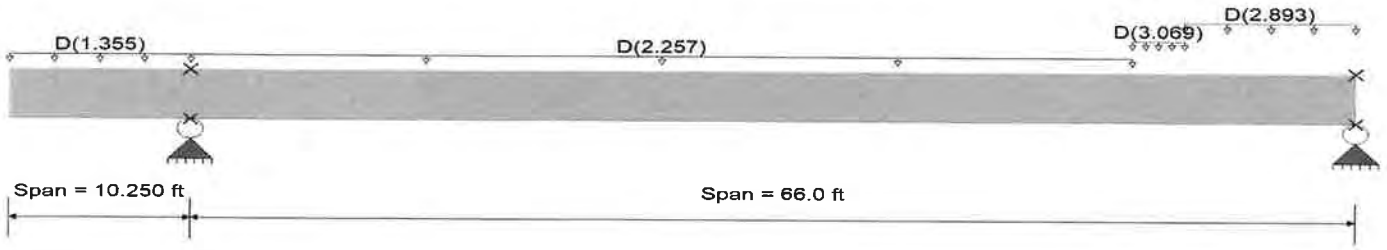
Lic. # : KW-06005908 MKM ASSOCIATES

DESCRIPTION: Diaphragm A-C @ 1.0g N-S

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	10.250 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	66.0 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 = 1.355 k/ft, Tributary Width = 1.0 ft, (w5)

Load for Span Number 2
Uniform Load : D = 2.257 k/ft, Extent = 0.0 -->> 53.330 ft, Tributary Width = 1.0 ft, (w6)

Uniform Load : D = 3.069 k/ft, Extent = 53.330 -->> 56.330 ft, Tributary Width = 1.0 ft, (w7)

Uniform Load : D = 2.893 k/ft, Extent = 56.330 -->> 66.0 ft, Tributary Width = 1.0 ft, (w8)

DESIGN SUMMARY

Maximum Bending =	1,222.627 k-ft	Maximum Shear =	81.126 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2
Location of maximum on span	34.015 ft	Location of maximum on span	66.000 ft
Maximum Deflection			
Max Downward Transient Deflection	0.000 in	0	
Max Upward Transient Deflection	0.000 in	0	
Max Downward Total Deflection	333.717 in	2	
Max Upward Total Deflection	-158.196 in	0	

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		90.311	81.126
Overall MINimum			
D Only		90.311	81.126
+0.60D		54.187	48.675

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 10/2019
PE RHB 22 of

Roof Diaphragm

$F_{px} = 0.429\, w_{px} > 0.2 \times 1.0 \times 1.5\, w_{px}$
$< 0.4 \times 1.0 \times 1.5\, w_{px}$

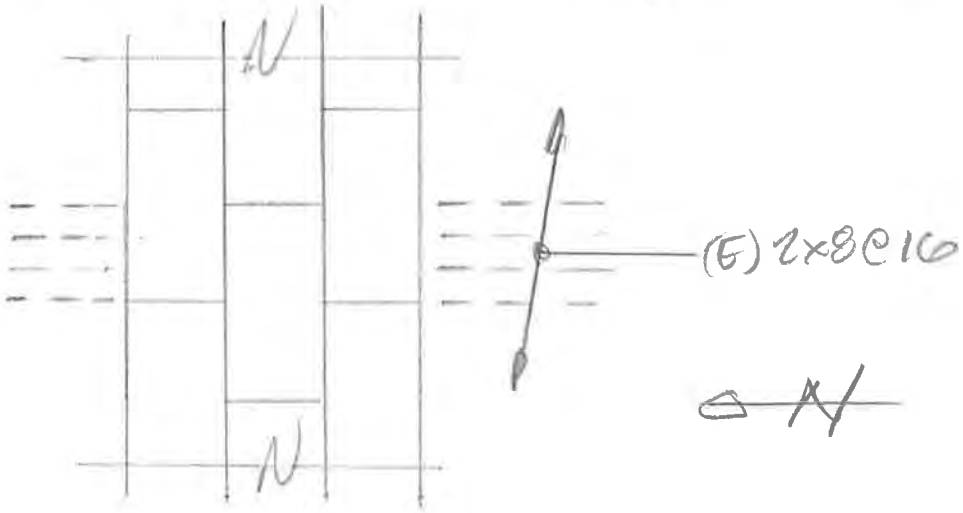
(E) 3/8 Ply w/ 8dC4" o.c. blocked

Framing direction N-S
Cont panel joints E-W
} Case 1 & 3

E-W Load Case 3
N-S Load Case 1
} Allow ASD = $\frac{640}{2}$ = 320 plf

(E) 3/8 Ply w/ 8dC6" o.c. unblocked

Case 1 Allow ASD = 430/2 = 215 plf
Case 3 " " = 320/2 = 160 plf



Extent of blocking is unknown.

Table 4.2 Nominal Unit Shear Capacities for Wood Frame Diaphragms

Blocked Wood Structural Panel Diaphragms[1,2,3,4,5]

Sheathing Grade	Common Nail Size	Minimum Fastener Penetration in Framing Member or Blocking (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Adjoining Panel Edges and Boundaries (in.)
Structural I	6d	1-1/4	5/16	2 3
	8d	1-3/8	3/8	2 3
	10d	1-1/2	15/32	2 3
Sheathing and Single-Floor	6d	1-1/4	5/16	2 3
			3/8	2 3
	8d	1-3/8	3/8	2 3
			7/16	2 3
			15/32	2 3
	10d	1-1/2	15/32	2 3
			19/32	2 3

A — SEISMIC

Nail Spacing (in.) at diaphragm boundaries (all cases), at continuous panel edges parallel to load (Cases 3 & 4), and at all panel edges (Cases 5 & 6)

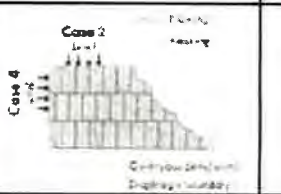
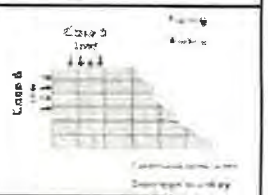
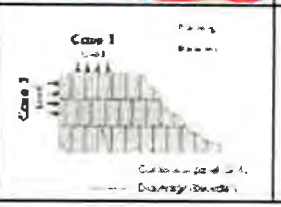
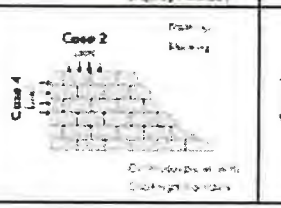
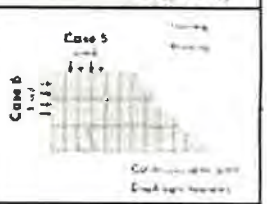
6			4			2-1/2			2		
Nail Spacing (in.) at other panel edges (Cases 1, 2, 3, & 4)											
6			6			4			3		
v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)	
	OSB	PLY		OSB	PLY		OSB	PLY		OSB	PLY
370	15	12	500	8.5	7.5	750	12	10	840	20	15
420	12	9.5	560	7.0	6.0	840	9.5	8.5	950	17	13
540	14	11	720	9.0	7.5	1060	13	10	1200	21	15
600	12	10	800	7.5	6.5	1200	10	9.0	1350	18	13
640	24	17	850	15	12	1280	20	15	1460	31	21
720	20	15	960	12	9.5	1440	16	13	1640	26	18
340	15	10	450	9.0	7.0	670	13	9.5	760	21	13
380	12	9.0	500	7.0	6.0	760	10	9.0	860	17	12
370	13	9.5	500	7.0	6.0	750	10	8.0	840	19	12
420	10	8.0	560	5.5	5.0	840	9.5	7.0	950	14	10
480	15	11	640	9.5	7.5	960	13	9.5	1090	21	13
540	12	9.5	720	7.5	6.0	1080	11	9.5	1220	19	12
530	14	10	660	9.5	7.0	1010	12	9.5	1150	20	13
570	11	9.0	780	7.0	6.0	1140	10	9.0	1290	17	12
540	13	9.5	720	7.5	6.5	1060	11	9.5	1200	19	13
600	10	8.5	800	6.0	5.5	1200	9.0	7.5	1350	15	11
580	25	19	770	15	11	1150	21	14	1310	33	18
650	21	14	880	12	9.5	1300	17	12	1470	28	16
640	21	14	850	13	9.5	1280	18	12	1460	29	17
720	17	12	960	10	8.0	1440	14	11	1640	24	15

B — WIND

Nail Spacing (in.) at diaphragm boundaries (all cases), at continuous panel edges parallel to load (Cases 3 & 4), and at all panel edges (Cases 5 & 6)

6	4	2-1/2	2
Nail Spacing (in.) at other panel edges (Cases 1, 2, 3, & 4)			
6	6	4	3
v_w (plf)	v_w (plf)	v_w (plf)	v_w (plf)
520	700	1050	1175
590	785	1175	1330
755	1010	1485	1680
840	1120	1680	1890
895	1190	1790	2045
1010	1345	2015	2295
475	630	940	1065
530	700	1065	1205
520	700	1050	1175
590	785	1175	1330
670	895	1345	1525
755	1010	1510	1710
715	950	1415	1610
800	1065	1595	1805
755	1010	1485	1680
840	1120	1680	1890
810	1080	1610	1835
910	1205	1820	2060
895	1190	1790	2045
1010	1345	2015	2295

1. Nominal unit shear capacities shall be adjusted in accordance with 4.2.3 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.2.6. For specific requirements, see 4.2.7.1 for wood structural panel diaphragms. See Appendix A for common nail dimensions.
2. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the *NDS* (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
3. Apparent shear stiffness values, G_a, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for diaphragms constructed with either OSB or 3-ply plywood panels. When 4-ply or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be multiplied by 1.2.
4. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
5. Diaphragm resistance depends on the direction of continuous panel joints with respect to the loading direction and direction of framing members, and is independent of the panel orientation.

	Cases 1&3: Continuous Panel Joints Perpendicular to Framing	Cases 2&4: Continuous Panel Joints Parallel to Framing	Cases 5&6: Continuous Panel Joints Perpendicular and Parallel to Framing
Long Panel Direction Perpendicular to Supports			
Long Panel Direction Parallel to Supports[a]			

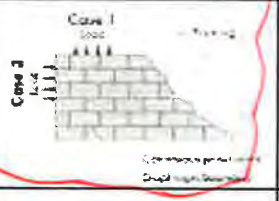
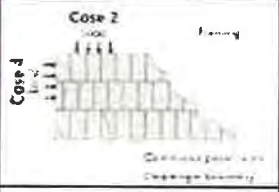
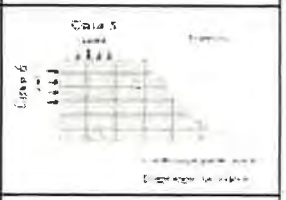
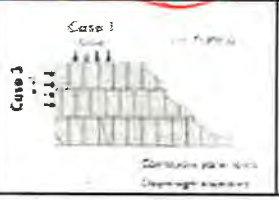
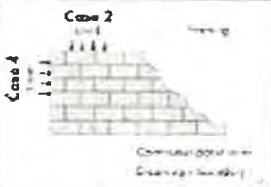
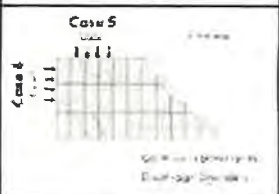
[a] Panel span rating for out-of-plane loads may be lower than the span rating with the long panel direction perpendicular to supports (See Section 3.2.2 and Section 3.2.3).

Table 4.2C Nominal Unit Shear Capacities for Wood-Frame Diaphragms

Unblocked Wood Structural Panel Diaphragms[1,2,3,4,5]

Sheathing Grade	Common Nail Size	Minimum Fastener Penetration in Framing (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Supported Edges and Boundaries (in.)	A SEISMIC 6 in. Nail Spacing at diaphragm boundaries and supported panel edges						B WIND 6 in. Nail Spacing at diaphragm boundaries and supported panel edges	
					Case 1			Cases 2,3,4,5,6			Case 1	Cases 2,3,4,5,6
					v_c (plf)	G_a (kips/in.) OSB	G_a (kips/in.) PLY	v_c (plf)	G_a (kips/in.) OSB	G_a (kips/in.) PLY	v_w (plf)	v_w (plf)
Structural I	6d	1-1/4	5/16	2	330	9.0	7.0	250	6.0	4.5	460	350
				3	370	7.0	6.0	280	4.5	4.0	520	390
	8d	1-3/8	3/8	2	480	8.5	7.0	360	6.0	4.5	670	505
				3	530	7.5	6.0	400	5.0	4.0	740	560
	10d	1-1/2	15/32	2	570	14	10	430	9.5	7.0	800	600
				3	640	12	9.0	480	8.0	6.0	895	670
Sheathing and Single-Floor	6d	1-1/4	5/16	2	300	9.0	6.5	220	6.0	4.0	420	310
				3	340	7.0	5.5	250	5.0	3.5	475	350
			3/8	2	330	7.5	5.5	250	5.0	4.0	460	350
				3	370	6.0	4.5	280	4.0	3.0	520	390
	8d	1-3/8	3/8	2	430	9.0	6.5	320	6.0	4.5	600	450
				3	480	7.5	5.5	360	5.0	3.5	670	505
			7/16	2	460	8.5	6.0	340	5.5	4.0	645	475
				3	510	7.0	5.5	380	4.5	3.5	715	530
			15/32	2	480	7.5	5.5	360	5.0	4.0	670	505
				3	530	6.5	5.0	400	4.0	3.5	740	560
	10d	1-1/2	15/32	2	510	15	9.0	380	10	6.0	715	530
				3	580	12	8.0	430	8.0	5.5	810	600
			19/32	2	570	13	8.5	430	8.5	5.5	800	600
				3	640	10	7.5	480	7.0	5.0	895	670

1. Nominal unit shear capacities shall be adjusted in accordance with 4.2.3 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.2.6. For specific requirements, see 4.2.7.1 for wood structural panel diaphragms. See Appendix A for common nail dimensions.
2. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the *NDS* (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
3. Apparent shear stiffness values, G_a, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for diaphragms constructed with either OSB or 3-ply plywood panels. When 4-ply or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be multiplied by 1.2.
4. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
5. Diaphragm resistance depends on the direction of continuous panel joints with respect to the loading direction and direction of framing members, and is independent of the panel orientation.

	Cases 1&3: Continuous Panel Joints Perpendicular to Framing	Cases 2&4: Continuous Panel Joints Parallel to Framing	Cases 5&6: Continuous Panel Joints Perpendicular and Parallel to Framing
Long Panel Direction Perpendicular to Supports			
Long Panel Direction Parallel to Supports[a]			

(a) Panel span rating for out-of-plane loads may be lower than the span rating with the long panel direction perpendicular to supports (See Section 3.2.2 and Section 3.2.3).

Roof Diaphragm E-W Loads

v_1 (ASD) = 18.8^k / 52.0' = 362 plf

(E) 2x T&G allows $\frac{100}{2}$ = 50 plf

→ Provide blocked plywd w/ 2x T&G
15/32" sheathing 8d@4" o.c. e.n.
allow 800/2 = 400 plf

V_{2+} (ASD) = 0.3(58.98 − 5.46) = 16.1^k

v_2 = 16.1^k / 52.0' = 309 plf

(E) 3/8 ply blocked w/ 8d@4
allows 640/2 = 320 plf OK!!

$V_{2.5}$ = 0.3(58.98 − 5.46 − 1.634 × 8') = 12.13^k

$v_{2.5}$ = 12.13 / 52.0' = 233 plf

(E) 3/8 unblocked allows 160 plf

→ Provide blocking & nail 8d@4" o.c.

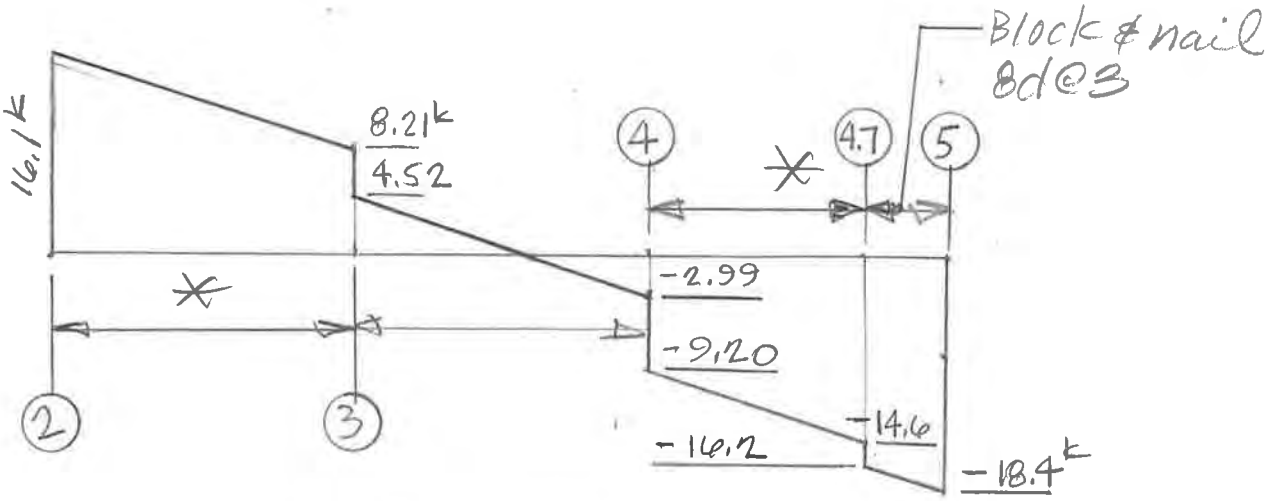
MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHB 26 of

Roof Diaphragm E-W loads cont.

V_5 (ASD) = 0.3(73.5 − 12.3)^k = 18.4^k



v_5 (ASD) = 18.4^k/52′ = 353 plf

* Block & nail 8d@4 : allows 320 plf

At 4.7–5 block & nail 8d@3

allows $\frac{850}{2}$ = 425 plf (interpolated)

At 3–4 unblocked OK 4.52^k/52′ = 87 plf < 160 plf

Chord = 0.3(717′^{k})/52′ = 4.14^k (ASD)

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHS 27 of

Roof Diaphragm E-W Loads cont

$V_{5+} = 0.13 \times 21.2 = 6.36^k$ (ASD)

$v = 6.36/52' = 122$ plf < 160 plf OK//

$V_{8-} = 0.13(26.5 - 1.017 \times 31) = 7.03^k$

$v = 7.03/52' = 135$ plf < 160 OK//

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHB 28 of

Roof Diaphragm N-S Loads

$V_C = 0.3(90.31 - 1.355 \times 10.25') = 22.9^k$

$v_C = 22.9/77.33' = 296$ plf < 320 plf ok

$V_A = 0.3(81.1)^k = 24.3^k$

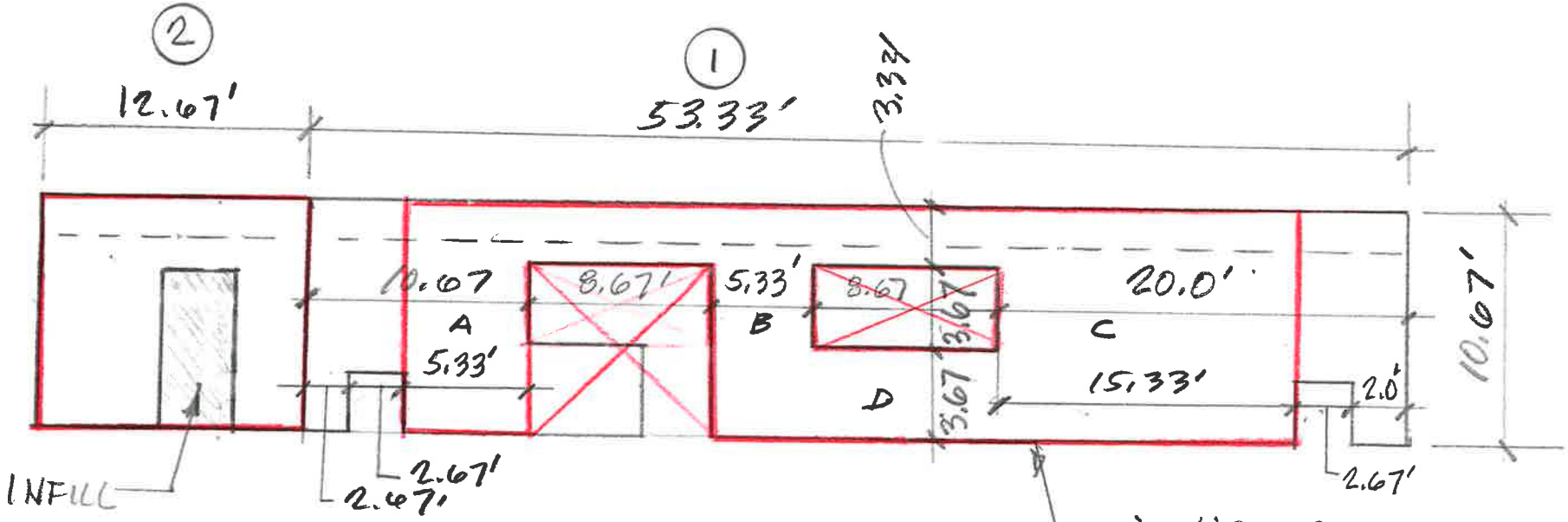
$v = \frac{24.3^k}{(70.67 - 11.0 - 1.33)'} = 417$ plf

→ Block & nail from A to B.

$V_B = 0.3(81.1^k - 2.893 \times 9.67' - 3.069 \times 3') = 13.2^k$

$v_{B-} = 13.2^k/58.33' = 226$ plf

$v_{B+} = 13.2^k/77.33' = 170$ plf



NORTH SIDE CMU

GEFD
190076
10/2019
KMB
29

CMU Wall Line 1-2

Line ①

$h/d = 10.67/12.67 = 0.84$ $R_c = 2.045$

Line ② (simplified)

$h/d = 10.67/43.33 = 0.25$ $\Delta_c = 0.081$

- bottom strip $7.33/43.33 = 0.17$ $-\Delta_F = 0.051$

pier B $3.67/5.33 = 0.69$ $R_F = 4.169$

" C $3.67/15.33 = 0.24$ $R_F = 13.627$

$\Sigma = 17.796$

$\Delta_{BC} = 0.056$

pier D $3.67/29.33 = 0.13$ $\Delta_D = 0.039$

0.095

pier BCD $R = 1/\Delta = 10.526$

pier A $7.33/5.33 = 1.375$

$R_A = 1.478$

$R_A + R_{BCD} = 12.004$ $\Delta = 0.083$

$\Sigma\Delta = 0.113$

pier ABCD $\Sigma R = 1/\Sigma\Delta = 8.826$

CMU Wall 1-2 cont

$R_1 = 8.826$ 81%
$R_2 = 2.045$ 19%
10.871 100%

} relative stiffness

→ Assume lines 1 & 2 share roof diaphragm reaction in proportion to stiffness.

Diaphragm reactions (ASD)

$R_1 = 0.3 \times 11.31^k = 3.39^k$

$R_2 = 0.3 \times (6.92 + 58.98) = 19.77$

23.16^k

$V_1 = 0.81 \times 23.16 = 18.8^k$

$V_2 = 0.19 \times 23.16 = 4.4^k$

S.W. reactions (ASD)

$V_1 = 0.3 \times 24.6^k = 7.38$ wall

18.8

26.2^k

$V_2 = 0.3 \times 7.0^k = 2.1^k$ wall

4.4

6.5^k

} 32.7^k

MKM & Associates
structural engineering

GCFD

Job # 190076
Date 11/2019
PE RHB 32 of

CMU Wall 1-2 Cont

Wall 1 $V = 26.2^k$ ASD

pier A $V_A = 26.2\left(\frac{1,478}{12,004}\right) = 3.23^k$

$v_A = 3.23^k / 5.33' = 605$ plf

pier B: $V_B = 26.2^k\left(\frac{4,169}{17,796}\right)\left(\frac{10,526}{12,004}\right) = 5.38^k$

$v_B = 5.38/5.33' = 1010$ plf

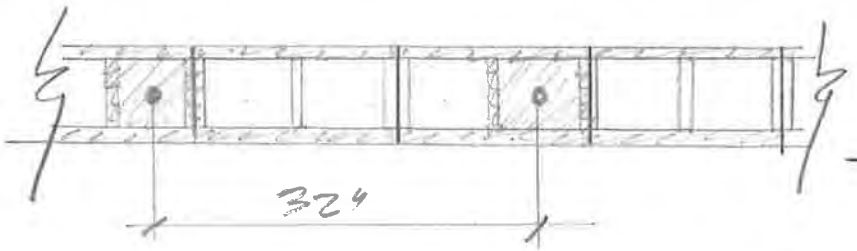
pier C: $V_C = 26.2\left(\frac{13,627}{17,796}\right)\left(\frac{10,526}{12,004}\right) = 17.6^k$

$v_C = 17.6/15.33' = 1148$ plf

TMS 402 8.3.5 (Assume partially grouted)

Allow $F_v = (F_{vm} + F_{vs})\phi_g = 43 \times 0.75 = 32$ psi

$F_{vm} \le \frac{1}{2}(4.0 - 1.75)\sqrt{1500} = 43$ psi



PLAN

$A_{nv} \ge 8" \times 7.625" + (32-8)" 1.25" \times 2 = 121$ in²

$f_v \le \frac{V}{A_{nv}} = \frac{1148^{\#} \times 2.67'}{121} = 25$ psi $< F_v$

CMU Wall Line 8

V_8 (ASD) = $0.3 \times 54.4^k = 16.3^k$

$v_8 = 16.3^k / 18.0' = 907$ plf

$f_v = \frac{907 \times 2.67'}{121\ in^2} = 20$ psi $< F_v$

Wood SW Line 5

V_5 (ASD) $= 0.3(73.5 + 21.2) =$ ~~28.4k~~ ✗

$v_5 =$ ~~$28.4^k / 28' = 1015$~~ 546 plf

B3 / ~~B3~~

~~Dbl~~ B3 allows ~~1200~~ plf 600 plf

$w_D =$ 16 psf × 15.33' = 245 plf
10 psf × 13.5' = 135 plf
380 plf

$T =$ ~~1015~~ $546 \times 13.5' - 0.46 \times 380 \times 14' =$ ~~11,250#~~ 4,930#

~~HDU14~~ w/ 4×8

✗ $28.4^k \times \frac{3.5}{6.5} = 15.3^k$

SW w/ openings

Shear Walls with Opening Roof #1

Grid	V (lbs)	l_1 (ft) / l_2 (ft) / l_3 (ft) / l_4 (ft)	l_5 (ft) / l_6 (ft) / l_7 (ft) / l_8 (ft)	L Total (ft)	H (ft) / h (ft)	Height (ft)	v_1 (plf) / v_2 (plf)	v_3 (plf) / v_{avg} (plf)	S.W. Type	W_{DL} (plf)	P_{up} (lbs)	Holdown / 5/8"AB Max Spacing (ft)	Sill Type / Opening Strap/ Comments
5	15300	4.50		51.0	7.00	13.5	360	235	B2	380	0	Negligible	2x sill
0.6*W		28.50			0.00		623	300					CS14
5	15300	3.00		51.0	7.00	13.5	360	235	B2	380	0	5.0	Strap Force lbs
0.7*E		6.50			0.00		623	300					2243
0.6*W													
0.7*E													
0.6*W													
0.7*E													
0.6*W													
0.7*E													
0.6*W													
0.7*E													
0.6*W													
0.7*E													

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHB 34 of

CMU wall Line C

10' piers h/d = 10.67/10.0 = 1.07 R_C = 1.233 × 2 = 2.466 86%

32" piers h/d = 10.67/2.67 = 4.00 R_F = 0.132 × 3 = 0.396 14%

ΣR = 2.466 + 0.396 = 2.842

V = 0.3(147.5k) = 44.3k

10' wall ~ 44.3 × 0.86/2 = 19.0k

v = 19.0k/10' = 1.90 klf

$f_v = \frac{1.90 \times 2.67}{121\ in^2}$ = 42 psi > F_v

→ Strengthen 10' piers (if partially grouted)

If solid grouted: $f_v = \frac{1.90 \times 2.67'}{7.625 \times 32}$ = 21 psi

U.I.F.

< F_{vm} = 43 psi

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHE 35 of

CMU Wall Line A

$V = 0.3(113.7^k) = 34.1^k$

Stiffest piers $h/d = 3.33/3.33 = 1.0$ $R_F = 2.50$

$3.33/2.0 = 1.67$ 1.034

$3.33/2.67 = 1.25$ 1.753

$3.33/5.33 = 0.62$ (34%) 4.766

$3.33/4.0 = 0.83$ 3.266

$4.0/2.0 = 2.0$ 0.714

19.03

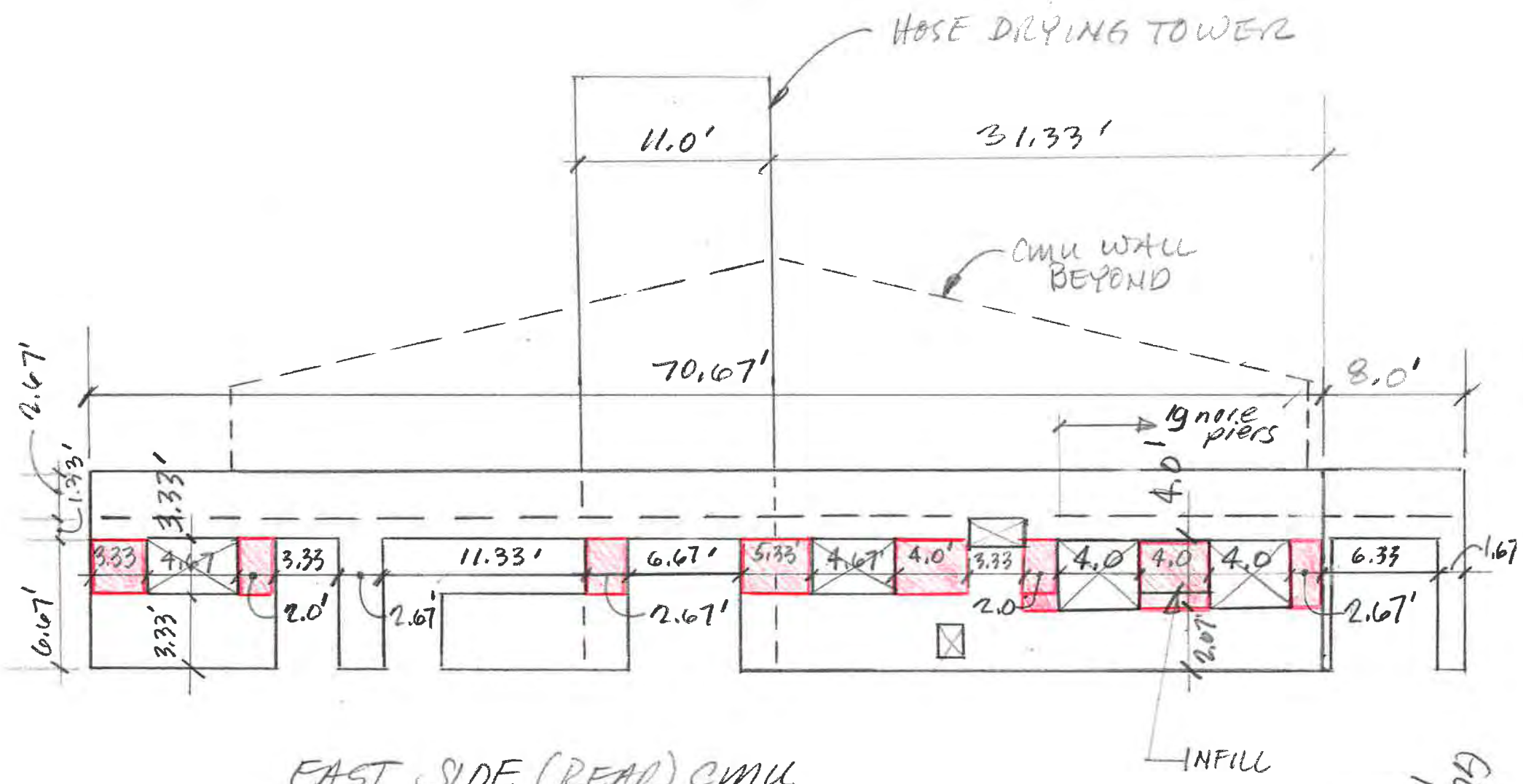
$\max V = 34.1 \times 0.34 = 11.58^k$

" $f_v = \frac{11.58}{5.33'} \times \frac{2.67'}{121\ in^2} = 48\ psi > F_v$

→

If solid grouted: $f_v = \frac{48 \times 121}{7.625 \times 32} = 24\ psi$

$< F_{vm} = 43\ psi$



EAST SIDE (REAR) CMU

GFED
1900 76
10/2019
2 of 2
36

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHG 37 of

Collectors

Line 1: $F_{px} = \frac{26.2^k}{0.7} = 37.4^k = 0.429\, w_{px}$

So $F_{px} = 2.5 \times 0.429\, w_{px} = 1.07\, w_{px}$

need not exceed $0.4 \times 1.0 \times 1.5\, w_{px} = 0.60\, w_{px}$

$= \frac{0.60}{0.429} \times 37.4^k = 52.4^k = 2.0 \times ASD$

Max $C_u = T_u = 15.5^k$ OK//

(E) (2) #5 Gr 40 $0.9 \times A_s f_y = 0.9 \times 2 \times 0.31 \times 40 = 22.3^k$

Line 2

$C_u = T_u = 2.0 \times 6.5^k = 13.0^k$

$0.7 \times 13.0 = 9.1^k$

(E) (2) 3/4 ø M.B. $= 2 \times 5348^\# = 10.7^k$

GEFD

190076
11/2019
RHB
38

Design Method	Allowable Stress Design (ASD)
Connection Type	Lateral loading
Fastener Type	Bolt
Loading Scenario	Double Shear - Wood Main Member

Main Member Type	Glulam Douglas Fir-Larch
Main Member Thickness	6.75 in.
Main Member: Angle of Load to Grain	0
Side Member Type	Steel
Side Member Thickness	1/4 in.
Side Member: Angle of Load to Grain	0
Fastener Diameter	3/4 in.
Load Duration Factor	C_D = 1.6
Wet Service Factor	C_M = 1.0
Temperature Factor	C_t = 1.0

Connection Yield Modes

Im	11340 lbs.
Is	13050 lbs.
IIIs	5348 lbs.
IV	7067 lbs.

Adjusted ASD Capacity	**5348 lbs.**

- Bolt bending yield strength of 45,000 psi is assumed.
- The Adjusted ASD Capacity is only applicable for bolts with adequate end distance, edge distance and spacing per NDS chapter 11.
- ASTM A36 Steel is assumed for steel side members 1/4 in. thick, and ASTM A653 Grade 33 Steel is assumed for steel side members less than 1/4 in. thick.

While every effort has been made to insure the accuracy of the information presented, and special effort has been made to assure that the information reflects the state-of-the-art, neither the American Wood Council nor its members assume any responsibility for any particular design prepared from this on-line Connection Calculator. Those using this on-line Connection Calculator assume all liability from its use.

The Connection Calculator was designed and created by Cameron Knudson, Michael Dodson and David Pollock at Washington State University. Support for development of the Connection Calculator was provided by American Wood Council.

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHS 39 of

Collectors, Cont

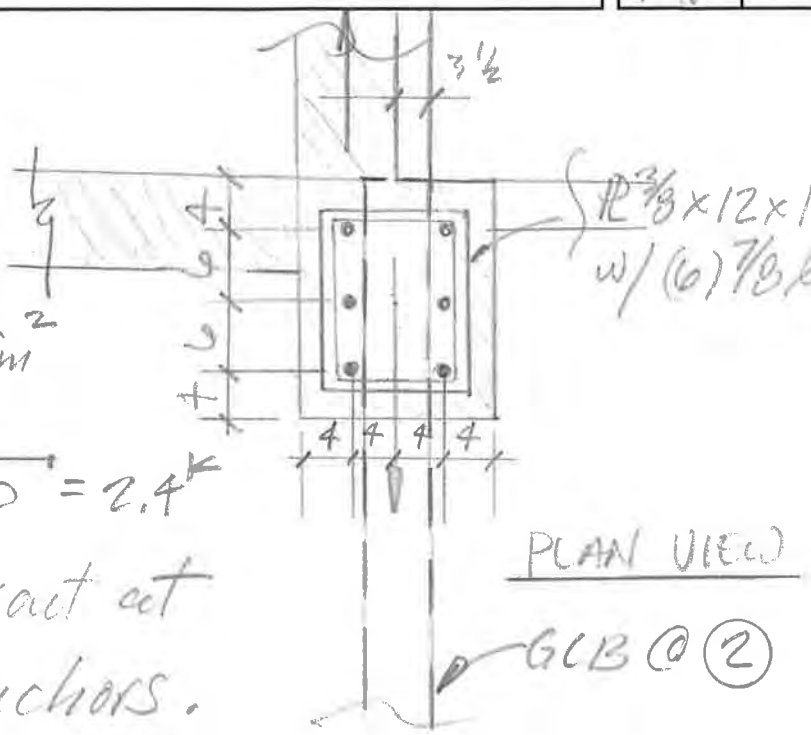
Line 2, Cont

$B_{Vb} = 1.25 A_{PV} \sqrt{f'_m}$

$A_{PV} = 2 \times \frac{\pi \times 4^2}{2} = 50.3 \text{ in}^2$

$B_{Vb} = 1.25 \times 50.3 \sqrt{1500} = 2.4^k$

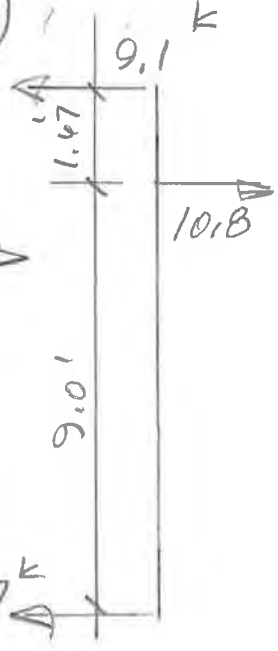
→ CMU breakout at leading anchors. Tie GCB to CMU wall.



ECCQ w/ (14) SDS x 2½ = 14 x 420 x 1.6 = 9410# > 9.1 (ASD)

3/4" Ø Rod ϕT_n = 0.9 x 0.44 x 36 = 14.3^k
0.75 x 0.33 x 58 = 14.4^k
} > 13.0^k T_u

(4) 3/4" Ø STB2 = 4 x 2.49 x 1.33 = 13.2^k (ASD)
↳ UES ER 240



HSS 6x6x5/16 transfer col →

$M_a = \frac{10.8 \times 9.0 \times 1.67}{10.67} = 15.2^{1k}$

$M_{n/\Omega} = 31.2^{1k}$

MKM & Associates structural engineering

GLFD

Job # 190076
Date 11/2019
PE RHS 40 of

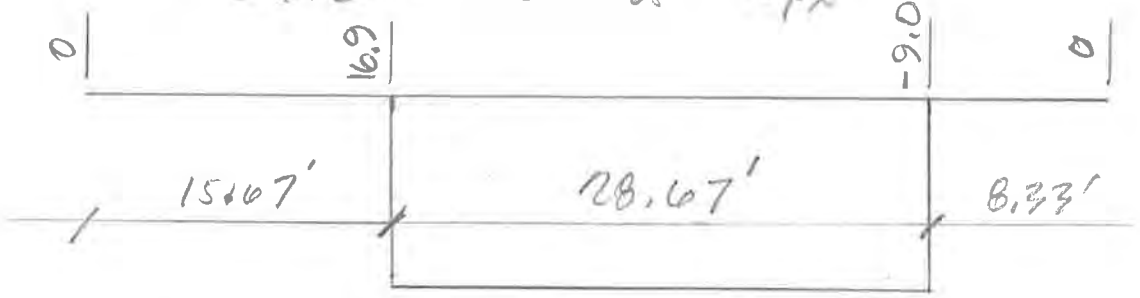
Collectors, Cont

Line 5

$0.7 F_{px} = 28.4^k$

$\times 2$

$56.8^k = 0.4 S_{DS} I W_{px}$



Max $C_u = T_u = 16.9^k$

$0.7 \times 16.9 = 11.8^k$ (ASD)

(2) CMST14 = $2 \times 6475^\# = 12.9^k$

$0.7 \times 9.0 = 6.3^k$ CMST14

Collectors, Cont

Line 8 Distribution to piers by relative rigidity. See elevation.

max $C_u = T_u = 8.9^k$

(E)(2)#5 $\phi A_s f_y = 0.9 \times 2 \times 0.31 \times 40 = 22.3^k$ OK

Line C See elevation.

max $C_u = T_u = 38.1 - \frac{88.6}{78.67} \times 10' = 26.8^k$

(E)#6 $\phi A_s f_y = 0.9 \times 0.44 \times 40 = 15.8^k$

→ Provide collector

$A_s > \frac{26.8^k}{0.9 \times 36} = 0.83\ in^2$

1 1/8" ø Rod $A_g = 0.99\ in^2$ @ C-2 & C-4

Conn to wall $26.8^k \times 0.7 = 18.8^k$

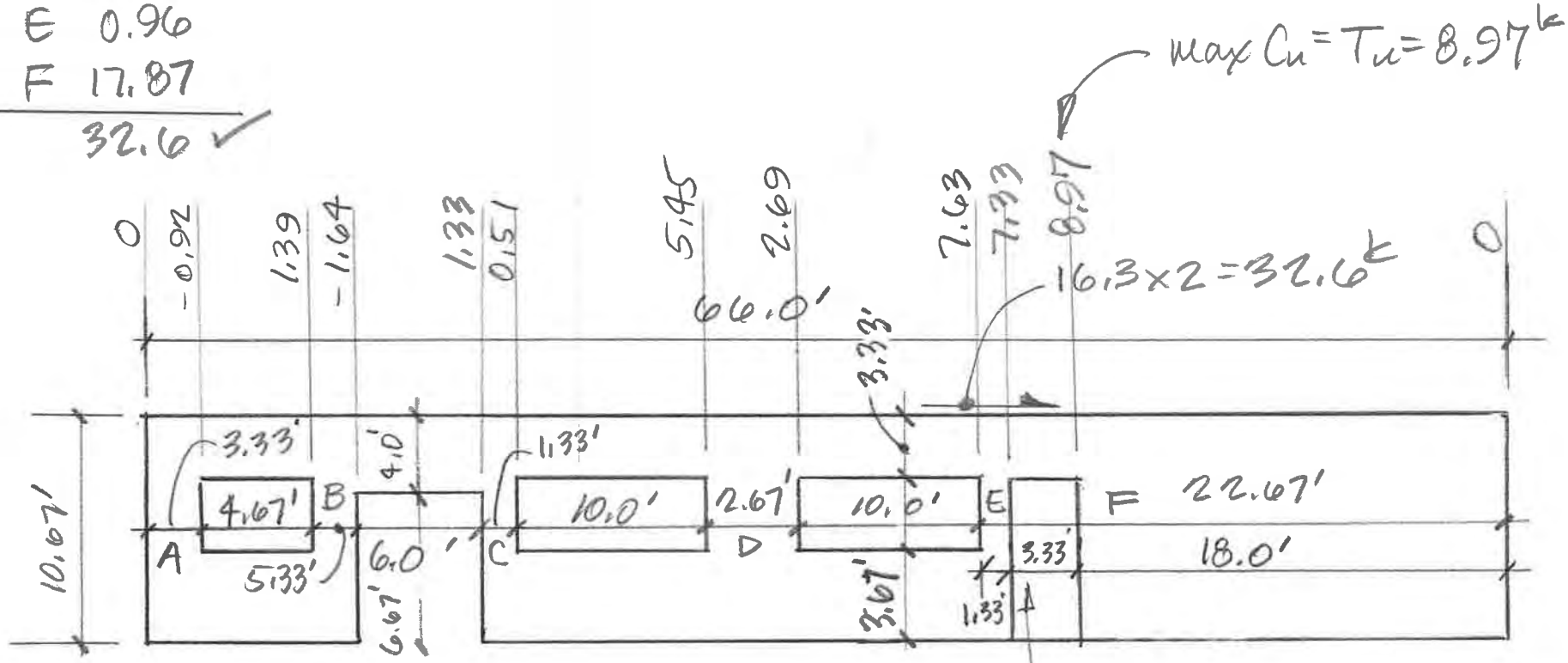
5/8 ø SET-XP = 1350#

× 0.87

1175# @ parallel edge dist 4"

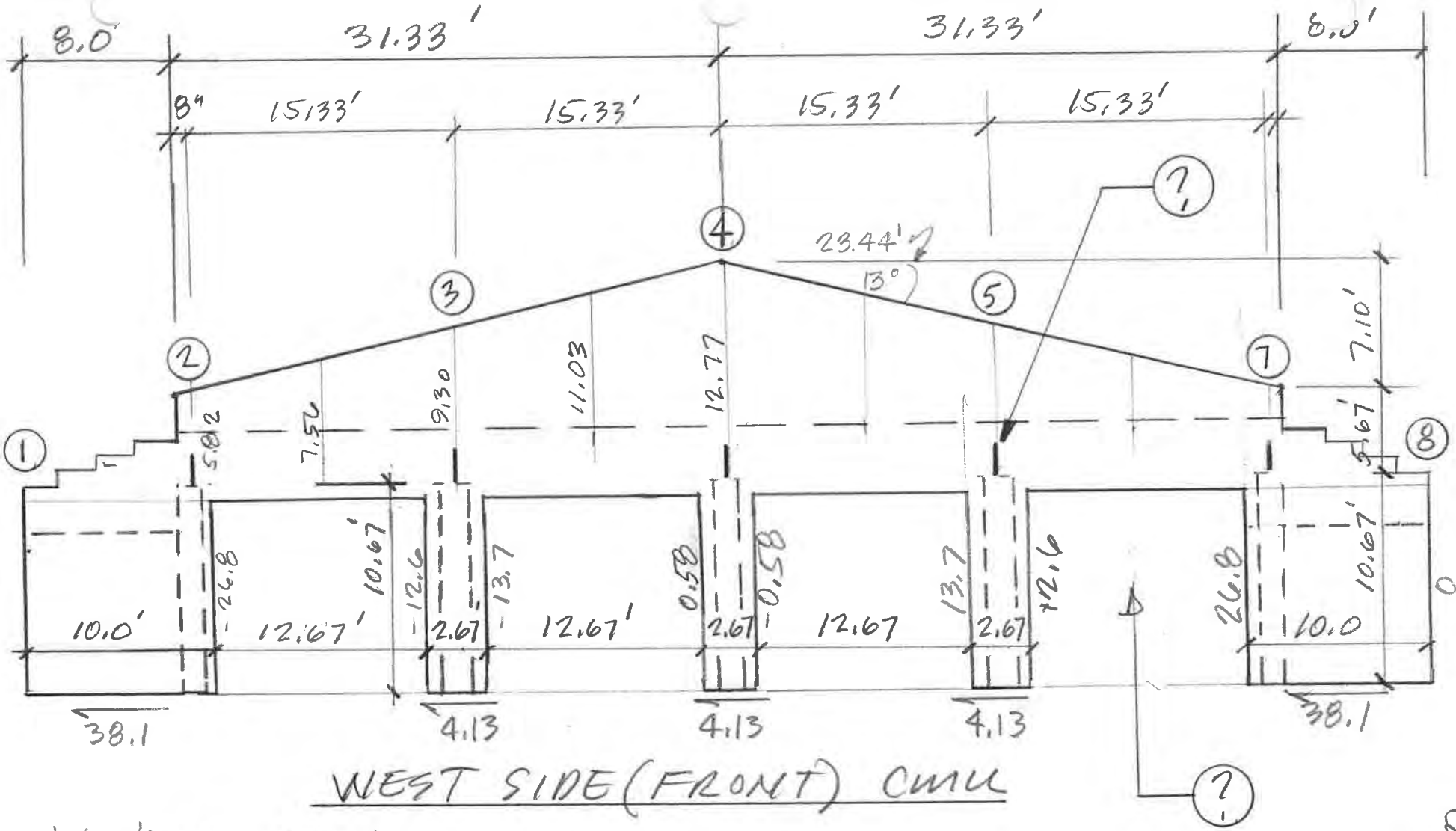
$1175 \times 5 + 1350 \times 10 = 19.4^k$

A 2.56k
B 5.66k
C 1.47k
D 4.08
E 0.96
F 17.87
32.6 ✓



SOUTH SIDE CMU

GEFD
190076
10/2019
12KB
42



WEST SIDE (FRONT) CMU

$44.3^{k} \times 2 = 88.6^{k}$

$\frac{88.6 \times 0.86}{2} = 38.1$

$\frac{88.6 \times 0.14}{3} = 4.13$

GEFD 1900710
10/2019
RMB
43

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 10/2019
PE 72183 44 of

Wall Anchorage

$F_p = 0.4 S_{DS} K_a I_e W_p$

$K_a = 1 + \frac{54}{100} = 1.54$ E-W EQ

$1 + \frac{66}{100} = 1.66$ N-S EQ

$F_p = 0.4 \times 1.0 \times 1.54 \times 1.5 \times W_p = 0.92 W_p$ E-W

" " 1.66 " " $= 1.00 W_p$ N-S.

North Wall

W_p A-B $= 75 \text{ psf} \times 6.67' = 500 \text{ plf} = F_p$

W_p B-C $= 75 \text{ psf} \times \left(\frac{53.33 \times 3.33 + 36.0 \times 3.33}{53.33}\right) = 418$ plf

South Wall

$W_p = 75 \text{ psf} \times \left(\frac{66' \times 3.33' + 35.33' \times 3.33'}{66'}\right) = 383$ plf

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHB 45 of

Wall Anchorage, Cont

East Wall

$W_p = 32.6^k / 78.67' = 414$ plf

$F_p = 0.92\, w_p = 381$ plf

$T_u = 381 \times 5.33' = 2030^\#$

$0.7\, T_u = 1422^\#$

HTT4 w/ 8/30 SET-XP @ 5'-4" O.C.

Subdiaphragm 30'x12'

$R_u = 2030^\# \times 5 \times 1/2 = 5075^\#$

$0.7\, R_u = 3550^\#$

$v\ (ASD) = 3550/12 = 296$ plf

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHS 46 of

Wall Anchorage, Cont

West Wall (Line C)

$F_p = 0.92 W_p$

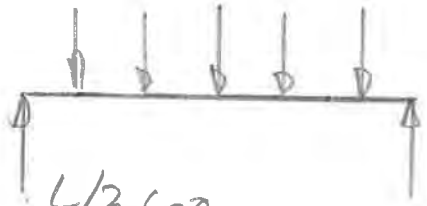
$W_p \leq 0.92 \times 75 \text{ psf} \times 12.5' = 862 \text{ plf}$

$T_u \leq 862 \times 2.67' = 2300^{\#}$

Beam Span $15.33 - 0.67 = 14.67'$

$R_u = 2300 \times 5/2 = 5750^{\#}$

$0.7R_u = 4025^{\#}$ HTT4



5 1/4 x 14 SCL w/ $\Delta_u < L/360$

5/8Ø SET XP = $1895^{\#}$ (ASD) $> 0.7 \times 2300 = 1610^{\#}$

Anchor to (E) GLB w/ (2) 3/4Ø M.B. Dbl Shr.

Allow $2 \times 3021^{\#} = 6042^{\#} > 0.7R_u$

GEFD

190076
11/2019
RHS

47

Design Method	Allowable Stress Design (ASD)
Connection Type	Lateral loading
Fastener Type	Bolt
Loading Scenario	Double Shear - Wood Main Member

Main Member Type	Douglas Fir-Larch
Main Member Thickness	5.5 in.
Main Member: Angle of Load to Grain	90
Side Member Type	Steel
Side Member Thickness	1/4 in.
Side Member: Angle of Load to Grain	0
Fastener Diameter	3/4 in.
Load Duration Factor	C_D = 1.6
Wet Service Factor	C_M = 1.0
Temperature Factor	C_t = 1.0

Connection Yield Modes

Im	3432 lbs.
Is	10440 lbs.
IIIs	3021 lbs.
IV	3916 lbs.

Adjusted ASD Capacity	**3021 lbs.**

(Conn for Anchor beam Line C

- Bolt bending yield strength of 45,000 psi is assumed.
- The Adjusted ASD Capacity is only applicable for bolts with adequate end distance, edge distance and spacing per NDS chapter 11.
- ASTM A36 Steel is assumed for steel side members 1/4 in. thick, and ASTM A653 Grade 33 Steel is assumed for steel side members less than 1/4 in. thick.

While every effort has been made to insure the accuracy of the information presented, and special effort has been made to assure that the information reflects the state-of-the-art, neither the American Wood Council nor its members assume any responsibility for any particular design prepared from this on-line Connection Calculator. Those using this on-line Connection Calculator assume all liability from its use.

The Connection Calculator was designed and created by Cameron Knudson, Michael Dodson and David Pollock at Washington State University. Support for development of the Connection Calculator was provided by American Wood Council.

MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHB | 48 of

North wall o/ Sleeper 3

418 plf × 4' = 1670# Tu

0.7 Tu = 1170# 5/8Ø SET XP allow 1895#

Subdiaphragm Span 14' × 8'

$v = \frac{3 \times 1170}{2 \times 8'} = 219$ plf

(E) 23/32 SHTG unblocked w/ 8d@6" o.c.

Case 1 allow $\frac{480}{2} = 240$ plf (ASD) OK

North Wall at Apparatus

Subdiaphragm Span 16' × 7.5'

$v = \frac{4 \times 1170}{2 \times 7.5'} = 312$ plf

→ Provide 1/2" blocked w/ 8d@4 ceiling

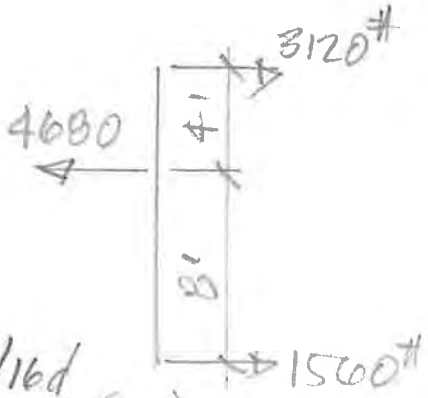
allow $\frac{720}{2} = 360$ plf (ASD)

Ties @16' o.c. max

Tu = 418 × 16' = 6690#

0.7 Tu = 4680#

→ HSS 7×7×1/4 transfer column HTS-3/4 w/16d allow 5090# (ASD)



MKM & Associates
structural engineering

GEFD

Job # 190076
Date 11/2019
PE RHB | 49 of

South Wall at Apparatus & Admin

Subdiaphragm Span 18.5' × 7.5'

$v = \frac{0.7 \times 383 \text{ plf} \times 18.5}{2 \times 7.5} = 330 \text{ plf} < 360 \text{ plf}$

Tie $T_u = \frac{383(18.5+12)}{2} = 5840^{\#} < 6690^{\#}$

→ Same as north wall retrofit.

East Wall at Hose Tower

Beam Span 10.5'

$w_u = 381$ plf

$R_u = 2000^{\#}$

$0.7 R_u = 1400^{\#}$

HSS 5×5×1/4

Sonoma Valley Fire District

Board of Directors Meeting

Agenda Item Summary

November 10, 2020

Agenda Item No.	Staff Contact
10a	Stephen Akre, Fire Chief

Agenda Item Title

Approve Resolution 2020/2021-12 updating the SVFD's Trustees for the Bidwell Deferred Compensation Plan (457 Plan).

Recommended Actions

Approve Resolution 2020/2021-12.

Executive Summary

Staff discovered in the process of updating our Deferred Compensation Plan with Bidwell, that the SVFD's named trustees for the Plan were out of date. Former Fire Chief Freeman and Finance Officer Darcy were both still named. Staff has worked with Bidwell to remove of the former employees as Trustees and has named current Fire Chief Akre and Finance Officer Jason as Trustees of the Plan.

Alternative Actions

Do not approve the Resolution and request alternate actions.

Strategic Plan Alignment

While not aligned to a specific goal, this is a necessary step in maintaining financial management and oversight best practices.

Fiscal Summary – FY 20/21

Expenditures		Funding Source(s)	
Budgeted Amount	$	District General Fund	$
Add. Appropriations Reqd.	$	Fees/Other	$
	$	Use of Fund Balance	$
		Contingencies	$
		Grants	$
Total Expenditure	**$**	**Total Sources**	**$**

Narrative Explanation of Fiscal Impacts (if required)

Staff has negotiated a no cost update to the named Trustees.

Attachments

1. Resolution 2020/2021-12
2. Bidwell Amendment
3. Bidwell Invoice
4. Bidwell Summary of Material Modifications

RESOLUTION NO. 2020/2021-12
Dated: November 10, 2020

RESOLUTION OF
Valley of the Moon Fire Protection District 303933
FOR THE ADOPTION OF TRUSTEE CHANGE AMENDMENT

On November 1, 2020, the following resolutions to amend the Valley of the Moon Fire Protection District 457 Deferred Compensation Plan were duly adopted by a majority of the Board of Directors of Valley of the Moon Fire Protection District 303933 and that such resolutions have not been modified or rescinded as of the date hereof:

RESOLVED, that the form of the Amendment presented to this meeting to change the trustees under the plan is accepted. Such amendment will be effective **July 1, 2020**.

RESOLVED, that effective **July 1, 2020**, Mark Freeman and Georgette Darcy are hereby removed as trustee(s) of the Valley of the Moon Fire Protection District 457 Deferred Compensation Plan, and that the proper officers of the Employer shall act to notify Mark Freeman and Georgette Darcy of the removal;

The undersigned further certifies that attached hereto is a true copy of the proper notification to remove trustees of the Valley of the Moon Fire Protection District 457 Deferred Compensation Plan approved and adopted in the above resolutions.

RESOLVED, that effective **July 1, 2020**, Stephen Akre, and effective **October 1, 2020**, Jennifer Jason are hereby appointed as trustees of the Valley of the Moon Fire Protection District 457 Deferred Compensation Plan, and that the proper officers of the Employer shall act to notify Jennifer Jason and Stephen Akre of the appointment;

The undersigned further certifies that attached hereto is a true copy of the proper notification to add trustees of the Valley of the Moon Fire Protection District 457 Deferred Compensation Plan approved and adopted in the above resolutions.

RESOLVED, the Employer shall act as soon as possible to notify employees of the Employer of the adoption of this amendment.

RESOLVED, the Employer be, and hereby are, authorized and directed to execute any and all such documents and to perform any and all such acts as may be necessary and proper to effect the foregoing; and THE UNDERSIGNED, does hereby certify that the foregoing is a full, true and correct copy of the Resolutions duly and regularly adopted by the Employer.

Passed, approved, and adopted at a regular meeting of the Board of Directors of the Sonoma Valley Fire District by the following votes. Passed and adopted this November 10, 2020.

_____
William Norton, President

Ayes: _____
Noes: _____
Absent:_____

CERTIFICATION:

_____
Maci Jerry, Clerk

Valley of the Moon Fire Protection District 303933
November 10, 2020

Valley of the Moon Fire Protection District 457 Deferred Compensation Plan
TRUSTEES
AMENDMENT # 2020-Trustee

This Amendment is adopted to change the trustees to the Plan.

This Amendment shall be effective beginning on and after **July 1, 2020**.

This Amendment shall supersede the provisions of the Plan to the extent those provisions are inconsistent with the provisions of this Amendment.

Effective **July 1, 2020**, Mark Freeman and Georgette Darcy are removed as trustee(s) of the

Valley of the Moon Fire Protection District 457 Deferred Compensation Plan;

Effective **July 1, 2020**, Stephen Akre and effective **October 1, 2020**, Jennifer Jason are appointed as trustees of the Valley of the Moon Fire Protection District 457 Deferred Compensation Plan;

Where appropriate, the term "Plan" shall mean the plan, trust, and adoption agreement.

_____ _____
William Norton, President Date

Valley of the Moon Fire Protection District 303933
November 10, 2020

Bidwell Consulting Services, Inc.
3251 Esplanade
Chico, CA 95973
(530) 891-9519

Date: **10/22/2020**

Jennifer Jason
VMFPD 303933
630 2nd Street West
Sonoma CA 95476

Transaction Number: **61502**
Account Number: **1093**

Balance Due:	$0.00
Date Due:	11/21/2020

Preparation of forms and notices necessary for amending the plan to remove Mark Freeman and Georgette Darcyh and add Jennifer Jason and Stephen Akre as trustees.	$150.00
John Hancock Credit	($150.00)

Thank you for your prompt payment! Please include the stub below with your payment.
Full payment is due within 30 days of receipt. *An 8% late fee will be charged to invoices over 90 days past due.*

To pay by credit card go to www.bidwellconsulting.com and follow the "online payments" link,
or complete the payment information below.

Company Name: **VMFPD 303933**
Transaction Number: **61502**
Account Number: **1093**
Amount Paid: $:_____

Balance Due:	**$0.00**
Date Due:	**11/21/2020**
After 01/20/2021	*$0.00*

☐ Visa ☐ M/C Acct No: _____ 65 _____ Exp Date: _____ Security Code:_____

Valley of the Moon Fire Protection District 303933
Valley of the Moon Fire Protection District 457 Deferred Compensation Plan
SUMMARY OF MATERIAL MODIFICATIONS

To: Participants of Valley of the Moon Fire Protection District 457 Deferred
From: Valley of the Moon Fire Protection District 303933
Date: November 1, 2020

This is a summary of recent changes to your Plan.

Please file this "Summary of Material Modifications" with your Summary Plan Description (the booklet that explains your Plan). If you would like to see the full text of the changes, you may inspect the Plan Document or receive a copy of the changes as explained in the "ERISA Rights" section of your Summary Plan Description.

Your plan has been amended effective July 1, 2020 as follows:

Mark Freeman and Georgette Darcy are removed as trustees of the Valley of the Moon Fire Protection District 457 Deferred Compensation Plan.

Jennifer Jason, effective October 1, 2020, and Stephen Akre, effective July 1, 2020 are appointed as trustees of the Valley of the Moon Fire Protection District 457 Deferred Compensation Plan.

Jennifer Jason
Valley of the Moon Fire Protection District 303933
630 2nd Street West
Sonoma CA 95476-6901

Sonoma Valley Fire District

Board of Directors Meeting

Agenda Item Summary

November 10, 2020

Agenda Item No.	Staff Contact
10b	Trevor Smith, Fire Marshall

Agenda Item Title

Approval of grant funding and the new Unmanned Aerial System (UAS) program for the SVFD

Recommended Actions

Approve the grant and the UAS program

Executive Summary

The intent of the program is to be able to operate in hazardous conditions to provide our Incident Commander with better situational awareness so that they can more effectively deploy their resources and keep people safe. The old saying holds true, "a picture is worth 1,000 words". Real-time pictures from UAS have proven to make a difference in an operational firefighting. This technology will allow us to deploy resources faster, fully document an incident and identify homes and occupants in need that may otherwise not be identified.

From a fire prevention standpoint, access to an UAS would afford us the ability to identify "at risk" areas within our wildland urban interface that require vegetation and forest management. Access to a UAS will also increase both safety and efficiency during inspections and allow us to identify remote areas requiring proper maintenance that would be crucial in slowing the spread of wildfire.

This technology will benefit both our employee and our residences by providing and increasing safety through efficiency. UAS programs in other agencies have proven to save both life and property.

Alternative Actions

Do not approve or approve with changes

Strategic Plan Alignment

This effort is in alignment with Goal 3

Fiscal Summary – FY 20/21

Expenditures		Funding Source(s)	
Budgeted Amount	$15,255.65	District General Fund	$255.65
Add. Appropriations Reqd.	$	Fees/Other	$
	$	Use of Fund Balance	$
		Contingencies	$
		Grants	$15,000.00
Total Expenditure	**$15,255.65**	**Total Sources**	**$15,255.65**

Narrative Explanation of Fiscal Impacts (if required)

There may be some recurring insurance costs for the UAS, however they are anticipated to be small in nature. The grant funds include an extended warranty, as well as maintenance and repairs for the first year of the program.

Attachments

1. SVFD UAS Application Packet
2. Grant Agreement
3. Draft SVFD Operations Policy
4. Draft SVFD UAS Operations Manual

Sonoma Valley Fire Unmanned Aircraft Fire Prevention & Safety Unit.

2020 Fire Prevention Grant

Valley of the Moon Fire Protection District DBA as Sonoma Valley Fire & Rescue Authority

Trevor Smith
630 Second Street West
Sonoma, CA 95476

O: 707-996-2102
M: 707-975-0857

Trevor Smith

trevors@svfra.org
O: 707-933-2305
M: 707-975-0857

Application Form

Question Group

Fire Department, Firefighter Association or Organization Name*

Sonoma Valley Fire District (formerly Valley of the Moon Fire Protection District DBA Sonoma Valley Fire & Rescue Authority)

Name of Person Completing this Application*

Trevor Smith

What is Your Affiliation with the Fire Department, Firefighter Association or Organization?*

Fire Marshal

Fire Department, Firefighter Association or Organization Size*

Aprox 100,000 Sq Miles, 120 Paid employees.

Website

svfra.org

Project Name*

Sonoma Valley Fire Unmanned Aircraft Fire Prevention & Safety Unit.

Provide an Overview of Your Project*

Please explain how your project will help prevent against or mitigate the impact(s) of wildfires in your local community, as well as how it will increase the public's safety and/or awareness.

Subject to COVID-19 social distancing and state re-opening guidelines, requests for funding may focus on fire prevention and safety education and messaging, including issues such as wildfire safety, emergency preparedness or first responder community engagement.

The intent of the program is to be able to operate in hazardous conditions to provide our IC's (Incident Commander) with better situational awareness so they could more effectively deploy their resources and keep people safe. The old saying holds true "a picture is worth 1,000 words" real-time pictures from drones

have proven to make all the difference in the world. This technology will allow us to deploy resources faster, fully document the incident and identify homes and occupants in need that may otherwise not be identified.

From a fire prevention standpoint access to an unmanned aircraft would afford us the ability to identify areas within our at risk fire wildland and wildland urban interface area that require vegetation and forest management. Access to a UAV will increase both safety and efficiency during inspection and allow us to identify remote areas that require management that would be crucial in slowing the spread of wildfire.

This technology will benefit both the employee and the customer and provide for increased safety and efficiency. UAV programs in other agencies have proven to save both life and property.

Purpose for Funding*

Summarize in one sentence the specific purpose for which you are requesting funding.

Implementation of a unmanned drone vehicle program to be utilized by the fire prevention and operation division for vegetation management, hazard assessment/identification to promote community and firefighter safety.

List Your Project Goals and How you Plan to Meet Them*

Examples:

- **Goal 1**. Prepare a fire prevention education flyer for distribution within your service area. *The plan for Goal 1 is to develop flyer content and budget for printing and distribution.*
- **Goal 2.** Distribute the prepared flyer electronically and at a community event. *The plan for Goal 2 is to post flyer across all social media channels, as well as reserve booth space at a community event to pass out flyers, subject to COVID-19 social distancing and/or state re-opening guidelines.*
- Obtain unmanned aerial vehicle (UAV) equipped with video and thermal cameras. - Secure Grant funding and other internal and external funding sources to ensure program success.

- Obtain FAA licensure and meet legal requirements to ensure program safety. - Contract for training and prepare employees for rigorous FAA testing.

- Secure Liability Insurance and Damage and Replacement Insurance. - work with our current insurance provider to obtain the proper coverage.

- Finalize established organizational operating procedures for UAV use. - continue work with committee made up of internal and external stakeholders to finalize official policies and procedures.

- Continue to work with internal and external stakeholders to provide additional operational benefits. - Per program design regular committee meetings will provide an opportunity for program evaluation and modifications to the program to provide for efficiency and additional opportunities.

Project start date (below) additional information - Our intent is to begin this program after receipt of grant funding. There is no end date as this program will become a part of our organization's operation and continued funding will be born by the agency.

Project Start Date*

01/01/2021

Project End Date*

12/31/2021

Geographic Area Served*

Please select the counties your project will impact

Sonoma

Provide the Name(s) of the City (or cities) that Your Project will Impact.*

Sonoma, Boyes Hot Springs, EL Verano, Temelec, DIamond A, Glen Ellen, Myacamas, Agua Caliente

Does your Project Directly Impact Tier 3 or Tier 2 High Wildfire Risk Areas?

Yes

If yes, please explain.

Much of our service area is within the SRA including HIgh and Moderate California Department of Forestry Fire Hazard Severity Zones.

Regional Area*

In what region of California is your fire department, firefighter association or organization located?

Northern

Population Served*

Please provide the demographic breakdown of who this project will serve, such as the percentage of your department, association or organization's service area that is identified as a disadvantaged community.

100% of our agencies staff will be served by this project as it will promote firefighter safety before and during fire incidents. Based on 2019 data our populated service area is made up of a number of disadvantaged communities. Nearly 80 percent of this populated area has been identified as disadvantaged communities by 2019 ATP data. Within our fire district there are two schools defined as disadvantaged by 2019 ATP Data.

https://scta.ca.gov/planning/comprehensive-transportation-plan/sonoma-disadvantaged-communities/

Key Management*

Please list key management personnel who will be involved with or overseeing the project, including their rank and title.

Trevor Smith, Fire Marshal
Spencer Andreis, Battalion Chief

Similar Successful Project*

Please provide a brief example of a successful project similar to the one you are proposing. This can describe a project that your department, association or organization has been involved with, or a project that you have researched. Please include the project's cost in your description (if known).

Los Angeles Fire Department - https://www.commercialuavnews.com/public-safety/success-lafd-drone-program - The LA Fire Department has successfully been using UAV since 2018 and report operational success with an increase in firefighter and community safety.

New York Fire, Millstone Valley Fire - https://www.fireapparatusmagazine.com/2018/10/01/fire-department-drones-serve-a-variety-of-needs-on-incident-scenes/#gref

Promotion/Media Engagement Plan*

Please describe your promotional/media engagement plan as it pertains to the grant, if it were to be awarded to your department, association or organization. Include the name of and contact information for the PIO or relevant point of contact. The California Fire Foundation will provide support to develop or assist you with executing your plan.

Sonoma Valley Fire Unmanned Aircraft Fire Prevention & Safety Unit would be marketed to the community for a number of reasons. Most importantly our agency would want to address the potential privacy issues associated with drones, we would want to clearly explain our mission to our customers and community to remove any worry. Many people have a negative impression of drones and this would be something we want to dispel in our community. When our customers see a drone flight in their community we want them to know we are there ensuring their safety.

PIO contact Trevor Smith, Fire Marshal and Social Media Coordinator Sarah Gibson - 707-996-2102

Total Project Budget*

$24,455.65

Amount Requested*

What is the total amount you are requesting from the California Fire Foundation?

$15,000.00

Please provide your detailed project budget here*

Click on the example budget template link to download, then either use it or provide a similar budget and upload it here.

2020_SVFD_Grant_Budget_Worksheet.xlsx

Reasoning for Proposed Budget*

1) Explain how the grant funds, if awarded, will be spent to support the goals and objectives of the project (reviewing your project outcomes, previously listed in the application, could be helpful in answering this particular budget question).

2) If the California Fire Foundation is only able to grant your department, association or organization a percentage of the overall project cost, how will you fund the remaining cost of the project?

Grant funds if awarded will make this essential program a reality. While we have support from both the organization and the community, the current fiscal situation secondary to budgetary losses associated with Covid-19 have taken a toll. This program will provide much needed capabilities in our district and will save lives. In addition it will allow for more efficient inspections allowing us to increase productivity and do more good from a safety and preparedness perspective with the limited resources available.

In the event the California Fire Foundation is only able to grant a percentage of the overall costs i fear that would be the end of the program. I would work with the agency, the community, and other funding sources in an attempt to make up the loss but in this climate I am not overly confident.

Additional Information (optional)

Please provide any additional information for consideration. This is optional. You can describe it here or upload a file here.

https://youtu.be/D3BWpoJ6ijs

https://youtu.be/Ih_ayi318X0

https://www.fireapparatusmagazine.com/2018/10/01/fire-department-drones-serve-a-variety-of-needs-on-incident-scenes/#gref

https://www.tdworld.com/overhead-transmission/article/20969411/flying-high-to-improve-vegetation-management

https://www.mdpi.com/journal/fire/special_issues/UAS

Sarah - Review app group

Completeness of Application*

1 - Poor
2 - Fair
3 - Good
4 - Excellent

Max Score: 4

Alignment*

Proposed project aligns with the funding priorities set forth in the Edison and CFF Agreement.

1 - Poor
2 - Fair
3 - Good
4 - Excellent

Max Score: 4

Financial Stability*

1 - Poor
2 - Fair
3 - Good
4 - Excellent

Max Score: 4

Management Systems in Place*

Key management information, project narrative, and successful project write-up

1 - Poor
2 - Fair
3 - Good
4 - Excellent

Max Score: 4

Community Impact*

Promo/media engagement plan, project narrative and successful project write-up

1 - Poor
2 - Fair
3 - Good
4 - Excellent

Max Score: 4

Overall Application Score*

1 - Poor
2 - Good
3 - Excellent

Max Score: 4

Application Score (comments)*

File Attachment Summary

Applicant File Uploads

- 2020_SVFD_Grant_Budget_Worksheet.xlsx

Budget Worksheet

Sonoma Valley Fire District (formerly Valley of the Moon Fire Protection District DBA Sonoma Valley Fire & Rescue Aut

Project Name: Sonoma Valley Fire Unmanned Aircraft Fire Prevention & Safety Unit.

PROJECT EXPENSES		% of Total Expenses			Total
DJI Matrice 200 Drone V2	$6,600.04	26.99%			$6,600.04
Cameras (Thermal/Zoom) & Mounts	$5,822.48	23.81%			$162.04
Flight Batteries x 2	$1,033.13	4.22%			$3,376.69
Training x 6 Students	$1,800.00	7.36%			$1,800
Staff Salaries Training	$6,800.00	27.81%			$6,800
Admin Fees	$2,400.00	9.81%			$2,400.00
TOTAL PROJECT EXPENSES					$24,455.65
SOURCES OF PROJECT REVENUE	Secured Funding	Funding Applied For			
				Total	
California Fire Foundation		$ 15,000.00	=	$15,000.00	
Other Foundations			=	$0.00	
Corporations			=	$0.00	
Individuals		$ 255.65	=	$255.65	
Department or Association	$ 2,400.00			$2,400.00	
Government Grants	$ -		=	$0.00	
Other (specify)			=	$0.00	
Earned Income					
Membership Dues Income			=	$0.00	
In-kind Support	$6,800.00		=	$6,800.00	
Other (specify)			=	$0.00	
Other (specify)			=	$0.00	
TOTAL PROJECT REVENUE					$24,455.65

Date:	August 24, 2020
Grantee:	Valley of the Moon Fire Protection District (dba Sonoma Valley Fire & Rescue Authority)
Award Amount:	$15,000.00
Project:	Sonoma Valley Fire Unmanned Aircraft Fire Prevention & Safety Unit

Congratulations! On behalf of the California Fire Foundation (CFF), a statewide nonprofit 501(c)(3) charitable organization founded in 1987, it is a pleasure to inform you that we have approved a grant in the amount of **$15,000.00** for **Valley of the Moon Fire Protection District DBA as Sonoma Valley Fire & Rescue Authority's** above-referenced project, which covers the period **01/01/2021 through 12/31/2021.**

Enclosed please find the Grant Agreement, Fund Disbursement, and W-9 forms. The Grant Agreement contains the terms and conditions governing your use of our grant funds. This agreement must be signed and dated by an officer or director. **Please email the signed Grant Agreement and related forms to Amy Howard in our office at ahoward@cpf.org.** The Foundation *will not* disburse payment on this grant until we receive the signed agreement and related forms.

If you have any questions about this grant, or your circumstances have changed since applying for funding, please contact our office as soon as possible. In all correspondence with us, please include your department, association or organization name and contact information.

And, when making any public announcement about this grant, we would appreciate it if you would recognize the support from the California Fire Foundation.

Thank you for the care you took in developing the proposal, the California Fire Foundation is honored to support your project and we wish you much success!

Sincerely,

Brian K. Rice

Brian K. Rice
Chair
California Fire Foundation

Grant Agreement for Valley of the Moon Fire Protection District (dba Sonoma Valley Fire & Rescue Authority)

AGREEMENT

This Grant Agreement contains the terms and conditions for your grant in the amount of $15,000.00 from the California Fire Foundation (the "Foundation") to Valley of the Moon Fire Protection District dba Sonoma Valley Fire & Rescue Authority (the "Grantee"), dated August 21, 2020. By signing this Grant Agreement and accepting grant funds, an officer or director of the Grantee makes the following representations and agrees to the obligations and conditions set forth.

The Foundation's offer of this grant is subject to your agreement with the following terms and conditions:

1. Grant funds shall be expended solely in support of the objectives detailed in your proposal and budget for the above-referenced project.
2. Grantee shall not engage in any activity that is inconsistent with the terms of this Agreement, including using these funds in a fashion inconsistent with the Foundation's status as an organization exempt from taxation under Internal Revenue Code Section 501(c)(3), related IRS regulations and rulings. In particular, no grant funds may be used for lobbying expenditures or to aid in the election or appointment of a public official and/or the passage or defeat of a ballot measure. And, Grantee shall not, directly or indirectly, engage in, support, or promote violence or terrorist-related activities.
3. Grantee shall furnish to the Foundation any information concerning a major program or budget change in the proposal.
4. The Foundation reserves the right to discontinue, modify or withhold any payment(s) that might otherwise be due under this grant, to require a refund of any unexpended grant funds, or both, if, in the California Fire Foundation's judgment, any of the following occur:
    - Grant funds have been used for purposes other than those contemplated by this commitment letter; or
    - Such action is necessary to comply with the requirements of any law or regulation affecting either your organization's or the California Fire Foundation's responsibilities under the grant.
5. Any undisbursed project funds shall be remitted to the Foundation within two months following the end of this grant period. Any refund of less than $100 will be waived.
6. Until Grantee receives approval from the Foundation, use of the name, logo or any of its licensed marks is prohibited.
7. Grantee agrees to defend and hold harmless the Foundation and its officers and employees from and against any claim, including the expenses of investigation and defense of such claim, arising out of or in any way connected with this grant or the expenditure of grant funds.
8. Grantee is required to maintain financial records for expenditures and receipts relating to this grant, retaining these records and other supporting documentation that details all grant funds are used for the approved project proposal and budget;

9. Grantee shall submit a final project impact report to Amy Howard with the Foundation via email at ahoward@cpf.org ***no later than*** 45 calendar days after the above-stated end date of your project. This report shall include both of the following:
    - A narrative summarizing what was accomplished within the specified project period via the expenditure of grant funds, as well as a description of progress made, related conclusions and/or the status of objectives with respect to how grant funds were expended to attain said objectives; and

- A financial report showing the total project budget (which may be greater than the amount of the California Fire Foundation grant) and expenditures against each line item since the start of the grant. Please include related receipts and/or invoices with your report.

10. If you are not able to utilize all or part of the grant funds for the proposed project, contact the Foundation at 916.641.1707 or ahoward@cpf.org.

Public Information

The Foundation will include information regarding this grant in its periodic public reports and through various media channels. The Foundation also welcomes grantees to make grant award announcements upon return of this signed commitment letter and, to this end, can provide messaging for your reference and use on social media and/or with media outlets. Until Grantee receives prior written approval from the Foundation, use of the Foundation's logo or any of its licensed marks is prohibited.

Acceptance

In signing this agreement, Grantee's signatory represents to the Foundation that they have the authority to sign this agreement on behalf of Grantee. This grant may be withdrawn if the Foundation has not received your acceptance within 14 calendar days of the date of this letter. If Grantee agrees to the grant terms and conditions as stated, please return a signed copy of this contract via email to Amy Howard at ahoward@cpf.org within 14 calendar days.

Name of Grantee: Valley of the Moon FPD (DBA Sonoma Valley Fire & Rescue)

Printed Name of Signatory: Stephen Akre

Signatory's Title: Fire Chief

Signature: [signature]

Date Executed: 8/28/2020

Unmanned Aerial System (UAS) Operations

334.1 PURPOSE AND SCOPE

The purpose of this policy is to establish guidelines for the use of the small unmanned aerial system (sUAS) and for the storage, retrieval and dissemination of images and data captured by the UAS. The following procedures are intended to promote the safe, efficient and lawful operation of the Sonoma Valley Fire District's small Unmanned Aircraft Systems.

334.2 DEFINITIONS

Definitions related to this policy include:

Unmanned Aerial System (UAS) - An unmanned aircraft of any type that is capable of sustaining directed flight, whether preprogrammed or remotely controlled (commonly referred to as an unmanned aerial vehicle (UAV)), and all of the supporting or attached systems designed for gathering information through imaging, recording or any other means. Unmanned Aircraft Vehicle (UAV) - An aircraft that is intended to navigate in the air without an on-board pilot.

Unmanned Aircraft Operator - A person exercising control over unmanned aircraft during flight. The pilot will be ultimately responsible for the operation and solely responsible for the input of commands/piloting during flight. The pilot will be qualified in the operation of the sUAS by maintaining currency as required by the FAA COA. The pilot must meet standards required by the Federal Aviation Administration (FAA), including successful completion of basic knowledge exam and vetting by the Transportation Security Administration. Pilots are authorized to evaluate and accept or decline any mission or portion thereof due to safety concerns. Refer to the UAS Operations Manual for additional information about operator duties and responsibilities.

sUAS Commander – The Sonoma Valley Fire District’s Fire Chief shall also be responsible for the overall direction and performance of the sUAS Team.

sUAS Supervisor - The Fire Marshal / Battalion Chief is responsible for the day-to-day supervision of the sUAS Team operations and personnel.

Visual Observer - A trained UA flight crew member responsible for the visual observation of the sUAS while in flight. The observer will maintain a visual observation of the sUAS while in flight and alert the pilot of any conditions (obstructions, terrain, structures, air traffic, weather, etc.) which affect the safety of flight. The observer will be responsible for all aviation related communications required by the FAA. To accomplish this, the observer will be in close proximity to the pilot to

ensure instant communication of information. The observer shall meet standards required by the FAA granted COA.

Certificate of Authorization (COA) - COA is an authorization issued by the Air Traffic Organization (FAA) to a public operator for a specific UA activity.

CFR Part 107 - Federal regulation governing sUAS regulation, operation and pilot certification.

334.3 POLICY

Unmanned aircraft systems may be utilized to enhance the Sonoma Valley Fire District's mission of protecting lives and property when other means and resources are not available or are less effective. Any use of a sUAS will be in strict accordance with constitutional and privacy rights and Federal Aviation Administration (FAA) regulations. The sUAS will be operated in accordance with 14 CFR Part 107. Any deviation from 14 CFR Part 107 will be in strict accordance with an FAA granted COA or Expedited Special Governmental Interest (SGI) Waiver or Authorization for sUAS operation.

Requests for deployment will be made by the Incident Commander, sUAS Supervisor, or on duty Chief Officers. The authorizing authority will contact or direct another to contact the sUAS pilot and notify him/her of the mission. the pilot will determine if the sUAS can be deployed safely and practically. If the request comes from an outside public safety agency, the request will be directed to Dispatch.

(a) A sUAS will only be operated by personnel, Unmanned Aircraft Operator and Visual Observer, who have been trained in the operation of the sUAS system. A Visual Observer will only be required if necessary under FAA regulations: ie, COA but may be considered for any flight. All agency personnel with the sUAS responsibilities, including command officers, will be provided training in policies and procedures governing sUAS use.

(b) All missions will be documented on the sUAS System Mission Report form designed for that purpose and all flight time shall be accounted for on the form. The reason for the flight and type of mission as specified above and name of the supervisor approving the operation will also be documented.

(c) When the sUAS is being flown, operators will take steps to ensure the camera is focused on the areas necessary to the mission and to minimize the inadvertent collection of data about uninvolved persons or places.

334.3.1 AUTHORIZED MISSIONS

The use of the sUAS will be limited to authorized missions described herein.

1. In response to specific requests from local, state or federal fire authorities for fire response and prevention.
2. In response to any transportation type emergencies as defined in Title 49 of the Code of Federal Regulations.
3. Search and Rescue (SAR) missions as defined in California Government Code Section 26614.
4. Structural collapse and building evaluations for rescue, safety and occupancy.
5. In response to hazardous materials spills.
6. Disaster response and recovery to include natural or human caused disasters including a full overview of a disaster area for post incident analysis and documentation.
7. Public Education development & training videos & documentation.
8. Training missions as as necessary to maintain pilot and sUAS readiness and as authorized from any granted COA.
9. Explosive ordnance disposal (EOD) missions.
10. Structure Fire incidents to provide for operational assessment and evaluation to aid in the maintenance of crew and community safety.
11. Public safety and life preservation missions to include but not limited to hostage situations, active shooters, threats for use of incendiary or explosive devices.
12. Post fire or incident investigation to assist with cause, origin and documentation.
13. Pre Incident planning and familiarization in areas in accessible by traditional means.

All sUAS deployments will be reviewed by the sUAS Supervisor to ensure that they are conducted in accordance with Sonoma Valley Fire District's policy, FAA regulations, state and federal law, and with due regard for public privacy.

The administration, safety policy, training requirements, general operation procedures and pre/post flight actions are contained in the Sonoma Valley Fire District’s sUAS Operations Manual.

334.4 PRIVACY

The use of the UAS potentially involves privacy considerations. Absent a warrant or exigent circumstances, operators and observers shall adhere to FAA altitude regulations and shall not intentionally record or transmit images of any location where a person would have a reasonable expectation of privacy (e.g., residence, yard, enclosure). Operators and observers shall take reasonable precautions to avoid inadvertently recording or transmitting images of areas where

there is a reasonable expectation of privacy. Reasonable precautions can include, for example, deactivating or turning imaging devices away from such areas or persons during UAS operations.

334.4.1 OBLIGATIONS IMPOSED BY LAW-CIVIL CODE 1708.8 (A)(B)

1. A person is liable for physical invasion of privacy when the person knowingly enters onto the land or into the airspace above the land of another person without permission or otherwise commits a trespass in order to capture any type of visual image, sound recording, or other physical impression of the plaintiff engaging in a private, personal, or familial activity and the invasion occurs in a manner that is offensive to a reasonable person.
2. A person is liable for constructive invasion of privacy when the person attempts to capture, in a manner that is offensive to a reasonable person, any type of visual image, sound recording, or other physical impression of the plaintiff engaging in a private, personal, or familial activity, through the use of any device, regardless of whether there is a physical trespass, if this image, sound recording, or other physical impression could not have been achieved without a trespass unless the device was used.

334.5 PROGRAM COORDINATOR / SUAS SUPERVISOR

The Fire Chief will appoint a program coordinator / sUAS Supervisor who will be responsible for the management of the UAS program. The program coordinator will ensure that policies and procedures conform to current laws, regulations and best practices and will have the following additional responsibilities:

1. Coordinating the FAA Certificate of Waiver or Authorization (COA) application process and ensuring that the COA is current.
2. Ensuring that all authorized operators and required observers have completed all required FAA and Sonoma Valley Fire District approved training in the operation, applicable laws, policies and procedures regarding use of the UAS.
3. Developing uniform protocol for submission and evaluation of requests to deploy a UAS, including urgent requests made during ongoing or emerging incidents. Deployment of a UAS shall require written authorization of the Fire Chief or the authorized designee, depending on the type of mission.
4. Implementing a system for public notification of UAS deployment.
5. Developing an operational protocol governing the deployment and operation of a UAS including, but not limited to, safety oversight, use of visual observers, establishment of lost link procedures and secure communication with air traffic control facilities.
6. Developing a UAS inspection, maintenance and record-keeping protocol to ensure continuing airworthiness of a UAS, up to and including its overhaul or life limits.
7. Developing protocols that ensure retention and purge periods are maintained in accordance with established records retention schedules.
8. Recommending program enhancements, particularly regarding safety and information security.

9. Ensuring that established protocols are followed by monitoring and providing periodic reports on the program to the Fire Chief.

334.6 USE OF SUAS

Only authorized operators who have completed the required training shall be permitted to operate the UAS.

Use of vision enhancement technology (e.g., thermal and other imaging equipment not generally available to the public) is permissible in viewing areas only where there is no protectable privacy interest or when in compliance with a search warrant or court order. In all other instances, legal counsel should be consulted.

sUAS operations at night or over populated areas shall not be conducted absent FAA waiver. (COA or Expedited SGI Waiver of Authorization for UAS Operation).

334.7 PROHIBITED USE

The UAS video surveillance equipment shall not be used:

1. To conduct random surveillance activities.
2. To target a person based solely on actual or perceived characteristics, such as race, ethnicity, national origin, religion, sex, sexual orientation, gender identity or expression, economic status, age, cultural group, or disability.
3. To harass, intimidate, or discriminate against any individual or group.
4. To conduct personal business of any type.

The UAS shall not be weaponized.

334.8 DATA RETENTION AND PROCESSING

Upon completion of each sUAS mission, the recorded data shall be reviewed and evaluated for evidentiary value by the sUAS Commander or authorized designee. Data of identifiable individuals captured during a sUAS mission shall not be retained unless there is reasonable suspicion that evidence of criminal activity is present. All retained data shall be maintained or destroyed pursuant to the Sonoma Valley Fire District's Records retention and evidence policies and in compliance with applicable laws and regulations

334.9 PROTECTION OF RIGHTS AND PRIVACY CONCERNS

sUAS Commander, sUAS Supervisor, Unmanned Aircraft System Pilots and Observers will consider the protection of individual civil rights and the reasonable expectation of privacy as a key component of any decision made to deploy the UAS. Each Unmanned Aircraft System Pilot

and Observer shall ensure that operations of the UAS are consistent with Fire District, state, and federal law.

Attached Sonoma Valley Fire District

Unmanned Aerial System (UAS)

Operations Manual

Steve Akre, Fire Chief - UAS Commander

Trevor Smith, Fire Marshal - UAS Supervisor

Revised: October 23, 2020

Preface

The purpose of this operations manual is to provide members of The Sonoma Valley Fire District a set of operational procedures intended to promote the safe, efficient, and lawful operation of an Unmanned Aerial System. As such, this handbook will be considered a living document and will be subject to modifications as seen fit by the leadership at SVFD.

MISSION STATEMENT

The Sonoma Valley Fire & Rescue Authority exists to protect the quality of life for present and future generations through interaction with our community, compassionate service and an atmosphere that encourages innovation, professionalism, and diversity.

FIREFIGHTER CODE OF ETHICS

As a firefighter and member of the Sonoma Valley Fire District, my fundamental duty is to serve the community; to safeguard and preserve life and property against the elements of fire and disaster; and maintain a proficiency in the art and science of fire engineering.

I will uphold the standards of my profession, continually search for new and improved methods and share my knowledge and skills with my contemporaries and successors.

I will not allow personal feelings, nor danger to self, deter me from my responsibilities as a firefighter.

I will at all times, respect the property and rights of all men and women, the laws of my community and my country, and the chosen way of life of my fellow citizens.

I recognize the badge of my office as a symbol of public faith, and I accept it as a public trust to be held so long as I am true to the ethics of the fire service. I will never use my official position to obtain advantages or favors for my friends, my family, or myself.

I will constantly strive to achieve the objectives and ideals, dedicating myself to my chosen profession, saving of life, fire prevention, and fire suppression.

As a member of the Sonoma Valley Fire District, I accept this self-imposed and self-enforced obligation as my responsibility.

Definitions and Abbreviations

Above Ground Level (AGL): AGL is the altitude expressed in the actual number of feet measured above the ground.

Air Traffic Control (ATC): Manages traffic from the airport to a radius of 3 to 30 miles. Provide pilots taxiing and take off instructions, air traffic clearance, and advice based on their own observations and experience. Maintains separation between landing and departing aircraft, transfers control of aircraft to the en-route center controllers when the aircraft leave their airspace, and receives control of aircraft on flights coming into their airspace.

Certificate of Authorization (COA): Issued by the FAA and grants permission to fly within specific boundaries and parameters.

Federal Aviation Administration (FAA): Federal agency in the United States and part of the Department of Transportation. The FAA regulates U.S. civil aviation, U.S. commercial space transportation, operates control towers, builds, installs, and maintains electronic aids to navigation, and registers all pilots and aircrafts in the United States.

Incident Commander (IC): The IC is responsible for directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority. The IC develops incident objectives and manages all incident operations. The IC sets priorities and defines the ICS organization for the particular response.

Instrument Flight Rules (IFR): Under IFR, ATC exercises positive control (i.e., separation of all air traffic within designated airspace) over all aircraft in controlled airspace, and is primarily responsible for aircraft separation. Aircraft operating under IFR must meet minimum equipment requirements. Pilots must also be specially certified and meet proficiency requirements. IFR aircraft fly assigned routes and altitudes, and use a combination of radio navigation aids and vectors from ATC to navigate.

National Airspace System (NAS): The NAS is made up of a network of air navigation facilities, ATC facilities, airports, technology, and appropriate rules and regulations that are needed to operate the system.

Navigable Airspace: FAA controlled airspace classified as: A, B, C, D, E, and G.

Notice to Airmen (NOTAM): A NOTAM is time critical information concerning the establishment, condition, or change in any component in the National Air Space (NAS). The NOTAM provides knowledge that is essential to personnel concerned with flight operations in designated areas. NOTAMs may be filed as a temporary change to the NAS as they were not known in advance to publish on aeronautical charts or other operational publications.

Pilot: Any member who has successfully met the criteria outlined by the UAS Commander for full flight duty.

Pilot-in-Command (PIC) (aka Remote Pilot in Command): A person exercising control over unmanned aircraft during flight. The pilot will be ultimately responsible for the operation and solely responsible for the input of commands/piloting during flight. The pilot will be qualified in the operation of the UAS by maintaining currency as required by the FAA COA. The pilot must meet standards required by the Federal Aviation Administration (FAA), including successful completion of basic knowledge exam and vetting by the Transportation Security Administration. Pilots are authorized to evaluate and accept or decline any mission or portion thereof due to safety concerns. See Also Unmanned Aircraft Operator

Unmanned Aerial Vehicle (UAV): A powered, aerial vehicle that uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, and can be expendable or recoverable. Refers more specifically to the unmanned aerial vehicle itself.

Unmanned Aerial System (UAS): Consists of an unmanned aircraft weighing less than 55 lbs., the command system, a secure control link, camera, and other related safety support equipment, including ground control base stations and specialty vehicles designed to support unmanned flight operations.

Unmanned Aerial System Crewmember: A Pilot in Command, Visual Observer, or other persons assigned UAS duties for the purpose of flight.

Unmanned Aircraft Operator: A person exercising control over unmanned aircraft during flight. The pilot will be ultimately responsible for the operation and solely responsible for the input of commands/piloting during flight. The pilot will be qualified in the operation of the UAS by maintaining currency as required by the FAA COA. The pilot must meet standards required by the Federal Aviation Administration (FAA), including successful completion of basic knowledge exam and vetting by the Transportation Security Administration. Pilots are authorized to evaluate and accept or decline any mission or portion thereof due to safety concerns. See Also Pilot-in-Command (PIC)

Visual Line of Sight (VLOS): Visual contact between PIC or VO and a UAS sufficient to maintain safe operational control of the aircraft, known location, and be able to scan the airspace in which it is operating to see and avoid other aircraft or objects aloft or on the ground.

Visual Observer (VO): The Visual Observer is equally responsible for the visual observation of the UAS while in-flight. The VO shall alert the PIC of any conditions (obstructions, terrain, structures, air traffic, weather, etc.) that may affect the safety of flight. The VO is responsible for all on scene radio communications between the IC or designee and the PIC, in addition to all aviation related communications required by the FAA. The VO shall be certified by successful completion of an approved training course outlined by the UAS Committee.

Sonoma Valley Fire District Unmanned Aerial System Operation Manual

Table of Contents

Section 1

Administration

Sonoma Valley Fire District Unmanned Aerial System Operation Manual

1.1 Preface

The following procedures are intended to promote the safe, efficient, and lawful operation of Sonoma Valley Fire District's Unmanned Aircraft System (UAS).

1.2 Operations Manual

The operations manual is written to satisfy the following criteria

- The policies and procedures contained in this manual are issued by the authority of the Fire Chief of SVFD. As such, it is an official document of the Sonoma Valley Fire District.

- This manual is not intended to be all-inclusive, but serve as a supplement to other department guidelines, FAA regulations, a COA, and the aircraft manufacturer's approved user manual.

- This manual has been written to address UAS operations as they existed when it was drafted. The manual will be reviewed and updated in the same manner and time frame as other programs at SVFD. Any changes to the manual will be communicated as currently dictated by District policy.

- A copy of the manual will be issued to each person having UAS responsibilities and will be posted on the G drive so all SVFD personnel may have access to it.

1.3 Organization

The UAS unit shall be composed of those personnel approved by the UAS Committee and the Fire Chief. Personnel include pilots, observers, those contributing or have an assignment to the UAS program.

- The UAS unit will be composed of trained SVFD personnel and members of the community who operate on a voluntary basis.

1.4 Personnel

1.4.1 UAS Committee: The UAS committee will consist of the UAS Commander, UAS Supervisor and three to five members of the UAS Program.

Responsibilities:

- Selection of UAS Program members
- Development of training modules and Position Task Book (PTB)
- Equipment evaluation and purchasing (present and future)
- Unmanned Aircraft System Operations Manual
- Budget maintenance

1.4.2 UAS Program Commander: The commander is responsible for the overall direction and performance of the UAS program and will exercise command and control over both.

1.4.3 UAS Supervisor: The supervisor is responsible for the day-to-day supervision of the UAS program. In addition, the supervisor will serve as the supervisor to any community volunteers involved in the program.

Responsibilities:

- Maintain all training, flight, and maintenance records for each pilot, observer, and each individual airframe
- Maintain contact with the FAA and familiarity with applicable FAA regulations
- Maintain proficiency on all UAS operated by the UAS program
- Obtain and maintain an FAA remote pilot certificate with a small UAS rating
- Ensuring Inspections, testing and maintenance occurs on all UAS equipment

1.4.4 Pilot in Command: The PIC is the sole person responsible for the safety and operation of the UAS during a mission or training.

Responsibilities:

- Have an understanding of, and comply with, FAA regulations applicable to the airspace where the UAS will operate
- Have an understanding of, and comply with, the manufacturer's user manual
- Maintain proficiency on each of the airframes in the UAS program
- Obtain and maintain an FAA remote pilot certificate with a small UAS rating

1.4.5 Visual Observer: The VO is crucial in ensuring the UAS operates in a safe manner.

Responsibilities:

- The ability to effectively communicate with the PIC, the IC, and manned aircraft (if applicable) via radio or face-to-face (whichever is most appropriate)
- Have an understanding of, and comply with, regulations concerning right of way rules, operating near other aircraft, careless operation, etc.
- Knowledge of, and ability to use, UAS support equipment (radio, camera, charging station, etc.)
- NOTAM filing (if applicable)

1.5 Facilities

UAS Operations will be based out of Sonoma Valley Fire District Headquarters Station # 1 -
630 2nd St. W, Sonoma CA 96576

1.5.1 The UAS Committee will determine which apparatus will be equipped with the UAS equipment.

1.6 Inspection, Testing, Maintenance

1.6.1 Daily check A daily check will be performed on all UAS equipment to ensure a state of Readiness.

- Each pilot is responsible for their own daily check.

1.6.2 Each airframe and UAS component will be maintained according to the manufacturer's recommendations. It shall be the responsibility of each pilot to assess the equipments records to ensure compliance with inspection, testing and maintenance requirements.

- The UAS Supervisor shall maintain the responsibility for scheduled inspections, testing and maintenance.

1.6.3 All UAS program members are equally responsible for maintaining, cleaning, and securing the UAS equipment.

1.7 Miscellaneous

1.7.1 Media: Inquiries from the news media will be forwarded to the on-duty battalion chief and/or the UAS Commander. Members of the UAS program will follow currently established department policy regarding interactions and inquiries from the media.

1.7.2 Complaints: Complaints, concerns, irregularities, etc. from the public and/or other agencies will be referred to the on-duty battalion chief. The battalion chief will inform the UAS Supervisor at their discretion.

Section 2

Safety

2.1 Preface

The Sonoma Valley Fire District is committed to maintaining a safe and healthy workplace. Above all else, the primary concern on every operation, regardless of the nature, is safety.

2.1 Safety Policy

The above goal is achieved through the following:

- The ongoing pursuit of an accident-free workplace, including no harm to people, equipment, property, or the environment
- A culture of open reporting of all safety hazards in which management will not initiate disciplinary action against personnel who, in good faith, disclose a hazard or safety occurrence due to unintentional conduct
- Support for safety training and awareness programs
- Conduct regular audits of safety policies, procedures, and practices
- Monitor the UAS community to ensure best safety practices are incorporated into the organization

2.2.1 It is the duty of every member within the UAS program to contribute to the goal of continued safe operations. This contribution may come in many forms and includes always operating in the safest manner practicable and never taking unnecessary risks. Any safety hazard, whether procedural, operational, or maintenance related should be identified as soon as possible. Any suggestions in the interest of safety should be made through the UAS program chain of command.

2.2.2 If any member observes or has knowledge of an unsafe or dangerous act committed by another member, the UAS Commander is to be notified immediately.

2.3 Safety Awareness

In regards to safety, all members of the UAS program are safety officers and are responsible for the following:

- Ensure all flight personnel understand applicable regulatory requirements, standards, and organizational safety policies and procedures
- Observe and control safety systems by monitoring all operations
- Review standards and practices of departmental personnel as they impact operational safety
- Communicate all reported safety related problems and the corrective action(s) taken. If there were any in-flight problems, lessons learned, and the proper procedures for handling the problem should be shared and discussed

- Copy and circulate pertinent safety information
- Copy and circulate emergency safety bulletins
- Place electronic copies of any safety information to the UAS Program file in the shared drive

2.4 Emergency Procedures

Members will follow established procedures and policies with regard to emergency notification(s). Further information on safety related matters is located in the Sonoma Valley Fire District Policies and Procedures Manual. Also refer to appendices in this document for lost link, lost communications, and emergency procedures documents.

2.5 Medical Factors

The health of the flight crew is paramount and any member of the UAS program can stand down if they feel they are not able to perform their duties to the highest level.

2.5.1 A self-assessment of physical condition shall be made by all flight crew members during pre-flight Activities.

2.5.2 No member shall act as a PIC or a VO within eight hours after consumption of any alcoholic beverage. (in compliance with Part 107)

Section 3

Training

3.1 Preface

To ensure the continued safe operation of the UAS, high levels of competency must be achieved and maintained. Proficiency, in both academic knowledge and practical skills, is best realized through regular training.

3.2 Instructors

3.2.1 The primary instructor will be the UAS Supervisor. Through training modules established by the UAS Committee, the UAS Supervisor will conduct training based on the varying needs of the program.

3.2.2 Duties of instructing new members shall fall upon those who have the most flight time and knowledge of UAS operations. Instructors will be designated based on experience and competency with the UAS operation and approved by the UAS Commander or designee.

3.3 Training Policies

3.3.1 All members will have access to the monthly and yearly training plan through Target Solutions.

3.3.2 Training plans will be developed jointly by the SVFD Training Division and the UAS Committee.

Training will be implemented by the UAS instructors.

3.3.3 Training for members who have been cleared for full flight duty may conduct their own training by utilizing the chain of command.

3.3.4 All deployments and/or exercises will be documented and counted toward a members training.

3.3.5 Each member of the UAS program has the responsibility to verify their training file is accurate and up-to-date with all pertinent information.

3.4 Initial Training

3.4.1 Unmanned Aircraft Operators in the SVFD UAS division have undergone In person training conducted by Enterprise UAS, and Additional Part 107 preparation " Drone Pilot Ground School - FAA Part 107 Test Prep & Training Course.

- All Unmanned Aircraft Operators must possess a valid FAA Part 107 License.

.3.5 Pilot Training

3.5.1 A member is authorized to conduct flight operations as the PIC when the following criteria has

been met - *As of October 2020 The SVFD does not intend on adding pilots to the UAS team. All current pilots have been certified under the Initial training standard. In the event the SVFD needs to add additional pilots the below requirements will be implemented.*

- PIC task book completion
- Minimum flight hours on each airframe as determined by the UAS Committee

3.5.1.1 Any member that has the status of 'pilot' may act as a VO while the PIC is at the controls of the UAS.

3.6 VO Training

3.6.1 Following the completion of the required training approved by the Fire District's Training Division, authorized personnel may serve in the role of Visual Observer.

3.7 Recurrent Training

3.7.1 All members shall maintain proficiency in their pilot/VO abilities. Members who do not have any documented training or flight time within 90 days of their previous operation/training/exercise, must meet with the UAS Supervisor before they can be returned to full flight status.

3.8 Miscellaneous

3.8.1 All requests for training shall be approved through the member's chain of command.

3.8.3 Unless approval is obtained through the chain of command, overtime will not be authorized for training.

3.8.4 Training shall only be conducted at approved locations as provided by written agreement, training policy, and any current COA.

Section 4

General Operating Procedures

4.1 Preface

Deployment of the UAS in the safest and most efficient manner is the purpose of this section and the goal of the UAS program.

4.2 General Deployment Rules

4.2.1 SVFD's UAS will be given the designator of "Drone 1" during all flights. Subsequent Drones deployed will be given "Drone 2" and so on. When operating with other agencies (who have additional UAS deployed) the designator "Sonoma Drone 1" may need to be utilized for clarity. This designator is subject to change at any time as determined by the IC, Operations, or the UAS Supervisor.

4.2.2 A minimum of one pilot and one observer are required for all deployments.

- 4.2.3 No pilot may act as a PIC for more than 10 hours in any 24-hour period.

4.2.4 Requests for deployment can be made at any time during the day or night. (if applicable waivers or COA's are in place) It is the responsibility of the Unmanned Aircraft Operator to determine if the flight is allowed.

4.2.5 All requests for UAS assistance will be made through one of the following

- The on-duty Battalion Chief
- The UAS Commander or Supervisor
- Sonoma County Fire Investigation Task-Force

4.2.6 Requests for deployment will be prioritized in a manner that has life safety as the main objective.

4.2.7 Rules, regulations, policies, and procedures in place for flights within SVFD's jurisdiction will remain as such should the UAS provide mutual aid to an allied agency.

4.2.8 The pilot is ultimately responsible for the UAS operation and their authority is absolute.

4.2.9 No member of SVFD (or other entity), regardless of rank, may order a pilot to:

- Accept a mission
- Fly outside of FAA, COA, or manufacturer's parameters
- Violate any rules or regulations that the PIC feels would put first responders, members of the public, or the flight team at a greater risk than is normally assumed with flight operations

4.2.9.1 Should the pilot decline a mission, the pilot must make a written declaration outlining the reason(s) why the mission was not accepted and submit the draft to the on-duty battalion chief, the UAS Commander, and the UAS Coordinator.

4.3 Deployment Rules- Internal

4.3.1 When the need for the UAS becomes apparent, the on-duty battalion chief will take the appropriate steps to make contact with a UAS pilot.

- Requests for UAS deployments will be made through the on duty SVFD Battalion Chief.
- The Battalion Chief will gather information pertaining to the mission and contact the Pilot in Command to notify him/her of the mission and all pertinent information.
- The Pilot in Command will determine if the UAS can be deployed safely and practically and will either accept or decline the mission.

4.3.2 The pilot will screen the request based on the following criteria

- Is the proposed mission of the UAS within the capabilities of the equipment and personnel to perform?
- Does the proposed mission fall within FAA and any issued FAA Waivers or COA requirements?
- Does the proposed mission fall within department rules, regulations, policies, and procedures?
- Can the UAS be deployed safely given the current and future weather conditions?

4.3.3 If the mission is accepted, the following will take place when the pilot arrives on scene (if not already present)

- The IC and the pilot will conduct a face to face briefing
- The pilot will make an on-scene assessment of the conditions and determine if the UAS can fulfill the requested goals of the mission
- The IC will contact PSC and request a secondary radio channel to be used for flight team communications when needed.
- Normal pre-flight operations will be initiated including the filing of a NOTAM when required by FAA Part 107 requirements or any current waivers or COA.

4.4 Deployment Rules- External

4.4.1 Part 107 and any valid FAA waivers / COA outline the parameters of where and when SVFD's UAS may operate.

4.4.2 Requests from allied agencies (outside of the Sonoma Valley Fire District) will follow the same procedures as internal requests.

4.4.3 Should the mutual aid request come through REDCOM, the on-duty battalion chief will be notified and gather as much information as possible on the nature of the mission.

4.4.4 The pilot will screen the request based on the criteria outlined in 4.3.2 of this manual.

4.4.5 The on-duty battalion chief will inform the requesting party of the pilot's decision to accept or decline the mission.

4.4.6 The procedures outlined in 4.3.2 of this manual will remain in place regardless of the operating area or mission type.

4.5 Pre-flight

4.5.1 Before launch, a thorough pre-flight inspection must be completed by the designated PIC and VO.

4.5.2 The pre-flight checklist will be utilized to the fullest extent.

4.5.3 A pre-flight checklist can be located in Section 5.2 of this manual.

4.6 Weather

4.6.1 Before launch, a thorough check of the weather will be conducted and all members of the flight team will be made aware of the findings.

4.6.2 Weather information can be obtained through two primary means

- An anemometer
- FAA approved weather resources

4.6.3 Weather information obtained during the pre-flight phase will be documented in the flight log.

4.7 Post-flight

4.7.1 After landing, a thorough post-flight inspection must be completed by the designated PIC and VO.

4.7.2 The post-flight checklist that will be utilized to the fullest extent.

4.7.3 A post-flight checklist can be located in Section 5.3 of this manual.

4.8 Documentation

4.8.1 A flight log form will be completed following every mission or training exercise.

4.8.2 The flight log can be found "Insert weblink here"

4.8.2 All pictures and videos captured during a mission will be stored in accordance with Sonoma Valley Fire District's UAS and Data Retention Policy.

4.8.3 Materials not required to be retained can be deleted at the discretion of the UAS Commander, the UAS Supervisor, or the Training Officer.

4.8.3.1 Pictures and videos captured during training fall under this category.

4.8.4 Data Retention and Processing (video / digital media files)
Upon completion of each UAS mission, the recorded data shall be reviewed and evaluated for evidentiary value by the UAS Commander or authorized designee. Data of identifiable individuals captured during a UAS mission shall not be retained unless there is reasonable suspicion that evidence of criminal activity is present. All retained data shall be maintained or destroyed pursuant to the Sonoma Valley Fire District's Records retention and evidence policies and in compliance with applicable laws and regulations

4.8.4.1 Unauthorized use, duplication, and/or distribution of UAS digital media files is prohibited. Personnel shall not make copies of any UAS digital media files for their personal use and are prohibited from using recording devices (such as a personal camera, tablets, or smartphone) or any secondary video camera to capture UAS systems media including the retention of video cached on the web. All recorded digital media; images and audio are property of the Sonoma Valley Fire District and shall not be copied, released or disseminated in any form or manner outside the parameters of this policy without the expressed written consent of the Fire Chief.

- Departmental requests for a UAS digital media, including requests from the District Attorney's Office or City Attorney's Office, shall be forwarded as a written request via email, to the Sonoma Valley Fire District, with sufficient information to locate the UAS camera system file.
- Non-Departmental requests for a UAS digital media shall be accepted and processed in accordance with Federal, State, and local laws, and Fire Departmental policy (discovery, media inquiries, subpoenas, Public Records Act requests, etc.).
- When practical, District personnel will be advised prior to any release of UAS digital media files under the California Public Records Act (CPRA).

4.9 UAS End of service procedures

4.9.1 When a UAS has been determined to no longer be of use or airworthy it will be decommissioned and tagged as "decommissioned"

4.9.2 Department representative with insurance authority will be notified to remove unit from District insurance policy

4.9.3 Manufacturer will be notified so that any unlock applied to the airframe will be cancelled. For DJI this will occur through appropriate notification to the Qualified Entities Program Representative.

Section 5

Appendices

5.1 Preface

Additional information, used to supplement Sections 1-4, can be found in this section.

5.2 Pre-Flight Risk Assessment & Checklist

SVFD UAV PRE-FLIGHT RISK ASSESSMENT & CHECKLIST

Date		Location	
PIC		VO	
Other		Other	

Mission Type					
	Search		Rescue		Reconnaissance

Mode of Operation					
	Emergency		Training		Recovery

Aircraft					
	Matrice 200 V2		Mavic Mini		Other:

Checklist	
	Manufacturer pre-flight checks on airframe, controller, accessories
	Weather assessed both current and projected
	Map of area / walk around area
	Takeoff and landing site identified
	Safety zone identified
	Flight plan / flight parameters / crew briefing
	Projected flight time

Risk Assessment					
0-23	Pilot in training with mentor	24-44	Trained Pilot	45-60	Seasoned pilot / Consider NO-GO

Rate each section 1-10 1 is the best case situation and a value of 10 is the worst

Supervision		Environment	
Planning		Equipment	
Pilot Selection		Evolution Complexity	
		TOTAL RISK SCORE	

5.2.1 Preflight Checklist Manufacturer Specific

I. Pre-Flight Checklist

1. Check the motors to confirm that they are rotating smoothly.
2. Check the propellers to confirm that they have not come loose.
3. Check the arm connectors to confirm that they are mounted firmly.
4. Ensure that the gimbal is rotating smoothly.
5. Ensure that the landing gears are mounted firmly and check the pins to confirm that they are inserted fully and tightly. (Fig. 1)
6. Ensure that the SD card cover and the rear cover are closed tightly.
7. When mounting an upward gimbal, ensure the gimbal cables are tied properly to avoid affecting the propellers.
8. An external GPS module is required when the upward gimbal is used. Ensure the GPS cable is connected to the rear port and the cable is tied properly. (Fig. 2)
9. When using the M210 RTK, check that the RTK antenna screws have been tightened. (Fig. 3)

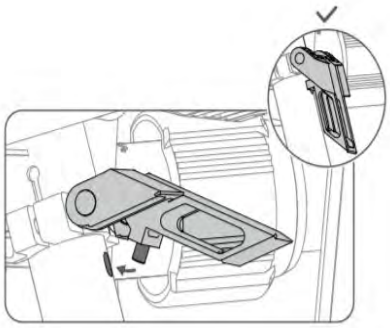


Fig.1

5.2.2 Preflight Checklist General

WEATHER & SITE SAFETY CHECK

Chance of precipitation less than 10%
Wind speed under 15 knots (less than 20 mph)
Cloud base at least 500 feet
Visibility at least 3 statute miles (SM)
If flying at dawn / dusk, double-check civil twilight hours
Establish take-off, landing, and emergency hover zones
Potential for electromagnetic interference?
Look for towers, wires, buildings, trees, or other obstructions
Look for pedestrians and/or animals and set up safety perimeter if needed
Discuss flight mission with other crew members if present

VISUAL AIRCRAFT / SYSTEM INSPECTION

Registration number is displayed properly and is legible
Look for abnormalities -- aircraft frame, propellers, motors, undercarriage
Look for abnormalities -- gimbal, camera, transmitter, payloads, etc.
Gimbal clamp and lens caps are removed
Clean lens with microfiber cloth
Attach propellers, battery/fuel source, and insert SD card / lens filters

POWERING UP

Turn on transmitter / remote control and open up DJI Go 4 app
Turn on aircraft
Verify established connection between transmitter and aircraft
Position antennas on transmitter toward the sky

Verify display panel / FPV screen is functioning properly
Calibrate Inertial Measurement Unit (IMU) as needed
Calibrate compass before every flight
Verify battery / fuel levels on both transmitter and aircraft
Verify that the UAS has acquired GPS location from at least six satellites

TAKING OFF

Take-off to eye-level altitude for about 10-15 seconds
Look for any imbalances or irregularities
Listen for abnormal sounds
Pitch, roll, and yaw to test control response and sensitivity
Check for electromagnetic interference or other software warnings
Do one final check to secure safety of flight operations area
Proceed with flight mission

5.3 Post Flight Checklist

II. Post-Flight Checklist

Check below parts to avoid damage from water intrusion:

1. Intelligent Flight Batteries: Check that the connectors between the batteries and aircraft are dry. Dry the aircraft and batteries with a towel before storage.
2. FPV camera: Check that the camera is dry, especially along the roll axis where the camera meets the gimbal frame.
3. Aircraft arms: Ensure that the arms and arm locks are dry before unlocking and folding.
4. Rear aircraft port where pair button and USB port are housed: Keep dry and closed while flying. Ensure this area is dry before storage.
5. Downward gimbal connector: Keep dry, avoid disconnecting a camera and leaving the gimbal connector exposed in the rain or other wet-weather conditions.
6. Keep the gimbal and camera away from sand and water, and wipe them down if they've been exposed to sand or water.

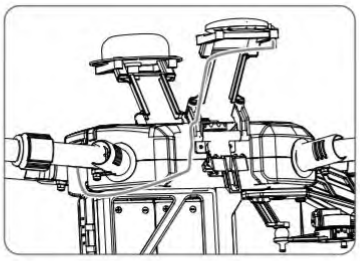


Fig.2

Check below parts to avoid damage from sand intrusion:

1. Aircraft arms: In cases where small objects like sand become lodged in the connector or arm, use a compressed air duster to remove these objects.
2. FPV camera: Check that the camera rotates smoothly along each axis. The camera will judder if objects are lodged inside.
3. Motors: Detach the propellers and start the motors. Listen carefully to see if there is any abnormal noise, please replace the motors.
4. Speaker port: keep it clean.

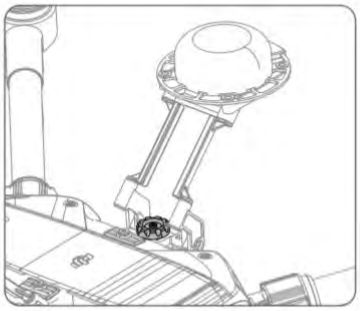


Fig.3

Checking for worn and loose parts:

1. Check that the gimbal protection cable is properly affixed to the gimbal frame. Replace it with a 0.5mm fishing line if it is damaged. (Fig. 4)
2. Check that the landing gear lock screw is tightened properly, and ensure that the landing gear firmly locks when connected to the drone. (Fig. 5)
3. Check that the battery release button is working normally, and the battery can be mounted firmly.
4. Check the propeller base screws are tightened. Ensure the spring elasticity is good and no foreign objects are stuck in the spring.
5. Ensure that the frame arm connectors are rotating smoothly.
6. Keep the upward infrared sensor lens clean and avoid wear and tear.
7. Check the following parts for signs of wearing: propellers, landing gears and motors. If these parts seem worn or damaged, please contact your reseller to schedule parts replacements.
8. Landing gears: Check the drawn line on the landing gear when mounted to ensure it has been installed. To determine whether the landing gear is properly mounted, firmly pull out the landing gear. If the attempt fails, this indicates it has been properly mounted.
9. Keep the vision system camera lenses clean and avoid scratching them.
10. Check the battery button is functioning normally. DO NOT press the button with sharp objects.
11. Check the battery light waterproof covers and make sure the covers have no signs of coming off.
12. Check the external GPS cable and connector to avoid damage.
13. Check the gimbal dampeners to avoid aging, cracking, or leaking. (Fig. 6)

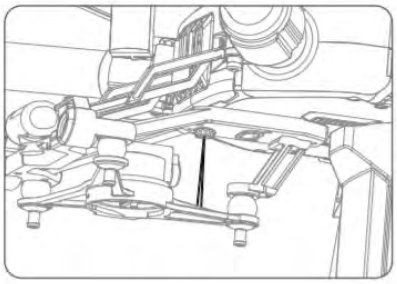


Fig.4

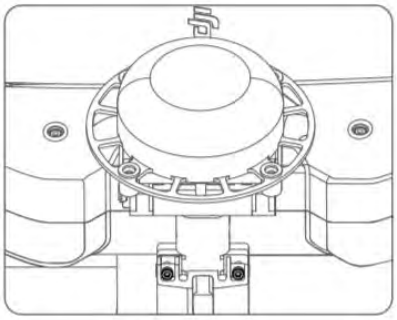


Fig.5

https://www.dji.com/matrice-200-series-v2/info#specs. - Matrie 200 V2 specs
https://www.dslrpros.com/night-operations-red-green-navigation-strobe-light-kit.html. - Light package

5.4 Emergency Procedures

Personnel flying the UAS will first and foremost be trained that in any emergency situation, the safety of persons on the ground and in the air is number one. The following are emergency procedures and each will be documented with an emergency checklist for crew to review.

- Fire
  - ❖ UAS will be flown away from people and property until a safe landing location can be found. A fire extinguisher and first aid kit will be located at the mission site.

- Loss of Link
  - ❖ Onboard system will execute lost link protocol by either landing immediately or returning to the launch point and landing.

- Line of Sight lost
  - ❖ In the event that both crew members lose sight of the aircraft the pilot will initiate a Return-To-Home on the remote control. The Return-To-Home protocol is identical to the Loss of Link protocol. Once visual contact with the aircraft is reestablished the pilot will take-back the aircraft using the remote control.

- Loss of Engine
  - ❖ During an engine failure UAS flight cannot be maintained and the UAS will make an uncontrolled landing. An announcement will be made to all crew members of the loss of the flight of the aircraft and to watch for the landing site. One crew member will bring a fire extinguisher to the landing site in case of fire.

- Unusual Attitude
  - ❖ Onboard stabilization gyros will be allowed to level aircraft before control is resumed by ground control.

In the unlikely event of an emergency involving the aircraft and person on the ground, the flight crew (PIC and Observer) shall maintain a list of applicable numbers (EMS, Dispatch, ATC) for emergency contact. The flight crew as members of the SVFD are also licensed EMT's and Paramedics additionally trained in CPR and can render medical assistance.

5.5 Lost Link Procedures

1. Lost Link Procedures:

    a. In the event of a lost link, the UA must initiate a flight maneuver that ensures landing of the aircraft. Lost Link airborne operations shall be predictable and shall remain within the defined operating area filed in the NOTAM for that flight operation. In the event that the UA could potentially enter controlled airspace, the PIC will immediately contact the appropriate ATC facility having jurisdiction over the controlled airspace to advise them of the UAS's last known altitude, speed, direction of flight and estimated flight time remaining and the Proponent's action to recover the UA.

    b. The sUA is preconfigured / programmed in the event of a Lost Link condition to stop forward flight and attempt to regain link to the remote operated by the PIC. If the link is not re-established the UA is programmed to initiate a Return to Home maneuver. If link is not re-established the PIC will also initiate a manual Return to Home procedure by activation the Return to Home function on the UA's remote.

    c. If the link is reestablished the PIC will take control of the UA and continue the operation or maneuver the UA back to the launch location if safe to do so. If link is intermittent the PIC will immediately land the UA in a safe location.

    d. Once the UA has returned to home or recovered, the UA will be inspected for causes of the lost link condition and necessary repairs will be made prior to any future flights.

    e. All lost link events will be documented along with any findings of causes of these lost link events.

2. Lost Visual Line of Sight:

    a. If the VO loses sight of the UA the VO must notify the PIC immediately. If the UA is visually reacquired promptly, the mission may continue. If not, the PIC will immediately execute lost link procedures.

3. Loss of Communications:

    a. If communication is lost between the PIC and the VO(s), the PIC must execute the lost link procedures

Please refer to UAS Lost Communications Procedures for additional information on this topic.

5.6 Lost Communications Procedure

1. Loss of Communications between the Pilot in Command and Air Traffic Control If required, the PIC will communicate with ATC through use of two way radio communications or a cellular phone based on the agreement between ATC and the PIC. In the event the PIC is unable to establish communications, the PIC will immediately land the UA until communications can be regained. In all cases, when during Loss of Communications there is concern for people or property in the air or on the ground the PIC will immediately land the aircraft.

2. Loss of Communications between the Observer and the Pilot in Command The PIC and Observer will be collocated during operations for this COA and communications will be through direct communication. However, if the observer and the PIC are not co-located where verbal communication is not possible, the following communication tools will be utilized:

- Hand held radio
- Voice actuated headsets
- Cellular phone
- Hand Signals (may be used solely or in conjunction with the communication equipment)

If communication is lost and cannot be re-established the UA will immediately land

5.7 The PAVE checklist

Pilots are familiar with acronyms, and the PAVE checklist is an important personal minimums checklist for pilots to use during the preflight planning stage of a flight. The letters of the PAVE acronym stand for different risks associated with flying: personal, aircraft, environment and external pressures.

As part of the pre-flight risk management process, potential risk factors should be identified and the pilot should decide what his or her personal minimums for flight should be based on his or her own self-assessment. Every pilot will have different minimums based on their own flying experiences, in addition to other factors such as health habits and tolerance for stress.

Keep in mind that a pilot's personal minimums will change over time as he or she becomes more comfortable in a particular airplane or environment. But personal minimums should never be modified or reduced in order to takeoff before a thorough risk assessment has been completed.

Personal: Personal minimums analyze both the health and experience of the pilot. A deeper view can be found using the I'M SAFE checklist. This is taught early in flight training and is used throughout a pilot's professional career to assess their overall readiness for flight when it comes to illness, medication, stress, alcohol, fatigue, and emotion.

Some personal questions a pilot should ask include: Did you get enough sleep to function optimally? How is your health? Have you been ill lately or taking any medications? How many flight hours have you logged in the particular aircraft you are flying? How many flight hours have you flown in the past week, month and year?

Aircraft: Pilots should determine and ensure that their plane is airworthy. Was it inspected recently? Do you have enough fuel for your journey? Are you comfortable with the weight, balance and performance of the aircraft? Do you know the aircraft's limitations? Do you have the most up-to-date GPS and charts?

Environment: These questions include: What's the weather forecast for your path and are you comfortable flying in those weather conditions? Have you explored alternative flight path options? Are you fluent and comfortable using the instruments? Are you aware of the approaches available and are you proficient for each alternative?

Also, did you check PIREPs and NOTAMs? Are you comfortable flying in busy airspace or on edge about the air traffic control situation? Does the aircraft have heat or air conditioning? Are you familiar with the terrain?

External Pressures: Are you feeling stressed or anxious? Will this flight make you feel that way? Are you being pressured to get to your destination quickly? Are your passengers difficult? Are your passengers exhibiting unsafe or distracting behavior? Are you being honest with yourself and others about your pilot abilities and limitations?

With the PAVE checklist, pilots have a simple way to remember each personal minimum category to identify risk before departure and assist in their decision-making process.

5.8 The IMSAFE Checklist

There is a self-assessment checklist to assist pilots in determining their own physical and mental health before a flight. The I'M SAFE Checklist is taught early in flight training and is used throughout a pilot's professional career to assess their overall readiness for flight when it comes to illness, medication, stress, alcohol, fatigue, and emotion.

I - Illness

The FAA requires most pilots to possess a valid medical certificate for flight, but the occasional medical exam every five years doesn't cover illness such as colds and flu. In the interest of safety, the FAA does regulate this topic loosely by stating that if a pilot has or develops a known medical condition that would prevent him from obtaining a medical certificate, he is prohibited from flying as a required crewmember (FAR 61.53).

Also, FAR 91.3 states that the pilot in command is directly responsible for the operation of the flight. The pilot alone is responsible for ensuring his health is up to par before taking the controls.

Colds, allergies, and other common illnesses can cause problems for pilots. From sinus pressure to general malaise, pilots can easily become more of a risk to the flight than an asset.

Before flying, pilots should think about recent or current illnesses that might affect flight. After the coughing and sneezing subside, a pilot might feel well enough to fly but could still have trouble performing the Valsalva maneuver, for example, which equalizes the pressure inside of his ears.

M - Medication

With illness, it's mostly clear when a pilot should or shouldn't fly. But with illness comes medication, and all medications should be scrutinized by both the pilot and his or her doctor before taking it. Many prescription and over-the-counter medications can be dangerous for a pilot to take before flying.

If medication is necessary, pilots should discuss the specific effects of the medication with an aviation medical examiner to determine if it causes mental or physical impairment that would interfere with the safety of flight. Then, pilots need to be aware of residual effects of both short-term and long-term use of medications. Even after the medication has been stopped, the effects of it may remain in the body for some time.

So how long should you wait after taking medication to fly? Well, that depends on the drug itself, but the FAA recommends waiting until at least five dosage periods have passed. If the medication is taken once a day, for example, you would wait five days before flying again.

S - Stress

There are at least three kinds of stress that pilots should be aware of: Physiological, environmental and psychological stress.

Physiological stress is stress in the physical sense. It comes from fatigue, strenuous exercise, being out of shape or changing time zones, to name a few. Unhealthy eating habits, illness, and other physical ailments are included in this category, too.

Environmental stress comes from the immediate surroundings and includes things such as being too hot or too cold, inadequate oxygen levels or loud noises.

Psychological stress can be more difficult to identify. This category of stress includes anxiety, social and emotional factors and mental fatigue. Psychological stress can occur for many reasons such as divorce, family problems, financial troubles or just a change in schedule.

A small level of stress can be a good thing, as it keeps pilots aware and on their toes. But stress can accumulate and affect performance. Also, everyone handles stress differently. A source of anxiety for one person might be a fun challenge for another person. It's important for pilots to be able to recognize and evaluate their stressors so they can mitigate risk.

A - Alcohol

There's no doubt that alcohol and flying don't mix. Alcohol abuse affects the brain, eyes, ears, motor skills and judgment, all of which are necessary components to safe flight. Alcohol makes people dizzy and sleepy which decreases reaction time.

The rules surrounding the use of alcohol while flying are clear: FAR 91.17 prohibits the use of alcohol within the 8 hours before flying, while under the influence of alcohol, or with a blood alcohol content of .04% or greater. The FAA recommends that pilots wait at least 24 hours after drinking to get behind the controls.

A pilot should remember, though, that they can follow the "8 hours from bottle to throttle" rule and still not be fit to fly. Hangovers are dangerous in the cockpit, too, with effects similar to being drunk or ill: Nausea, vomiting, extreme fatigue, problems focusing, dizziness, etc.

F - Fatigue

Pilot fatigue is a difficult problem to address completely, as fatigue affects everyone differently. Some people can function well with little sleep; others don't perform well at all without at least ten hours of sleep per night. There's no medical way to address the sleep issue with pilots -- each pilot must be responsible for knowing his or her limitations.

The effects of fatigue are cumulative, meaning that small sleep deprivations over time can be dangerous for pilots. Pilots should also take into account time changes, jet lag and day/night scheduling options when managing fatigue.

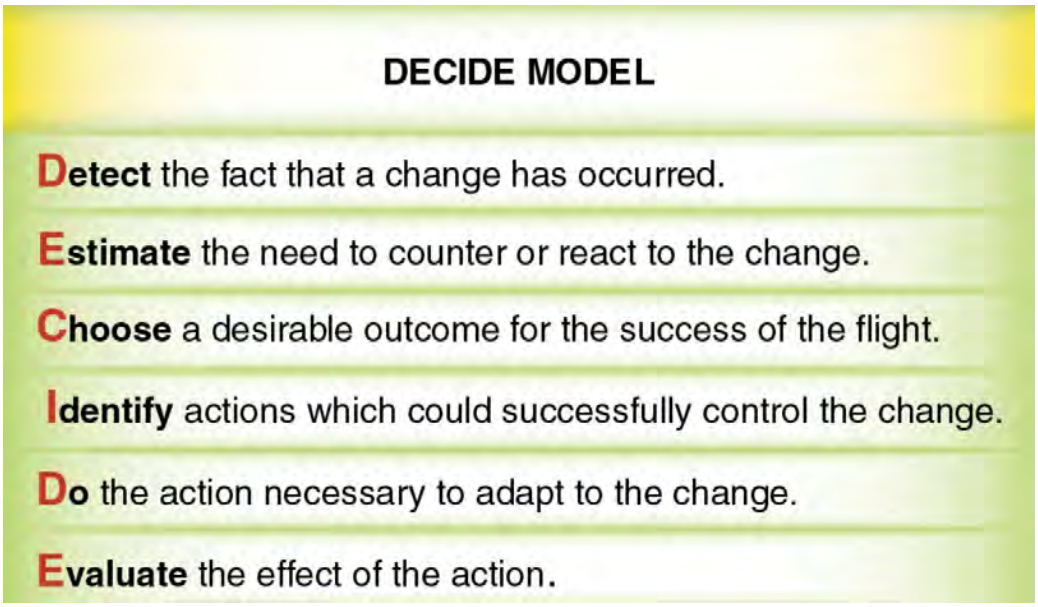
Although there are FAA regulations and company policies for commercial pilots to help manage fatigue, the responsibility for safety lies with the pilot alone.

E - Emotion

For some people, emotions can get in the way of behaving in a safe, productive manner. Pilots should ask themselves if they are in an emotionally stable state of mind before departing. Emotions can be subdued and managed most of the time, but they can also resurface easily, especially when faced with a stressful situation.

Most of the time, this type of self-assessment is hard, but pilots need to try to maintain an objective view of themselves to assess their behavior and emotions in a safe way. For example, if a pilot notices that he is unusually angry or impatient while preparing for a flight, he may want to reconsider flying.

5.9 The DECIDE MODEL



SONOMA LOCAL AGENCY FORMATION COMMISSION

111 SANTA ROSA AVE STE 240, SANTA ROSA, CA 95404
(707) 565-2577 www.sonomalafco.org

Date: October 27, 2020

To: All Independent Special Districts

From: Diana Wilson, Clerk

Subject: Availability of Alternate Special District Member on LAFCO

The Sonoma Local Agency Formation Commission (Sonoma LAFCO) has an opening for the Alternate Member representing Independent Special Districts. The recruitment is to fill the position for the term ending May 2024.

Sonoma LAFCO is comprised of seven members: two each from the county (Board of Supervisors), cities (city councils) and independent special districts (boards of directors), and one representative from the public. Each group has an alternate representative.

Nominees for the position of Alternate Special District Member may be members of any special district board. Any current district board member who is interested in becoming a candidate for this position should complete the attached application and provide a current resume and letter of nomination signed by the district's presiding officer. Applications submitted without a resume will be considered incomplete and cannot be accepted. The application will also be available on our website at www.sonomalafco.org.

Completed applications and accompanying resumes must be received by mail in the LAFCO office at 111 Santa Rosa Ave Ste 240, Santa Rosa, CA 95404 or by email to diana.wilson@sonoma-county.org by **5:00 p.m. on Tuesday, January 19, 2021**. Late applications will not be accepted.

After the close of the application period, LAFCO will mail a ballot to each independent district, along with copies of completed application forms and candidate resumes, so that a mail ballot election can be conducted. Districts will be given approximately six weeks to cast ballots and return them to the LAFCO office. Instructions for voting and return mailing will be provided at the time ballots are sent out. *All districts can vote*. If a majority of the districts do not vote in the election, the ballots will not be considered valid and a new election will be held. If only one candidate is nominated, the candidate will be deemed selected and no ballots mailed.

If you have any questions about the position or the process, please contact Diana Wilson at 707-565-4855 or by email at diana.wilson@sonoma-county.org.

SONOMA LOCAL AGENCY FORMATION COMMISSION

575 ADMINISTRATION DRIVE, ROOM 104A, SANTA ROSA, CA 95403
(707) 565-2577 FAX (707) 565-3778
www.sonomalafco.org

APPLICATION FOR SPECIAL DISTRICT REPRESENTATIVE (ALTERNATE)

This application has been designed to provide pertinent information about each candidate applying for the position of the Alternate Special District Representative to LAFCO. Please read the application carefully and type your responses or print in ink. Additional pages may be included as necessary. An electronic version is available online at www.sonomalafco.org

Note: *Candidates* for this position may be board members from any independent special district.

Date Submitted: _____

Name: _____

Address: _____

Phone(s): _____

Email: _____

Name of District You Represent: _____

Date of Most Current Election/Appointment: _____

Date Term Expires: _____

Total years with District: _____

Total Years Associated with Government/ Community Service: _____

List any other agencies/special Districts you have been or are currently involved with:

_____

_____

_____

_____

List Community Service Activities including Names of Organizations and Dates of Service:

_____

_____

_____

_____

_____

_____

_____

_____

SONOMA LOCAL AGENCY FORMATION COMMISSION

Have you attended LAFCO meetings? If yes, when?

Please explain why you want to serve on the Sonoma Local Agency Formation Commission (LAFCO).

From your perspective, explain the purpose of LAFCO:

SONOMA LOCAL AGENCY FORMATION COMMISSION

111 SANTA ROSA AVE STE 240, SANTA ROSA, CA 95404
(707) 565-2577 www.sonomalafco.org

Date: October 27, 2020

To: Class I Independent Special Districts

Subject: Availability of Special District Representative Position on LAFCO

The Sonoma Local Agency Formation Commission (Sonoma LAFCO) has an opening for the Regular Member representing Independent Special Districts Class I. The recruitment is to fill the position for the term ending May 2024.

Sonoma LAFCO is comprised of seven members: two each from the county (Board of Supervisors), cities (city councils) and independent special districts (boards of directors), and one representative from the public. Each group has an alternate representative.

For purposes of nomination and selection as a special district representative to LAFCO, there are two classes of districts: Class I which includes fire protection, community services, and life support districts and Class II which includes all other districts. Nominations for the position of Class I representative are restricted to members of the boards of directors of fire protection, community services, and life support districts.

Any current district board member who is interested in becoming a candidate should complete the application and provide a current resume and letter of nomination signed by the district's presiding officer. Applications submitted without a resume will be considered incomplete and cannot be accepted. The application will also be available on our website at www.sonomalafco.org.

Completed applications and accompanying resumes must be received by mail in the LAFCO office at 111 Santa Rosa Ave Ste 240, Santa Rosa, CA 95404 or by email to diana.wilson@sonoma-county.org by **5:00 p.m. on Tuesday, January 19, 2021**. Late applications will not be accepted.

After the close of the application period, LAFCO will mail a ballot to each independent district, along with copies of the completed application forms and candidate resumes so that a mail ballot election can be conducted. Districts will be given approximately six weeks to cast ballots and return them to the LAFCO office. Instructions for voting and return mailing will be provided at the time ballots are sent out. *All districts can vote*. If a majority of the districts do not vote in the election, the ballots will not be considered valid and a new election will be held. If only one candidate is nominated, the candidate will be deemed selected and no ballots mailed.

If you have any questions about the position or the process, please contact Diana Wilson at 707-565-4855 or by email at diana.wilson@sonoma-county.org.

SONOMA LOCAL AGENCY FORMATION COMMISSION

575 ADMINISTRATION DRIVE, ROOM 104A, SANTA ROSA, CA 95403
(707) 565-2577 FAX (707) 565-3778
www.sonomalafco.org

SPECIAL DISTRICT REPRESENTATIVE CLASS I
APPLICATION FORM

This application has been designed to provide pertinent information about each candidate applying for the position of Class I Special District Representative to LAFCO. Please read the application carefully and type or print your responses. Feel welcome to attach additional sheets if necessary.

Note: Class I districts include fire protection, community services, and life support districts.

Date Application Submitted: _____

Name: _____

Address: _____

Home Phone: _____ Cell: _____ Work: _____

Name of District You Represent: _____

Date of Most Current Appointment or Election: _____

Date Term Expires: _____ Total Years with District: _____

Indicate Involvement in Other Agencies/Special Districts:

_____ _____

_____ _____

Total Years Associated with Government/ Community Service: _____

List Community Service Activities including Names of Organizations and Dates of Service:

_____

_____

_____

_____

Have you attended LAFCO meetings? If so, when?

_____

SONOMA LOCAL AGENCY FORMATION COMMISSION
575 ADMINISTRATION DRIVE, ROOM 104A, SANTA ROSA, CA 95403
(707) 565-2577 FAX (707) 565-3778
www.sonomalafco.org

Please explain why you want to serve on the Sonoma Local Agency Formation Commission (LAFCO).

From your perspective, explain the purpose of LAFCO: