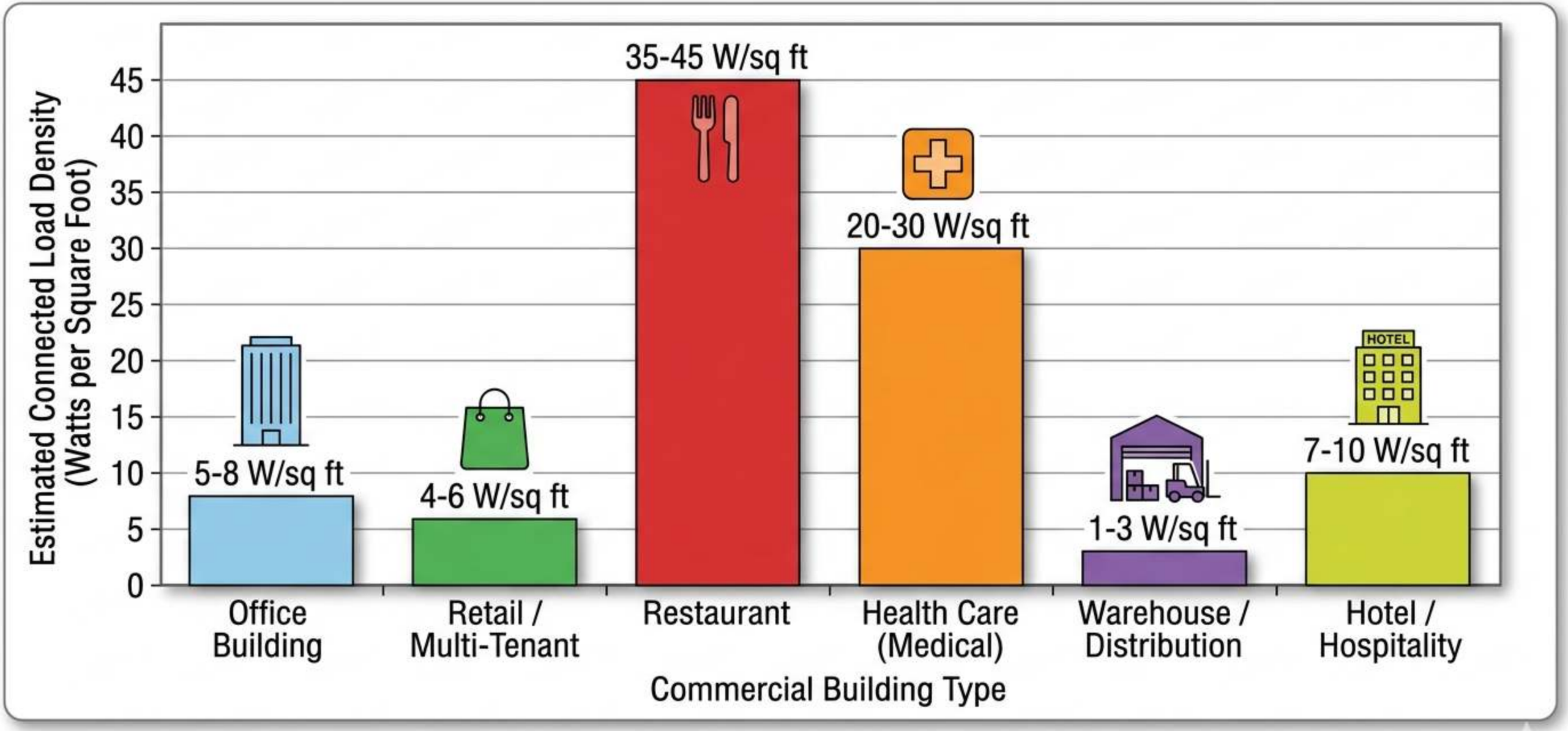
Figure 1.1 — Comparison of typical electrical load densities by commercial building type



SHOP-C PANELBOARD SCHEDULE

PANEL:
"B2C"

MOUNT:
FLUSH

AMP BUS RATING:
200 AMPS

VOLTAGE:
208Y/120V, 3-PHASE, 4-WIRE

AIC RATING:
22,000 AIC
FULLY RATED

MAIN TYPE:
MAIN LUG ONLY

ENCLOSURE:
NEMA 1

CIRCUIT NO.	CIRCUIT DESCRIPTION	OCPD RATING	LOAD (VA)[1]			DESCRIPTION	OCPD RATING	CIRCUIT NO.
			PHASE A	PHASE B	PHASE C			
1	Lighting	20A	450VA	2000VA	2800VA	Receptacle (Walls)	20A	2
3	Appliance (APL)	40A	3080VA	—	—	HVAC Unit	30A	4
5	HVAC Service Receptacle	20A	1500VA	—	—	—	—	6
7	Receptacle (Walls)	20A	—	2800VA	—	Spare	20A	8
9	Spare	20A	—	—	2000VA	Spare	20A	10
11	Spare	20A	—	—	—	Spare	20A	12
13	Spare	20A	—	—	—	Spare	20A	14
15	Spare	20A	—	—	—	Spare	20A	16
17	Spare	—	—	—	—	Spare	—	18
19	Spare	—	—	—	—	Spare	—	20
21	Spare	—	—	—	—	Spare	—	22
23	Spare	—	—	—	—	Spare	—	24

PHASE LOAD SUMMARY (VA)[1]			
PHASE A	PHASE B	PHASE C	
6,830 VA	4,800 VA	4,800 VA	
TOTAL LOAD (VA)[1]:		16,430 VA	
AMPERES PER PHASE[1]:	57.0 A	40.0 A	40.0 A

NOTES

1. Load for each circuit is calculated in Panelboard Worksheet (use the value from "Modified Load" column).
2. The load is balanced among all three phases to the extent possible.

PANELBOARD INFORMATION				
TOTAL LOAD (VA)[1]	AMPERES PER PHASE[1]	CONNECTED LOAD (VA)[1]	DEMAND FACTOR (Per NEC 220.42)	CALCULATED DEMAND LOAD (VA)[1]
16,430 VA	57.0 A / 40.0 A / 40.0 A	16,430 VA	100%	16,430 VA

LEGEND & ABBREVIATIONS

VA	Volt-Amperes
NEC	National Electrical Code
OCPD	Overcurrent Protective Device
AIC	Amperes Interrupting Capacity
APL	Appliance

CODE REFERENCES (USED IN THIS WORKSHEET)

- NEC 220.12, 220.14, 220.81, 210.19, 215.2, 430.24, 440.14
- NEC 310.15(B)(16) — Ampacity of Conductors
- NEC 240.4 — OCPD Sizing
- NEC 408.3 — Panelboard Ratings
- NEC 110.14(C) — Working Space

1. Load for each circuit is calculated in Panelboard Worksheet (use the value from "Modified Load" column).
2. The load is balanced among all three phases to the extent possible.

FIGURE 1.2 The Commercial Electrical Design Process

The design process moves through five distinct phases, each with specific deliverables and milestones.

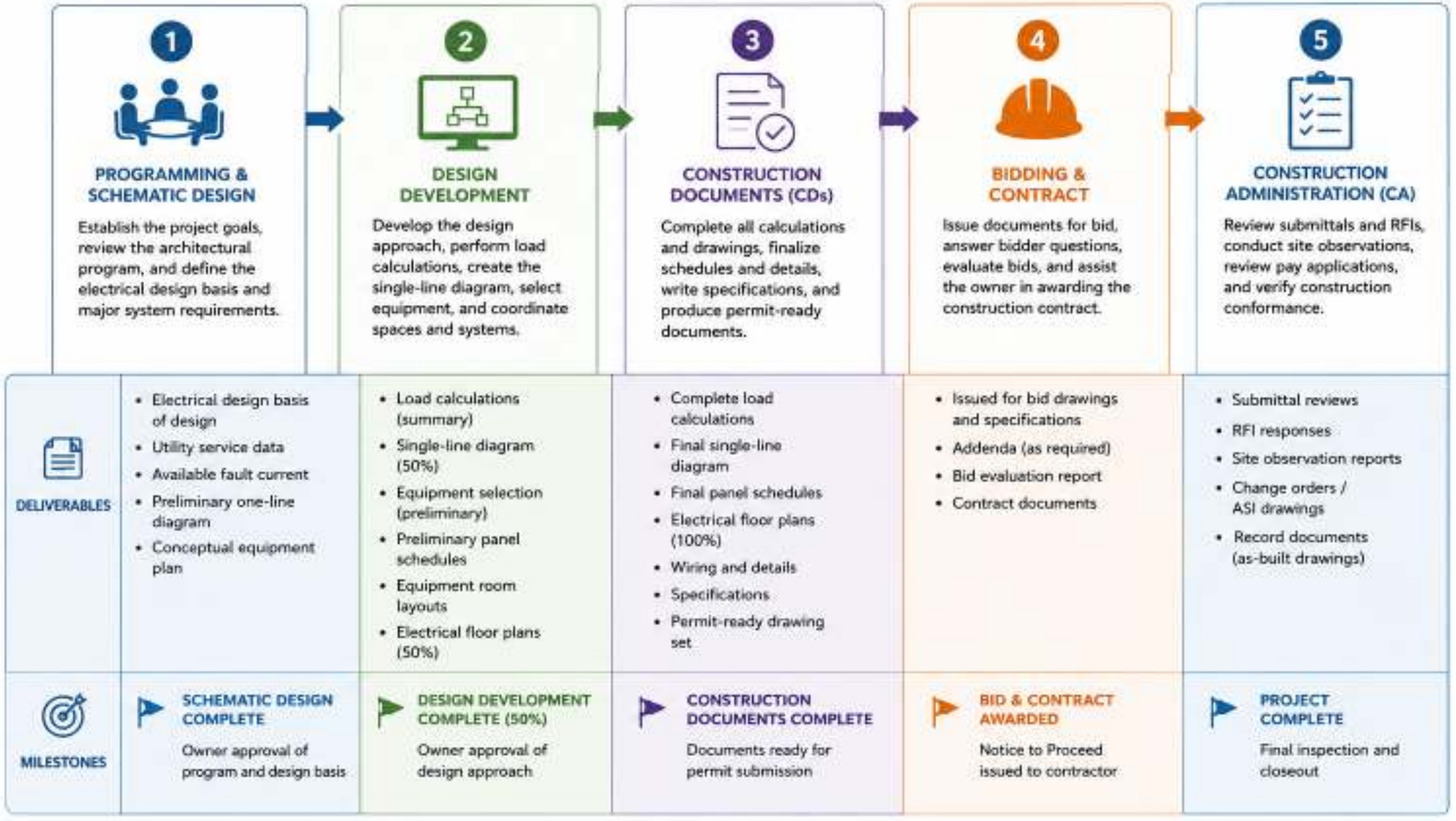


FIGURE 2.1 The NEC's nine-chapter structure determines which provisions apply to a given installation.

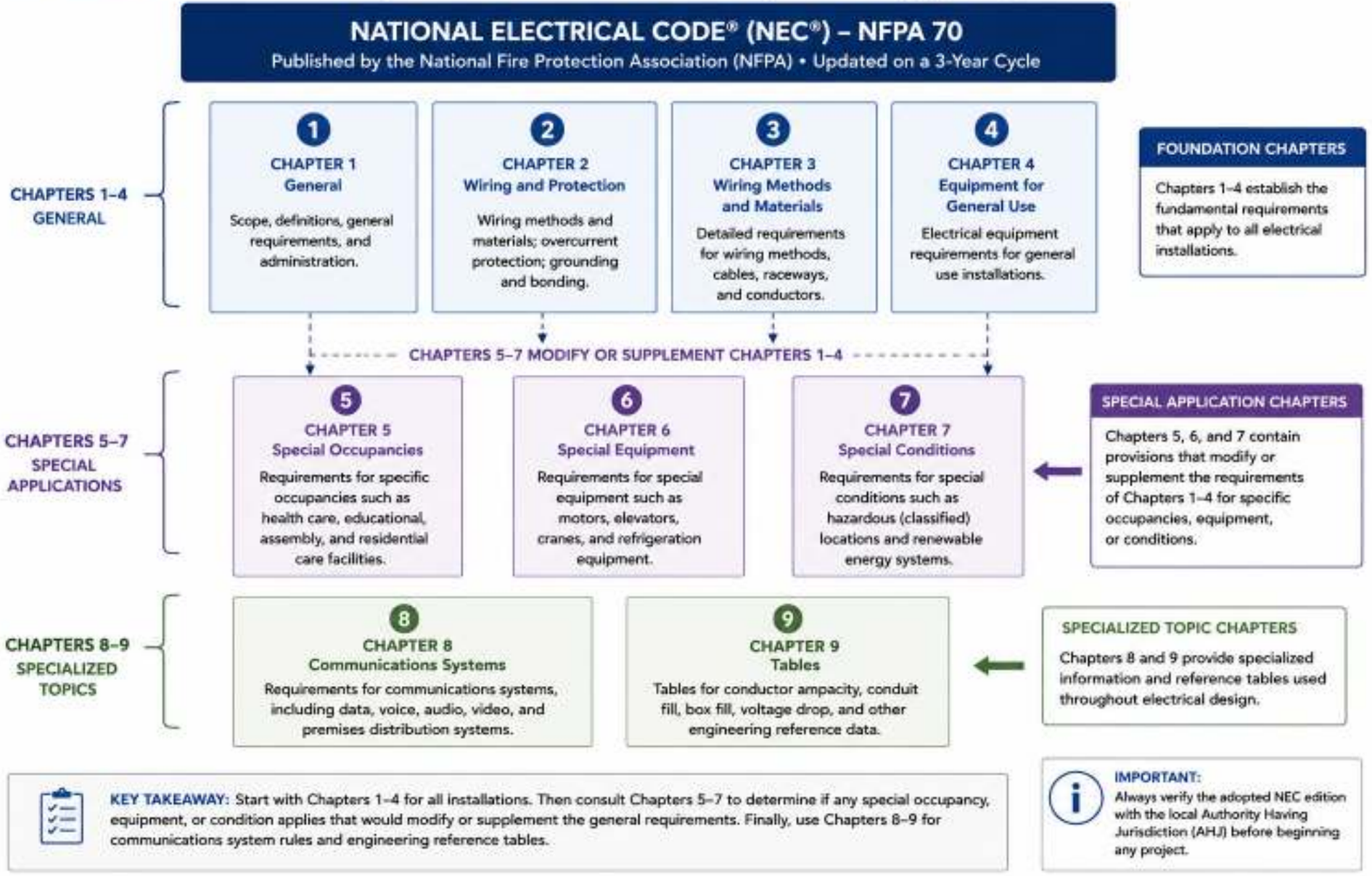


FIGURE 3.1 The distribution hierarchy flows from utility service through decreasing equipment sizes to branch circuit outlets. Each level must be properly coordinated with the levels above and below it.

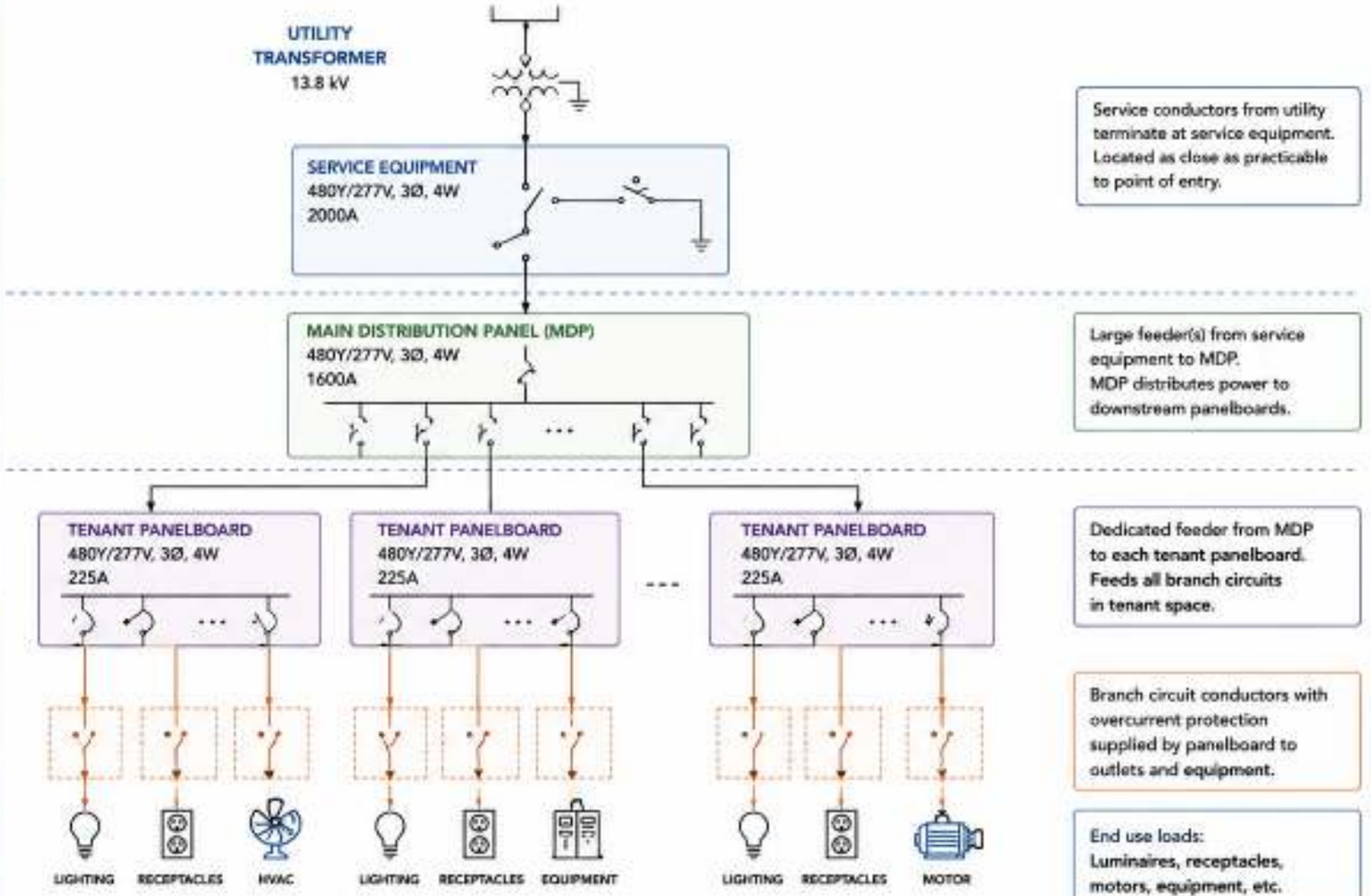
1 SERVICE EQUIPMENT
Main switchboard or service entrance panel. Contains main service disconnect and overcurrent protection for building feeders.

2 MAIN DISTRIBUTION PANEL (MDP)
Hub of the electrical distribution system. Receives power from service equipment and distributes it to downstream panelboards via feeder circuits.

3 TENANT PANELBOARDS / SUB-PANELS
Each tenant space (or area) is served by a panelboard fed from the MDP by a dedicated feeder. Contains overcurrent devices for all branch circuits in the tenant space.

4 BRANCH CIRCUITS
Final runs of wiring from the panelboard to the outlets (luminaires, receptacles, equipment connections). Governed by NEC Article 210.

5 LOADS
Luminaires, receptacles, motors, and equipment connections are the end points of the distribution hierarchy.



KEY POINTS

- Electrical distribution is a series of coordinated levels from source to load.
- Each level must be properly sized and protected relative to the levels above and below.
- Overcurrent devices and conductor ampacities must maintain proper coordination and selectivity.
- The diagram above is a typical 480Y/277V, 3-phase, 4-wire distribution system.

FIGURE 6.1 The electrical engineer annotates the architectural floor plan to identify load areas, space types, and equipment locations before starting the load calculation.

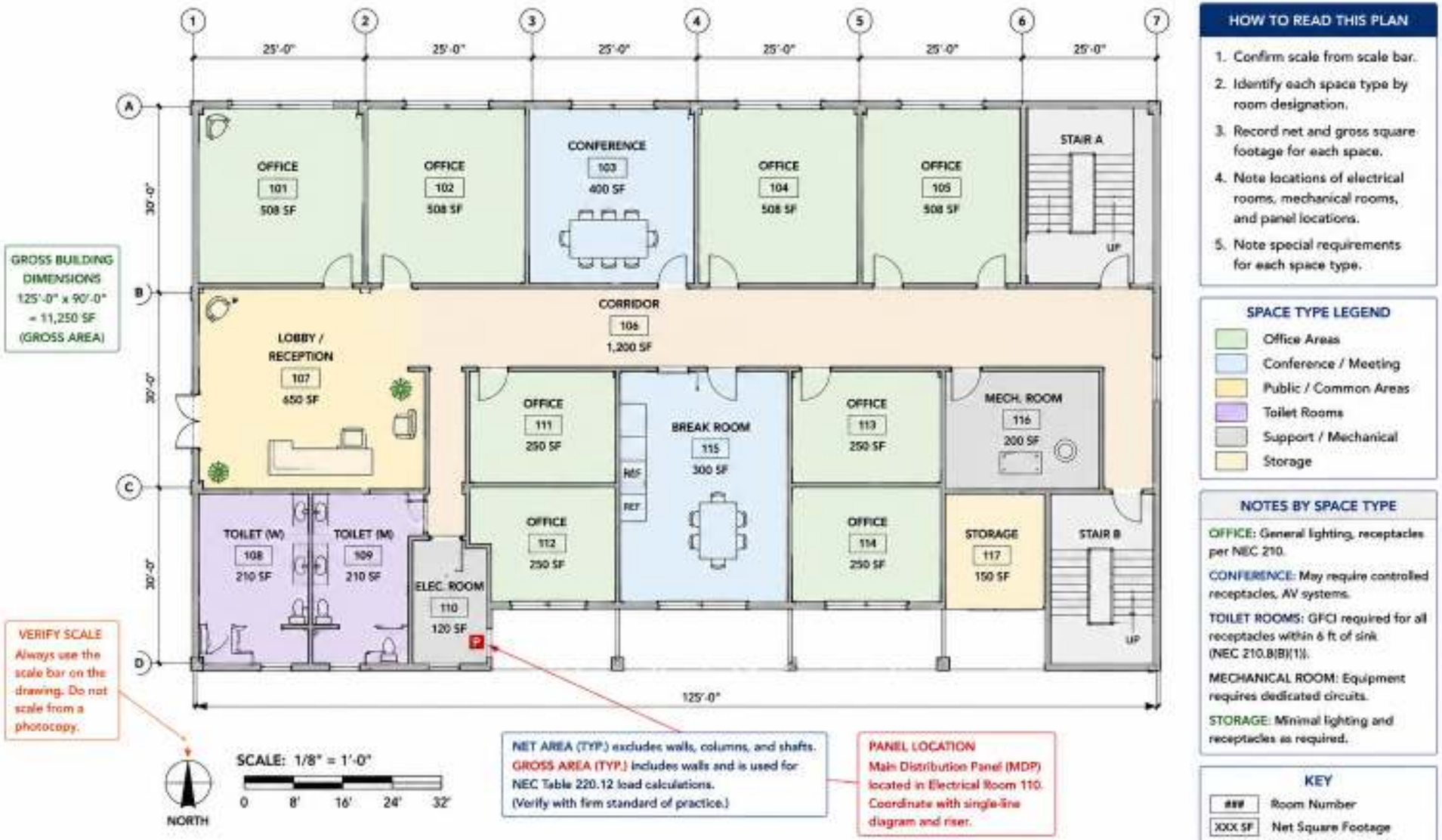


FIGURE 13.1 The nine-step feeder sizing procedure applied to a commercial tenant feeder. Each step references the applicable NEC provision.

FEEDER SIZING WORKSHEET (COMPLETED EXAMPLE)
TENANT A FEEDER – 100A

PROJECT: Strip Mall – 3 Tenant Building
TENANT: Store A **SYSTEM:** 208Y/120V, 3Ø, 4W **LOCATION:** From B2A (Tenant Panel) to First Device 5/20/2024 **BY:** EED

1 DETERMINE THE MINIMUM FEEDER AMPERE — NEC 215.2(A)(1)

Total Demand Load (from Chapter 10 worksheet)	32,460 VA
System Voltage (3Ø)	208 V
I (minimum) = Total Demand VA ÷ (Voltage × 1.732) = 32,460 ÷ (208 × 1.732)	**90.0 A (minimum)**

2 SELECT THE MINIMUM CONDUCTOR SIZE — NEC 310.15(B)(16)

Minimum feeder ampere from Step 1: 90.0 A

Conductor Size	75°C Ampacity (Table 310.15(B)(16))	Ambient Temp. Factor (30°C)	Conduit Fill (40% fill)	Derated Ampacity
#3 Cu THHN	100 A	0.96	0.91	87.4 A
#2 Cu THHN	115 A	0.96	0.91	**100.5 A**
#1 Cu THHN	130 A	0.96	0.91	113.6 A

✓ #2 Cu THHN selected (derated ampacity 100.5 A ≥ 90.0 A)

3 DETERMINE THE OCPD RATING — NEC 240.4, 240.6(A)

Conductor from Step 2: #2 Cu THHN, 75°C ampacity = 100.5 A
Select OCPD not to exceed conductor ampacity.
Nearest standard OCPD rating not exceeding 100.5 A = **100 A**

4 ADJUST FOR FUTURE LOAD GROWTH (ENGINEERING JUDGMENT) — (Not an NEC requirement)

Minimum OCPD from Step 3 = 100 A
Engineering practice: select one standard size above minimum.
Design OCPD selected: 100 A
(This becomes the design OCPD for Steps 5–9)

5 DETERMINE THE MINIMUM CONDUCTOR PROTECTABLE BY THE DESIGN OCPD — NEC 310.15(B)(16), NEC 240.4(B)

Design OCPD from Step 4 = 100 A
Find smallest conductor with ampacity ≥ 100 A (75°C column).
#2 Cu THHN has 115 A (≥ 100 A) → OK
Minimum conductor protectable by 100 A OCPD: **#2 Cu THHN**

6 SIZE THE NEUTRAL (GROUNDED) CONDUCTOR — NEC 250.122, 215.2, Table 250.122

Design OCPD = 100 A

OCPD Rating	From Table 250.122: Minimum EGC	Neutral Minimum (not less than EGC)
15 A	14 AWG	14 AWG
20 A	12 AWG	12 AWG
30 A	10 AWG	10 AWG
60 A	10 AWG	10 AWG
→ 100 A	8 AWG	8 AWG
150 A	6 AWG	6 AWG
200 A	6 AWG	6 AWG
300 A	4 AWG	4 AWG
400 A	3 AWG	3 AWG
500 A	2 AWG	2 AWG
600 A	1 AWG	1 AWG
800 A	1/0 AWG	1/0 AWG

For 100 A OCPD:
- Minimum EGC = 8 AWG
- Neutral conductor shall not be smaller than EGC.

Neutral Selected: **8 AWG Cu THHN**
EGC Selected: **8 AWG Cu THHN**

7 UPSIZE CONDUCTORS IF DESIRED (OPTIONAL ADJUSTMENT) — (Engineering Practice)

Upsize phase conductors one standard size above minimum from Step 5.
Minimum from Step 5 = #2 Cu → Upsized to: **#1 Cu THHN**
Upsize neutral by same ratio.
Neutral/EGC remain: **8 AWG Cu THHN**

8 DETERMINE TOTAL CONDUCTOR CROSS-SECTIONAL AREA — NEC Chapter 9, Table 5

Conductor	Size	Type	Area per Conductor (in²)	Quantity	Total Area (in²)
Phase (Ungrounded)	#1	Cu THHN	0.1331	3	0.3993
Neutral (Grounded)	8 AWG	Cu THHN	0.0507	1	0.0507
Equipment Ground	8 AWG	Cu THHN	0.0507	1	0.0507
TOTAL CONDUCTOR CROSS-SECTIONAL AREA =					**0.5007 in²**

9 DETERMINE CONDUIT SIZE FROM NEC CHAPTER 9 TABLES — NEC Chapter 9, Tables 4 and 5

Using Table 4 (EMT – 40% fill)
Total Conductor Area from Step 8 = 0.5007 in²
Select smallest EMT size with 40% fill area ≥ 0.5007 in².

EMT Trade Size	Inside Area (in²)	40% Fill Area (in²)	OK?
1"	1.049	0.420	No
1-1/4"	1.380	0.552	Yes
1-1/2"	1.863	0.745	Yes

SELECTED CONDUIT SIZE: **1-1/4" EMT**
Conduit Fill = 0.5007 / 1.380 = 36% (≤ 40%) **OK**

PROJECT SUMMARY

Feeder: B2A–F1 (Tenant A)
Voltage: 208Y/120V, 3Ø, 4W
Design OCPD: 100 A

Phase Conductors: #1 Cu THHN
Neutral Conductor: 8 AWG Cu THHN
EGC: 8 AWG Cu THHN
Conduit: 1-1/4" EMT

Total Conductors in Raceway: 5
(3 Phase + 1 Neutral + 1 EGC)

Conduit Fill: 36% (OK ≤ 40%)

DESIGN RESULT

The feeder selected provides:
- ✓ Ampacity ≥ Demand Load
- ✓ Proper OCPD protection
- ✓ Neutral and EGC sized per NEC
- ✓ Conduit sized within 40% fill

FEEDER IS CODE COMPLIANT

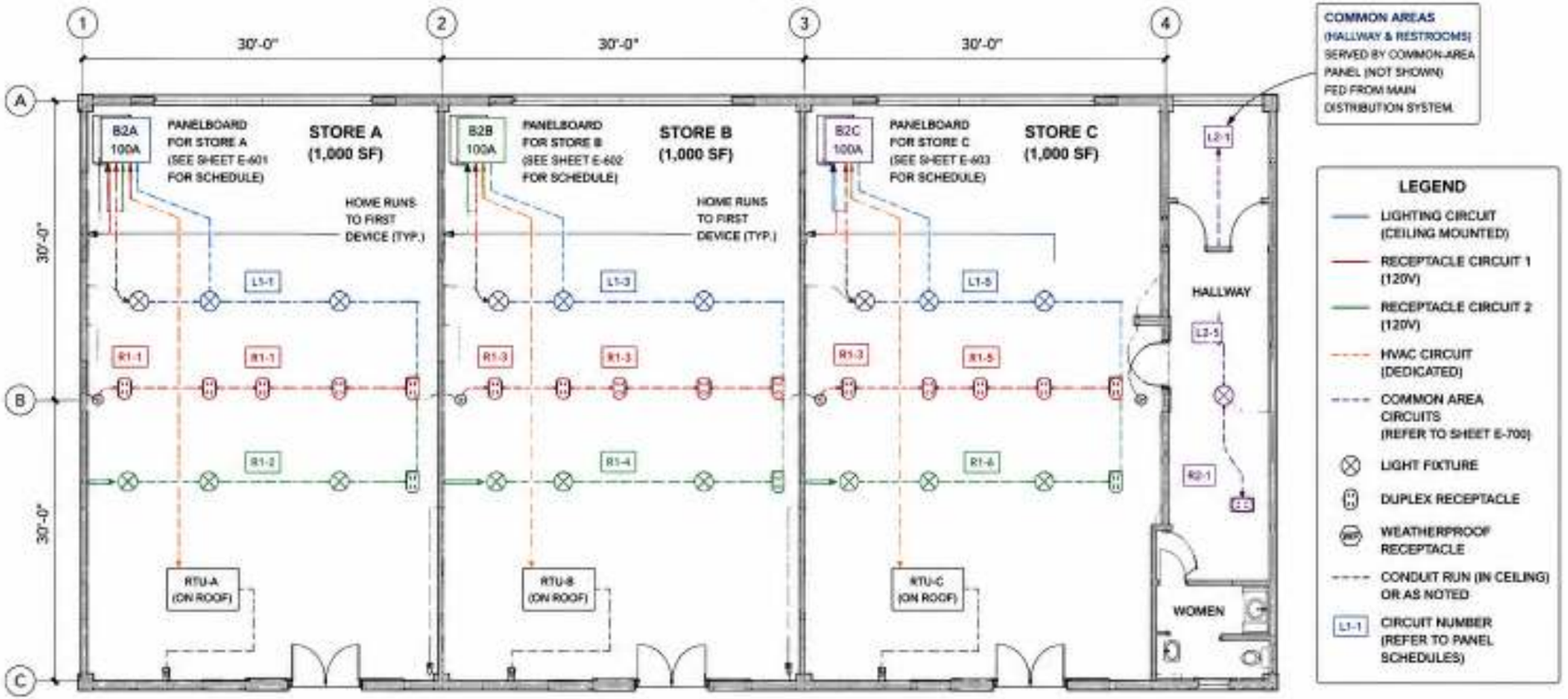
NOTES:

1. Ampacities based on 75°C copper conductors (NEC 310.15(B)(16)).
2. Ambient temperature = 30°C.
3. Conduit fill adjustment = 40% (NEC Chapter 9, Note 7).
4. THHN/THWN-2 conductors assumed.

REFERENCES: NEC 215.2(A)(1) | NEC 240.4, 240.6(A) | NEC 250.122(A) | NEC 310.15(B)(16) | NEC Chapter 9 (Tables 4 and 5, Notes)

All calculations are examples for instructional purposes. Verify all values per actual project conditions and applicable NEC edition.

FIGURE 20.1 The wiring layout plan shows how conductors are grouped into conduit runs and routed from panelboards to devices throughout the tenant spaces.



NOTES:

1. ALL CONDUIT RUNS ARE IN CEILING SPACE UNO.
2. CIRCUIT NUMBERS ARE SHOWN AT DEVICES AND HOMERUNS.
3. REFER TO SHEETS E-601 TO E-603 FOR PANEL SCHEDULES.
4. CIRCUITING SHOWN IS DIAGRAMMATIC. ROUTE CONDUIT TO AVOID STRUCTURE, DUCTWORK AND OTHER SYSTEMS.

TYPICAL HOMERUN CALLOUT (AT PANELBOARD)

(3) #10 THHN, (1) #10 THHN G, 3/4" C
TO FIRST DEVICE ON CIRCUIT L1-1

L1-1 → B2A

KEY PLAN

CIRCUITING SUMMARY

CIRCUIT TYPE	TYPICAL USE	VOLTAGE	PANEL
L1-x	LIGHTING (STORE AREAS)	120V	B2x
R1-x	RECEPTACLES (GENERAL)	120V	B2x
H-x	HVAC UNIT CONNECTION	208/230V	B2x
L2-x	LIGHTING (COMMON AREAS)	120V	COMMON
R2-x	RECEPTACLES (COMMON AREAS)	120V	COMMON

FIGURE 23.1 **Key Plan — Multi-Tenant Commercial Strip Mall.** The building contains four tenant spaces plus common areas served by a central hallway, shared restrooms, storage, and elevator.

SPACE LEGEND				
COLOR	SPACE	DESCRIPTION	AREA (SF)	PANEL
	Store A	Retail / Light Commercial	2,400	B2A
	Store B1	Retail / Light Commercial	2,800	B2B
	Store C1	Retail / Light Commercial	800	B2C
	Store C2	Retail / Light Commercial	400	B2C
	Common Areas	Hallway, Restrooms, Storage, Elevator	1,200	N/A

BUILDING SUMMARY

Building Type:	Single-Story Commercial Strip Mall
Construction:	Wood-Framed
Total Building Area:	10,400 SF (approx.)
Occupancy Classification:	
+ Group M (Mercantile) – Tenant Spaces	
+ Group S-1 – Storage Room	
Stories:	1 Story (with mezzanine served by elevator)
Ceiling Height:	12'-0" (typ.)
Electrical Service:	208Y/120V, 3Ø, 4W
Main Distribution Panel:	400A MDP
Tenant Sub-Panels:	200A Each (208Y/120V, 3Ø, 4W)

PANEL DESIGNATION STRATEGY

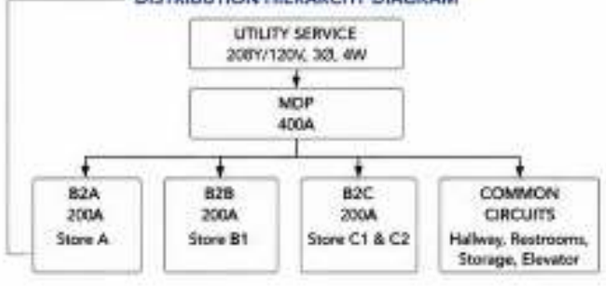
- MDP = Main Distribution Panel (Common Electrical Room)
- B2A = Branch Panel, Level 2 – Store A
- B2B = Branch Panel, Level 2 – Store B1
- B2C = Branch Panel, Level 2 – Store C1 & C2

NOTE: Circuit 3/B2A = Circuit 3 in Panel B2A feeding a load in Store A.

KEY NOTES

1. All dimensions are to finish face of exterior walls.
2. Demising walls are full height to underside of roof deck.
3. Restrooms are "wet locations" – GFCI required for all receptacles within 6 ft of sink (NEC 210.8(B)(1)).
4. Storage room is classified as Group S-1 (Moderate-Hazard Storage).
5. Elevator subject to NEC Article 620 and NFPA 101 Life Safety.
6. All tenant panels (B2A, B2B, B2C) are fed from the MDP through individual feeder circuits.
7. Common areas (hallway, restrooms, storage, elevator) are served by the MDP through dedicated circuits.

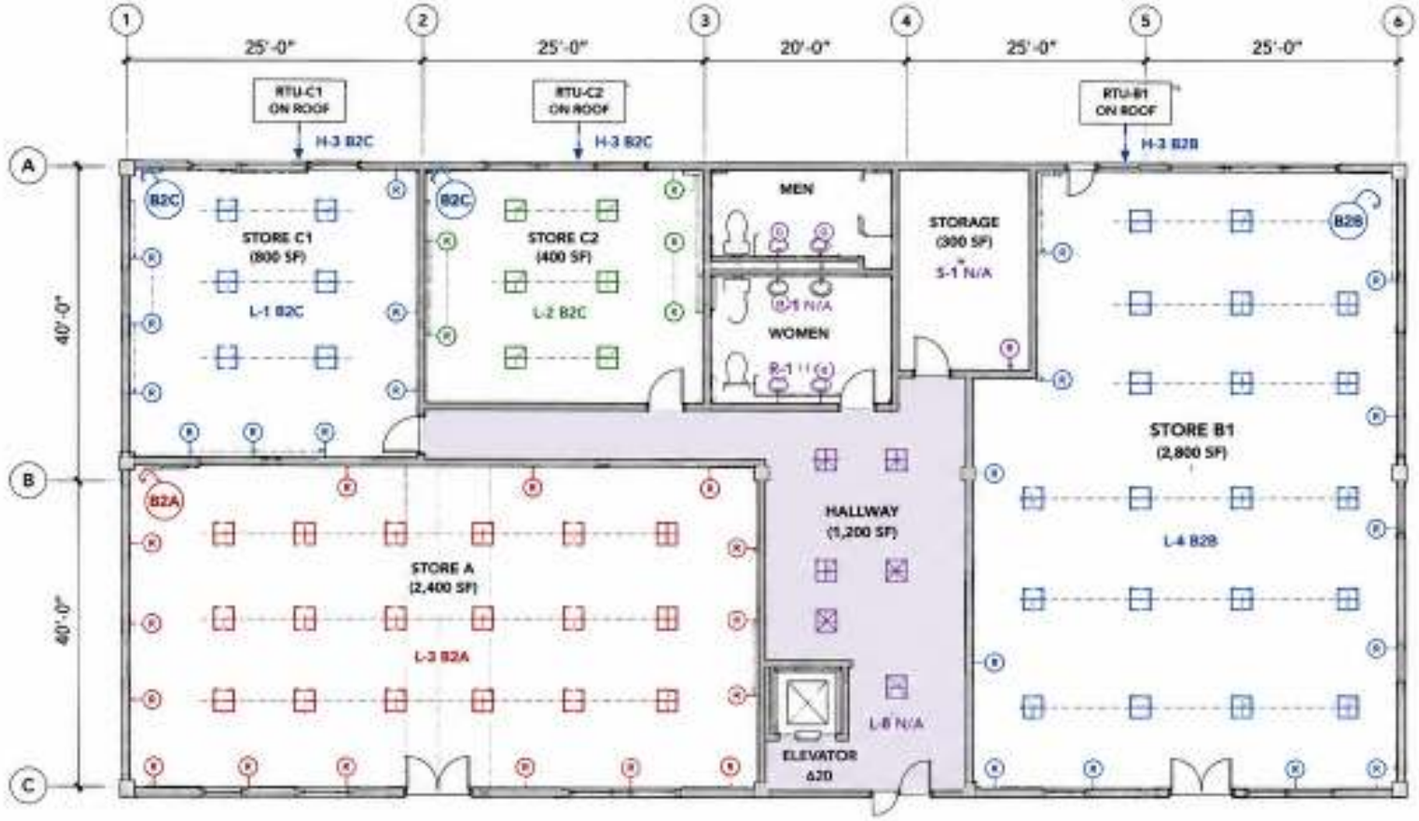
DISTRIBUTION HIERARCHY DIAGRAM



CODE & DESIGN BASIS

- NEC 2023
- International Building Code (IBC) 2021
- NFPA 101 – Life Safety Code
- NEC Table 220.12 – "Stores" = 3 VA/SF (General Lighting Load)
- All receptacles in tenant spaces: NEC 210.52(C)
- Full coordination with architectural and mechanical disciplines

FIGURE 28.1 Electrical Plan — the drawing shows device locations and circuit identification for all four tenant spaces and common areas. Every device is labeled with its circuit number and panel reference.



SYMBOL LEGEND

	LED 2' x 4' TROFFER (LUMINAIRES)
R	DUPLEX RECEPTACLE (WALL MOUNTED)
G	GFCI DUPLEX RECEPTACLE (AT LAVATORY)
	HVAC UNIT CONNECTION (CONDUIT DROP TO RTU)
B2A	PANELBOARD (WALL MOUNTED) – TENANT
	LED 2' x 4' TROFFER (COMMON AREAS)
X-Y	CIRCUIT/PANEL IDENTIFICATION (X = CIRCUIT, Y = PANEL)

CIRCUIT IDENTIFICATION KEY

- L-# = LIGHTING CIRCUITS
- R-# = RECEPTACLE CIRCUITS
- H-# = HVAC UNIT CIRCUITS
- S-# = SPECIAL/OTHER CIRCUITS
- N/A = COMMON PANEL (NOT RESIDENT IN TENANT PANEL)

PANEL SCHEDULE (SUMMARY)

PANEL	SERVES	RATING	VOLTAGE/PHASE
B2A	Store A	200A	208Y/120V, 3Ø, 4W
B2B	Store B1	200A	208Y/120V, 3Ø, 4W
B2C	Stores C1 & C2	200A	208Y/120V, 3Ø, 4W
N/A	Common Areas (Hallway, Restrooms, Storage, Elevator)	—	208Y/120V, 3Ø, 4W

GENERAL PLAN NOTES

1. ALL LIGHTING FIXTURES ARE LED TROFFERS, 2' x 4', 40W, 3500K.
2. LIGHTING GRID SPACING APPROXIMATELY 9'-0" ON CENTER (TYP.).
3. RECEPTACLE SPACING ALONG PERIMETER WALLS APPROXIMATELY 8'-0" TO 10'-0" ON CENTER (TYP.).
4. ALL DEVICES MOUNTED AT 18" AFF UNLESS NOTED OTHERWISE.

PLAN NORTH

N

SCALE

0 10' 20' 30'

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

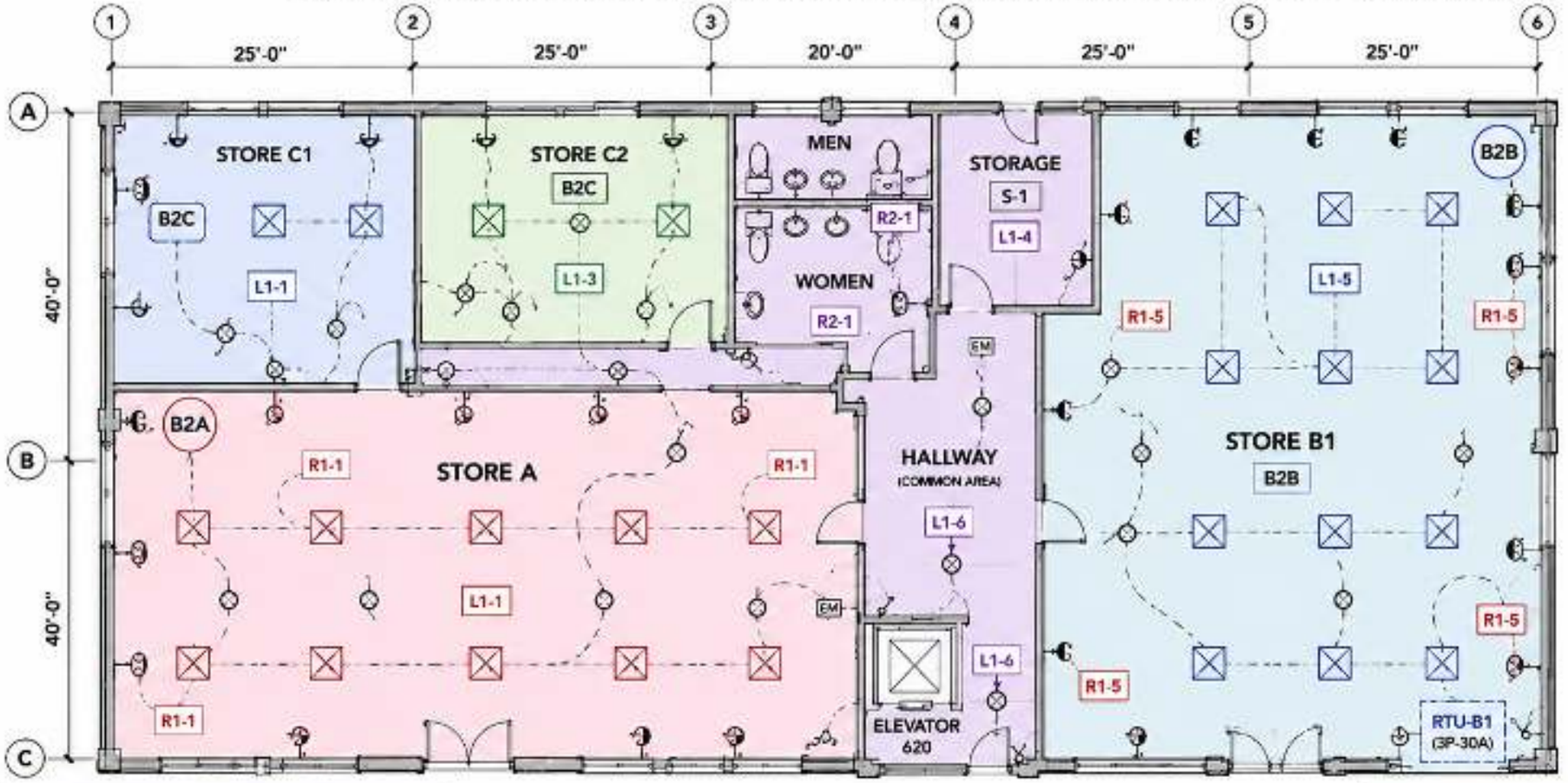
SPACE SUMMARY

SPACE	OCCUPANCY	AREA (SF)	PANEL
Store A	M (Mercantile)	2,400	B2A
Store B1	M (Mercantile)	2,800	B2B
Store C1	M (Mercantile)	800	B2C
Store C2	M (Mercantile)	400	B2C
Common Areas	M / S-1 (Storage)	1,200	N/A
TOTAL BUILDING AREA (APPROX.)		10,400 SF	

NOTES

1. ALL RECEPTACLES ARE 20A, 125V UNLESS NOTED OTHERWISE.
2. ALL RESTROOM RECEPTACLES ARE GFCI PROTECTED.
3. RECEPTACLES SHOWN ON INTERIOR WALLS ARE AT TENANT PROGRAM LOCATIONS (TYP.).
4. CIRCUIT NUMBERS REFER TO PANEL SCHEDULES.
5. VERIFY ALL DEVICE LOCATIONS WITH ARCHITECTURAL DRAWINGS AND OWNER REQUIREMENTS.

FIGURE 28.1 Electrical Plan — the drawing shows device locations and circuit identification for all four tenant spaces and common areas. Every device is labeled with its circuit number and panel reference.



ELECTRICAL PLAN LEGEND

⊠	LED 2'x4' Troffer (40W)
⊗	LED Downlight (Hallway)
⊖	Duplex Receptacle (120V)
GFCI	GFCI Receptacle
S	Single-Pole Wall Switch
3	Three-Way Switch
EM	Emergency Light
EXIT	Exit Sign
RTU	Rooftop HVAC Unit (3P)
B2X	Panelboard Location

CIRCUIT COLOR KEY (Typical)

L1-x	Lighting Circuit
R1-x	Receptacle Circuit
R2-x	Common Area Circuit (Restrooms, Hallway, Storage)
HVAC	HVAC Equipment Circuit

TENANT PANEL LOCATIONS

Panel	Serving	Location
B2A	Store A	Rear (West Wall)
B2B	Store B1	Rear (East Wall)
B2C	Store C1 & C2	Rear (North Wall)
Common Panel	Hallway, Restrooms, Storage, Elevator	Electrical Room (near MDP)

TYPICAL CIRCUIT IDENTIFICATION CALL-OUT

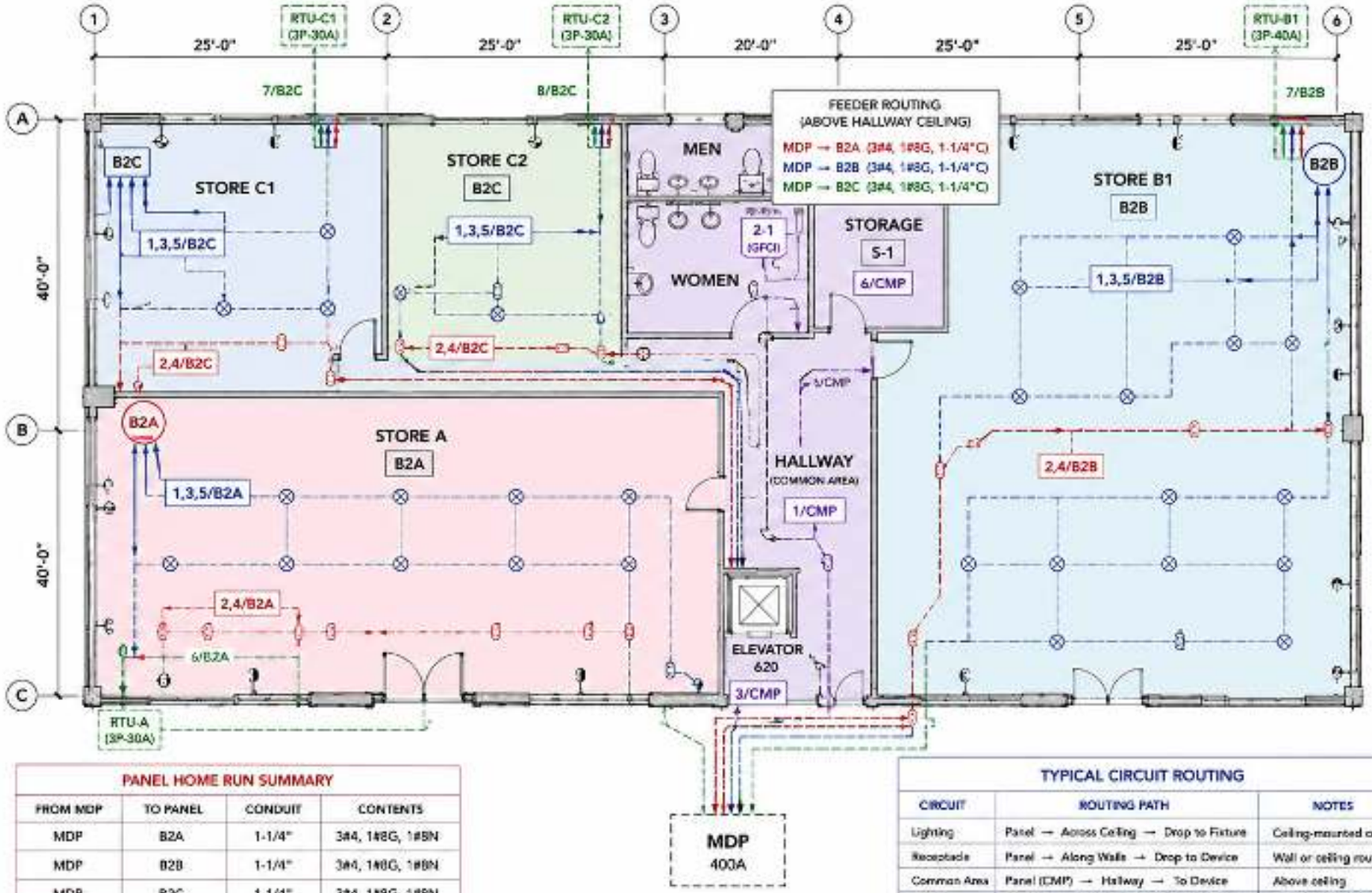
- **L1-1** — Lighting Circuit 1 from Panel B2A
- **R1-1** — Receptacle Circuit 1 from Panel B2A
- **R2-1 (GFCI)** — Common Area Circuit 1 from Common Panel
- **RTU-B1 (3P-30A)** — HVAC Unit Connection from Panel B2B

PLAN NOTES

1. All receptacles in restrooms are GFCI protected within 6' of sink (NEC 210.8(B)(1)).
2. Lighting in hallway and common areas is on Cat. B emergency power.
3. All exit signs and emergency lights are on emergency power.
4. All rooftop HVAC units are fed by 3-pole, 208V circuits from tenant panels.
5. Switches shown control the nearest row/zone of luminaires (typical).

NORTH

FIGURE 28.2 Wiring Layout Plan — circuit routing from each panelboard to devices throughout the building. Home run annotations include circuit numbers and panel references for every conduit run.



WIRING LAYOUT LEGEND

- Lighting Circuit (Typical)
- Receptacle Circuit (Typical)
- Common Area Circuit (Typical)
- HVAC Circuit (3P)
- Feeder Conduit (MDP to Panels)
- Home Run from Panel
- Conduit Run (Ceiling)
- Conduit Run (Wall or Below Slab)
- Luminaire (See Electrical Plan)
- Receptacle (See Electrical Plan)

HOME RUN ANNOTATION KEY

`1,3,5/B2A` — Circuits in Conduit; Panel Reference

Example: 1,3,5/B2A means that *Circuits 1, 3, and 5* from *Panel B2A* **share the first home run conduit.**

GENERAL NOTES

1. All home runs are shown to first device on each circuit.
2. Circuits continue beyond first device as shown on this layout.
3. Home runs and conduits are routed above ceiling in common areas.
4. Conduit sizes are shown on feeder routing callout.
5. All HVAC circuits are 3-pole. Conduit shown to rooftop units.

NORTH

PANEL HOME RUN SUMMARY

FROM MDP	TO PANEL	CONDUIT	CONTENTS
MDP	B2A	1-1/4"	3#4, 1#8G, 1#8N
MDP	B2B	1-1/4"	3#4, 1#8G, 1#8N
MDP	B2C	1-1/4"	3#4, 1#8G, 1#8N

TYPICAL CIRCUIT ROUTING

CIRCUIT	ROUTING PATH	NOTES
Lighting	Panel → Across Ceiling → Drop to Fixture	Ceiling-mounted conduit
Receptacle	Panel → Along Walls → Drop to Device	Wall or ceiling route
Common Area	Panel (CMP) → Hallway → To Device	Above ceiling
HVAC	Panel → Up Wall → To Roof → RTU	3P circuit to rooftop unit

SHOP-A FEEDER LOAD WORKSHEET (WS)

DESIGN CRITERIA

- NEC 220.12, 220.42, 220.60, 310.15(B), 430.24, 440.14
- All continuous loads sized at 125% per NEC 210.19(A)(1) and 215.2(A)(1)
- Demand factors per NEC Table 220.42
- Feeder load = 100% of non-continuous load + 125% of continuous load

LOAD TYPE	DESCRIPTION	AREA / QTY (OR UNIT COUNT)	VA (PER UNIT)	CALCULATED LOAD (VA) (PER NEC)	CONNECTED LOAD (VA)		DEMAND FACTOR (NEC 220.42)	CALCULATED DEMAND LOAD (VA)
					NON-CONTINUOUS	CONTINUOUS		
GENERAL LIGHTING LOADS NEC 220.12	General Lighting	(14 ft × 27 ft) = 378 sq ft	3 VA/sq ft	1,134 VA	1,134 VA	–	100%	1,134 VA
	Connected Load	–	113 VA	113 VA	113 VA	–	100%	113 VA
	Total General Lighting	–	–	**1,247 VA**	**1,247 VA**	–	**100%**	**1,247 VA**
CONNECTED LOAD NEC 220.14	From Panelboard Worksheet	–	570 VA	570 VA	–	570 VA	100%	570 VA
RECEPTACLE OUTLETS NEC 220.14(I)	Receptacle Outlets	8	180 VA	1,440 VA	1,440 VA	–	100%	1,440 VA
	Dryer Receptacles	3	1,440 VA	4,320 VA	4,320 VA	–	100%	4,320 VA
	HVAC Service Receptacle	1	1,000 VA	1,000 VA	1,000 VA	–	100%	1,000 VA
	Subtotal Receptacle Outlets	–	–	**7,260 VA**	**7,260 VA**	–	–	**7,260 VA**
MOTOR LOADS NEC 430.24	Appliance (AP)	1	3,000 VA (Nameplate)	3,000 VA	3,000 VA	–	70%	3,000 VA (70% of 3,000)
	HVAC Unit (Rooftop)	1	72,000 VA (largest motor)		72,000 VA	72,000 VA	125% of largest motor	90,000 VA (72,000 × 1.25)
	Subtotal Motor Loads	–	–	**77,000 VA**	**77,000 VA**	**72,000 VA**	–	**93,000 VA**
TOTAL LOADS SUMMARY	Total Non-Continuous Loads (From Above)	–	–	91,977 VA	91,977 VA	–	–	91,977 VA
	Total Continuous Loads (From Above)	–	–	72,570 VA	–	72,570 VA	–	90,713 VA (72,570 × 1.25)
	FEEDER LOAD (100% of Non-Continuous + 125% of Continuous)	–	–	–	–	–	–	**182,690 VA**
MINIMUM FEEDER AMPACITY	Feeder Load (VA)							182,690 VA
	Feeder Voltage							208Y/120V, 3Ø, 4W
	Minimum Feeder Current (A)							$I = \frac{182,690}{(\sqrt{3} \times 208)} = 507\ A$
	Selected Feeder Device (OCPD)							600 A, 3P
	Feeder Conductor Size (Cu)							(3) 500 kcmil THWN + (1) 350 kcmil THWN (N) + (1) #3 THWN (EGC)
	Feeder Conduit / Raceway							3" EMT (or as required by NEC Chapter 9)

NOTES:

1. All loads and calculations in accordance with NEC 220 and 215.
2. Continuous loads sized at 125% per NEC 210.19(A)(1) and 215.2(A)(1).
3. Motor loads use largest motor multiplier NEC 430.24.
4. Receptacle loads per NEC 220.14(I), Table 220.55.
5. Demand factors per NEC Table 220.42.

VA	Volt-Amperes	**NEC**	National Electrical Code
AP	Appliance	**EGC**	Equipment Grounding Conductor
OCPD	Overcurrent Protective Device	**kcmil**	Thousand Circular Mils

SHOP-A PANELBOARD WORKSHEET (WS)

LOAD	QUANTITY	LOAD PER ITEM (VA)	TOTAL LOAD (VA)	CONTINUOUS vs NON-CONTINUOUS	MODIFIED LOAD (VA)	NUMBER OF CONDUCTORS IN THE SAME RACEWAY	ADJUSTMENT FACTOR [illegible]	[illegible] AMPACITY SIZE (A)	ALLOWABLE AMPACITY (A) [illegible]	OCPD RATING [illegible]	CIRCUIT NUMBER
Lighting Load	Luminaire Type L1	[illegible]	[illegible]	Continuous [illegible]	[illegible]	2	1	[illegible]	[illegible]	[illegible]	1
	Luminaire Type L2	[illegible]	[illegible]	Continuous [illegible]	[illegible]	2	1	[illegible]	[illegible]	[illegible]	1
	Luminaire Type L3	[illegible]	[illegible]	Non-Continuous [illegible]	[illegible]	2	0.8	[illegible]	[illegible]	[illegible]	1
Receptacle Load (Walls)	[illegible]	[illegible]	[illegible]	Receptacle [illegible]	[illegible]	2	1	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Receptacle [illegible]	[illegible]	4	0.8	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Receptacle [illegible]	[illegible]	[illegible]	0.8	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Receptacle [illegible]	[illegible]	4	0.8	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Receptacle [illegible]	[illegible]	4	0.8	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Receptacle [illegible]	[illegible]	4	0.8	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Receptacle [illegible]	[illegible]	[illegible]	0.8	[illegible]	[illegible]	[illegible]	[illegible]
	Appliance [illegible]	[illegible]	[illegible]	Non-Continuous [illegible]	[illegible]	2	1	[illegible]	[illegible]	[illegible]	[illegible]
	HVAC Unit [illegible]	[illegible]	[illegible]	Non-Continuous [illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]
	HVAC Service Receptacle	[illegible]	[illegible]	Receptacle [illegible]	[illegible]	2	1	[illegible]	[illegible]	[illegible]	[illegible]
TOTALS	—	—	[illegible] VA	—	[illegible] VA	—	—	—	—	—	—
SHOP-A PANELBOARD TOTAL CONNECTED LOAD = [illegible] VA						TOTAL CALCULATED LOAD = [illegible] VA					

NOTES:

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]

LEGEND & ABBREVIATIONS

VA	Volt-Amperes	NEC	National Electrical Code
OCPD	Overcurrent Protective Device	APL	Appliance
AWG	American Wire Gauge	kcmil	Thousand Circular Mils

DESIGN CRITERIA

- [illegible]
- [illegible]
- [illegible]
- [illegible]

SHOP-A PANELBOARD SCHEDULE

PANEL: "B2A"

MOUNT: FLUSH

AMPERE RATING: 200 AMPS

VOLTAGE: 208Y/120V, 3-PHASE, 4-WIRE

AIC RATING: 22,000 AIC FULLY RATED

MAIN TYPE: MAIN LUG ONLY

ENCLOSURE: NEMA 1

CIRCUIT NO.	CIRCUIT DESCRIPTION	OCPD RATING	LOAD (VA)[1]			DESCRIPTION	OCPD RATING	CIRCUIT NO.
			PHASE A	PHASE B	PHASE C			
1	Lighting	20A	705VA	360VA	1440VA	HVAC Unit	30A	11
2	–	–	–	–	–	–	–	12
3	Receptacle Load 3	20A	360VA	–	–	HVAC Service Receptacle	20A	13
4	–	–	–	–	–	–	–	14
5	Receptacle Load 5	20A	–	360VA	–	Spare	20A	15
6	Receptacle 6 (Dryer)	20A	–	–	1440VA	Spare	20A	17
7	Receptacle 7 (Dryer)	20A	1440VA	–	–	–	–	19
8	Receptacle 8 (Dryer)	20A	–	2800VA	–	–	–	21
9	Appliance (APL)	30A	–	–	1500VA	–	–	23
10	–	–	–	–	–	–	–	24

LOAD SUMMARY	PHASE TOTALS (VA)		
	PHASE A	PHASE B	PHASE C
Connected Load (VA)	2,845VA	6,020VA	7,100VA
Total Load (VA):	15,965 VA		
Total Amperes Per Phase[2]:	68.7 A	50.2 A	59.2 A

NOTES

1. Load for each circuit is calculated in Panelboard Worksheet (use the value from "Modified Load" column).
2. The load is balanced among all three phases to the extent possible.

PANELBOARD INFORMATION

TOTAL LOAD (VA):	AMPERES PER PHASE[2]:	CONNECTED LOAD (VA):	DEMAND FACTOR:	DEMAND LOAD (VA):
15,965 VA	68.7 A / 50.2 A / 59.2 A	15,965 VA	100%	15,965 VA

CODE REFERENCES

- NEC 220.42 – Demand Factors
- NEC 310.15(B)(16) – Ampacity of Conductors
- NEC 240.4 – OCPD Sizing
- NEC 408.3 – Panelboard Ratings
- NEC 110.14(C) – Working Space

LEGEND & ABBREVIATIONS

VA	Volt-Amperes	NEC	National Electrical Code
OCPD	Overcurrent Protective Device	APL	Appliance
AIC	Amperes Interrupting Capacity	A	Amperes

GENERAL NOTES

- All conductors are copper unless otherwise noted.
- All equipment shall be UL listed and labeled.
- Panelboard shall be suitable for the available short-circuit current.

SHOP-B FEEDER LOAD WORKSHEET (WS)

LOAD TYPE	DESCRIPTION	AREA (SQ FT OR UNIT COUNT)	VA PER UNIT	CALCULATED LOAD (VA)	CONNECTED LOAD (VA)		DEMAND FACTOR %	CALCULATED DEMAND LOAD (VA)
					NONCONTINUOUS	CONTINUOUS		
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
	[illegible]	—	—	—	—	—	—	—
	[illegible]	—	—	[illegible]	[illegible]	—	[illegible]	[illegible]
[illegible]	[illegible]	—	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]
[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]
	[illegible]	1	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]
	[illegible]	—	—	[illegible]	[illegible]	—	—	[illegible]
[illegible]	[illegible]	—	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
	[illegible]	—	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]
	[illegible]	—	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]
	[illegible]	—	—	[illegible]	—	[illegible]	—	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
	[illegible]	—	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]
	[illegible]	—	—	[illegible]	—	[illegible]	—	[illegible]
[illegible]	[illegible]		[illegible]					
	[illegible]	—	[illegible]	—	—	—	—	—
	[illegible]		[illegible]					
	[illegible]	—	[illegible]	—	—	—	—	—
	[illegible]		[illegible]	—	—	—	—	—
[illegible]	[illegible]	[illegible]	—	—	—	—	—	—
	[illegible]	[illegible]	—	—	—	—	—	—
	[illegible]	1	—	—	—	—	—	—
	[illegible]	1	—	—	—	—	—	—
[illegible]		—	—	[illegible]	[illegible]	[illegible]	—	[illegible]
[illegible]		—	—	—	—	—	—	[illegible]
[illegible]								[illegible]

NOTES

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]

ABBREVIATIONS

- VA — [illegible]
- NEC — [illegible]
- [illegible] — [illegible]
- sq ft — [illegible]

[illegible]

SHOP-B PANELBOARD WORKSHEET (WS)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
—	—	—	—	—	—	—	—	—	—	—	—
TOTALS	—	—	[illegible]	—	[illegible]	—	—	—	—	—	—

[illegible] | [illegible]

NOTES:

[illegible]

LEGEND & ABBREVIATIONS:

VA [illegible]
OCPD [illegible]
AWG American Wire Gauge
NEC National Electrical Code

[illegible]

SHOP-B PANELBOARD SCHEDULE

PANEL:
"B2B"

MOUNT:
FLUSH

AMPERE RATING:
200 AMPS

VOLTAGE:
208Y/120V, 3-PHASE, 4-WIRE

AIC RATING:
22,000 AIC
FULLY RATED

MAIN TYPE:
MAIN LUG ONLY

ENCLOSURE:
NEMA 1

CIRCUIT NO.	CIRCUIT DESCRIPTION	OCPD RATING	LOAD (VA)[1]			DESCRIPTION	OCPD RATING	CIRCUIT NO.
			PHASE A	PHASE B	PHASE C			
1	Lighting	20A	1850VA	900VA	720VA	HVAC Unit	40A	11
2	–	–	–	–	–	Spare	20A	12
3	Receptacle (Walls)	20A	720VA	1080VA	720VA	Spare	20A	13
4	–	–	–	–	–	–	–	14
5	Receptacle (Floors)	20A	720VA	0	–	Spare	20A	15
6	–	–	–	–	–	–	–	16
7	Appliance (APL)	20A	2000VA	1500VA	4000VA	Spare	20A	17
8	Multicoilset Assembly	20A	–	4000VA	–	–	–	19
9	HVAC Service Receptacle	20A	–	–	4000VA	–	–	21
10	–	–	–	–	–	–	–	23

PHASE LOAD SUMMARY (VA)[1]			
PHASE A	PHASE B	PHASE C	
8,750VA	7,480VA	5,440VA	
TOTAL LOAD (VA)[1]:	21,670 VA		
AMPERES PER PHASE[1]:	72.9 A	62.3 A	45.3 A

NOTES:

1. Load for each circuit is calculated in Panelboard Worksheet (use the value from "Modified Load" column).
2. The load is balanced among all three phases to the extent possible.

PANELBOARD INFORMATION				
TOTAL LOAD (VA)[1]	AMPERES PER PHASE[1]	CONNECTED LOAD (VA)[1]	DEMAND FACTOR (Per NEC 220.42)	CALCULATED DEMAND LOAD (VA)[1]
21,670 VA	72.9 A / 62.3 A / 45.3 A	21,670 VA	100%	21,670 VA

LEGEND & ABBREVIATIONS

VA	Volt-Amperes
OCPD	Overcurrent Protective Device
AIC	Amperes Interrupting Capacity
APL	Appliance

CODE REFERENCES (USED IN THIS WORKSHEET)

- NEC 220.12, 220.14, 220.61, 210.19, 215.2, 430.24, 440.14
- NEC 310.15(B)(16) – Ampacity of Conductors
- NEC 240.4 – OCPD Sizing
- NEC 408.3 – Panelboard Ratings
- NEC 110.14(C) – Working Space

[1] Load for each circuit is calculated in Panelboard Worksheet (use the value from "Modified Load" column).

[2] The load is balanced among all three phases to the extent possible.

SHOP-C FEEDER LOAD WORKSHEET (WS)

LOAD TYPE	DESCRIPTION	AREA (sq ft) (OR UNIT COUNT)	VA (PER AREA/UNIT)	CALCULATED LOAD (VA)	CONNECTED LOAD (VA)		DEMAND FACTOR (Per NEC 220.42)	CALCULATED DEMAND LOAD (VA)
					NON-CONTINUOUS	CONTINUOUS		
GENERAL LIGHTING LOADS (NEC 220.12)	General Lighting (Single Phase Loads)	–	540 VA	540 VA	540 VA	–	100%	540 VA
	Connected Load	–	–	–	–	–	–	–
	Total General Lighting Load	–	–	**540 VA**	**540 VA**	–	**100%**	**540 VA**
NON-CONTINUOUS LOADS (VA) ([illegible])	From Panelboard Worksheet	–	1800 VA	1800 VA	1800 VA	–	70% (NEC 220.[illegible])	1260 VA
	4000 VA	–	4000 VA	4000 VA	4000 VA	–	–	–
	Total Non-Continuous Loads			**5800 VA**	**5800 VA**	–	70% (NEC 220.[illegible])	**4060 VA**
CONTINUOUS LOADS (VA) ([illegible])	**5400 VA** (Larger of connected and calculated load)	–	5400 VA	5400 VA	–	5400 VA	100%	5400 VA
CONNECTED LOADS (VA)	From Panelboard Worksheet ([illegible])	–	1600 VA	1600 VA	–	1600 VA	100%	1600 VA
	1x1500VA = 1500VA	–	1500 VA	1500 VA	–	1500 VA	100%	1500 VA
	Largest motor load + [illegible]	–	10500 VA	10500 VA	–	10500 VA	100%	10500 VA
	Total Connected Load			**13600 VA**	–	**13600 VA**	–	**13600 VA**
CALCULATED LOAD (VA) (PER NEC 220.12)	3600 sq ft × 3VA = 10800VA	3600 sq ft	3 VA/sq ft	10800 VA	–	10800 VA	100%	**10800 VA**
	28x180VA = 5040VA	28	180 VA	5040 VA	–	5040 VA	100%	**5040 VA**
	Total Calculated Load			**15840 VA**	–	**15840 VA**	–	**15840 VA**
VA (PER AREA/UNIT)	3 VA/sq ft	–	3 VA/sq ft	–	–	–	–	–
	180 VA	28	180 VA	–	–	–	–	–
	1500 VA	1	1500 VA	–	–	–	–	–
	4000 VA (from nameplate)	1	4000 VA	–	–	–	–	–
	5400 VA (from nameplate)	1	5400 VA	–	–	–	–	–
	10000 VA (MBCSC: Minimum Branch Circuit Selection Current is given as [illegible] A on nameplate)	1	10000 VA	–	–	–	–	–
AREA (SQFT) (OR UNIT COUNT)	([illegible]) = [illegible] sq ft	[illegible] sq ft	–	–	–	–	–	–
	[illegible] = 540 sqft	540 sqft	–	–	–	–	–	–
	28	28	–	–	–	–	–	–
	1	1	–	–	–	–	–	–
TOTAL LOADS		–	–	**33,540 VA**	**6,040 VA**	**17,500 VA**	–	**33,540 VA**
FEEDER LOAD (100% of noncontinuous load plus 125% of continuous load)				–	–	–	–	32,[illegible] VA
MINIMUM FEEDER AMPACITY				–	–	–	–	[illegible] A ([illegible])

NOTES:

1. All loads and calculations in accordance with NEC 220 and 215.
2. Continuous loads at 125% per NEC 210.19(A)(1) and 215.2(A)(1).
3. Motor load uses largest motor method per NEC 430.24.
4. Receptacle loads per NEC 220.14(I), Table 220.44.
5. Demand factors per NEC Table 220.42.

ABBREVIATIONS:

VA	Volt-Ampere
NEC	National Electrical Code
MBCSC	Minimum Branch Circuit Selection Current
sqft	Square Feet

CODE REFERENCES:

- NEC 220.12, 220.14, 220.40, [illegible], [illegible], 430.24, [illegible]
- NEC 310.15(B)(16) – Ampacity of Conductors
- NEC 240.4 – OCPD Sizing
- NEC 408.[illegible] – Panelboard Ratings
- NEC 110.26(C) – Working Space

NOTE: Use the value from the "Modified Load" column in the Panelboard Worksheet for all connected load calculations.

SHOP-C PANELBOARD WORKSHEET (WS)

CIRCUIT NUMBER	1	3	2	3,5	4,6,8	7
OCPD RATING	20A (Per NEC 240.[illegible])	20A (Per NEC 240.[illegible])	20A (Per NEC [illegible])	50A (Per NEC [illegible])	30A (Per NEC [illegible])	20A (Per NEC [illegible])
ALLOWABLE AMPACITY	25A (Per NEC [illegible])	25A (Per NEC [illegible])	25A (Per NEC [illegible])	[illegible] (Per NEC [illegible])	[illegible] (Per NEC [illegible])	25A (Per NEC [illegible])
CONDUCTOR SIZE (AWG)	12 AWG (Minimum required)	12 AWG (Minimum required)	12 AWG (Minimum required)	6 AWG (Minimum required)	10 AWG (Minimum required)	12 AWG (Minimum required)
MINIMUM AMPACITY (A)	3.75A ([illegible])	1.88A ([illegible])	8A ([illegible])	20.83A ([illegible])	24.50A ([illegible])	12.5A ([illegible])
ADJUSTMENT FACTOR PER NEC 310.15(C)(1)	1	1	1	1	1	1
NUMBER OF CONDUCTORS IN THE SAME RACEWAY	2	3	2	3	4	3
MODIFIED LOAD (VA)	450 (1.25 x 360)	225 (1.25 x 180)	2000 (1 x 2000)	4000 (1 x 4000)	5400 (1 x 5400)	1500 (1 x 1500)
CONTINUOUS or NON-CONTINUOUS	Continuous (multiplied by 125%)	Continuous (multiplied by 125%)	Receptacle (multiplied by 1)	Non-Continuous (multiplied by 1)	Non-Continuous (multiplied by 1)	Receptacle (multiplied by 1)
TOTAL LOAD (VA)	360 (6 x 60)	180 (2 x 90)	2000 ([illegible])	4000 (1 x 4000)	5400 (1 x 5400)	1500 (1 x 1500)
LOAD PER ITEM (VA)	60 (Load Rating)	90 (Load Rating)	180 (VA Per NEC 220.14)	4000 (Per Nameplate)	5400 (Per Nameplate)	1500 ([illegible])
QUANTITY	6	2	8	1	1	1
LOAD	Luminaire Type L1	Luminaire Type L2	Receptacle (Wall)	Appliance (APL)	HVAC Unit (Rooftop)	HVAC Service Receptacle

NOTES:

1. All loads and calculations in accordance with NEC 2023 [illegible]
2. Continuous loads at 125% per NEC [illegible] and [illegible]
3. Motor loads [illegible] per NEC 430.24
4. Receptacle loads per NEC 220.14([illegible]), Table 220.52
5. [illegible] per NEC Table 220.[illegible]

ABBREVIATIONS:

VA	Volt-Ampere
NEC	National Electrical Code
OCPD	Overcurrent Protective Device
AWG	American Wire Gauge
APL	Appliance
[illegible]	[illegible]

CODE REFERENCES (USED IN THIS WORKSHEET):

- NEC [illegible]
- NEC 310.15(B)(16) – Ampacity of Conductors
- NEC 240.4 – OCPD Sizing
- NEC 408.[illegible] – Panelboard Ratings
- NEC 110.26(A) – Working Space

NOTE: [illegible]

MEDICAL OFFICE BUILDING

TWO-STORY MEDICAL OFFICE FACILITY

123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

ELECTRICAL CONSTRUCTION DOCUMENTS

ISSUED FOR PERMIT
MAY 20, 2024

BUILDING PERSPECTIVE

VICINITY MAP

SITE PLAN (KEY PLAN)

CODE SUMMARY

BUILDING CODE:	INTERNATIONAL BUILDING CODE (IBC) 2021
ELECTRICAL CODE:	NATIONAL ELECTRICAL CODE (NEC) 2023
FIRE CODE:	NFPA 101 – LIFE SAFETY CODE 2021
FIRE PROTECTION:	NFPA 13 – STANDARD FOR SPRINKLER SYSTEMS 2022
ACCESSIBILITY:	ICC/ANSI A117.1 – 2017

OCCUPANCY CLASSIFICATION

PRIMARY OCCUPANCY:	GROUP B – BUSINESS (OFFICES)
SECONDARY OCCUPANCY:	GROUP M – MERCANTILE (PHARMACY / RETAIL)
RESIDENTIAL OCCUPANCY:	GROUP I-2 – INSTITUTIONAL (HEALTH CARE)
CONSTRUCTION TYPE:	TYPE II-B (FULLY SPRINKLERED)
STORIES:	2
BUILDING HEIGHT:	28'-0" (TO TOP OF PARAPET)
TOTAL GROSS AREA:	12,000 SQUARE FEET
FIRE SPRINKLERED:	YES (NFPA 13)

ELECTRICAL SERVICE

UTILITY:	LOCAL UTILITY COMPANY
SERVICE:	480Y/277V, 3-PHASE, 4-WIRE
SERVICE ENTRANCE RATING:	600A
AVAILABLE FAULT CURRENT:	35,000 KIC (MAXIMUM)

PROJECT DATA

PROJECT DESCRIPTION
NEW TWO-STORY MEDICAL OFFICE BUILDING INCLUDING PHYSICIAN SUITES, EXAM ROOMS, PROCEDURE ROOM, IMAGING SUITE, ADMINISTRATIVE OFFICES, AND SUPPORT SPACES.

SITE ADDRESS
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER
HEALTHCARE DEVELOPERS, LLC
456 BUSINESS PARKWAY
ANYTOWN, STATE 12345
(555) 555-0100

ARCHITECT
DESIGN SOLUTIONS ARCHITECTS
789 ARCHITECTURAL WAY
ANYTOWN, STATE 12345
(555) 555-0200

ENGINEER – ELECTRICAL
POWER DESIGN GROUP, P.E.
101 ENGINEERING DRIVE
ANYTOWN, STATE 12345
(555) 555-0300

BUILDING INFORMATION

TOTAL GROSS AREA:	12,000 SF (6,000 SF PER FLOOR)
NUMBER OF STORIES:	2
CONSTRUCTION TYPE:	TYPE II-B
FIRE SPRINKLERED:	YES (NFPA 13)
OCCUPANCY:	GROUP B (BUSINESS) GROUP M (MERCANTILE – PHARMACY) GROUP I-2 (INSTITUTIONAL – HEALTH CARE)

DESIGN CRITERIA

AMBIENT TEMPERATURE:	30°C (86°F)
WINTER DESIGN TEMP:	10°F
SEISMIC DESIGN CATEGORY:	B
WIND SPEED:	115 MPH (3-SECOND GUST)
EXPOSURE CATEGORY:	B
IMPORTANCE FACTOR:	1.0

DRAWING INDEX

SHEET NO.	SHEET TITLE
E0.0	COVER SHEET, DRAWING INDEX, PROJECT DATA
E0.1	GENERAL NOTES, ABBREVIATIONS, SYMBOL LEGEND, NEC ARTICLE 517 PATIENT CARE CLASSIFICATION PLAN
E0.2	SINGLE-LINE DIAGRAM
E1.1	ELECTRICAL SITE PLAN
E2.1	POWER PLAN – FIRST FLOOR
E2.2	POWER PLAN – SECOND FLOOR
E3.1	LIGHTING PLAN – FIRST FLOOR
E3.2	LIGHTING PLAN – SECOND FLOOR
E4.1	SYSTEMS PLAN – FIRST FLOOR
E4.2	SYSTEMS PLAN – SECOND FLOOR
E5.1	ROOF PLAN – EQUIPMENT POWER
E6.0	ENLARGED PLANS – ELECTRICAL ROOMS
E7.1	ENLARGED PLANS – EXAM ROOM & PROCEDURE ROOM
E8.1	PANEL SCHEDULES
E8.2	PANEL SCHEDULES (CONTINUED)
E9.1	ONE-LINE DIAGRAMS – POWER PANELS
E9.2	ONE-LINE DIAGRAMS – ESSENTIAL SYSTEM PANELS
E9.3	TRANSFER SWITCH & GENERATOR DIAGRAMS
E10.1	RISER DIAGRAM – NORMAL POWER
E10.2	RISER DIAGRAM – ESSENTIAL SYSTEM
E11.1	DETAILS – TYPICAL ELECTRICAL DETAILS
E11.2	DETAILS – NEC 517 DETAILS
E11.3	DETAILS – GROUNDING & BONDING DETAILS
E12.1	SCHEDULES – LIGHT FIXTURES & EQUIPMENT
E13.1	ROOM FINISH SCHEDULE & EQUIPMENT CONNECTION SCHEDULE

APPLICABLE REFERENCES

- NATIONAL ELECTRICAL CODE (NEC) 2023
- INTERNATIONAL BUILDING CODE (IBC) 2021
- NFPA 70 – NATIONAL ELECTRICAL CODE 2023
- NFPA 101 – LIFE SAFETY CODE 2021
- NFPA 99 – HEALTH CARE FACILITIES CODE 2021
- NEC ARTICLE 517 – HEALTH CARE FACILITIES
- NEC ARTICLE 700 – EMERGENCY SYSTEMS
- NEC ARTICLE 701 – LEGALLY REQUIRED STANDBY SYSTEMS

SHEET NOTES

1. DO NOT SCALE DRAWINGS. USE WRITTEN DIMENSIONS ONLY.
2. ALL WORK SHALL COMPLY WITH THE LATEST ADOPTED CODES AND ORDINANCES.
3. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK.
4. ALL MATERIALS AND EQUIPMENT SHALL BE NEW, UL LISTED, AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

DESIGN TEAM

DISCIPLINE	FIRM	CONTACT	PHONE
CIVIL ENGINEER	CIVIL SOLUTIONS	JOHN SMITH, P.E.	(555) 555-0400
MEP ENGINEER	POWER DESIGN GROUP	JANE DOE, P.E.	(555) 555-0300
STRUCTURAL ENGINEER	STRUCTURAL DESIGN INC.	MICHAEL BROWN, P.E.	(555) 555-0500
LANDSCAPE ARCHITECT	GREEN DESIGN GROUP	LAURA GREEN	(555) 555-0600

POWER DESIGN GROUP, P.E.
CONSULTING ENGINEERS
101 ENGINEERING DRIVE
ANYTOWN, STATE 12345
(555) 555-0300
WWW.POWERDESIGN.COM

LICENSED PROFESSIONAL ENGINEER
JANE DOE
No. 123456
STATE OF ANYWHERE
ELECTRICAL

Jane Doe

05/20/2024

PROJECT
MEDICAL OFFICE BUILDING
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER
HEALTHCARE DEVELOPERS, LLC
456 BUSINESS PARKWAY
ANYTOWN, STATE 12345

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM #1	05/15/24
2	CITY COMMENTS	05/17/24

DRAWN BY:	AMD
CHECKED BY:	JDD
DATE:	05/20/2024
PROJECT NO.:	24-0123

SHEET TITLE
COVER SHEET, DRAWING INDEX, PROJECT DATA

SHEET NO.
E0.0

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE 2023 NATIONAL ELECTRICAL CODE (NEC), INCLUDING ARTICLE 517 – HEALTH CARE FACILITIES, AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.
2. ALL EQUIPMENT SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
3. DO NOT SCALE DRAWINGS; WRITTEN DIMENSIONS GOVERN.
4. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE DESIGNER OF RECORD PRIOR TO PROCEEDING WITH WORK.
5. ALL CIRCUITS IN PATIENT CARE SPACES SHALL COMPLY WITH NEC 517.13.
6. PATIENT CARE AREAS SHALL BE SUPPLIED BY TWO SEPARATE BRANCH CIRCUITS AS REQUIRED BY NEC 517.13(A).
7. GROUND-FAULT PROTECTION SHALL BE PROVIDED IN ACCORDANCE WITH NEC 517.18.
8. ISOLATED GROUND (IG) RECEPTACLES SHALL BE USED IN ALL PATIENT CARE SPACES AS REQUIRED BY NEC 517.13(B). RECEPTACLE FACEPLATES SHALL BE ORANGE AND MARKED "ISOLATED GROUND".
9. EQUIPMENT GROUNDING CONDUCTORS SHALL BE INSTALLED IN ALL BRANCH CIRCUITS IN PATIENT CARE SPACES (NEC 517.13(A)(1)).
10. CONDUIT ROUTING IS SCHEMATIC. COORDINATE ROUTING WITH ALL MECHANICAL, STRUCTURAL, AND ARCHITECTURAL ELEMENTS.
11. ALL FIRE ALARM, LIFE SAFETY, AND EMERGENCY SYSTEMS SHALL COMPLY WITH NFPA 101 AND NEC REQUIREMENTS.
12. PANELBOARD SCHEDULES ARE SHOWN ON SHEETS E7.1 – E7.4.
13. SINGLE-LINE DIAGRAM IS SHOWN ON SHEET E0.2.
14. REFER TO SHEET E1.1 FOR LIGHTING PLAN AND SHEET E2.1 FOR POWER PLAN.
15. ALL DEVICES MOUNTED IN WET LOCATIONS SHALL BE LISTED FOR THE LOCATION AND PROVIDED WITH GFCI PROTECTION AS REQUIRED BY NEC 210.8.

ABBREVIATIONS

A	AMPERE
AIC	AMPERE INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
AF	ABOVE FINISHED FLOOR
AFF	ABOVE FINISHED FLOOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CU	COPPER
DC	DIRECT CURRENT
E	EXISTING
EES	ESSENTIAL ELECTRICAL SYSTEM
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
G	GROUND
GFCI	GROUND-FAULT CIRCUIT INTERRUPTER
HP	HORSEPOWER
IG	ISOLATED GROUND
KVA	KILOVOLT-AMPERE
LED	LIGHT EMITTING DIODE
MCC	MOTOR CONTROL CENTER
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NTS	NOT TO SCALE
P	POLE
PVC	POLYVINYL CHLORIDE
RGS	RIGID GALVANIZED STEEL
SP	SINGLE POLE
ST	SINGLE THROW
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VA	VOLT-AMPERE
XFMR	TRANSFORMER

ELECTRICAL SYMBOL LEGEND

LIGHTING FIXTURES

- 2'x4' LED RECESSED TROFFER
- 2'x2' LED RECESSED TROFFER
- LED SURFACE MOUNTED FIXTURE
- LED LINEAR FIXTURE
- EXIT SIGN (LED, SINGLE FACE)
- EMERGENCY LIGHT (TWO HEAD)

RECEPTACLES

- DUPLEX RECEPTACLE, 120V
- DUPLEX RECEPTACLE, 120V, MOUNTED ABOVE COUNTER
- ISOLATED GROUND DUPLEX RECEPTACLE, ORANGE FACE
- DUPLEX GFCI RECEPTACLE, 120V
- QUAD RECEPTACLE, 120V
- FLOOR DUPLEX RECEPTACLE
- SINGLE RECEPTACLE, 240V
- TWIST-LOCK RECEPTACLE, 208V, 3-PHASE
- EQUIPMENT CONNECTION (J-BOX)

SWITCHES

- S — SINGLE-POLE SWITCH
- S3 — THREE-WAY SWITCH
- S4 — FOUR-WAY SWITCH
- OS — OCCUPANCY SENSOR SWITCH
- DS — DIMMER SWITCH

POWER / EQUIPMENT

- P — PANELBOARD
- DISCONNECT SWITCH
- M — MOTOR
- MS — MOTOR STARTER
- TRANSFORMER
- UPS — UPS
- SPD — SURGE PROTECTIVE DEVICE
- T — TELECOMMUNICATIONS OUTLET
- D — DATA OUTLET
- FA — FIRE ALARM DEVICE
- SPEAKER / HORN

RACEWAYS / MISCELLANEOUS

- EXISTING TO REMAIN
- NEW CONDUIT RUN (CONCEALED)
- NEW CONDUIT RUN (EXPOSED)
- CONDUIT TURN UP
- CONDUIT TURN DOWN
- HOME RUN TO PANEL
- NIC — NOT IN CONTRACT

NEC ARTICLE 517 PATIENT CARE CLASSIFICATION PLAN

FIRST FLOOR

SECOND FLOOR

NORTH

0 8' 16' 32'

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

NOTE:

1. ALL PATIENT CARE SPACES (GREEN AND ORANGE) SHALL BE SUPPLIED BY TWO SEPARATE BRANCH CIRCUITS – ONE FROM NORMAL SYSTEM AND ONE FROM ESSENTIAL SYSTEM PER NEC 517.13(A).
2. ALL PATIENT CARE SPACES SHALL USE ISOLATED GROUND RECEPTACLES PER NEC 517.13(B).

PATIENT CARE CLASSIFICATION KEY (NEC ARTICLE 517)

PATIENT CARE SPACE (ENHANCED)
NEC 517.3
Procedure Room, Imaging Suite
Requirements:
- Isolated Power System (NEC 517.160)
- Equipotential Grounding (NEC 517.13)
- Two Branch Circuits (Normal + Essential)

PATIENT CARE SPACE (BASIC)
NEC 517.3
Exam Rooms
Requirements:
- Isolated Ground Receptacles (NEC 517.13(B))
- Two Branch Circuits (Normal + Essential)

GENERAL AREAS (NOT PATIENT CARE SPACES)
NEC 517.3
Nursing Station, Administrative Offices
Requirements:
- Normal Power
- GFCI as required by NEC 210.8

PUBLIC AREAS (NOT PATIENT CARE SPACES)
NEC 517.3
Reception/Waiting, Corridors
Requirements:
- Normal Power
- Emergency Lighting per NEC 700

SUPPORT SPACES (NOT PATIENT CARE SPACES)
NEC 517.3
Restrooms, Storage, Mechanical, Electrical Rooms
Requirements:
- Normal Power
- GFCI in Restrooms per NEC 210.8

PROJECT

MEDICAL OFFICE BUILDING

PROJECT INFORMATION

TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER

OWNER

DESIGNER OF RECORD

DESIGNER

CONSULTANT

ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR

CONSTRUCTION DOCUMENTS

DATE [illegible]

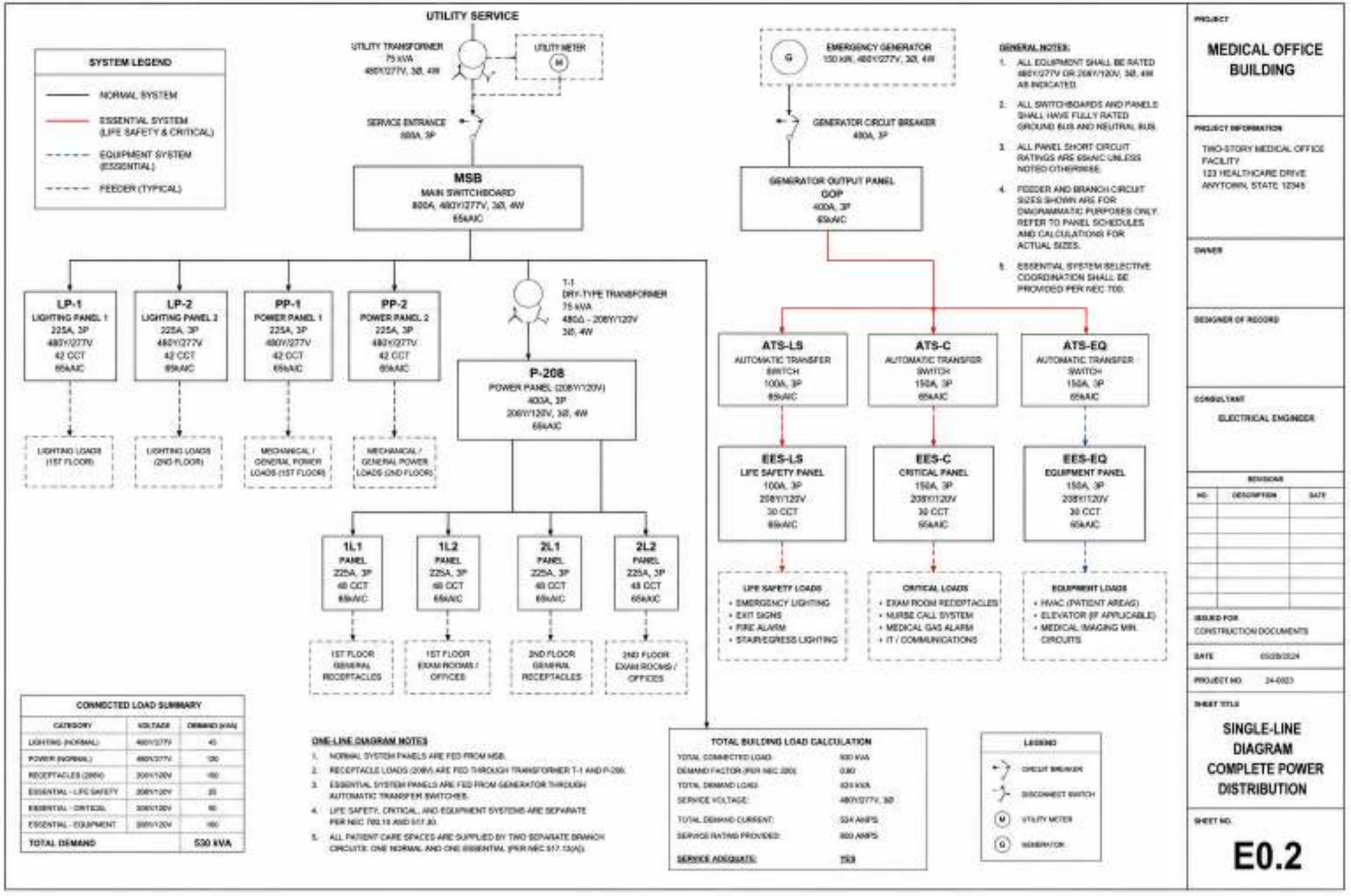
PROJECT NO. 24-0031

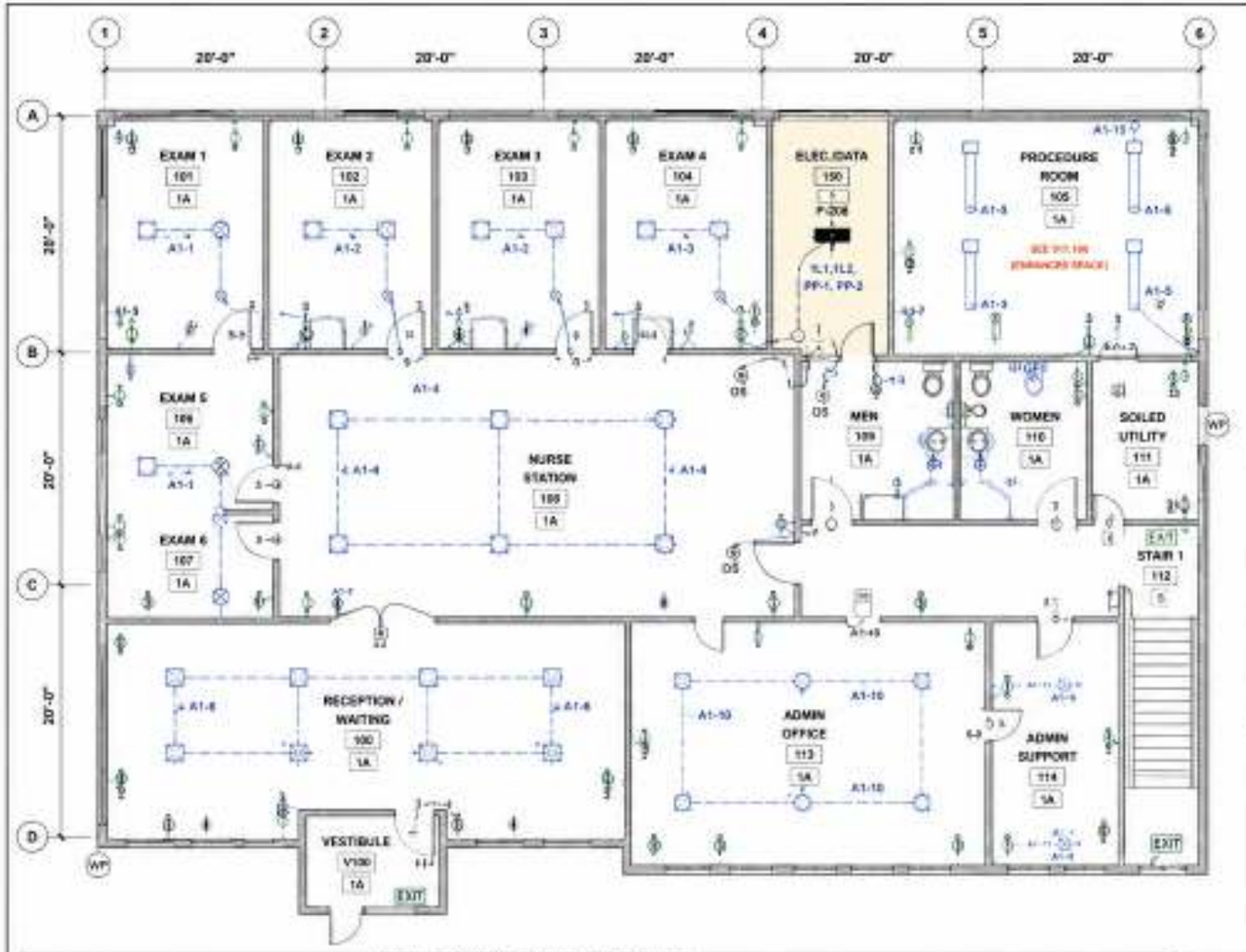
SHEET TITLE

GENERAL NOTES, ABBREVIATIONS, SYMBOL LEGEND, NEC 517 PATIENT CARE CLASSIFICATION PLAN

SHEET NO.

E0.1


UTILITY SERVICE
UTILITY TRANSFORMER
75 kVA
480Y/277V, 3Ø, 4W
UTILITY METER
M
SERVICE ENTRANCE
800A, 3P
MSB
MAIN SWITCHBOARD
800A, 480Y/277V, 3Ø, 4W
65kAIC
SYSTEM LEGEND
NORMAL SYSTEM
ESSENTIAL SYSTEM (LIFE SAFETY & CRITICAL)
EQUIPMENT SYSTEM (ESSENTIAL)
FEEDER (TYPICAL)
LP-1
LIGHTING PANEL 1
225A, 3P
480Y/277V
42 CCT
65kAIC
LP-2
LIGHTING PANEL 2
225A, 3P
480Y/277V
42 CCT
65kAIC
PP-1
POWER PANEL 1
225A, 3P
480Y/277V
42 CCT
65kAIC
PP-2
POWER PANEL 2
225A, 3P
480Y/277V
42 CCT
65kAIC
LIGHTING LOADS (1ST FLOOR)
LIGHTING LOADS (2ND FLOOR)
MECHANICAL / GENERAL POWER LOADS (1ST FLOOR)
MECHANICAL / GENERAL POWER LOADS (2ND FLOOR)
T-1
DRY-TYPE TRANSFORMER
75 kVA
480Δ - 208Y/120V
3Ø, 4W
P-208
POWER PANEL (208Y/120V)
400A, 3P
208Y/120V, 3Ø, 4W
65kAIC
1L1
PANEL
225A, 3P
42 CCT
65kAIC
1L2
PANEL
225A, 3P
42 CCT
65kAIC
2L1
PANEL
225A, 3P
42 CCT
65kAIC
2L2
PANEL
225A, 3P
42 CCT
65kAIC
1ST FLOOR GENERAL RECEPTACLES
1ST FLOOR EXAM ROOMS / OFFICES
2ND FLOOR GENERAL RECEPTACLES
2ND FLOOR EXAM ROOMS / OFFICES
G
EMERGENCY GENERATOR
150 kW, 480Y/277V, 3Ø, 4W
GENERATOR CIRCUIT BREAKER
400A, 3P
GENERATOR OUTPUT PANEL
GOP
400A, 3P
65kAIC
ATS-LS
AUTOMATIC TRANSFER SWITCH
100A, 3P
65kAIC
ATS-C
AUTOMATIC TRANSFER SWITCH
150A, 3P
65kAIC
ATS-EQ
AUTOMATIC TRANSFER SWITCH
150A, 3P
65kAIC
EES-LS
LIFE SAFETY PANEL
100A, 3P
208Y/120V
30 CCT
65kAIC
EES-C
CRITICAL PANEL
150A, 3P
208Y/120V
30 CCT
65kAIC
EES-EQ
EQUIPMENT PANEL
150A, 3P
208Y/120V
30 CCT
65kAIC
LIFE SAFETY LOADS
• EMERGENCY LIGHTING
• EXIT SIGNS
• FIRE ALARM
• STAIR/EGRESS LIGHTING
CRITICAL LOADS
• EXAM ROOM RECEPTACLES
• NURSE CALL SYSTEM
• MEDICAL GAS ALARM
• IT / COMMUNICATIONS
EQUIPMENT LOADS
• HVAC (PATIENT AREAS)
• ELEVATOR (IF APPLICABLE)
• MEDICAL IMAGING MIN. CIRCUITS
GENERAL NOTES:
1. ALL EQUIPMENT SHALL BE RATED 480Y/277V OR 208Y/120V, 3Ø, 4W AS INDICATED.
2. ALL SWITCHBOARDS AND PANELS SHALL HAVE FULLY RATED GROUND BUS AND NEUTRAL BUS.
3. ALL PANEL SHORT CIRCUIT RATINGS ARE 65kAIC UNLESS NOTED OTHERWISE.
4. FEEDER AND BRANCH CIRCUIT SIZES SHOWN ARE FOR DIAGRAMMATIC PURPOSES ONLY. REFER TO PANEL SCHEDULES AND CALCULATIONS FOR ACTUAL SIZES.
5. ESSENTIAL SYSTEM SELECTIVE COORDINATION SHALL BE PROVIDED PER NEC 700.
CONNECTED LOAD SUMMARY
CATEGORY | VOLTAGE | DEMAND (kVA)
LIGHTING (NORMAL) | 480Y/277V | 45
POWER (NORMAL) | 480Y/277V | 120
RECEPTACLES (208V) | 208Y/120V | 150
ESSENTIAL - LIFE SAFETY | 208Y/120V | 25
ESSENTIAL - CRITICAL | 208Y/120V | 80
ESSENTIAL - EQUIPMENT | 208Y/120V | 100
TOTAL DEMAND | | 530 kVA
ONE-LINE DIAGRAM NOTES
1. NORMAL SYSTEM PANELS ARE FED FROM MSB.
2. RECEPTACLE LOADS (208V) ARE FED THROUGH TRANSFORMER T-1 AND P-208.
3. ESSENTIAL SYSTEM PANELS ARE FED FROM GENERATOR THROUGH AUTOMATIC TRANSFER SWITCHES.
4. LIFE SAFETY, CRITICAL, AND EQUIPMENT SYSTEMS ARE SEPARATE PER NEC 700.10 AND 517.30.
5. ALL PATIENT CARE SPACES ARE SUPPLIED BY TWO SEPARATE BRANCH CIRCUITS: ONE NORMAL AND ONE ESSENTIAL (PER NEC 517.19(A)).
TOTAL BUILDING LOAD CALCULATION
TOTAL CONNECTED LOAD: 600 kVA
DEMAND FACTOR (PER NEC 220): 0.80
TOTAL DEMAND LOAD: 530 kVA
SERVICE VOLTAGE: 480Y/277V, 3Ø
TOTAL DEMAND CURRENT: 534 AMPS
SERVICE RATING PROVIDED: 800 AMPS
SERVICE ADEQUATE: YES
LEGEND
CIRCUIT BREAKER
DISCONNECT SWITCH
M UTILITY METER
G GENERATOR
PROJECT
MEDICAL OFFICE BUILDING
PROJECT INFORMATION
TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345
OWNER
DESIGNER OF RECORD
CONSULTANT
ELECTRICAL ENGINEER
REVISIONS
NO. | DESCRIPTION | DATE
ISSUED FOR
CONSTRUCTION DOCUMENTS
DATE 03/28/2024
PROJECT NO. 24-003
SHEET TITLE
SINGLE-LINE DIAGRAM COMPLETE POWER DISTRIBUTION
SHEET NO.
E0.2



ELECTRICAL LEGEND

- 2'x4' LED RECESSED TROFFER
- 2'x2' LED RECESSED TROFFER
- LED LINEAR FIXTURE
- WALL SCONCE
- D — DIMMER SWITCH
- S — SINGLE POLE SWITCH
- 3 — THREE-WAY SWITCH
- S3 — THREE-WAY SWITCH, 3-POLE
- OS — OCCUPANCY SENSOR SWITCH
- DUPLEX RECEPTACLE, 120V
- GFCI — GFCI DUPLEX RECEPTACLE, 120V
- WP — WEATHERPROOF RECEPTACLE, 120V
- J — JUNCTION BOX
- (1) — HOME RUN / CIRCUIT TAG
- PANELBOARD

GENERAL NOTES

1. ALL RECEPTACLES IN EXAM ROOMS, PROCEDURE ROOM, AND NURSE STATION ARE ISOLATED GROUND RECEPTACLES (ORANGE FACE) PER NEC 517.18(B).
2. ALL RECEPTACLES IN RESTROOMS ARE GFCI PROTECTED PER NEC 210.8.
3. ALL PATIENT CARE AREAS (EXAM / PROCEDURE ROOMS) ARE SUPPLIED BY TWO BRANCH CIRCUITS: ONE NORMAL (A1-4) AND ONE ESSENTIAL (E1-4). SEE E1.1.
4. CEILING MOUNTED DEVICES UNLESS NOTED OTHERWISE.
5. ALL CIRCUITS ARE 120V UNLESS NOTED OTHERWISE.
6. REFER TO SHEET E0.1 FOR ABBREVIATIONS AND SYMBOLS NOT SHOWN.

KEY PLAN

CIRCUIT DIRECTORY – FLOOR 1 (NORMAL SYSTEM)

CKT	DESCRIPTION	LOAD	PANEL	CKT	DESCRIPTION	LOAD	PANEL	CKT	DESCRIPTION	LOAD	PANEL
A1-1	EXAM ROOMS 1–4	LIGHTS / RECEPTS (50)	1A, L1	A1-6	RECEPTION / WAITING	LIGHTS / RECEPTS	1A, L1	A1-11	ADMIN SUPPORT	LIGHTS / RECEPTS	1A, L1
A1-2	EXAM ROOMS 1–4	LIGHTS / RECEPTS (42)	1A, L1	A1-7	MEN'S RESTROOM	LIGHTS / RECEPTS	1A, L1	A1-12	STAIR 1	LIGHT / RECEPT	1A
A1-3	EXAM ROOMS 5–6	LIGHTS / RECEPTS (32)	1A, L2	A1-8	WOMEN'S RESTROOM	LIGHTS / RECEPTS	1A, L1	A1-13	VESTIBULE	LIGHTS / RECEPTS	1A
A1-4	NURSE STATION	LIGHTS / RECEPTS (56)	1A, L1	A1-9	SOILED UTILITY ROOM	RECEPTACLE	1A, L2	A1-14	EXTERIOR WALL	WALL SCONCES	1A
A1-5	PROCEDURE ROOM	LIGHTS / RECEPTS (50)	1A, L2	P1-10	ADMIN OFFICE	LIGHTS / RECEPTS	1A, L2	A1-15	EWC (OUTSIDE)	RECEPTACLE	1A
								A1-16	DOOR OPERATOR (VESTIBULE)		1A

NOTE: PATIENT CARE SPACES ARE SUPPLIED BY TWO SEPARATE BRANCH CIRCUITS – ONE NORMAL (A1-4) AND ONE ESSENTIAL (E1-4).

PANEL SCHEDULE (FLOOR 1)

PANEL	LOCATION	VOLTAGE	PHASE	WIRE	MCA	AIC RATING
P-208	ELEC./DATA 150	208Y/120V	3	4	400A	65kAIC
1L1	ELEC./DATA 150	480Y/277V	3	4	225A	65kAIC
1L2	ELEC./DATA 150	480Y/277V	3	4	225A	65kAIC
PP-1	ELEC./DATA 150	480Y/277V	3	4	225A	65kAIC
PP-2	ELEC./DATA 150	480Y/277V	3	4	225A	65kAIC

PROJECT

MEDICAL OFFICE BUILDING

PROJECT INFORMATION

TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER

OWNER

DESIGNER OF RECORD

DESIGNER

CONSULTANT

ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR

CONSTRUCTION DOCUMENTS

DATE 08/26/2024

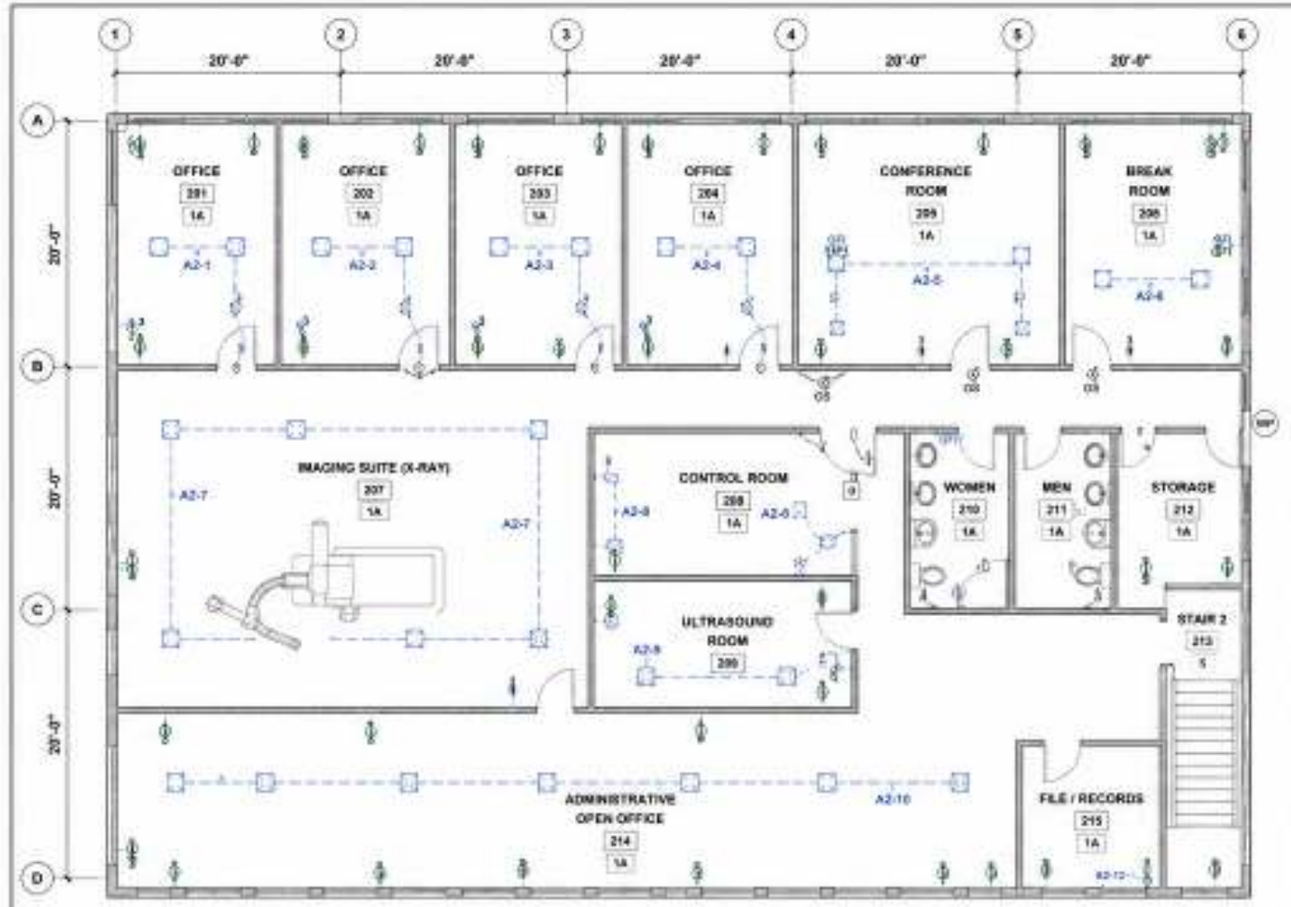
PROJECT NO. 24-0033

SHEET TITLE

FLOOR 1 ELECTRICAL PLAN (NORMAL SYSTEM)

SHEET NO.

E1.0



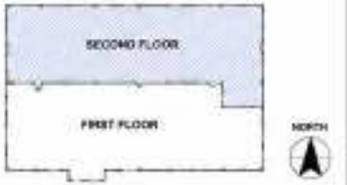
ELECTRICAL LEGEND

- 2'x4' LED RECESSED TROFFER
- 2'x2' LED RECESSED TROFFER
- LED LINEAR FIXTURE
- WALL SCONCE
- D — DIMMER SWITCH
- S — SINGLE POLE SWITCH
- 3S — THREE-WAY SWITCH, 3-POLE
- OS — OCCUPANCY SENSOR SWITCH
- DUPLEX RECEPTACLE, 120V
- GFCI DUPLEX RECEPTACLE, 120V
- WP — WEATHERPROOF RECEPTACLE, 120V
- J — JUNCTION BOX
- HOME RUN / CIRCUIT TAG
- PANELBOARD

GENERAL NOTES

1. ALL RECEPTACLES IN RESTROOMS AND BREAK ROOM ARE GFCI PROTECTED PER NEC 210.8.
2. ALL IMAGING EQUIPMENT SHALL BE CONNECTED TO DEDICATED CIRCUITS AS SHOWN ON PANEL SCHEDULE E1.3.
3. ALL CIRCUITS ARE 120V UNLESS NOTED OTHERWISE.
4. REFER TO SHEET E0.1 FOR ABBREVIATIONS AND SYMBOLS NOT SHOWN.

KEY PLAN



CIRCUIT DIRECTORY – FLOOR 2 (NORMAL SYSTEM)

CKT	DESCRIPTION	LOAD	PANEL
A2-1	OFFICES 201–202	LIGHTS / RECEPTS (G)	2L1, 2L2
A2-2	OFFICES 203–204	LIGHTS / RECEPTS (G)	2L1, 2L2
A2-3	CONFERENCE ROOM	LIGHTS / RECEPTS (G)	2L1, 2L2
A2-4	BREAK ROOM	LIGHTS / RECEPTS	2L1, 2L2
A2-5	CONFERENCE ROOM	LIGHTS / RECEPTS (G)	2L1, 2L2
A2-6	BREAK ROOM	LIGHTS / RECEPTS	2L1, 2L2
A2-7	IMAGING SUITE (X-RAY)	LIGHTS / RECEPTS (G)	2L1, 2L2
A2-8	CONTROL ROOM	LIGHTS / RECEPTS (G)	2L1, 2L2
A2-9	ULTRASOUND ROOM	LIGHTS / RECEPTS (G)	2L1, 2L2
A2-10	ADMIN OPEN OFFICE	LIGHTS / RECEPTS	2L1, 2L2
A2-11	FILE / RECORDS ROOM	LIGHTS / RECEPTS	2L1, 2L2
A2-12	DOOR OPERATOR (STAIR 2)	RECEPTACLE	2L1

NOTE: PATIENT CARE SPACES ARE SUPPLIED BY TWO SEPARATE BRANCH CIRCUITS – ONE NORMAL (A2-A) AND ONE ESSENTIAL (E2-A).

PANEL SCHEDULE (FLOOR 2)

PANEL	LOCATION	VOLTAGE	PHASE	WIRE	MCA	AIC RATING
2L1	SECOND FLOOR ELEC. ROOM	480Y/277V	3	4	225A	65kAIC
2L2	SECOND FLOOR ELEC. ROOM	480Y/277V	3	4	225A	65kAIC

PANEL NOTES:
1. PANELS 2L1 AND 2L2 ARE FED FROM PP-1 AND PP-2 IN ROOM ELEC./DATA 150 ON THE FIRST FLOOR.

PROJECT

MEDICAL OFFICE BUILDING

PROJECT INFORMATION

TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER

OWNER

DESIGNER OF RECORD

DESIGNER

CONSULTANT

ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR

CONSTRUCTION DOCUMENTS

DATE 09/03/2024

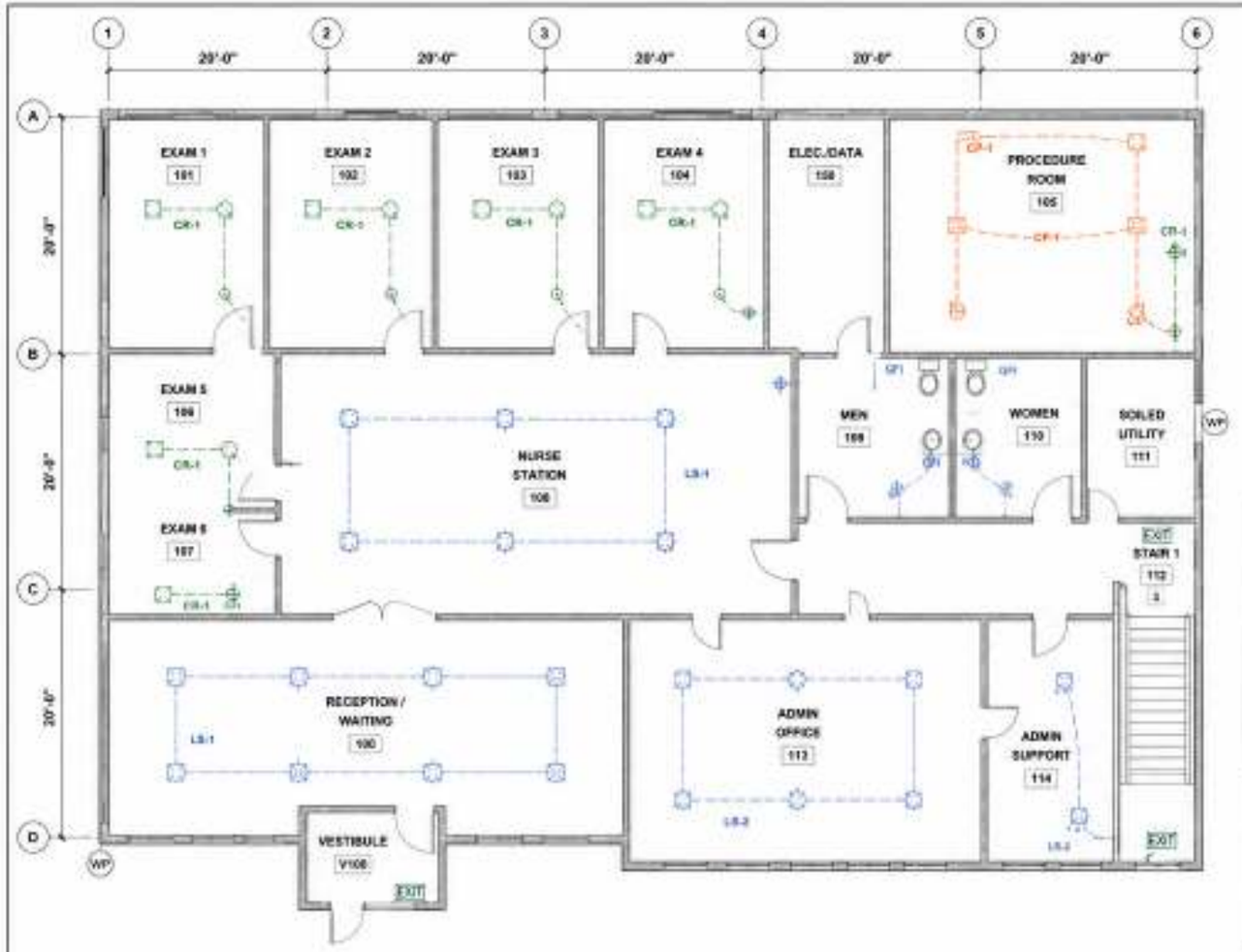
PROJECT NO. 24-8023

SHEET TITLE

FLOOR 2 ELECTRICAL PLAN (NORMAL SYSTEM)

SHEET NO.

E1.1



ESSENTIAL SYSTEM LEGEND

LIFE SAFETY BRANCH (EES-LS) – BLUE

- LED EXIT SIGN / EGRESS LIGHT
- EMERGENCY LIGHT (TWO HEAD)
- FIRE ALARM DEVICE / STROBE
- STAIR / CORRIDOR LIGHTING
- EES-LS CIRCUIT (120V)

CRITICAL BRANCH (EES-C) – GREEN

- ISOLATED GROUND DUPLEX RECEPTACLE (IG)
- GFCI ISOLATED GROUND RECEPTACLE (IG)
- ISOLATED GROUND JUNCTION BOX
- EES-C CIRCUIT (120V)

EQUIPMENT BRANCH (EES-EQ) – ORANGE

- DEDICATED EQUIPMENT CONNECTION
- X-RAY EQUIPMENT CIRCUIT
- EES-EQ CIRCUIT (208V/240V)

GENERAL NOTES

1. ALL PATIENT CARE AREAS (EXAM ROOMS, PROCEDURE ROOM) ARE SUPPLIED BY TWO BRANCH CIRCUITS: ONE NORMAL (SEE E1.0) AND ONE ESSENTIAL (E1.1/E1.2).
2. RECEPTACLES IN EXAM ROOMS ARE ISOLATED GROUND AND CONNECTED TO CRITICAL BRANCH (CR-1).
3. PROCEDURE ROOM EQUIPMENT IS CONNECTED TO CRITICAL AND EQUIPMENT BRANCH CIRCUITS.
4. ALL EXIT SIGNS, EGRESS LIGHTING, AND FIRE ALARM DEVICES ARE ON LIFE SAFETY BRANCH (LS-1).
5. NURSE STATION, ADMIN OFFICE, AND RECEPTION RECEPTACLES ARE ON CRITICAL BRANCH (CR-1/CR-2).
6. PANELS EES-LS, EES-C, AND EES-EQ ARE LOCATED IN ROOM ELEC./DATA 158. REFER TO E1.3.

KEY PLAN

EES-LS (LIFE SAFETY BRANCH) – FLOOR 1

CKT	DESCRIPTION	LOAD	LOCATION / SERVES
LS-1	EXIT SIGNS / EGRESS LIGHTS	1,200 VA	ALL EXIT SIGNS, EM LIGHTS, STAIR 1, CORRIDORS, NURSE STATION, RECEPTION / WAITING
LS-2	ADMIN / OFFICE LIGHTING	600 VA	ADMIN OFFICE 113, ADMIN SUPPORT 114
LS-3	FIRE ALARM / NOTIFICATION	300 VA	FIRE ALARM DEVICES (STROBES, HORNS/SPEAKERS)
TOTAL CONNECTED LOAD		2,100 VA	

EES-C (CRITICAL BRANCH) – FLOOR 1

CKT	DESCRIPTION	LOAD	LOCATION / SERVES
CR-1	EXAM ROOM RECEPTACLES (IG)	1,800 VA	EXAM ROOMS 101–107 (IG RECEPTACLES)
CR-2	NURSE STATION RECEPTACLES	1,200 VA	NURSE STATION 108
CR-3	RESTROOM RECEPTACLES (IG)	800 VA	MEN 109, WOMEN 110 (IG RECEPTACLES)
CR-4	ADMIN / RECEPTION RECEPTACLES	1,000 VA	RECEPTION 100, ADMIN 113, ADMIN SUPPORT 114
CR-5	PROCEDURE ROOM RECEPTACLES (IG)	1,200 VA	PROCEDURE ROOM 105 (IG RECEPTACLES)
TOTAL CONNECTED LOAD		6,000 VA	

EES-EQ (EQUIPMENT BRANCH) – FLOOR 1

CKT	DESCRIPTION	LOAD	LOCATION / SERVES
EP-1	PROCEDURE ROOM EQUIPMENT	8,000 VA	PROCEDURE ROOM 105 – DEDICATED 208V/240V CIRCUITS FOR MEDICAL EQUIPMENT
TOTAL CONNECTED LOAD		8,000 VA	

NOTE:

1. ALL CIRCUITS SHOWN ON THIS PLAN ARE PART OF THE ESSENTIAL ELECTRICAL SYSTEM (EES) AND ARE SUPPLIED FROM THE APPROPRIATE EES PANEL VIA AUTOMATIC TRANSFER SWITCHES (ATS).

PROJECT

MEDICAL OFFICE BUILDING

PROJECT INFORMATION

TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER

OWNER

DESIGNER OF RECORD

DESIGNER

CONSULTANT

ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR

CONSTRUCTION DOCUMENTS

DATE 06/28/2024

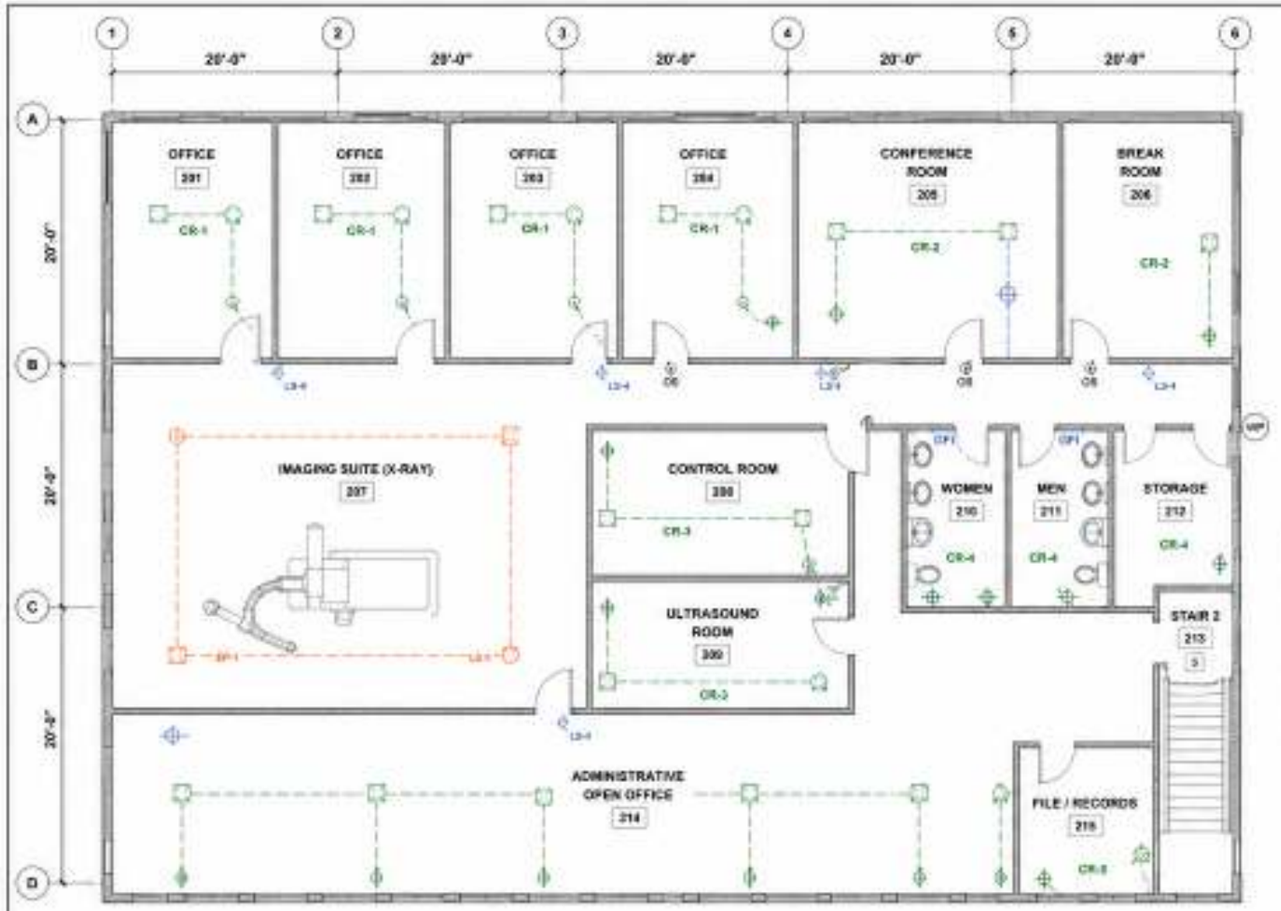
PROJECT NO. 24-0623

SHEET TITLE

FLOOR 1 ESSENTIAL SYSTEM PLAN (EES) LIFE SAFETY, CRITICAL & EQUIPMENT BRANCH

SHEET NO.

E2.0



ESSENTIAL SYSTEM LEGEND

LIFE SAFETY BRANCH (EES-LS) – BLUE

- LED EXIT SIGN / EGRESS LIGHT
- EMERGENCY LIGHT (TWO HEAD)
- FIRE ALARM DEVICE / STROBE
- STAIR / CORRIDOR LIGHTING
- LS-# EES-LS CIRCUIT (120V)

CRITICAL BRANCH (EES-C) – GREEN

- ISOLATED GROUND DUPLEX RECEPTACLE (IG)
- GFCI ISOLATED GROUND RECEPTACLE (IG)
- ISOLATED GROUND JUNCTION BOX
- CR-# EES-C CIRCUIT (120V)

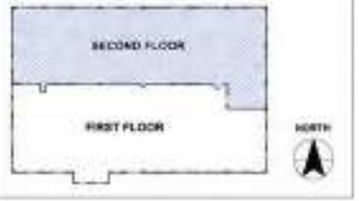
EQUIPMENT BRANCH (EES-EQ) – ORANGE

- DEDICATED EQUIPMENT CONNECTION
- X-RAY EQUIPMENT CIRCUIT
- EP-# EES-EQ CIRCUIT (208V/240V)

GENERAL NOTES

1. ALL PATIENT CARE AREAS (IMAGING, ULTRASOUND) ARE SUPPLIED BY TWO BRANCH CIRCUITS: ONE NORMAL AND ONE ESSENTIAL.
2. ALL RECEPTACLES IN RESTROOMS AND BREAK ROOM ARE GFCI-PROTECTED PER NEC 210.8.
3. ALL IMAGING EQUIPMENT IS CONNECTED TO EQUIPMENT BRANCH CIRCUITS.
4. ALL EES-LS, EES-C, AND EES-EQ ARE LOCATED IN ROOM ELECTRICAL 158 ON THE FIRST FLOOR. REFER TO E1.0.

KEY PLAN



EES-LS (LIFE SAFETY BRANCH) – FLOOR 2

CKT	DESCRIPTION	LOAD
LS-1	EXIT SIGNS / EGRESS LIGHTS	800 VA
LS-2	CORRIDOR & STAIR LIGHTING	800 VA
LS-3	CONFERENCE ROOM LIGHTING	500 VA
LS-4	OFFICE EMERGENCY LIGHTING	800 VA
LS-5	FIRE ALARM / NOTIFICATION	300 VA
TOTAL CONNECTED LOAD		2,700 VA

EES-C (CRITICAL BRANCH) – FLOOR 2

CKT	DESCRIPTION	LOCATION / SERVES	LOAD
CR-1	OFFICES 201–204 RECEPTACLES	OFFICES 201–204	1,800 VA
CR-2	CONFERENCE ROOM & BREAK ROOM	ROOMS 205, 206	1,200 VA
CR-3	IMAGING CONTROL & ULTRASOUND ROOMS	ROOMS 208, 209	1,200 VA
CR-4	RESTROOMS & STORAGE RECEPTACLES	ROOMS 210, 211, 212	800 VA
CR-5	ADMIN OPEN OFFICE & FILE/RECORDS	ROOMS 214, 215	1,200 VA
TOTAL CONNECTED LOAD			6,900 VA

EES-EQ (EQUIPMENT BRANCH) – FLOOR 2

CKT	DESCRIPTION	LOCATION / SERVES	LOAD
EP-1	X-RAY IMAGING EQUIPMENT	IMAGING SUITE 207	8,000 VA
TOTAL CONNECTED LOAD			8,000 VA

NOTE: ALL CIRCUITS SHOWN ON THIS PLAN ARE PART OF THE ESSENTIAL ELECTRICAL SYSTEM (EES) AND ARE SUPPLIED FROM THE APPROPRIATE EES PANEL VIA AUTOMATIC TRANSFER SWITCHES (ATS).

PROJECT

MEDICAL OFFICE BUILDING

PROJECT INFORMATION

TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER

OWNER

DESIGNER OF RECORD

DESIGNER

CONSULTANT

ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR:
CONSTRUCTION DOCUMENTS

DATE 05/20/2024

PROJECT NO. 24-0822

SHEET TITLE

FLOOR 2 ESSENTIAL SYSTEM PLAN (EES) LIFE SAFETY, CRITICAL & EQUIPMENT BRANCH

SHEET NO.

E2.1

LP-1 – LIGHTING PANEL 1 (NORMAL SYSTEM)

LOCATION: ELEC./DATA 150 | **PANEL:** LP-1 | **PHASE:** 3
VOLTAGE: 480Y/277V, 3Ø, 4W | **MAIN BREAKER:** 225A MCB | **WIRE:** 4
MOUNTING: SURFACE | **BUS RATING:** 225A | **ENCLOSURE:** NEMA 1
AIC RATING: 65kAIC | **FED FROM:** MSB

CKT	DESCRIPTION	LOAD (VA)	A	B	C	LOAD (VA)	DESCRIPTION	CKT
1	1ST FLR – RECEPTION / WAITING LTG	1,200	1,200	—		1,200	1ST FLR – ADMIN OFFICE LTG	2
3	1ST FLR – CORRIDOR LTG	900			—	900	1ST FLR – NURSE STATION LTG	4
5	1ST FLR – EXAM RMS 1–4 LTG	1,000	—			1,000	1ST FLR – EXAM RMS 5–8 LTG	6
7	1ST FLR – PROCEDURE RM LTG	800		800		800	1ST FLR – RESTROOM LTG	8
9	1ST FLR – EXTERIOR WALL LTG	600			—	600	1ST FLR – STAIR 1 & EXIT SIGNS	10
11	1ST FLR – SOILED UTILITY LTG	300	300			—	SPARE	12
13	SPARE	—		—	—	—	SPACE	14
15	SPACE	—	—	—	—	—	SPACE	16
17	SPACE	—	—	—	—	—	SPACE	18
19	SPACE	—	—	—	—	—	SPACE	20
21	SPACE	—	—	—	—	—	SPACE	22
23	SPACE	—	—	—	—	—	SPACE	24
	CONNECTED LOAD (VA)		3,700	3,100	3,500		TOTAL	10,300

DEMAND FACTOR: 1.25 | DEMAND LOAD (VA): 12,875 | DEMAND CURRENT (A): 15.5 | BREAKER SIZE: 225A

LP-2 – LIGHTING PANEL 2 (NORMAL SYSTEM)

LOCATION: 2ND FLR ELEC. ROOM | **PANEL:** LP-2 | **PHASE:** 3
VOLTAGE: 480Y/277V, 3Ø, 4W | **MAIN BREAKER:** 225A MCB | **WIRE:** 4
MOUNTING: SURFACE | **BUS RATING:** 225A | **ENCLOSURE:** NEMA 1
AIC RATING: 65kAIC | **FED FROM:** MSB

CKT	DESCRIPTION	LOAD (VA)	A	B	C	LOAD (VA)	DESCRIPTION	CKT
1	2ND FLR – OFFICES 201–202 LTG	1,000	1,000	—		1,000	2ND FLR – OFFICES 203–205 LTG	2
3	2ND FLR – CORRIDOR LTG	900			—	900	2ND FLR – CONFERENCE RM LTG	4
5	2ND FLR – BREAK ROOM LTG	600	—			600	2ND FLR – ADMIN OPEN OFFICE LTG	6
7	2ND FLR – IMAGING SUITE LTG	1,000		1,000		000	2ND FLR – ULTRASOUND RM LTG	8
9	2ND FLR – RESTROOMS LTG	600			—	600	2ND FLR – STAIR 2 & EXIT SIGNS	10
11	2ND FLR – FILE / RECORDS LTG	400	400			—	SPARE	12
13	SPARE	—		—	—	—	SPACE	14
15	SPACE	—	—	—	—	—	SPACE	16
17	SPACE	—	—	—	—	—	SPACE	18
19	SPACE	—	—	—	—	—	SPACE	20
21	SPACE	—	—	—	—	—	SPACE	22
23	SPACE	—	—	—	—	—	SPACE	24
	CONNECTED LOAD (VA)		3,800	3,100	5,000		TOTAL	8,000

DEMAND FACTOR: 1.25 | DEMAND LOAD (VA): 12,000 | DEMAND CURRENT (A): 14.5 | BREAKER SIZE: 225A

PP-1 – POWER PANEL 1 (NORMAL SYSTEM)

LOCATION: ELEC./DATA 150 | **PANEL:** PP-1 | **PHASE:** 3
VOLTAGE: 480Y/277V, 3Ø, 4W | **MAIN BREAKER:** 225A MCB | **WIRE:** 4
MOUNTING: SURFACE | **BUS RATING:** 225A | **ENCLOSURE:** NEMA 1
AIC RATING: 65kAIC | **FED FROM:** MSB

CKT	DESCRIPTION	LOAD (VA)	A	B	C	LOAD (VA)	DESCRIPTION	CKT
1	RECEPTION / WAITING – RECEPTS	1,800	1,800	—		1,800	ADMIN OFFICE 113 – RECEPTS	2
3	NURSE STATION 106 – RECEPTS	1,800			—	1,800	ADMIN SUPPORT 114 – RECEPTS	4
5	EXAM RMS 101–102 – RECEPTS	1,800	—	—	1,800	1,800	EXAM RMS 103–104 – RECEPTS	6
7	EXAM RMS 105–107 – RECEPTS	1,800		1,800		1,800	SOILED UTILITY 111 – RECEPTS	8
9	PROCEDURE ROOM 108 – RECEPTS	1,800	—		—	1,800	MEN RR 109 – RECEPTS	10
11	WOMEN RR 110 – RECEPTS	1,000	1,500			1,500	STAIR 1 112 – RECEPT	12
13	SPARE	—		—	—	—	SPACE	14
15	SPACE	—	—	—	—	—	SPACE	16
17	SPACE	—	—	—	—	—	SPACE	18
19	SPACE	—	—	—	—	—	SPACE	20
21	SPACE	—	—	—	—	—	SPACE	22
23	SPACE	—	—	—	—	—	SPACE	24
	CONNECTED LOAD (VA)		5,800	5,100	4,900		TOTAL	15,800

DEMAND FACTOR: 1.00 | DEMAND LOAD (VA): 15,800 | DEMAND CURRENT (A): 20.5 | BREAKER SIZE: 225A

RP-1 – RECEPTACLE PANEL 1 (TRANSFORMER SECONDARY) (NORMAL SYSTEM)

LOCATION: ELEC./DATA 150 | **PANEL:** RP-1 | **PHASE:** 3
VOLTAGE: 208Y/120V, 3Ø, 4W | **MAIN BREAKER:** 225A MLO | **WIRE:** 4
MOUNTING: SURFACE | **BUS RATING:** 225A | **ENCLOSURE:** NEMA 1
AIC RATING: 10kAIC | **FED FROM:** P-208 (XFMR)

CKT	DESCRIPTION	LOAD (VA)	A	B	C	LOAD (VA)	DESCRIPTION	CKT
1	EXAM RMS 101–102 – RECEPTS	1,440	1,440			1,440	EXAM RM 107 – RECEPTS	2
3	EXAM RMS 103–104 – RECEPTS	1,440	—			1,440	EXAM RM 105 – RECEPTS	4
5	NURSE STATION 106 – RECEPTS	1,440			1,440	1,440	PROCEDURE RM 108 – RECEPTS	6
7	RECEPTION / WAITING – RECEPTS	1,440		1,440		1,000	MEN RR 109 – RECEPTS	8
9	WOMEN RR 110 – RECEPTS	1,000				1,000	SOILED UTILITY 111 – RECEPTS	10
11	ADMIN OFFICE 113 – RECEPTS	1,440	1,440			1,000	ADMIN SUPPORT 114 – RECEPTS	12
13	SPARE	—		—	—	—	SPACE	14
15	SPACE	—	—	—	—	—	SPACE	16
17	SPACE	—	—	—	—	—	SPACE	18
19	SPACE	—	—	—	—	—	SPACE	20
21	SPACE	—	—	—	—	—	SPACE	22
23	SPACE	—	—	—	—	—	SPACE	24
	CONNECTED LOAD (VA)		5,760	4,760	4,320		TOTAL	14,840

DEMAND FACTOR: 1.00 | DEMAND LOAD (VA): 14,840 | DEMAND CURRENT (A): 41.2 | BREAKER SIZE: 225A

RP-2 – RECEPTACLE PANEL 2 (TRANSFORMER SECONDARY) (NORMAL SYSTEM)

LOCATION: ELEC./DATA 150 | **PANEL:** RP-2 | **PHASE:** 3
VOLTAGE: 208Y/120V, 3Ø, 4W | **MAIN BREAKER:** 225A MLO | **WIRE:** 4
MOUNTING: SURFACE | **BUS RATING:** 225A | **ENCLOSURE:** NEMA 1
AIC RATING: 10kAIC | **FED FROM:** P-208 (XFMR)

CKT	DESCRIPTION	LOAD (VA)	A	B	C	LOAD (VA)	DESCRIPTION	CKT
1	2ND FLR OFFICES 201-202 – RECEPTS	1,440	1,440	—		1,440	2ND FLR OFFICES 203–204 – RECEPTS	2
3	CONFERENCE RM 205 – RECEPTS	1,440	—			1,440	BREAK ROOM 206 – RECEPTS	4
5	IMAGING SUITE 207 – RECEPTS	1,440	—	—	1,440	1,000	CONTROL ROOM 208 – RECEPTS	6
7	ULTRASOUND RM 209 – RECEPTS	1,440		1,440	—	1,000	WOMEN RR 210 – RECEPTS	8
9	MEN RR 211 – RECEPTS	1,000	—		—	1,000	STORAGE 212 – RECEPTS	10
11	ADMIN OPEN OFFICE 214 – RECEPTS	1,000	1,800	—		1,000	FILE / RECORDS 213 – RECEPTS	12
13	SPARE	—		—	—	—	SPACE	14
15	SPACE	—	—	—	—	—	SPACE	16
17	SPACE	—	—	—	—	—	SPACE	18
19	SPACE	—	—	—	—	—	SPACE	20
21	SPACE	—	—	—	—	—	SPACE	22
23	SPACE	—	—	—	—	—	SPACE	24
	CONNECTED LOAD (VA)		5,760	4,760	4,320		TOTAL	14,840

DEMAND FACTOR: 1.00 | DEMAND LOAD (VA): 14,840 | DEMAND CURRENT (A): 41.2 | BREAKER SIZE: 225A

GENERAL NOTES

1. ALL PANELS ARE FED FROM THE NORMAL POWER SYSTEM ONLY.
2. ALL BREAKERS ARE 100% RATED.
3. ALL PANELBOARDS ARE BOLT-ON CIRCUIT BREAKER TYPE.
4. PANEL ENCLOSURES ARE NEMA 1 SURFACE MOUNTED UNLESS NOTED OTHERWISE.
5. RECEPTACLE CIRCUITS ARE 20A UNLESS NOTED OTHERWISE.
6. LIGHTING CIRCUITS ARE 20A UNLESS NOTED OTHERWISE.

ABBREVIATIONS

AIC	AMPERE INTERRUPTING CAPACITY
CKT	CIRCUIT
MLO	MAIN LUGS ONLY
MCB	MAIN CIRCUIT BREAKER
VA	VOLT-AMPERE
XFMR	TRANSFORMER

LOAD SUMMARY – NORMAL SYSTEM

PANEL	DESCRIPTION	CONNECTED LOAD (VA)	DEMAND LOAD (VA)	DEMAND AMPS
LP-1	LIGHTING PANEL 1	10,300	12,875	15.5
LP-2	LIGHTING PANEL 2	8,000	12,000	14.5
PP-1	POWER PANEL 1	15,800	15,800	20.5
RP-1	RECEPTACLE PANEL 1	14,840	14,840	41.2
RP-2	RECEPTACLE PANEL 2	14,840	14,840	41.2
TOTAL NORMAL SYSTEM		66,380	67,355	132.6

NOTE: DEMAND AMPS BASED ON 208Y/120V, 3Ø.

MEDICAL OFFICE BUILDING

PROJECT INFORMATION
TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER
OWNER

DESIGNER OF RECORD
DESIGNER

CONSULTANT
ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR
CONSTRUCTION DOCUMENTS

DATE 05/20/2024

PROJECT NO. 24-0033

SHEET TITLE
NORMAL SYSTEM PANEL SCHEDULES LP-1, LP-2, PP-1, RP-1, RP-2

SHEET NO.
E3.0

EES-LS – LIFE SAFETY BRANCH PANEL (ESSENTIAL ELECTRICAL SYSTEM)

LOCATION: ELEC/DATA 150 | **PANEL:** EES-LS | **PHASE:** 3
VOLTAGE: 208Y/120V, 3Ø, 4W | **MAIN BREAKER:** 100A MCB | **WIRE:** 4
MOUNTING: SURFACE | **BUS RATING:** 100A | **ENCLOSURE:** NEMA 1
AIC RATING: 10kAIC | **FED FROM:** ATS-LS (GENERATOR)

CKT	DESCRIPTION	LOAD (VA)	A	B	C	LOAD (VA)	DESCRIPTION	CKT
1	EXIT SIGNS / EGRESS LIGHTS	600	600	–	–	600	EXIT SIGNS / EGRESS LIGHTS	2
3	EMERGENCY LIGHTING – CORRIDOR A	600	–	–	600	600	EMERGENCY LIGHTING – CORRIDOR B	4
5	STAIR 1 LIGHTING	600	–	600	–	600	STAIR 2 LIGHTING	6
7	FIRE ALARM PANEL	360	300	–	–	360	FIRE ALARM DEVICES	8
9	FIRE PUMP CONTROLLER	1,000	–	–	1,000	1,000	FIRE PUMP HEATER	10
11	ELEVATOR – CAR LIGHT / ALARM	500	500	–	–	500	ELEVATOR – MACHINE ROOM LIGHT	12
13	SMOKE CONTROL SYSTEM	600	–	600	–	600	SMOKE DAMPER POWER	14
15	EMERGENCY VOICE / SECURITY	480	400	–	–	480	SECURITY PANEL	16
17	SPARE	–	–	–	–	–	SPARE	18
19	SPARE	–	–	–	–	–	SPARE	20
21	SPARE	–	–	–	–	–	SPARE	22
23	SPARE	–	–	–	–	–	SPARE	24
25	SPARE	–	–	–	–	–	SPARE	26
27	SPARE	–	–	–	–	–	SPARE	28
29	SPARE	–	–	–	–	–	SPARE	30
	CONNECTED LOAD (VA)		**3,900**	**2,400**	**2,400**		**TOTAL**	**12,600**

DEMAND FACTOR: 1.00 | **DEMAND LOAD (VA): 12,600** | **DEMAND CURRENT (A): 35.0** | **BREAKER SIZE: 100A MCB**

EES-C – CRITICAL BRANCH PANEL (ESSENTIAL ELECTRICAL SYSTEM)

LOCATION: ELEC/DATA 150 | **PANEL:** EES-C | **PHASE:** 3
VOLTAGE: 208Y/120V, 3Ø, 4W | **MAIN BREAKER:** 150A MCB | **WIRE:** 4
MOUNTING: SURFACE | **BUS RATING:** 150A | **ENCLOSURE:** NEMA 1
AIC RATING: 10kAIC | **FED FROM:** ATS-C (GENERATOR)

CKT	DESCRIPTION	LOAD (VA)	A	B	C	LOAD (VA)	DESCRIPTION	CKT
1	EXAM 1 – ISOLATED GROUND REC (IG)	1,000	1,000	–	–	1,000	EXAM 2 – ISOLATED GROUND REC (IG)	2
3	EXAM 3 – ISOLATED GROUND REC (IG)	1,000	–	–	1,000	1,000	EXAM 4 – ISOLATED GROUND REC (IG)	4
5	EXAM 5 – ISOLATED GROUND REC (IG)	1,000	1,000	–	–	1,000	EXAM 6 – ISOLATED GROUND REC (IG)	6
7	NURSE STATION 106 – RECEPTS (IG)	1,200	–	1,200	–	1,200	NURSE STATION 106 – EQUIPMENT	8
9	PROCEDURE ROOM 105 – REC (IG)	2,000	2,000	–	–	2,000	PROCEDURE ROOM 106 – EQUIP	10
11	WOMEN RR 110 – REC (IG)	800	–	–	800	800	MEN RR 109 – REC (IG)	12
13	SOILED UTILITY 111 – RECEPTS (IG)	800	800	–	–	800	SOILED UTILITY 111 – EQUIPMENT	14
15	ADMIN OFFICE 113 – RECEPTS	1,000	–	1,000	–	1,000	ADMIN OFFICE 113 – EQUIPMENT	16
17	ADMIN SUPPORT 114 – RECEPTS	800	800	–	–	800	ADMIN SUPPORT 114 – EQUIPMENT	18
19	RECEPTION 108 – RECEPTS	1,000	–	–	1,000	1,000	RECEPTION 108 – EQUIPMENT	20
21	IT / NURSE CALL SYSTEM	800	800	–	–	800	MED GAS ALARM PANEL	22
23	SPARE	–	–	–	–	–	SPARE	24
25	SPARE	–	–	–	–	–	SPARE	26
27	SPARE	–	–	–	–	–	SPARE	28
29	SPARE	–	–	–	–	–	SPARE	30
	CONNECTED LOAD (VA)		**9,000**	**6,600**	**6,000**		**TOTAL**	**32,600**

DEMAND FACTOR: 1.00 | **DEMAND LOAD (VA): 32,600** | **DEMAND CURRENT (A): 91.0** | **BREAKER SIZE: 150A MCB**

EES-EQ – EQUIPMENT BRANCH PANEL (ESSENTIAL ELECTRICAL SYSTEM)

LOCATION: ELEC/DATA 150 | **PANEL:** EES-EQ | **PHASE:** 3
VOLTAGE: 208Y/120V, 3Ø, 4W | **MAIN BREAKER:** 150A MCB | **WIRE:** 4
MOUNTING: SURFACE | **BUS RATING:** 150A | **ENCLOSURE:** NEMA 1
AIC RATING: 10kAIC | **FED FROM:** ATS-EQ (GENERATOR)

CKT	DESCRIPTION	LOAD (VA)	A	B	C	LOAD (VA)	DESCRIPTION	CKT
1	IMAGING SUITE 207 – X-RAY EQUIPMENT	6,000	6,000	–	–	6,000	IMAGING SUITE 207 – SUPPORT EQUIP	2
3	CONTROL ROOM 209 – RECEPTS	1,500	–	–	1,500	1,500	ULTRASOUND ROOM 209 – RECEPT	4
5	ULTRASOUND ROOM 209 – EQUIPMENT	1,000	1,000	–	–	1,000	CONFERENCE ROOM 205 – REC	6
7	CONFERENCE ROOM 206 – EQUIP	1,000	–	1,000	–	1,000	BREAK ROOM 208 – RECEPTS	8
9	OFFICE 201 – RECEPTS	1,000	1,000	–	–	1,000	OFFICE 202 – RECEPTS	10
11	OFFICE 203 – RECEPTS	1,000	–	–	1,000	1,000	OFFICE 204 – RECEPTS	12
13	ADMIN OPEN OFFICE 214 – RECEPTS	1,500	1,500	–	–	1,500	ADMIN OPEN OFFICE 214 – EQUIP	14
15	FILE / RECORDS 215 – RECEPTS	900	–	900	–	900	FILE / RECORDS 215 – EQUIPMENT	16
17	HVAC – AHU-1 (SECOND FLOOR)	2,400	2,400	–	–	2,400	HVAC – AHU-2 (SECOND FLOOR)	18
19	HVAC – VAV BOXES (FLR 2)	1,200	–	1,200	–	1,200	ELEVATOR (IF APPLICABLE)	20
21	MEDICAL VACUUM PUMP	1,500	1,500	–	–	1,500	COMPRESSED AIR COMPRESSOR	22
23	SPARE	–	–	–	–	–	SPARE	24
25	SPARE	–	–	–	–	–	SPARE	26
27	SPARE	–	–	–	–	–	SPARE	28
29	SPARE	–	–	–	–	–	SPARE	30
	CONNECTED LOAD (VA)		**22,400**	**8,060**	**7,500**		**TOTAL**	**88,000**

DEMAND FACTOR: 0.80 (EQUIPMENT LOAD) | **DEMAND LOAD (VA): 49,240** | **DEMAND CURRENT (A): 133.9** | **BREAKER SIZE: 150A MCB**

NOTE: ALL ESSENTIAL SYSTEM PANELS ARE SUPPLIED FROM THE GENERATOR VIA AUTOMATIC TRANSFER SWITCHES (ATS-LS, ATS-C, ATS-EQ).

ESSENTIAL ELECTRICAL SYSTEM LOAD SUMMARY

PANEL	BRANCH	CONNECTED LOAD (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	DEMAND CURRENT (A)
EES-LS	LIFE SAFETY	12,600	1.00	12,600	35.0
EES-C	CRITICAL	32,600	1.00	32,600	91.0
EES-EQ	EQUIPMENT	80,300	0.80	68,240	133.9
TOTAL ESSENTIAL SYSTEM		**105,700**		**93,040**	**259.9**

NOTES:

1. ALL PANELS ARE 208Y/120V, 3Ø, 4W WITH SOLID NEUTRAL.
2. ALL BRANCH CIRCUITS ARE 120V UNLESS NOTED OTHERWISE.
3. ISOLATED GROUND (IG) RECEPTACLES ARE SUPPLIED IN ALL PATIENT CARE SPACES FROM THE CRITICAL BRANCH (EES-C).
4. EES-EQ SUPPLIES HVAC, MEDICAL EQUIPMENT, AND OTHER EQUIPMENT SYSTEM LOADS.
5. ALL PANELS ARE LOCATED IN ELEC/DATA 150.

MEDICAL OFFICE BUILDING

PROJECT INFORMATION
TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER
OWNER

DESIGNER OF RECORD
DESIGNER

CONSULTANT
ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR
CONSTRUCTION DOCUMENTS

DATE 05/20/2024

PROJECT NO. 24-0023

SHEET TITLE
ESSENTIAL SYSTEM PANEL SCHEDULES EES-LS, EES-C, EES-EQ

SHEET NO.
E3.1

NORMAL SYSTEM LOAD CALCULATIONS

A. GENERAL LIGHTING AND RECEPTACLE LOADS (NEC 220.12 & 220.14)

DESCRIPTION	AREA / QTY	UNIT VA	VA	DEMAND FACTOR	DEMAND VA
First 10,000 sq ft @ 3 VA/sq ft	10,000 sq ft	3	30,000	100%	30,000
Remainder (2,000 sq ft) @ 3 VA/sq ft	2,000 sq ft	3	6,000	50%	3,000
SUBTOTAL GENERAL LIGHTING & RECEPTACLES			**36,000**		**33,000**

B. KITCHENETTE / BREAK ROOM SMALL APPLIANCE LOAD (NEC 220.52)

DESCRIPTION	QTY	VA EACH	VA	DEMAND FACTOR	DEMAND VA
Kitchenette / Break Room (1 per floor)	2	1,500	3,000	100%	3,000
SUBTOTAL SMALL APPLIANCE LOAD			**3,000**		**3,000**

C. HVAC LOAD (NEC 220.60)

DESCRIPTION	QTY	MCA EACH	VOLTAGE	PHASE	MCA	DEMAND FACTOR	DEMAND VA
RTU-1 (First Floor)	1	22.0	208	3	22.0	100%	7,920
RTU-2 (Second Floor)	1	24.0	208	3	24.0	100%	8,640
Exhaust Fans / Misc. HVAC	—	—	208	3	6.8	100%	2,160
SUBTOTAL HVAC LOAD					**52.8**		**18,720**

D. ELECTRICAL EQUIPMENT AND MISCELLANEOUS LOADS (NEC 220.50)

DESCRIPTION	QTY	MCA EACH	VOLTAGE	PHASE	MCA	DEMAND FACTOR	DEMAND VA
Elevator (if applicable)	1	20.8	208	3	20.8	100%	7,200
Water Heater(s)	1	12.0	208	3	12.0	100%	4,320
Utility Receptacle	1	18.8	208	3	18.8	100%	3,800
Spare / Future Load Allowance (25% of above)	—	—	—	—	13.9	100%	5,760
SUBTOTAL MISCELLANEOUS LOAD					**52.5**		**18,080**

NORMAL SYSTEM TOTAL LOAD SUMMARY

DESCRIPTION	CONNECTED VA	DEMAND VA
General Lighting & Receptacles	36,000	33,000
Small Appliance Load (Kitchenette/Break Room)	3,000	3,000
HVAC Load	18,720	18,720
Miscellaneous / Electrical Equipment	18,800	18,800
TOTAL NORMAL SYSTEM LOAD (VA)	**76,520**	**73,520**

NORMAL SYSTEM FEEDER CALCULATIONS

System Voltage	480Y/277V, 3ø, 4W	
Total Demand (VA)	73,520	
Total Demand Current (A) = VA / (√3 × VLL)	73,520 / (1.732 × 480) =	88.6 A
Design Current with 125% Factor	88.6 × 1.25 =	110.7 A
Selected Main Breaker (MSB)	225 A, 3P	
Selected Service	800 A, 3P (From Utility)	

NOTES:

1. ALL CALCULATIONS ARE IN ACCORDANCE WITH NEC 220 AND 517.
2. DEMAND FACTORS PER NEC TABLE 220.42, 220.52, 220.60, AND 220.50.
3. FEEDER SIZING BASED ON 125% OF TOTAL DEMAND IN ACCORDANCE WITH NEC 215.3(A)(1).
4. MOTOR LOADS (HVAC, ELEVATOR) ARE SIZED USING MCA VALUES FROM EQUIPMENT DATA.
5. ALL PANELS AND CIRCUITS ARE 120V OR 208Y/120V UNLESS NOTED OTHERWISE.

ESSENTIAL SYSTEM LOAD CALCULATIONS (NEC 517)

A. LIFE SAFETY BRANCH (EES-LS)

DESCRIPTION	CONNECTED VA	DEMAND FACTOR	DEMAND VA	NOTES
Exit Signs / Egress Lighting	1,200	100%	1,200	NEC 517.33(C)
Emergency Lighting	1,000	100%	1,000	NEC 517.33(C)
Stair & Corridor Lighting	600	100%	600	NEC 517.33(C)
Fire Alarm System	300	100%	300	NEC 517.34
Elevator - Car Light & Alarm	500	100%	500	NEC 517.34
Smoke Control System	500	100%	500	NEC 517.31
Fire Pump Controller	1,000	100%	1,000	NEC 695
Total	**5,200**		**5,200**	

B. CRITICAL BRANCH (EES-C)

DESCRIPTION	CONNECTED VA	DEMAND FACTOR	DEMAND VA	NOTES
Exam Room Receptacles (12 rooms)	5,760	100%	5,760	6 Receptacles
Nurse Station Receptacles	1,200	100%	1,200	6 Receptacles
Procedure Room Receptacles	2,000	100%	2,000	10 Receptacles
Men / Women Restroom Receptacles	800	100%	800	10 Receptacles
Reception / Waiting Receptacles	1,000	100%	1,000	10 Receptacles
Admin Office 113 Receptacles	1,000	100%	1,000	Standard
Admin Support 114 Receptacles	1,000	100%	1,000	Standard
Medical Gas Alarm Panel	600	100%	600	NEC 517.13(D)
IT / Nurse Call System	800	100%	800	NEC 517.13(D)
Total	**13,560**		**13,360**	

C. EQUIPMENT BRANCH (EES-EQ)

DESCRIPTION	CONNECTED VA	DEMAND FACTOR	DEMAND VA(T)	NOTES
X-Ray Imaging Equipment	8,000	100%	8,000	Dedicated Circuit
Ultrasound Equipment	1,500	100%	1,500	Dedicated Circuit
Control Room / PACS Equipment	1,500	100%	1,500	Dedicated Circuit
HVAC – AHU-1 (Second Floor)	2,400	100%	2,400	Dedicated Circuit
HVAC – VAV Boxes (Second Floor)	1,200	100%	1,200	Dedicated Circuit
Elevator (if applicable)	1,200	100%	1,200	Dedicated Circuit
Medical Vacuum Pump	1,500	100%	1,500	Dedicated Circuit
Compressed Air Compressor	1,500	100%	1,500	Dedicated Circuit
Total	**18,800**		**18,600**	

ESSENTIAL SYSTEM TOTAL SUMMARY

BRANCH	DEMAND VA	BRANCH DEMAND CURRENT @ 208V, 3Ø (A)
Life Safety Branch (EES-LS)	5,200	5,200 / (1.732 × 208) = 14.4 A
Critical Branch (EES-C)	13,560	13,560 / (1.732 × 208) = 37.8 A
Equipment Branch (EES-EQ)	18,800	18,800 / (1.732 × 208) = 52.1 A
TOTAL ESSENTIAL SYSTEM	**37,560**	**104.3 A (TOTAL)**

NOTES:

1. EQUIPMENT BRANCH (EES-EQ) DEMAND FACTOR PER NEC 517.30 – 80% MAXIMUM OF EQUIPMENT LOAD.
2. CURRENT CALCULATION FORMULA: I = VA / (√3 × VLL).
3. ALL ESSENTIAL SYSTEM PANELS ARE 208Y/120V, 3Ø, 4W.
4. ALL CIRCUITS ARE SUPPLIED FROM GENERATOR VIA AUTOMATIC TRANSFER SWITCHES (ATS).

GENERATOR LOAD SUMMARY

ITEM	DEMAND VA
Life Safety Branch (EES-LS)	5,200
Critical Branch (EES-C)	13,560
Equipment Branch (EES-EQ)	18,800
Total Essential System Load	**37,560**
Add 25% Margin (NEC 517.30(G))	**9,390**
TOTAL REQUIRED GENERATOR CAPACITY	**46,950 VA**

GENERATOR SELECTION

Required kVA (Total / 1000)	46.95 kVA
Selected Generator Size	75 kVA
Voltage / Phase	208Y/120V, 3Ø, 4W
Power Factor	0.8
Fuel Type	Natural Gas
Type	Standby
Location	Exterior – Generator Pad

ESSENTIAL SYSTEM FEEDER CALCULATIONS (FROM GENERATOR)

Life Safety Branch (EES-LS)	
Demand VA	5,200
Current @ 208V, 3Ø	14.4 A
Design Current (125%)	18.0 A
Selected ATS	ATS-LS – 100A
Selected Feeder / Breaker	3P 100A
Critical Branch (EES-C)	
Demand VA	13,560
Current @ 208V, 3Ø	37.8 A
Design Current (125%)	47.3 A
Selected ATS	ATS-C – 150A
Selected Feeder / Breaker	3P 150A
Equipment Branch (EES-EQ)	
Demand VA	18,800
Current @ 208V, 3Ø	52.1 A
Design Current (125%)	65.1 A
Selected ATS	ATS-EQ – 150A
Selected Feeder / Breaker	3P 150A

MEDICAL OFFICE BUILDING

PROJECT INFORMATION

TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

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DESIGNER OF RECORD

DESIGNER

CONSULTANT

ELECTRICAL ENGINEER

REVISIONS

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CONSTRUCTION DOCUMENTS

DATE 09/03/2024

PROJECT NO. 24-0023

SHEET TITLE

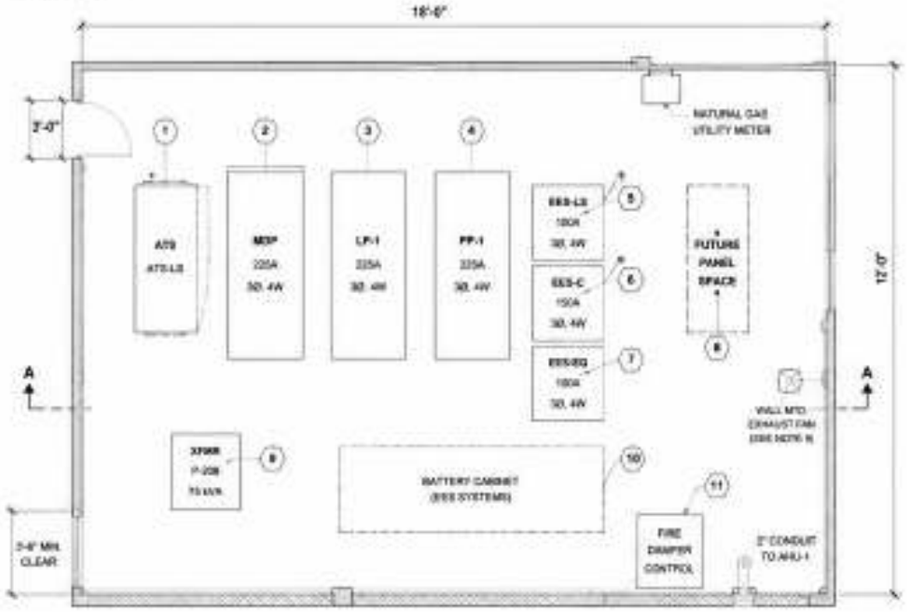
LOAD CALCULATIONS NORMAL SYSTEM & ESSENTIAL SYSTEM

SHEET NO.

E4.0

ELECTRICAL ROOM 150 – ENLARGED PLAN

SCALE: 3/8" = 1'-0"



EQUIPMENT SCHEDULE

KEY	EQUIPMENT	DESCRIPTION
1	ATS-LS	AUTOMATIC TRANSFER SWITCH 150A, 3Ø, 4W, 208Y/120V
2	MDP	MAIN DISTRIBUTION PANEL 225A, 3Ø, 4W, 208Y/120V
3	LP-1	LIGHTING PANEL 1 (NORMAL) 225A, 3Ø, 4W, 208Y/120V
4	PP-1	POWER PANEL 1 (NORMAL) 225A, 3Ø, 4W, 208Y/120V
5	EES-LS	LIFE SAFETY PANEL 150A, 3Ø, 4W, 208Y/120V
6	EES-C	CRITICAL PANEL 150A, 3Ø, 4W, 208Y/120V
7	EES-EQ	EQUIPMENT PANEL 150A, 3Ø, 4W, 208Y/120V
8	SPARE SPACE	36" WIDE x 72" HIGH x 8" DEEP PROVIDE WITH BLANK COVER
9	P-208 XF MR	75 kVA, 208Y/120V - 208Y/120V ISOLATION TRANSFORMER
10	BATTERY CABINET	FOR EES SYSTEMS (RACK MTD.)
11	FIRE DAMPER CONTROL PANEL	120V, 1Ø

ELECTRICAL ROOM NOTES

1. ELECTRICAL ROOM IS ROOM 150. PROVIDE MIN. 1-HR FIRE RATED CONSTRUCTION WITH 20 MIN. SELF-CLOSING, SELF-LATCHING DOOR.
2. PROVIDE PERMANENT "ELECTRICAL ROOM" SIGN PER NEC 110.21.
3. WORKING CLEARANCES PER NEC 110.26 SHALL BE MAINTAINED.
4. ALL EQUIPMENT SHALL BE SURFACE MOUNTED.
5. ALL RACEWAYS ENTERING THE ROOM SHALL BE SEALED WITH FIRESTOP SYSTEM.
6. FLOOR SHALL BE SMOOTH, HARD AND NONCOMBUSTIBLE.
7. PROVIDE EQUIPMENT NAMEPLATES PER NEC 110.22.
8. PROVIDE 2" PVC CONDUIT SLEEVE WITH FIRESTOP FOR GENERATOR CONTROL/POWER CIRCUITS TO OUTDOOR GENERATOR.
9. PROVIDE WALL MOUNTED EXHAUST FAN INTERLOCKED WITH DOOR AND THERMOSTAT SET AT 85°F.

PANEL MOUNTING HEIGHTS

TOP OF PANELS (1 – 7)	6'-6" AFF (MAX.)
BOTTOM OF PANELS	1'-6" AFF (MIN.)
DISCONNECTS	5'-0" AFF (MAX.)
FIRE DAMPER PANEL	5'-0" AFF (MAX.)
RECEPTACLES	1'-6" AFF (TYP.)

ELECTRICAL ROOM FINISH

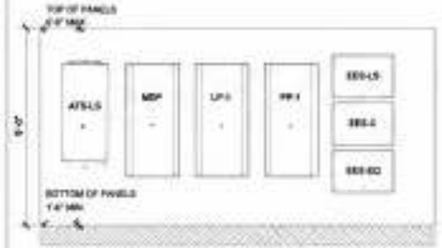
WALLS:	PAINTED CONCRETE / GYPSUM BOARD
FLOOR:	SEALED CONCRETE
CEILING:	PAINTED GYPSUM BOARD
LIGHTING:	LED, 10 FC., 3000K, 36 FC AWS.
RECEPTACLES:	20A, 120V, 1Ø/1C), ABOVE COUNTER

LEGEND

- SURFACE MOUNTED PANEL
- FUTURE PANEL SPACE
- WALL MOUNTED EXHAUST FAN
- RECEPTACLE (QTY.)
- XFMR TRANSFORMER
- FIRE DAMPER CONTROL PANEL

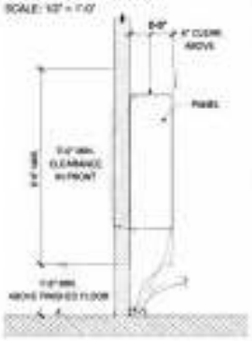
SECTION A-A (EQUIPMENT ELEVATION)

SCALE: 3/8" = 1'-0"



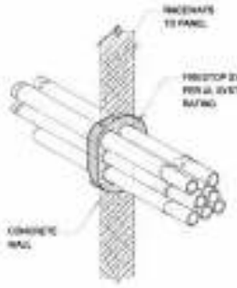
TYPICAL PANEL MOUNTING DETAIL (SURFACE MOUNTED)

SCALE: 1/2" = 1'-0"



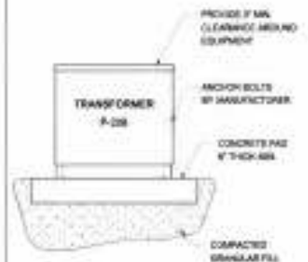
TYPICAL CONDUIT ENTRY DETAIL

SCALE: N.T.S.



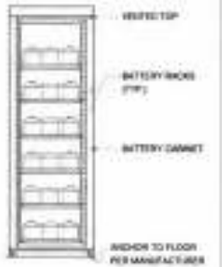
EQUIPMENT PAD DETAIL (TRANSFORMER)

SCALE: N.T.S.



BATTERY CABINET DETAIL

SCALE: N.T.S.



GENERAL NOTES

1. ALL EQUIPMENT AND MATERIALS SHALL BE N.E.C. LISTED AND INSTALLED IN ACCORDANCE WITH N.E.C. AND MANUFACTURER'S REQUIREMENTS.
2. ALL CONDUITS SHALL BE RMC OR EMT UNLESS NOTED OTHERWISE.
3. PROVIDE LABELS ON ALL PANELS AND DISCONNECTS PER NEC 110.22.

MEDICAL OFFICE BUILDING

PROJECT INFORMATION

TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER

OWNER

DESIGNER OF RECORD

DESIGNER

CONSULTANT

ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR

CONSTRUCTION DOCUMENTS

DATE 00/00/0000

PROJECT NO. 24-0023

SHEET TITLE

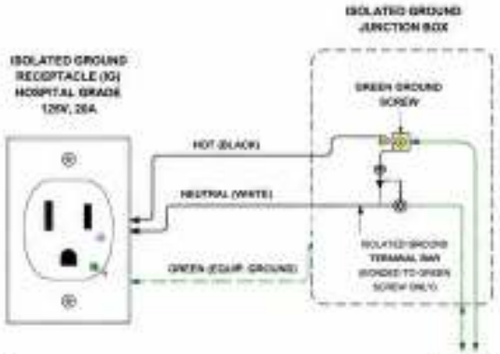
ELECTRICAL ROOM ENLARGED PLAN AND DETAILS

SHEET NO.

E5.0

1. ISOLATED GROUND RECEPTACLE (IG) WIRING DETAIL

N.T.S.

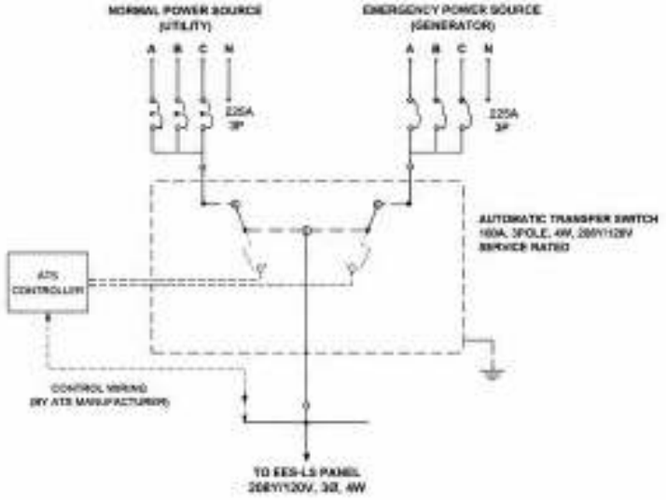


NOTES:

1. ISOLATED GROUND RECEPTACLES (IG) SHALL HAVE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR RUN TO THE PANELBOARD EQUIPMENT GROUND BAR.
2. DO NOT CONNECT THE IG RECEPTACLE GROUND TERMINAL TO THE CONDUIT HOME.
3. IG RECEPTACLES SHALL BE MARKED "ISOLATED GROUND".
4. ALL IG RECEPTACLES SHALL BE ON DEDICATED CIRCUITS PER NEC 517.18.

2. AUTOMATIC TRANSFER SWITCH (ATS) – ONE-LINE DIAGRAM

N.T.S.

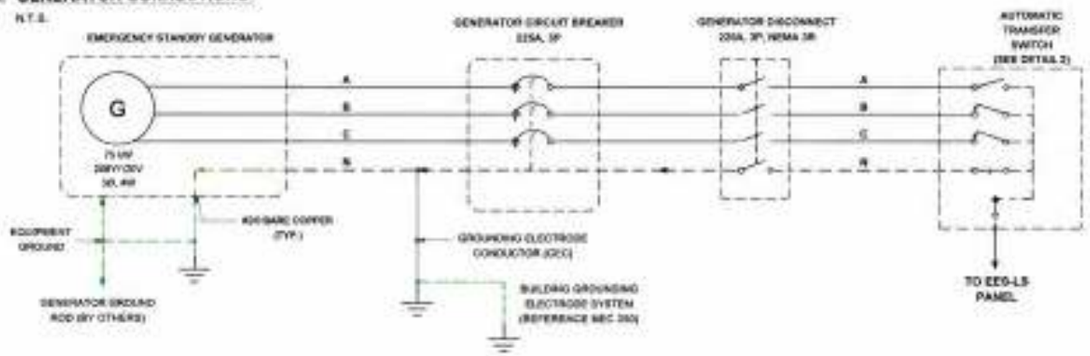


NOTES:

1. ATS SHALL BE SERVICE RATED AND SUITABLE FOR USE AS THE SERVICE DISCONNECTING MEANS.
2. ATS SHALL BE ELECTRICALLY AND MECHANICALLY INTERLOCKED.
3. TRANSFER TIME: 5 SECONDS MAXIMUM.
4. ATS SHALL BE MAINTENANCE BYPASS TYPE.
5. ALL WIRING AND CONDUIT BY ELECTRICAL CONTRACTOR UNLESS NOTED OTHERWISE.

3. GENERATOR CONNECTIONS

N.T.S.



GENERATOR DATA	
RATED POWER	75 kW
VOLTAGE	208Y/120V
PHASE	3Ø, 4W
FREQUENCY	60 Hz
FULL LOAD AMPS	208 A
ENCLOSURE	WEATHERPROOF
FUEL	NATURAL GAS
LOCATION	EXTERIOR (GENERATOR PAD)

WIRE SCHEDULE (COPPER)	
CONDUCTOR	SIZE
PHASE CONDUCTORS (A, B, C)	#2/0 THWN
NEUTRAL CONDUCTOR (N)	#2/0 THWN
EQUIPMENT GROUND (EGC)	#2/0 THWN

SIZES BASED ON 75°C, 208Y/120V, 3Ø, 4W, CONDUIT INSTALLATION, 75°C TERMINALS.

SHORT-CIRCUIT INFORMATION	
GENERATOR SCCR	22,000 AIC
ATS SCCR	22,000 AIC
EES-LS PANEL SCCR	22,000 AIC

NOTES:

1. GENERATOR RATED 75 kW, 208Y/120V, 3Ø, 4W, 60 Hz.
2. GENERATOR SHALL BE UL 2200 LISTED.
3. NEUTRAL SHALL BE SOLIDLY BONDED TO THE GENERATOR FRAME.
4. GENERATOR EQUIPMENT GROUND SHALL BE CONNECTED TO BUILDING GROUNDING ELECTRODE SYSTEM PER NEC 250.
5. SERVICE ENTRANCE CONDUCTORS FROM GENERATOR TO ATS SHALL BE COPPER, TYPE THHN/THWN-2 IN CONDUIT.
6. PROVIDE CONDUIT SEALING FITTINGS AT ALL POINTS OF ENTRY.

MEDICAL OFFICE BUILDING

PROJECT INFORMATION

TWO-STORY MEDICAL OFFICE FACILITY
123 HEALTHCARE DRIVE
ANYTOWN, STATE 12345

OWNER

OWNER

DESIGNER OF RECORD

DESIGNER

CONSULTANT

ELECTRICAL ENGINEER

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR

CONSTRUCTION DOCUMENTS

DATE 05/20/2024

PROJECT NO. 24-0035

SHEET TITLE

ELECTRICAL DETAILS ISOLATED GROUND RECEPTACLE WIRING DETAIL, TRANSFER SWITCH ONE-LINE, GENERATOR CONNECTIONS

SHEET NO.

E6.0