Electrical Support Documents

Table of Contents

Children's Museum of the Magic Valley

Non-Dwelling Feeder/Service Load Calculation

	Volts:	480	Phase:	3	Area (SqFt):	18,538	Occupancy:	Museum	Date:	8/27/2024	
	DESCRIPTION										**LOAD (VA)**
1	Lighting Load for Non-Dwelling Units - General. 2023 NEC 220.42(A) *A unit load of not less than that specified in Table 220.42(A) for non-dwelling unit occupancies and the floor area determined in 220.5(C) shall be used to calculate the minimum lighitng load. Motors rated less than 1/8 HP and connected to a lighting circuit shall be considered general lighting load.*								**Sq Ft** 18,538	**220.42(A) (VA)** 1.6	29660.8
2	Lighting Energy Code. 2023 NEC 220.42 (B) *Where the building is designed to comply with a local energy code, the lighting shall be permitted to be calculated using the unit values specified in the energy code where the following conditions are met:* *(1) A power monitoring system is installed that will provide continuous information regarding the total general lighting load for the building.* *(2) The power monitoring system will alarm and alert the building personnel if the lighting load exceeds the energy code.* *(3) The demand factors specified in 220.45 are not applied to the general lighting load.*										
3	Office Buildings. 2023 NEC 220.43 *In office buildings, the receptacle loads shall be calculated to be the larger of the following:* *(1) The calculated load from 220.14(I) after Table 220.47 demand factors have been applied. (Actual receptacle load with first 10kVA taken at 100% and remainder taken at 50%.* *(2) 1 volt-ampere/sqft.* NOTE: This item shall also apply for Item 8 below, 220.47								**Sq Ft** 18,538	**Load (VA)** 0	**W/ 220.47** 18,538
4	Hotel and Motel Occupancies. 2023 NEC 220.44 *In guest rooms or suites of hotels and motels, the following lighting and receptacle outlets are included in the minimum unit load in Table 220.42(A), and no additional load calculations shall be required for such outlets.* (1) All general use receptacle outlets of 20 ampere rating or less, including receptcles connected to the circuits in 210.11(C)(3) (Bathroom Ccts) and (C)(4) (Garage Ccts). (2) Receptacle outlets specified in 210.52(E)(3) (Recs on Balconies, Decks and Porches). (3) Lighting outlets specified in 210.70 (General Lighting)										
5	General Lighting Demand Factors. 2023 NEC 220.45 *The demand factors specified in Table 220.45 shall apply to that portion of the total branch circuit load calculated for generatl illumination. They shall not be applied in determining the number of branch circuits for general illumination.*						All Others Total VA		**OCC (%)** 100	**LOAD (VA)** 29660.8	**W/ 220.45** **29660.8**
6	Show Window Lighting. 2023 NEC 220.46(A) *For Show Window lighting, a load of not less than 200VA / Linear Foot shall be included for a show window, measured horizontally along its base.*								**LIN FT** 0	**LOAD (VA)** 200	0
7	Track Lighting. 2023 NEC 220.46(B) *For track lighting in other than dwelling units or guest rooms of hotels and motels, an additional load of 150VA shall be inlcuded for every 2 ft of lightiingtrack or fraction thereof. Where multicircuit track is installed, the load shall be considered to be divided equally between the track circuits.*								**TRACK FT** 0	**LOAD (VA)** 75	0
8	Receptacle Loads - Other than Dwelling Units 2023 NEC 220.47 *Receptacle Loads calculated in accordance with 220.14(H) and (I) (180VA load)shall be permitted to be made subject to the demand factors given in Table 220.45 or Table 220.47*										**SEE ITEM 3 ABOVE.**

Children's Museum of the Magic Valley

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9	Motors 2023 NEC 220.50 (A) *The conductor sizing requirements specified in 430.24 and 430.25 and the feeder demand factor calculation method specified in 430.26 shall be used to determine motor loads.* NEC 430.24. Several Motors or a Motor and other loads. Conductors supplying several motors and/or other loads, shall have an ampacity not less than the sum of each of the following: (1) 125% of FLA of the highest rated motor, as determined by 430.6(A). (2) Sum of FLA of all other motors in the group, as determined by 430.6(A). (3) 100% of the noncontinuous non-motor load. (4) 125% of the continuos non-motor load. *NEC 430.25. Multimotor and Combination Load Equipment. The ampacity of conductors supplying multimotor and combination load equipment shall not be less than the minimum circuit ampacity marked on the equipment in accordance with 430.7(D). Where the equipment is not factory wired and the individual nameplates are visible in accordance wit 430.7(D)(2), the conductor ampacity shall be determined in accordance with 430.24.*	**AREA (SqFt) or LARGEST LOAD (VA)** 18538	**LOAD/SqFt (VA) or SUM OF OTHER LOADS (VA)** 3	55614
10	Air-Conditioning Equipment. 2023 NEC 220.50(B) *The conductor sizing requirements speicifed in Part IV os article 440 shall be used to determine air-conditioning loads for hermetic refrigerant motor-compressors.* *Part IV of 440 paraphrased: 125% of first compressor + sum of the rest of the loads.*	**AREA (SqFt) or LARGEST LOAD (VA)** 18538	**LOAD/SqFt (VA) or SUM OF OTHER LOADS (VA)** 22	407836
11	Fixed Electric Space Heating. 2023 NEC 220.51 *Fixed Electric space-heating loads shall be calculated at 100% of the total connected load. Hoever in no case shall a feeder or service load current rating be less than the rating of the largest branch circuit supplied.*	**AREA (SqFt) if Load Unknown** 18538	**LOAD/SqFt (VA) or KNOWN LOADS (VA)** 5	92690
12	Small-Appliance Circuit Load - Dwelling Unit. 2023 NEC 220.52(A) *In each Dwelling Unit the load shall be calculated at 1500 VA for each 2-wire small appliance branch circuit as covered by 210.11(C)(1).* The loads shall be permitt4ed to be included witht the general lighting load and subjected to the demand factors provided in Table 220.45.			
13	Laundry Circuit Load - Dwelling Unit. 2023 NEC 220.52(B). *A load of not less than 1500VA shall be included for each 2-wire laundry branch circuit as covered by 210.11(C)(1). The loads shall be permitted to be included witht the general lighting load and subjected to the demand factors provided in Table 220.45.*			
14	Appliance Load - Dwelling Unit. 2023 NEC 220.53 *It is permitted to apply a demand factor of 75% to the nameplate rating of 4 or more appliances rated 1/4hp or greater, or 500 watts or greater, that are fastened in place and that are served by the same feeder or service in a one, two or multifamily dwelling. This demand factor shall not apply to the following:* *(1) Household electric cooking equipment that is fastened in place.* *(2) Clothes Dryers.* *(3) Space Heating Equipment* *(4) Air Conditioning Equipment* *(5) Electric Vehicle Supply Equipment (EVSE)*			

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15 Electric Clothes Dryers - Dwelling Units 2023 NEC 220.54

The load for household electric clothes dryeers in a dwelling unit(s) shall be either 5000 watts or the nameplate rating, whichever is larger, for each dryer served. The use of demand factors in Table 220.54 shall be permitted.

16 Electric Cooking Appliances - Dweling Units and Instructional Kitchens 2023 NEC 220.55

The load for household electric ranges, wall mounted ovens, counter-mounted cooking units and other household cooking appliances individually rated in excess of 1 3/4kW shall be permitted to be calculated in accordance with Table 220.55.

17 Kitchen Equipment - Other than Dwelling Units 2023 NEC 220.56

Calculating the load for commercial electric cooking equipment, dishwasher booster heaters, water heaters, and other kitchen equipment in accordance with Table 220.56 shall be permitted. Other kitchen equipment shall include equipment that is fastened in place and rated 1/4hp or greater, or 500 watts or greater. These demand factors shall be applied to all equipment that has either thermostatic control or intermittent use as kitchen equipement. These demand factors shall not apply to space-heating, ventilating, or air-conditionaing equipment.

However, in no case shall the feeder or service calculated load be less than the sum of the largest two kitchen equipment loads.

Units of Equipment	Units of Equipment	DEMAND	LOAD (VA)	
		360 sf * 40W/SF = 14400VA		14400

Table 220.56 Demand Factors for Kitchen Equipment - Other than Dwelling Units

Units of Equipment	Demand Factor
Units of Equipment - 1	Demand Factor 100%
Units of Equipment - 2	Demand Factor 100%
Units of Equipment - 3	Demand Factor 90%
Units of Equipment - 4	Demand Factor 80%
Units of Equipment - 5	Demand Factor 70%
Units of Eq - 6 or more	Demand Factor 65%

6 or more		

18 Electric Vehicle Supply Equipment (EVSE) 2023 NEC 220.57

The EVSE load shall be calculated at either 7200 watts or the nameplate rating of the equipement, which is larger.

Special Note: WAC 51-50-429 is in disagreement with this requirement. WAC would allow 6.656kW per charger with variations allowed for Auto Load Mgmt Systems.

QTY	LOAD (VA)	

19 Noncoincident Loads 2023 NEC 220.60

If it is ulikely that two or more noncoincident loads will be in use simultaneaously, using only the largest load(s) that will be used at one time for calculating the total load of a feeder or service shall be permitted. If a motor orair conditioning load is part fo the non coincident load and is not the largest of the noncoincident loads, 125% of either the motor load or air-conditioning load, whichever is larger, shall be used in the calculation.

LOAD (VA) REDUCTION	

Total Load (VA)	648399.6
Amps	780
Service size at 120/208V (A)	2000
Service size at 277/480V (A)	1200

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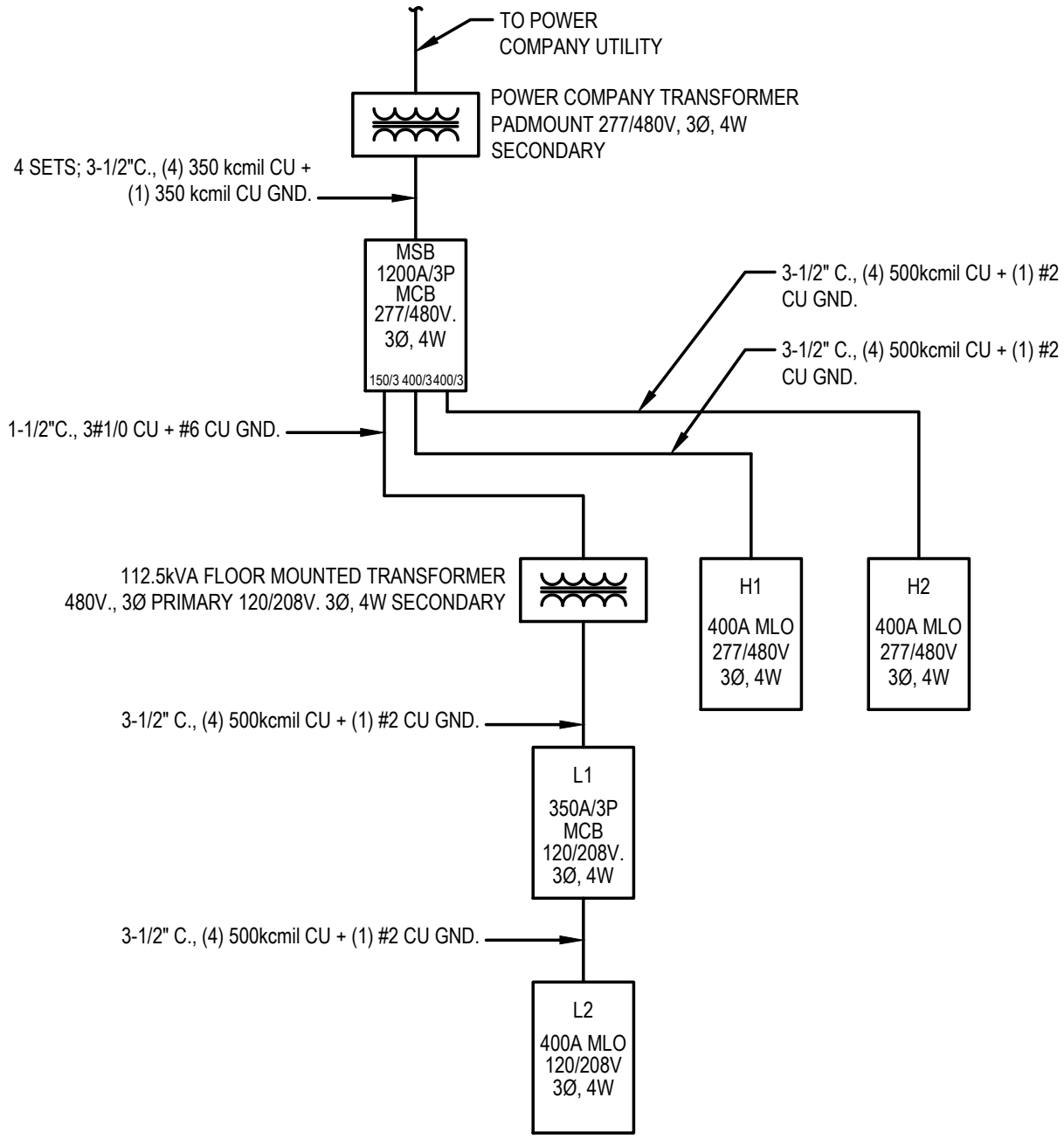
Non-Dwelling Feeder/Service Load Calculation

Notes:

1



ONE LINE DIAGRAM

3

SCALE: NTS

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SÄZÄN
GROUP
600 Stewart St., Ste 1400
Seattle, Washington 98101
Tel 206.267.1700
Fax 206.267.1701

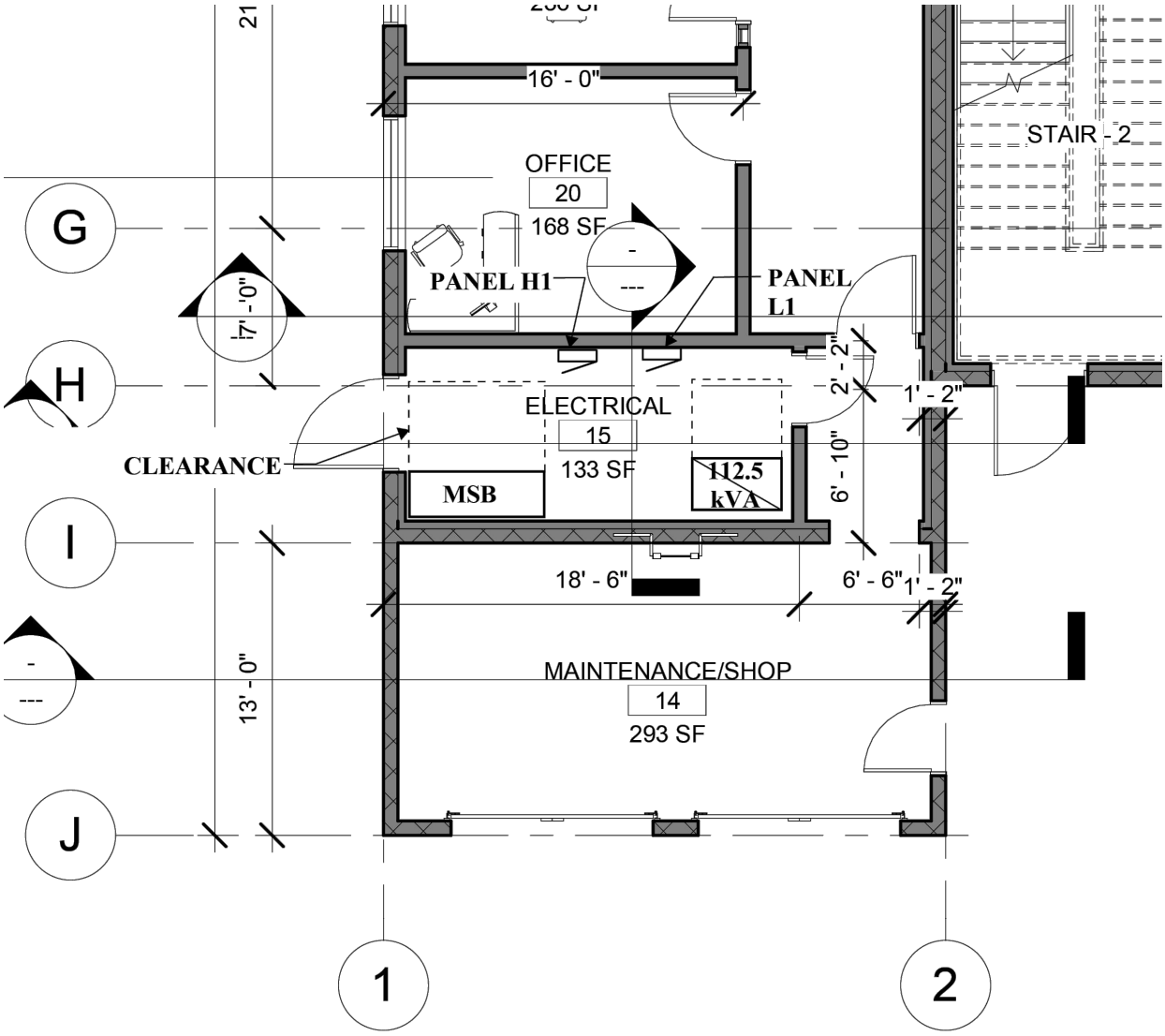
ONE LINE DIAGRAM

CHILDREN'S MUSEUM
OF MAGIC VALLEY

JOB NO.
D32-24001-00

DATE
08/29/2024

DWG. NO.
SKE3



MAIN ELECTRICAL ROOM

1

SCALE: 1/8" = 1' - 0"

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SÄZÄN
GROUP
600 Stewart St., Ste 1400
Seattle, Washington 98101
Tel 206.267.1700
Fax 206.267.1701

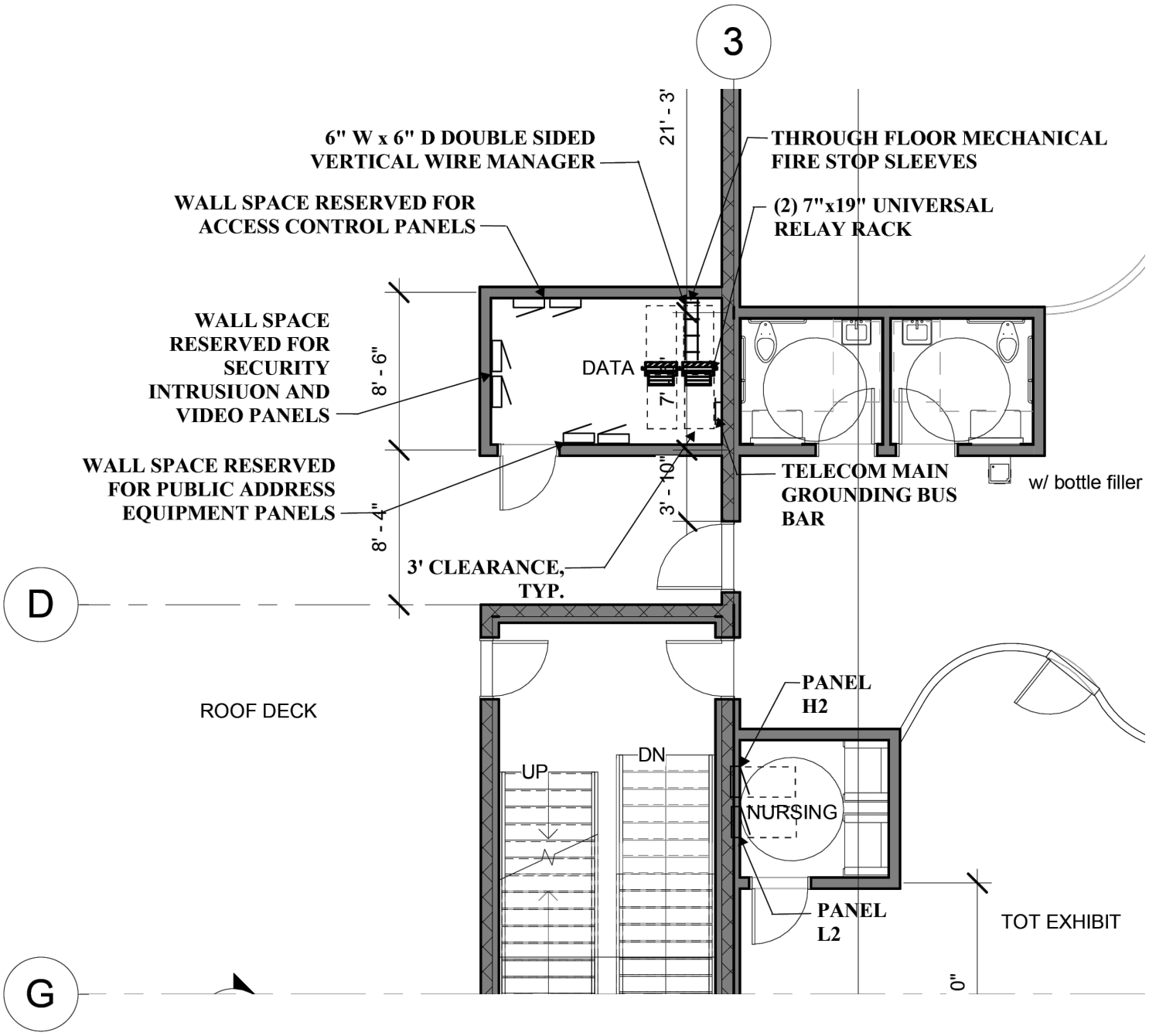
MAIN ELECTRICAL ROOM

CHILDREN'S MUSEUM
OF MAGIC VALLEY

JOB NO. D32-24001-00

DATE 08/29/2024

DWG. NO. SKE1



2ND FLOOR PANEL LOCATION

2

SCALE: 1/8" = 1' - 0"

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SÄZÄN GROUP
600 Stewart St., Ste 1400
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2ND FLOOR PANEL LOCATION

CHILDREN'S MUSEUM OF MAGIC VALLEY

JOB NO. D32-24001-00

DATE 08/29/2024

DWG. NO. SKE2