ASHLEY & VANCE ENGINEERING

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Roseville, CA 95661
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S T R U C T U R A L C A L C U L A T I O N S:

PROJECT NO.:
251477

PROJECT NAME:
Nevada County Homekey+
Auburn Residence

PROJECT TYPE:
Addition and Remodel

PROJECT ADDRESS:
13668 Auburn Rd.
Grass Valley, CA 95945

ARCHITECT:
Russell Davidson Architecture + Design
149 Crown Point Court, Suite C
Grass Valley, CA 95945

PROJECT ENGINEER:
Arlene Castillo

DATE:
March 30, 2026

Monte Gillan
Jun 18, 2026
2:30 pm

JOB SET

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JOB SET

DESIGN PARAMETERS

Code: 2025 CBC (based upon the 2024 IBC)

Design Materials :
(Please refer to General Notes & Specifications for more detailed information)

Wood : Douglas Fir-Larch

Foundations:

Concrete	2500	psi
Rebar	60	ksi

Note:
The intent of lateral design is to prevent structural failures, in the event of seismic activities or high-winds, but not to prevent the damage of architectural finishes or systems. The lateral calculations herein conform to the specifications of the current California Building Code (CBC). Ashley & Vance Engineering Inc. provides no guarantees, expressed or implied, as to the adequacy of the CBC provisions.

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Job: 251477 - Nevada County Homekey+ - RDA **Load Sheet**

ROOF LOADS

Typical Roof Live Loads	**20.0 psf**

Snow Load **Ps = 0.7·Ce·Ct·Cs·Pg**	
Ground Snow Load: Pg (psf)	**68.0 psf**
Exposure Factor: Ce	**1.0 psf**
Thermal Factor: Ct	**1.2 psf**
Roof Slope Factor: Cs	**1.0 psf**
Minimum Roof Snow Load per Jurisdiction	**0.0 psf**
	58.0 psf

Typical Roof Dead Loads	
Asphalt Shingles	**3.0 psf**
1/2" Plywood	**1.7 psf**
Wood Framing	**2.8 psf**
10" Batt Insulation	**0.8 psf**
5/8" Gyp. Board Ceiling	**2.8 psf**
Misc. Mechanical / Solar	**3.9 psf**
Total Dead Load	**15.0 psf**

FLOOR LOADS

Typical Floor Live Loads	**40 psf**

Typical Floor Dead Loads	
Hardwood	**4.0 psf**
3/4" Plywood	**2.5 psf**
Wood Framing	**3.3 psf**
10" Batt Insulation	**0.8 psf**
5/8" Gyp. Board Ceiling	**2.8 psf**
Misc. Loads	**1.6 psf**
Total Dead Load	**15.0 psf**

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DECK LOADS

Typical Deck Live Loads	**60 psf**
Typical Deck Dead Loads	
Elastomeric	**0.3 psf**
3/4" Plywood	**2.5 psf**
Wood Framing	**3.3 psf**
10" Batt Insulation	**0.8 psf**
5/8" Gyp. Board Ceiling	**2.8 psf**
Misc. Loads	**1.3 psf**
Total Dead Load	**11.0 psf**
Partition Load	
Assumed Partition Load	**20 psf**
Wall Dead Weight	**10 psf**

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Job: **251477 - Nevada County Homekey+ - RDA** **Criteria Sheet**

DEFLECTION CRITERIA:

Construction	L	S	E | W	D + L
Roof	**240**	240	240	**180**
Floor	**360**	---	---	**240**
Exterior Walls	---	---	240	---
Interior Partitions	240	---	---	---

LOAD CASE LEGEND

ASCE 07 Equations

2 **D + L**

3 **D + L_R|0.7S**

4 **D + 0.75[L + L_R|0.7S]**

5 **D + 0.6W**

6 **D + 0.75(0.6W) + 0.75(L + L_R|0.7S)**

7 **0.6D - 0.6W**

8 **(1.0 + 0.14*S_{DS})D + 0.7Ω_OE**

9 **(1.0 + 0.105*S_{DS})D + 0.525Ω_OE + 0.75L + 0.1S**

10 **(0.6 - 0.14*S_{DS})D - 0.7Ω_OE***

SESIMIC CRITERIA

S_{DS} = **0.660**

Ω_O = **2.5**

LOAD MATRIX

Description:		D	L_R	L	L_2	S	W	E	
1r = 1 ft of roof trib	Roof	15	20	0	0	58	0	0	psf
2f = 2 ft of floor trib	Floor	15	0	40	0	0	0	0	psf
3g = 3 ft of garage trib	Garage	0	0	0	0	0	0	0	psf
4d = 4 ft of deck trib	Deck	11	0	60	0	58	0	0	psf
5w = 5 ft of wall trib	Wall	10	0	0	0	0	0	0	psf

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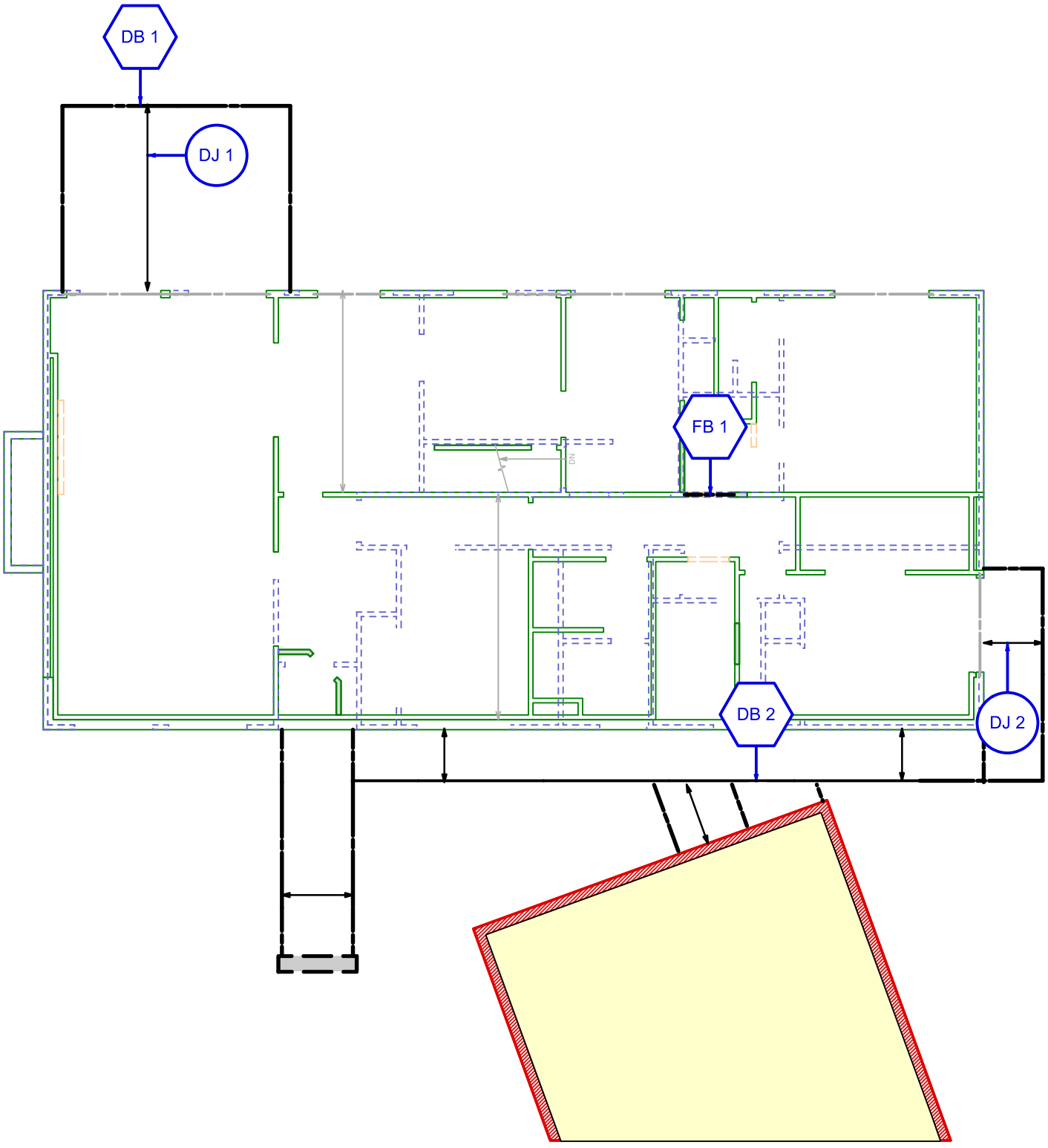
Nevada County Homekey +
13668 Auburn Rd.
Grass Valley, CA 95949

Job No.: **251477**

Floor Framing Layout



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Job: 251477 - Nevada County Homekey+ - RDA

Beam/Joist Input Data

Description:		D	L_R	L	S	W	E	
1r = 1 ft of roof trib	Roof	15	20	0	58	0	0	psf
2f = 2 ft of floor trib	Floor	15	0	40	0	0	0	psf
3g = 3 ft of garage trib	Garage	0	0	0	0	0	0	psf
4d = 4 ft of deck trib	Deck	11	0	60	58	0	0	psf
5w = 5 ft of wall trib	Wall	10	0	0	0	0	0	psf

S_{DS} = 0.660
Ω_o = 2.5

FLOOR BEAMS

adVanceBeam 2.0

Member	Trib (ft)	SPAN INFO L/X_a(ft)	SPAN INFO L_u/X_b(ft)	D (plf)	L_R (plf)	L (plf)	S (plf)	W (plf)	E (plf)	Span/Load Type
FB 1	14.0 r			210	280	0	812	0	0	
	14.0 f			210	0	560	0	0	0	
	0.0 g			0	0	0	0	0	0	
	0.0 d			0	0	0	0	0	0	
	1.0 w			10	0	0	0	0	0	
Spans										
	1	3.0	3.0	430	280	560	812	0	0	Simple Span
Additional Loads										

BEAM DESIGN

4x6 D.F. #2

	Force	Loc(ft)	%Max
Bending	-1.4kft	1.5	73%
Shear	-1,914#	0	72%

REACTIONS		Loc(ft)	M(k*ft)	Rmin	Rmax
Roller	1	0	---	327#	1,914#
Roller	2	3	---	327#	1,914#

DEFLECTIONS		l / x	Defl(in)	Loc(ft)	%Max
Max(ASD)		---	0.03	1.5	---
L	360	1826	0.02	1.5	20%
E|W|S	---	1889	0.02	1.5	---
D+L	240	1208	0.03	1.5	20%

JOB SET

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Job: 251477 - Nevada County Homekey+ - RDA

Beam/Joist Input Data

Description:		D	L_R	L	S	W	E	
1r = 1 ft of roof trib	Roof	15	20	0	58	0	0	psf
2f = 2 ft of floor trib	Floor	15	0	40	0	0	0	psf
3g = 3 ft of garage trib	Garage	0	0	0	0	0	0	psf
4d = 4 ft of deck trib	Deck	11	0	60	58	0	0	psf
5w = 5 ft of wall trib	Wall	10	0	0	0	0	0	psf

S_{DS} = 0.660
Ω_o = 2.5

DECK BEAMS

adVanceBeam 2.0

DB 1

Member	Trib (ft)	SPAN INFO L/X_a(ft)	L_u/X_b(ft)	D (plf)	L_R (plf)	L (plf)	S (plf)	W (plf)	E (plf)	Span/Load Type
	0.0 r			0	0	0	0	0	0	
	0.0 f			0	0	0	0	0	0	
	0.0 g			0	0	0	0	0	0	
	6.0 d			66	0	360	348	0	0	
	1.0 w			10	0	0	0	0	0	
Spans										
1		7.5	7.5	76	0	360	348	0	0	Simple Span
Additional Loads										

BEAM DESIGN: 6x10 D.F. #1

	Force	Loc(ft)	%Max
Bending	-3.7kft	3.8	44%
Shear	-1,983#	0	36%

REACTIONS		Loc(ft)	M(k*ft)	Rmin	Rmax
Roller	1	0	---	145#	1,983#
Roller	2	8	---	145#	1,983#

DEFLECTIONS		l / x	Defl(in)	Loc(ft)	%Max
Max(ASD)		---	0.06	3.75	---
L	240	2098	0.04	3.75	11%
E|W|S	240	2170	0.04	3.75	11%
D+L	180	1732	0.05	3.75	10%

DB 2

Member	Trib (ft)	SPAN INFO L/X_a(ft)	L_u/X_b(ft)	D (plf)	L_R (plf)	L (plf)	S (plf)	W (plf)	E (plf)	Span/Load Type
	0.0 r			0	0	0	0	0	0	
	0.0 f			0	0	0	0	0	0	
	0.0 g			0	0	0	0	0	0	
	4.0 d			44	0	240	232	0	0	
	1.0 w			10	0	0	0	0	0	
Spans										
1		8.0	8.0	54	0	240	232	0	0	Simple Span
Additional Loads										

BEAM DESIGN: 6x8 D.F. #1

	Force	Loc(ft)	%Max
Bending	-2.8kft	4.0	60%
Shear	-1,423#	0	33%

REACTIONS		Loc(ft)	M(k*ft)	Rmin	Rmax
Roller	1	0	---	110#	1,423#
Roller	2	8	---	110#	1,423#

DEFLECTIONS		l / x	Defl(in)	Loc(ft)	%Max
Max(ASD)		---	0.11	4.0	---
L	240	1276	0.08	4.0	19%
E|W|S	240	1320	0.07	4.0	18%
D+L	180	1041	0.09	4.0	17%

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Beam/Joist Input Data

Description:		D	L_R	L	S	W	E	
1r = 1 ft of roof trib	Roof	15	20	0	58	0	0	psf
2f = 2 ft of floor trib	Floor	15	0	40	0	0	0	psf
3g = 3 ft of garage trib	Garage	0	0	0	0	0	0	psf
4d = 4 ft of deck trib	Deck	11	0	60	58	0	0	psf
5w = 5 ft of wall trib	Wall	10	0	0	0	0	0	psf

S_{DS} = 0.660
Ω_o = 2.5

DECK JOISTS

adVanceBeam 2.0

Member	Trib (ft)	SPAN INFO L/X_a(ft)	L_u/X_b(ft)	D (psf)	L_R (psf)	L (psf)	S (psf)	W (psf)	E (psf)	Span/Load Type
DJ 1	0.0 r			0	0	0	0	0	0	
	0.0 f			0	0	0	0	0	0	
	0.0 g			0	0	0	0	0	0	
	1.0 d			11	0	60	58	0	0	
	0.0 w			0	0	0	0	0	0	
Spans										
	1	11.8	1.0	11	0	60	58	0	0	Simple Span
Additional Loads										

JOIST DESIGN
Trib, Forces & Reactions are on per foot basis

2x10 D.F. #1 @ 16" o.c.

	Force	Loc(ft)	%Max
Bending	-1.5kft	5.9	97%
Shear	-508#	0	44%

REACTIONS		Loc(ft)	M(k*ft)	Rmin	Rmax
Roller	1	0	---	33plf	508plf
Roller	2	12	---	33plf	508plf

DEFLECTIONS		l / x	Defl(in)	Loc(ft)	%Max
Max(ASD)		---	0.31	5.88	---
L	240	657	0.21	5.88	37%
E|W|S	240	679	0.21	5.88	35%
D+L	180	555	0.25	5.88	32%

Member	Trib (ft)	SPAN INFO L/X_a(ft)	L_u/X_b(ft)	D (psf)	L_R (psf)	L (psf)	S (psf)	W (psf)	E (psf)	Span/Load Type
DJ 2	1.0 r			15	20	0	58	0	0	
	0.0 f			0	0	0	0	0	0	
	0.0 g			0	0	0	0	0	0	
	0.0 d			0	0	0	0	0	0	
	0.0 w			0	0	0	0	0	0	
Spans										
	1	4.0	1.0	15	20	0	58	0	0	Simple Span
Additional Loads										

2x8 D.F. #2 @ 16" o.c.

	Force	Loc(ft)	%Max
Bending	-111#ft	2.0	12%
Shear	-111#	0	12%

REACTIONS		Loc(ft)	M(k*ft)	Rmin	Rmax
Roller	1	0	---	15plf	111plf
Roller	2	4	---	15plf	111plf

DEFLECTIONS		l / x	Defl(in)	Loc(ft)	%Max
Max(ASD)		---	0.01	2.0	---
L	240	22627	0.00	2.0	1%
E|W|S	240	7802	0.01	2.0	3%
D+L	180	12929	0.00	2.0	1%

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Grass Valley, CA 95949

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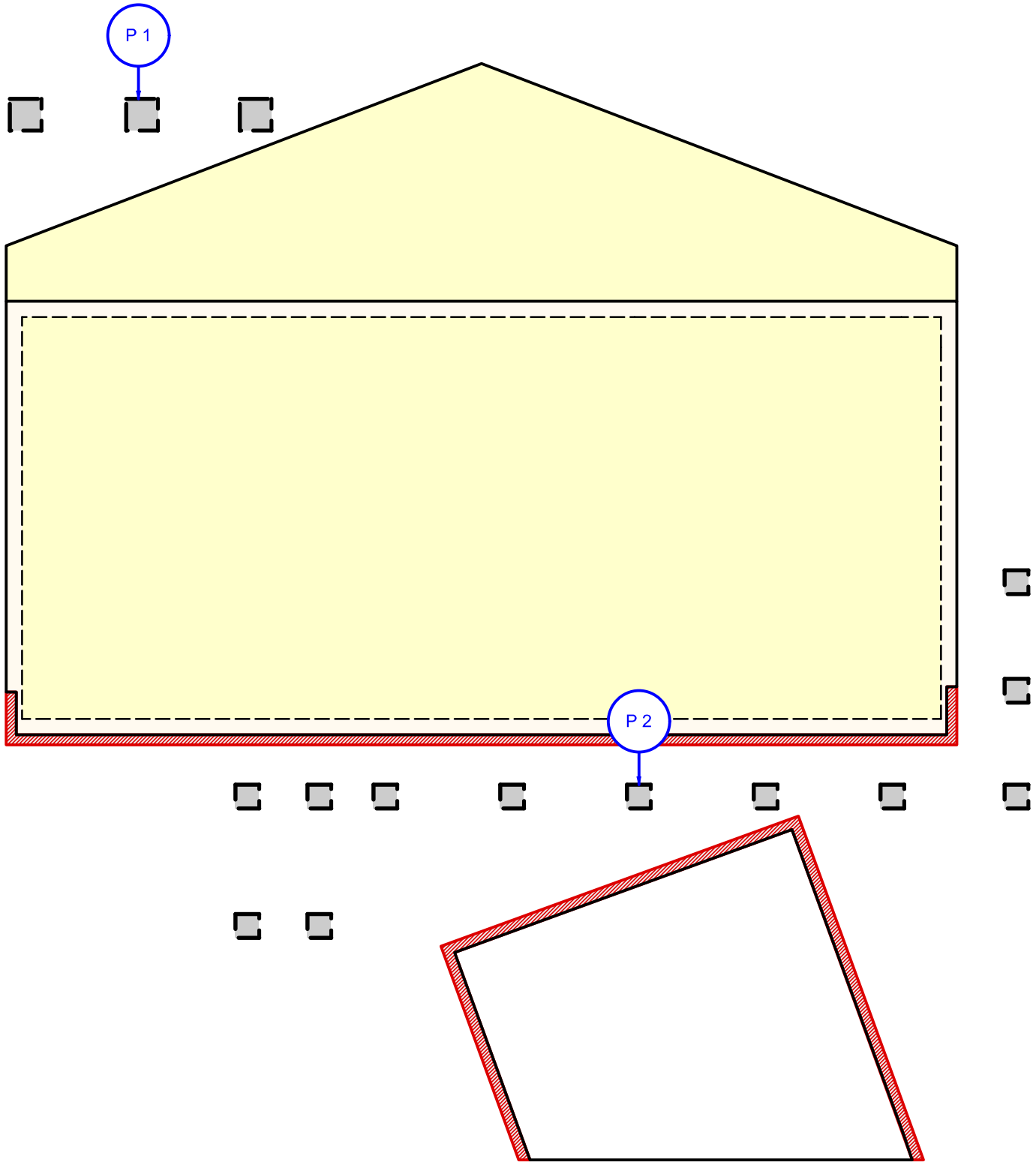
Foundation Layout



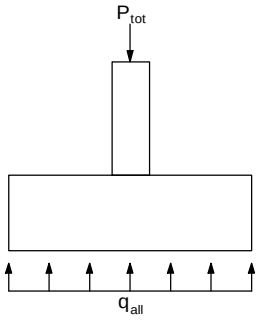
JOB SET

Job: 251477 - Nevada County Homekey+ - RDA

Pad Footing Design Calculation:

q_{all} = 1,500 psf Allowable Bearing Pressure (per Table 1806.2)
+ 33% Increase for Transient Loading
q_{all} = 1,995 psf Allowable Bearing Pressure with Transient Loading

* Allowable Bearing Capacity Based on ASD Load Combinations (ASCE 7-22 2.4.1)
* Reinfocement design based on LRFD Load Combinations (Per ASCE 7-22 2.3.1)



Pad	Reactions on Footing	Point Loads D	LR	L	L2	S	W	E	Bearing Design			Pad Design		
P1	DB 1 r1	285 #	0 #	1.35 k	0 #	1.31 k	0 #	0 #	Pad Width, W =	24	in.	**Use (3) #4 @ 9" oc EW**		
	DB 1 r2	285 #	0 #	1.35 k	0 #	1.31 k	0 #	0 #	Pad Length, L =	24	in.	Bending Check		
									Pad Thick., d =	12	in.	q_u =	10.41	psi
									P_{tot} =	**3965**	lbs	M_u =	10.68	kip-in
									q_{bear} =	991	psf	$A_{s\ Req'd}$ =	0.518	$in.^2$
									q_{bear}/q_{all} =	**0.66**	**OK**	**A_s =**	**0.589**	**in^3** **OK**
	Totals	570 #		2.70 k		2.61 k						Shear Check		
	Worst Case Load Combinations (per ASCE 7-22 2.4 & 2.3)											V_u =	3.81	kips (2-Way)
	ASD Static: Case 4: D + 0.75L + 0.75(0.7S)											ϕV_c =	78.30	kips
	LRFD Design: Case 3: 1.2D + 1.0S + 1.0L											**Vu/øVc =**	**0.05**	**OK**
P2	DB 2 r1	216 #	0 #	0.96 k	0 #	0.93 k	0 #	0 #	Pad Width, W =	18	in.	**Use (2) #4 @ 12" oc EW**		
	DB 2 r2	216 #	0 #	0.96 k	0 #	0.93 k	0 #	0 #	Pad Length, L =	18	in.	Bending Check		
									Pad Thick., d =	12	in.	q_u =	13.25	psi
									P_{tot} =	**2846**	lbs	M_u =	4.66	kip-in
									q_{bear} =	1265	psf	$A_{s\ Req'd}$ =	0.389	$in.^2$
									q_{bear}/q_{all} =	**0.84**	**OK**	**A_s =**	**0.393**	**in^3** **OK**
	Totals	432 #		1.92 k		1.86 k						Shear Check		
	Worst Case Load Combinations (per ASCE 7-22 2.4 & 2.3)											V_u =	0.66	kips (1-Way)
	ASD Static: Case 4: D + 0.75L + 0.75(0.7S)											ϕV_c =	12.15	kips
	LRFD Design: Case 3: 1.2D + 1.0S + 1.0L											**Vu/øVc =**	**0.05**	**OK**

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