BUILDING ENERGY ANALYSIS REPORT

PROJECT:

Mann Residence
415 Monte Vista CT
Napa, CA 94559

Project Designer:

Report Prepared by:

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Job Number:

100

Date:

1/12/2023

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: Mann Residence

Calculation Date/Time: 2023-01-12T12:55:58-08:00

Calculation Description: Title 24 Analysis

Input File Name: tmpDC74.ribd22x

GENERAL INFORMATION					
01	**Project Name**	Mann Residence			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	415 Monte Vista CT			
04	**City**	Napa	05	**Standards Version**	2022
06	**Zip code**	94559	07	**Software Version**	EnergyPro 9.0
08	**Climate Zone**	2	09	**Front Orientation (deg/ Cardinal)**	0
10	**Building Type**	Single family	11	**Number of Dwelling Units**	1
12	**Project Scope**	Newly Constructed	13	**Number of Bedrooms**	2
14	**Addition Cond. Floor Area (ft^2)**	0	15	**Number of Stories**	2
16	**Existing Cond. Floor Area (ft^2)**	n/a	17	**Fenestration Average U-factor**	0.3
18	**Total Cond. Floor Area (ft^2)**	4475	19	**Glazing Percentage (%)**	32.80%
20	**ADU Bedroom Count**	n/a			

COMPLIANCE RESULTS	
01	**Building Complies with Computer Performance**
02	**This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider.**
03	**This building incorporates one or more Special Features shown below**

ENERGY DESIGN RATINGS

	Energy Design Ratings			Compliance Margins		
	Source Energy (EDR1)	**Efficiency[1] EDR (EDR2efficiency)**	**Total[2] EDR (EDR2total)**	**Source Energy (EDR1)**	**Efficiency[1] EDR (EDR2efficiency)**	**Total[2] EDR (EDR2total)**
Standard Design	48	59.8	38.5			
Proposed Design	27.7	55.2	23.6	20.3	4.6	14.9
RESULT[3]: PASS						

[1]Efficiency EDR includes improvements like a better building envelope and more efficient equipment

[2]Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries

[3]Building complies when source energy, efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded

- Standard Design PV Capacity: 4.26 kWdc
- PV System resized to 8.47 kWdc (a factor of 8.473) to achieve 'Maximum PV for Compliance Credit' PV scaling

ENERGY USE SUMMARY

Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft^2 -yr)	Standard Design TDV Energy (EDR2) (kTDV/ft^2 -yr)	Proposed Design Source Energy (EDR1) (kBtu/ft^2 -yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft^2 -yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	10.63	46.32	4.84	36.74	5.79	9.58
Space Cooling	0.07	9.82	0.14	13.51	-0.07	-3.69
IAQ Ventilation	1.24	13.3	1.3	13.94	-0.06	-0.64
Water Heating	0.75	7.89	1.08	7.11	-0.33	0.78
Self Utilization/Flexibility Credit				0		0
Efficiency Compliance Total	**12.69**	**77.33**	**7.36**	**71.3**	**5.33**	**6.03**
Photovoltaics	-0.76	-25.24	-1.52	-48.61		
Battery			0	0		
Flexibility						
Indoor Lighting	0.61	6.1	0.61	6.1		
Appl. & Cooking	0.66	5.83	0.67	5.86		
Plug Loads	1.01	10.55	1.01	10.55		
Outdoor Lighting	0.17	1.53	0.17	1.53		
TOTAL COMPLIANCE	**14.38**	**76.1**	**8.3**	**46.73**		

ENERGY USE INTENSITY

	Standard Design (kBtu/ft^2 - yr)	Proposed Design (kBtu/ft^2 - yr)	Compliance Margin (kBtu/ft^2 - yr)	Margin Percentage
Gross EUI[1]	17.93	10.69	7.24	40.38
Net EUI[2]	13.08	1.05	12.03	91.97

Notes
1. Gross EUI is Energy Use Total (not including PV) / Total Building Area.
2. Net EUI is Energy Use Total (including PV) / Total Building Area.

REQUIRED PV SYSTEMS

01	02	03	04	05	06	07	08	09	10	11	12
DC System Size (kWdc)	**Exception**	**Module Type**	**Array Type**	**Power Electronics**	**CFI**	**Azimuth (deg)**	**Tilt Input**	**Array Angle (deg)**	**Tilt: (x in 12)**	**Inverter Eff. (%)**	**Annual Solar Access (%)**
8.47	NA	Standard (14-17%)	Fixed	none	true	150-270	n/a	n/a	<=7:12	96	98

REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- Indoor air quality, balanced fan
- IAQ Ventilation System: as low as 0.666667 W/CFM
- IAQ Ventilation System Heat Recovery: minimum 70 SRE and 70 ASRE
- Ceiling has high level of insulation
- Floor has high level of insulation
- Insulation above roof deck
- Insulation below roof deck
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the buildng tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry

- Indoor air quality ventilation
- Kitchen range hood
- Whole house fan airflow and fan efficacy
- Verified heat pump rated heating capacity

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft^2)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
Mann Residence	4475	1	2	5	0	2

ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft^2)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
Master Suite (Bed + Bath)	Conditioned	Master Suite (Bed + Bath)1	858	9	DHW Sys 1	New
Great Room	Conditioned	Great Room2	1131	9	DHW Sys 1	New
Pantry/Laundry/Powder	Conditioned	Pantry/Laundry/Powder 3	460	9	DHW Sys 1	New
Lower Level	Conditioned	Lower Level4	1026	9	DHW Sys 1	New
Den/Guest Bed/Bath/Office	Conditioned	Den/Guest Bed/Bath/Office5	1000	9	DHW Sys 3	New

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft^2)**	**Window and Door Area (ft2)**	**Tilt (deg)**
East Walls	Master Suite (Bed + Bath)	R33	90	Left	120.9	48	90
South Walls	Master Suite (Bed + Bath)	R33	180	Back	209.25	96	90
West Walls	Master Suite (Bed + Bath)	R33	90	Left	358.05	84	90
North Walls	Great Room	R33	0	Front	251.1	162	90
East Walls 2	Great Room	R33	90	Left	223.2	45	90
West Walls 2	Great Room	R33	270	Right	24.18	0	90
South Walls 2	Great Room	R33	180	Back	436.17	277.13	90
East Walls 3	Pantry/Laundry/Powder	R33	90	Left	258.54	69	90
West Walls 3	Pantry/Laundry/Powder	R33	270	Right	258.54	164.67	90
North Walls 2	Lower Level	Basement Wall	0	Front	566	0	90
East Walls 4	Lower Level	Basement Wall	90	Left	230	0	90
West Walls 4	Lower Level	Basement Wall	270	Right	230	0	90
South Walls 3	Lower Level	Basement Wall	180	Back	560	212	90
North Walls 3	Den/Guest Bed/Bath/Office	R33	0	Front	210.18	45	90
East Walls 5	Den/Guest Bed/Bath/Office	R33	90	Left	427.8	215.67	90
West Walls 5	Den/Guest Bed/Bath/Office	R33	270	Right	427.8	70.5	90
Adjacent Walls	Master Suite (Bed + Bath)>>Den/Guest Bed/Bath/Office	R-15 Wall	n/a	n/a	209.25	0	n/a

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft^2)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Adjacent Walls 2	Great Room>>Master Suite (Bed + Bath)	R-15 Wall	n/a	n/a	204.6	0	n/a
Adjacent Floors	Great Room>>Lower Level	R-15 Wall	n/a	n/a	1131	0	n/a
Adjacent Walls 3	Pantry/Laundry/Powder>>Great Room	R-15 Wall	n/a	n/a	186	0	n/a
Adjacent Walls 4	Pantry/Laundry/Powder>>__Garage__	R-15 Wall	n/a	n/a	144.15	0	n/a
Adjacent Walls 5	Den/Guest Bed/Bath/Office>>Master Suite (Bed + Bath)	R-15 Wall	n/a	n/a	209.25	0	n/a
Adjacent Walls 6	__Garage__>>Pantry/Laundry/Powder	R-15 Wall	n/a	n/a	144.15	0	n/a
Roof	Master Suite (Bed + Bath)	R-1	n/a	n/a	858	n/a	n/a
Roof 2	Great Room	R-2	n/a	n/a	1131	n/a	n/a
Roof 3	Pantry/Laundry/Powder	R-3	n/a	n/a	460	n/a	n/a
Roof 4	Den/Guest Bed/Bath/Office	R-1	n/a	n/a	1000	n/a	n/a
Roof 5	__Garage__	R-1	n/a	n/a	782	n/a	n/a
Raised Floor	Master Suite (Bed + Bath)	R-30 Floor Crawlspace	n/a	n/a	426	n/a	n/a
Raised Floor 2	Pantry/Laundry/Powder	R-30 Floor Crawlspace	n/a	n/a	460	n/a	n/a
Raised Floor 3	Den/Guest Bed/Bath/Office	R-30 Floor Crawlspace	n/a	n/a	1000	n/a	n/a
Adjcent Floor	Master Suite (Bed + Bath)	R-21 Wall	n/a	n/a	858	n/a	n/a
Roofing	Lower Level	R-21 Wall	n/a	n/a	426	n/a	n/a

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft^2)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Roofing 2	Lower Level	R-21 Wall	n/a	n/a	600	n/a	n/a
East Walls 6	__Garage__	R33	90	Left	208.32	15	90
West Walls 6	__Garage__	R33	270	Right	208.32	24	90
North Walls 4	__Garage__	R33	0	Front	336.66	144	90
South Walls 4	__Garage__	R33	180	Back	336.66	24	90

ATTIC

01	02	03	04	05	06	07	08
Name	**Construction**	**Type**	**Roof Rise (x in 12)**	**Roof Reflectance**	**Roof Emittance**	**Radiant Barrier**	**Cool Roof**
Attic __Garage__	Attic Garage Roof Cons	Ventilated	6	0.1	0.85	No	No
Attic Master Suite (Bed + Bath)	Attic RoofMaster Suite (Bed + Bath)	Ventilated	6	0.1	0.85	No	No
Attic Great Room	Attic RoofGreat Room	Ventilated	6	0.1	0.85	No	No
Attic Pantry/Laundry/Powder	Attic RoofPantry/Laundry/Powder	Ventilated	6	0.1	0.85	No	No
Attic Den/Guest Bed/Bath/Office	Attic RoofDen/Guest Bed/Bath/Office	Ventilated	6	0.1	0.85	No	No

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Width (ft)**	**Height (ft)**	**Mult.**	**Area (ft^2)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
W26	Window	East Walls	Left	90			1	48	0.3	NFRC	0.23	NFRC	Bug Screen
W27	Window	South Walls	Back	180			1	48	0.3	NFRC	0.23	NFRC	Bug Screen
W28	Window	South Walls	Back	180			1	48	0.3	NFRC	0.23	NFRC	Bug Screen

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	Type	Surface	Orientation	Azimuth	Width (ft)	Height (ft)	Mult.	Area (ft^2)	U-factor	U-factor Source	SHGC	SHGC Source	Exterior Shading
W29	Window	West Walls	Left	90			1	48	0.3	NFRC	0.23	NFRC	Bug Screen
W30	Window	West Walls	Left	90			1	18	0.3	NFRC	0.23	NFRC	Bug Screen
W31	Window	West Walls	Left	90			1	18	0.3	NFRC	0.23	NFRC	Bug Screen
E104	Window	North Walls	Front	0			1	66	0.3	NFRC	0.23	NFRC	Bug Screen
E105	Window	North Walls	Front	0			1	96	0.3	NFRC	0.23	NFRC	Bug Screen
W14	Window	East Walls 2	Left	90			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
W15	Window	East Walls 2	Left	90			1	30	0.3	NFRC	0.23	NFRC	Bug Screen
W16	Window	South Walls 2	Back	180			1	25	0.3	NFRC	0.23	NFRC	Bug Screen
W17	Window	South Walls 2	Back	180			1	25	0.3	NFRC	0.23	NFRC	Bug Screen
W25	Window	South Walls 2	Back	180			1	78.63	0.3	NFRC	0.23	NFRC	Bug Screen
E106	Window	South Walls 2	Back	180			1	108	0.3	NFRC	0.23	NFRC	Bug Screen
E108	Window	South Walls 2	Back	180			1	40.5	0.3	NFRC	0.23	NFRC	Bug Screen
W11	Window	East Walls 3	Left	90			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
W12	Window	East Walls 3	Left	90			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
W13	Window	East Walls 3	Left	90			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
E109	Window	East Walls 3	Left	90			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
W7	Window	West Walls 3	Right	270			1	48	0.3	NFRC	0.23	NFRC	Bug Screen
W8	Window	West Walls 3	Right	270			1	48	0.3	NFRC	0.23	NFRC	Bug Screen

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Width (ft)**	**Height (ft)**	**Mult.**	**Area (ft^2)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
W9	Window	West Walls 3	Right	270			1	68.67	0.3	NFRC	0.23	NFRC	Bug Screen
W25 2	Window	South Walls 3	Back	180			1	68	0.3	NFRC	0.23	NFRC	Bug Screen
E001	Window	South Walls 3	Back	180			1	108	0.3	NFRC	0.23	NFRC	Bug Screen
E002	Window	South Walls 3	Back	180			1	36	0.3	NFRC	0.23	NFRC	Bug Screen
W1	Window	North Walls 3	Front	0			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
W2	Window	North Walls 3	Front	0			1	30	0.3	NFRC	0.23	NFRC	Bug Screen
W3	Window	East Walls 5	Left	90			1	30	0.3	NFRC	0.23	NFRC	Bug Screen
W4	Window	East Walls 5	Left	90			1	68.67	0.3	NFRC	0.23	NFRC	Bug Screen
W5	Window	East Walls 5	Left	90			1	48	0.3	NFRC	0.23	NFRC	Bug Screen
W6	Window	East Walls 5	Left	90			1	48	0.3	NFRC	0.23	NFRC	Bug Screen
W32	Window	West Walls 5	Right	270			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
W33	Window	West Walls 5	Right	270			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
W34	Window	West Walls 5	Right	270			1	6	0.3	NFRC	0.23	NFRC	Bug Screen
W35	Window	West Walls 5	Right	270			1	4.5	0.3	NFRC	0.23	NFRC	Bug Screen
W37	Window	West Walls 5	Right	270			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
W38	Window	West Walls 5	Right	270			1	15	0.3	NFRC	0.23	NFRC	Bug Screen
W10	Window	East Walls 6	Left	90			1	15	0.3	NFRC	0.23	NFRC	Bug Screen

OPAQUE DOORS

01	02	03	04
Name	**Side of Building**	**Area (ft^2)**	**U-factor**
E103	East Walls 5	21	0.2
E102	West Walls 6	24	0.2
E111	North Walls 4	144	0.7
E110	South Walls 4	24	0.2

SLAB FLOORS

01	02	03	04	05	06	07	08
Name	**Zone**	**Area (ft^2)**	**Perimeter (ft)**	**Edge Insul. R-value and Depth**	**Edge Insul. R-value and Depth**	**Carpeted Fraction**	**Heated**
Slab-on-Grade	Great Room	600	0.1	none	0	80%	No
Slab-on-Grade 2	Lower Level	1026	0.1	none	0	80%	No
Slab-on-Grade 3	__Garage__	782	0.1	none	0	0%	No

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07	08
Construction Name	**Surface Type**	**Construction Type**	**Framing**	**Total Cavity R-value**	**Interior / Exterior Continuous R-value**	**U-factor**	**Assembly Layers**
R33	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.069	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: 3 Coat Stucco
Basement Wall	Exterior Walls	Concrete / ICF / Brick	None	n/a	/	0.056	Inside Finish: Gypsum Board Insulation/Furring: R-14 / 4 in. wd Mass Layer: 12 in. Concrete Insulation/Furring: R-4 / 1 in. wd Exterior Finish: 3 Coat Stucco

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07	08
Construction Name	**Surface Type**	**Construction Type**	**Framing**	**Total Cavity R-value**	**Interior / Exterior Continuous R-value**	**U-factor**	**Assembly Layers**
R-15 Wall	Interior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-19	None / None	0.069	Inside Finish: Gypsum Board Cavity / Frame: R-19 in 5-1/2 in. (R-18) / 2x6 Other Side Finish: Gypsum Board
Attic Garage Roof Cons	Attic Roofs	Wood Framed Ceiling	2x12 @ 24 in. O. C.	R-49	None / None	0.024	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-41.8 / 2x12 Around Roof Joists: R-7.2 insul.
Attic RoofMaster Suite (Bed + Bath)	Attic Roofs	Wood Framed Ceiling	2x12 @ 24 in. O. C.	R-49	None / None	0.024	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-41.8 / 2x12 Around Roof Joists: R-7.2 insul.
Attic RoofGreat Room	Attic Roofs	Wood Framed Ceiling	2x12 @ 24 in. O. C.	R-0	None / None	0.635	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: no insul. / 2x12
Attic RoofPantry/Laundry/Powder	Attic Roofs	Wood Framed Ceiling	2x10 @ 24 in. O. C.	R-44	None / None	0.023	Roofing: Light Roof (Asphalt Shingle) Above Deck Insulation: R-4 Sheathing Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-34.4 / 2x10 Around Roof Joists: R-9.6 insul.
Attic RoofDen/Guest Bed/Bath/Office	Attic Roofs	Wood Framed Ceiling	2x12 @ 24 in. O. C.	R-49	None / None	0.024	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-41.8 / 2x12 Around Roof Joists: R-7.2 insul.

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07	08
Construction Name	**Surface Type**	**Construction Type**	**Framing**	**Total Cavity R-value**	**Interior / Exterior Continuous R-value**	**U-factor**	**Assembly Layers**
R-30 Floor Crawlspace	Floors Over Crawlspace	Wood Framed Floor	2x10 @ 16 in. O. C.	R-30	None / None	0.034	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-30 / 2x10
R-1	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-0	None / None	0.481	Cavity / Frame: no insul. / 2x4 Inside Finish: Gypsum Board
R-2	Ceilings (below attic)	Wood Framed Ceiling	2x12 @ 16 in. O. C.	R-48	None / None	0.021	Over Ceiling Joists: R-18.7 insul. Cavity / Frame: R-29.3 / 2x12 Inside Finish: Gypsum Board
R-3	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-0	None / None	0.481	Cavity / Frame: no insul. / 2x4 Inside Finish: Gypsum Board
R-21 Wall	Interior Ceiling	Wood Framed Ceiling	2x4 @ 16 in. O. C.	R-19	None / None	0.052	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-19 in 5-1/2 in. (R-18) / 2x4 Ceiling Below Finish: Gypsum Board

BUILDING ENVELOPE - HERS VERIFICATION

01	02	03	04	05
Quality Insulation Installation (QII)	**High R-value Spray Foam Insulation**	**Building Envelope Air Leakage**	**CFM50**	**CFM50**
Not Required	Not Required	N/A	n/a	n/a

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08	09
Name	**System Type**	**Distribution Type**	**Water Heater Name**	**Number of Units**	**Solar Heating System**	**Compact Distribution**	**HERS Verification**	**Water Heater Name (#)**
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (1)
DHW Sys 3	Domestic Hot Water (DHW)	Standard	DHW Heater 3	1	n/a	None	n/a	DHW Heater 3 (1)

WATER HEATERS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	**Heating Element Type**	**Tank Type**	**# of Units**	**Tank Vol. (gal)**	**Heating Efficiency Type**	**Efficiency**	**Rated Input Type**	**Input Rating or Pilot**	**Tank Insulation R-value (Int/Ext)**	**Standby Loss or Recovery Eff**	**1st Hr. Rating or Flow Rate**	**Tank Location**
DHW Heater 3	Gas	Consumer Instantaneous	1	0	UEF	0.95	Btu/Hr	200000	0	n/a		

WATER HEATERS - NEEA HEAT PUMP

01	02	03	04	05	06	07	08
Name	**# of Units**	**Tank Vol. (gal)**	**NEEA Heat Pump Brand**	**NEEA Heat Pump Model**	**Tank Location**	**Duct Inlet Air Source**	**Duct Outlet Air Source**
DHW Heater 1	1	66	AOSmith	AOSmithHPTU66	__Garage__	__Garage__	__Garage__

WATER HEATING - HERS VERIFICATION

01	02	03	04	05	06	07
Name	**Pipe Insulation**	**Parallel Piping**	**Compact Distribution**	**Compact Distribution Type**	**Recirculation Control**	**Shower Drain Water Heat Recovery**
DHW Sys 1 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required

WATER HEATING - HERS VERIFICATION

01	02	03	04	05	06	07
Name	**Pipe Insulation**	**Parallel Piping**	**Compact Distribution**	**Compact Distribution Type**	**Recirculation Control**	**Shower Drain Water Heat Recovery**
DHW Sys 3 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required

SPACE CONDITIONING SYSTEMS

01	02	03	04	05	06	07	08	09
Name	**System Type**	**Heating Unit Name**	**Heating Equipment Count**	**Cooling Unit Name**	**Cooling Equipment Count**	**Fan Name**	**Distribution Name**	**Required Thermostat Type**
Master Suite (Bed + Bath)1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	n/a	n/a	Setback
Great Room2	Heat pump heating cooling	Heat Pump System 2	1	Heat Pump System 2	1	n/a	n/a	Setback
Pantry/Laundry/Powder3	Heat pump heating cooling	Heat Pump System 3	1	Heat Pump System 3	1	n/a	n/a	Setback
Lower Level4	Heat pump heating cooling	Heat Pump System 4	1	Heat Pump System 4	1	n/a	n/a	Setback
Den/Guest Bed/Bath/Office5	Heat pump heating cooling	Heat Pump System 5	1	Heat Pump System 5	1	n/a	n/a	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	**System Type**	**Number of Units**	**Heating**				**Cooling**			**Zonally Controlled**	**Compressor Type**	**HERS Verification**
			Efficiency Type	**HSPF / HSPF2 / COP**	**Cap 47**	**Cap 17**	**Efficiency Type**	**SEER / SEER2**	**EER / EER / CEER**			
Heat Pump System 1	Ductless MiniSplit HP	1	HSPF	10	22000	12500	EERSEER	20	12.7	Not Zonal	Single Speed	Heat Pump System 1-hers-htpump

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating				Cooling			Zonally Controlled	Compressor Type	HERS Verification
			Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / EER / CEER			
Heat Pump System 2	Ductless MiniSplit HP	1	HSPF	10	22000	12500	EERSEER	20	12.7	Not Zonal	Single Speed	Heat Pump System 2-hers-htpump
Heat Pump System 3	Ductless MiniSplit HP	1	HSPF	12.5	12000	10000	EERSEER	26.1	13.8	Not Zonal	Single Speed	Heat Pump System 3-hers-htpump
Heat Pump System 4	Ductless MiniSplit HP	1	HSPF	9.8	25000	19600	EERSEER	20	13.6	Not Zonal	Single Speed	Heat Pump System 4-hers-htpump
Heat Pump System 5	Ductless MiniSplit HP	1	HSPF	10	22000	12500	EERSEER	20	12.7	Not Zonal	Single Speed	Heat Pump System 5-hers-htpump

HVAC HEAT PUMPS - HERS VERIFICATION

01	02	03	04	05	06	07	08	09
Name	Verified Airflow	Airflow Target	Verified EER/EER2	Verified SEER/SEER2	Verified Refrigerant Charge	Verified HSPF/HSPF2	Verified Heating Cap 47	Verified Heating Cap 17
Heat Pump System 1-hers-htpump	Not Required	0	Not Required	Not Required	No	No	Yes	Yes
Heat Pump System 2-hers-htpump	Not Required	0	Not Required	Not Required	No	No	Yes	Yes
Heat Pump System 3-hers-htpump	Not Required	0	Not Required	Not Required	No	No	Yes	Yes
Heat Pump System 4-hers-htpump	Not Required	0	Not Required	Not Required	No	No	Yes	Yes
Heat Pump System 5-hers-htpump	Not Required	0	Not Required	Not Required	No	No	Yes	Yes

INDOOR AIR QUALITY (IAQ) FANS								
01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**
Dwelling Unit	**Airflow (CFM)**	**Fan Efficacy (W/CFM)**	**IAQ Fan Type**	**Includes Heat/Energy Recovery?**	**IAQ Recovery Effectiveness - SRE**	**Includes Fault Indicator Display?**	**HERS Verification**	**Status**
SFam IAQVentRpt 1-1	120	0.666667	Balanced	Yes	70	No	Yes	
SFam IAQVentRpt 2-1	120	0.666667	Balanced	Yes	70	No	Yes	
SFam IAQVentRpt 3-1	120	0.666667	Balanced	Yes	70	No	Yes	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name: Mohamad Nohayli	Documentation Author Signature:
Company: InnoDez, Inc.	Signature Date: 1/12/2023
Address:	CEA/ HERS Certification Identification (If applicable):
City/State/Zip: ,	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California: 1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance. 2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations. 3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.	
Responsible Designer Name: Mohamad Nohayli	Responsible Designer Signature:
Company: Innodez	Date Signed:
Address: Foxbrough pl	License:
City/State/Zip: Pleasanton, CA 94556	Phone: 4244140997

RESIDENTIAL MEASURES SUMMARY — RMS-1

Project Name	Building Type	Date
Mann Residence	☑ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration	*1/12/2023*

Project Address	California Energy Climate Zone	Total Cond. Floor Area	Addition	# of Units
415 Monte Vista CT Napa	*CA Climate Zone 02*	*5,257*	*n/a*	*1*

INSULATION

Construction	Type	Cavity	Area (ft^2)	Special Features	Status
Wall	*Wood Framed*	*R 21*	*2,812*		*New*
Demising	*Wood Framed*	*R 19*	*2,228*		*New*
Demising	*Wood Framed Rafter*	*R 19*	*1,884*		*New*
Roof	*Wood Framed Attic*	*R 38*	*2,640*	*Add=R-49.0*	*New*
Floor	*Wood Framed w/Crawl Space*	*R 30*	*1,886*		*New*
Roof	*Wood Framed Attic*	*R 38*	*1,131*		*New*
Slab	*Unheated Slab-on-Grade*	*- no insulation*	*2,408*	*Perim = 0'*	*New*
Roof	*Wood Framed Attic*	*R 38*	*460*	*Add=R-48.0*	*New*

FENESTRATION

Total Area: *1,483* | Glazing Percentage: *28.2%* | New/Altered Average U-Factor: *0.30*

Orientation	Area(ft^2)	U-Fac	SHGC	Overhang	Sidefins	Exterior Shades	Status
Left (E)	*455.7*	*0.300*	*0.23*	*none*	*none*	*N/A*	*New*
Rear (S)	*585.1*	*0.300*	*0.23*	*none*	*none*	*N/A*	*New*
Front (N)	*207.0*	*0.300*	*0.23*	*none*	*none*	*N/A*	*New*
Right (W)	*235.2*	*0.300*	*0.23*	*none*	*none*	*N/A*	*New*

HVAC SYSTEMS

Qty.	Heating	Min. Eff	Cooling	Min. Eff	Thermostat	Status
1	*Electric Heat Pump*	*10.00 HSPF*	*Split Heat Pump*	*20.0 SEER*	*Setback*	*New*
1	*Electric Heat Pump*	*10.00 HSPF*	*Split Heat Pump*	*20.0 SEER*	*Setback*	*New*
1	*Electric Heat Pump*	*12.50 HSPF*	*Split Heat Pump*	*26.1 SEER*	*Setback*	*New*

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Status
Master Suite (Bed + Bath)	*Ductless / with Fan*	*Ductless*	*n/a*	*n/a*	*New*
Great Room	*Ductless / with Fan*	*Ductless*	*n/a*	*n/a*	*New*
Pantry/Laundry/Powder	*Ductless / with Fan*	*Ductless*	*n/a*	*n/a*	*New*

WATER HEATING

Qty.	Type	Gallons	Min. Eff	Distribution	Status
1	*Heat Pump*	*66*	*3.10*	*Standard*	*New*
1	*Small Instantaneous Gas*	*1*	*0.95*	*Standard*	*New*

RESIDENTIAL MEASURES SUMMARY — RMS-1

Project Name	Building Type	Date
Mann Residence	☑ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration	*1/12/2023*

Project Address	California Energy Climate Zone	Total Cond. Floor Area	Addition	# of Units
415 Monte Vista CT Napa	*CA Climate Zone 02*	*5,257*	*n/a*	*1*

INSULATION

Construction	Type	Cavity	Area (ft^2)	Special Features	Status
Door	*Opaque Door*	*R-5*	*69*		*New*
Door	*Opaque Door*	*- no insulation*	*144*		*New*
Wall	*Solid Unit Masonry*	*- no insulation*	*1,374*	*Add=R-18.0*	*New*

FENESTRATION

Total Area: *1,483* | Glazing Percentage: *28.2%* | New/Altered Average U-Factor: *0.30*

Orientation	Area(ft^2)	U-Fac	SHGC	Overhang	Sidefins	Exterior Shades	Status

HVAC SYSTEMS

Qty.	Heating	Min. Eff	Cooling	Min. Eff	Thermostat	Status
1	*Electric Heat Pump*	*9.80 HSPF*	*Split Heat Pump*	*20.0 SEER*	*Setback*	*New*
1	*Electric Heat Pump*	*10.00 HSPF*	*Split Heat Pump*	*20.0 SEER*	*Setback*	*New*

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Status
Lower Level	*Ductless / with Fan*	*Ductless*	*n/a*	*n/a*	*New*
Den/Guest Bed/Bath/Office	*Ductless / with Fan*	*Ductless*	*n/a*	*n/a*	*New*

WATER HEATING

Qty.	Type	Gallons	Min. Eff	Distribution	Status

2022 Single-Family Residential Mandatory Requirements Summary

NOTE: Single-family residential buildings subject to the Energy Codes must comply with all applicable mandatory measures, regardless of the compliance approach used. Review the respective section for more information.
(04/2022)

Building Envelope:

§ 110.6(a)1:	**Air Leakage.** Manufactured fenestration, exterior doors, and exterior pet doors must limit air leakage to 0.3 CFM per square foot or less when tested per NFRC-400, ASTM E283, or AAMA/WDMA/CSA 101/I.S.2/A440-2011. *
§ 110.6(a)5:	**Labeling.** Fenestration products and exterior doors must have a label meeting the requirements of § 10-111(a).
§ 110.6(b):	**Field fabricated exterior doors and fenestration** products must use U-factors and solar heat gain coefficient (SHGC) values from Tables 110.6-A, 110.6-B, or JA4.5 for exterior doors. They must be caulked and/or weather-stripped. *
§ 110.7:	**Air Leakage.** All joints, penetrations, and other openings in the building envelope that are potential sources of air leakage must be caulked, gasketed, or weather stripped.
§ 110.8(a):	**Insulation Certification by Manufacturers.** Insulation must be certified by the Department of Consumer Affairs, Bureau of Household Goods and Services (BHGS).
§ 110.8(g):	**Insulation Requirements for Heated Slab Floors.** Heated slab floors must be insulated per the requirements of § 110.8(g).
§ 110.8(i):	**Roofing Products Solar Reflectance and Thermal Emittance.** The thermal emittance and aged solar reflectance values of the roofing material must meet the requirements of § 110.8(i) and be labeled per §10-113 when the installation of a cool roof is specified on the CF1R.
§ 110.8(j):	**Radiant Barrier.** When required, radiant barriers must have an emittance of 0.05 or less and be certified to the Department of Consumer Affairs.
§ 150.0(a):	**Roof Deck, Ceiling and Rafter Roof Insulation.** Roof decks in newly constructed attics in climate zones 4 and 8-16 area-weighted average U-factor not exceeding U-0.184. Ceiling and rafter roofs minimum R-22 insulation in wood-frame ceiling; or area-weighted average U-factor must not exceed 0.043. Rafter roof alterations minimum R-19 or area-weighted average U-factor of 0.054 or less. Attic access doors must have permanently attached insulation using adhesive or mechanical fasteners. The attic access must be gasketed to prevent air leakage. Insulation must be installed in direct contact with a roof or ceiling which is sealed to limit infiltration and exfiltration as specified in § 110.7, including but not limited to placing insulation either above or below the roof deck or on top of a drywall ceiling. *
§ 150.0(b):	**Loose-fill Insulation.** Loose fill insulation must meet the manufacturer's required density for the labeled R-value.
§ 150.0(c):	**Wall Insulation.** Minimum R-13 insulation in 2x4 inch wood framing wall or have a U-factor of 0.102 or less, or R-20 in 2x6 inch wood framing or have a U-factor of 0.071 or less. Opaque non-framed assemblies must have an overall assembly U-factor not exceeding 0.102. Masonry walls must meet Tables 150.1-A or B. *
§ 150.0(d):	**Raised-floor Insulation.** Minimum R-19 insulation in raised wood framed floor or 0.037 maximum U-factor. *
§ 150.0(f):	**Slab Edge Insulation.** Slab edge insulation must meet all of the following: have a water absorption rate, for the insulation material alone without facings, no greater than 0.3 percent; have a water vapor permeance no greater than 2.0 perm per inch; be protected from physical damage and UV light deterioration; and, when installed as part of a heated slab floor, meet the requirements of § 110.8(g).
§ 150.0(g)1:	**Vapor Retarder.** In climate zones 1 through 16, the earth floor of unvented crawl space must be covered with a Class I or Class II vapor retarder. This requirement also applies to controlled ventilation crawl space for buildings complying with the exception to §150.0(d).
§ 150.0(g)2:	**Vapor Retarder.** In climate zones 14 and 16, a Class I or Class II vapor retarder must be installed on the conditioned space side of all insulation in all exterior walls, vented attics, and unvented attics with air-permeable insulation.
§ 150.0(q):	**Fenestration Products.** Fenestration, including skylights, separating conditioned space from unconditioned space or outdoors must have a maximum U-factor of 0.45; or area-weighted average U-factor of all fenestration must not exceed 0.45. *

Fireplaces, Decorative Gas Appliances, and Gas Log:

§ 110.5(e)	**Pilot Light.** Continuously burning pilot lights are not allowed for indoor and outdoor fireplaces.
§ 150.0(e)1:	**Closable Doors.** Masonry or factory-built fireplaces must have a closable metal or glass door covering the entire opening of the firebox.
§ 150.0(e)2:	**Combustion Intake.** Masonry or factory-built fireplaces must have a combustion outside air intake, which is at least six square inches in area and is equipped with a readily accessible, operable, and tight-fitting damper or combustion-air control device. *
§ 150.0(e)3:	**Flue Damper.** Masonry or factory-built fireplaces must have a flue damper with a readily accessible control. *

Space Conditioning, Water Heating, and Plumbing System:

§ 110.0-§ 110.3:	**Certification.** Heating, ventilation, and air conditioning (HVAC) equipment, water heaters, showerheads, faucets, and all other regulated appliances must be certified by the manufacturer to the California Energy Commission. *
§ 110.2(a):	**HVAC Efficiency.** Equipment must meet the applicable efficiency requirements in Table 110.2-A through Table 110.2-N. *
§ 110.2(b):	**Controls for Heat Pumps with Supplementary Electric Resistance Heaters.** Heat pumps with supplementary electric resistance heaters must have controls that prevent supplementary heater operation when the heating load can be met by the heat pump alone; and in which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating. *
§ 110.2(c):	**Thermostats.** All heating or cooling systems not controlled by a central energy management control system (EMCS) must have a setback thermostat. *
§ 110.3(c)3:	**Insulation.** Unfired service water heater storage tanks and solar water-heating backup tanks must have adequate insulation, or tank surface heat loss rating.
§ 110.3(c)6:	**Isolation Valves.** Instantaneous water heaters with an input rating greater than 6.8 kBtu per hour (2 kW) must have isolation valves with hose bibbs or other fittings on both cold and hot water lines to allow for flushing the water heater when the valves are closed.

§ 110.5:	**Pilot Lights.** Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour); and pool and spa heaters. *
§ 150.0(h)1:	**Building Cooling and Heating Loads.** Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0(h)2.
§ 150.0(h)3A:	**Clearances.** Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.
§ 150.0(h)3B:	**Liquid Line Drier.** Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.
§ 150.0(j)1:	**Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.** All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code. *
§ 150.0(j)2:	**Insulation Protection.** Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment` maintenance, and wind as required by §120.3(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.
§ 150.0(n)1:	**Gas or Propane Water Heating Systems.** Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5' x 2.5' x 7' suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2" higher than the base of the water heater
§ 150.0(n)3:	**Solar Water-heating Systems.** Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&T), or by a listing agency that is approved by the executive director.

Ducts and Fans:

§ 110.8(d)3:	**Ducts.** Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.
§ 150.0(m)1:	**CMC Compliance.** All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than ¼", If mastic or tape is used. Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *
§ 150.0(m)2:	**Factory-Fabricated Duct Systems.** Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.
§ 150.0(m)3:	**Field-Fabricated Duct Systems.** Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.
§ 150.0(m)7:	**Backdraft Damper.** Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.
§ 150.0(m)8:	**Gravity Ventilation Dampers.** Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.
§ 150.0(m)9:	**Protection of Insulation.** Insulation must be protected from damage due tosunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.
§ 150.0(m)10:	**Porous Inner Core Flex Duct.** Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.
§ 150.0(m)11:	**Duct System Sealing and Leakage Test.** When space conditioning systems use forced air duct systems to supply conditioned air to an occupiable space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.
§ 150.0(m)12:	**Air Filtration.** Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *

§ 150.0(m)13:	**Space Conditioning System Airflow Rate and Fan Efficacy.** Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≤ 0.45 watts per CFM for gas furnace air handlers and ≤ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≤ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *

Ventilation and Indoor Air Quality:

§ 150.0(o)1:	**Requirements for Ventilation and Indoor Air Quality**. All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0(o)1. *
§ 150.0(o)1B:	**Central Fan Integrated (CFI) Ventilation Systems.** Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed andcontrolled per §150.0(o)1Biii&iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0(o)1C.
§ 150.0(o)1C:	**Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses .** Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floors with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0(o)1Ci-iii.
§ 150.0(o)1G:	**Local Mechanical Exhaust.** Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0(o)1Giii,enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0(o)1Giii-iv. Airflow must be measured by the installer per §150.0(o)1Gv, and rated for sound per §150.0(o)1Gvi. *
§ 150.0(o)1H&I:	**Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.** The airflow required per § 150.0(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0(o)1C.
§ 150.0(o)2:	**Field Verification and Diagnostic Testing.** Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0(o)1G

Pool and Spa Systems and Equipment:

§ 110.4(a):	**Certification by Manufacturers.** Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDbS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *
§ 110.4(b)1:	**Piping.** Any pool or spa heating system or equipment must be installed with at least 36 inches of pipe between the filter and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.
§ 110.4(b)2:	**Covers.** Outdoor pools or spas that have a heat pump or gas heater must have a cover.
§ 110.4(b)3:	**Directional Inlets and Time Switches for Pools.** Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.
§ 110.5:	**Pilot Light.** Natural gas pool and spa heaters must not have a continuously burning pilot light.
§ 150.0(p):	**Pool Systems and Equipment Installation.** Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *

Lighting:

§ 110.9:	**Lighting Controls and Components.** All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *
§ 150.0(k)1A:	**Luminaire Efficacy.** All installed luminaires must meet the requirements in Table 150.0-A, except lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.
§ 150.0(k)1B:	**Screw based luminaires.** Screw based luminaires must contain lamps that comply with Reference Joint Appendix JA8. *
§ 150.0(k)1C:	**Recessed Downlight Luminaires in Ceilings.** Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.
§ 150.0(k)1D:	**Light Sources in Enclosed or Recessed Luminaires.** Lamps and other separable light sources that are not compliant with the JA8 elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.
§ 150.0(k)1E:	**Blank Electrical Boxes.** The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.
§ 150.0(k)1F:	**Lighting Integral to Exhaust Fans.** Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0(k). *

§ 150.0(k)1G:	**Screw based luminaires.** Screw based luminaires must contain lamps that comply with Reference Joint Appendix JA8. *
§ 150.0(k)1H:	**Light Sources in Enclosed or Recessed Luminaires.** Lamps and other separable light sources that are not compliant with the JA8 elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.
§ 150.0(k)1I:	**Light Sources in Drawers, Cabinets, and Linen Closets.** Light sources internal to drawers, cabinetry or linen closets are not required to comply with Table 150.0-A or be controlled by vacancy sensors provided that they are rated to consume no more than 5 watts of power, emit no more than 150 lumens, and are equipped with controls that automatically turn the lighting off when the drawer, cabinet or linen closet is closed.
§ 150.0(k)2A:	**Interior Switches and Controls.** All forward phase cut dimmers used with LED light sources must comply with NEMA SSL 7A.
§ 150.0(k)2B:	**Interior Switches and Controls.** Exhaust fans must be controlled separately from lighting systems. *
§ 150.0(k)2A:	**Accessible Controls.** Lighting must have readily accessible wall-mounted controls that allow the lighting to be manually turned on and off. *
§ 150.0(k)2B:	**Multiple Controls.** Controls must not bypass a dimmer, occupant sensor, or vacancy sensor function if the dimmer or sensor is installed to comply with § 150.0(k).
§ 150.0(k)2C:	**Mandatory Requirements.** Lighting controls must comply with the applicable requirements of § 110.9.
§ 150.0(k)2D:	**Energy Management Control Systems.** An energy management control system (EMCS) may be used to comply with dimming, occupancy, and control requirements if it provides the functionality of the specified control per § 110.9 and the physical controls specified in § 150.0(k)2A.
§ 150.0(k)2E:	**Automatic Shutoff Controls.** In bathrooms, garages, laundry rooms, utility rooms and walk-in closets, at least one installed luminaire must be controlled by an occupancy or vacancy sensor providing automatic-off functionality. Lighting inside drawers and cabinets with opaque fronts or doors must have controls that turn the light off when the drawer or door is closed.
§ 150.0(k)2F:	**Dimmers.** Lighting in habitable spaces (e.g., living rooms, dining rooms, kitchens, and bedrooms) must have readily accessible wall-mounted dimming controls that allow the lighting to be manually adjusted up and down. Forward phase cut dimmers controlling LED light sources in these spaces must comply with NEMA SSL 7A.
§ 150.0(k)2K:	**Independent controls.** Integrated lighting of exhaust fans shall be controlled independently from the fans. Lighting under cabinets or shelves, lighting in display cabinets, and switched outlets must be controlled separately from ceiling-installed lighting.
§ 150.0(k)3A:	**Residential Outdoor Lighting.** For single-family residential buildings, outdoor lighting permanently mounted to a residential building, or to other buildings on the same lot, must have a manual on/off switch and either a photocell and motion sensor or automatic time switch control) or an astronomical time clock. An energy management control system that provides the specified control functionality and meets all applicable requirements may be used to meet these requirements.
§ 150.0(k)4:	**Internally illuminated address signs.** Internally illuminated address signs must either comply with § 140.8 or consume no more than 5 watts of power.
§ 150.0(k)5:	**Residential Garages for Eight or More Vehicles.** Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages in §§ 110.9, 130.0, 130.1, 130.4, 140.6, and 141.0.

Solar Readiness:

§ 110.10(a)1:	**Single-family Residences.** Single-family residences located in subdivisions with 10 or more single-family residences and where the application for a tentative subdivision map for the residences has been deemed complete and approved by the enforcement agency, which do not have a photovoltaic system installed, must comply with the requirements of § 110.10(b)-(e).
§110.10(b)1A:	**Minimum Solar Zone Area.** The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. *
§ 110.10(b)2:	**Azimuth.** All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.
§ 110.10(b)3A:	**Shading.** The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment. *
§ 110.10(b)3B:	**Shading.** Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *
§ 110.10(b)4:	**Structural Design Loads on Construction Documents.** For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.
§ 110.10(c):	**Interconnection Pathways.** The construction documents must indicate: a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.
§ 110.10(d):	**Documentation.** A copy of the construction documents or a comparable document indicating the information from § 110.10(b)-(c) must be provided to the occupant.
§ 110.10(e)1:	**Main Electrical Service Panel.** The main electrical service panel must have a minimum busbar rating of 200 amps.
§ 110.10(e)2:	**Main Electrical Service Panel.** The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."

Electric and Energy Storage Ready:

2022 Single-Family Residential Mandatory Requirements Summary

§ 150.0(s)	**Energy Storage System (ESS) Ready.** All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS supplied branch circuits, *or* a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.
§ 150.0(t)	**Heat Pump Space Heater Ready.** Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."
§ 150.0(u)	**Electric Cooktop Ready.** Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."
§ 150.0(v)	**Electric Clothes Dryer Ready.** Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."

*Exceptions may apply.

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
Mann Residence	1/12/2023
System Name	**Floor Area**
Master Suite (Bed + Bath)	858

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	22,000
Total Output (Btuh)	22,000
Output (Btuh/sqft)	25.6
Cooling System	
Output per System	18,000
Total Output (Btuh)	18,000
Total Output (Tons)	1.5
Total Output (Btuh/sqft)	21.0
Total Output (sqft/Ton)	572.0
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0%
Outside Air (cfm/sqft)	0.00
Note: values above given at ARI conditions	

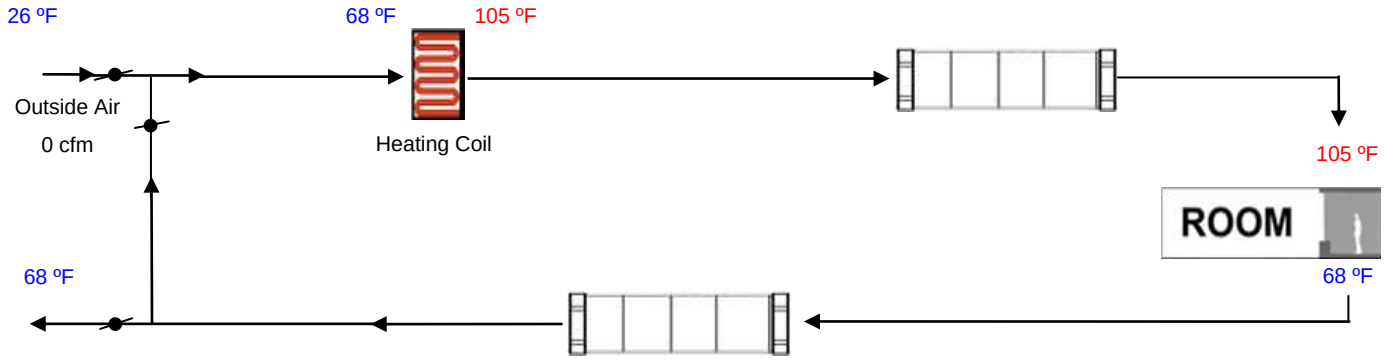
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	**Sensible**	**Latent**	**CFM**	**Sensible**
Total Room Loads	567	12,218	331	195	7,782
Return Vented Lighting		0			
Return Air Ducts		0			0
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		0			0
TOTAL SYSTEM LOAD		12,218	331		7,782

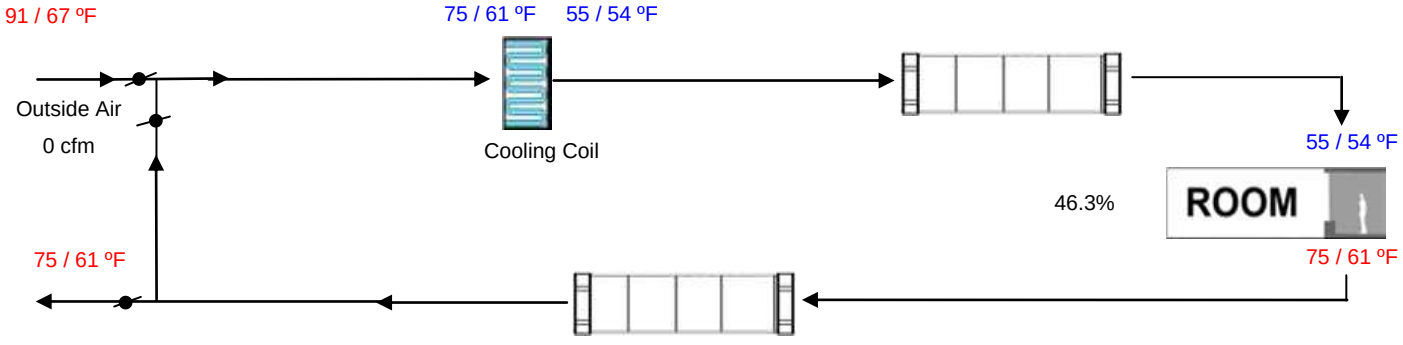
HVAC EQUIPMENT SELECTION

MXZ-2C20NA2	16,782	0		13,741
Total Adjusted System Output (Adjusted for Peak Design conditions)	16,782	0		13,741
TIME OF SYSTEM PEAK	Aug 3 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
Mann Residence	1/12/2023
System Name	**Floor Area**
Great Room	1,131

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	22,000
Total Output (Btuh)	22,000
Output (Btuh/sqft)	19.5
Cooling System	
Output per System	18,000
Total Output (Btuh)	18,000
Total Output (Tons)	1.5
Total Output (Btuh/sqft)	15.9
Total Output (sqft/Ton)	754.0
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0%
Outside Air (cfm/sqft)	0.00
Note: values above given at ARI conditions	

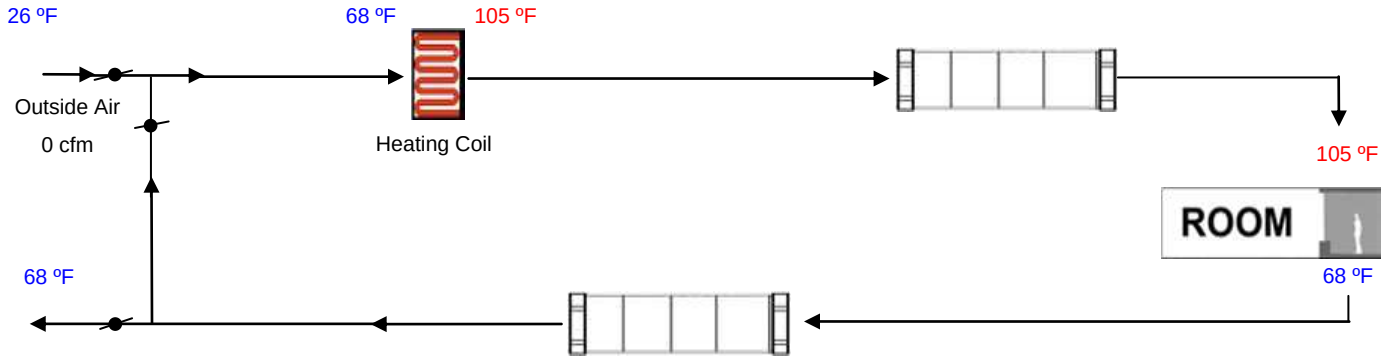
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	**Sensible**	**Latent**	**CFM**	**Sensible**
Total Room Loads	544	11,725	437	283	11,297
Return Vented Lighting		0			
Return Air Ducts		0			0
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		0			0
TOTAL SYSTEM LOAD		11,725	437		11,297

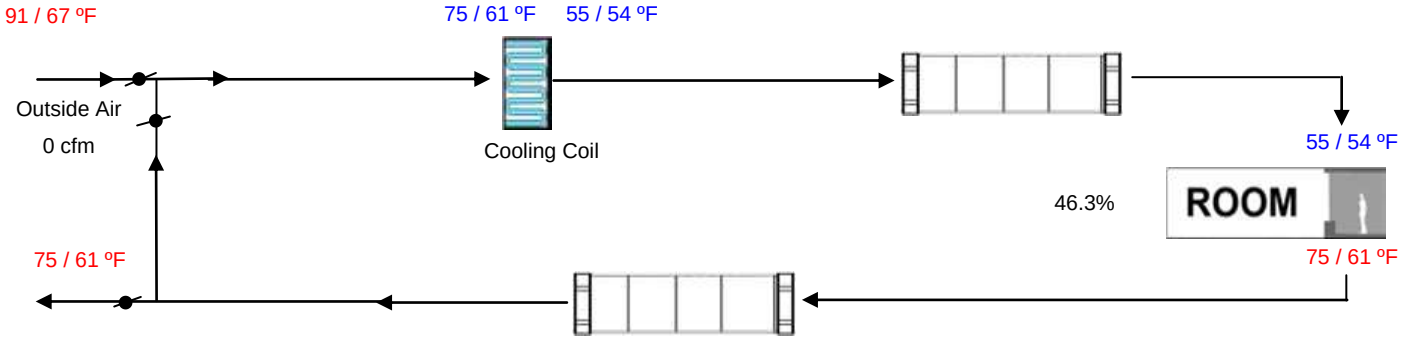
HVAC EQUIPMENT SELECTION

MXZ-2C20NA2	16,782	0		13,741
Total Adjusted System Output (Adjusted for Peak Design conditions)	16,782	0		13,741
TIME OF SYSTEM PEAK	Aug 3 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
Mann Residence	1/12/2023
System Name	**Floor Area**
Pantry/Laundry/Powder	460

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	12,000
Total Output (Btuh)	12,000
Output (Btuh/sqft)	26.1
Cooling System	
Output per System	12,000
Total Output (Btuh)	12,000
Total Output (Tons)	1.0
Total Output (Btuh/sqft)	26.1
Total Output (sqft/Ton)	460.0
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0%
Outside Air (cfm/sqft)	0.11
Note: values above given at ARI conditions	

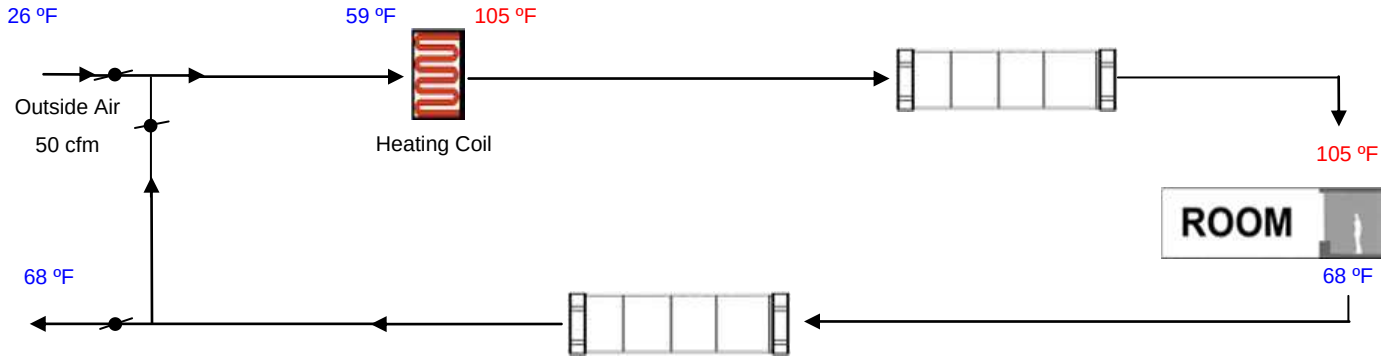
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	**Sensible**	**Latent**	**CFM**	**Sensible**
Total Room Loads	376	8,104	178	151	6,017
Return Vented Lighting		0			
Return Air Ducts		0			0
Return Fan		0			0
Ventilation	50	862	5	50	2,263
Supply Fan		0			0
Supply Air Ducts		0			0
TOTAL SYSTEM LOAD		8,966	182		8,280

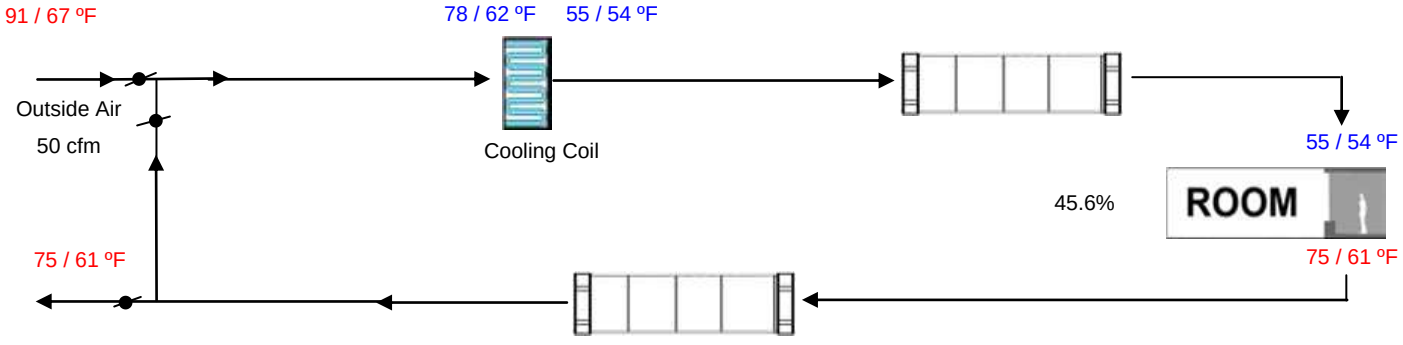
HVAC EQUIPMENT SELECTION

MUZ-FS12NA	11,352	0		7,495
Total Adjusted System Output (Adjusted for Peak Design conditions)	11,352	0		7,495
TIME OF SYSTEM PEAK	Aug 3 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
Mann Residence	1/12/2023
System Name	**Floor Area**
Lower Level	1,026

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	25,000
Total Output (Btuh)	25,000
Output (Btuh/sqft)	24.4
Cooling System	
Output per System	22,000
Total Output (Btuh)	22,000
Total Output (Tons)	1.8
Total Output (Btuh/sqft)	21.4
Total Output (sqft/Ton)	559.6
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0%
Outside Air (cfm/sqft)	0.15
Note: values above given at ARI conditions	

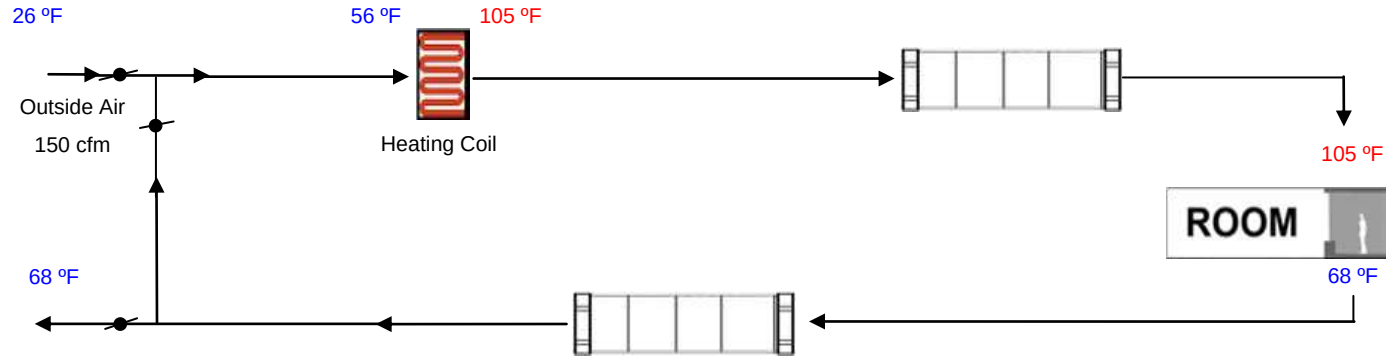
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	**Sensible**	**Latent**	**CFM**	**Sensible**
Total Room Loads	598	12,885	396	1,022	40,757
Return Vented Lighting		0			
Return Air Ducts		0			0
Return Fan		0			0
Ventilation	150	2,586	44	150	6,789
Supply Fan		0			0
Supply Air Ducts		0			0
TOTAL SYSTEM LOAD		15,472	440		47,546

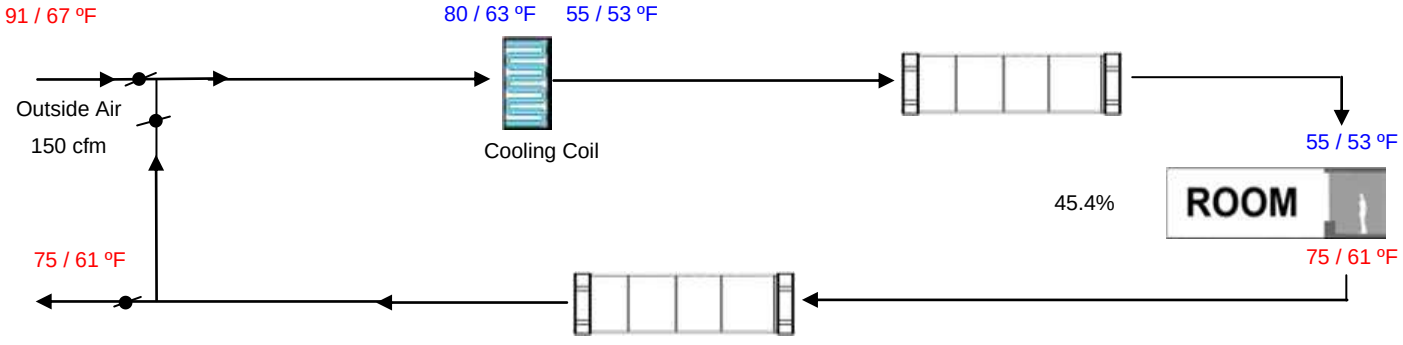
HVAC EQUIPMENT SELECTION

MXZ-3C24NA2	17,007	3,916		15,614
Total Adjusted System Output (Adjusted for Peak Design conditions)	17,007	3,916		15,614
TIME OF SYSTEM PEAK		Aug 3 PM		Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
Mann Residence	1/12/2023
System Name	**Floor Area**
Den/Guest Bed/Bath/Office	1,000

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	22,000
Total Output (Btuh)	22,000
Output (Btuh/sqft)	22.0
Cooling System	
Output per System	18,000
Total Output (Btuh)	18,000
Total Output (Tons)	1.5
Total Output (Btuh/sqft)	18.0
Total Output (sqft/Ton)	666.7
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0%
Outside Air (cfm/sqft)	0.00

Note: values above given at ARI conditions

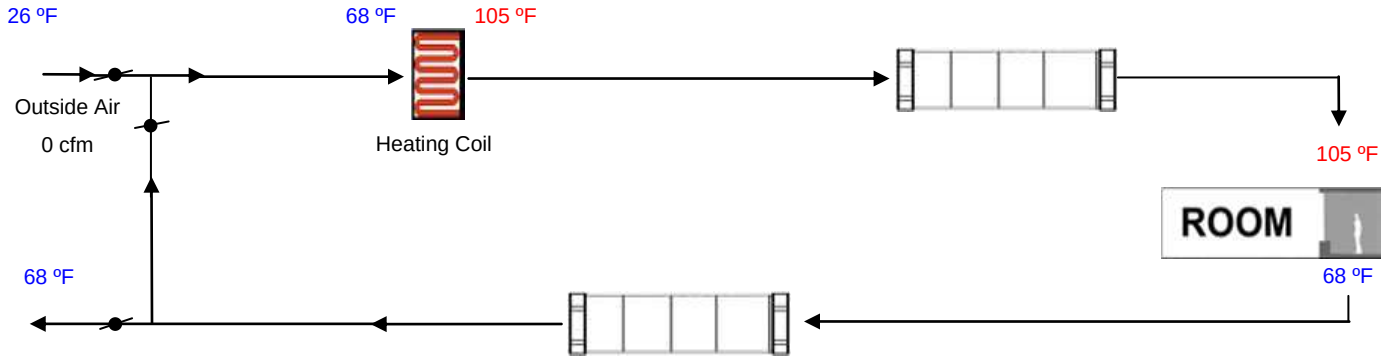
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	**Sensible**	**Latent**	**CFM**	**Sensible**
Total Room Loads	565	12,187	386	279	11,126
Return Vented Lighting		0			
Return Air Ducts		0			0
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		0			0
TOTAL SYSTEM LOAD		12,187	386		11,126

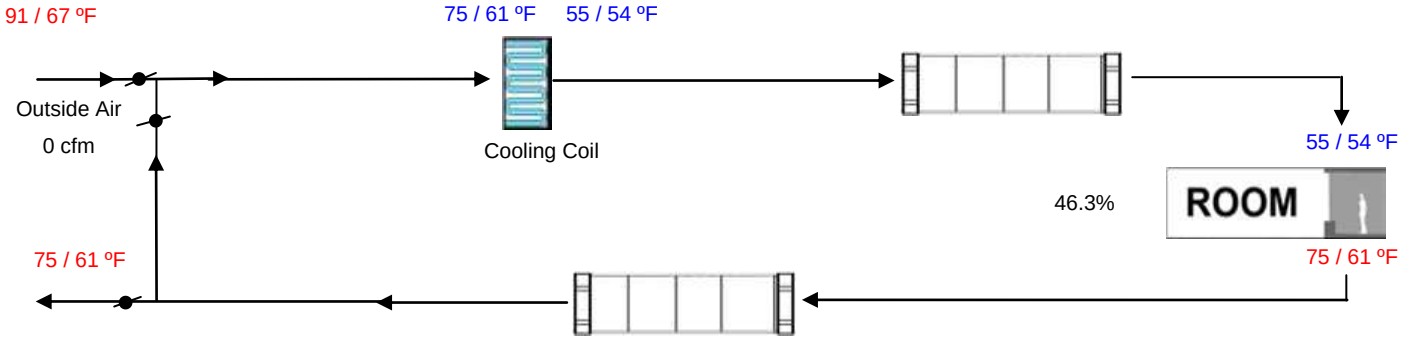
HVAC EQUIPMENT SELECTION

MXZ-2C20NA2	16,782	0		13,741
Total Adjusted System Output (Adjusted for Peak Design conditions)	16,782	0		13,741
TIME OF SYSTEM PEAK	Aug 3 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



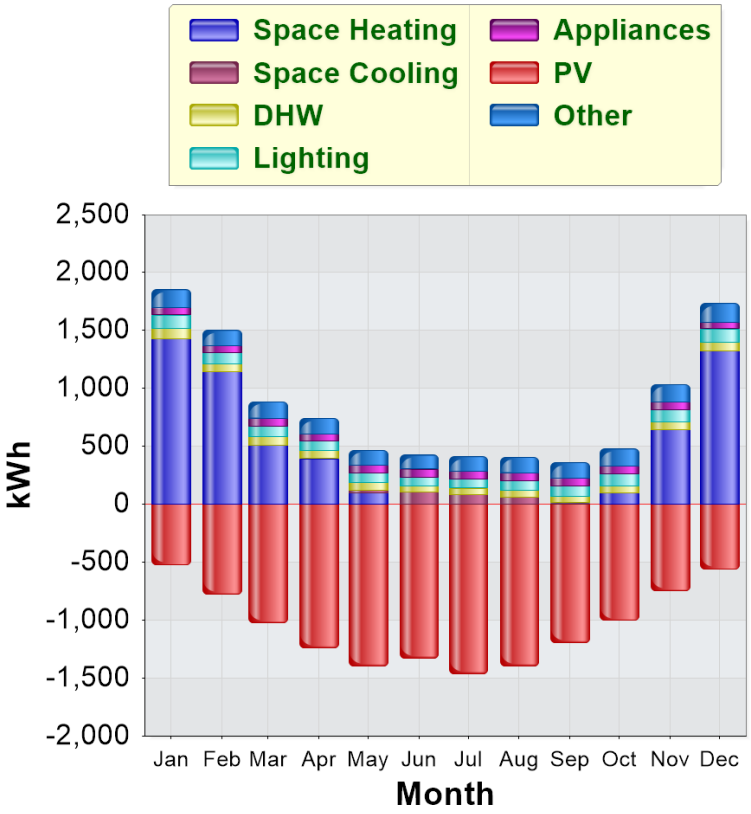
Energy Use Summary

415 Monte Vista CT
Napa, CA 94559

The tables and graphs below summarize the major energy uses in the home for both electricity and fossil fuels. Ancillary uses include swimming pools and spas.

ELECTRICITY

End Use	kWh/yr
Space Heating	*5,683*
Space Cooling	*277*
Fans	*2,313*
Pumps	*0*
Domestic Hot Water	*798*
Indoor Lighting	*882*
Outdoor Lighting	*229*
Plug Loads	*1,681*
Appliances/Ancillary	*780*
Renewables	*-12,643*
TOTAL	***0***



FOSSIL FUEL

End Use	Therms/yr
Space Heating	*0*
Domestic Hot Water	*35*
Appliances	*13*
Ancillary	*0*
TOTAL	***47***