

**1** 1st FLOOR ELECTRICAL OVERALL PLAN  
1/16" = 1'-0"

**REVISIONS**


**JOB NUMBER:** 15-020

**ISSUED:** 10/01/19

**ISSUED FOR:**  
**CONSTRUCTION**

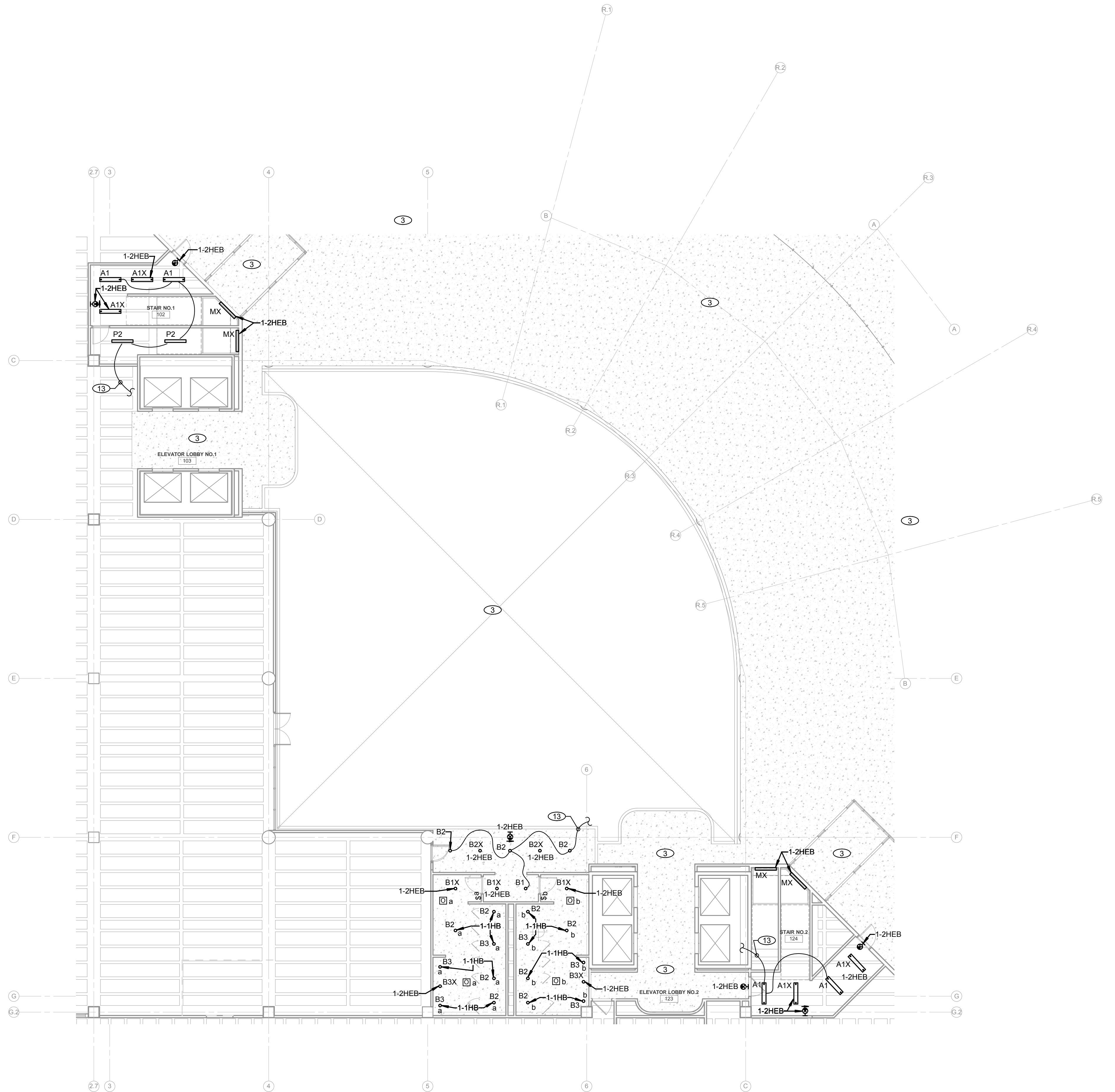
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1st FLOOR ELECTRICAL OVERALL PLAN

**E1.1.0**

PHASE: CD



**1** 1st FLOOR ELECTRICAL LIGHTING PLAN  
3/32" = 1'-0"

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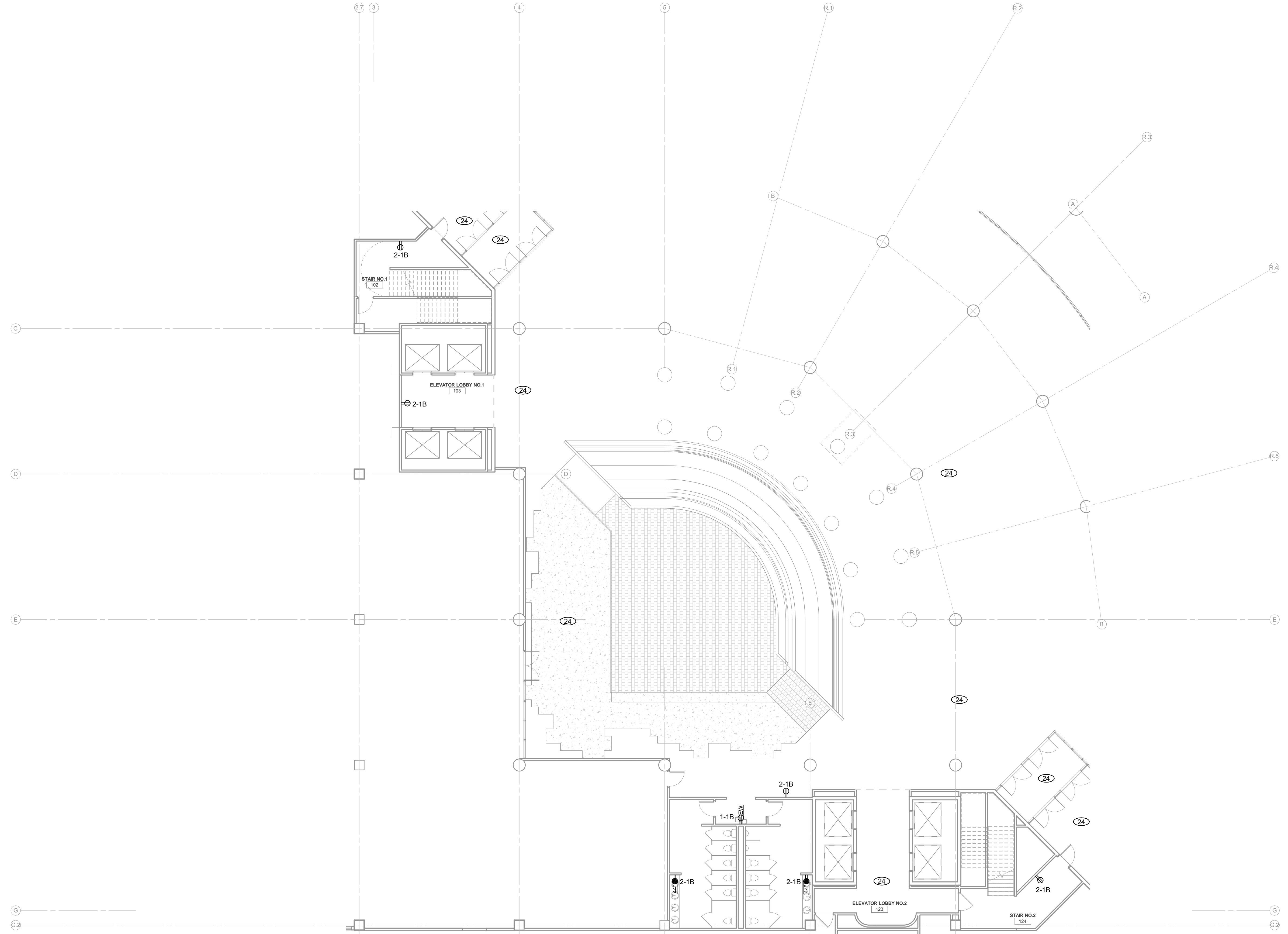
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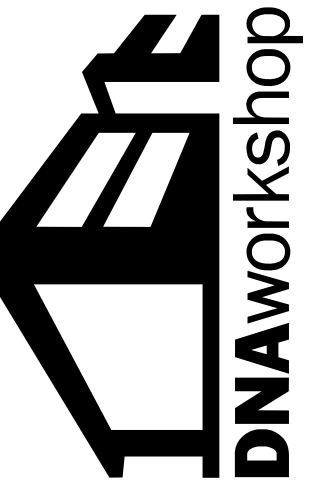
1st FLOOR ELECTRICAL LIGHTING PLAN

**E1.1.1**

**PHASE:** CD



**1** 1st FLOOR ELECTRICAL PLAN  
3/32" = 1'-0"



**LANDMARK BUILDING**  
175 EAST CAPITOL ST., JACKSON, MS 39201

DYKE NELSON ARCHITECTURE 235 SOUTH 14TH ST., BATON ROUGE, LA 70802 DNA-WORKSHOP.COM (225) 224 3363

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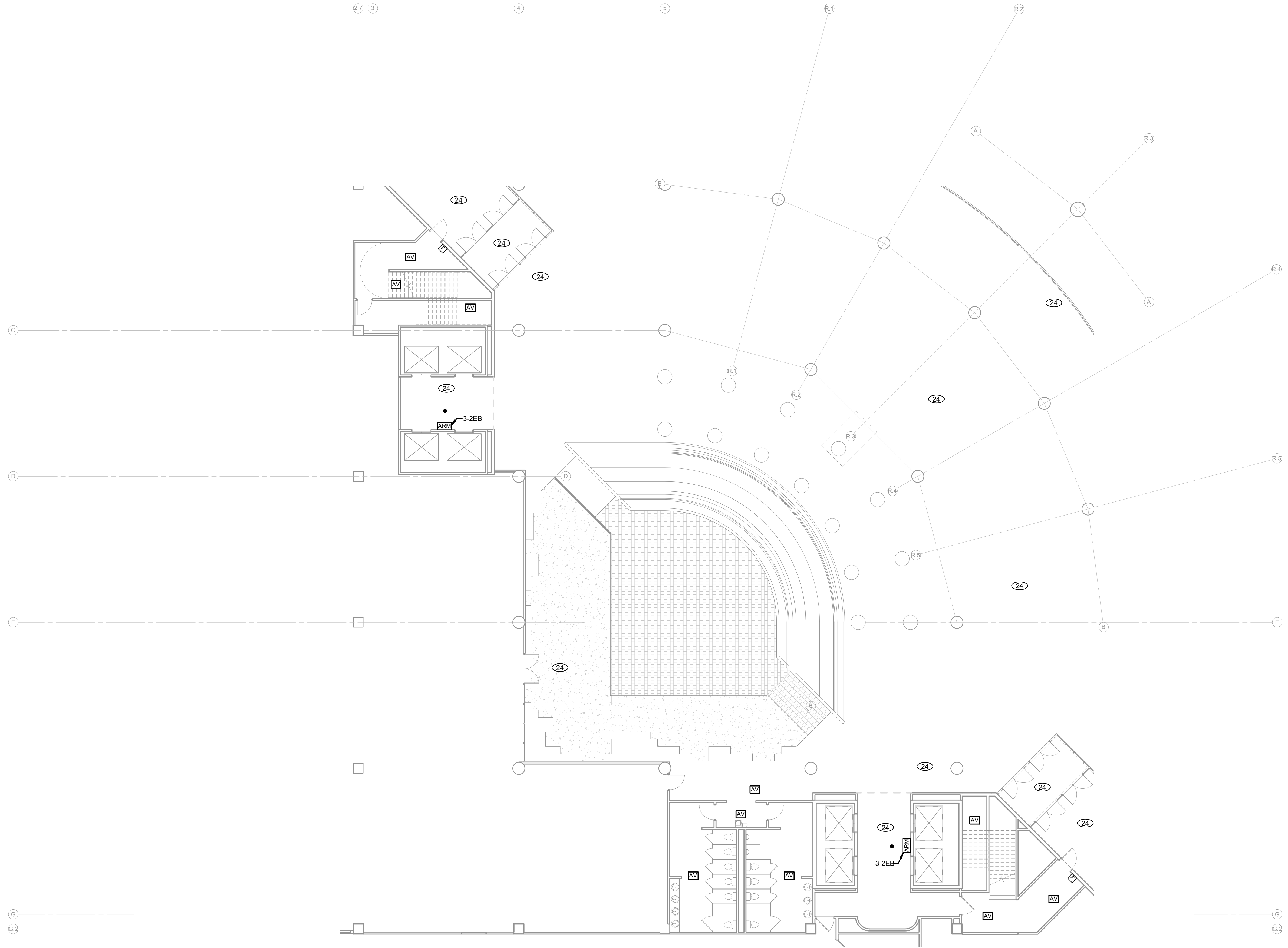
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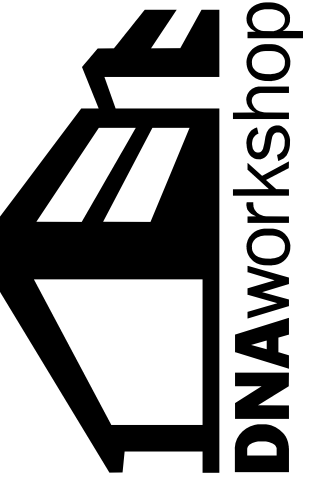
1st FLOOR ELECTRICAL PLAN

**E1.1.2**

**PHASE:** CD



**1** 1st FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN  
3/32" = 1'-0"



**LANDMARK BUILDING**  
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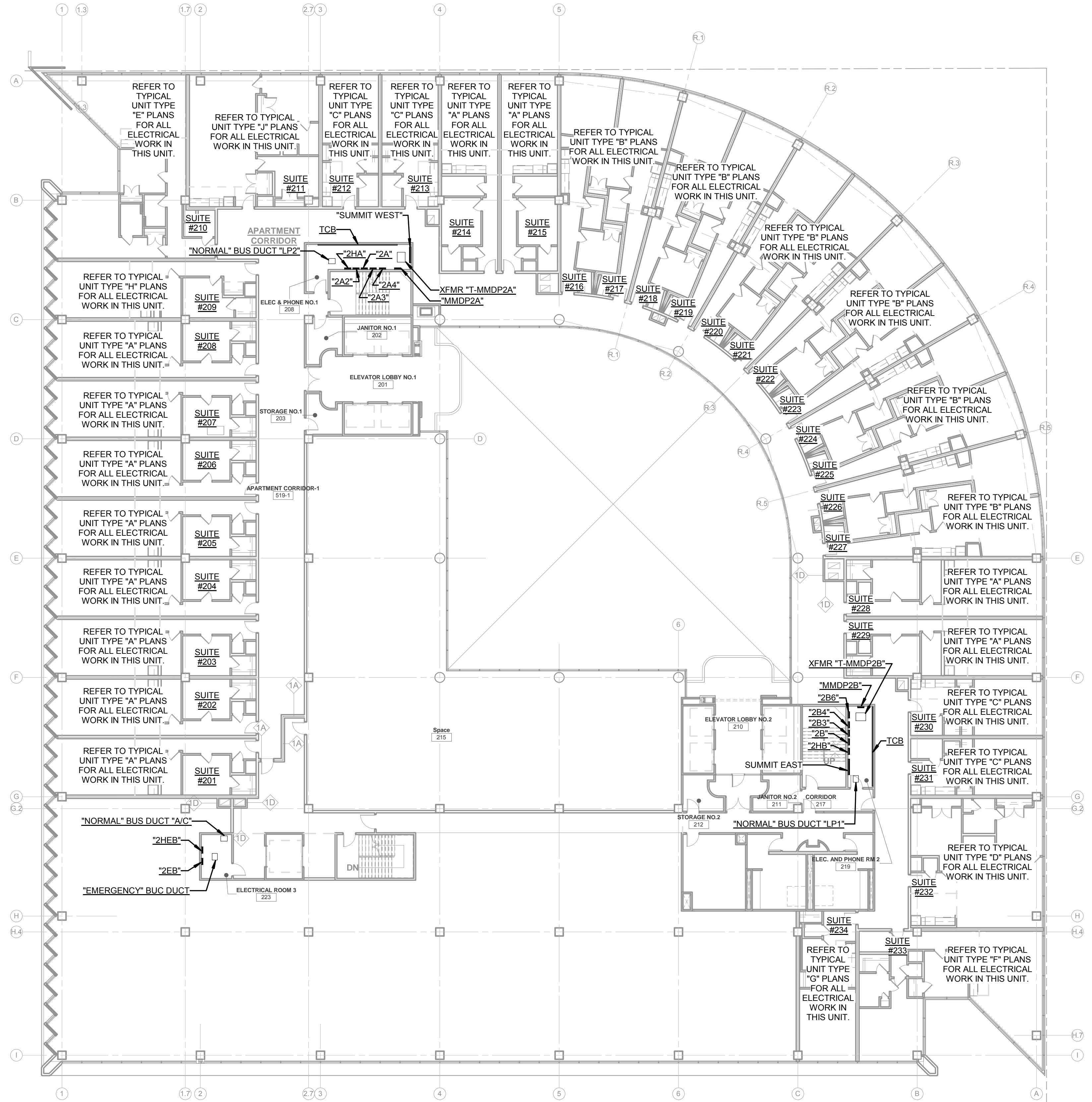
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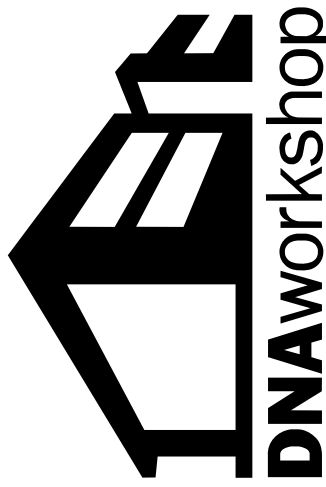
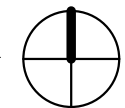
1st FLOOR ELECTRICAL  
SPECIAL SYSTEMS PLAN

**E1.1.3**

**PHASE:** CD



**1** 2nd FLOOR ELECTRICAL OVERALL PLAN  
1/16" = 1'-0"



# LANDMARK BUILDING

## 175 EAST CAPITOL ST., JACKSON, MS 39201

DYKE NELSON ARCHITECTURE 235 SOUTH 14TH ST. BATON ROUGE, LA 70802 DINA-WORKSHOP.COM (225) 224 3363

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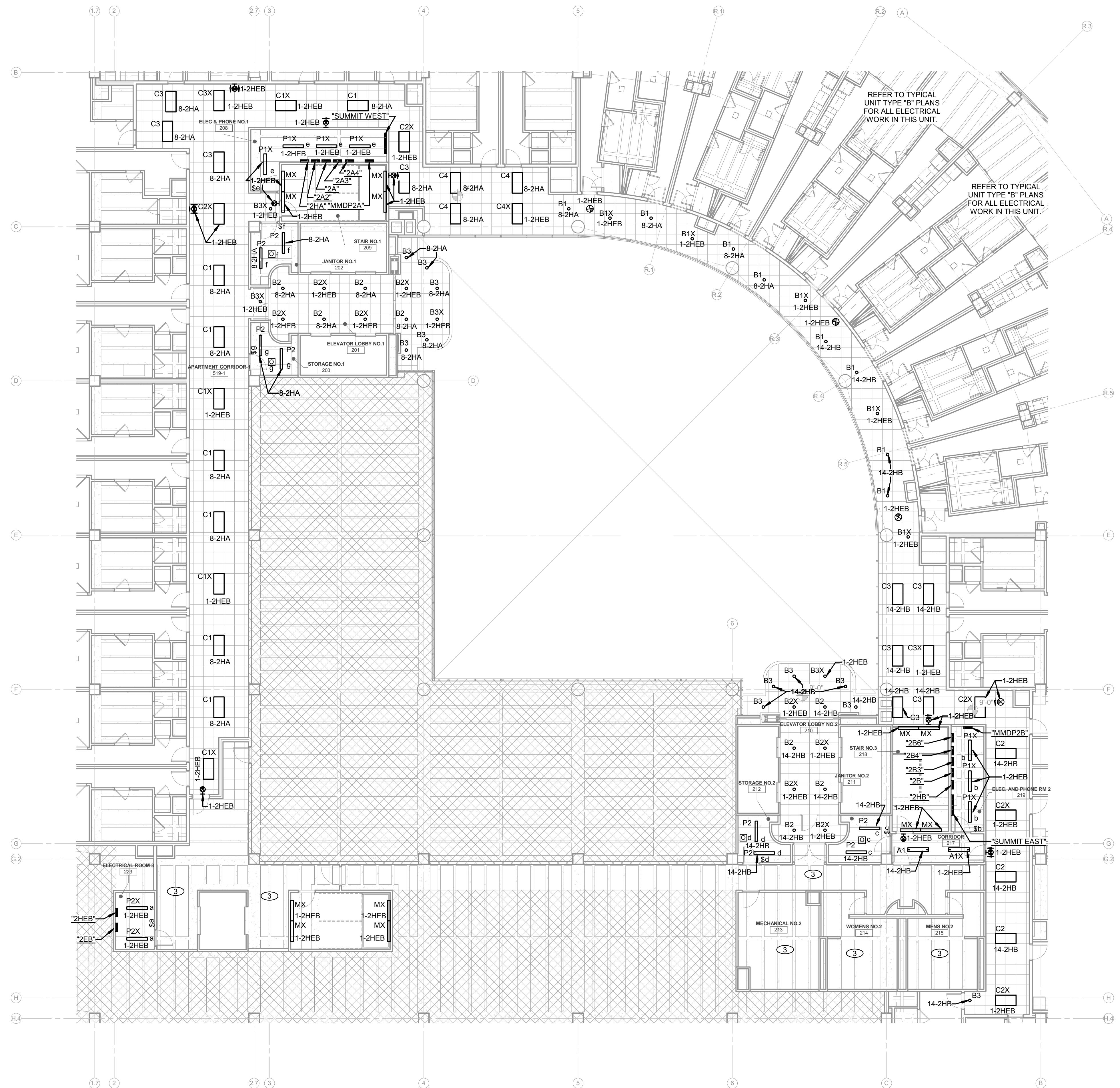
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2nd FLOOR ELECTRICAL OVERALL PLAN

E1.2.0

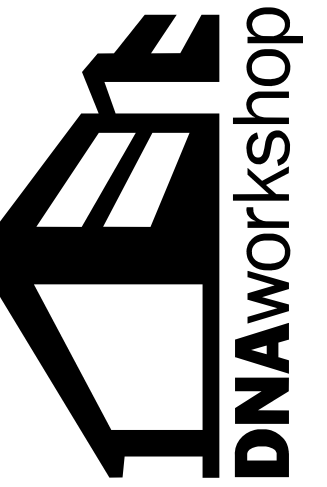
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**1** 2nd FLOOR ELECTRICAL LIGHTING PLAN  
3/32" = 1'-0"

REFER TO TYPICAL UNIT TYPE "B" PLANS FOR ALL ELECTRICAL WORK IN THIS UNIT.

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**DNAworkshop**

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175 EAST CAPITOL ST., JACKSON, MS 39201

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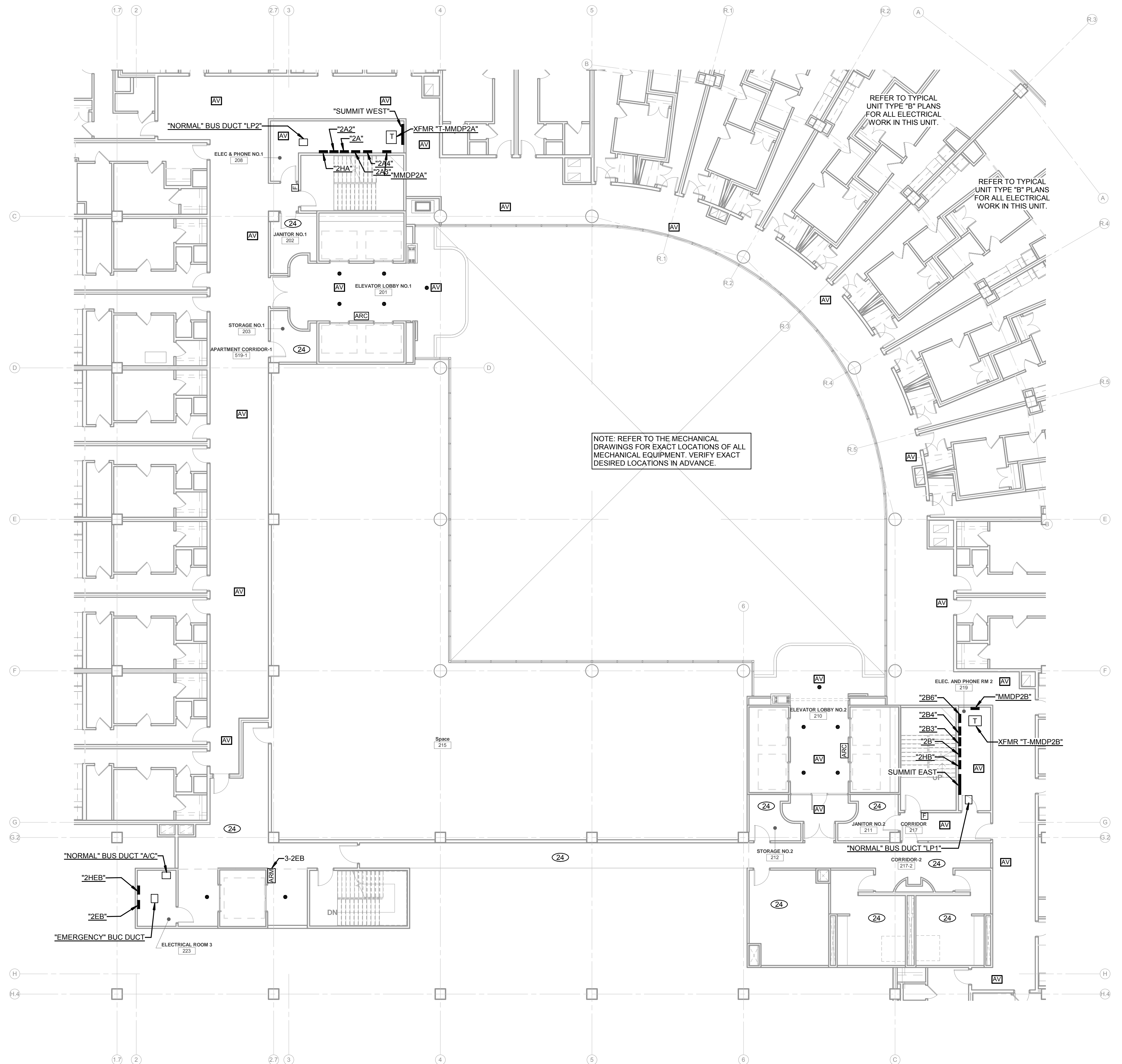


2nd FLOOR ELECTRICAL LIGHTING PLAN

**E1.2.1**

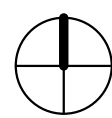
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NOTE: REFER TO THE MECHANICAL DRAWINGS FOR EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT. VERIFY EXACT DESIRED LOCATIONS IN ADVANCE.

**1** 2nd FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN  
 3/32" = 1'-0"



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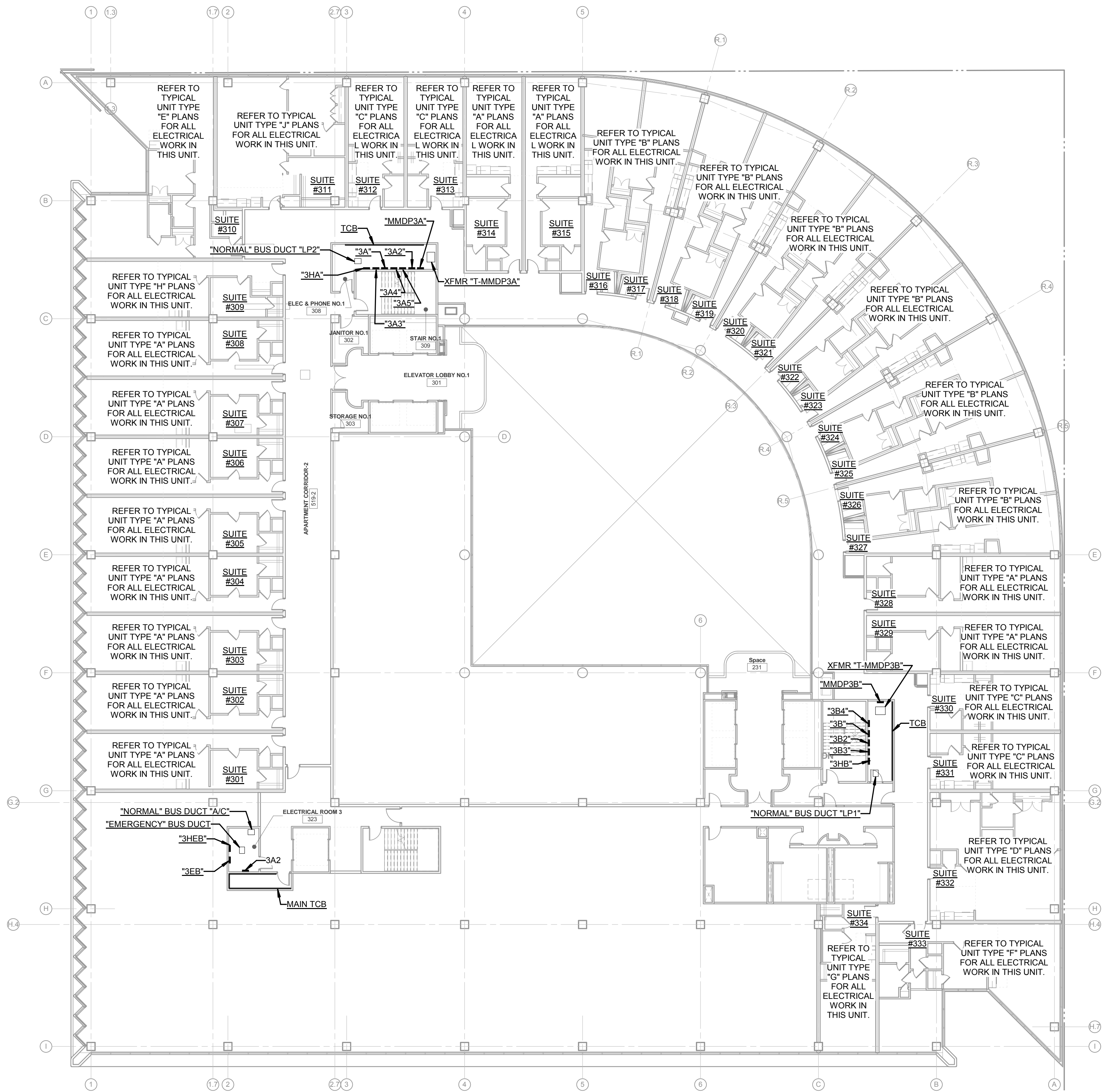
2nd FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN

**E1.2.3**

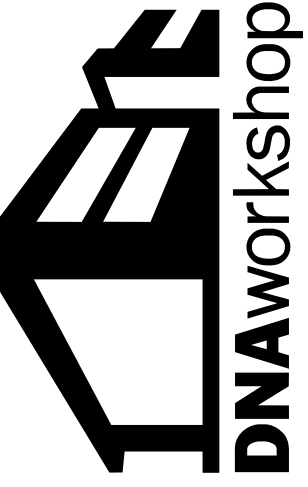
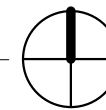
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**1** 3rd FLOOR ELECTRICAL OVERALL PLAN  
1/16" = 1'-0"



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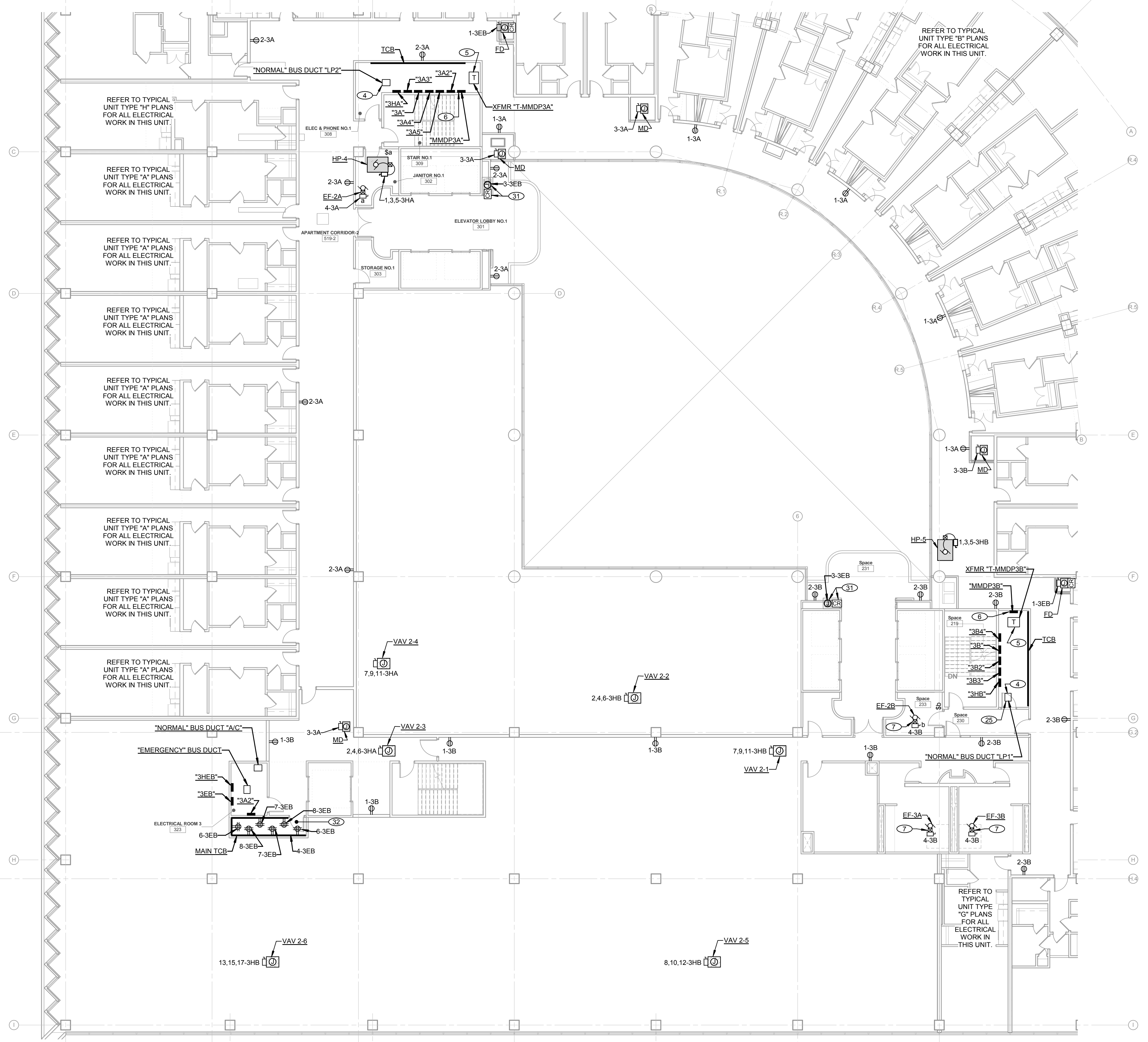


3rd FLOOR ELECTRICAL OVERALL PLAN

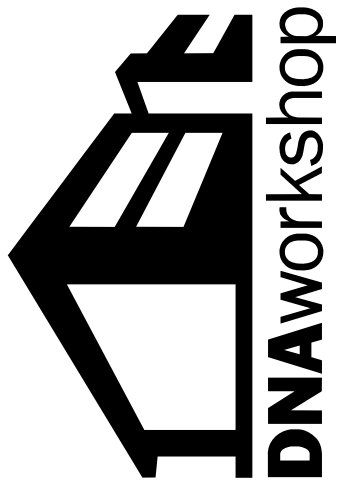
**E13.0**

PHASE: CD





1 3rd FLOOR ELECTRICAL PLAN  
3/32" = 1'-0"



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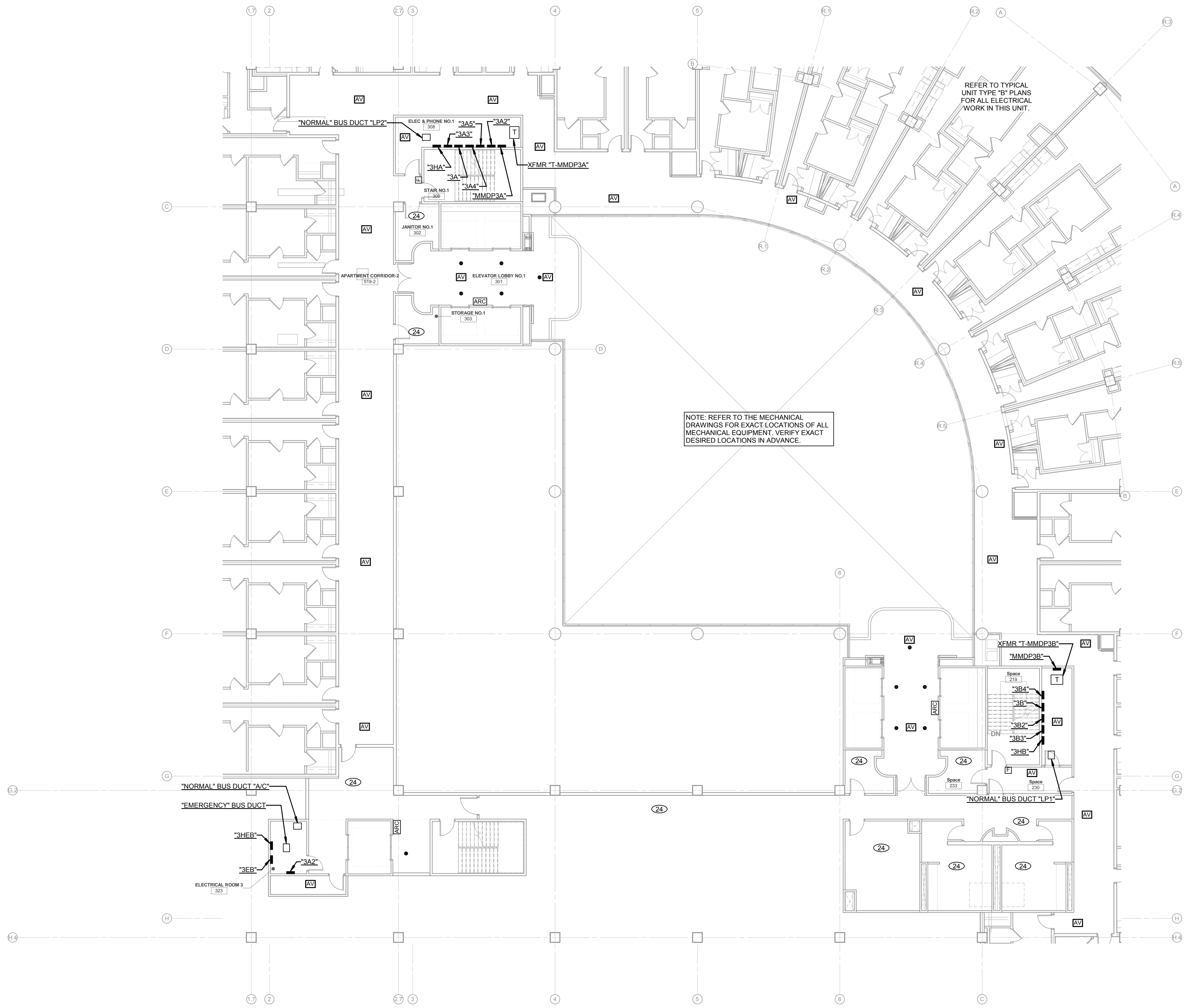
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3rd FLOOR ELECTRICAL PLAN

**E13.2**  
**PHASE:** CD

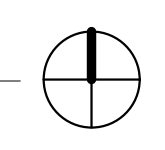
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REFER TO TYPICAL UNIT TYPE "B" PLANS FOR ALL ELECTRICAL WORK IN THIS UNIT.

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1 3rd FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN  
3/32" = 1'-0"



# LANDMARK BUILDING

175 EAST CAPITOL ST., JACKSON, MS 39201

DYKE NELSON ARCHITECTURE 235 SOUTH 14TH ST., BATON ROUGE, LA 70802 DNA-WORKSHOP.COM (225) 224 3363

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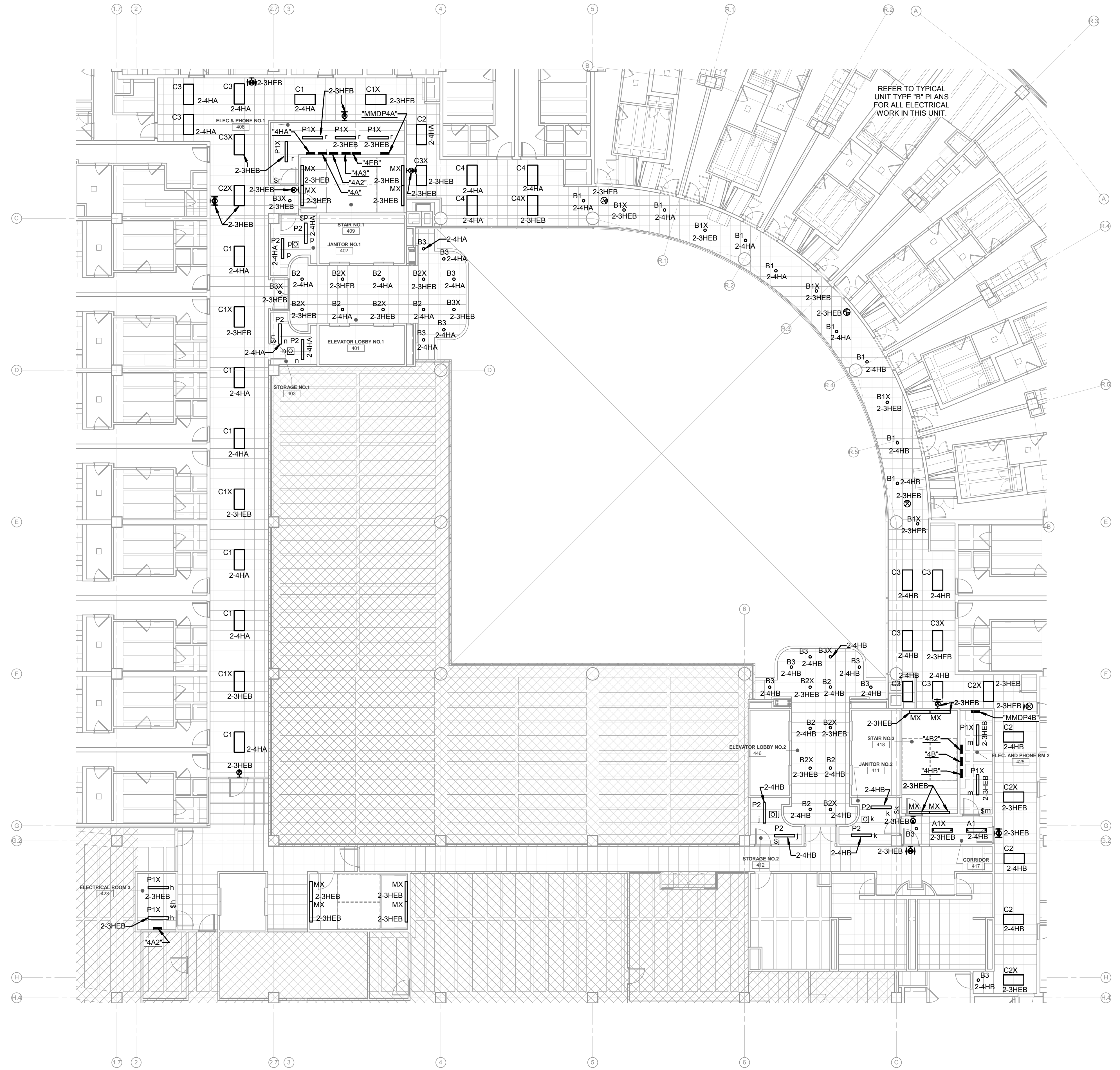


3rd FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN

E1.3.3

PHASE: CD





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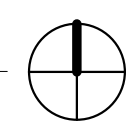


4th FLOOR ELECTRICAL LIGHTING PLAN

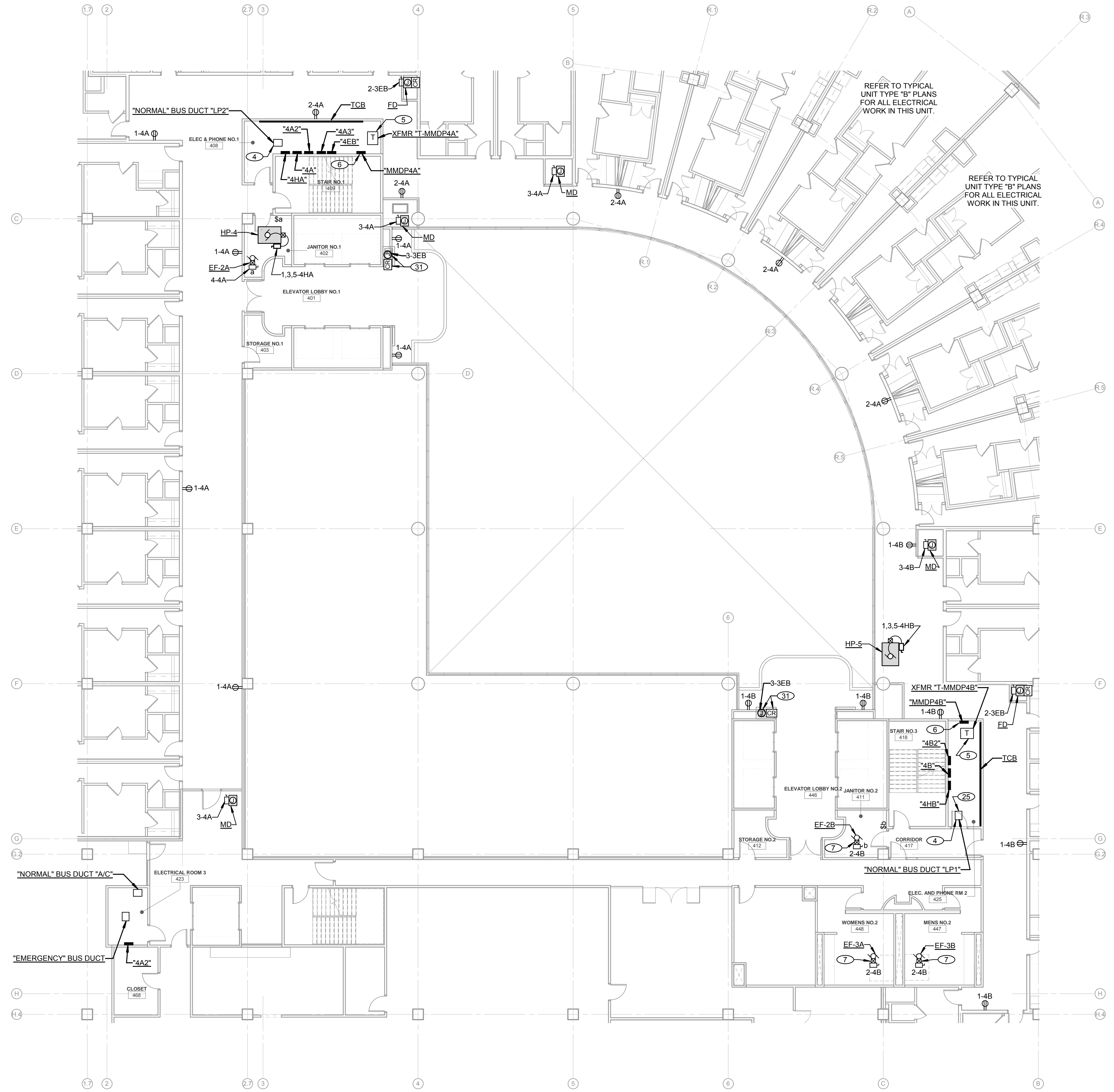
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PHASE: CD

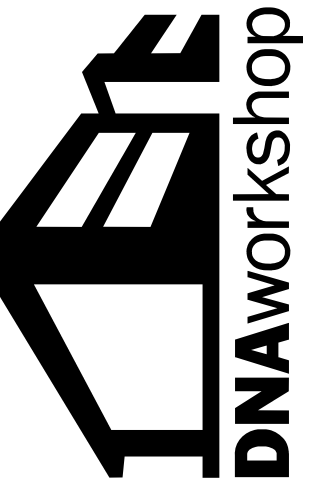
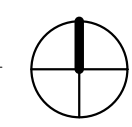
**1** 4th FLOOR ELECTRICAL LIGHTING PLAN  
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**1** 4th FLOOR ELECTRICAL PLAN  
3/32" = 1'-0"



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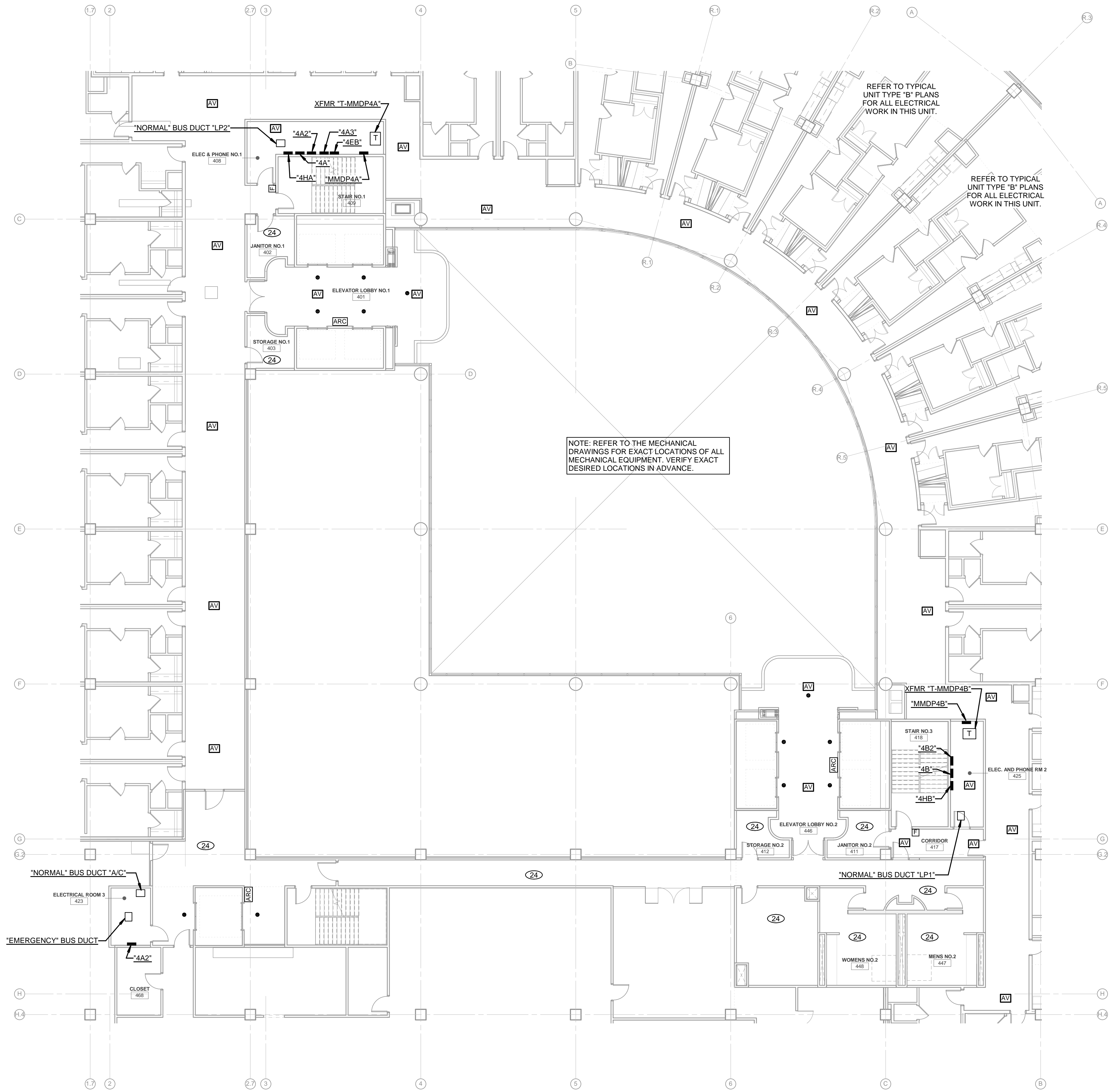
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4th FLOOR ELECTRICAL PLAN

**E1.4.2**

**PHASE:** CD

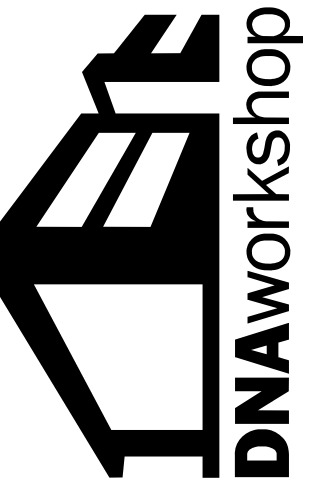


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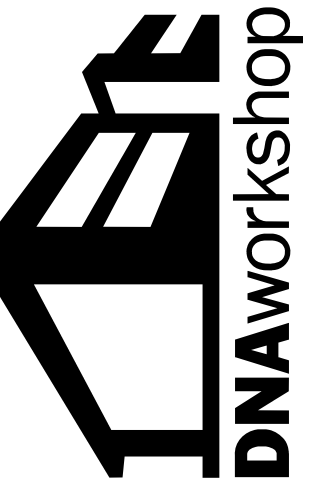


4th FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN

**E1.4.3**

PHASE: CD

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# LANDMARK BUILDING 175 EAST CAPITOL ST., JACKSON, MS 39201

## REVISIONS

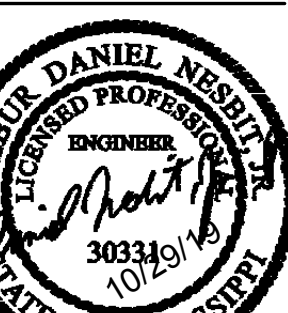
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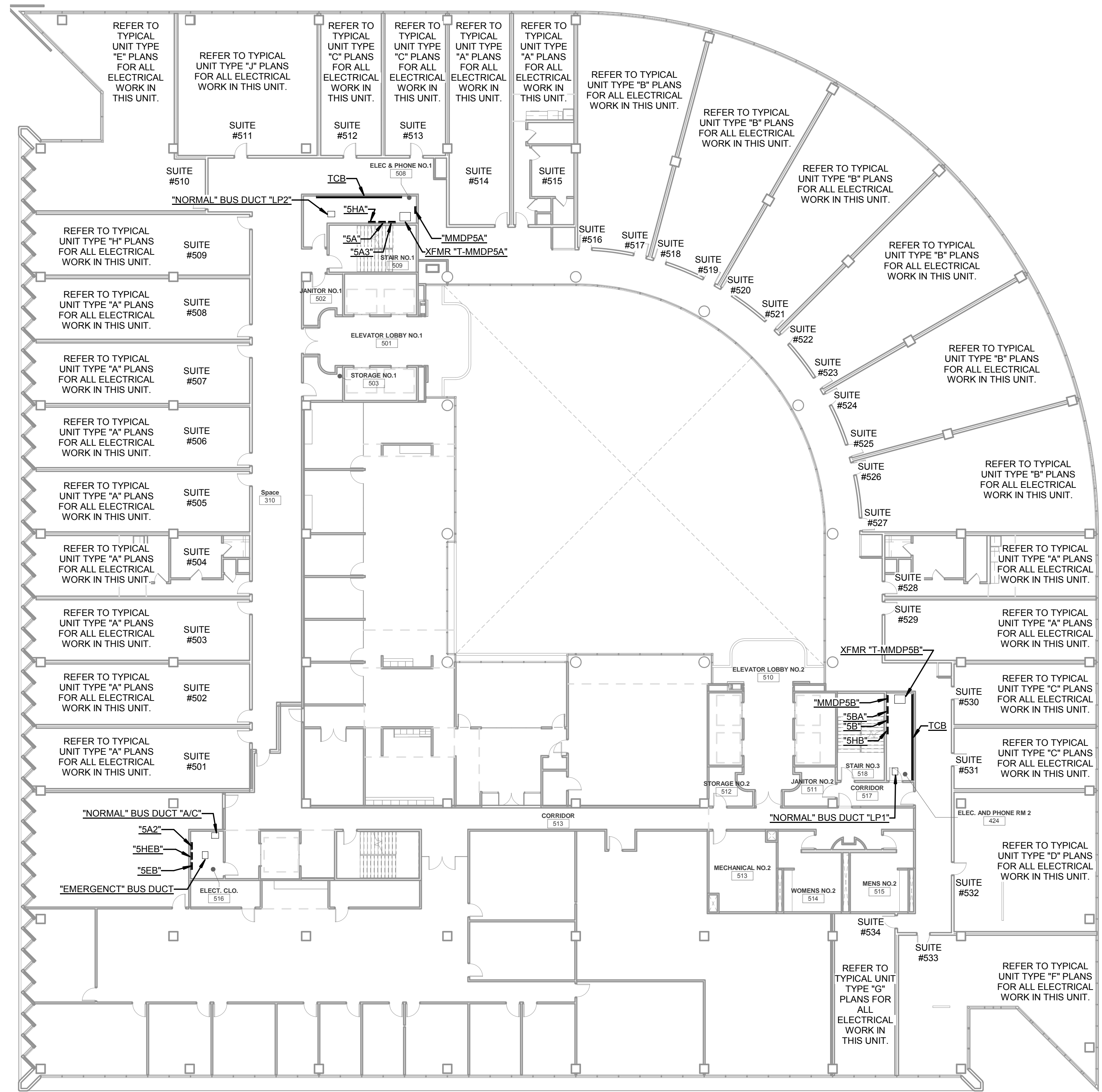
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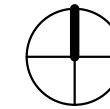
5th FLOOR ELECTRICAL OVERALL PLAN

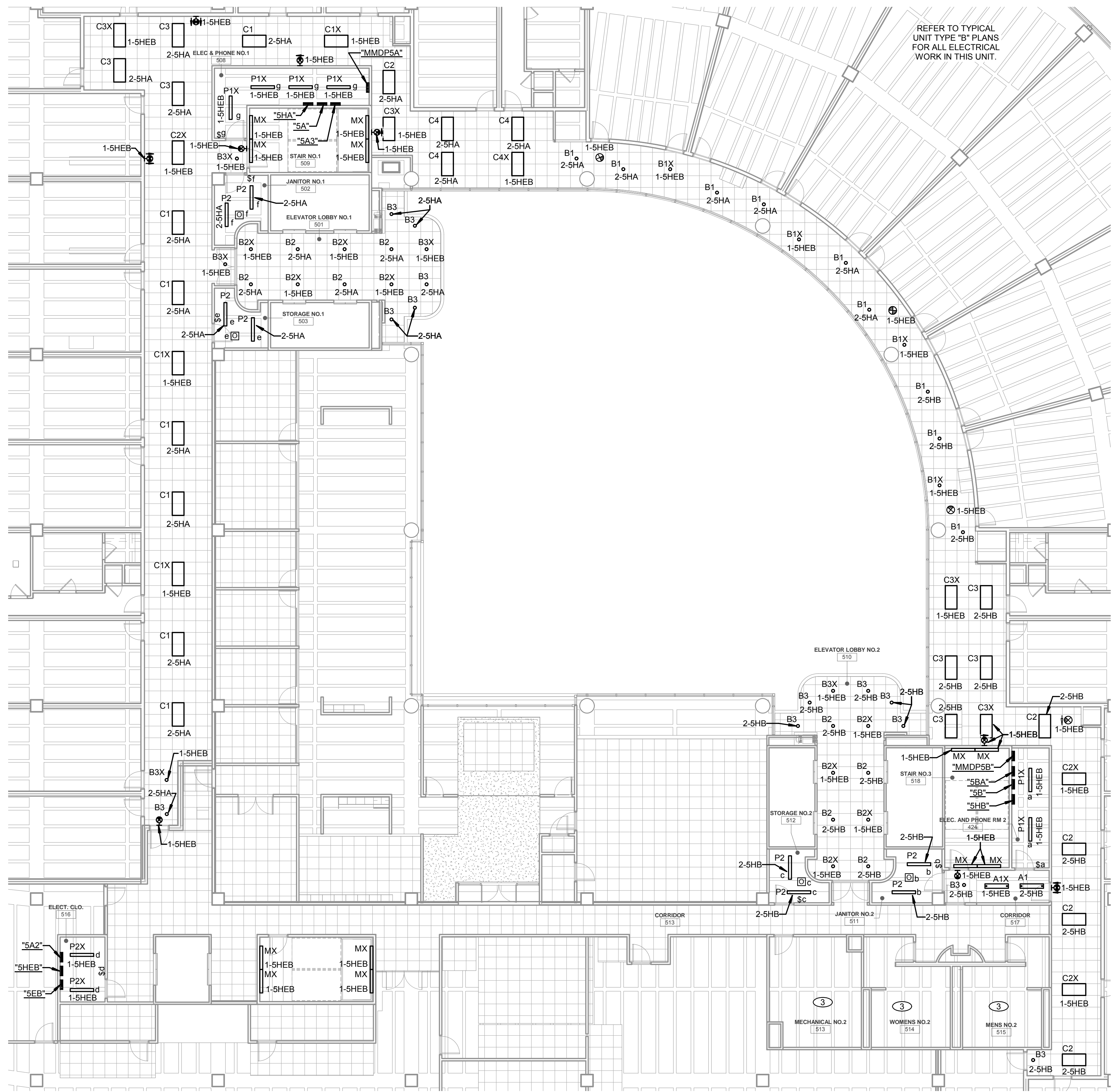
E15.0

PHASE: CD



**1** 5th FLOOR ELECTRICAL OVERALL PLAN  
 1/16" = 1'-0"





**1** 5th FLOOR ELECTRICAL LIGHTING PLAN  
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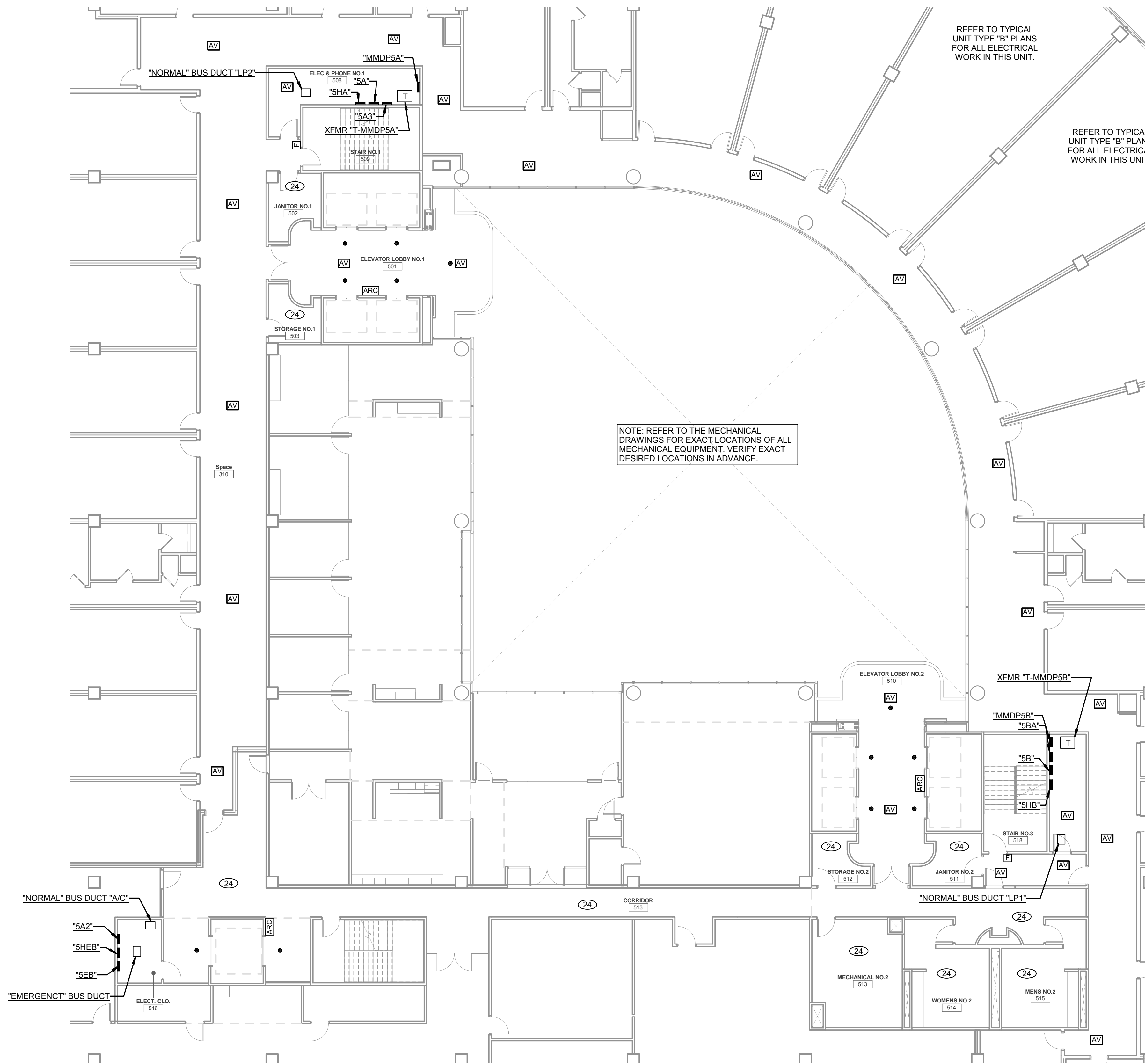


5th FLOOR ELECTRICAL LIGHTING PLAN

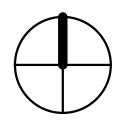
**E15.1**

PHASE: CD





1 5th FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN  
3/32" = 1'-0"



REVISIONS

JOB NUMBER: 15-020  
 ISSUED: 10/02/19  
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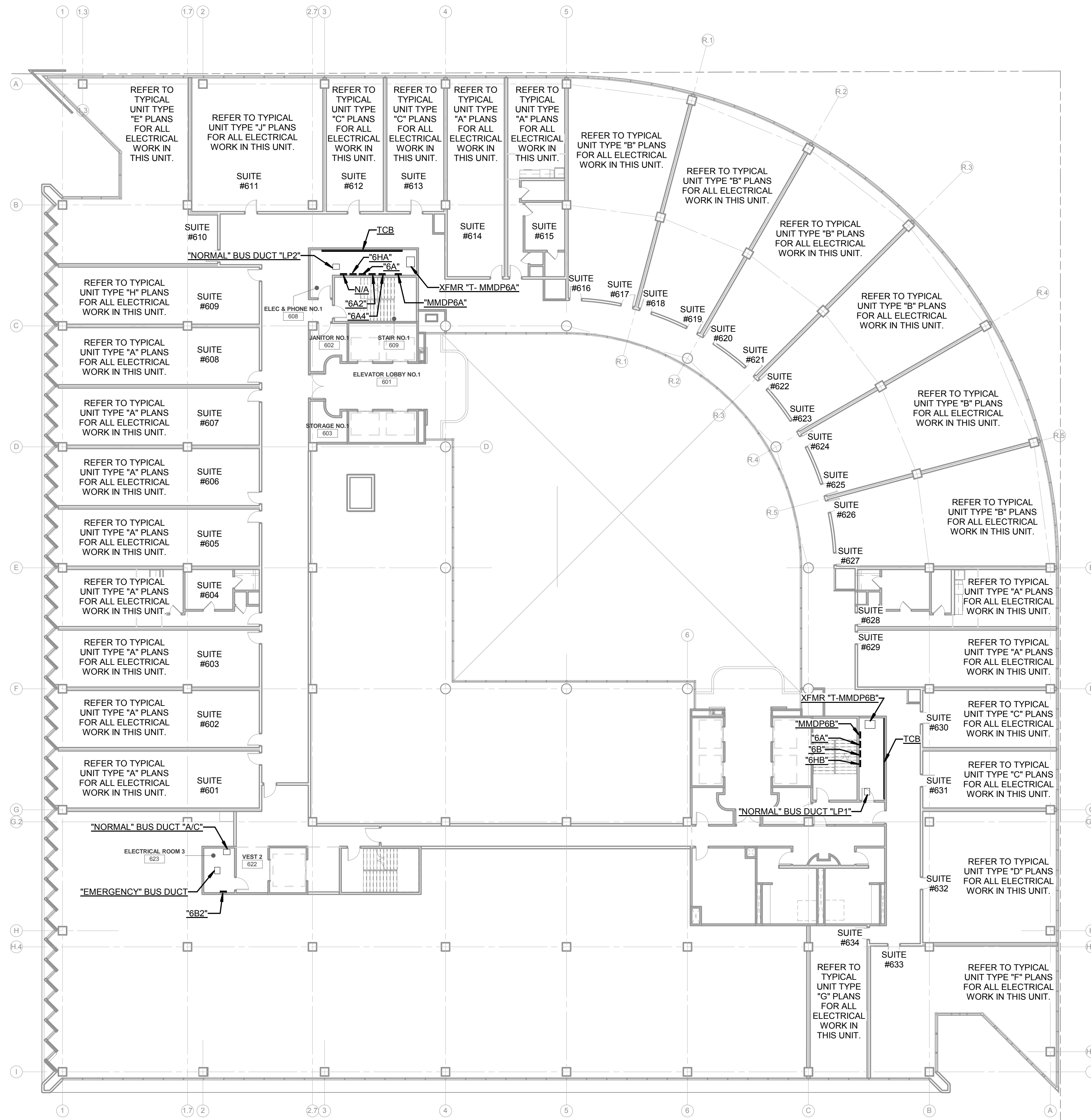
5th FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN

**E1.5.3**

PHASE: CD

**LANDMARK BUILDING**  
 175 EAST CAPITOL ST., JACKSON, MS 39201

10/20/2014 4:47:48 PM © COPYRIGHT 2016 DYKE NELSON ARCHITECTURE, LLC



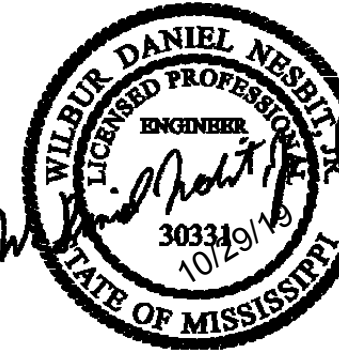
**1** 6th FLOOR ELECTRICAL OVERALL PLAN  
 1/16" = 1'-0"



REVISIONS	

**JOB NUMBER:** 15-020  
**ISSUED:** 10/02/19  
**ISSUED FOR:**  
**CONSTRUCTION**

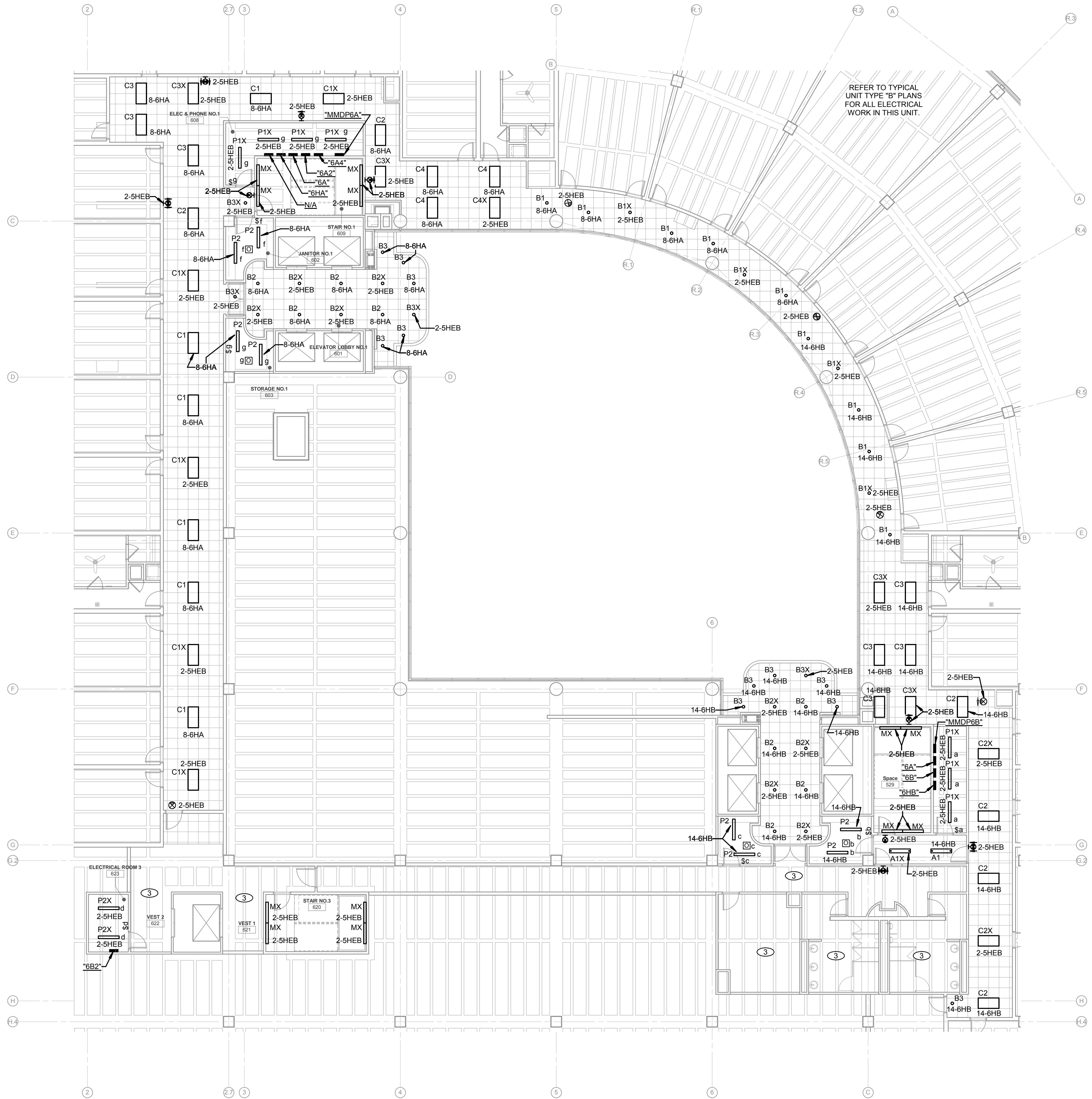
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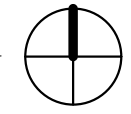
6th FLOOR ELECTRICAL OVERALL PLAN

**E1.6.0**

**PHASE:** CD



**1** 6th FLOOR ELECTRICAL LIGHTING PLAN  
3/32" = 1'-0"



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JOB NUMBER: 15-020  
ISSUED: 08/13/19

ISSUED FOR:  
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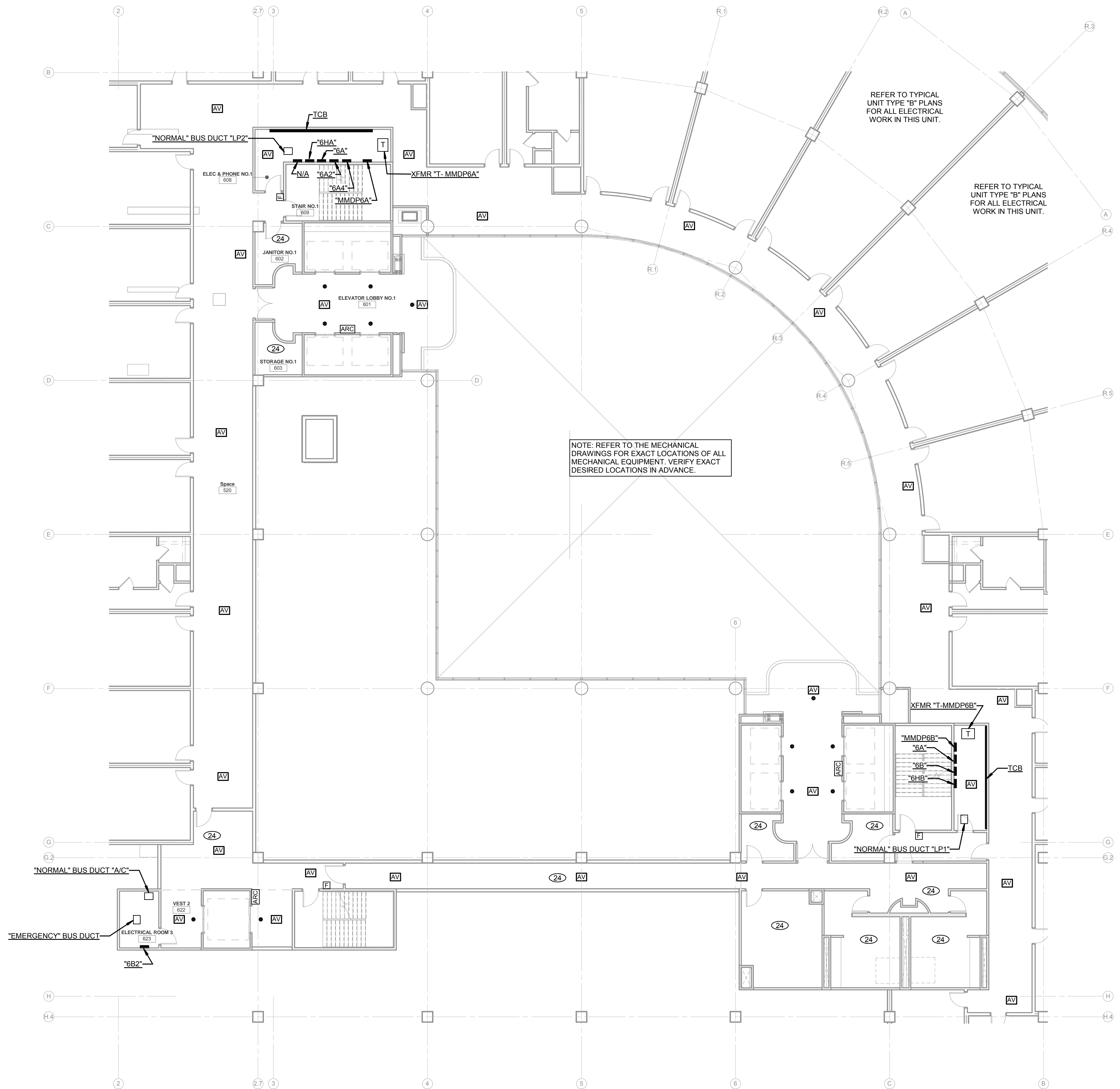


6th FLOOR ELECTRICAL LIGHTING PLAN

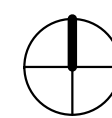
**E1.6.1**

PHASE: CD





**1** 6th FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN  
3/32" = 1'-0"



**REVISIONS**

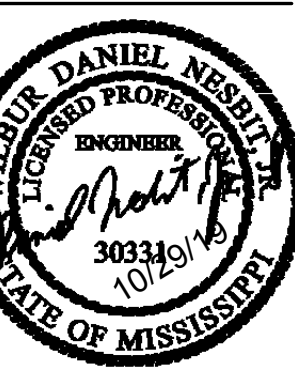
NO.	DESCRIPTION	DATE

**JOB NUMBER:** 15-020

**ISSUED:** 10/02/19

**ISSUED FOR:**  
**CONSTRUCTION**

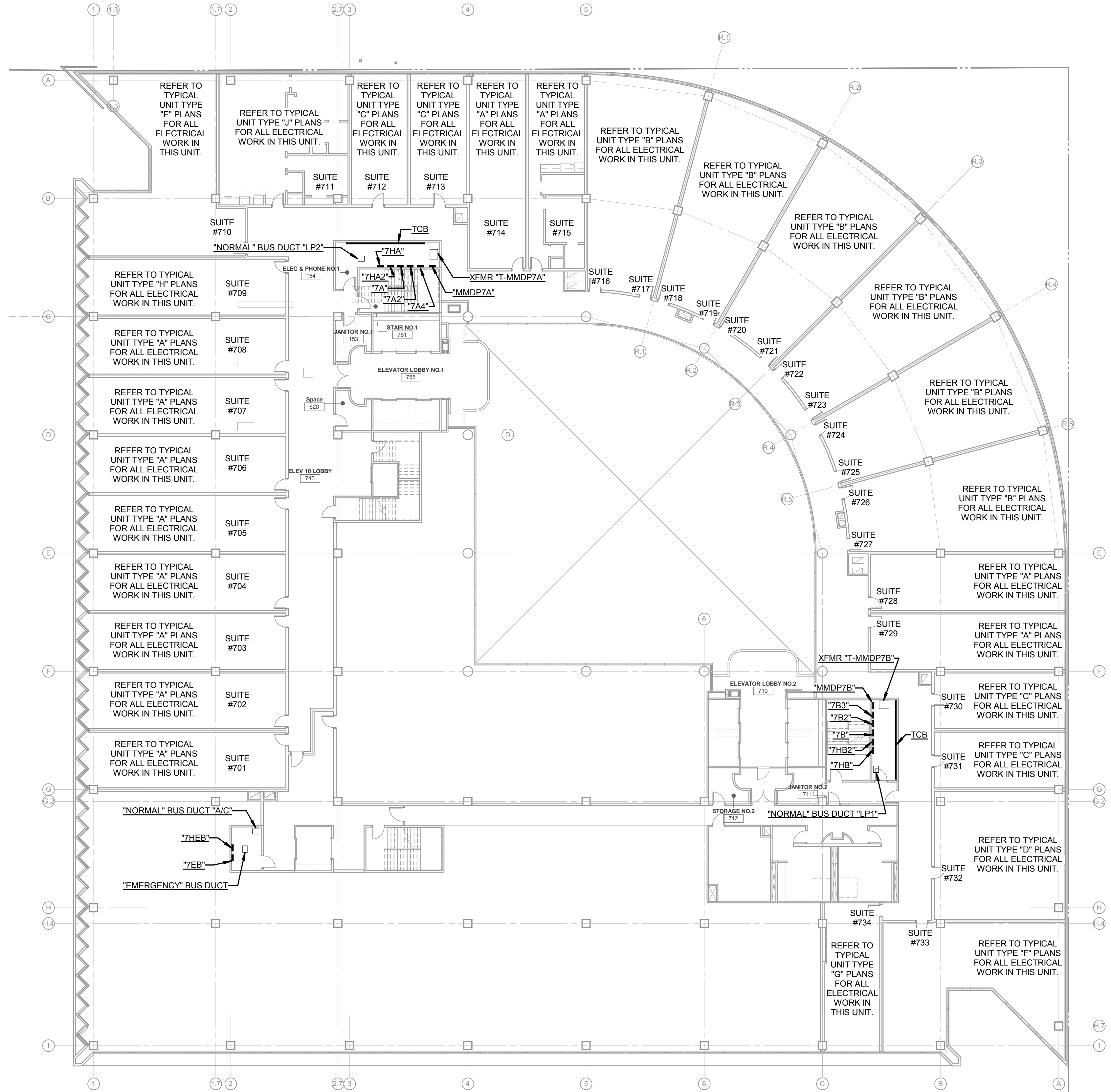
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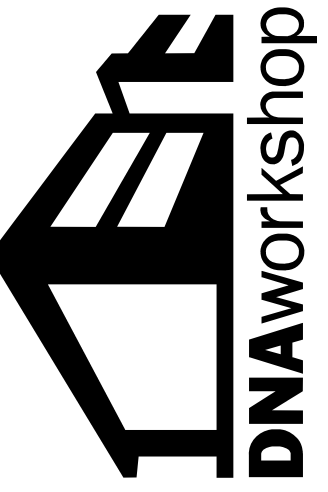
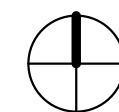
6th FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN

**E1.6.3**

**PHASE:** CD



**1** 7th FLOOR ELECTRICAL OVERALL PLAN  
1/16" = 1'-0"



**LANDMARK BUILDING**  
175 EAST CAPITOL ST., JACKSON, MS 39201

DYKE NELSON ARCHITECTURE 235 SOUTH 14TH ST. BATON ROUGE, LA 70802 DNA-WORKSHOP.COM (225) 224 3363

**REVISIONS**

NO.	DESCRIPTION

**JOB NUMBER:** 15-020

**ISSUED:** 10/02/19

**ISSUED FOR:**  
**CONSTRUCTION**

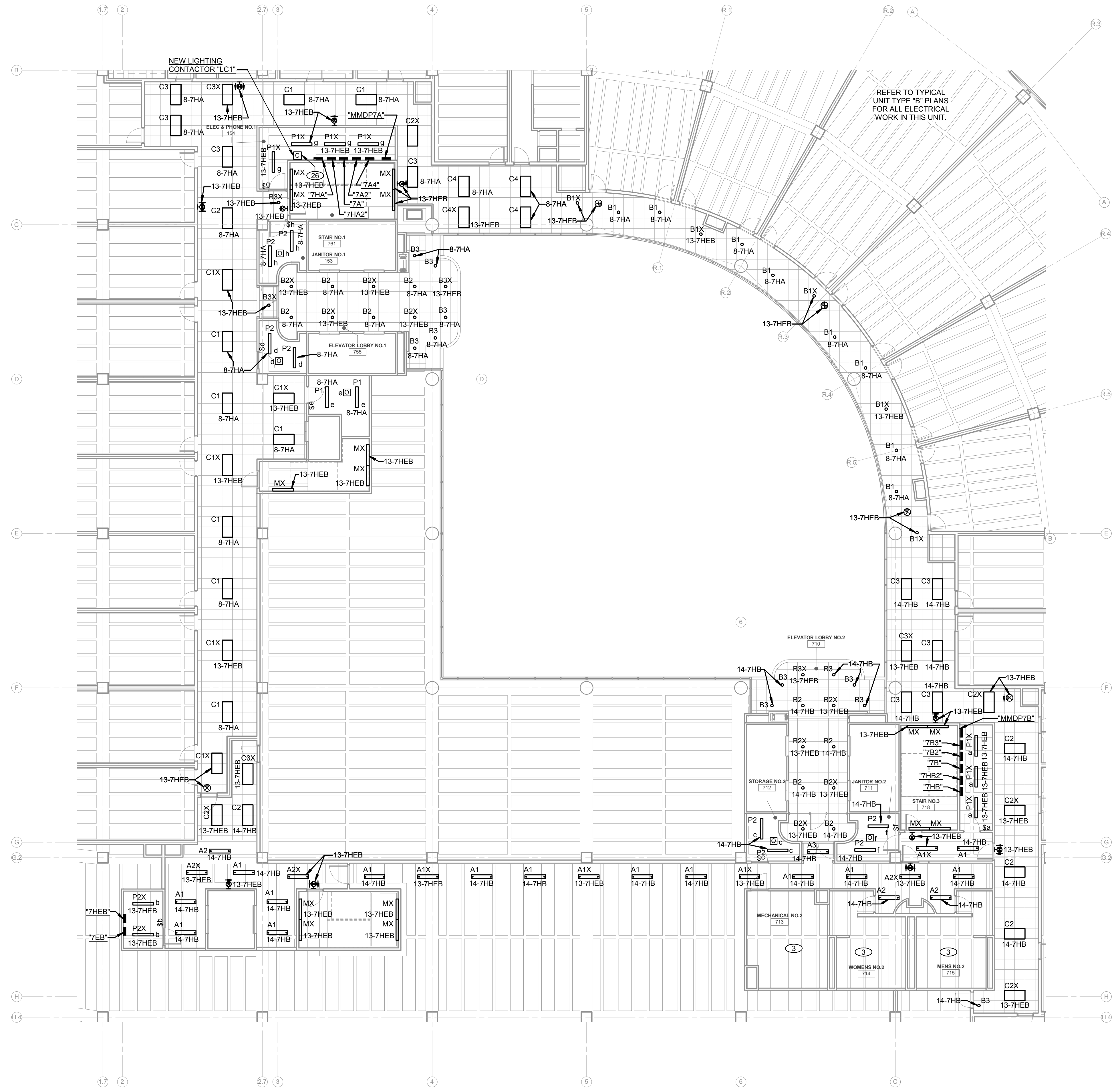
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7th FLOOR ELECTRICAL OVERALL PLAN

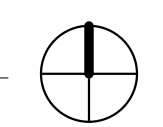
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**PHASE:** CD

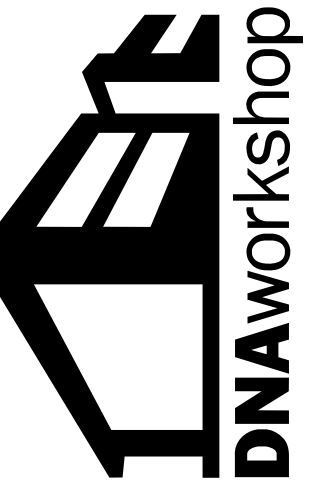


REFER TO TYPICAL UNIT TYPE "B" PLANS FOR ALL ELECTRICAL WORK IN THIS UNIT.

**1** 7th FLOOR ELECTRICAL LIGHTING PLAN  
3/32" = 1'-0"



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**LANDMARK BUILDING**  
175 EAST CAPITOL ST., JACKSON, MS 39201  
DYKE NELSON ARCHITECTURE 235 SOUTH 14TH ST. BATON ROUGE, LA 70802 DNA-WORKSHOP.COM (225) 224 3363

**REVISIONS**

NO.	DATE	DESCRIPTION

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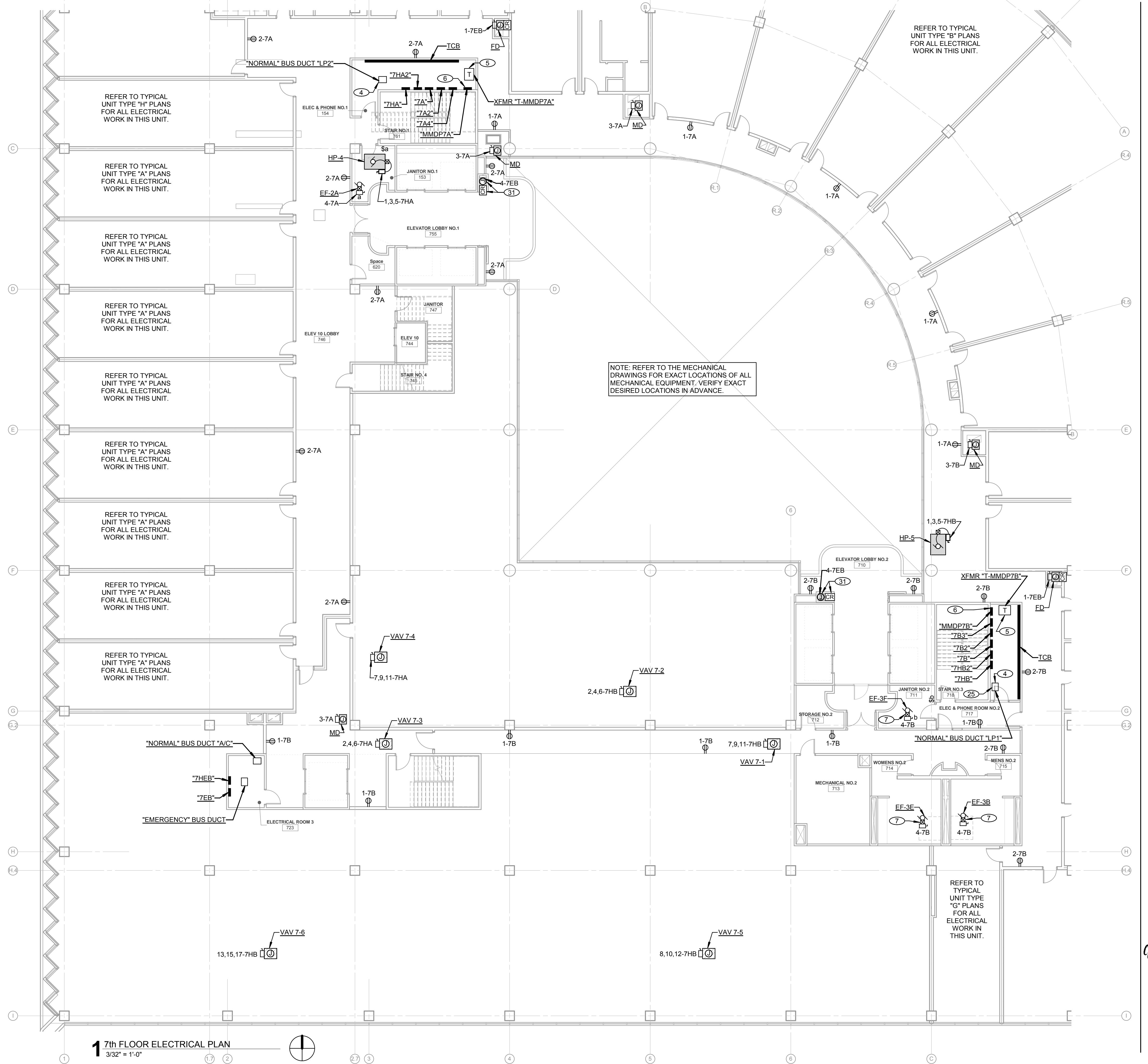


7th FLOOR ELECTRICAL LIGHTING PLAN

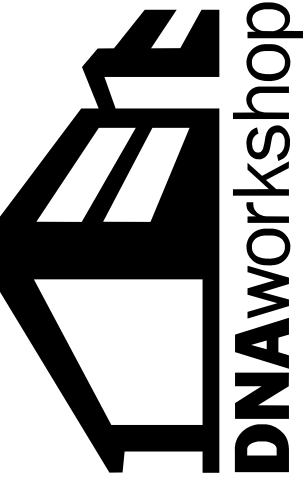
**E1.7.1**

**PHASE:** CD

10/20/2014 4:28:38 PM COPYRIGHT 2016 DYKE NELSON ARCHITECTURE, LLC



**17th FLOOR ELECTRICAL PLAN**  
3/32" = 1'-0"



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DYKE NELSON ARCHITECTURE 235 SOUTH 14TH ST. BATON ROUGE, LA 70802 DNA-WORKSHOP.COM (225) 224 3363

REVISIONS	

**JOB NUMBER:** 15-020

**ISSUED:** 08/13/19

**ISSUED FOR:**  
**CONSTRUCTION**

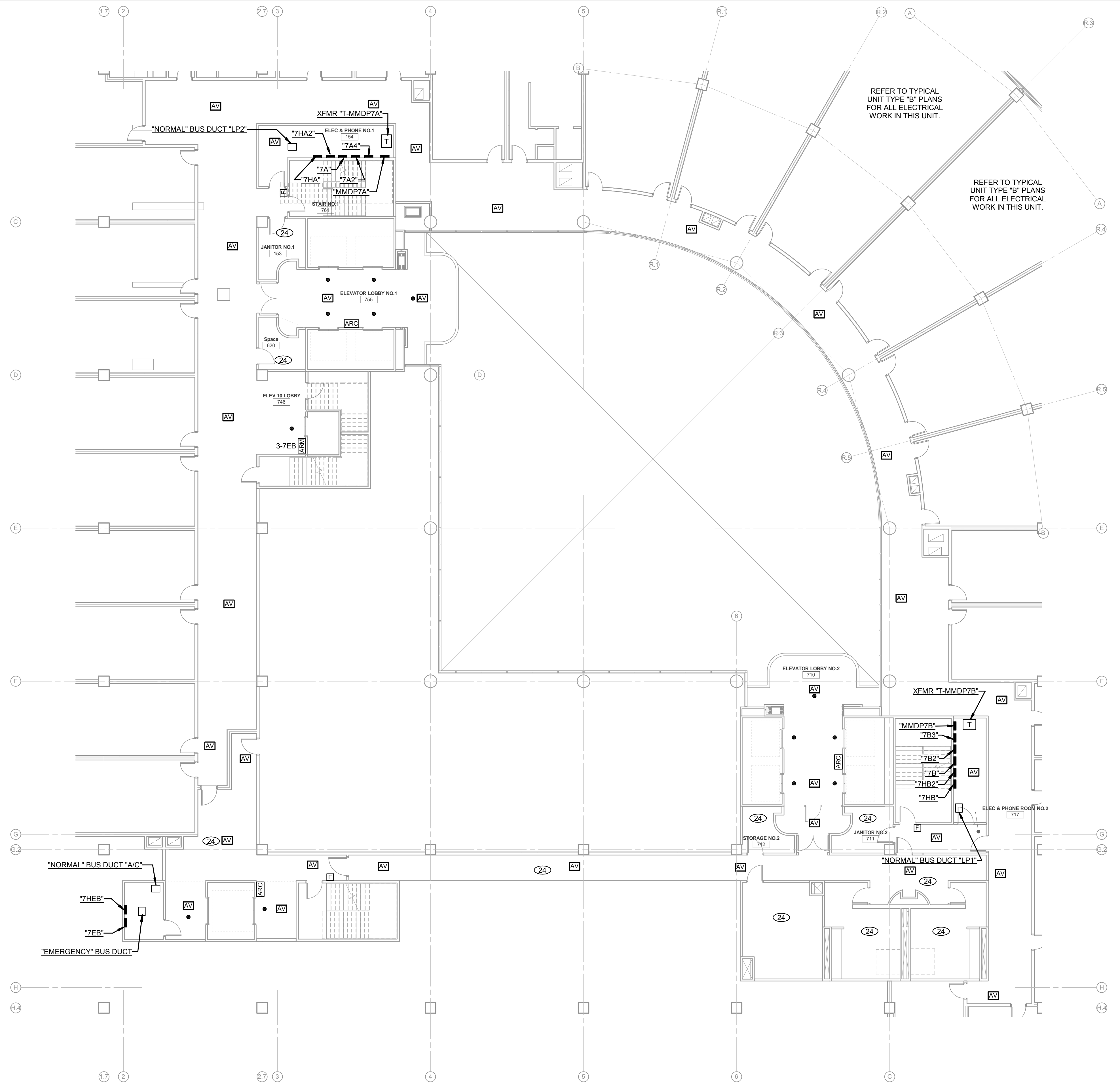
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7th FLOOR ELECTRICAL PLAN

**E17.2**

**PHASE:** CD



REVISIONS

NO.	DATE	DESCRIPTION

JOB NUMBER: 15-020

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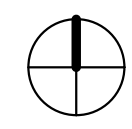


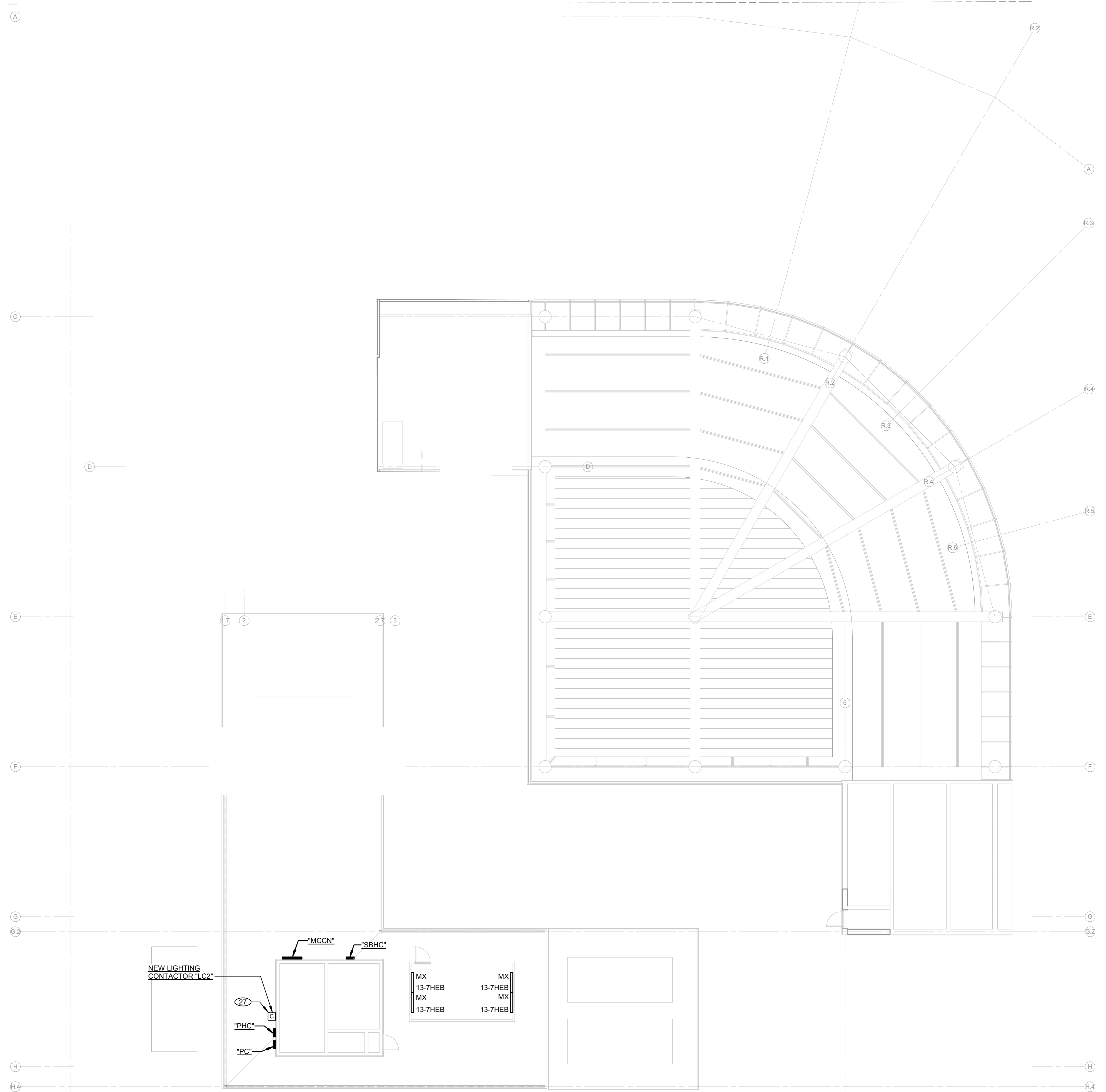
7th FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN

E1.7.3

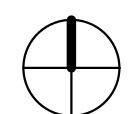
PHASE: CD

1 7th FLOOR ELECTRICAL SPECIAL SYSTEMS PLAN  
 3/32" = 1'-0"





**1** PENTHOUSE ELECTRICAL LIGHTING PLAN  
3/32" = 1'-0"



**REVISIONS**


**JOB NUMBER:** 15-020

**ISSUED:** 08/13/19

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**CONSTRUCTION**

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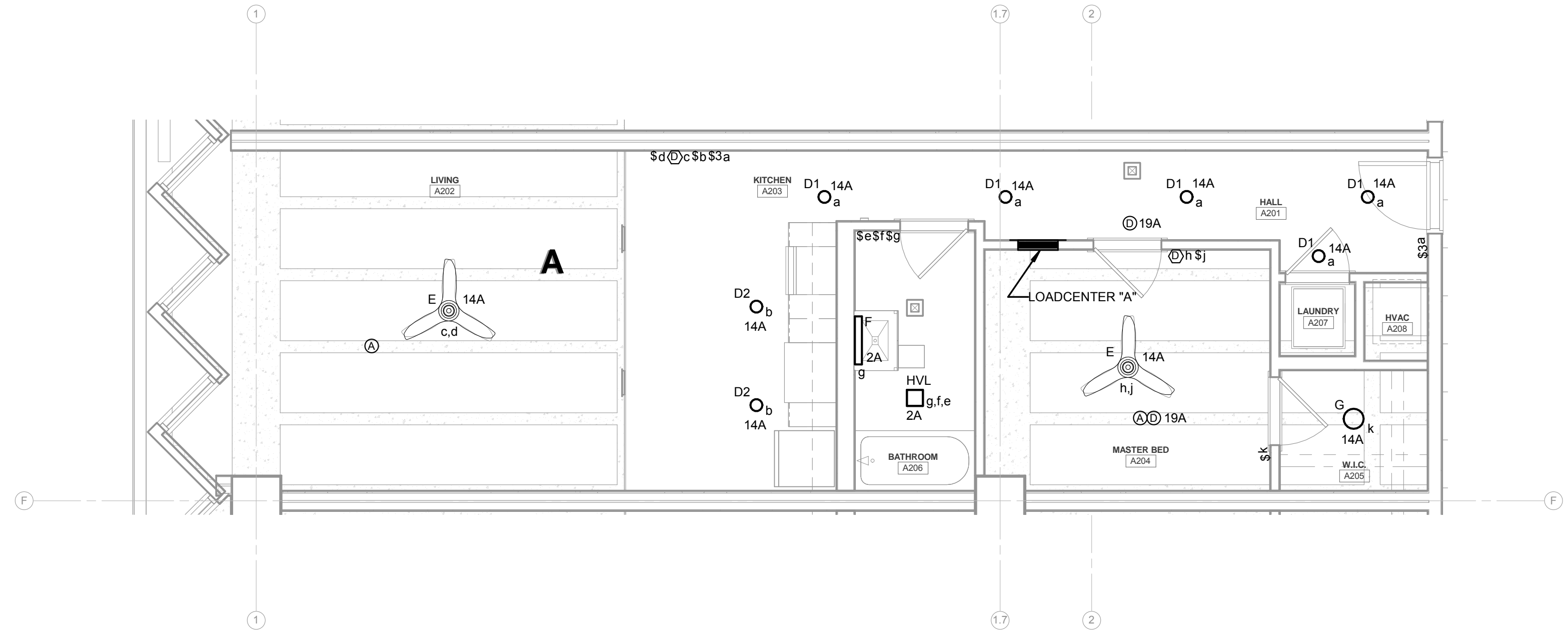


PENTHOUSE ELECTRICAL LIGHTING PLAN

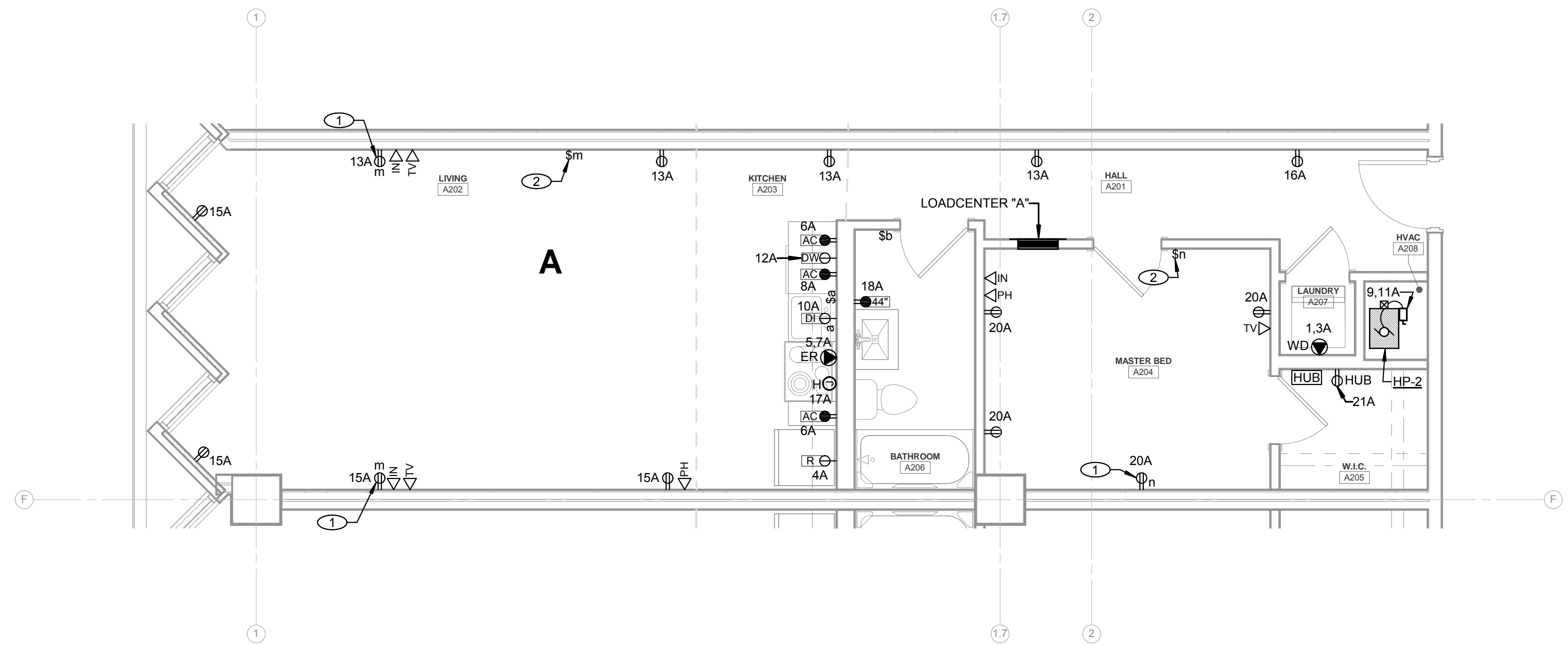
**E1.8.1**

**PHASE:** CD





**1** UNIT TYPE A ELECTRICAL LIGHTING PLAN  
 1/4" = 1'-0"



**2** UNIT TYPE A ELECTRICAL PLAN  
 1/4" = 1'-0"

**REVISIONS**

NO.	DESCRIPTION	DATE

**JOB NUMBER:** 15-020

**ISSUED FOR:** 08/13/19

**CONSTRUCTION**

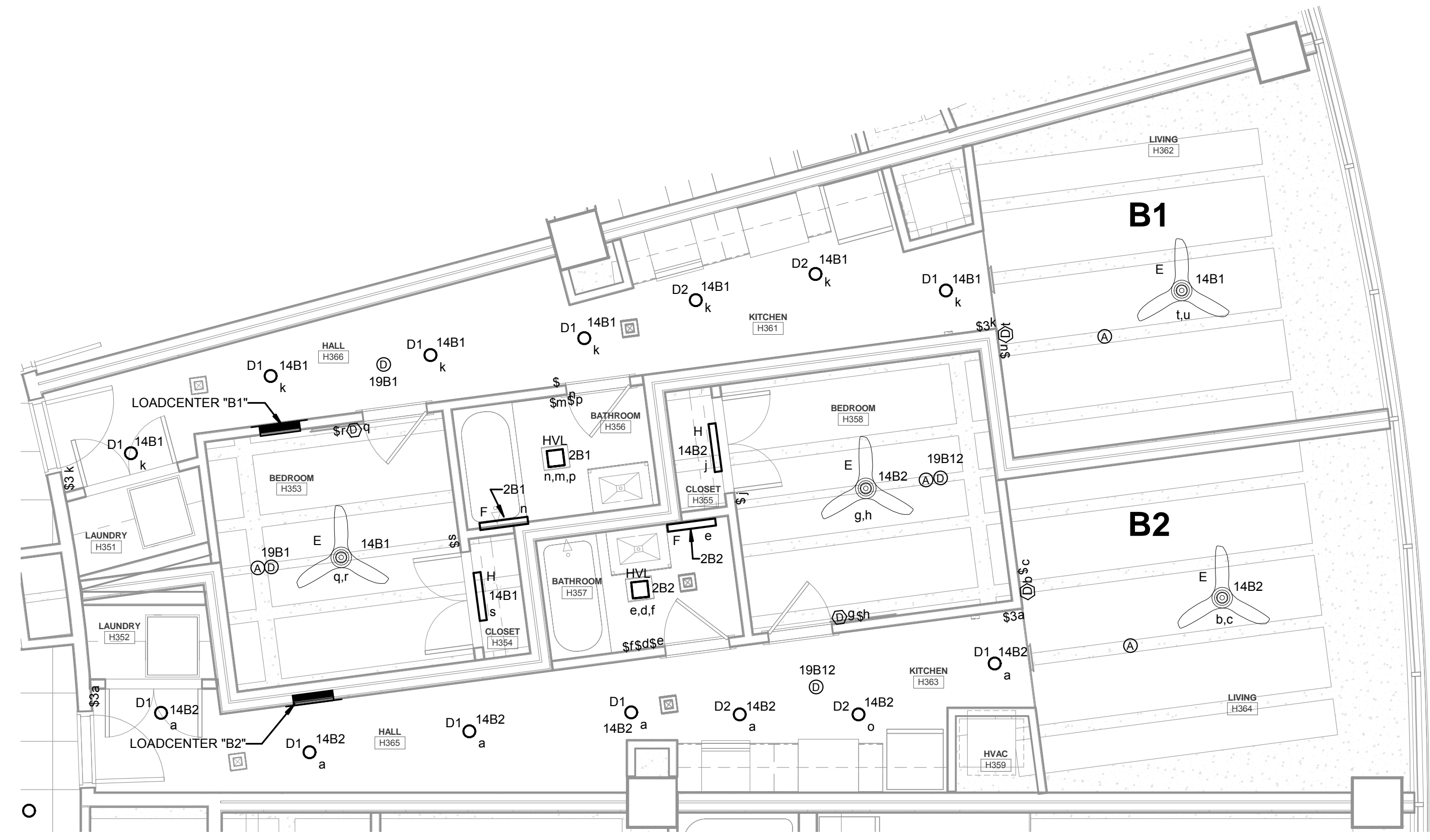
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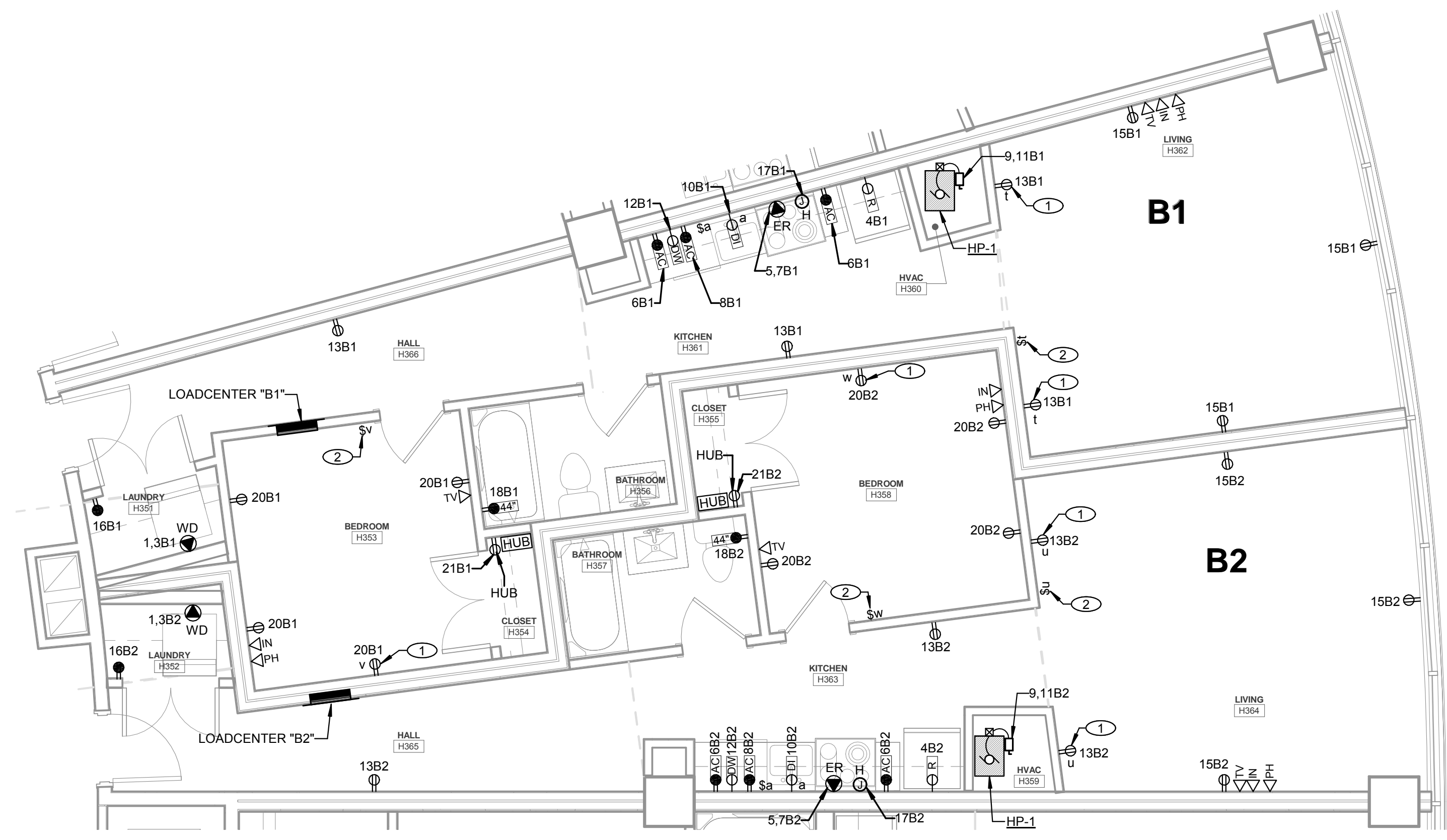
UNIT TYPE A ELECTRICAL PLANS

**E1.9.1**

PHASE: CD



**1** UNIT TYPE B ELECTRICAL LIGHTING PLAN  
 1/4" = 1'-0"



**2** UNIT TYPE B ELECTRICAL PLAN  
 1/4" = 1'-0"

**REVISIONS**

NO.	DESCRIPTION

**JOB NUMBER:** 15-020

**ISSUED:** 08/13/19

**ISSUED FOR:**  
**CONSTRUCTION**

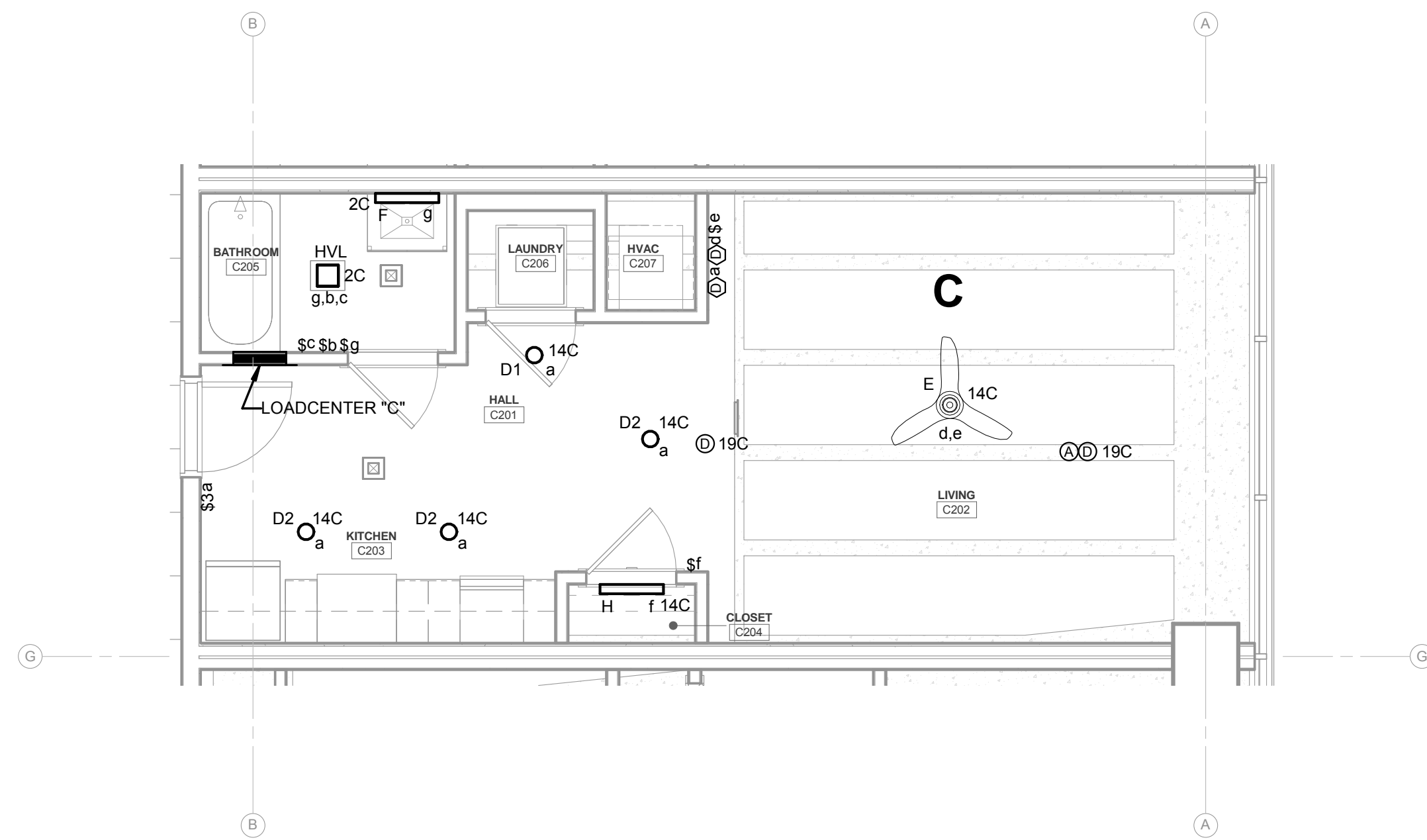
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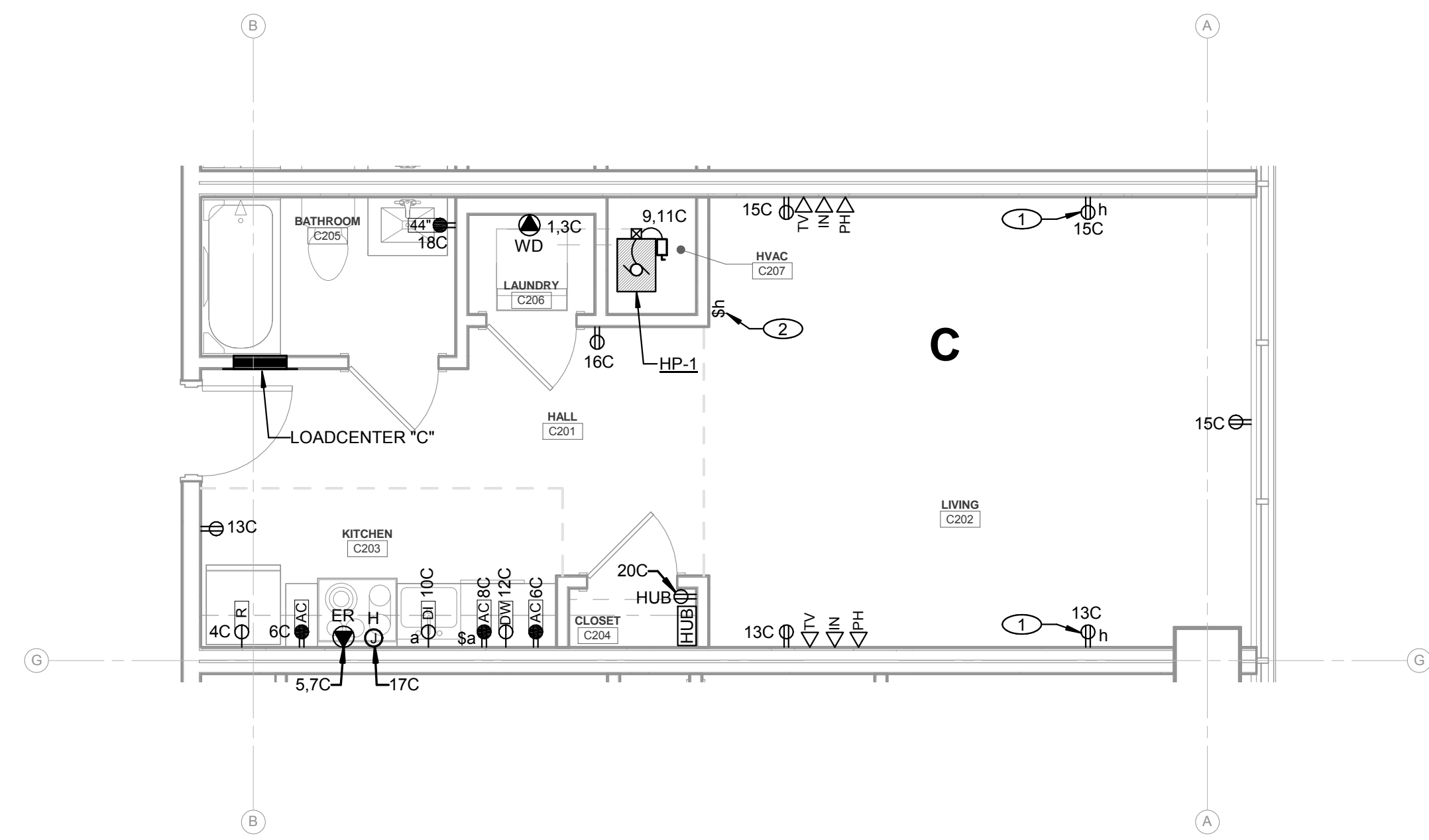
UNIT TYPE B ELECTRICAL PLANS

**E1.9.2**

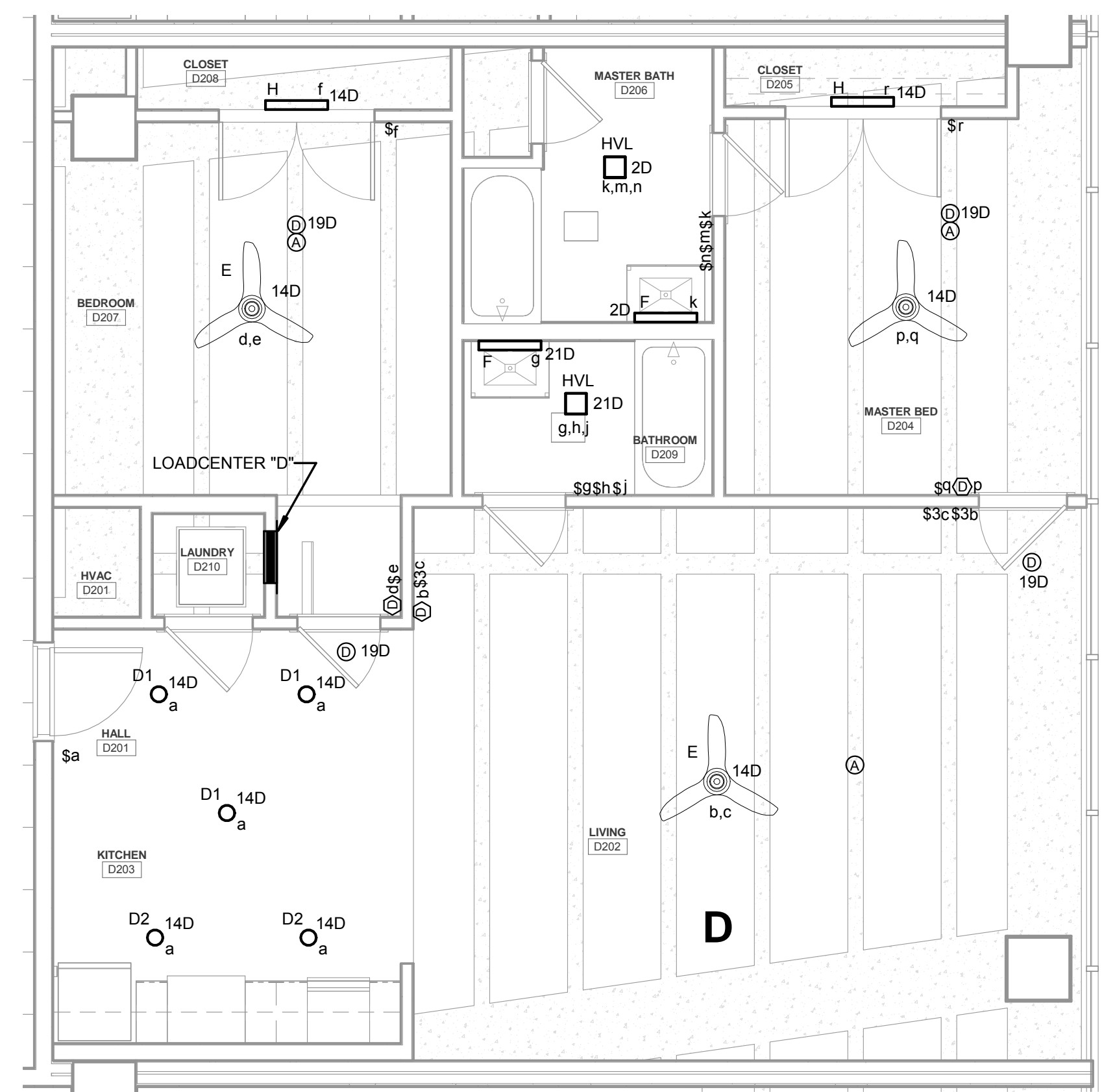
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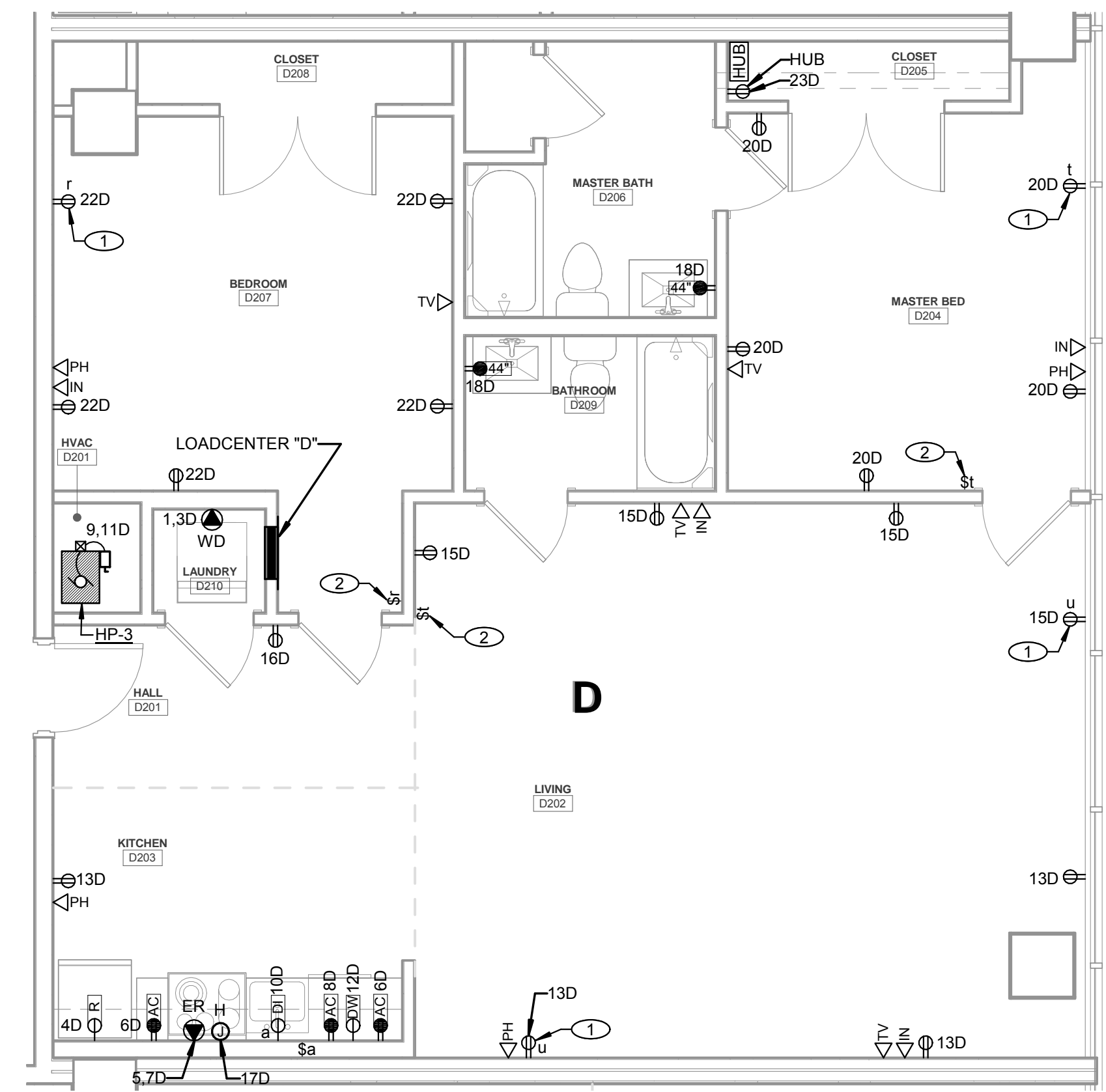
**1** UNIT TYPE C ELECTRICAL LIGHTING PLAN  
1/4" = 1'-0"



**2** UNIT TYPE C ELECTRICAL PLAN  
1/4" = 1'-0"



**3** UNIT TYPE D ELECTRICAL LIGHTING PLAN  
1/4" = 1'-0"

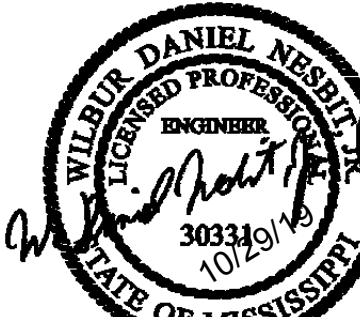


**4** UNIT TYPE D ELECTRICAL PLAN  
1/4" = 1'-0"

REVISIONS	

**JOB NUMBER:** 15-020  
**ISSUED:** 08/13/19  
**ISSUED FOR:**  
**CONSTRUCTION**

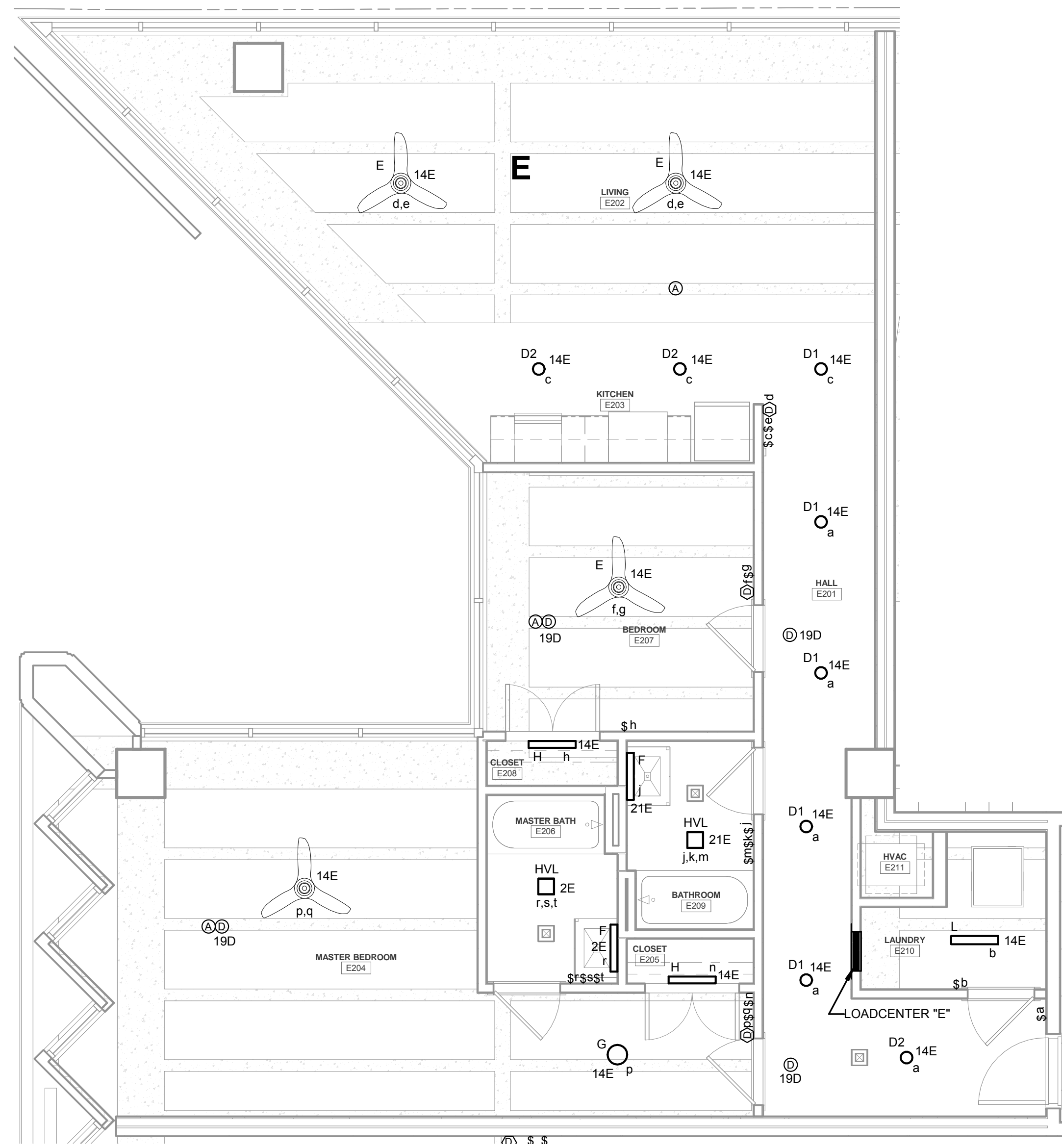
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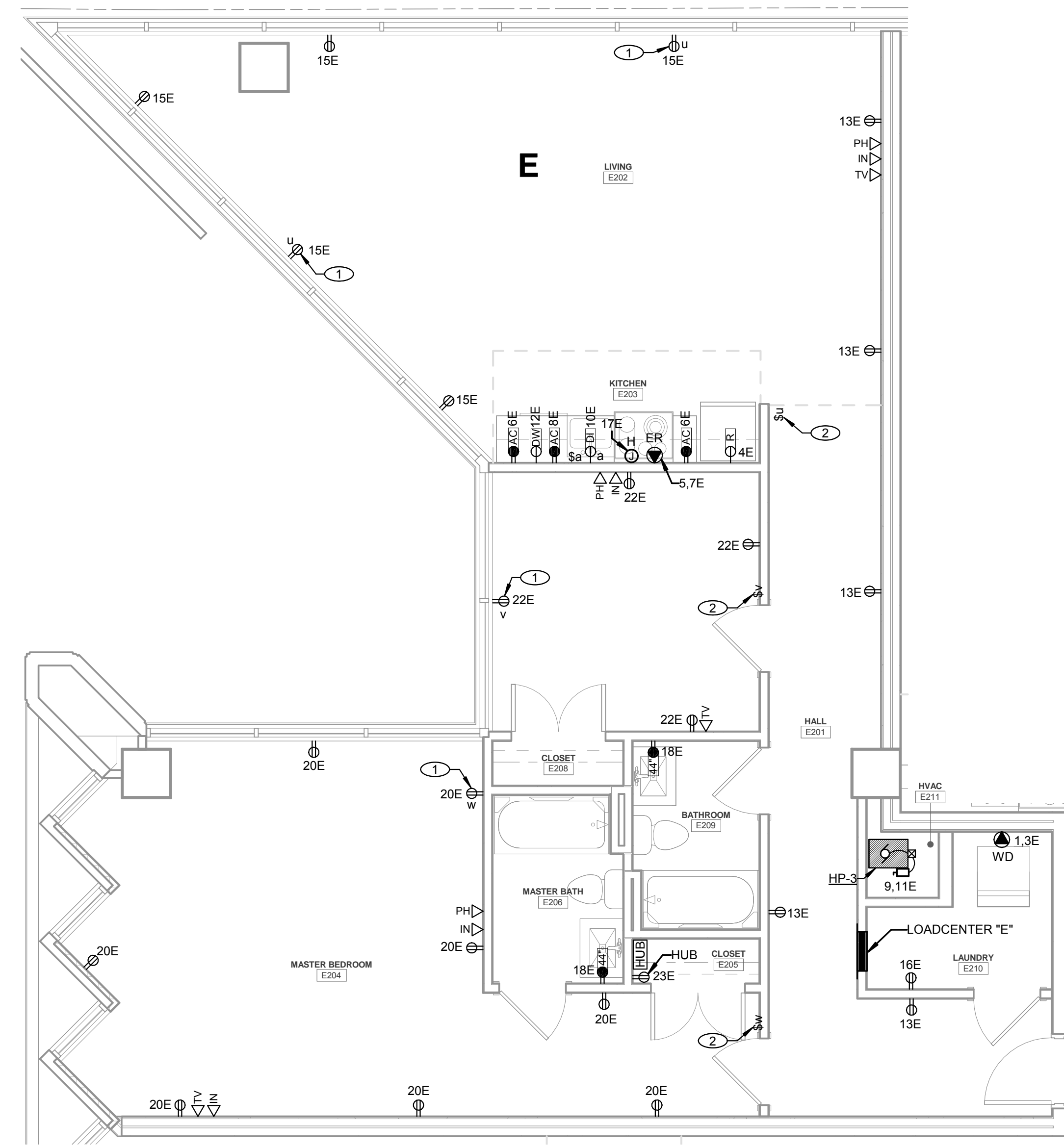
UNIT TYPE C & D  
ELECTRICAL PLANS

**E1.9.3**

**PHASE:** CD



**1 UNIT TYPE E ELECTRICAL LIGHTING PLAN**  
 1/4" = 1'-0"



**2 UNIT TYPE E ELECTRICAL PLAN**  
 1/4" = 1'-0"

REVISIONS	
<b>JOB NUMBER:</b>	15-020
<b>ISSUED:</b>	08/13/19
<b>ISSUED FOR:</b>	<b>CONSTRUCTION</b>

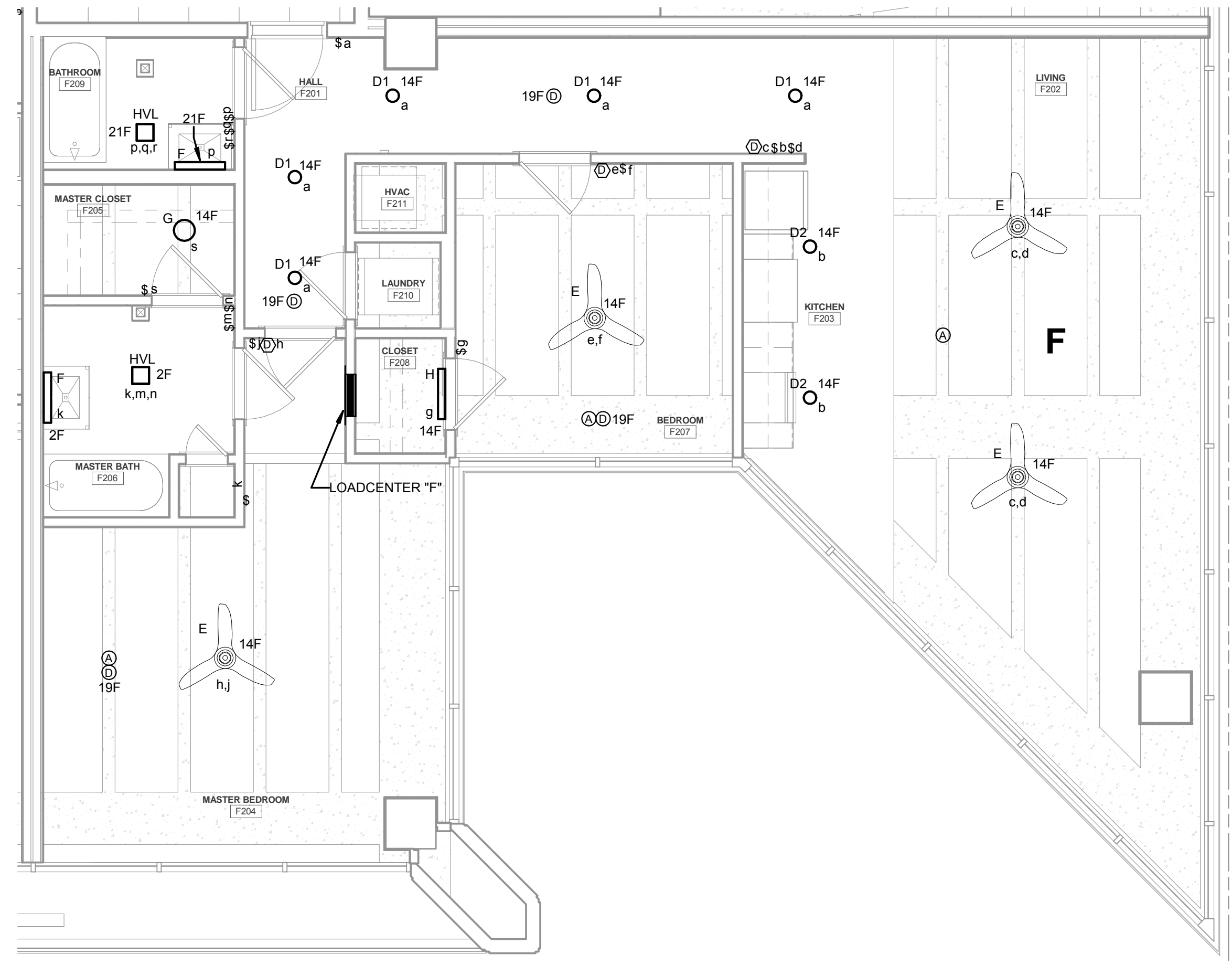
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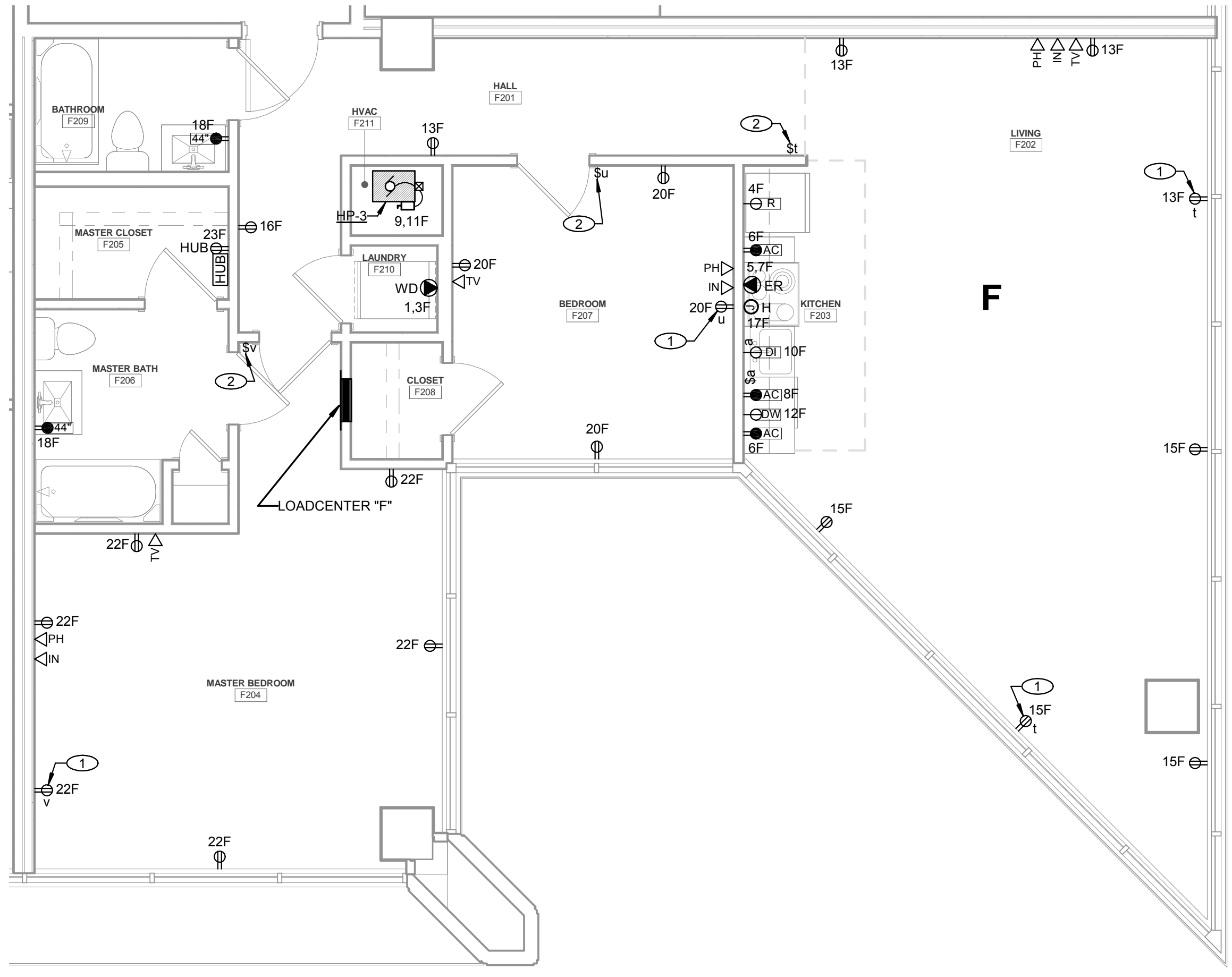
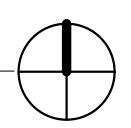
UNIT TYPE E ELECTRICAL PLANS

**E19.4**

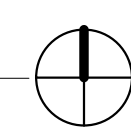
PHASE: CD



**1** UNIT TYPE F ELECTRICAL LIGHTING PLAN  
 1/4" = 1'-0"



**2** UNIT TYPE F ELECTRICAL PLAN  
 1/4" = 1'-0"



**REVISIONS**

NO.	DATE	DESCRIPTION

**JOB NUMBER:** 15-020

**ISSUED:** 08/13/19

**ISSUED FOR:**

**CONSTRUCTION**

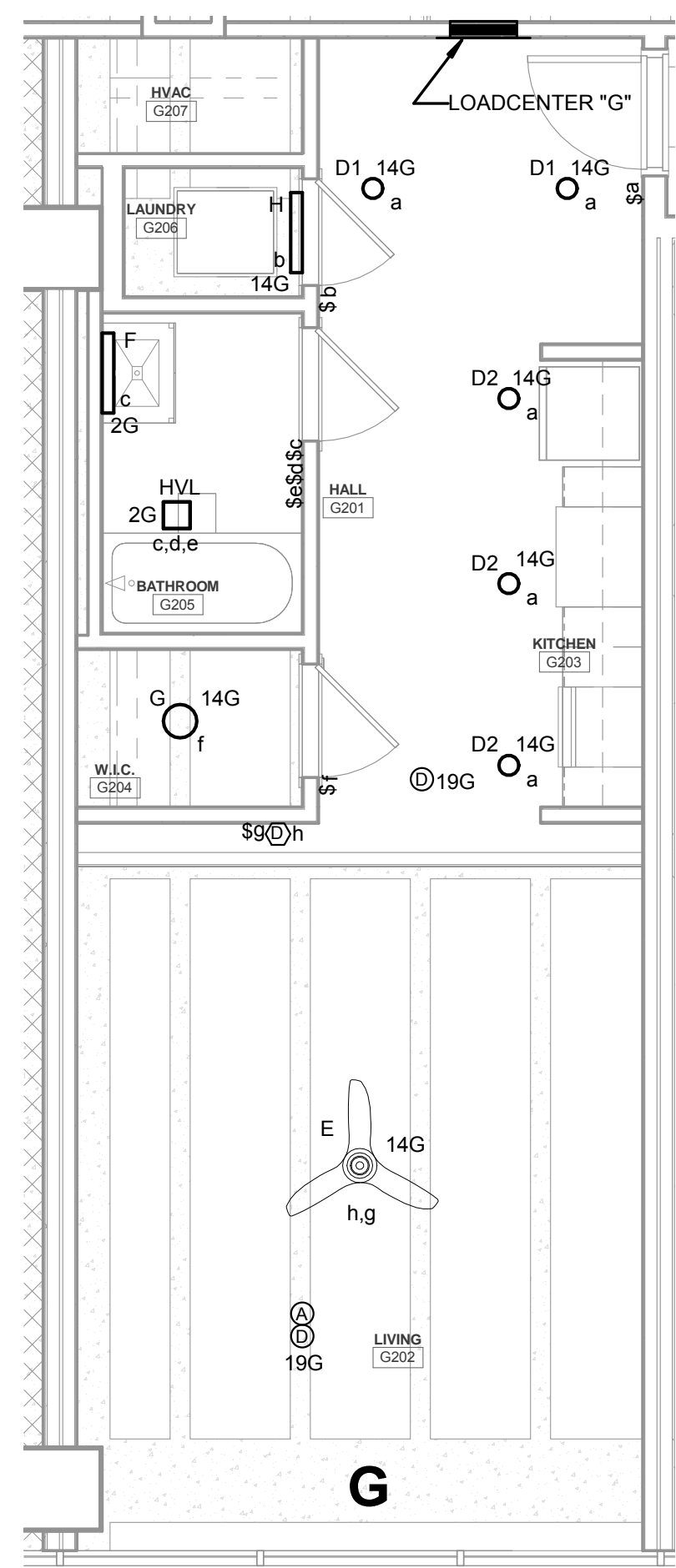
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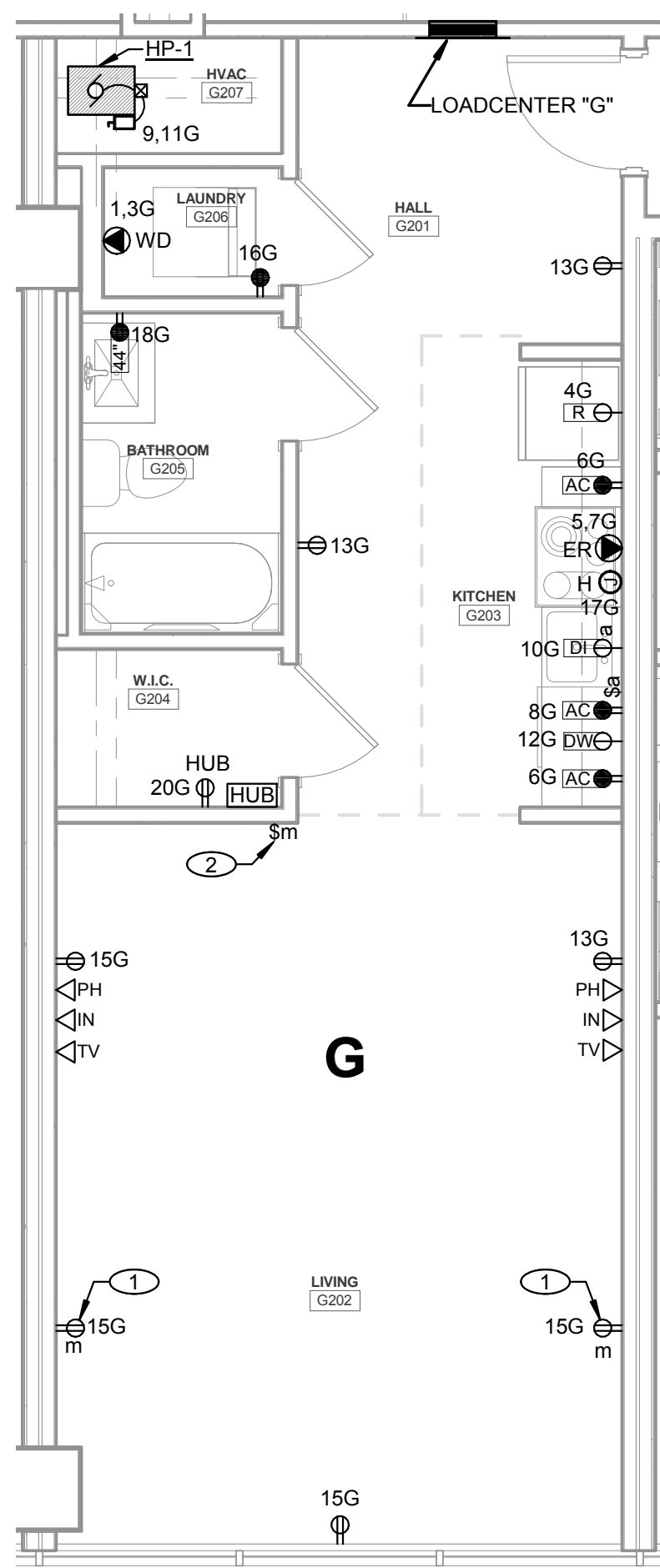
UNIT TYPE F ELECTRICAL PLANS

**E1.9.5**

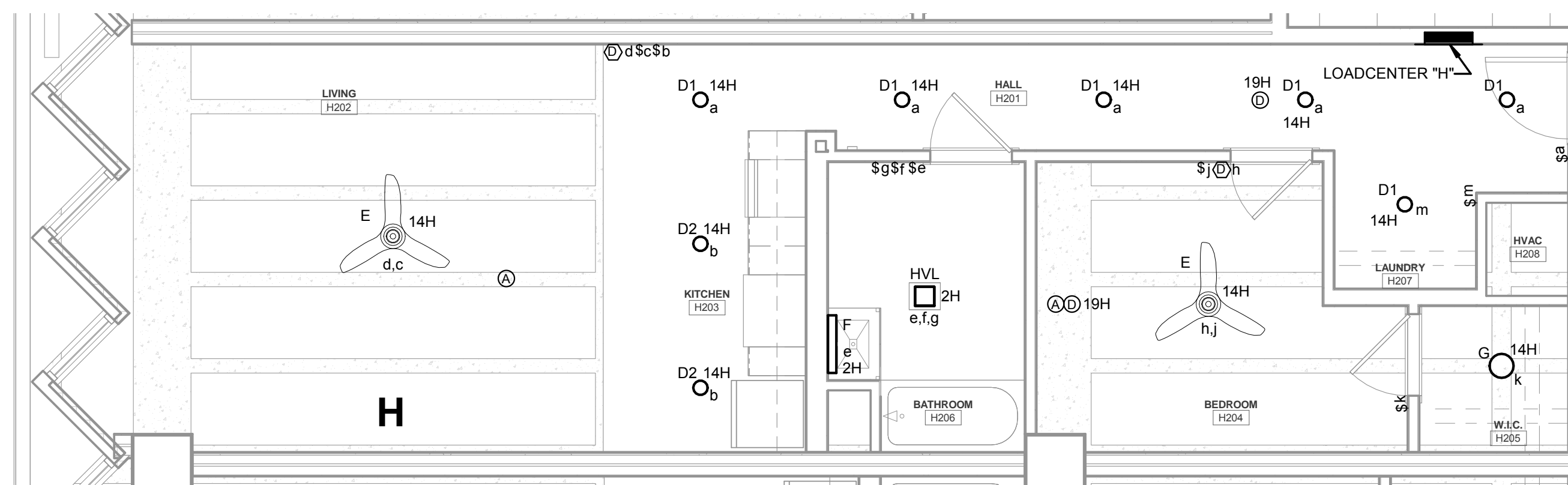
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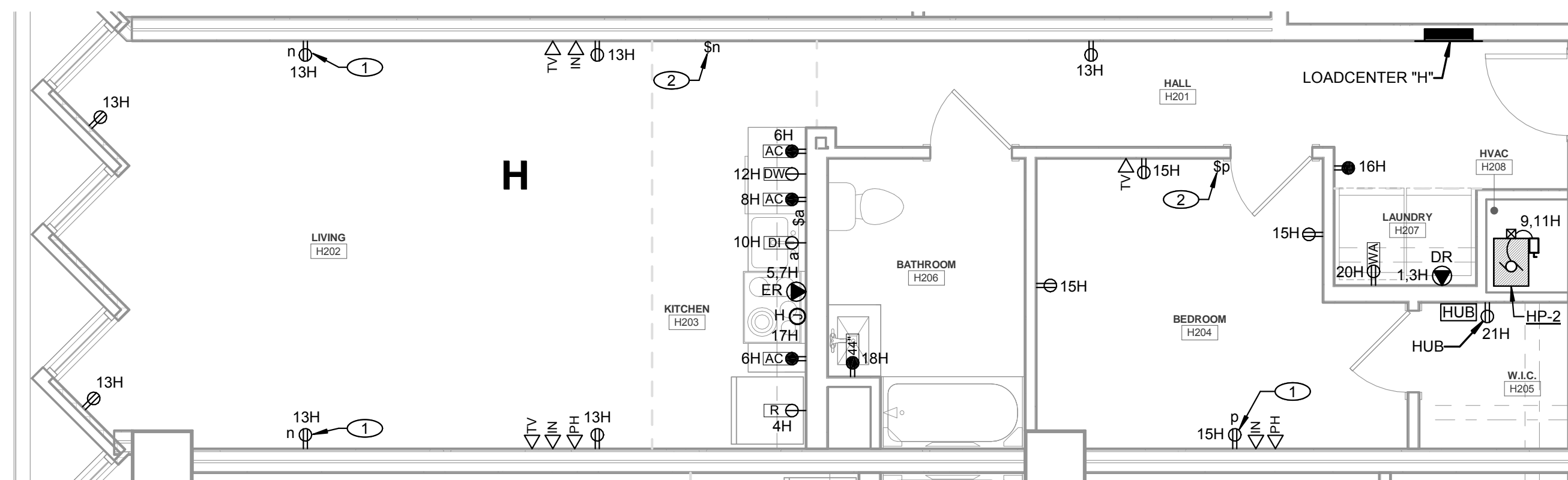
**1** UNIT TYPE G ELECTRICAL LIGHTING PLAN  
1/4" = 1'-0"



**2** UNIT TYPE G ELECTRICAL PLAN  
1/4" = 1'-0"



**3** UNIT TYPE H ELECTRICAL LIGHTING PLAN  
1/4" = 1'-0"

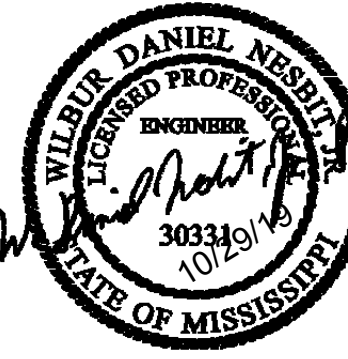


**4** UNIT TYPE H ELECTRICAL PLAN  
1/4" = 1'-0"

REVISIONS	

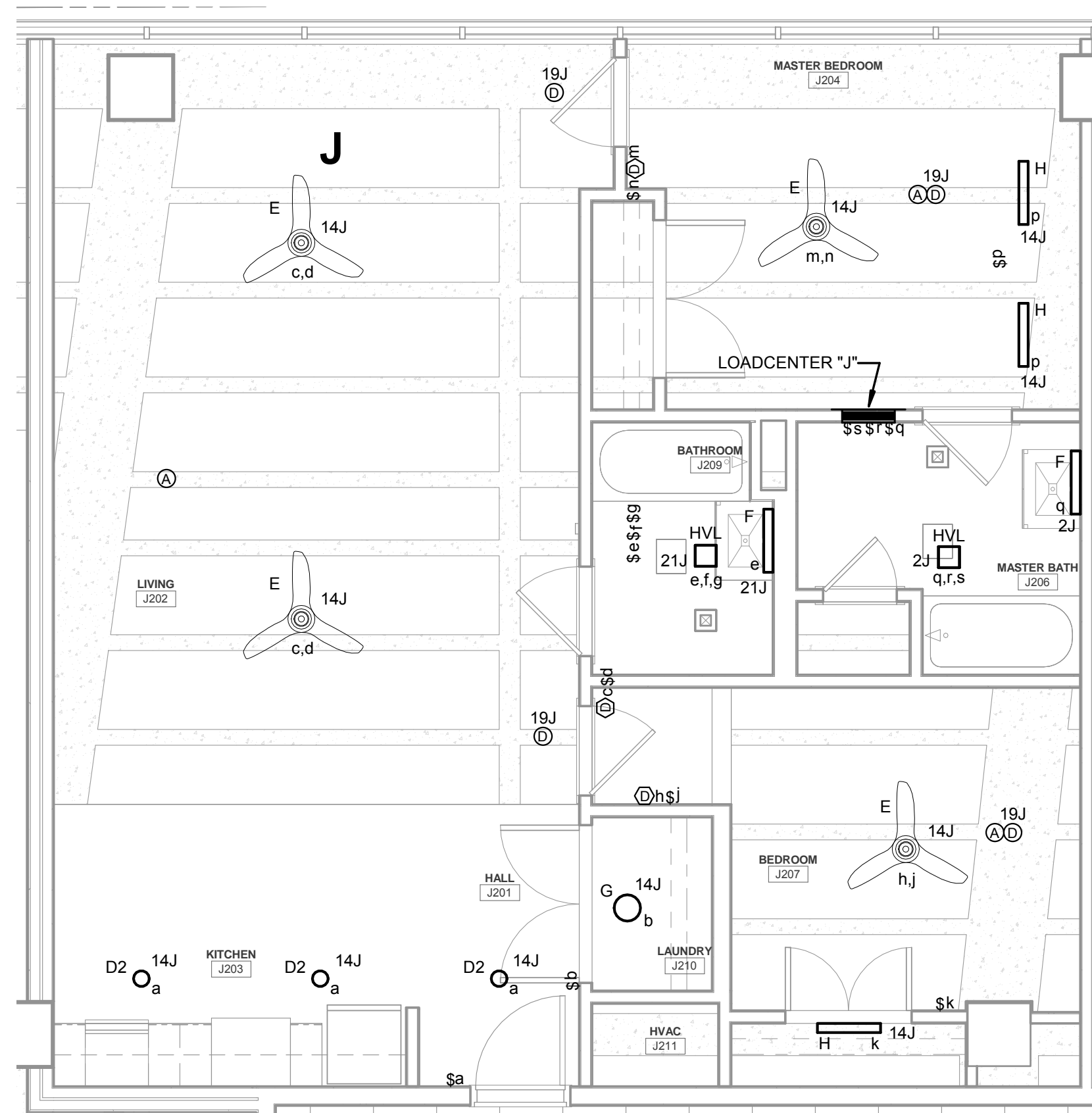
JOB NUMBER: 15-020  
ISSUED: 08/13/19  
ISSUED FOR: CONSTRUCTION

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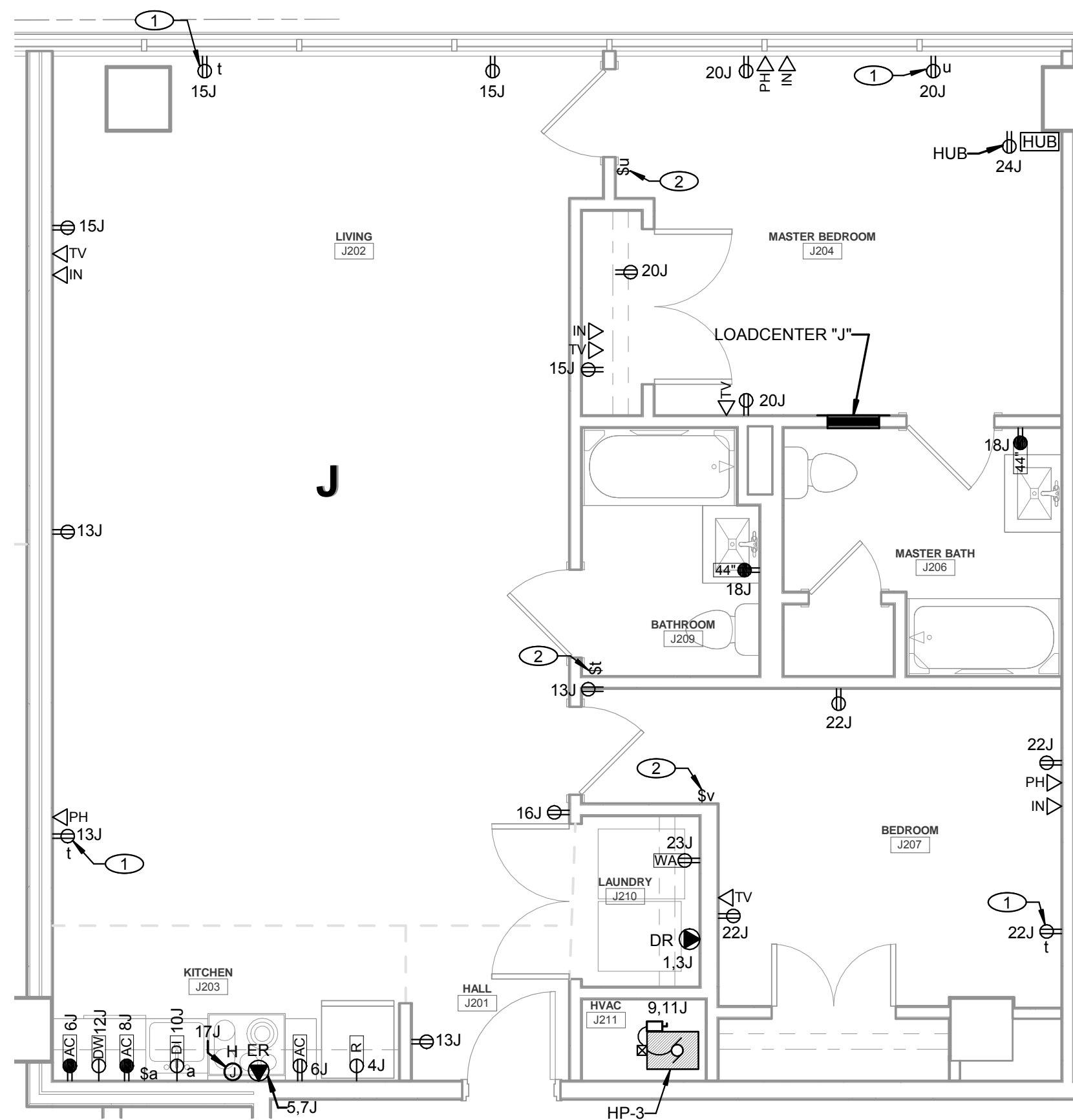
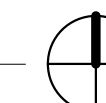


UNIT TYPE G & H ELECTRICAL PLANS

**E1.9.6**  
PHASE: CD



1 UNIT TYPE J ELECTRICAL LIGHTING PLAN  
1/4" = 1'-0"



2 UNIT TYPE J ELECTRICAL PLAN  
1/4" = 1'-0"



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UNIT TYPE J ELECTRICAL PLANS

**E1.9.7**

PHASE: CD

ELECTRICAL SYMBOL AND ABBREVIATION SCHEDULE

	LIGHTING FIXTURE. "B" DENOTES TYPE.		PHOTOCELL. MOUNT AS HIGH AS PRACTICABLE IN LOCATION STIPULATED BY THE ARCHITECT.	WP	NEAR ANY DEVICE DENOTES "WEATHERPROOF".
	WALL-MOUNTED LIGHTING FIXTURE. "B" DENOTES TYPE.		RECESSED-MOUNTED PANELBOARD OR LOADCENTER.	VD	NEAR ANY RECEPTACLE DENOTES "LOCATE AS REQUIRED FOR VENDING MACHINE. VERIFY EXACT LOCATION IN ADVANCE."
	CEILING FAN. "B" DENOTES TYPE. SEE LIGHTING FIXTURE SCHEDULE.		SURFACE-MOUNTED PANELBOARD.	CU	CONDENSING UNIT. SEE MECHANICAL DRAWINGS.
	CEILING-MOUNTED EXIT LIGHTING FIXTURE WITH THE NUMBER OF FACES INDICATED BY THE "FILLED-IN" QUADRANTS OF THE SYMBOL; AND WITH DIRECTIONAL CHEVRONS AS INDICATED FOR EACH RESPECTIVE APPLICATION. SEE FIXTURE TYPE "X" IN THE LIGHTING FIXTURE SCHEDULE FOR MORE INFORMATION.		TELECOMMUNICATION BACKBOARD. WITH PLUGMOLD.	EF	EXHAUST FAN. SEE MECHANICAL DRAWINGS.
	WALL-MOUNTED (SIDE OR BACK AS REQUIRED FOR EACH RESPECTIVE APPLICATION) EXIT LIGHTING FIXTURE WITH THE NUMBER OF FACES INDICATED BY THE "FILLED-IN" QUADRANTS OF THE SYMBOL; AND WITH DIRECTIONAL CHEVRONS AS INDICATED FOR EACH RESPECTIVE APPLICATION. SEE FIXTURE TYPE "X" IN THE LIGHTING FIXTURE SCHEDULE FOR MORE INFORMATION.		TELECOMMUNICATION BACKBOARD.	F	FURNACE.
1-1LA	NEAR ANY ELECTRICAL LOAD INDICATES THE BRANCH-CIRCUIT-BREAKER-POLE-NUMBER AND THE PANELBOARD OR SWITCHBOARD NAME FOR THE RESPECTIVE SINGLE-POLE BRANCH CIRCUIT; POLE NUMBER 1 IN PANEL "1LA" IS SHOWN HERE.		JUNCTION/OUTLET BOX.	FC	FLUID COOLER.
3,5-1LA	NEAR ANY ELECTRICAL LOAD INDICATES THE BRANCH-CIRCUIT-BREAKER-POLE-NUMBERS AND THE PANELBOARD OR SWITCHBOARD NAME FOR THE RESPECTIVE TWO-POLE BRANCH CIRCUIT; POLES NUMBERS 3 AND 5 IN PANEL "1LA" ARE SHOWN HERE.		WIRING ABOVE GRADE OR FLOOR LEVEL.	FD	FIRE/SMOKE DAMPER.
7,9,11-1LA	NEAR ANY ELECTRICAL LOAD INDICATES THE BRANCH-CIRCUIT-BREAKER-POLE-NUMBERS AND THE PANELBOARD OR SWITCHBOARD NAME FOR THE RESPECTIVE THREE-POLE BRANCH CIRCUIT; POLES NUMBERS 7, 9, AND 11 IN PANEL "1LA" ARE SHOWN HERE.		WIRING BELOW GRADE OR FINISHED FLOOR.	HP	HEAT PUMP.
\$a	SINGLE-POLE, LIGHTING-CONTROL SWITCH COMPATIBLE WITH ALL OTHER LOW-VOLTAGE, LIGHTING-CONTROL DEVICES BEING USED. "a" DENOTES FIXTURES OR OUTLETS CONTROLLED.		RACEWAY AND ELECTRICAL CABLE HOMERUN TO PANELBOARD DESIGNATED.	MCCN	MOTOR CONTROL CENTER.
\$3a	3-WAY, LIGHTING-CONTROL SWITCH COMPATIBLE WITH ALL OTHER LOW-VOLTAGE, LIGHTING-CONTROL DEVICES BEING USED. "a" DENOTES FIXTURES OR OUTLETS CONTROLLED.		AREA-OF-REFUGE, TWO-WAY, AUDIO/VISUAL, COMMUNICATION SYSTEM (RESCUE-ASSISTANCE SYSTEM) MAIN CONTROL PANEL. VERIFY EXACT DESIRED LOCATION IN ADVANCE WITH THE ARCHITECT. SEE SPECIFICATIONS.	MD	MOTORIZED DAMPER.
\$4a	4-WAY, LIGHTING-CONTROL SWITCH COMPATIBLE WITH ALL OTHER LOW-VOLTAGE, LIGHTING-CONTROL DEVICES BEING USED. "a" DENOTES FIXTURES OR OUTLETS CONTROLLED.		AREA-OF-REFUGE, TWO-WAY, AUDIO/VISUAL, COMMUNICATION SYSTEM (RESCUE-ASSISTANCE SYSTEM) CALL STATION PANEL. VERIFY EXACT DESIRED LOCATION IN ADVANCE WITH THE ARCHITECT. SEE SPECIFICATIONS.	SF	SUPPLY FAN.
aa	BIG ASS FAN, WALL-MOUNTED, REMOTE CONTROL STATION. OBTAIN INSTALLATION INSTRUCTIONS FROM THE FAN MANUFACTURER AND PROVIDE ALL WORK DESCRIBED THEREIN. VERIFY EXACT DESIRED LOCATION IN ADVANCE WITH THE ARCHITECT.		KITCHEN HOOD FIRE EXTINGUISHING SYSTEM.	WH	ELECTRIC HOT WATER HEATER
a	LOW-VOLTAGE (0-10V), LED, LIGHTING DIMMER SWITCH COMPATIBLE WITH ALL OTHER LOW-VOLTAGE, LIGHTING-CONTROL DEVICES BEING USED. "a" DENOTES FIXTURES OR OUTLETS CONTROLLED.		FIRE ALARM SYSTEM CONTROL RELAY/ MODULE.	WSHP	WATER SOURCE HEAT PUMP.
a	SENSORSWITCH #CM-PDT-10 (OR APPROVED EQUAL), CEILING-MOUNTED, DUAL-TECHNOLOGY (PASSIVE-INFRARED/ULTRASONIC), OCCUPANCY-SENSING, LIGHTING CONTROLLER. "a" DENOTES FIXTURES OR LOADS CONTROLLED. IF NO SWITCH DESIGNATION IS SHOWN AS BEING ASSOCIATED WITH THIS SYMBOL, CONNECT THIS CONTROLLER AS REQUIRED TO CONTROL ALL LIGHTING FIXTURES INSTALLED WITH THE SAME ROOM IN WHICH IT IS SHOWN.		CEILING-MOUNTED AUDIO/VISUAL FIRE ALARM SYSTEM NOTIFICATION DEVICE.	VAV	VARIABLE AIR VOLUME BOX.
a	SENSORSWITCH #WSD-PDT (OR APPROVED EQUAL); WALL-MOUNTED, OCCUPANCY-SENSING, LIGHTING CONTROLLER. "a" DENOTES FIXTURES OR LOADS CONTROLLED. IF NO SWITCH DESIGNATION IS SHOWN AS BEING ASSOCIATED WITH THIS SYMBOL, CONNECT THIS CONTROLLER AS REQUIRED TO CONTROL ALL LIGHTING FIXTURES IN THE ROOM.		WALL-MOUNTED AUDIO/VISUAL FIRE ALARM SYSTEM NOTIFICATION DEVICE.		
PP	SENSORSWITCH #PP20 (OR APPROVED EQUAL); LOW-VOLTAGE, LIGHTING-CONTROL, POWER PACK. INSTALL ABOVE CEILING IN THE EXACT LOCATION STIPULATED BY THE ARCHITECT (VERIFY IN ADVANCE). OBTAIN INSTALLATION REQUIREMENTS INFORMATION IN ADVANCE FROM LIGHTING CONTROL MANUFACTURER AND PROVIDE ALL WORK ACCORDINGLY, AS DESCRIBED THEREIN.		FIRE ALARM SYSTEM MANUAL PULL STATION.		
C	LIGHTING CONTACTOR.		FIRE ALARM SYSTEM SMOKE DETECTOR.		
or	LETTERING DENOTES REFERENCE ABBREVIATIONS BELOW FOR ADDITIONAL DESCRIPTION/INFORMATION OF/FOR THIS RECEPTACLE. "AC" IS SHOWN HERE FOR EXAMPLE. IF NO LETTERING IS SHOWN, NO ADDITIONAL DESCRIPTION/INFORMATION IS INTENDED.		FIRE ALARM SYSTEM DUCT-TYPE SMOKE DETECTORS. UNLESS INDICATED OTHERWISE, LOCATE IN BOTH SUPPLY AND RETURN DUCTS.		
	DUPLEX RECEPTACLE, 125V, 3W GROUNDING TYPE, DEDICATED TO COMPUTER (DATA) EQUIPMENT. AMPERE RATING AS REQ'D TO COORDINATE WITH RESPECTIVE CIRCUIT BREAKER RATING.		FIRE ALARM SYSTEM HEAT DETECTOR.		
	DUPLEX RECEPTACLE, 125V, 3W GROUNDING TYPE, WITH GROUND FAULT INTERRUPTER. AMPERE RATING AS REQ'D TO COORDINATE WITH RESPECTIVE CIRCUIT BREAKER RATING.		REFERENCE TO REFERENCED ELECTRICAL NOTE. NOTE NUMBER THREE SHOWN.		
	SINGLE RECEPTACLE, 125V, 3W GROUNDING TYPE. AMPERE RATING AS REQ'D TO COORDINATE WITH RESPECTIVE CIRCUIT BREAKER RATING.	GRC	GROUND ROD & CONNECTOR		
A	WALL-MOUNTED ALL-COMMUNICATION OUTLET (ACO).	EG	EQUIPMENT GROUND.		
A	FLOOR-MOUNTED ALL-COMMUNICATION OUTLET (ACO).	EC	EMPTY CONDUIT WITH PULL WIRE.		
HUB	APARTMENT UNIT TELECOMMUNICATIONS HUB. SEE SPECIFICATIONS.	A	AMP(S).		
HUB	NEAR ANY DEVICE INDICATES "LOCATE AS REQUIRED FOR TELECOMMUNICATIONS HUB. VERIFY EXACT LOCATION (INCLUDE MOUNTING HEIGHT) IN ADVANCE WITH THE ARCHITECT.	V	VOLT(S).		
TV	CABLE-TV OUTLET.	KVA	KILOVOLT-AMP(S).		
PH	PHONE OUTLET.	W	WIRE(S).		
IN	INTERNET OUTLET.	Δ	DELTA-CONNECTED.		
		Y	WYE-CONNECTED.		
		P	POLE(S).		
		F	FUSE(S).		
		SN	SOLID NEUTRAL.		
		AIC	AMPS INTERRUPTING CAPACITY.		
		KCM	KILO-CIRCULAR-MILS.		
		REQ'D	REQUIRED.		
		XFMR	TRANSFORMER.		
		SPD	SURGE PROTECTIVE DEVICE.		
		GEC	GROUNDING ELECTRODE CABLE.		
			SAFETY SWITCH.		
			MOTOR.		
			MOTOR STARTER.		
		VFD	VARIABLE FREQUENCY DRIVE (MOTOR STARTER).		
		CP	CONTROL PANEL.		
		44"	NEAR ANY DEVICE INDICATES MOUNTING HEIGHT ABOVE FINISHED FLOOR. MOUNTING HEIGHT OF FOURTY-FOUR (44) INCHES ABOVE FINISHED FLOOR SHOWN HERE.		
		AC	NEAR ANY OUTLET INDICATES ABOVE COUNTER. LOCATE EXACT DESIRED LOCATION WITH ARCHITECT IN ADVANCE.		
		CM	NEAR ANY DEVICE DENOTES "LOCATE AS REQUIRED FOR COFFEE MAKER. VERIFY EXACT LOCATION IN ADVANCE."		
		EW	ELECTRIC WATER COOLER.		
		ER	NEAR ANY DEVICE DENOTES "LOCATE AS REQUIRED FOR ELECTRIC RANGE. VERIFY EXACT LOCATION IN ADVANCE."		
		DR	NEAR ANY RECEPTACLE DENOTES "LOCATE AS REQUIRED FOR DRYER. VERIFY EXACT LOCATION IN ADVANCE."		
		DW	NEAR ANY DEVICE DENOTES "LOCATE AS REQUIRED FOR DISHWASHER. VERIFY EXACT LOCATION IN ADVANCE."		
		DJ	NEAR ANY DEVICE DENOTES "LOCATE AS REQUIRED FOR SINK DISPOSAL. VERIFY EXACT LOCATION IN ADVANCE."		
		H	NEAR ANY DEVICE DENOTES "LOCATE AS REQUIRED FOR HOOD. VERIFY EXACT LOCATION IN ADVANCE."		
		M	NEAR ANY RECEPTACLE DENOTES "LOCATE AS REQUIRED FOR MICROWAVE. VERIFY EXACT DESIRED LOCATION IN ADVANCE."		
		R	NEAR ANY DEVICE DENOTES "LOCATE AS REQUIRED FOR REFRIGERATOR. VERIFY EXACT LOCATION IN ADVANCE."		
		TV	NEAR ANY DEVICE DENOTES "LOCATE AS REQUIRED FOR TELEVISION OR MONITOR. VERIFY EXACT LOCATION IN ADVANCE."		
		WA	NEAR ANY RECEPTACLE DENOTES "LOCATE AS REQUIRED FOR WASHER. VERIFY EXACT LOCATION IN ADVANCE."		
		WD	NEAR ANY RECEPTACLE DENOTES "LOCATE AS REQUIRED FOR WASHER/DRYER COMBO UNIT. VERIFY EXACT LOCATION IN ADVANCE."		

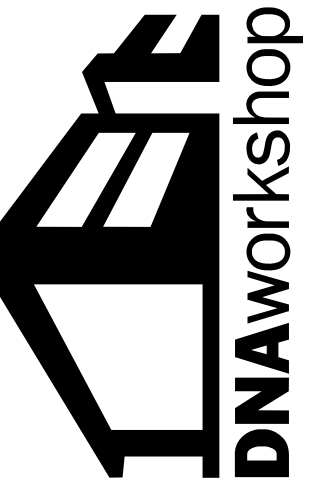
REFERENCED ELECTRICAL NOTES:

- As required to control a tenant-provided table lamp, connect the bottom half of this duplex receptacle as required to be controlled by the wall-mounted, toggle-type, lighting-control switch designated by Referenced Electrical Note No. 2.
- Connect this wall-mounted, toggle-type, lighting-control switch as required to control the bottom half of the wall-mounted, duplex receptacle(s) designated by Referenced Electrical Note No. 1. Install this toggle switch adjacent to (as part of) the lighting controls switchbank approximately here (see respective "Unit Electrical Lighting Plan" for switchbank location [verify exact desired location of all switchbanks in advance with the architect]).
- For ALL existing lighting fixtures in this area/room, verify the existing lamp types for each and every respective fixture, and replace them with new, LED, retrofit, lamps having similar lumen output and which is compatible with the fixture. Verify all such fixtures in advance with the architect and provide accordingly.
- Provide a new, 480V, 350A/3P, circuit-breaker-type, bus-duct plug at and on the existing, 1600A, 277/480V, 3-phase, 4-wire, General Electric, vertical-riser, plug-in-type, bus duct which is located in this room. Such circuit-breaker-type, bus-duct plug shall be of the same manufacture as the respective, plug-in-type, bus duct, and shall have a minimum interrupting rating which is equal to the bus-bracing rating of the respective, plug-in-type, bus duct (verify in advance, and indicate such interrupting rating in the respective equipment shop drawings). Connect the load lugs of this bus-duct-plug circuit breaker, where and as required to feed the primary of the new step-down transformer which is being provided in this room, with 3", 3-500KCM & 1#3EG. Reference the specifications. See Referenced Electrical Note No. 5.
- Provide in this room (verify the exact location in advance) a new 150kVA, 480delta-208Y/120V, 3-phase, dry-type, step-down transformer:
  - At and for the secondary of such transformer, establish the required electrical-system ground and the required equipment ground for this separately-derived system, by bonding the transformer-secondary neutral point and the transformer-enclosure grounding lug together, and provide the proper grounding-electrode system for such transformer common bonding, by connecting such transformer common bonding to the nearest, grounded, building-structural-steel member, with 3/4", 1#20GEC;
  - Connect the secondary of such transformer where and as required to feed the line lugs of the main circuit breaker of the multi-meter distribution panelboard ("MMDP") which is being provided in this room, with (2) 3", 4-350KCM & 1#20GEC EACH;
  - Reference the specifications, and
  - See Referenced Electrical Notes Nos. 4 and 6.
- Provide the designated, new, 120/208V, 600A MCB, multi-meter distribution panelboard ("MMDP") approximately here (verify the exact location in advance). Reference the respective "MMDP" schedule, reference the specifications, and see Referenced Electrical Note No. 5.
- Interconnect exhaust fan as required to be controlled with the restroom lighting fixtures. Coordinate division of work in advance with the mechanical subcontractor and provide accordingly.
- As required to facilitate the relocation of the existing stairwell pressurization fan, disconnect it at its existing location (verify location in advance), and reconnect it at its new location, splicing and extending existing raceways and electrical cables as required. Coordinate all associated work in advance with the mechanical subcontractor and provide all required work accordingly.
- Coordinate in advance with the mechanical subcontractor for the demolition of mechanical equipment located in this room/area. Reference the mechanical demolition drawings. Verify parameters and requirements in advance.
- Interconnect this exhaust fan with the building fire alarm system as required to force it "ON" in the event of an emergency/fire condition for smoke evacuation. Provide all control relays, wiring, etc. as required (verify in advance). Modify the existing fire alarm panel/system as required. Verify all parameters and requirements in advance and provide all required work accordingly.
- Interconnect this supply fan with the building fire alarm system as required to trip its shunt-trip breaker ("OFF") in the event of an emergency/fire condition. Provide all control relays, wiring, etc. as required (verify in advance). Modify the existing fire alarm panel/system as required. Verify all parameters and requirements in advance and provide all required work accordingly.
- Coordinate in advance with the mechanical subcontractor for the required method of control for this exhaust fan and determine the division of such associated work. Verify all parameters and requirements in advance and provide all required work accordingly.
- Connect to the nearest, remaining-existing, 277-volt, "normal", lighting branch circuit in the area which has adequate spare load capacity (verify in advance).
- Locate as required for pool-equipment "Auto Makeup Water Panel" (verify exact location in advance with the architect). Install as per the manufacturer's instructions (verify in advance). Conform to all applicable details. Reference the pool consultant "SP" drawings and provide a work described therein.
- Locate as required for pool-equipment "Filter Pump" main power (verify exact location in advance with the architect). Install as per the manufacturer's instructions (verify in advance). Conform to all applicable details. Reference the pool consultant "SP" drawings and provide a work described therein.
- Install the in-pool underwater lighting fixture "Junction box transformer" (furnished by the pool equipment subcontractor) in the exact location stipulated by the architect, a minimum total distance of 90'-0" (total distance of the light fixture power cord) of each respective in-pool lighting fixture. Install as per the manufacturer's instructions (verify in advance). Conform to all applicable details. Reference the pool consultant "SP" drawings and provide a work described therein.
- In-pool, underwater, LED, light by pool supplier/installer. Provide 1" conduit (beneath the pool deck) and the power feeder cable (including connections) as required. Coordinate all required work in advance with the pool supplier/installer and provide all work accordingly. Conform to all applicable pool construction details. Reference the "SP" drawings and provide all work required as described therein.
- Verify exact desired routing for all in-pool-lighting, low-voltage, conduit in advance with the architect. See Referenced Electrical Note No. 17. Coordinate all required work in advance with the pool supplier/installer and provide all work accordingly. Conform to all applicable pool construction details. Reference the "SP" drawings and provide all work required as described therein.
- Bond (with a min. #8 AWG solid copper wire in a 1" conduit) the pool structure to the filter equipment in the Pool Equipment Room. Verify exact desired routing in advance with the architect. Coordinate all required work in advance with the pool supplier/installer and provide all work accordingly. Conform to all applicable pool construction details. Reference the "SP" drawings and provide all work required as described therein.
- Provide a 1" empty conduit (with pull wire) for "Gutter Float Switch Power Cord" (cord by pool equipment supplier/installer) from pool to actuator valve in Pool Equipment Room. Verify exact desired routing in advance with the architect. Coordinate all required work in advance with the pool supplier/installer and provide all work accordingly. Conform to all applicable pool construction details. Reference the "SP" drawings and provide all work required as described therein.
- Provide a 1" empty conduit (with pull wire) for pool "Automatic Water Level Sensor Cabling" (cabling by pool equipment supplier/installer) from the pool to Pool Equipment Room. Verify exact desired routing in advance with the architect. Coordinate all required work in advance with the pool supplier/installer and provide all work accordingly. Conform to all applicable pool construction details. Reference the "SP" drawings and provide all work required as described therein.
- Provide a weatherproof ("while-in-use") duplex receptacle, mounted at 12" above finished floor, on a proper support structure (submit such support method with project shop drawings for approval) approximately here (but not less than 6'-0" and not more than 20'-0" away from the inside of the pool wall; verify exact desired location in advance with the architect). Coordinate all roof penetrations in advance with the architect and as per the architect's instructions. Conform to all applicable architectural details.
- Provide corrosion-resistant, conduit for all wiring being installed in "Corrosive Environments" (e.g., pool filter pump rooms, etc.) as described in National Electrical Code (NFPA 72), Article 680.14. Verify all parameters and requirements in advance and provide all required work accordingly.
- In order to facilitate the re-finishing of ceilings and walls in this area, coordinate in advance with the general contractor to determine all existing fire alarm and security system devices which are intended to remain in use; disconnect and remove all such devices to allow for re-finishing (painting, ceiling/walls patching work, etc.), and retain them for re-installation. Upon completion of all such re-finishing work (by the general contractor/painter), re-install and reconnect all such existing fire alarm and security system devices in their original/existing locations; and ensure that all such devices function exactly as before their disconnection. Verify all parameters and requirements in advance and provide all required work accordingly.
- Coordinate with the architect for the location of the new door with relation to the location of Remaining-Existing, "Normal" Bus Duct "P1". Coordinate in advance with the general contractor for the exact location of this new door as required to mitigate any clearance and operation conflicts.
- Install New, 277/480V, 20A/4P, Electrically-Held, Lighting Contactor "LC1" adjacent to Existing Panel "7HA" (verify exact location in advance with the architect). Interconnect with New Photocell "P1" as required to control all associated lighting branch circuits for "dusk-to-dawn" operation. See Referenced Electrical Note No. 28. Verify exact routing of all associated conduits in advance with the architect.
- Install New, 120/208V, 20A/4P, Electrically-Held, Lighting Contactor "LC2" adjacent to Existing Panel "PC" (verify exact location in advance with the architect). Interconnect with New Photocell "P2" as required to control all associated lighting branch circuits for "dusk-to-dawn" operation. See Referenced Electrical Note No. 29. Verify exact routing of all associated conduits in advance with the architect.
- Provide and install New Photocell "P1" approximately here, as high as practicable, on the northernmost face of the building (verify exact desired location in advance with the architect). Interconnect with New Lighting Contactor "LC1" as required to control the associates lighting branch circuits for "dusk-to-dawn" operation. Verify exact routing of all associated conduits in advance with the architect.
- Provide and install New Photocell "P2" approximately here, as high as practicable, on the northernmost face of the building (verify exact desired location in advance with the architect). Interconnect with New Lighting Contactor "LC2" as required to control the associates lighting branch circuits for "dusk-to-dawn" operation. Verify exact routing of all associated conduits in advance with the architect.
- Connect the integral, LED, lighting fixture for this fan to the lighting branch circuit which feeds the adjacent Type "Q2", LED cylinder downlights. Obtain fan manufacturer's installation instructions and provide all required work accordingly.
- Locate as required for WON-Door, automatic, fire-door (verify exact location in advance with the architect). Connect to building fire alarm system as required to activate shutting mechanism upon sounding of a fire condition. Obtain manufacturer's installation instructions in advance and provide all required work described therein. Verify all parameters and requirements in advance and provide all required work accordingly.
- Provide all telecommunication service conduits into and out of the new Third Floor, Main Telecommunication Room, as described in the project electrical specifications. See the electrical specifications and provide all work associated with the establishment of this room as described therein accordingly.

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**1** ELECTRICAL SYMBOL & ABBREVIATION SCHEDULE UNITS  
N.T.S.

**2** REFERENCED ELECTRICAL NOTES  
No Scale



**LANDMARK BUILDING**  
175 EAST CAPITOL ST., JACKSON, MS 39201  
DYKE NELSON ARCHITECTURE 235 SOUTH 14TH ST. BATON ROUGE, LA 70802 DNA-WORKSHOP.COM (225) 224 3363

REVISIONS


JOB NUMBER: 15-020

ISSUED: 10/22/19

**ISSUED FOR: CONSTRUCTION**

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ELECTRICAL SYMBOL SCHEDULE & REFERENCED ELECTRICAL NOTES

**E2.1.1**

PHASE: CD

LIGHTING FIXTURE SCHEDULE

Notes:

1. Reference the electrical specifications for additional information which is relevant lighting fixtures and additional associated work.
2. The lamps for all lighting fixtures shall be furnished with the respective lighting fixtures by the respective lighting-fixture manufacturers, and shall be the lamps which are respectively recommended by such manufacturers for best illumination and performance. LED lamps may be factory installed. Indicate in the lighting-fixture shop drawings the exact lamps and drivers which are proposed to be furnished for the respective lighting fixtures.
3. Verify that adequate recessing space will indeed exist at the proposed location for each recessed lighting fixture and bring any and all conflicts to the immediate attention of the architect for resolution, in advance of preparing the project lighting-fixture shop drawings and in advance of ordering the project lighting fixtures.
4. Reference the architectural reflected ceiling plans for the exact locations for all ceiling-mounted lighting fixtures, and coordinate fully with all ceiling configurations which are indicated thereon.
5. Reference the architectural drawings for the exact heights and locations for all wall-mounted lighting fixtures, and coordinate fully with all wall configurations which are indicated thereon.
6. Verify all desired fixture finishes in advance. Architect shall have the option of selecting premium/custom finishes (if desired) at no additional cost.
7. Verify, in advance with the architect, with the general contractor, and with the ceiling subcontractor, the exact type and construction of each project ceiling (as actually provided) and utilize all such information while preparing the project lighting-equipment shop drawings and while ordering the respective project lighting fixtures, so that all lighting fixtures will be completely compatible with the respective ceilings (as actually provided). This contractor is cautioned that the type and construction of each project ceiling which is indicated in the project construction documents (drawings and specifications) do not necessarily represent the type and construction of the ceiling that will actually be provided and, also, that the types of lighting fixtures which are indicated for each project ceiling do not necessarily represent the types of lighting fixtures that are required for each project ceiling, as related to compatibility with the respective ceiling. It is this contractor's responsibility to assure that the project lighting fixtures which are provided are completely compatible with the respective ceilings, as actually installed.
8. Verify the exact respective desired locations (including mounting heights for wall-mounted) for all lighting fixtures and lighting equipment (luminaires, mounting brackets, poles, etc.) with the architect before commencing the installations.
9. Provide all mounting and connecting hardware which is required for each lighting fixture and for each piece of lighting equipment. All such hardware shall be appropriate for the respective exact applications.
10. Install and connect all project lighting equipment in strict accordance with all of the manufacturer's recommendations, instructions, requirements, details, etc. (verify in advance).
11. Each lighting fixture (or 4'-0" section of a lighting fixture) having a type designation which includes the letter "X" (e.g., Lighting Fixture Type "X1") shall be the same type lighting fixture as described herein for a lighting fixture having only the respective base lighting fixture designation (e.g., Lighting Fixture Type "1"), except that it shall be provided with an integral or remotely-mounted (as respectively applicable; verify in advance), emergency lighting system which is equipped with rechargeable battery backup. Connect the LED module/driver for each such "emergency" lighting fixture so as to be controlled (by the respectively-assigned local switch) as shown, and connect its emergency lighting system ahead of all switching (e.g., ahead of all local switches), in strict accordance with manufacturer's instructions, so that the batteries of the emergency lighting system will be maintained in the charged condition for "emergency" operation (for this purpose, provide the required, additional, "hot" conductor from the respective branch circuit, etc.). In addition, each such lighting fixture shall be equipped with a WATTSTOPPER ELCU-200, or approved equivalent, UL924, "emergency" lighting control unit which will allow such "emergency" lighting fixture to be powered by the respective "emergency" lighting circuit only, but will allow such "emergency" lighting fixture to be controlled (switched) by the lighting control device(s) that control(s) the adjacent "normal" lighting fixtures in the same area (i.e., to be controlled in tandem with such "normal" lighting fixtures). Such "emergency" lighting control unit shall cause such "emergency" lighting fixture to remain ON or to be turned ON (as applicable at the time) when "normal" power to such control device(s) is lost. Connect each such equipped "emergency" lighting fixture for "emergency" power to an unswitched, "emergency" lighting circuit of the emergency-electrical-power-generation-and-distribution system, for "emergency" operation, but so as to be controlled (switched) by the lighting control device(s) that control(s) the adjacent "normal" lighting fixtures in the respective same area (e.g., local toggle switches, local light dimmers, occupancy-sensing controls, control relays of a lighting contactor, etc.), i.e., to be controlled in tandem with the adjacent "normal" lighting fixtures; but so that, upon loss of power of such "normal" lighting circuit to such adjacent "normal" lighting fixtures, such "emergency" lighting control unit will cause all such lighting control devices to be bypassed. Verify all parameters and requirements in advance, and provide accordingly.
12. Except as noted otherwise, each exit lighting fixture shall be unswitched (uncontrolled) and shall be connected to an "emergency" lighting circuit, i.e., a circuit of the emergency-electrical-power-generation-and-distribution system, for "emergency/night-light" operation, in strict accordance with manufacturer's instructions. Verify all parameters and requirements in advance, and provide accordingly.
13. All suspension-mounted lighting fixtures which are being installed adjacent to ceiling fans, HVAC diffusers, etc., provide rigid stems in lieu of suspension cables (whether specified as having cables or not) so as to eliminate the possibility of such fixture from swaying due to air movement. Verify all such fixtures in advance and provide accordingly.
14. In all places where manufacturer's names and/or model numbers are given, the words "or approved equivalent" shall be assumed to follow.

Descriptions:

- A1 LITHONIA #GRD-LLP-4FT-MSL4-80CRI-35K-ID1500LMFT-0/100-MIN10-ZT-277-SCT-F2/36A-C110; 277-volt; 4'-0" long, linear, suspended, dimmable, LED, fixture; with a painted aluminum (low gloss) finish; 0% uplight/100% downlight distribution; and a 51-watt, 6015-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver. Provide suspension cable length as required for mounting fixture at the exact height stipulated by the architect (verify in advance).
- A2 LITHONIA #GRD-LLP-4FT-MSL4-80CRI-35K-ID1000LMFT-0/100-MIN10-ZT-277-SCT-F2/36A-C110; 277-volt; 4'-0" long, linear, suspended, dimmable, LED, fixture; with a painted aluminum (low gloss) finish; 0% uplight/100% downlight distribution; and a 32-watt, 4153-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver. Provide suspension cable length as required for mounting fixture at the exact height stipulated by the architect (verify in advance).
- A3 LITHONIA #GRD-LLP-4FT-MSL4-80CRI-35K-ID600LMFT-0/100-MIN10-ZT-277-SCT-F2/36A-C110; 277-volt; 4'-0" long, linear, suspended, dimmable, LED, fixture; with a painted aluminum (low gloss) finish; 0% uplight/100% downlight distribution; and a 25-watt, 3401-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver. Provide suspension cable length as required for mounting fixture at the exact height stipulated by the architect (verify in advance).

- B1 LITHONIA #LDN6-35/20-LO6AR-LSS-MVOLT-EZ10; 277-volt, dimmable, recessed, LED downlight; with a 6" aperture; clear trim; semi-specular silver reflector; and a 22.6-watt, 2000-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver.
- B2 LITHONIA #LDN6-35/15-LO6AR-LSS-MVOLT-EZ10; 277-volt, dimmable, recessed, LED downlight; with a 6" aperture; clear trim; semi-specular silver reflector; and a 20.5-watt, 1500-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver.
- B3 LITHONIA #LDN6-35/10-LO6AR-LSS-MVOLT-EZ10; 277-volt, dimmable, recessed, LED downlight; with a 6" aperture; clear trim; semi-specular silver reflector; and a 13-watt, 1000-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver.
- C1 LITHONIA #ZBLT4-60L-ADSM-MVOLT-EZ1-LP835; 277-volt, 2' x 4'; recessed (lay-in type), volumetric, LED fixture; with curved, smooth diffuser; and a 53-watt, 6000-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver.
- C2 LITHONIA #ZBLT4-48L-ADSM-MVOLT-EZ1-LP835; 277-volt, 2' x 4'; recessed (lay-in type), volumetric, LED fixture; with curved, smooth diffuser; and a 45-watt, 4800-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver.
- C3 LITHONIA #ZBLT4-40L-ADSM-MVOLT-EZ1-LP835; 277-volt, 2' x 4'; recessed (lay-in type), volumetric, LED fixture; with curved, smooth diffuser; and a 34-watt, 4000-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver.
- C4 LITHONIA #ZBLT4-30L-ADSM-MVOLT-EZ1-LP835; 277-volt, 2' x 4'; recessed (lay-in type), volumetric, LED fixture; with curved, smooth diffuser; and a 30-watt, 3000-lumen, 3500K, dimmable (down to 10% of total output), LED module/driver.
- D1 LITHONIA #REAL6C D6MW-ESL-1000L-30K-65SC; 120V, EnergyStar-rated, 6" aperture, recessed, LED downlighting fixture; 14W, 1000L lumen output; 3000K color temperature;.65 spacing criteria; and with appropriate housing.
- D2 LITHONIA #REAL6C-D6MW-ESL-1500L-30K-65SC; 120V, EnergyStar-rated, 6" aperture, recessed, LED downlighting fixture; 19W, 1500L lumen output; 3000K color temperature;.65 spacing criteria; and with appropriate housing.
- E CASABLANCA #59159; 120V, EnergyStar-Rated, 54", triple-bladed, ceiling fan with finish grille to be selected by the architect (verify in advance); integrated light kit (one [1] 16W LED); clear and white cased glass; 4-speed (0.699 amps high); 36" downrod; and with a total input wattage of 98W.
- F PURE EDGE LIGHTING "Sail" #SAIL-25X33-LED-27K; 120-volt, surface-mounted, self-illuminated, LED, vanity, mirror (33"H x 25"W x 2.35"D); with frosted glass diffuser; and a 69-watt, 2679-lumen, 2700K, LED module/driver. Wall-mount mirror in the exact location stipulated by the architect (verify in advance). Reference all associated architectural drawing details and provide all required work accordingly.
- G LITHONIA #FMLRL-14-20830M4; 120-volt, 14" round, surface-mounted, LED fixture; with white acrylic diffuser; and a 24-watt, 1600-lumen, 3000K, LED module/driver.
- H LITHONIA #W/L2-08L-MVOLT-EZ1-LP830; 120-volt, 24" long, wall-surface-mounted, LED, fixture; with housing finish to be selected by the architect (verify in advance); and a 7.5-watt, 800-lumen, 3000K, LED module/driver. Wall-surface-mount fixture, centered above the closet door at 6" above the door frame.
- HVL PANASONIC "WhisperWarm" #FV-11VH12; 120V; recessed, light/heater/fan combination unit with 90CFM fan; a 1440W heater; and two (2) 13-watt, 3000K, (self-ballasted) compact fluorescent lamps.
- L LITHONIA #FMLWL-48-835-MVOLT; 120-volt, 48" long, ceiling-surface-mounted, LED, utility, wraparound fixture; with white housing; white polycarbonate, diffuser/lens; and a 41-watt, 4600-lumen, 3500K, LED module/driver.
- M LITHONIA #WL4-40L-EZ1-LP835-MSDT-DIM50-EL14L-"FINISH"; 277-volt, 4'-0" long, wall-surface-mounted, LED, stairwell fixture; with housing finish to be selected by the architect (verify in advance); integral occupancy-sensor; 50% dimming, stairwell, mode controls; and a 39.5-watt, 4124-lumen, 3500K, dimming, LED module/driver. Connect as required to limit the light output "down" to 50% of total output when stairwell is unoccupied. Install (wall-mount) fixture at the exact height stipulated by the architect (verify in advance). Whether all stairwell landings are shown on the drawings or not, provide two (2) Type "M" fixtures (end-to-end so as to be in a continuous row) at each and every stairwell landing and floor level; and as required to be controlled as described. Verify exact required quantity of Type "M" fixtures based upon the number of stairwell landings and floor levels in advance and provide accordingly.
- N LITHONIA #LDN4-35/05-LO4-AR-LS-MVOLT-GZ10; 277-volt, recessed, 4", LED downlight; with specular silver reflector; clear trim; and a 5.7-watt, 500-lumen, 3500K, LED module/driver.
- P1 LITHONIA #ZL1D-148-7000LM-FST-MVOLT-35K-80CRI-"FINISH"; 277-volt, 48" long, surface-mounted (or chain-hung as required; verify), LED strip fixture; with housing finish to be selected by the architect (verify in advance); diffuse, acrylic, drop lens; and a 59-watt, 7000-lumen, 3500K, LED module/driver. Surface-mount fixture, or provide chain-hanging hardware as required to install fixture at the exact height stipulated by the architect (verify in advance). If installed in rooms/areas where there are electrical or mechanical equipment, and/or building structural steel obstructions; chain-hang and/or surface-mount (on ceiling or wall) fixture as required to avoid conflicts with obstructions while providing the best and most even lighting of the room/area. Verify all parameters and requirements in advance and provide all required work accordingly.
- P2 LITHONIA #ZL1D-148-5000LM-FST-MVOLT-35K-80CRI-"FINISH"; 277-volt, 48" long, surface-mounted (or chain-hung as required; verify), LED strip fixture; with housing finish to be selected by the architect (verify in advance); diffuse, acrylic, drop lens; and a 41-watt, 5000-lumen, 3500K, LED module/driver. Surface-mount fixture, or provide chain-hanging hardware as required to install fixture at the exact height stipulated by the architect (verify in advance). If installed in rooms/areas where there are electrical or mechanical equipment, and/or building structural steel obstructions; chain-hang and/or surface-mount (on ceiling or wall) fixture as required to avoid conflicts with obstructions while providing the best and most even lighting of the room/area. Verify all parameters and requirements in advance and provide all required work accordingly.
- P3 LITHONIA #ZL1D-148-3000LM-FST-MVOLT-35K-80CRI-"FINISH"; 277-volt, 48" long, surface-mounted (or chain-hung as required; verify), LED strip fixture; with housing finish to be selected by the architect (verify in advance); diffuse, acrylic, drop lens; and a 30-watt, 3000-lumen, 3500K, LED module/driver. Surface-mount fixture, or provide chain-hanging hardware as required to install fixture at the exact height stipulated by the architect (verify in advance). If installed in rooms/areas where there are electrical or mechanical equipment, and/or building structural steel obstructions; chain-hang and/or surface-mount (on ceiling or wall) fixture as required to avoid conflicts with obstructions while providing the best and most even lighting of the room/area. Verify all parameters and requirements in advance and provide all required work accordingly.
- Q1 LITHONIA #LDN6CYL-40/40-LO6-AR-LS-MVOLT-GZ10-PM-"FINISH"; 277-volt, damp-location-rated, LED, cylinder, downlight having a 6" aperture; with finish color to be selected by the architect (verify in advance); clear trim; specular silver reflector; 0-10V, dimming driver (dimmable "down" to 10% of total output); and a 44.3-watt, 4000-lumen, 4000K, LED module/driver. Provide pendant-mount stem length as required for mounting fixture at the exact height stipulated by the architect (verify in advance).

- Q2 LITHONIA #LDN6CYL-40/30-LO6-AR-LS-MVOLT-GZ10-PM-"FINISH"; 277-volt, damp-location-rated, LED, cylinder, downlight having a 6" aperture; with finish color to be selected by the architect (verify in advance); clear trim; specular silver reflector; 0-10V, dimming driver (dimmable "down" to 10% of total output); and a 34.8-watt, 3000-lumen, 4000K, LED module/driver. Provide pendant-mount stem length as required for mounting fixture at the exact height stipulated by the architect (verify in advance).
- R MARK ARCHITECTURAL LIGHTING "Slot 4" #S4LWD-LCB-4FT-MSL4-80CRI-35K-1000LMF-180CRI-135K-1600LMF-NODIM-SCT-MVOLT-"FINISH"; 277-volt, 4'-0" long, wall-surface-mounted, direct/indirect, LED, fixture; with finish to be selected by the architect (verify in advance); extruded acrylic lens; non-dimming; 37.2-watt, 1000-lumen, 3500K, "direct" LED module driver, and a non-dimming, 16.8-watt, 600-lumen, 3500K, LED module/driver. Wall-mount fixture at the exact height stipulated by the architect (verify in advance).
- T LITHONIA #KAXWLED-P3-R4-MVOLT-"FINISH"; 277-volt, exterior, wet-location-rated, wall-surface-mounted, LED wallpack; with finish color to be selected by the architect (verify in advance); and a 79-watt, 9703-lumen, 4000K, LED module/driver. Wall-mount fixture at the exact height stipulated by the architect (verify in advance).
- U1 HYDREL #8200LED-P1-40K-MVOLT-HFL-YM-TNM-BD-"FINISH"; 277-volt, yoke-mounted, LED, flood light; with finish to be selected by the architect (verify in advance); "barn doors" glare shield; "wide flood" light distribution; and a 220-watt, 21,555-lumen, 4000K, LED module/driver. Provide all required mounting hardware as required, and install fixture underneath the canopy in the exact location stipulated by the architect (verify in advance). Verify exact routing of conduit in advance with the architect (verify in advance). Once installed, aim fixture at night in the presence of the architect/owner, and as required to provide the best and most even lighting of the pool and pool deck area.
- U2 HYDREL #8200LED-P1-40K-MVOLT-WFL-YM-TNM-BD-"FINISH"; 277-volt, yoke-mounted, LED, flood light; with finish to be selected by the architect (verify in advance); "barn doors" glare shield; "wide flood" light distribution; and a 220-watt, 18,990-lumen, 4000K, LED module/driver. Provide all required mounting hardware as required, and install fixture underneath the canopy in the exact location stipulated by the architect (verify in advance). Verify exact routing of conduit in advance with the architect (verify in advance). Once installed, aim fixture at night in the presence of the architect/owner, and as required to provide the best and most even lighting of the pool and pool deck area.
- X LITHONIA #EDGR-"FACES"-R; 277-volt, LED, "edge-lit", exit sign with brushed, aluminum housing; the quantity of faces as required for each respective location (verify in advance); green letters; side-mounting, top-mounting, or back-mounting hardware as required for each respective location (verify in advance); and directional chevrons as required for each respective location (verify in advance). Provide clear faces for single-faced locations and mirrored faces for all double-faced locations. Provide recessed mounting hardware in all locations where it is possible and as directed by the architect (verify all such desired locations in advance with the architect), and surface-mounted in all other locations as required (verify for each respective location in advance and provide accordingly).
- Z BIG ASS FANS "Essence LED" #005792-267-04; 277-volt, 12'-0" diameter, ceiling-fan; with silver finish; LED downlight having a 5000-lumen, 4000K module/driver; with the appropriate, wall-mounted, fan-speed, control-panel. Provide a separate circuit for the integral LED lighting fixture, and connect such fixture to the branch circuit feeding the nearest adjacent Type "Q2" lighting fixture (LED cylinder) in the area as required for common control and power source (verify in advance). Provide all required mounting and connecting hardware to install fan at the exact location (including height) stipulated by the architect (verify in advance), and as per the manufacturer's instructions (verify in advance). Install the speed control panel in the exact location stipulated by the architect (verify in advance). Verify all parameters and requirements in advance and provide all required work accordingly.

GENERAL ELECTRICAL NOTES:

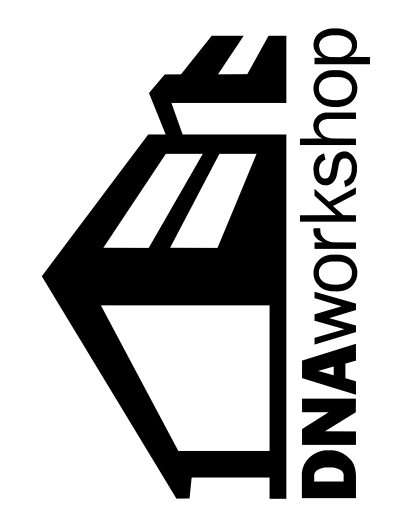
1. Protect from damage all existing electrical equipment which shall remain and be reused.
2. Unless indicated otherwise, in all areas where new construction is involved, disconnect and completely remove all existing electrical work which conflicts with the new construction, which is not in strict accordance with the requirements of all applicable codes and governing authorities (verify in advance), and/or is not intended to remain and/or be reused. All other existing electrical work in such areas, and all existing electrical work in areas where new construction is not involved, shall remain to operate "where and as is", unless indicated or noted otherwise. Where there is doubt as to whether or not certain existing electrical work is intended to remain and be reused, verify such fact with the architect before commencing any disconnections and/or removals which are relative thereto.
3. Existing raceways (conduits), pull boxes, junction boxes, and outlet boxes may remain and be reused in place to the extent that they are in satisfactory reusable condition; to the extent that they are in accordance with the various schemes of the project scope; to the extent that they meet all project requirements (verify all parameters and requirements in advance); to the extent that they meet the requirements of all applicable codes and governing authorities (verify in advance); and to the extent that such raceways (conduits) in and for finished areas are completely concealed from view and such pull boxes, junction boxes, and outlet boxes in and for finished areas are recessed. As a clarification, remove and replace all raceways (conduits), pull boxes, junction boxes, and outlet boxes which show any signs of corrosion, damage, etc., or are not (for any reason) completely fit for reuse (i.e., which are not in 100% first-class condition). Where there is doubt as to whether or not such existing raceways (conduits), outlet boxes, junction boxes, and pull boxes are indeed fit for reuse, verify such fact in advance with the architect.
4. Schedule well in advance with the owner (and give proper notice to the owner, as determined in advance by the owner) verify all required power shutdowns, as well as their respective durations. Be advised that all project work which is associated in any way with power shutdowns (particularly if and when such shutdowns would adversely affect areas of the facility which are not directly involved with the project) will be required by the owner to be done at certain times so that such work will not interfere with the required on-going operations of the facility (as determined by the owner; verify in advance). The owner shall have the freedom to determine the most advantageous times and durations for all such power shutdowns so as to minimize the impact of such power shutdowns on such operations. Schedule, coordinate, and phase the project work so that the number of such power shutdowns (particularly if and when such shutdowns would adversely affect areas of the facility which are not directly involved with the project), as well as their respective durations, are kept to a minimum.
5. At and for each panelboard which is involved in any way with this project, whether new or remaining-existing, provide a typewritten, branch-circuit directory that accurately identifies all existing and new loads which are fed therefrom; utilize nomenclature that is approved in advance by the architect and the owner.
6. At and for each existing switchboard which is involved in any way with this project (if any), provide a laminated plastic label which is engraved with the respective, new, electrical loads that are fed therefrom; utilize nomenclature that is approved in advance by the architect and the owner (verify). As a clarification, tape labels are unacceptable for this purpose.
7. Obtain advanced approval from the architect for the exact routing for all raceways and for the exact locations for the respective raceway penetrations.
8. Before commencing any other project electrical construction/work, and at a time which is approved in advance by the owner, establish a maximum existing-load condition on each existing panelboard that is involved in any way with this project; determine whether or not adequate spare electrical-power capacity and adequate spare branch-circuit-breaker space does indeed respectively exist for accommodating the project electrical construction/work, by taking into account the existing electrical loads which are being respectively removed and the new electrical loads which are being respectively added; and bring all conflicts to the immediate attention of the architect for resolution.
9. In each case where new electrical loads are shown to be connected to a particular, existing, "emergency-power" panelboard, and such existing, "emergency-power" panelboard does not, indeed, have adequate spare electrical-power capacity and/or adequate branch-circuit-breaker space for accommodating such new electrical loads, connect such new electrical loads, instead, where and as required to be fed from the nearest "emergency-power" panelboard which has adequate spare electrical-power capacity and which has adequate branch-circuit-breaker space, and upsize the respective electrical conductors, based on circuit length, accordingly (reference the specifications). Verify all parameters and requirements in advance, and provide accordingly.
10. In each case where new electrical loads are shown to be connected to a particular, existing, "normal-power" panelboard, and such existing, "normal-power" panelboard does not, indeed, have adequate spare electrical-power capacity and/or adequate branch-circuit-breaker space for accommodating such new electrical loads, connect such new electrical loads, instead, where and as required to be fed from the nearest "normal-power" panelboard which has adequate spare electrical-power capacity and which has adequate branch-circuit-breaker space, and upsize the respective electrical conductors, based on circuit length, accordingly (reference the specifications). Verify all parameters and requirements in advance, and provide accordingly.
11. Verify the number of all remaining and/or reconnected-existing branch circuits in advance, and take such information into consideration while executing the project electrical work. Bring all conflicts to the immediate attention of the architect for resolution.

**2** GENERAL ELECTRICAL NOTES  
No Scale

12. For each project circuit which is required to be provided to a branch circuit breaker in an existing panelboard, provide a new branch circuit breaker, therefore, having the respective ratings (e.g., the continuous-current rating, the number of poles, etc.) which are indicated. In order to render physical space in such existing panelboard for such new branch circuit breaker, disconnect and remove no-longer-needed, branch, circuit breakers, and/or re-arrange needed, branch, circuit breakers, if, where, and as required. Verify all parameters and requirements in advance.
13. Ensure that the circuit (raceway and electrical cables) to and for each project, under cabinet, lighting fixture is concealed from view, i.e., that no portion is exposed. In order for such to be accomplished, verify with the architect, in advance of the commencement of each such installation, the desired exact, lighting-fixture location; the desired, exact means of support; the desired, exact means of connection; and the desired, exact, circuit routing.
14. For each location where a recessed, wall-mounted, partition-mounted, etc. outlet is required (for power, data, cable-television, etc.), and such location is where the respective wall, partition, etc. is not thick enough to accommodate a standard-depth outlet box, provide a shallow outlet box having a depth which is shallow enough to fit into such wall, partition, etc., but that still meets all applicable code requirements. If there is no outlet box which is shallow enough to fit in a particular such location and still meet all applicable code requirements, bring such fact to the advanced and immediate attention of the architect for resolution.
15. Verify all pendant-mounted-lighting-fixture outlet-box locations and fixture heights (above finished floor) with the architect prior to the installation of such lighting fixtures.
16. As a clarification, the existing fire-pump equipment (e.g., the fire pump, the fire-pump cabinet, the jockey pump, the jockey pump controller, the associated electrical feeders [raceways and electrical cables], the associated junction boxes, etc.) shall remain and continue to be used.
17. Throughout construction and for the benefit of the owner, keep accurate record of all new and existing electrical equipment (panelboards, switchboards, transformers, telecommunications equipment, fire alarm panels/boosters, security system panels, etc.) which are located in all electrical rooms and accurately mark-up/sketch all such equipment locations on the contractor's on-site "as-built" drawings so that accurate "as-built" record drawings can be created for the building owner at the end of construction.
18. Not all homerun, branch, circuit pole numbers shown are necessarily accurate. There are some unknown (at the time of design) existing building loads/circuits which shall remain in use, and are not accounted for in the existing panel schedules shown on these drawings. [However, their estimated loads have been accounted for in the respective panel and service capacities.] Therefore, connect the new branch circuit shown on these drawings to the next available breaker pole(s) in the intended panelboard respectively (verify in advance). Keep accurate record of ALL such required branch circuit pole changes on the contractor's on-site "as-built" drawings so that accurate "as-built" record drawings can be created for the building owner at the end of construction.
19. If there are no available spare circuit breakers (or breaker spaces), or spare load capacity in the panelboard to which a new branch circuit is to be run, run/connect new branch circuit from a next nearest existing panelboard (on the same floor level) which has the same electrical characteristics (i.e., voltage, phase, connected to the same bus-duct, etc.) as the initially-intended panelboard (verify in advance), but obtain permission from the architect prior to performing such work. Verify all parameters and requirements in advance.
20. Coordinate in advance (prior to commencing all work) with the mechanical and plumbing subcontractors for the disconnection and removal of all existing mechanical and plumbing equipment which is intended to be disconnected and removed. Determine the quantities and locations of all breakers and/or breaker spaces which shall become available for use due to such equipment disconnections and removals, and verify that there will indeed be enough existing breakers and/or breaker spaces in the existing switchboards and panelboards which are required to accommodate (feed) all new mechanical and plumbing equipment loads as indicated on these electrical drawings (and panel schedules). Bring all conflicts to the immediate attention of the architect for resolution. Verify all parameters and requirements in advance and provide all required work accordingly. See General Electrical Note No. 18.

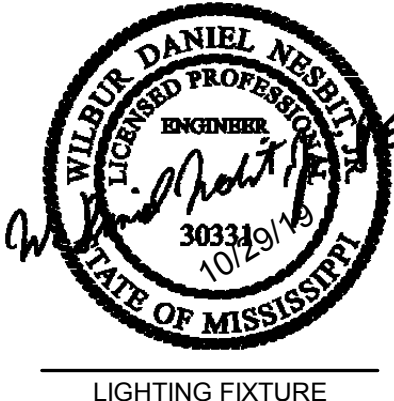
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**1** LIGHTING FIXTURE SCHEDULE  
No Scale



**LANDMARK BUILDING**  
175 EAST CAPITOL ST., JACKSON, MS 39201  
DYKE NELSON ARCHITECTURE 235 SOUTH 14TH ST. BATON ROUGE, LA 70802  
DINA-ARCHITECTURE.COM (225) 224 3363

REVISIONS	
<b>JOB NUMBER:</b>	15-020
<b>ISSUED:</b>	10/24/19
<b>ISSUED FOR:</b>	<b>CONSTRUCTION</b>



LIGHTING FIXTURE SCHEDULE & GENERAL ELECTRICAL NOTES

**E2.1.2**  
PHASE: CD









Existing Panel "PC", 120/208 Volts, Three-Phase, Four-Wire, Solid Neutral, 50A MCB, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus, Door & Lock.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
? 1	35	1	Exhaust Fans (EF-11 & EF-12) 3/4", 2#8 & 1#10EG
3	20	1	Exterior Rooftop Receptacles 3/4", 2#8 & 1#10EG
5	20	1	Receptacles 3/4", 2#8 & 1#10EG
? 7	20	1	Receptacles 3/4", 2#8 & 1#10EG
# 9	20	1	Vending Machines 1/2", 2#10 & 1#10EG
? 11	15	3	Pool Filter Pump
? 13	--	--	Pool Filter Pump
? 15	--	--	Pool Filter Pump
? 17	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
? 2	20	2	Fumaces F-1, F-2, and F-3 1", 3#8 & 1#10EG
? 4	--	--	Fumaces F-1, F-2, and F-3 1", 3#8 & 1#10EG
6	20	1	Receptacles 3/4", 2#8 & 1#10EG
8	20	1	Receptacles 3/4", 2#8 & 1#10EG
# 10	20	1	In-Pool Lights 1/2", 2#10 & 1#10EG
? 12	20	1	Pool Auto Makeup Water Panel 1/2", 2#10 & 1#10EG
? 14	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
16	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
18	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions

Existing Panel "PHC", 277/480 Volts, Three-Phase, Four-Wire, Solid Neutral, 225A MLO, 14000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus, Door & Lock.

# Shunt-Trip-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
? 1	15	3	Boiler #1
? 3	--	--	Boiler #1
? 5	--	--	Boiler #1
? 7	20	3	Pump (P-3)
? 11	--	--	Pump (P-3)
? 13	15	3	CU-1
? 15	--	--	CU-1
? 17	--	--	CU-1
? 19	15	3	CU-3
? 21	--	--	CU-3
? 23	--	--	CU-3
? 25	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
? 27	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
? 29	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
? 2	15	3	Boiler #2
? 4	--	--	Boiler #2
? 6	--	--	Boiler #2
? 8	20	3	Pump (P-4)
? 10	--	--	Pump (P-4)
? 12	--	--	Pump (P-4)
? 14	15	3	CU-2
? 16	--	--	CU-2
? 18	--	--	CU-2
& 7 20	20	3	Supply Fan (SF-1)
8 7 22	--	--	Supply Fan (SF-1)
8 7 24	--	--	Supply Fan (SF-1)
26	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
28	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
30	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions

Loadcenter "B2", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
? 1	30	2	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 3	--	--	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 5	50	2	RANGE 1", 3#8 & 1#10EG
? 7	--	--	RANGE 1", 3#8 & 1#10EG
? 9	20	2	AIR-HANDLING UNIT [HP-1]
? 11	--	--	AIR-HANDLING UNIT [HP-1]
13	20	1	RECEPTACLES
15	20	1	RECEPTACLES
17	20	1	HOODMICROWAVE RECEPTACLE
19	20	1	SMOKE DETECTORS
? 21	20	1	TELECOMMUNICATIONS HUB
23	20	1	SPARE
25	20	1	SPARE
27	--	--	Provisions
29	--	--	Provisions
31	--	--	Provisions
33	--	--	Provisions
35	--	--	Provisions
37	--	--	Provisions
39	--	--	Provisions
41	--	--	Provisions
2	20	1	HVL/BATHROOM LIGHTS
# 4	20	1	REFRIGERATOR
# 6	20	1	SMALL APPLIANCE CIRCUIT
# 8	20	1	SMALL APPLIANCE CIRCUIT
# 10	20	1	DISPOSAL RECEPTACLE
# 12	20	1	DISHWASHER
14	20	1	LIGHTING AND FANS
16	20	1	LAUNDRY CIRCUIT
18	20	1	RESTROOM RECEPTACLE
20	20	1	RECEPTACLES
22	20	1	SPARE
24	20	1	SPARE
26	20	1	SPARE
28	--	--	Provisions
30	--	--	Provisions
32	--	--	Provisions
34	--	--	Provisions
36	--	--	Provisions
38	--	--	Provisions
40	--	--	Provisions
42	--	--	Provisions

Existing Switchboard "SBHC", 277/480 Volts, Three-Phase, Four-Wire, Solid Neutral, 1600A MLO, 22000 A.I.C. (<10000 SCA Available), Free-Standing, Ground Bus, Door & Lock.

# Shunt-Trip-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
? 1	150	3	Pump (P-1) 2" 4#1/0 & 1#5EG
? 3	--	--	Pump (P-1) 2" 4#1/0 & 1#5EG
? 5	--	--	Pump (P-1) 2" 4#1/0 & 1#5EG
? 7	500	3	Chiller #1 3", 4-250KCM & 1#2EG EA
? 9	--	--	Chiller #1 3", 4-250KCM & 1#2EG EA
? 11	--	--	Chiller #1 3", 4-250KCM & 1#2EG EA
? 13	125	3	WSHP-1 2", 4#1 & 1#6EG
? 15	--	--	WSHP-1 2", 4#1 & 1#6EG
? 17	--	--	WSHP-1 2", 4#1 & 1#6EG
19	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
21	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
23	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
25	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
27	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
29	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
? 2	150	3	Pump (P-2) 2" 4#1/0 & 1#5EG
? 4	--	--	Pump (P-2) 2" 4#1/0 & 1#5EG
? 6	--	--	Pump (P-2) 2" 4#1/0 & 1#5EG
? 8	500	3	Chiller #2 3", 4-250KCM & 1#2EG EA
? 10	--	--	Chiller #2 3", 4-250KCM & 1#2EG EA
? 12	--	--	Chiller #2 3", 4-250KCM & 1#2EG EA
? 14	125	3	WSHP-2 2", 4#1 & 1#6EG
? 16	--	--	WSHP-2 2", 4#1 & 1#6EG
? 18	--	--	WSHP-2 2", 4#1 & 1#6EG
20	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
22	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
24	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
26	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
28	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions
30	--	--	Remaining-Existing Load, or Spare Breaker, or Provisions

Loadcenter "C", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
? 1	30	2	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 3	--	--	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 5	50	2	RANGE 1", 3#8 & 1#10EG
? 7	--	--	RANGE 1", 3#8 & 1#10EG
? 9	20	2	AIR-HANDLING UNIT [HP-1]
? 11	--	--	AIR-HANDLING UNIT [HP-1]
13	20	1	RECEPTACLES
15	20	1	RECEPTACLES
17	20	1	HOODMICROWAVE RECEPTACLE
19	20	1	SMOKE DETECTORS
21	20	1	SPARE
23	20	1	SPARE
25	20	1	SPARE
27	--	--	Provisions
29	--	--	Provisions
31	--	--	Provisions
33	--	--	Provisions
35	--	--	Provisions
37	--	--	Provisions
39	--	--	Provisions
41	--	--	Provisions
2	20	1	HVL/BATHROOM LIGHTS
# 4	20	1	REFRIGERATOR
# 6	20	1	SMALL APPLIANCE CIRCUIT
# 8	20	1	SMALL APPLIANCE CIRCUIT
# 10	20	1	DISPOSAL RECEPTACLE
# 12	20	1	DISHWASHER
14	20	1	LIGHTING AND FANS
16	20	1	LAUNDRY CIRCUIT
18	20	1	RESTROOM RECEPTACLE
? 20	20	1	TELECOMMUNICATIONS HUB
22	20	1	SPARE
24	20	1	SPARE
26	--	--	Provisions
28	--	--	Provisions
30	--	--	Provisions
32	--	--	Provisions
34	--	--	Provisions
36	--	--	Provisions
38	--	--	Provisions
40	--	--	Provisions
42	--	--	Provisions

Loadcenter "A", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
? 1	30	2	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 3	--	--	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 5	50	2	RANGE 1", 3#8 & 1#10EG
? 7	--	--	RANGE 1", 3#8 & 1#10EG
? 9	20	2	AIR-HANDLING UNIT [HP-1]
? 11	--	--	AIR-HANDLING UNIT [HP-1]
13	20	1	RECEPTACLES
15	20	1	RECEPTACLES
17	20	1	HOODMICROWAVE RECEPTACLE
19	20	1	SMOKE DETECTORS
? 21	20	1	TELECOMMUNICATIONS HUB
23	20	1	SPARE
25	20	1	SPARE
27	--	--	Provisions
29	--	--	Provisions
31	--	--	Provisions
33	--	--	Provisions
35	--	--	Provisions
37	--	--	Provisions
39	--	--	Provisions
41	--	--	Provisions
2	20	1	HVL/BATHROOM LIGHTS
# 4	20	1	REFRIGERATOR
# 6	20	1	SMALL APPLIANCE CIRCUIT
# 8	20	1	SMALL APPLIANCE CIRCUIT
# 10	20	1	DISPOSAL RECEPTACLE
# 12	20	1	DISHWASHER
14	20	1	LIGHTING AND FANS
16	20	1	LAUNDRY CIRCUIT
18	20	1	RESTROOM RECEPTACLE
20	20	1	RECEPTACLES
22	20	1	SPARE
24	20	1	SPARE
26	20	1	SPARE
28	--	--	Provisions
30	--	--	Provisions
32	--	--	Provisions
34	--	--	Provisions
36	--	--	Provisions
38	--	--	Provisions
40	--	--	Provisions
42	--	--	Provisions

Loadcenter "B1", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
? 1	30	2	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 3	--	--	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 5	50	2	RANGE 1", 3#8 & 1#10EG
? 7	--	--	RANGE 1", 3#8 & 1#10EG
? 9	20	2	AIR-HANDLING UNIT [HP-1]
? 11	--	--	AIR-HANDLING UNIT [HP-1]
13	20	1	RECEPTACLES
15	20	1	RECEPTACLES
17	20	1	HOODMICROWAVE RECEPTACLE
19	20	1	SMOKE DETECTORS
? 21	20	1	TELECOMMUNICATIONS HUB
23	20	1	SPARE
25	20	1	SPARE
27	--	--	Provisions
29	--	--	Provisions
31	--	--	Provisions
33	--	--	Provisions
35	--	--	Provisions
37	--	--	Provisions
39	--	--	Provisions
41	--	--	Provisions
2	20	1	HVL/BATHROOM LIGHTS
# 4	20	1	REFRIGERATOR
# 6	20	1	SMALL APPLIANCE CIRCUIT
# 8	20	1	SMALL APPLIANCE CIRCUIT
# 10	20	1	DISPOSAL RECEPTACLE
# 12	20	1	DISHWASHER
14	20	1	LIGHTING AND FANS
16	20	1	LAUNDRY CIRCUIT
18	20	1	RESTROOM RECEPTACLE
20	20	1	RECEPTACLES
22	20	1	SPARE
24	20	1	SPARE
26	20	1	SPARE
28	--	--	Provisions
30	--	--	Provisions
32	--	--	Provisions
34	--	--	Provisions
36	--	--	Provisions
38	--	--	Provisions
40	--	--	Provisions
42	--	--	Provisions

Loadcenter "D", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
? 1	30	2	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 3	--	--	WASHER/DRYER 1/2", 3#10 & 1#10EG
? 5	50	2	RANGE 1", 3#8 & 1#10EG
? 7	--	--	RANGE 1", 3#8 & 1#10EG
? 9	30	2	AIR-HANDLING UNIT [HP-3]
? 11	--	--	AIR-HANDLING UNIT [HP-3]
13	20	1	RECEPTACLES
15	20	1	RECEPTACLES
17	20	1	HOODMICROWAVE RECEPTACLE
19	20	1	SMOKE DETECTORS
21	20	1	HVL/BATHROOM LIGHTS
? 23	20	1	TELECOMMUNICATIONS HUB
25	20	1	SPARE
27	20	1	SPARE
29	--	--	Provisions
31	--	--	Provisions
33	--	--	Provisions
35	--	--	Provisions
37	--	--	Provisions
39	--	--	Provisions
41	--	--	Provisions
2	20	1	HVL/BATHROOM LIGHTS
# 4	20	1	REFRIGERATOR
# 6	20	1	SMALL APPLIANCE CIRCUIT
# 8	20	1	SMALL APPLIANCE CIRCUIT
# 10	20	1	DISPOSAL RECEPTACLE
# 12	20	1	DISHWASHER
14	20	1	LIGHTING AND FANS
16	20	1	LAUNDRY CIRCUIT
18	20	1	RESTROOM RECEPTACLES
20	20	1	RECEPTACLES
22	20	1	SPARE
24	20	1	SPARE
26	20	1	SPARE
28	20	1	SPARE
30	--	--	Provisions
32	--	--	Provisions
34	--	--	Provisions

Loadcenter "F", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
1	30	2	WASHER/DRYER 1/2", 3#10 & 1#10EG
2	-	-	WASHER/DRYER 1/2", 3#10 & 1#10EG
3	-	-	WASHER/DRYER 1/2", 3#10 & 1#10EG
4	50	2	RANGE 1", 3#8 & 1#10EG
5	-	-	RANGE 1", 3#8 & 1#10EG
6	-	-	RANGE 1", 3#8 & 1#10EG
7	30	2	AIR-HANDLING UNIT [HP-3] 1/2", 3#10 & 1#10EG
8	-	-	AIR-HANDLING UNIT [HP-3] 1/2", 3#10 & 1#10EG
9	20	1	RECEPTACLES
10	20	1	RECEPTACLES
11	20	1	HOOD/MICROWAVE RECEPTACLE
12	20	1	SMOKE DETECTORS
13	20	1	HVL/BATHROOM LIGHTS
14	20	1	TELECOMMUNICATIONS HUB
15	20	1	SPARE
16	20	1	SPARE
17	-	-	Provisions
18	-	-	Provisions
19	-	-	Provisions
20	-	-	Provisions
21	-	-	Provisions
22	-	-	Provisions
23	-	-	Provisions
24	-	-	Provisions
25	-	-	Provisions
26	-	-	Provisions
27	-	-	Provisions
28	-	-	Provisions
29	-	-	Provisions
30	-	-	Provisions
31	-	-	Provisions
32	-	-	Provisions
33	-	-	Provisions
34	-	-	Provisions
35	-	-	Provisions
36	-	-	Provisions
37	-	-	Provisions
38	-	-	Provisions
39	-	-	Provisions
40	-	-	Provisions
41	-	-	Provisions
42	-	-	Provisions

Loadcenter "G", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
1	30	2	WASHER/DRYER 1/2", 3#10 & 1#10EG
2	-	-	WASHER/DRYER 1/2", 3#10 & 1#10EG
3	-	-	WASHER/DRYER 1/2", 3#10 & 1#10EG
4	50	2	RANGE 1", 3#8 & 1#10EG
5	-	-	RANGE 1", 3#8 & 1#10EG
6	-	-	RANGE 1", 3#8 & 1#10EG
7	20	2	AIR-HANDLING UNIT [HP-1] 1/2", 3#10 & 1#10EG
8	-	-	AIR-HANDLING UNIT [HP-1] 1/2", 3#10 & 1#10EG
9	20	1	RECEPTACLES
10	20	1	RECEPTACLES
11	20	1	HOOD/MICROWAVE RECEPTACLE
12	20	1	SMOKE DETECTORS
13	20	1	SPARE
14	20	1	SPARE
15	20	1	SPARE
16	-	-	Provisions
17	-	-	Provisions
18	-	-	Provisions
19	-	-	Provisions
20	-	-	Provisions
21	-	-	Provisions
22	-	-	Provisions
23	-	-	Provisions
24	-	-	Provisions
25	-	-	Provisions
26	-	-	Provisions
27	-	-	Provisions
28	-	-	Provisions
29	-	-	Provisions
30	-	-	Provisions
31	-	-	Provisions
32	-	-	Provisions
33	-	-	Provisions
34	-	-	Provisions
35	-	-	Provisions
36	-	-	Provisions
37	-	-	Provisions
38	-	-	Provisions
39	-	-	Provisions
40	-	-	Provisions
41	-	-	Provisions
42	-	-	Provisions

Loadcenter "H", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
1	30	2	DRYER 1/2", 3#10 & 1#10EG
2	-	-	DRYER 1/2", 3#10 & 1#10EG
3	-	-	DRYER 1/2", 3#10 & 1#10EG
4	50	2	RANGE 1", 3#8 & 1#10EG
5	-	-	RANGE 1", 3#8 & 1#10EG
6	-	-	RANGE 1", 3#8 & 1#10EG
7	30	2	AIR-HANDLING UNIT [HP-2] 1/2", 3#10 & 1#10EG
8	-	-	AIR-HANDLING UNIT [HP-2] 1/2", 3#10 & 1#10EG
9	20	1	RECEPTACLES
10	20	1	RECEPTACLES
11	20	1	HOOD/MICROWAVE RECEPTACLE
12	20	1	SMOKE DETECTORS
13	20	1	TELECOMMUNICATIONS HUB
14	20	1	SPARE
15	20	1	SPARE
16	-	-	Provisions
17	-	-	Provisions
18	-	-	Provisions
19	-	-	Provisions
20	-	-	Provisions
21	-	-	Provisions
22	-	-	Provisions
23	-	-	Provisions
24	-	-	Provisions
25	-	-	Provisions
26	-	-	Provisions
27	-	-	Provisions
28	-	-	Provisions
29	-	-	Provisions
30	-	-	Provisions
31	-	-	Provisions
32	-	-	Provisions
33	-	-	Provisions
34	-	-	Provisions
35	-	-	Provisions
36	-	-	Provisions
37	-	-	Provisions
38	-	-	Provisions
39	-	-	Provisions
40	-	-	Provisions
41	-	-	Provisions
42	-	-	Provisions

Loadcenter "J", 120/208 Volts, Single-Phase, Three-Wire, Solid Neutral, 125A MLO, 10000 A.I.C. (<10000 SCA Available), Flush-Mounted, Ground Bus.

Note: All 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".

# GFI-Type Circuit Breaker  
? Verify exact electrical requirements in advance.

CKT NO.	AMPS	PL	REMARKS
1	30	2	DRYER 1/2", 3#10 & 1#10EG
2	-	-	DRYER 1/2", 3#10 & 1#10EG
3	-	-	DRYER 1/2", 3#10 & 1#10EG
4	50	2	RANGE 1", 3#8 & 1#10EG
5	-	-	RANGE 1", 3#8 & 1#10EG
6	-	-	RANGE 1", 3#8 & 1#10EG
7	30	2	AIR-HANDLING UNIT [HP-3] 1/2", 3#10 & 1#10EG
8	-	-	AIR-HANDLING UNIT [HP-3] 1/2", 3#10 & 1#10EG
9	20	1	RECEPTACLES
10	20	1	RECEPTACLES
11	20	1	HOOD/MICROWAVE RECEPTACLE
12	20	1	SMOKE DETECTORS
13	20	1	HVL/BATHROOM LIGHTS
14	20	1	WASHING MACHINE
15	20	1	SPARE
16	20	1	SPARE
17	-	-	Provisions
18	-	-	Provisions
19	-	-	Provisions
20	-	-	Provisions
21	-	-	Provisions
22	-	-	Provisions
23	-	-	Provisions
24	-	-	Provisions
25	-	-	Provisions
26	-	-	Provisions
27	-	-	Provisions
28	-	-	Provisions
29	-	-	Provisions
30	-	-	Provisions
31	-	-	Provisions
32	-	-	Provisions
33	-	-	Provisions
34	-	-	Provisions
35	-	-	Provisions
36	-	-	Provisions
37	-	-	Provisions
38	-	-	Provisions
39	-	-	Provisions
40	-	-	Provisions
41	-	-	Provisions
42	-	-	Provisions

Multi-Meter Distribution Panel "MMDP2A", 120/208 Volts, Three-Phase, Four-Wire, Solid Neutral, 600A MCB, 22000 A.I.C., Surface-Mounted, Ground Bus, Door & Lock, SPD.

CKT NO.	AMPS	PL	REMARKS
1	125	2	Apartment #201 [Loadcenter "A"]
2	-	-	Apartment #201 [Loadcenter "A"]
3	-	-	Apartment #201 [Loadcenter "A"]
4	125	2	Apartment #203 [Loadcenter "A"]
5	-	-	Apartment #203 [Loadcenter "A"]
6	-	-	Apartment #203 [Loadcenter "A"]
7	125	2	Apartment #205 [Loadcenter "A"]
8	-	-	Apartment #205 [Loadcenter "A"]
9	-	-	Apartment #205 [Loadcenter "A"]
10	125	2	Apartment #207 [Loadcenter "A"]
11	-	-	Apartment #207 [Loadcenter "A"]
12	-	-	Apartment #207 [Loadcenter "A"]
13	125	2	Apartment #209 [Loadcenter "H"]
14	-	-	Apartment #209 [Loadcenter "H"]
15	-	-	Apartment #209 [Loadcenter "H"]
16	125	2	Apartment #211 [Loadcenter "J"]
17	-	-	Apartment #211 [Loadcenter "J"]
18	-	-	Apartment #211 [Loadcenter "J"]
19	125	2	Apartment #213 [Loadcenter "C"]
20	-	-	Apartment #213 [Loadcenter "C"]
21	-	-	Apartment #213 [Loadcenter "C"]
22	125	2	Apartment #215 [Loadcenter "A"]
23	-	-	Apartment #215 [Loadcenter "A"]
24	-	-	Apartment #215 [Loadcenter "A"]
25	125	2	Apartment #217 [Loadcenter "B2"]
26	-	-	Apartment #217 [Loadcenter "B2"]
27	-	-	Apartment #217 [Loadcenter "B2"]
28	-	-	Provisions
29	-	-	Provisions
30	-	-	Provisions
31	-	-	Provisions
32	-	-	Provisions
33	125	2	Apartment #202 [Loadcenter "A"]
34	-	-	Apartment #202 [Loadcenter "A"]
35	-	-	Apartment #202 [Loadcenter "A"]
36	125	2	Apartment #204 [Loadcenter "A"]
37	-	-	Apartment #204 [Loadcenter "A"]
38	-	-	Apartment #204 [Loadcenter "A"]
39	125	2	Apartment #206 [Loadcenter "A"]
40	-	-	Apartment #206 [Loadcenter "A"]
41	-	-	Apartment #206 [Loadcenter "A"]
42	125	2	Apartment #208 [Loadcenter "A"]
43	-	-	Apartment #208 [Loadcenter "A"]
44	-	-	Apartment #208 [Loadcenter "A"]
45	125	2	Apartment #210 [Loadcenter "E"]
46	-	-	Apartment #210 [Loadcenter "E"]
47	-	-	Apartment #210 [Loadcenter "E"]
48	125	2	Apartment #212 [Loadcenter "C"]
49	-	-	Apartment #212 [Loadcenter "C"]
50	-	-	Apartment #212 [Loadcenter "C"]
51	125	2	Apartment #214 [Loadcenter "A"]
52	-	-	Apartment #214 [Loadcenter "A"]
53	-	-	Apartment #214 [Loadcenter "A"]
54	125	2	Apartment #216 [Loadcenter "B1"]
55	-	-	Apartment #216 [Loadcenter "B1"]
56	-	-	Apartment #216 [Loadcenter "B1"]
57	-	-	Provisions
58	-	-	Provisions
59	-	-	Provisions
60	-	-	Provisions
61	-	-	Provisions
62	-	-	Provisions

Multi-Meter Distribution Panel "MMDP2B", 120/208 Volts, Three-Phase, Four-Wire, Solid Neutral, 600A MCB, 22000 A.I.C., Surface-Mounted, Ground Bus, Door & Lock, SPD.

CKT NO.	AMPS	PL	REMARKS
1	125	2	Apartment #219 [Loadcenter "B2"]
2	-	-	Apartment #219 [Loadcenter "B2"]
3	-	-	Apartment #219 [Loadcenter "B2"]
4	125	2	Apartment #221 [Loadcenter "B2"]
5	-	-	Apartment #221 [Loadcenter "B2"]
6	-	-	Apartment #221 [Loadcenter "B2"]
7	125	2	Apartment #223 [Loadcenter "B2"]
8	-	-	Apartment #223 [Loadcenter "B2"]
9	-	-	Apartment #223 [Loadcenter "B2"]
10	125	2	Apartment #225 [Loadcenter "B2"]
11	-	-	Apartment #225 [Loadcenter "B2"]
12	-	-	Apartment #225 [Loadcenter "B2"]
13	125	2	Apartment #227 [Loadcenter "B2"]
14	-	-	Apartment #227 [Loadcenter "B2"]
15	-	-	Apartment #227 [Loadcenter "B2"]
16	125	2	Apartment #229 [Loadcenter "B2"]
17	-	-	Apartment #229 [Loadcenter "B2"]
18	-	-	Apartment #229 [Loadcenter "B2"]
19	125	2	Apartment #231 [Loadcenter "C"]
20	-	-	Apartment #231 [Loadcenter "C"]
21	-	-	Apartment #231 [Loadcenter "C"]
22	125	2	Apartment #233 [Loadcenter "E"]
23	-	-	Apartment #233 [Loadcenter "E"]
24	-	-	Apartment #233 [Loadcenter "E"]
25	125	2	Apartment #235 [Loadcenter "F"]
26	-	-	Apartment #235 [Loadcenter "F"]
27	-	-	Apartment #235 [Loadcenter "F"]
28	-	-	Provisions
29	-	-	Provisions
30	-	-	Provisions
31	-	-	Provisions
32	-	-	Provisions
33	125	2	Apartment #218 [Loadcenter "B1"]
34	-	-	Apartment #218 [Loadcenter "B1"]
35	-	-	Apartment #218 [Loadcenter "B1"]
36	125	2	Apartment #220 [Loadcenter "B1"]
37	-	-	Apartment #220 [Loadcenter "B1"]
38	-	-	Apartment #220 [Loadcenter "B1"]
39	125	2	Apartment #222 [Loadcenter "B1"]
40	-	-	Apartment #222 [Loadcenter "B1"]
41	-	-	Apartment #222 [Loadcenter "B1"]
42	125	2	Apartment #224 [Loadcenter "B1"]
43	-	-	Apartment #224 [Loadcenter "B1"]
44	-	-	Apartment #224 [Loadcenter "B1"]
45	125	2	Apartment #226 [Loadcenter "B1"]
46	-	-	Apartment #226 [Loadcenter "B1"]
47	-	-	Apartment #226 [Loadcenter "B1"]
48	125	2	Apartment #228 [Loadcenter "A"]
49	-	-	Apartment #228 [Loadcenter "A"]
50	-	-	Apartment #228 [Loadcenter "A"]
51	125	2	Apartment #230 [Loadcenter "C"]
52	-	-	Apartment #230 [Loadcenter "C"]
53	-	-	Apartment #230 [Loadcenter "C"]
54	125	2	Apartment #232 [Loadcenter "D"]
55	-	-	Apartment #232 [Loadcenter "D"]
56	-	-	Apartment #232 [Loadcenter "D"]
57	125	2	Apartment #234 [Loadcenter "G"]
58	-	-	Apartment #234 [Loadcenter "G"]
59	-	-	Apartment #234 [Loadcenter "G"]
60	-	-	Provisions
61	-	-	Provisions
62	-	-	Provisions

Multi-Meter Distribution Panel "MMDP3A", 120/208 Volts, Three-Phase, Four-Wire, Solid Neutral, 600A MCB, \*\*\*\*\* A.I.C. (\*\*\*\* SCA Available), Surface-Mounted, Ground Bus, Door & Lock, SPD.

CKT NO.	AMPS	PL	REMARKS
1	125	2	Apartment #301 [Loadcenter "A"]
2	-	-	Apartment #301 [Loadcenter "A"]
3	-	-	Apartment #301 [Loadcenter "A"]
4	125	2	Apartment #303 [Loadcenter "A"]
5	-	-	Apartment #303 [Loadcenter "A"]
6	-	-	Apartment #303 [Loadcenter "A"]
7	125	2	Apartment #305 [Loadcenter "A"]
8	-	-	Apartment #305 [Loadcenter "A"]
9	-	-	Apartment #305 [Loadcenter "A"]
10	125	2	Apartment #307 [Loadcenter "A"]
11	-	-</	



DIVISION 26 00 00 - ELECTRICAL

1.1 BASIC ELECTRICAL REQUIREMENTS

- A. The specifications for the project electrical work are included in Divisions 26 00 00, 27 00 00, and 28 00 00. The separation of the project electrical specifications into such divisions is for the sole purpose of convenience. The specifications of any of these divisions shall hold for all such divisions the same as if they were stated in each division.
- B. The word "shall", where used, is to characterize mandatory requirements, and the word "should", where used, is to characterize advisories. The word "may" is used in the permissive sense.
- C. Unless noted otherwise, the word "provide" shall be interpreted to mean "furnish, install, and connect as required to be complete and ready for the intended use" when referencing connectible items, equipment, and/or materials which are associated with the electrical work; shall be interpreted to mean "furnish and install as required to be complete and ready for the intended use" when referencing unconnectible items, equipment, and/or materials which are associated with the electrical work; and shall be interpreted to mean "furnish as required to be complete and ready for the intended use" when referencing electrical work which is neither installable nor connectible.
- D. Consult the General Conditions and the supplementary conditions, and all other sections of the project drawings and specifications, in detail for instructions pertaining to this work.
- E. Give written notice to the architect of all materials and/or apparatuses which are believed to be inadequate or unsuitable, and/or believed to be in violation of codes, laws, ordinances, and/or rules, and of all required items of work which are omitted. In the absence of such written notice, provide all such materials and apparatuses, and be responsible for the approved satisfactory functioning of the entire electrical system, without additional compensation.
- F. The locations of existing electrical work which is involved with the scope of this work, where and as indicated on the drawings and/or referenced herein are offered only as a general guide, with no guarantee as to accuracy. Examine the site and verify the locations of all existing electrical work, and the relationship of such electrical work to the project work, and base the contract proposal on all conditions which will be encountered during the progress of the work. Verify all parameters and requirements in advance.
- G. Cooperate fully with all other trades, where and as required, so as not adversely to impact the project construction schedule or the work of such other trades. Verify all parameters and requirements in advance.
- H. Unless explicitly indicated otherwise, provide all materials, devices, equipment, equipment supports, controls, appurtenances, etc. which are referenced in these specifications, shown on the drawings, and/or required to make complete and satisfactory installations, in working order.

- I. Before submitting the project proposal, ask the architect for a decision concerning all places where drawings, specifications, standards, and/or codes conflict, or are not clearly understood. In the absence of obtaining such decisions, abide by the decisions of the architect if the necessity for such decisions arises after the signing of the project construction contract.
- J. Visit the project site, determine the existing conditions, and allow for such conditions in the project proposal.
- K. Coordinate the locations of the electrical work with the work of all other trades.
- L. The general arrangement of the work is indicated on the drawings. Due to the small scale of the drawings, not all required offsets, fittings, conduit bodies, boxes, etc. are indicated. Provide offsets, fittings, conduit bodies, boxes, etc. where and as needed, in accordance with codes and accepted practices.
- M. Verify measurements for accuracy before ordering any materials or doing any work.
- N. Provide all flashing which is required for the electrical work. Flashing shall meet the architect's approval; verify in advance.
- O. Provide all labor, material, equipment, and services which are required to provide the complete electrical system where and as shown on the accompanying drawings and specified herein, unless explicitly expressed otherwise.
- P. Provide and maintain a complete grounding system.
- Q. Connect all electrical equipment, including that which is furnished by others.
- R. Disconnect and remove all existing electrical equipment which is not intended to remain and be reused.
- S. Disconnect, relocate, and reconnect existing electrical equipment, where and as required.
- T. Refeed, with homeruns where necessary, all existing electrical equipment which is intended to remain and be reused, but becomes de-energized by the removal of other existing electrical equipment on the respective circuit(s).
- U. Connect all electrical equipment in strict accordance with the instructions of the respective manufacturers; verify in advance.
- V. Perform all electrical work in strict accordance with local and state ordinances governing this class of work, and with the National Electrical Code.
- W. The specifications are intended to describe complete and workable systems of various sorts. Report all discrepancies and/or omissions preventing such utility prior to making the contract proposal.

- X. Due to the equipment which will be installed for this project by other trades, coordination is required. Reference the architectural and mechanical drawings and specifications for layouts and descriptions of equipment which shall be connected.
- Y. Note carefully that the electrical drawings are intended to indicate, only diagrammatically, the extent, the general character, and the respective locations of the work which is included. Provide all work which is obviously intended, but for which minor details are not shown, so as to be complete where and as required to perform the functions that are intended. Follow the architectural and/or structural drawings and specifications for building details and fit the work of the electrical drawings and specifications thereto.
- Z. Furnished materials shall be new and listed by UNDERWRITERS' LABORATORIES as conforming to their standards for the respective applications. All work shall be installed in a well-executed manner and shall present a neat appearance when completed.
- AA. Base the project proposal on the equipment and materials which are specified herein and/or on the drawings. Reference to a specific manufacturer or trade name is not intended to indicate a preference for a specific manufacturer but to indicate a standard of quality. Substitute equipment which meets the architect's approval as being "equivalent" for the respective application, may be provided.
- BB. Provide proper grounding of the construction power system, and provide proper lighting if, where, and as required during construction. Provide adequate construction power and lighting where and as required by all trades.
- CC. Keep the work as installed in repair and perfect working order for one (1) year from the date of notice of final acceptance. Such guarantee shall be based on defective materials, installation, and connection. Provide, free of additional cost to the owner, all materials and labor which are required to comply with such guarantee. In all cases where equipment has a factory warranty exceeding one (1) year, such full warranty shall apply.
- DD. Obtain and pay for all required permits, pay all required legal fees and charges, and comply with all state and municipal building and safety laws, ordinances, and regulations relating to building and public health and safety, and with the National Electrical Code.
- EE. Notify the architect well in advance of permanently concealing any of the project work.
- FF. Coordinate fully with Entergy, the local power company, and give Entergy all required information.
- GG. For the purpose of coordination with Entergy, contact Entergy directly; call 1-800-ENTERGY.
- HH. As soon as this contract is let, make arrangements with the local inspection department to have an inspector make periodic inspections of the electrical work as the project progresses. The work shall be inspected before being permanently concealed. Furnish final inspection certificates from the local inspection department to the architect. Include in the contract proposal all costs to comply with the above requirements.

- II. Follow, as minimum project standards, the established standards of the following organizations, and the individual standards which are named, the same as if they were fully written herein, except where otherwise explicitly specified (in all places in the project construction/bid documents where standards and codes are referenced, the reference is to the respective latest editions of such standards and codes; provide higher grades of materials and workmanship which are specified herein or indicated on the drawings):
1. The Institute of Electrical and Electronic Engineers (IEEE);
  2. The National Fire Protection Association "National Electrical Code" (NFPA No. 70) and "Life Safety Code" (NFPA No. 101);
  3. The National Electrical Manufacturers Association (NEMA);
  4. The Edison Electric Institute (EEI);
  5. The Insulated Power Cable Engineers Association (IPCEA);
  6. The American National Standards Institute (ANSI);
  7. The American Society for Testing Materials (ASTM);
  8. The National Electrical Safety Code (Handbook H30);
  9. The Safety Rules for the Installation and Maintenance of Electrical Supply and Communications Lines (Handbook 81) of the National Bureau of Standards, Washington, D.C.;
  10. All National Fire Protection Association related standards; and
  11. The applicable Entergy rules and regulations.
- JJ. Submit to the architect for review an electronic copy of detailed drawings showing construction details and dimensions, and in the case of lighting fixtures photometric data, of all items, equipment, and/or materials which are being provided, before they are ordered. Drawings for motor starters and safety switches which do not designate the respective motors and/or equipment, will not be reviewed and will be considered informal.
- KK. With the first set of such detailed drawings (i.e., the project electrical-equipment shop drawings) which are submitted for review, submit for review a scaled drawing of each electrical-equipment space illustrating the exact proposed equipment layout using the dimensions of all remaining-existing, electrical equipment, and the dimensions of all new equipment which is actually being provided, and obtain the approval for such layouts from the architect before ordering the project equipment. In laying out such spaces, strictly conform to the requirements of all applicable codes and governing authorities, particularly to the requirements for working space, clearances, guarding, and warning signs of Article 110 of the National Electrical Code. It shall be this contractor's responsibility to produce and submit such accurate, scaled drawings to the architect in a timely manner, i.e., with the project electrical-equipment shop drawings. If this contractor does not submit such accurate, scaled drawings in a timely manner, i.e., with the project electrical-equipment shop drawings, this contractor shall accept all responsibility for all lack of adequate physical space and clearances, and shall bear the cost for all remedies, no matter how extensive and/or costly.
- LL. Deliver to the architect an electronic copy, and three (3) hard copies, of maintenance manuals, which shall include printed instructions relating to the operation, proper maintenance, and repair, and parts lists indicating the various parts by name, number, and diagram, for each piece of equipment that is being provided. Neatly bind such

documentation in hard-covered binders and deliver it to the architect before the acceptance of the project.

- MM. Request and obtain from the architect one (1) set of the project electrical drawings and keep such set of drawings on the project site. Show on such drawings all changes in the project work which are caused by any factors whatsoever. At the end of the project, submit such corrected set of drawings to the architect prior to receiving the final project payment.
- NN. Advise the general contractor, both before the contract proposal is made and during construction, which electrical items, equipment, and materials shall be painted in strict accordance with the architectural painting specifications.
- OO. Remove all debris and clean all electrical work prior to project completion.
- PP. Before preparing and submitting the project shop drawings, coordinate fully with the general contractor, and with all applicable subcontractors, as required to ascertain whether or not, based on the project design as depicted on the project drawings and/or in the project specifications, there would be above-ceiling-construction conflicts (particularly as related to the architectural, structural, mechanical, electrical, etc. portions of the work, but not limited thereto); bring all such conflicts to the immediate attention of the architect; and propose, to the architect for approval, practicable remedies for all such conflicts. Then, in advance of the commencement of any project construction, prepare, submit, and obtain the review comments for, all equipment shop drawings, based on such approved remedies.

## 1.2 MOTOR STARTERS, VARIABLE-FREQUENCY DRIVES (VFD'S), AND PUSHBUTTONS

- A. Install and connect starters and/or VFD's (as applicable) for all motors, and contactors for all equipment, except for motors and equipment having integral, factory-mounted starters, VFD's, and/or contactors (as applicable). In such case, connect the starters, VFD's, and/or contactors.
- B. Furnish starters and/or VFD's (where and as applicable) for all motors, and contactors for all equipment, except for motor starters, VFD's, and/or equipment contactors (where and as applicable) which are expressly specified as being furnished by others.
- C. For all motor starters, VFD's, and/or equipment contactors (where and as applicable) which are required to be furnished, obtain from the mechanical contractor, the control contractor, and/or any other entity that is furnishing the respective motors and/or equipment, the exact electrical characteristics of, and the exact electrical requirements for, such motors and/or equipment, and provide starters, VFD's, and/or contactors (where and as applicable) therefor which are completely compatible with the respective motors and/or equipment, and which are approved for the respective applications. Furnish starters, VFD's, and/or contactors (where and as applicable) having respectively, among other characteristics, the proper NEMA sizes; the proper NEMA-enclosure types; the proper voltage-and-current ratings; the proper numbers of poles; the proper coil arrangements and coil-voltage ratings; the proper numbers and types of auxiliary contacts; the proper control devices for the control schemes that are designed and intended; the proper pilot devices; and the properly-sized overload devices.

- D. Magnetic motor starters and VFD's for motors which are rated 25HP and above shall have undervoltage, overvoltage, and phase-failure protection.
- E. Install and connect pushbuttons and pushbutton stations where and as shown on the drawings, and where and as required (verify in advance).
- F. Furnish all required pushbuttons and pushbutton stations, except for pushbuttons and pushbutton stations which are expressly specified as being furnished by others. Pushbuttons and pushbutton stations shall be completely compatible with the respective devices which they control, and shall be approved for the respective applications. Pushbuttons and pushbutton stations shall have the numbers of contacts of the proper ratings and configurations, and shall have the proper enclosures, as required for the respective applications.

### 1.3 MOTOR WIRING

- A. Provide electrical connections to all motors, pushbutton stations, starters, contactors, and starting switches.
- B. Provide conduit connections to motors using flexible (liquidtight where installed outdoors and/or where exposed to moisture) metallic conduit which is not less than 12" long nor more than 36" long.
- C. Provide a safety switch adjacent to, and within sight from, each motor, unless the respective branch-circuit protective device is within fifty (50) feet of, and within sight from, a particular motor and the respective motor starter contains correctly-sized and correctly-rated overload devices protecting all phase conductors. Each such safety switch shall be fused, unless the respective motor starter has correctly-sized and correctly-rated overload devices protecting all phase conductors; in such case the respective safety switch may be the "non-fusible" type.
- D. Provide all wiring to and for all motors, including the feeders to the line side of all starters and contactors, and from the load side of all starters and contactors to the respective motors.
- E. Do not test equipment motors for rotation except in the presence, and under the direction, of qualified representatives of the respective equipment suppliers and/or installers.

### 1.4 CIRCUITING AND GROUPING OF CIRCUITS

- A. The electrical cables two (2) or three (3) 15-amp and/or 20-amp, single-pole circuits which emanate from a common three-phase, four-wire panelboard may be grouped into common raceways, boxes, etc.
- B. The electrical cables for two (2) 15-amp and/or 20-amp, single-pole circuits which emanate from a common single-phase, three-wire load center may be grouped into common raceways, boxes, etc.

- C. Except for the electrical cables for 15-amp, single-pole circuits and for 20-amp, single-pole circuits, group, as a maximum, into common raceways, boxes, etc. the electrical cables for individual circuits as indicated on the drawings.
- D. Unless approved in writing and in advance by the architect, do not install the electrical cables for additional circuits (power, lighting, control, or otherwise) into the above-mentioned, common raceways, boxes, etc.
- E. Where, for any reason, the inclusion of additional electrical cables into such common raceways, boxes, etc. is unavoidable, submit in writing to the architect for review a request indicating exactly which raceways, boxes, electrical cables, circuits, etc. would be involved, and the exact proposed sizes and ratings of all items which would be involved.
- F. Except where the number of electrical cables is indicated on the drawings (e.g., for feeders), determine and provide the number of electrical cables which is required for each individual circuit according to all applicable codes and governing authorities, according to the instructions of the manufacturers of the respective electrical equipment that is being fed, and according to good practice.
- G. Provide a separate-and-distinct neutral conductor for each project circuit which requires a neutral conductor, whether such circuit is a "single-pole" circuit or a "multi-wire" circuit. As a clarification, do not provide any "common neutrals" for this project (a "common neutral" conductor is defined as a neutral conductor which is associated with more than one [1] circuit).
- H. Provide an insulated equipment-grounding conductor in each raceway, box, wireway, etc., whether so indicated on the drawings and/or elsewhere in these specifications or not. Such equipment-grounding conductors shall be sized respectively in accordance with Section 250-122 of the National Electrical Code.

#### 1.5 BALANCING THE SYSTEM

- A. Balance the electrical loads to +/- 10% across the incoming phase conductors at each panelboard which is involved in any way with this project, whether new or remaining-existing, and at each load center, and submit to the architect a tabulation of such balancing.

#### 1.6 TORQUING

- A. Torque all project lugs in strict accordance with the respective manufacturers' instructions, with all UNDERWRITERS' LABORATORIES' standards, and with the National Electrical Code, once at connection, and again just prior to project completion.

#### 1.7 TESTING

- A. After the electrical work is complete and at the time that the architect directs, conduct an operating test of each electrical item, equipment, and material for approval. Provide all instruments and personnel which are required for such tests.

1.8 CUTTING AND PATCHING

- A. Cut, patch, and paint where required. Obtain the approval of the architect for the cutting of any structural beams or joists. Patching and painting shall be done by the various crafts whose work is respectively involved.

1.9 SAFETY PRECAUTIONS

- A. Provide proper guards for the prevention of accidents. Provide and maintain all other construction which is required to secure safety of life and property, including maintaining sufficient lights where and as required to secure such protection.

1.10 SUPERVISION

- A. Constantly supervise the project work from beginning to completion. Furnish all information and personnel which are required to assist the architect in inspecting the work.

1.11 SLEEVES, THIMBLES, INSERTS, CLAMPS, HANGERS, AND OPENINGS

- A. Provide all sleeves, thimbles, and openings through floors and/or walls which are required for the passage of raceways.
- B. Sleeves and thimbles shall be constructed of Schedule 40 galvanized-steel pipe which is rigidly supported and suitably packed. After the installation of the raceways and/or cables through such sleeves, thimbles, and/or openings, thoroughly and completely seal such sleeves, thimbles, and/or openings so as to be watertight and firestopped. Seal all unused sleeves, thimbles, and/or openings so as to be watertight and firestopped.
- C. Provide inserts, clamps, and hangers where and as required to support all electrical items, equipment, and/or materials. Fasten hangers and clamps to joists and/or beams and not directly to slabs, roof decks, duct work, piping, or conduit.
- D. Provide all required roof penetrations in strict accordance with architectural details and instructions from the architect. Verify all parameters and requirements in advance, and provide accordingly.

1.12 SPECIAL NOTE--CONTRACTOR'S ATTENTION

- A. The horsepowers of motors and the load ratings of equipment which are indicated on the drawings or in the specifications are the estimated horsepowers and load-rating requirements of equipment which is being furnished under other project divisions. Provide raceways, electrical cables, circuit breakers, safety switches, and fuses (also contactors, motor starters, VFD's, etc., where and as applicable) of the respective sizes, ratings, and capacities which are required to suit the horsepowers of the motors and the load ratings of the equipment that are actually being furnished under such various project divisions. However, in no case provide raceways, electrical cables, and safety switches (also contactors, motor starters, VFD's, etc., where and as applicable) having smaller capacities or sizes than those which are respectively indicated on the drawings or in the specifications. Coordinate the requirements of the various divisions of the project

drawings and specifications, and provide suitable equipment and electrical facilities therefor, in order that the above requirements will be met, without additional cost to the owner. Note carefully all other divisions of the project drawings and specifications which describe electrical work which shall be provided in order to fully understand the total extent of the required electrical work.

#### 1.13 TEMPORARY ELECTRICAL SERVICE

- A. Provide temporary electrical service for construction power, in strict accordance with the National Electrical Code, all local codes, and all requirements and recommendations of the local power company, and disconnect and remove same before the completion of the project.
- B. Electrical energy for temporary construction power may be obtained from the existing electrical system at the facility. Make all required, advanced arrangements with the owner. Obtain advanced and written approval from the owner for each required power shutdown, and for its maximum possible duration.

#### 1.14 SAFETY SWITCHES

- A. Safety switches shall be heavy-duty, fusible (except as specified otherwise herein above), quick-make, quick-break, with cover interlock and, where installed outdoors, shall be U.L.-listed as raintight. The handle for each safety switch shall be lockable in the "open" position and in the "closed" position with up to three (3) padlocks. Fusible safety switches shall include rejection clips which will accept current-limiting fuses and reject all others.
- B. Safety switches shall be manufactured by SQUARE "D", GENERAL ELECTRIC, SIEMENS, or CUTLER-HAMMER, or shall be approved equivalent.

#### 1.15 FUSES

- A. Each fuse shall be the current-limiting type, shall be Class "RK1", shall have a minimum U.L.-listed interrupting rating of 200,000 amps, shall provide fast-acting protection against short-circuit currents but time-delayed protection against motor overloads, and shall have a barrel which are yellow in color.
- B. Unless indicated otherwise, the continuous-current rating of each fuse which is provided for a distribution circuit shall be in accordance with the National Electrical Code current-carrying capacity of the conductors of the respective circuit.
- C. Unless indicated otherwise, the continuous-current rating of each fuse which is provided for a motor circuit shall be in accordance with the nameplate of the respective equipment. The exact fuse which is provided for each application involving a motor circuit shall be as determined by the manufacturer of the motor that is being protected, and by the manufacturer of the fuse that is being provided, so that no possibility for a single-phasing condition will exist.

- D. Install each fuse so that its continuous-current rating is readily visible without the need to be removed. As a clarification, on each project punch list, a monetary value will be assigned to each fuse which is not so installed.
- E. Deliver to the owner six (6) spare fuses of each different type and size fuse which is being furnished for the project, and obtain a signed receipt from the owner.

#### 1.16 PROJECT CONDUCTOR AND LUG/TERMINATION TEMPERATURE RATINGS

- A. Ensure that all project conductors and all project lugs/terminations are compatible, as per NEC 110-14(C) and 110-40, as applicable.

#### 1.17 IDENTIFICATION AND DIRECTORIES

- A. Provide at and for each new panelboard, transformer, unit motor starter, safety switch, pushbutton station, and motor starter switch a laminated plastic nameplate which is engraved with the appropriate device designation. Provide at and for each new distribution panelboard an engraved laminated plastic nameplate which respectively identifies each branch/feeder circuit.
- B. Provide at and for each panelboard, other than distribution panelboards, and at each load center, a typewritten directory which accurately identifies all respective branch circuits.

#### 1.18 ELEVATOR:

- A. Whether indicated on the drawings or not, provide for the new elevator the required, fused, elevator control switch, which is sized and rated as necessary for the equipment and as required to coordinate with the upstream feeder protective device (verify all parameters and requirements in advance, and provide accordingly), and which is located in the same room as, and near, the new elevator-control equipment, and provide the new, elevator, main-line-power feeder to such elevator control switch. Extend such main-line-power feeder from such elevator control switch to the new elevator-control equipment and make the required connections, etc.
- B. Such fused elevator control switch (disconnecting means) which is provided for elevator-controller main-line power shall be equipped with a set of auxiliary contacts (which will disconnect all additional power sources from the respective loads when the disconnecting means is in the "open" position) wired to terminal blocks; with a micro switch mounted on the main switch which is field-wired in parallel with the alarm contact on the voltage-monitoring relay; with a shunt-trip device and mechanism; with a fire-safety-interface control relay having the proper coil voltage which is required for the respective application (verify in advance and provide accordingly); with shunt-trip-control-circuit monitoring and annunciation; with the proper (for the exact application) fire-alarm-voltage-monitoring relay; with a "key-to-test" switch for performing functional tests of the operation of the shunt-trip device and mechanism; with a pilot light which signals that the switch is "on"; with a neutral lug; and with the associated, properly-sized raceway and electrical cables (verify all parameters and requirements with the elevator supplier in advance, and provide accordingly) that are routed to the new elevator controller [as per ANSI/NFPA70 1996, Section 620/91(c)]. Such set of auxiliary contacts shall be positively open when the main disconnecting means is open. Such set of auxiliary

contacts shall cause the Emergency Return Unit (ERU) power source of the new elevator equipment to be disconnected from its load when such disconnecting means is in the "open" position. The size and rating of such contacts shall be as required to suit the power characteristics of the new elevator (verify all parameters and requirements with the elevator supplier in advance, and provide accordingly). Such fused elevator control switch shall be an all-in-one solution for meeting the various codes which are associated with elevator shutdown and monitoring, shall be lockable in the "open" position and externally operable, and shall have a short-circuit-current rating of 200,000 RMS amps. Such fusible elevator control switch shall be in strict accordance with NFPA 70, NFPA 72, ANSI/ASME A17.1, NFPA 13, UL 98, and UL 50. Such fusible elevator control switch shall be EATON Type "ES", LITTLEFUSE LPS Series, or approved equivalent by SQUARE "D", GENERAL ELECTRIC, or SIEMENS.

- C. Whether indicated on the drawings or not, provide near the new elevator-control equipment a 20-amp, 125-volt, ground-fault-interrupter-type, duplex receptacle which is fed from a separate, dedicated circuit, and provide in the new elevator pit a 20-amp, 125-volt, ground-fault-interrupter-type, duplex receptacle which is fed from a separate, dedicated circuit.
- D. Whether indicated on the drawings or not, provide for the new elevator equipment the respectively properly-sized and properly-rated, shunt-trip-type, feeder (branch-circuit) circuit breaker (that is equipped with the set of N.C. dry contacts which is required by the elevator equipment supplier; verify all requirements and parameters in advance and provide accordingly) that is required to feed the new elevator controller and to furnish the required, short-circuit and ground-fault protection, and connect such shunt-trip-type, feeder circuit breaker as required to trip upon the activation of any of the appropriate, fire-alarm-system, heat detectors which are located in the new elevator shaft or in the respective elevator controller/machine room.
- E. Whether indicated on the drawings or not, provide for the new elevator the required, fused, safety switch which is sized and rated as necessary for the respective equipment (verify all parameters and requirements in advance, and provide accordingly) and which is located in the same room as, and near, the new elevator-control equipment, and provide the new, elevator, lighting-and-signal-power feeder to such safety switch. Extend such lighting-and-signal-power feeder from such safety switch to the new elevator-control equipment and make the required connections, etc.
- F. Whether indicated on the project drawings or not, provide for the new elevator equipment the properly-sized and properly-rated, circuit breaker (verify all requirements and parameters in advance and provide accordingly) which is required to feed incoming, lighting-and-signal power to the new elevator controller.
- G. Each such heat detector which will automatically disconnect the main-line power supply to the new elevator controller prior to the application of water from sprinklers shall be provided with a set of normally-closed contacts and with wiring from the sensing device, through the project fire-alarm system or dedicated function fire alarm control unit (as applicable), to the new elevator controller, as designated by the elevator supplier (verify all parameters and requirements in advance). Such set of contacts shall be "closed" when the respective heat detector is not activated and shall be "open" when the respective heat detector is activated.

- H. Provide all required rough-ins in strict accordance with the equipment manufacturer's drawings, requirements, and recommendations (verify all parameters and requirements with the elevator supplier in advance, and provide accordingly).
- I. As a clarification, the project elevator-design requirements are based on a certain manufacture and type of elevator being provided. To the extent that alternate (substitute) elevator equipment is provided for the project, provide all electrical work and construction, and all electrical engineering and design services, which are required therefor, at no additional cost to the owner or to the architect. Verify all parameters and requirements in advance, and provide accordingly.

#### 1.19 PROJECT ELECTRICAL WORK, EQUIPMENT, ETC. FOR THE SWIMMING-POOL AREA

- A. Whether indicated on the drawings, or specified herein, or not all project electrical work, equipment, etc. which is involved in any way with the swimming-pool area shall be in strict accordance with:
  - 1. All relevant requirements of NFPA 70: National Electrical Code, particularly Article 680; and
  - 2. The requirements of all other applicable codes, standards, and governing authorities.
- B. Verify all parameters and requirements in advance, and provide accordingly.

#### 1.20 RACEWAYS AND ELECTRICAL CABLES

- A. Electrical cables shall be installed in raceways which are concealed to the full extent which is practicable (verify in advance).
- B. Raceways which are completely concealed within walls or above ceilings shall be electrical metallic tubing (EMT), or metal-clad cable may be provided, except in locations where any governing authority or the National Electrical Code does not permit their use. In such locations, rigid metallic conduit shall be provided.
- C. In locations where metal-clad cable is provided, only as allowed herein above, such metal-clad cable shall be neatly installed, shall be adequately supported, and shall be routed so as to be parallel or perpendicular (as respectively applicable) to building and structural lines, and all excess lengths of metal-clad cable shall be removed. The "coiling" and retention of excess lengths of metal-clad cable, even where totally concealed, is unacceptable and shall not be done.
- D. Exposed raceways in unfinished interior areas shall be EMT, unless prohibited by any governing authority or the National Electrical Code, or unless subject to mechanical abuse. In such cases, rigid metallic conduit shall be provided.
- E. Exposed raceways in finished interior areas shall be WIREMOLD, WALKERDUCT, or PORTER surface-type, metallic raceways. Notify the architect before installing any exposed raceways in finished interior areas so that possible alternate routings using concealed raceways might be found. As a clarification, the architect and the owner will not entertain the provision of exposed raceways in finished areas unless such provision is

justified (as determined by the architect) as a result of unusual existing conditions. Be advised of the owner's strong desire for no exposed raceways to be provided in finished areas.

- F. Above-grade, exterior raceways shall be rigid metallic conduit.
- G. Install exposed raceways so as to be parallel or perpendicular to building or structural lines.
- H. EMT and metallic conduit shall be aluminum or galvanized steel, except that metallic conduit which is installed in concrete shall not be aluminum.
- I. EMT connectors and couplings shall be the "compression-type". "Set-screw-type" connectors and couplings are unacceptable and shall not be provided.
- J. Support raceways by pipe straps, conduit clamps, hangers, or other approved fastening devices. Do not provide tie wires for such application.
- K. Provide an approved expansion fitting wherever a raceway crosses an expansion joint.
- L. Keep raceways at least 12" from parallel runs, and at least 6" from perpendicular runs, of hot-water pipes.
- M. In runs of flexible metallic conduit, where 90-degree bends of less than 6" radius are unavoidable, use 90-degree fittings or connectors, as required. Do not install flexible metallic conduit for 90-degree bends of less than 6" radius.
- N. Raceways serving roof-mounted equipment shall penetrate the roof inside of the respective equipment curbs, to the full extent which is practicable (verify in advance); otherwise the penetrations shall be within 18" of the respective equipment. External penetrations shall be sheathed through the roof allowing conduits to have free movement. Each conduit shall have a weathercone. The sleeve shall be sealed with a watertight compound.
- O. Provide pull boxes where and as required. Each pull box shall be of code-gauge steel or aluminum, and shall have a removable access panel in its side, top, or bottom, as required.
- P. Do not install horizontal runs of raceways in slabs, unless special permission for each such run is obtained from the architect in advance.
- Q. Where vertical raceway runs interrupt more than 12" of structural concrete in any direction, reinforce the concrete in accordance with typical reinforcing details.
- R. Provide an insulated equipment-grounding conductor in each raceway system, wireway, etc., whether so indicated on the drawings and/or elsewhere in these specifications or not. Such grounding conductors shall be sized respectively in accordance with Section 250-122 of the National Electrical Code (verify in advance and provide accordingly).

- S. Conductors shall be of soft-drawn copper having the ampacity of at least ninety-eight percent (98%) of that of pure copper, except that aluminum conductors (other than conductors for the main, incoming-power, transformer-secondary, low-voltage, service-lateral, service feeder, which shall be copper) may be provided for electrical feeders for which copper conductors would be sized #1/0AWG or larger; such substitution shall not be made relative to grounding and/or bonding conductors, which shall all be copper. However, in order to make such substitution from copper conductors to aluminum conductors:
1. Provide aluminum conductors which are of AA-8000 Series, electrical-grade, aluminum-alloy, conductor material;
  2. Provide connectors for the respective connections which are U.L. listed and NEC-approved for the exact applications, and which are similar to AL9CU connectors;
  3. Provide, at and for each conductor termination/connection, the proper conductor-termination compound, if recommended by the respective connector manufacturer (verify in advance and provide accordingly) as preliminary preparation of the conductor;
  4. Perform wire brushing at and for each conductor termination/connection if recommended by either the connector manufacturer or the cable manufacturer, or both (verify in advance and provide accordingly) as preliminary preparation of the conductor;
  5. Upsize the affected conductors from the sizes and ratings of the respective copper conductors which are indicated on the drawings to the appropriate, respective sizes and ratings which are required so as to render the same or greater respective ampacities (unless specifically indicated otherwise on the drawings or elsewhere herein, the following minimum aluminum conductor sizes shall be provided as substitutions for the respectively-indicated copper conductor sizes: #3/0 aluminum for #1/0 copper, #4/0 aluminum for #2/0 copper, 250KCM aluminum for #3/0 copper, 300KCM aluminum for #4/0 copper, 400KCM aluminum for 250KCM copper, 500KCM aluminum for 300KCM copper, 500KCM aluminum for 350KCM copper, 600KCM aluminum for 400KCM copper, and 750KCM aluminum for 500KCM copper);
  6. Provide respectively upsized raceways as required, in strict accordance with the requirements of all codes and governing authorities (verify all parameters and requirements in advance, and provide accordingly); and
  7. Be advised that the conductor sizes and ratings which are indicated on the drawings and/or referenced elsewhere in these specifications are based on the provision of copper conductors.
- T. Unless noted otherwise, the minimum conductor size shall be No. 12 AWG. 15-amp and 20-amp, 120-volt or 208-volt, circuit runs of from 75 feet to 199 feet in length, and 15-amp and 20-amp, 277-volt or 480-volt, circuit runs of from 175 feet to 449 feet in length, to the ends of the respective loads shall have conductors which are sized no smaller than No. 10 AWG; 15-amp and 20-amp, 120-volt or 208-volt, circuit runs of from 200 feet to 349 feet in length, and 15-amp and 20-amp, 277-volt or 480-volt, circuit runs of from 450 feet to 799 feet in length, to the ends of the respective loads shall have conductors which are sized no smaller than No. 8 AWG; and 15-amp and 20-amp, 120-volt or 208-volt, circuit runs that are longer than 349 feet in length, and 15-amp and 20-amp, 277-volt or 480-volt, circuit runs that are longer than 799 feet in length, to the ends of the respective

loads shall have conductors which are sized no smaller than No. 6 AWG. The conductor size shall be the same throughout each circuit.

- U. Unless noted otherwise, size all conductors in accordance with the ratings of the respective protective devices and in accordance with the requirements of Article 240-OVERCURRENT PROTECTION of the National Electrical Code.
- V. Provide variable-frequency-drive (VFD) electrical cables from each project VFD to the respective motor. Provide termination kits which are designed, manufactured, installed, and connected specifically for the exact, helical, copper-tape shields that are provided (verify in advance). Each VFD cable:
  - 1. Shall consist of three (3) conductors;
  - 2. Shall be rated 90 degrees C., wet or dry;
  - 3. Shall have stranded conductors which are insulated with heat-and moisture-resistant, cross-linked polyethylene
  - 4. Shall have phase-identified conductors;
  - 5. Shall have such insulated conductors cables together with suitable fillers and with three (3) symmetrical, bare-copper, equipment-grounding conductors;
  - 6. Shall have a 5-mil thick, helical, copper-tape shield and an overall, flame-and-sunlight-resistant, black, PVC jacket;
  - 7. Shall be code-approved and UL-listed specifically for VFD application; and
  - 8. Shall be in strict accordance with UL 1227, IEEE 383, IEEE 1202, ICEA T-29-520, and ICEA S-95-658/NEMA WC-70.
- W. Unless noted otherwise, electrical cables shall be the single-conductor type.
- X. Unless noted otherwise, electrical cables shall be Type "THHN/THWN" (75-degree C. rating).
- Y. Conductors which are sized No. 8 AWG or larger shall be stranded; conductors which are sized smaller than No. 8 AWG shall be solid, except that conductors which are provided purely for control work may be stranded.
- Z. Wiring which is installed in spaces that are being used, or will be used, as air plenums or for environmental air shall be in accordance with Section 300-22 of the National Electrical Code.
- AA. Color code electrical cables in strict accordance with the National Electrical Code. Unless required otherwise by any applicable code or governing authority, the insulation on electrical cables shall be color coded as follows:
  - 1. 277/480-Volt, Three-Phase, Four-Wire, Wye-Connected System:
    - a. Phase A - brown
    - b. Phase B - orange
    - c. Phase C - yellow
    - d. Neutral - white or grey
    - e. Equipment ground - green
  - 2. 120/208-Volt, Three-Phase, Four-Wire, Wye-Connected System:
    - a. Phase A - black
    - b. Phase B - red
    - c. Phase C - blue

- d. Neutral - white
  - e. Equipment ground - green
- BB. On each phase-conductor cable and on each neutral-conductor cable (not on equipment-grounding-conductor cables) in each outlet and junction box, and in each equipment enclosure, provide a permanent cable marker which indicates from which panelboard, switchboard, or motor control center, and from which pole number in such panelboard, switchboard, or motor control center, it is fed.
- CC. Remove and store, or abandon, as directed, existing electrical work which is not intended to remain and be reused. Do not reinstall removed, existing, electrical work unless so indicated on the drawings or specified herein, or unless such reinstatement is in accordance with the obvious intent of the drawings and/or the specifications. Provide blank covers for abandoned boxes.
- DD. Extend, alter, and reconnect existing raceways where and as shown, directed, and/or intended, or where impossible or impractical to do so, provide new, replacing raceways. Provide new homeruns where and as required to refeed remaining-existing equipment, devices, etc. (verify in advance and provide accordingly).

#### 1.21 OUTLET BOXES

- A. Provide all outlet boxes which are required for electrical devices and connections, whether so indicated on the drawings or not. Each outlet box shall be U.L. listed, and shall be suitable and approved for the exact applications for which it is provided.
- B. As per NFPA101:8.3.5.6.3, electrical outlet boxes which are located on opposite sides of any fire-rated wall shall be separated by not less than 24" horizontally, and the required openings shall not exceed a total of 100 square inches per 100 square feet of wall area.
- C. Each outlet box for a lighting fixture or for another type of ceiling outlet shall be galvanized steel. Each such outlet box which is provided for a lighting fixture shall have a 3/8" fixture stud protruding through, and fastened to, the back of the box.
- D. Each floor-mounted, outlet box shall be cast iron or PVC; shall be fully adjustable before and after the respective floor installation; shall be the flush type; shall be watertight; shall be appropriate for the depth of the respective floor; shall have a carpet flange, if required; and shall have the appropriate screw-type cover. The cover for each such outlet box shall be brass or aluminum, as respectively selected by the architect (verify in advance and provide accordingly). Where practicable, each such outlet box which is provided in a location that requires both (a) power connection(s) and communication wiring shall be the combination type with (a) divider(s) where and as necessary to separate the "electrical-power" section(s) from the "communication" section(s). "Pedestal-type" and "tombstone-type" floor outlet boxes are unacceptable and shall not be provided.
- E. Surface-mounted outlet boxes which are provided for weatherproof switches and receptacles shall be corrosion-resistant; cast iron or cast aluminum; and Type "FS" or "FD", as required for the respective application; verify in advance and provide accordingly.

- F. Covers for switches and receptacles in damp or wet locations shall be metallic, and shall be U.L. listed and code approved as being weatherproof. Weatherproof covers which are provided for receptacles in wet locations shall be weatherproof while the respective receptacles are in use.
- G. Each outlet box which is provided for exposed work in an unfinished interior area shall be corrosion-resistant; cast iron or cast aluminum; Type "FS" or "FD", as required for the respective application (verify in advance and provide accordingly); and of the proper number of gangs, with surface-wiring-type cover plates. "Flush-type" boxes (e.g., sheet metal boxes with knockouts, etc.) for such application are unacceptable, as are plaster rings with standard receptacle or switch plates.
- H. Each outlet box which is provided for exposed work in a finished interior area shall be the surface-type and metallic, of the proper number of gangs, with a surface-wiring-type cover plate. "Flush-type" boxes (e.g., sheet metal boxes with knockouts, etc.) for such application are unacceptable, as are plaster rings with standard receptacle or switch plates. Notify the architect before installing any surface-mounted outlet/junction boxes in finished interior areas so that possible alternate installations utilizing recessed outlet/junction boxes might be found. As a clarification, the architect and the owner will not entertain the provision of exposed outlet/junction boxes in finished interior areas unless such provision is justified (as determined in advance by the architect and the owner) as a result of unusual existing conditions, etc. Be advised of the owner's strong desire for no surface-mounted outlet/junction boxes to be provided in finished interior areas.

## 1.22 SWITCHES

- A. Switches shall be U.L. listed and approved for the respective applications for which they are provided and shall have minimum ratings which are equal to the ratings of the respective loads that they control.
- B. Switches shall have a minimum continuous-current rating of 20 amps.
- C. Each switch shall be industrial-specification grade with a nylon or urea housing and a steel mounting strap; switches which are equipped with plastic or nylon mounting straps are unacceptable and shall not be provided. Switches may be back wired and/or side wired (this contractor's option), but each back-wired switch shall utilize pressure connections which require the side screws to be tightened; wires that are held with "clip-type" mechanisms are unacceptable and shall not be provided. This contractor shall tighten the screws on all unused switch terminations so as to reduce the possibility of protruding screws faulting (shorting) to the respective outlet boxes.
- D. Switches which control motor circuits shall be motor-rated, shall have "on" pilot lights, and shall have minimum ratings that are equal to the ratings of the respective loads which they control.
- E. Install switches in suitable metallic boxes and, where they are installed adjacent to doors, locate them on the strike side of the respective doors, whether so indicated on the drawings or not. Install each switch, except for three-way and four-way switches, so that its "up" position closes, and its "down" position opens, the respective circuit.

- F. The colors of switches shall be as respectively selected by the architect.
- G. Switches which are installed adjacent to lighting dimmers shall match the appearance of such adjacent lighting dimmers (as approved in advance by the architect).

### 1.23 OCCUPANCY-SENSING CONTROLS

- A. Each occupancy-sensing control:
  - 1. Shall be approved for the respective exact application for which it is provided. Verify, in advance, all parameters and requirements which are associated with each occupancy-sensing-control application and provide the respectively-appropriate, occupancy-sensing controls (and associated relays, etc.) accordingly;
  - 2. Shall be the "line-voltage" type, complete with an integral line-voltage relay, having the voltage rating which is compatible with the voltage rating (i.e., 120 volts or 277 volts) of the respective circuit to which it is connected and having a continuous-current rating which is equal to, or greater than, the continuous-current rating of the respective branch-circuit protective device; or be the "low-voltage" type, complete with one (1) or more (as applicable) remote line-voltage relay(s), each having the number of poles which is required for the exact application, having the voltage rating which is compatible with the voltage rating (i.e., 120 volts or 277 volts) of the respective circuit(s) to which it is connected, and having a continuous-current rating which is equal to, or greater than, the continuous-current rating(s) of the respective branch-circuit protective device(s), as respectively required for the exact application; verify all parameters and requirements in advance and provide accordingly. For example:
    - a. Where a particular occupancy-sensing control is indicated on the drawings to control both (a) lighting circuit(s) and (an) exhaust-fan circuit(s), such occupancy-sensing control shall be equipped with one (1) or more (as required for the application) line-voltage relay(s), each having the proper number of poles, the proper voltage rating, and the proper continuous-current rating which are respectively-required for the application (verify all parameters and requirements in advance and provide accordingly); or
    - b. Where a particular occupancy-sensing control is indicated on the drawings to control both (a) "normal-power" lighting circuit(s) and (an) "emergency-power" lighting circuit(s), such occupancy-sensing control shall be equipped with two (2) or more (as required for the application) line-voltage relays, each having the proper number of poles, the proper voltage rating, and the proper continuous-current rating which are respectively-required for the application (verify all parameters and requirements in advance and provide accordingly);
  - 3. Shall render maximum immunity to false triggering;
  - 4. Shall be equipped with dual technology, i.e., infrared and ultrasonic technologies; each such technology shall have a separate-and-distinct, field-adjustable sensitivity and shall have the capability of being completely de-activated;
  - 5. Shall be equipped with dual LED motion indicators;
  - 6. Shall be equipped with a "field of view" (e.g., 90 degrees, 120 degrees, 180 degree, 270 degrees, 360 degrees, etc.) which is appropriate for the respective

- exact application for which it is provided; verify all parameters and requirements in advance and provide accordingly;
7. Shall have an occupancy-detection range which is appropriate for the respective application for which it is provided; verify all parameters and requirements in advance and provide accordingly;
  8. Shall be equipped for, and sensitive to, small ("hand-movement") motions;
  9. Shall have an easily-field-adjustable, "automatic-OFF", time delay of from 30 seconds to 20 minutes (minimum range). Factory-pre-set such time delay for the maximum (i.e., 20 minutes);
  10. Shall be equipped with a self-adjusting feature which will maintain optimum performance by automatically and immediately self adjusting its sensitivity and time delay as required to optimize performance and as required to minimize the need for "follow-up" adjustments;
  11. Shall be provided with all required junction/outlet boxes and cover plates, and with all required mounting, installation, and connection hardware; and
  12. Shall be manufactured by ACUITY, LEVITON, LUTRON, HUBBELL, G.E., ENERLITES, or WATT-STOPPER, or shall be approved equivalent.
- B. The quantities and locations which are respectively indicated on the drawings for the occupancy-sensing controls are the approximately-required quantities and locations, and are presented only as a general guide, with no guarantee as to accuracy. Employ and pay (if payment is necessary) a factory-trained representative of the manufacturer of the actual occupancy-sensing controls which are being provided (whether such controls are the ones specified or are substitute controls) to determine the proper quantity of, and the best respective locations for, the project occupancy-sensing controls, based on best operation and based on the owner's desired control operation; then provide the proper, respectively-required quantities of occupancy-sensing controls and locate them accordingly. Also, field adjust and field calibrate all possible settings of each installed occupancy-sensing control, as many times as necessary (without limit) until the termination of the project one-year warranty period, as required to render proper operation, as determined by the owner, based on the owner's desired control operation; verify all parameters and requirements in advance and provide accordingly.

#### 1.24 RECEPTACLES

- A. Rigidly fasten receptacles to their respective outlet boxes so that they do not depend on their respective cover plates for support.
- B. Install each vertically-mounted receptacle so that its "equipment-ground hole" is oriented downward (i.e., its blades are oriented upward) and install each horizontally-mounted receptacle so that its "equipment-ground hole" is oriented to the left (i.e., its blades are oriented to the right).
- C. Receptacles which are connected to 20-amp circuits shall be rated 20 amps.
- D. Each receptacle shall be industrial-specification grade with a nylon housing and a steel mounting strap; receptacles which are equipped with plastic or nylon mounting straps are unacceptable and shall not be provided. Receptacles may be back wired and/or side wired (this contractor's option), but each back-wired receptacle shall utilize pressure connections which require the side screws to be tightened; wires held with "clip-type"

mechanisms are unacceptable and shall not be provided. This contractor shall tighten the screws on all unused receptacle terminations so as to reduce the possibility of protruding screws faulting (shorting) to the respective outlet boxes. Provide receptacles with integral ground-fault protection for outdoor receptacles, for receptacles which are installed in wet locations, and for all other receptacles which are required by code to be the "ground-fault" type.

- E. Receptacles shall be in strict accordance with the requirements of all applicable articles, sections, and figures of the National Electrical Code Handbook, and in strict accordance with the applicable, ANSI/NEMA, receptacle-configuration standards.
- F. The colors of receptacles shall be as respectively selected by the architect.

#### 1.25 INTERIOR WIRING-DEVICE COVER PLATES

- A. Unless otherwise noted, interior, wiring-device, cover plates shall be flexible nylon or polycarbonate (and expressly not phenolic plastic), and shall be provided in proper gangs as required for the respective outlets.
- B. The colors of interior, wiring-device cover plates shall be as respectively selected by the architect.

#### 1.26 OUTLETS

- A. Provide outlets where and as shown on the drawings, and where and as required, and provide wiring for the controls which are respectively indicated and required. Accurately locate outlets. Unless specified herein or indicated on the drawings otherwise, locate outlets as follows (each dimension which is given is from finished floor to the centerline of the respective outlet, unless noted otherwise):
  - 1. Wall-mounted, cable-TV outlets, internet outlets, phone outlets, all-communication outlets (ACO's), switch outlets, dimmer outlets, and receptacle outlets which are located above counter tops: 6" above the respective counter-top back splashes;
  - 2. Wall-mounted, cable-TV outlets, internet outlets, phone outlets, ACO's), switch outlets, dimmer outlets, and receptacle outlets which are located above work tables: 6" above the respective working surfaces;
  - 3. Phone outlets and ACO's for wall telephones: 4'-0";
  - 4. All other wall-mounted, switch outlets, and dimmer outlets: 4'-0";
  - 5. All other wall-mounted, ACO's, cable-TV outlets, internet outlets, phone outlets, and receptacle outlets: 1'-6"; and
  - 6. Pushbutton and fire-alarm-pull-station outlets: 4'-0".
- B. The face of each recessed outlet box shall not be more than 1/8" from the respective finished face. Install each recessed outlet box at such a height so as to require the cutting of only one (1) course of brick, block, or tile. Have a mechanic at the project site at such times as necessary to locate outlet boxes in order to comply with such requirement.

1.27 CONCRETE

- A. Concrete for electrical work shall be ready-mix and shall develop a compressive strength of 3000 p.s.i. (minimum) within twenty-eight (28) days.
- B. Thoroughly compact concrete during and immediately after pouring, and thoroughly work concrete into the corners of the respective forms.
- C. Provide a 4" high, reinforced-concrete, housekeeping pad for each piece of floor-mounted, electrical equipment.

1.28 SEALING AND FIRESTOPPING

- A. Seal with an approved sealing compound all raceways which are required to be sealed.
- B. Provide firestopping in strict accordance with details which are furnished by an approved testing agency (U.L.) for all penetrations of vertical and horizontal fire-rated assemblies, as per Section 713 of the IBC. Request and obtain all such details in advance.
- C. Inspections for through-penetrations, membrane penetration firestops, fire-resistant joint systems and perimeter fire-barrier systems shall be in strict accordance with Section 1705.16 of the IBC. Employ and pay an approved inspection agency to inspect penetration firestop systems which are tested and listed in accordance with Sections 714.3.1.2 and 714.4.1.2 of the IBC, in accordance with ASTM E 2174, and to document all such compliance. Employ and pay an approved inspection agency to inspect fire-resistant joint systems which are tested and listed in accordance with Sections 715.3 and 715.4 of the IBC, in accordance with ASTM E 2393, and to document all such compliance. Submit compliance documentation, as well as the certification of such inspection agency's approval status, to the architect.
- D. As per NFPA101:8.3.5, penetrations through rated construction shall be sealed by approved firestop systems or devices which are tested in accordance with ASTM E-814 or ANSI/UL 1479, or by assemblies or firestopping materials that are capable of preventing the passage of flames and hot gasses when tested and rated in accordance with NFPA 251 (such requirement shall apply to electrical outlets, light switches, etc.). Detailed, instructive, cut sheets of the fire-penetration-sealing system which is being provided shall be furnished to the inspector at the time of the inspection. Random selective sampling shall be furnished by the contractor for observation by the inspector, upon the inspector's command.

1.29 GROUND RODS

- A. Ground rods shall be 3/4" diameter x 10'-0" long, copper-clad steel with braze, irreversible-crimp, or thermal-weld connectors for the connection of grounding cables.
- B. Bond all electrical-system-grounding and equipment-grounding means to all telecommunication-system equipment-grounding means, to all metallic piping, and to all metallic building structures. The electrical cables which are provided for all such bonding shall be sized the same as the project grounding-electrode cable.

1.30 CONNECTION OF COMPUTER (DATA) EQUIPMENT

- A. Connect all computer (data) equipment.
- B. The connection for power shall be in the form of a grounded receptacle. Provide matching plugs on equipment cords if, where, and as required.
- C. Each piece of equipment shall be fed from a circuit which includes an equipment-grounding cable.
- D. For each piece of equipment, provide an all-communication outlet (ACO), consisting of a single-gang outlet box (which is recessed to the full extent that is practicable) and a blank cover plate, and provide an empty raceway, which is similar to a 1" conduit, with pull wire, from each ACO to an accessible location above the ceiling of the respective building-floor level that has a contiguous, above-ceiling path to the main telecommunication backboard or to the nearest satellite, telecommunication backboard (as applicable; verify in advance), unless shown on the drawings otherwise. For more information, specifications, and requirements which are relative hereto, reference DIVISION 27 00 00 - COMMUNICATIONS.

1.31 DIMMERS

- A. Provide lighting dimmers where and as shown on the drawings, and where and as required, for the respective light control which is indicated.
- B. Dimmer installations shall include the appropriate outlet boxes and cover plates.
- C. Dimmers which are installed in gangs shall be installed, in strict accordance with instructions from the dimmer manufacturer, so that derating of the dimmers is not required.
- D. The colors of the handles of the dimmers, and the respective cover plates (faceplates), shall be as respectively selected by the architect; verify in advance and provide accordingly.
- E. LED dimmers shall be completely compatible with the corresponding dimming LED drivers in and for the respective lighting fixtures. Whether specifically stipulated in the lighting-fixture descriptions (or catalogue numbers) or not, provide the proper dimming LED drivers (of the proper manufacture) so that such compatibility is realized.
- F. Each LED dimmer which is provided for 0-10V dimming application:
  - 1. Shall be UL-listed for the exact application for which it is provided;
  - 2. Shall be equipped with a large paddle switch with a captive, linear-slide control, and shall be compatible with a standard, designer-opening, wall plate;
  - 3. Shall be completely compatible with all third-party, LED lighting fixtures (verify in advance);
  - 4. Shall be able to be connected for single-pole, 3-way, or 4-way application (as selected in the field, at the project site), and shall be connected for single-pole, 3-wire, or 4-way operation as required for the application for which it is provided, in strict accordance with the appropriate wiring diagrams which are furnished by

- the dimmer manufacturer directly to this contractor (request and obtain all required wiring diagrams in advance);
5. Shall have a rated operating voltage of from 120VAC to 277VAC;
  6. Shall be equipped with power-failure memory;
  7. Shall be able to be furnished with accompanying Claro switches and coordinating wall plates;
  8. Shall be equipped with field-adjustable, high-end and low-end, trim settings, for optimal performance;
  9. Shall be rated as required to control up to fifteen (15) LED drivers; and
  10. Shall be LUTRON Model Number DVSTV-XX or Model Number DVSTV-453PH-WH, or shall be LUTRON Model Number DVTV-XX with the required LUTRON Model Number PP-DV power pack (so as to render it applicable for 120VAC to 277VAC driver/ballast-switching operation), as required for the exact application for which it is provided, and for the amount of electrical load that is respectively being controlled (verify in advance and provide accordingly), or shall approved equivalent by ACUITY, ETC, or WATT-STOPPER.
- G. Switches which are installed adjacent to lighting dimmers shall match the appearance of such adjacent lighting dimmers (as approved in advance by the architect).

#### 1.32 SYSTEMS OF WIRING

- A. The existing systems of wiring are, and shall remain, 120/208 and 277/480 volts, three phase, four wire, wye connected.
- B. The load center at and for each apartment unit shall be fed for incoming power via a 120/208-volt, single-phase, electrical feeder (raceway and electrical cables) from the respectively-designated, 2-pole, feeder (branch) circuit breaker in the respectively-designated, 120/208-volt, 3-phase, 4-wire, multi-meter distribution panelboard ("MMDP").

#### 1.33 SERVICE ENTRANCES

- A. The existing service entrances, which shall remain and continue to be used, are from underground.

#### 1.34 NEW CIRCUIT BREAKERS WHICH ARE INSTALLED INTO EXISTING PANELBOARDS, SWITCHBOARDS, OR MOTOR CONTROL CENTERS

- A. Each such circuit breaker:
  1. Shall be of the same manufacture as the respective panelboard, switchboard, or motor control center;
  2. Shall have the same voltage rating as the respective panelboard, switchboard, or motor control center;
  3. Shall have the continuous-current rating and the number of poles which are respectively shown on the drawings;
  4. Shall have a minimum interrupting rating which is equal to the bus-bracing rating of the respective panelboard, switchboard, or motor control center;
  5. Shall be the quick-make, quick-break, thermal-magnetic, molded-case type;
  6. Shall be furnished with all required mounting and connecting hardware; and

7. Shall be installed and connected in strict accordance with instructions from the manufacturer of both the circuit breaker and the respective panelboard, switchboard, or motor control center (verify in advance).

1.35 NEW, CIRCUIT-BREAKER-TYPE, BUS-DUCT PLUGS WHICH ARE INSTALLED ONTO THE EXISTING, GENERAL ELECTRIC, VERTICAL-RISER, PLUG-IN-TYPE, BUS DUCTS

- A. Each such circuit-breaker-type, bus-duct plug:
  1. Shall be of the same manufacture as the respective, plug-in-type, bus duct;
  2. Shall have the same voltage rating as the respective, plug-in-type, bus duct;
  3. Shall have the continuous-current rating and the number of poles which are respectively shown on the drawings;
  4. Shall have a minimum interrupting rating which is equal to the bus-bracing rating of the respective, plug-in-type, bus duct;
  5. Shall be equipped with a circuit breaker which is the quick-make, quick-break, thermal-magnetic, molded-case type;
  6. Shall be furnished with all required mounting and connecting hardware; and
  7. Shall be installed and connected in strict accordance with instructions from the manufacturer of both the circuit-breaker-type, bus-duct plug and the respective, plug-in-type, bus duct (verify in advance).

1.36 NEW SWITCHES WHICH ARE INSTALLED INTO EXISTING SWITCHBOARDS

- A. Each such switch:
  1. Shall be of the same manufacture as the respective switchboard;
  2. Shall have the same voltage rating as the respective switchboard;
  3. Shall have the continuous-current rating and the number of poles which are respectively shown on the drawings;
  4. Shall have a minimum bracing and interrupting rating which is equal to the bus-bracing rating of the respective switchboard;
  5. Shall be the quick-make, quick-break type with rejection clips which will accept current-limiting fuses and reject all others;
  6. Shall be furnished with all required mounting and connecting hardware; and
  7. Shall be installed and connected in strict accordance with instructions from the manufacturer of both the switch and the respective panelboard or switchboard (verify in advance).

1.37 DRY-TYPE TRANSFORMERS

- A. Each dry-type transformer shall have the KVA, voltage, phase, and wire ratings which are respectively indicated on the drawings.
- B. Dry-type transformers shall have all-copper or all-aluminum (this contractor's option) windings.
- C. Each dry-type transformer shall be self-cooled and shall be capable of carrying a continuous full load at normal voltage and frequency, without exceeding 115 degrees C. above an ambient of 40 degrees C. and without shortening its expected lifetime. Each transformer shall have a sound rating which is equal to, or less than, the respective NEMA standard rating.

- D. Each dry-type transformer shall be equipped with NEMA standard taps below and above normal voltage on the primary side. Such taps shall be the external type.
- E. Each dry-type transformer shall have Class 155, or higher, insulation systems and shall be completely enclosed, except for ventilating openings.
- F. Each dry-type transformer shall have a NEMA 1 (general-purpose, indoor) enclosure. Each dry-type transformer shall have built-in junction boxes for primary and secondary connections.
- G. Install each dry-type transformer on vibration isolators and make flexible conduit connections. Floor mount each dry-type transformer unless it is respectively indicated on the drawings to be wall-mounted or to be hung from the overhead building structure. Provide a 4" high, reinforced-concrete, housekeeping pad for each floor-mounted, dry-type transformer. The weight loading rating of each supporting means which is provided for hanging a dry-type transformer from the overhead building structure, or for wall mounted a dry-type transformer, shall be at least thrice the total weight of the respective transformer and supporting means.
- H. Replace at no additional cost to the owner, all dry-type transformers which are considered by the architect or by the owner to be excessively hot and/or noisy.
- I. Each dry-type transformer shall be provided with a warning nameplate which is permanently affixed to the top of the transformer and which is engraved to say "WARNING - HOT SURFACE - DO NOT PLACE OR STORE ANYTHING ON TOP OF, OR DIRECTLY ABOVE, THIS TRANSFORMER."
- J. Dry-type transformers shall be manufactured by SQUARE "D", GENERAL ELECTRIC, SIEMENS, or CUTLER-HAMMER, or shall be approved equivalent.

#### 1.38 PANELBOARDS AND LOAD CENTERS

- A. Provide panelboards and load centers where and as shown on the drawings, and where and as required. The top of each panelboard and load-center cabinet shall be at 6'-6" above finished floor.
- B. Each panelboard and load center shall have the current rating, the voltage rating, the phase and wire ratings, the number and type of branch circuit breakers and branch-circuit-breaker spaces, and a main circuit breaker or main lugs, as respectively shown on the drawings, and as required for the respective application. Verify all parameters and requirements in advance, and provide accordingly.
- C. Whether so indicated on the drawings and/or specified herein, or not, the number of panelboard or load-center sections for each panelboard or load center shall be as required to accommodate the number of circuit breakers of the respective ratings and the number of branch-circuit-breaker-pole spaces/provisions which are indicated in the respective panelboard or load-center schedule, which are required for the respective applications, and as required for such panelboard or load center physically to fit in the respectively-designated location while accommodating all code-required clearances, etc.; verify all

parameters and requirements in advance, and provide accordingly. In order to accomplish such, and to the extent which is practicable, provide panelboard or load-center sections which accommodate more than the classical forty-two (42) branch-circuit-breaker poles (and pole spaces/provisions), where and as required.

- D. Load-centers shall be provided only where specifically indicated on the drawings, i.e., at and for the apartment units; otherwise, panelboards shall be provided.
- E. Panelboards and load centers shall have all-copper or all-aluminum (this contractor's option) buses.
- F. Branch circuit breakers shall be bolt-on, quick-make, quick-break, over-center toggle devices with trip indication, and with common-trip for multi-pole breakers. Trip indication for each circuit breaker shall be clearly shown by the circuit-breaker handle taking a position between the "OFF" position and the "ON" position. No tandem-type circuit breakers shall be provided.
- G. Whether so indicated on the drawings and/or specified elsewhere herein, or not, all 15-amp and 20-amp, 1-pole, 120-volt, branch circuit breakers which are provided at and for the apartment units shall be UL-listed and code-approved as being "combination-type, arc-fault circuit interrupters".
- H. Whether so indicated on the drawings and/or specified elsewhere herein, or not, all circuit breakers which are provided for circuits that are involved with air-conditioning equipment shall be UL-listed and code-approved as being the "listed HACR type".
- I. Branch circuit breakers feeding unswitched lighting loads shall be U.L.-listed as being "switching-duty" rated.
- J. Panelboards shall have distributed phase bussing throughout. Any two (2) adjacent, 1-pole, branch circuit breakers shall be replaceable by a 2-pole, branch circuit breaker and any three (3) adjacent, 1-pole, branch circuit breakers shall be replaceable by a 3-pole, branch circuit breaker.
- K. Load centers shall have distributed phase bussing throughout. Any two (2) adjacent, 1-pole, branch circuit breakers shall be replaceable by a 2-pole, branch circuit breaker.
- L. All branch-circuit-breaker spaces shall contain complete provisions (including, but not limited to, bussing, mounting apparatuses, access holes, access hole covers, etc.) which are required for accommodating future branch circuit breakers.
- M. The minimum bus-bracing rating and the minimum circuit-breaker-interrupting rating for each panelboard and load center shall be the value of the available short-circuit current which is indicated in the respective panelboard or load-center schedule. In order to achieve such ratings, "U.L. series-connected ratings" may be utilized if, and only if, all documentation which is required to prove such ratings is a part of, and submitted with, the respective panelboard and load-center review submittals (shop drawings). The review submittals (shop drawings) for all panelboards and load centers shall be submitted simultaneously.

- N. Number branch-circuit-breaker poles from top to bottom beginning at the top of the left-hand column, with odd numbers occurring on the left and even numbers occurring on the right, as required to conform to the circuit numbers which are respectively shown on the drawings. In multiple-section panelboards and load centers, number the branch-circuit-breaker poles consecutively. Do not repeat numbers in the same panelboard or load center. Each successive odd-numbered pole and each successive even-numbered pole shall be connected to an alternate incoming line, i.e., for three-phase panelboards, the poles shall be connected alternately to Incoming Line 1, Incoming Line 2, Incoming Line 3, Incoming Line 1, Incoming Line 2, Incoming Line 3, etc.; and for single-phase load centers, the poles shall be connected alternately to Incoming Line 1, Incoming Line 2, Incoming Line 1, Incoming Line 2, etc.
- O. Each panelboard, for which such feature is available, shall be equipped with door-in-door trim as required to allow hinged access to its interior panelboard wiring without removing the panelboard-door assembly (i.e., one [1] lockable door over the interior and one [1] which exposes the gutter).
- P. Unless indicated otherwise, panelboards and load centers shall have NEMA 1 enclosures.
- Q. Provide lock-on and lock-off devices for branch circuit breakers where and as indicated, and where and as required.
- R. At each panelboard and load center, provide a "bushing-type" raceway connector at and for each raceway which contains electrical cables that are sized No. 6 AWG or larger.
- S. Panelboards and load centers shall be manufactured by SQUARE "D", SIEMENS, GENERAL ELECTRIC, or CUTLER-HAMMER, or shall be approved equivalent.

#### 1.39 MULTI-METER DISTRIBUTION PANELBOARDS (MMDP'S)

- A. Provide the multi-meter distribution panelboards (each of which is referenced on the drawings and herein as an "MMDP") which are shown on the drawings, specified herein, and required for the project, where and as necessary to distribute electrical power to and for, and to measure and record the electrical energy usage of, the respective, facility, apartment units.
- B. Verify, in advance of preparing the project, electrical equipment, shop drawings and in advance of ordering any project electrical equipment, that all project MMDP's will physically fit in the locations which are respectively designated on the drawings, while maintaining all code-required clearances and all clearance which are recommended by the MMDP manufacturer for maintenance, etc.; and bring all conflicts to the immediate attention of the architect for resolution.
- C. Each MMDP shall be complete in every respect, and shall be equipped with all options, appurtenances, characteristics, etc. that are required for the respective exact applications.
- D. Each MMDP shall comprise an electrical power monitoring-and-control system; a standard, circuit-breaker-type, electrical power-distribution panelboard, except that such panelboard shall be modified and augmented (including being equipped with an

enclosure which is of sufficient physical size, and is code-approved and UL-listed for the exact application), as required to accommodate all of the integral equipment, connections, etc. of its electrical power monitoring-and-control system; and all required, externally-located, system equipment, enclosures, racks, connections, etc.; verify all parameters and requirements in advance, and provide accordingly.

- E. The power-distribution panelboard of each MMDP shall be rated for connection to a 120/208-volt, 3-phase, 4-wire, input-power source, and shall be rated as required to supply 120/208-volt, single-phase, 3-wire power to the 120/208-volt, single-phase, 3-wire load centers at the respective apartment units.
- F. The power-distribution panelboard of each MMDP shall be equipped with a 3-pole, main, circuit breaker, and with individual, 2-pole, feeder (branch), circuit breakers for the respective apartment units (one [1] such feeder [branch] circuit breaker shall be dedicated to feed the load center at and for each such apartment unit), which are sized and rated as respectively indicated on the drawings (reference the respective panelboard schedules).
- G. The electrical power monitoring-and-control system for each MMDP (each of which is referenced herein as the "system") shall be as follows:
  - 1. General:
    - a. Scope: The system shall be an embedded, kWh-revenue-class, multi-circuit sub-metering system for use in the AC electrical equipment. The system shall provide a low-voltage metering system which integrated into the respective electrical equipment. The system shall render an efficient system for residential sub-metering. The shall render the ability to report the required energy-usage information remotely, using a web-based software platform, [and a billing solution for tenant bill generation;
    - b. Related Documents: The project drawings and the general provisions of the contract, including general and supplementary conditions, and all other specification sections, apply to this work;
    - c. Submittals: Submit shop drawings and product data for approval for ordering the respective equipment, and submit final documentation, in the quantities which are stipulated elsewhere herein;
    - d. Related Standards and Compliance: The system meet the following recognized standards and approvals:
      - (1) Accuracy:
        - (a) ANSI C12.1; and
        - (b) ANSI C12.20/0.5;
      - (2) Measurement:
        - (a) UL916 Energy Management Equipment; and
        - (b) UL61010-1 (IEC 61010-1) Test and Measurement Equipment;
      - (3) Approvals/Certification:
        - (a) ANSI C12.20 certification done through NRTL (Nationally Recognized Test Lab); and
        - (b) BTL Certified (BACnet Test Laboratories); and
      - (4) Electro-Magnetic Compatibility:
        - (a) IEC 61000-4-2 Electrostatic Discharge (B);
        - (b) IEC 61000-4-3 Radiated Immunity (A);
        - (c) IEC 61000-4-4 Electric Fast Transient (B);

- (d) IEC 61000-4-5 Surge Immunity (B)
    - (e) IEC 61000-4-6 Conducted Immunity; and
    - (f) FCC Part 15 subpart B, Class A Digital Device, Radiated Emissions;
  - e. Quality Assurance:
    - (1) Manufacturer Qualifications: The system manufacturer shall have a minimum of five (5) years' experience producing electronic sub-metering-system equipment;
    - (2) The system manufacturer shall furnish both external and embedded metering solutions;
    - (3) The system shall have a 0.2% accuracy rating;
    - (4) The system shall comply with the requirements of the latest revisions of all applicable industry standards;
    - (5) The system shall include all required, remote, web-based, tenant-billing software;
    - (6) The system metering hardware shall be designed, fabricated, factory installed, and factory tested before being shipping to the project site; and
    - (7) The system embedded-metering solution shall be a standard-product offering by the system distribution-panelboard manufacturer. Custom (for the project) designed, fabricated, installed, and connected metering solutions are unacceptable; and
  - f. Delivery, Storage and Handling:
    - (1) Store and handle all system components in strict compliance with system manufacturer's instructions and recommendations. Protect all system components from potential damage, including damage from weather and construction operations. If the meters are installed inside of equipment, store such equipment so that condensation will not form on or in it. If necessary, apply temporary heat where required to obtain suitable service conditions.
- 2. Products:
  - a. Manufacturers and Series: The system shall be SIEMENS SEM3 metering solution, ABB/GENERAL ELECTRIC Spectra Series Integrated Submetering, or approved equivalent;
  - b. Hardware Overview:
    - (1) The meters and the ancillary equipment shall meet kWh-revenue-class approval by the applicable recognized authorities;
    - (2) Current Transformers (CT's): The system include solid-core-design CT's which shall have the respectively-proper amperage ratings (e.g., 50,125, 250, 400, 600, or 800 amps), and which meet Accuracy Standard IEC 60044-1, Class 0.2s:
      - (a) Such CT's shall have only a milliamp (i.e., 100mA) output, and shall measure accurately down to 0.2% of the maximum range;
      - (b) Such CT's shall be self protecting and shall not require shorting blocks;
      - (c) Such CT's shall support 1.3 times the CT rating;

- (d) Such CT's shall be rated for (CAT IV UL metering) ;  
and
- (e) Such CT's shall be rated for 600VAC;
- (3) Micro-Meter Modules: Individual micro-metering modules shall be provided, one (1) for each phase conductor of each metered circuit. Such meter modules shall tie to the milliamp CT's. Such CT's shall be supplied by the manufacturer of the meter modules:
  - (a) Each meter module shall measure data with 0.2% accuracy, as tested in accordance with ANSI C12.20;
  - (b) When grouped together, such meter modules shall render the measurement of 120/208-volt, single-phase, 3-wire circuits or 120/208-volt, 3-phase, 4-wire circuits, as respectively required;
  - (c) Each meter module shall incorporate a dip-switch selector as required to select Phase Conductor A, Phase Conductor B, or Phase Conductor C, and shall have LED indicators as required to indicate the respectively-selected phase conductor;
  - (d) Each meter module shall be able to accept inputs from all available milliamp CT's ranging from 50 to 800A;
  - (e) The setup for the CT sizing at each meter module shall be accomplished through the controller web page;
  - (f) Each meter module shall plug directly into the respective metering rack without any additional installation work or tools being needed;
  - (g) All embedded metering solutions shall have the respective meter modules installed at the respective electrical equipment manufacturer's factory. No field installation shall be required;
  - (h) Each meter modules shall be pre-calibrated and shall never need future calibration;
  - (i) Each meter module shall be equipped with an LED indicator which will indicate when the unit has power and is communicating; and
  - (j) Each micro-meter module shall record the kWh readings and shall retain such readings for over forty-five (45) years without external power;
- (4) Racks: The micro-meter modules shall be mounted on scalable racks. Each rack assembly shall be designed and constructed as required to allow the respective micro-meter modules to be snapped into the rack without the use of tools:
  - (a) Such rack assemblies shall be provided in sizes of 3, 9, 15, and/or 21 micro-meter modules, as respectively required;
  - (b) Such rack assemblies shall be sized as required to meter all circuits which are denoted on the drawings for metering (i.e., all apartment-unit feeders), and shall accept up to 3, 9, 15, or 21 micro-meter modules, as respectively required;

- (c) Such rack assemblies shall allow for open slots, as necessary to accommodate future expansion, as required; and
- (d) Such rack assemblies shall be connected to the controller using a 600-volt-rated communications cable;
- (5) Controllers: Each controller shall function as the collection, processing, and setup point for the respective micro-meter units, via a built-in web page interface:
  - (a) The built-in web-page configuration and real-time data screens shall include:
    - i) System Settings: CT ratios, PT ratios, the system type, alarm settings, communications settings, and passwords;
    - ii) Global Settings: For threshold and set-point alarms;
    - iii) Branch Meter Configuration: For 1-pole, 2-pole, or 3-pole; and individual meter warnings, CT ratings, and labels. Dynamic logic shall be built into the web-configuration tool, so as to prevent the user from setting up an incorrect arrangement;
    - iv) Real-Time Data Monitoring;
    - v) Diagnostics data to be used to monitor the Modbus-register-address information being passed to other monitoring or control systems; and
    - vi) No third-party software shall be required to configure the controller or the micro meter modules;
  - (b) Each controller shall communicate the metered values to outside systems via an HTML web-page interface, Modbus RTU, or Modbus TCP;
  - (c) Each controller shall be able to manage up to forty-five (45) micro-meter modules from the same voltage;
  - (d) Each controller shall be equipped with two (2) digital pulse inputs for receiving pulse inputs from other metering devices;
  - (e) Each controller shall have one (1) configurable (KY or KYZ) digital pulse output which can be used to output total kWh data from one (1) or more micro-meter modules that are totalized together; and
  - (f) Each controller shall be powered from its own voltage inputs, and shall be rated so as to be suitable for 480VAC, 240VAC, 208VAC, and 120VAC, as applicable, applications;
- (6) Service Types:
  - (a) Single Phase, 3-Wire; and
  - (b) 3-Phase, 4-Wire;
- (7) Metering Data: The data which is recorded and calculated, and which shall be able to be passed on to an external system or

displayed on the respective controller's web page, shall include the following for each circuit breaker:

- (a) Energy: Each meter shall record and report true RMS, fully bi-directional, and revenue-certified energy metering for the following parameters:
    - i) kWh (Active Energy);
    - ii) kVARh (Reactive Energy);
    - iii) KVAh (Apparent Energy);
    - iv) kW Demand; and
    - v) Integration of any instantaneous measurement;
  - (b) Instantaneous: Each meter shall record and report high accuracy, 1-second, 1/2- cycle measurements, including true RMS, per phase and total, for the following parameters:
    - i) Voltage and Current;
    - ii) Active, Reactive, and Apparent Power (kW, kVAR, and kVA);
    - iii) Phase Angle;
    - iv) Power Factor;
    - v) Current Demand; and
    - vi) kW Demand;
  - (c) Instantaneous Max: Each meter shall record and report each new maximum value, for the following parameters:
    - i) Current Demand;
    - ii) Current;
    - iii) kW Demand; and
    - iv) kW;
  - (d) Alarming/Monitoring: The system shall display and configure alarming for the following parameters:
    - i) Phase Loss;
    - ii) Over-Current Warning;
    - iii) Over-Current Alarm;
    - iv) Over kW Demand Alarm; and
    - v) Under/Over-Voltage Alarm;
- (8) Displays:
- (a) Touchscreen displays, each measuring at least 7" diagonal, shall be provided in the exact central location which is stipulated by the architect (verify in advance), for viewing each sub-metered circuit's data:
    - i) Each such touchscreen shall be mounted in a separate NEMA 1 enclosure, and shall be installed and connected in the exact location which is stipulated by the architect (verify in advance);
    - ii) Each such touchscreen shall be furnished pre-wired for 120VAC control power. Provide a 120-volt, control-power circuit for each such touchscreen, whether shown on the drawings, or not;

- iii) Each such touchscreen shall be able to communicate to up to six (6) sub-meter controllers, as required to allow viewing and navigation from circuit-to-circuit relative to the data for six (6) distribution panelboards;
  - iv) Provide the number of touchscreens which are required, based on the number of distribution panelboards which are provided for the project (verify in advance, and provide accordingly);
  - v) Each such touchscreen shall show circuit naming and designations as configured in each system controller which is specific to the respective panelboard; standard numbering is unacceptable; and
  - vi) Ethernet communications switches, for connecting the system controllers to the respective touchscreen displays, shall be provided, and mounted and pre-wired into the respective enclosure;
- c. Tenant-Metering Software:
- (1) The meter manufacturer shall provide web-based, local, tenant-metering software which will allow the owner to download, store, view, and render tenant bills at predefined intervals;
  - (2) System:
    - (a) The sub-metering system shall automatically upload all metering-based data at pre-defined times;
    - (b) Such tenant-metering software shall be expandable up to 1,000 tenant meters per site;
    - (c) Detailed energy profiles (via an energy-consumption tracker), with the time periods being scalable on an hourly, daily, monthly, and/or annual basis, shall be attainable, and implemented;
    - (d) Energy-usage-bar charts, by meter or groups of meters, shall be able to be rendered, and the generation of such charts shall be implemented;
    - (e) Detailed consumption reports, with meter-profile information, shall be able to be rendered, and the generation of such charts shall be implemented;
    - (f) Provide a resident-management tool which shall allow the owner to manage the residents, as they move in and out, and to show vacant units; and
    - (g) Provide a web-based, tenant-metering dashboard which shall allow easy access to the billing and tenant information. Such dashboard shall allow users to print bills and reports, and to save notes relative to on individual tenants;
  - (3) Software-Operating-System Requirements for a Local, Computer Workstation:
    - (a) Operating Environment:
      - i) Windows 7 Professional;

- ii) Microsoft-Database capability shall be included. Provide storage and collection services that shall host the data within a standard exchange format such as XML, MS ACCESS, EXCEL, or CSV format which is capable of exporting this data to the owner's management accounting system;
  - iii) The data shall be collected at a central point in the system which is known as the "data concentrator", or PTLIS, and which is connected to the internet via a standard TCP/IP Ethernet; and
  - iv) The local server (PC) shall support, at least, 1.6 Ghz, with 1-2 Gig Ram, 100-160 GB space, and Microsoft Excel, or one (1) of the other aforementioned database formats for reporting;
- (b) Management Reports:
- i) The system shall automatically upload metering-based data on a pre-defined time schedule, on 1-minute to 60-minute intervals, and shall print reports on demand, or on a schedule;
  - ii) The billing engine for the local software shall be an easy-to-use wizard which will allow the user to set:
    - a) Multiple rates;
    - b) Taxes;
    - c) Late payment dates;
    - d) Late payment charges;
    - e) Custom charges;
    - f) Customer names and unique accounts to be accessed by only numbers; and
    - g) Tenant access shall be by secure billing data and consumption profile only;
  - iii) Reports shall include each tenant's name, location, periods covered, move-in and move-out dates, payment types, and invoice numbers; and
  - iv) Reports shall include charges for electrical service.
3. Execution:
- a. Installation and Connection:
    - (1) This (i.e., the project) contractor shall provide all communication conductors, and associated raceways, which are external to the system-manufacturer-provided equipment, even though not shown on the drawings;
    - (2) All system communications cabling, raceways, and routing shall be in accordance with the system manufacturer's recommendations and requirements, for a complete and functioning system; and

- (3) All additional connections, cables, raceways, etc. which are required for the metering system shall be provided in the field by this (i.e., the project) contractor.
- b. Adjusting and Cleaning:
  - (1) The system meters and CT's shall be pre-calibrated and shall require only basic setup via the embedded web pages; and
  - (2) Clean all exposed surfaces using system-manufacturer-recommended materials and methods;
- c. Testing: Perform all required factory and installation tests in accordance with applicable NEC, NEMA, UL, and requirements;
- d. Warranty: The system manufacturer shall warrant that the entire system, including all equipment, materials, and workmanship, are free of non-conformities for one (1) year from the date of initial operation;
- e. Start-Up Services:
  - (1) Engage and pay a factory-authorized service representative to perform all required startup services for the system. Such representative shall be trained and qualified relative to the exact system which is provided;
  - (2) Provide all personnel which are required to assist in the commissioning of the system;
  - (3) Obtain, and submit as part of final documents, the relevant system-commissioning report;
  - (4) Verify that all system meters are installed and connected in strict accordance with the drawings and these specifications, and with all system-manufacturer's recommendations and requirements; and
  - (5) Complete all required installation-and-startup checks in strict accordance with all system-manufacturer's written instructions;
- f. Support:
  - (1) The system manufacturer and the distribution-panelboard-equipment manufacturer shall each provide a 1-800 number for telephone support;
  - (2) The system manufacturer shall demonstrate to the owner, and to all personnel that are selected by the owner, at the project site and at the time(s) which are selected by the owner, all aspects of the system, including software, programming, devices, functions, etc.;
  - (3) The system manufacturer shall, at the project site, train the owner, and all personnel that are chosen by the owner, relative to all aspects of the system, including software, programming, devices, functions, etc., as many times as necessary (as determined by the owner), until the termination of the project one-year warranty period; and
  - (4) The system manufacturer shall furnish, to the owner, on-line support for technical information and literature, in perpetuity (without limit).

1.40 SURGE PROTECTIVE DEVICES

- A. Provide surge protective devices (each of which is referenced herein below and on the drawings as "SPD") where and as indicated on the drawings, where and as specified herein, and where and as required for the project.
- B. Each SPD shall be complete in every respect, shall be modified and/or augmented as required for the exact application for which it is provided, and shall contain all appurtenances that are required for proper operation.
- C. Each SPD shall be listed and labeled in strict accordance with UL 1449-3rd Edition, and shall comply with all other UL standards, and with all applicable ANSI/IEEE standards and testing procedures.
- D. Each SPD shall be manufactured by a company that is normally engaged in the design, development, and manufacture of such equipment, and by the manufacturer of the respective panelboard or multi-meter distribution panelboard ("MMDP") into which it is provided.
- E. The SPD manufacturer shall provide unlimited free replacement of all inoperable SPD units during the warranty period.
- F. Each SPD shall be guaranteed by this project contractor and by the SPD manufacturer to be free of defects in materials and workmanship for a period of not less than ten (10) years from the date of the notice of acceptance of the project by the owner. Any SPD which shows evidence of failure, malfunction, or incorrect operation during such 10-year warranty period shall be replaced as a complete unit, not just modules, subassemblies, or components, by the manufacturer, at no cost to the owner.
- G. Each SPD shall have the phase rating (i.e., single-phase or three-phase), the voltage rating (i.e., 120/208 volts or 277/480 volts), and the type of connection (i.e., wye) which are required to be completely compatible with the system to which it is connected (verify all parameters and requirements in advance, and provide accordingly).
- H. Each SPD shall be of a "parallel" design utilizing fast-acting, transient energy protection which will divert and dissipate the surge energy.
- I. Each SPD shall be self-restoring and fully automatic with a total response time not exceeding 1 nanosecond for any individual component.
- J. The maximum continuous-operating-voltage (MCOV) rating and threshold-voltage rating of all suppression components in each SPD unit shall be selected in accordance with ANCI C84.1, and shall provide ample "headroom" for C84.1 Voltage Range B, maximum utilization and service voltage per Table 1, as required to provide continuous operation without AC voltage sine-wave interaction.
- K. Each SPD shall use only solid-state clamping components to limit the surge voltage. SPD devices and SPD components which "crowbar" short circuit the AC power system (e.g., spark gaps, gas tubes, or SCR's) are unacceptable and shall not be provided.

- L. Each SPD shall have phase-to-phase, phase-to-ground, phase-to-neutral, and neutral-to-ground, independent, distinct, and dedicated, protective circuitry. Reduced-mode devices are unacceptable and shall not be provided.
- M. Each SPD shall have LED status monitors as required to indicate, at a minimum, the continuous, positive, operational status of each protected phase.
- N. Each SPD shall be labeled as a secondary surge arrester and shall meet all requirements of the National Electrical Code, NFPA 70: Article 285.
- O. Each SPD shall be provided with, and shall be factory installed and connected within, the cabinet (enclosure) of the respective panelboard or MMDP which it is designed and specified to protect.
- P. Each SPD shall be equipped with EMI/RFI filtration (54dB attenuation from 20kHz. to 100MHz., minimum performance), incorporating true, sine-wave tracking ("normal" and "common" mode).
- Q. Each SPD which is designated on the drawings and/or elsewhere (e.g., in a panelboard or MMDP schedule) as "SPD1" shall have a minimum peak surge current rating of 120kA per phase.
- R. Each SPD which is designated on the drawings and/or elsewhere (e.g., in a panelboard or MMDP schedule) as "SPD2" shall have a minimum peak surge current rating of 160kA per phase.

1.41 LIGHTING FIXTURES, DRIVERS, LAMPS, ETC.

- A. Individually support each lighting fixture. Provide two (2) hangers for each suspended-type lighting fixture.
- B. Recessed lighting fixtures shall be compatible with the respective ceiling-suspension systems. Ascertain the type and manufacture of each project ceiling prior to purchasing the respective project lighting fixtures, and utilize all such information while deciding exactly which lighting fixtures to order.
- C. Firmly support each ceiling-mounted lighting fixture from the respective ceiling structure by using supports which are designed for the specific purpose; verify all parameters and requirements in advance, and provide accordingly. Such supports shall be attached to the main ceiling-system runners or ceiling joists, as applicable. Such supports shall have a test rating of at least thrice the weight of the respective lighting fixtures.
- D. Provide #9 galvanized steel wires at diagonal corners of each recessed, square or rectangular, lighting fixture, and provide one (1) #9 galvanized steel wire at each recessed, round, lighting fixture, in order to support such lighting fixtures. Firmly attach such wires to the structural system of the building.
- E. Securely bolt lighting-fixture hangers to the structural system of the building. Toggle bolts are unacceptable and shall not be provided for this purpose.

- F. Seal light leaks between the lighting-fixture trim and the ceiling at each recessed lighting fixture.
- G. Pendant-mounted lighting fixtures shall be equipped with ball-aligner or swivel-type hangers.
- H. Lighting-fixture drivers shall be U.L.-listed, high-power factor, and certified by CBM, if such certification is available.
- I. Provide dimming LED drivers in and for all project LED lighting fixtures which are indicated on the drawings, and/or are required and intended, to be controlled by lighting dimmers, whether dimming LED drivers are specified in the respective lighting-fixture descriptions in the lighting-fixture schedule on the drawings, or not. Provide LED lamps and dimming LED drivers which are completely compatible with one another, as determined by their manufacturers, by UNDERWRITERS' LABORATORIES, and by good practice; verify all parameters and requirements in advance, and provide accordingly.
- J. Provide LED lamps for all lighting fixtures.
- K. LED lamps shall produce illumination having a minimum color-rendering index (CRI) of 82 and having the apparent correlated color temperature which is respectively indicated on the drawings.
- L. Provide lighting fixtures which have the respectively-proper input-voltage characteristics, based on the actual circuits from which they are fed, whether so indicated on the drawings and/or in the schedules or not (verify all parameters and requirements in advance, and provide accordingly).
- M. The lighting-fixture catalogue numbers which are indicated on the drawings do not necessarily contain the designations for all respectively-required options. Provide all necessary options, the requirements for which are made obvious by the respective lighting-fixture applications (verify all parameters and requirements in advance, and provide accordingly).
- N. Recessed lighting fixtures shall be equipped with thermal, safety-cutout devices, whether so designated in the respective catalogue numbers or not (verify in advance).
- O. Connect to each lighting fixture which is installed in an accessible ceiling with flexible, galvanized-steel conduit or metal-clad cable which is routed from the respective branch-circuit outlet box to such lighting fixture (6'-0" maximum length) in such of a way that will not interfere with the removal of any lay-in ceiling panels, any lighting fixtures, etc. Each such branch-circuit outlet box shall be fed from the respective source (e.g., branch-circuit panelboard, next "upstream" junction or outlet box, etc.) with E.M.T., rigid metallic conduit, or metal-clad cable (as applicable), and shall serve no more than four (4) lighting fixtures. Do not loop from lighting-fixture-to-lighting-fixture with flexible conduit or metal-clad cable.

- P. Install exit lights so that their faces are visible from the respectively-required directions and so that their arrows (chevrons) point in the respective directions of egress, whether so shown on the drawings or not. Exit lights shall be the "red-LED" type.
- Q. Each exit light shall be equipped with integral, rechargeable batteries.
- R. Each exit light shall be connected to an "emergency" circuit and ahead of all switching for "emergency/night-light" operation.
- S. Whether so indicated on the drawings or not, equip each "switched" "emergency" lighting fixture (i.e., not including "unswitched" "emergency" lighting fixtures that are intended for 24-hour "night-lighting" operation) with a WATTSTOPPER ELCU-200, or approved equivalent, UL924, "emergency" lighting control unit which will allow such "emergency" lighting fixture to be powered by the respective "emergency" lighting circuit only, but will allow such "emergency" lighting fixture to be controlled (switched and/or dimmed, as applicable) by the lighting control device(s) that control(s) the adjacent "normal" lighting fixtures in the same area (i.e., to be controlled in tandem with such "normal" lighting fixtures). Such "emergency" lighting control unit shall cause such "emergency" lighting fixture to remain ON or to be turned ON (as applicable at the time) when "normal" power to such control device(s) is lost. Request and obtain, in advance from the manufacturer of such lighting control unit, the proper wiring diagram, and other required information, which is relevant to the exact application for which such lighting control unit is provided, and utilize such wiring diagram and such information while connecting such lighting control unit. As a clarification, "unswitched" "emergency" lighting fixtures which are intended for 24-hour "night-lighting" operation need not be equipped with such "emergency" lighting control units.

#### 1.42 EQUIPMENT CONNECTIONS

- A. Connect all project equipment, regardless of who actually furnishes such equipment.
- B. Provide junction-box connections and/or receptacles of the proper configurations, ratings, and sizes where and as required to accept the respective plugs on the equipment, and provide matching plugs on equipment cords where and as required.
- C. Information which is presented on the electrical drawings for connection of equipment is based on information which was furnished during the design phases of the project from certain manufacturers, from certain suppliers, and/or from the owner. The possibility exists that the actual requirements for the electrical connections for some or all of such equipment differ from the requirements which are respectively depicted on the project electrical drawings. Provide the facilities which are required for the equipment that will actually be installed. Make allowances in the project proposal as required to accommodate changes in the requirements of the equipment due to changes in the equipment which is actually furnished by such manufacturers, and/or due to changes in the equipment suppliers and/or manufacturers. Bring all conflicts to the immediate attention of the architect for resolution well in advance of the commencement of any work which is associated with equipment connections.

- D. Well in advance of preparing the project electrical-equipment shop drawings and well in advance of ordering any project electrical equipment, and as part of the requirements and work of this project division:
1. Employ, coordinate directly with, and pay (if such payment is required) the respective suppliers/vendors of all project electrified equipment and/or the respective project subcontractors who are providing all project electrified equipment, as respectively applicable,:
    - a. To review all respective equipment electrical characteristics and requirements which are indicated and/or given on any of the project drawings and/or in any of the project specifications; and
    - b. To determine whether or not each bit of the information that is relevant to such indicated equipment electrical characteristics and requirements is accurate for the exact respective equipment which is being furnished for the project;
  2. Have such suppliers/vendors and/or subcontractors, as respectively applicable,:
    - a. Verify, in no uncertain terms, with proper documentation, which bits of the information that is relevant to such indicated equipment electrical characteristics and requirements are indeed so accurate; and
    - b. Furnish the respective, properly-corrected, equipment electrical characteristics and requirements for all indicated equipment electrical characteristics and requirements which are not so accurate;
  3. Submit all such verifying and/or correcting documentation to the architect, in a timely manner, in the same formats in which the respective equipment electrical characteristics and requirements were originally indicated and/or given. For example,:
    - a. For all equipment electrical characteristics and requirements which were originally indicated and/or given in the form of equipment schedules, submit the respective, properly-corrected, equipment electrical characteristics and requirements in the form of corrected, similar, equipment schedules;
    - b. For all equipment electrical characteristics and requirements which were originally indicated and/or given in the form of equipment notes, submit the respective, properly-corrected, equipment electrical characteristics and requirements in the form of corrected, similar, equipment notes;
    - c. For all equipment electrical characteristics and requirements which were originally indicated and/or given in the form of specification verbiage, submit the respective, properly-corrected, equipment electrical characteristics and requirements in the form of corrected, similar, specification verbiage; etc.
- E. Rough-in in accordance with drawings and/or other information which is supplied by the respective equipment suppliers and/or manufacturers (request and obtain, well in advance and directly from the respective equipment suppliers and/or manufacturers, all relevant information).
- F. Whether so indicated on the drawings or not, connect the exterior, cooking-hood, fire-extinguishing equipment, including providing all required raceways; electrical-power cables; electrical-signal cables; electrical-control cables; micro switches; auxiliary relays; contactors; and shunt-trip circuit breakers, and all other required appurtenances. Connect all gas solenoid valves where and as required by all applicable codes, laws, ordinances,

rules, and regulations. Make all required connections so that, upon activation of the exterior, cooking-hood, fire-extinguishing equipment,:

1. The shunt-trip circuit breakers which feed all electrified equipment that is located beneath the hood shall trip and, thereby, de-energize the associated equipment;
2. The main, gas-supply, solenoid valve shall close;
3. A general fire-alarm signal shall be sent to the main fire-alarm-system control panel; and
4. As a clarification, the hood exhaust fan, if operating at the time, shall not be de-energized and shall continue to operate; and the hood exhaust fan, if not operating at the time, shall be energized and shall be caused to operate (verify all parameters and requirements in advance, and provide accordingly).

1.43 ELECTRICAL COORDINATION WITH THE PROJECT, BUILDING AND AUTOMATIC, TEMPERATURE CONTROLS (PRIOR TO MAKING THE PROJECT PROPOSAL)

- A. Given the nature of the evolving technology in the field of building and automatic temperature controls, as well as the differences between and among the equipment and systems of the various manufacturers, it is possible that temperature-control devices with various voltage characteristics and requirements (e.g., 120 volts, single-phase, 60Hz.; 24 volts AC or DC; etc.) have been specified in the HVAC divisions of the project (verify in advance).
- B. It is the responsibility of the project general contractor, the project mechanical subcontractor, the project electrical subcontractor, and the project temperature-controls subcontractor to coordinate, prior to making the project proposal, as required to ensure that all electrical provisions and accommodations for all project temperature-control devices and work (i.e., materials; equipment; raceways; circuit breakers; electrical power, signal, and control wiring; devices; terminations; connections; installation; labor; etc.) which are required to render a complete and working, temperature-controls system are included in the project proposal and work.
- C. If the project general contractor and such applicable project subcontractors fail to accomplish such coordination prior to making the project proposal, and/or if they fail to include all such electrical provisions and accommodations in the project proposal pricing, then the cost to provide such electrical provisions and accommodations shall be borne solely by the project general contractor and such applicable subcontractors.
- D. No additional cost will be paid by the owner to the project general contractor or to the applicable subcontractors for failure to accomplish such coordination prior to making the project proposal. Reference the applicable HVAC divisions of the project specifications, in advance, for the building and automatic, temperature-controls sequences of operation, EMS point lists, product data, etc.

1.44 GROUNDING AND BONDING

- A. Electrical work for system grounding and bonding of circuits and equipment shall conform fully to NFPA 70: National Electrical Code, particularly Article 250, including the other articles which are referenced in 250.4 for particular case applications.

- B. Each raceway system shall enclose a separate, insulated (with green-colored insulation), equipment-grounding conductor. Provide such ground-fault/transient-current return conductor regardless of whether or not the raceway system itself provides an adequate equipment-grounding return path.
- C. System-grounding and equipment-grounding conductors shall be sized in strict accordance with Sections 250-66 and 250-122, respectively, of the National Electrical Code. Adjust the respective sizes which are indicated on the drawings as required to accommodate changes (such as design-manufacture differences, design changes, etc.), voltage drop, etc.
- D. Grounding conductors which are sized No. 8AWG or larger shall be stranded.
- E. Grounding-conductor connections shall be braze, irreversible-crimp, or thermal-weld connected to structural steel and to ground rods.
- F. Grounding-conductor connections to equipment-ground busses, pipes, and wiring devices shall be mechanically bolted, clamped, or screwed, with the proper tightening torque, as required by the respective manufacturer, or by Article 110-14 of the National Electrical Code if the manufacturer's(s') recommendations are unavailable.
- G. Grounding-electrode conductors shall be installed in non-ferrous raceways to the full extent which is practicable.
- H. Grounding systems shall be tested for electrode-to-ground resistance utilizing instruments. Grounding-system electrode-to-ground-resistance magnitudes which exceed the respective, code-allowed, maximum values are unacceptable and shall be remedied.
- I. Grounding-electrode systems shall consist of 3/4" diameter x 10'-0" long (minimum), copper-clad steel rods; facility structural steel; the metallic cold-water-pipe system; the metallic natural-gas-pipe system; and concrete-encased electrodes.
- J. Building structural-steel columns shall be grounded in accordance with IEEE Green Book and industry standards.

END OF DIVISION 26 00 00

DIVISION 27 00 00 - COMMUNICATIONS

1.1 BASIC ELECTRICAL REQUIREMENTS

- A. The specifications for the project electrical work are included in Divisions 26 00 00, 27 00 00, and 28 00 00. The separation of the project electrical specifications into such divisions is for the sole purpose of convenience. The specifications of any of these divisions shall hold for all such divisions the same as if they were stated in each division.
- B. The word "shall", where used, is to characterize mandatory requirements, and the word "should", where used, is to characterize advisories. The word "may" is used in the permissive sense.
- C. Unless noted otherwise, the word "provide" shall be interpreted to mean "furnish, install, and connect as required to be complete and ready for the intended use" when referencing connectible items, equipment, and/or materials which are associated with the electrical work; shall be interpreted to mean "furnish and install as required to be complete and ready for the intended use" when referencing unconnectible items, equipment, and/or materials which are associated with the electrical work; and shall be interpreted to mean "furnish as required to be complete and ready for the intended use" when referencing electrical work which is neither installable nor connectible.

1.2 TELECOMMUNICATION BACKBOARDS, RACEWAYS, OUTLETS, JACKS, CONNECTORS, FACEPLATES, COVER PLATES, ETC.

- A. Provide a new, 3/4" thick, fireproofed-plywood, telecommunication backboard at the facility third-floor level, as a replacement for the existing, third-floor-level, telecommunication backboard, in the required new location, approximately where and as shown on the drawings (verify the required exact location in advance). Unless shown otherwise, such backboard shall be 8'-0" wide x 8'-0" high. Unless noted otherwise, provide on such backboard plugmold, with 120V, 15A, 3W grounding, single receptacles 6" on-center, for the full width of the backboard, and connect such plugmold receptacles to a separate, dedicated, 20-amp, 120-volt, branch circuit. Provide at and for such backboard a 1/4" thick x 2" high, copper, telecommunication equipment-ground bar for the full width of such backboard; insulate such equipment-ground bar from such backboard and from the wall, and label such equipment-ground bar as "telecommunication ground bar". Provide a No. 6 AWG, green-insulated, copper, equipment-grounding cable, in a 1/2" PVC Schedule 40 conduit, from such equipment-ground bar to the incoming electrical-service, system-grounding electrode, and provide the proper grounding connections.
- B. Provide three (3) 3" raceways, with pull wires, for communication use, from such new, replacing, third-floor-level, telecommunication backboard to an accessible location above the third-floor-level ceiling.
- C. Disconnect and remove the existing, third-floor-level, telecommunication backboard, and all existing appurtenances.
- D. Intercept the existing, incoming, telecommunication raceways to the existing, third-floor-level, telecommunication backboard, and extend such raceways to the above-referenced,

new, replacing, third-floor-level, telecommunication backboard, where and as required to accommodate the required, new, incoming, telecommunication-service cables to such, new, replacing, telecommunication backboard. Verify the exact number of, and size, raceways which are required. For the purpose of making the project proposal, assume that three (3) 4" conduits, with pull wires, are required.

- E. Intercept the existing, outgoing, telecommunication raceways which are routed between the existing, third-floor-level, telecommunication backboard and the remaining-existing, fourth-floor-level, telecommunication backboard, and extend such raceways to the above-referenced, new, replacing, third-floor-level, telecommunication backboard, where and as required to accommodate the required, new, outgoing, telecommunication-service cables from such, new, replacing, third-floor-level, telecommunication backboard to such, remaining-existing, fourth-floor-level, telecommunication backboard. Verify the exact number of, and size, raceways which are required. For the purpose of making the project proposal, assume that three (3) 4" conduits, with pull wires, are required.
- F. The existing telecommunication backboards; the associated, existing, grounding apparatuses; and the existing, telecommunication, vertical infrastructure (risers, etc.) at and for all other, facility, floor-levels (i.e., all facility floor levels other than the third-floor level) shall remain and continue to be used.
- G. In order to organize the communication wiring in and for the apartment units, provide in and for each apartment unit, in the exact location which is stipulated by the architect (verify the desired, exact location in advance; as a clarification, such location is not indicated on the drawings, but is likely to be very high in a closet), a recessed, combination telephone/internet/cable-television box (DATACOM Home Command Center; 12" x 15"; hinge cover with key lock; Part #70-0010 with #70-0020 module, where and as required for the respective application; with the appropriate enclosure bracket). Provide the respectively-required cabling to and for all jacks, connectors, etc. in the respective apartment unit, and make the required terminations, connections, etc. thereon. As a clarification, the local communication-service company will provide all required cabling from each such combination telephone/internet/cable-television box to the respective, nearest, telecommunication backboard, and will provide the required terminations, connections, etc. at and on such backboard. Verify all parameters and requirements in advance, and provide accordingly.
- H. Provide telephone-station outlets (which are referenced on the drawings as "phone outlets") in the apartment units, where and as shown on the drawings, and where and as required. The exact locations for all telephone-station outlets shall be as respectively determined by the architect and the owner (verify in advance). Each telephone-station outlet shall consist of an outlet box; the appropriate, local-telephone-service-company-compliant, telephone jack; and the appropriate faceplate. Verify all parameters and requirements in advance and provide accordingly.
- I. Pre-wire each apartment unit for telephone (voice) service, from the respective, above-referenced, combination, telephone/internet/cable-television box, to each telephone-station outlet, in strict accordance with all local-telephone-service-company standards, instructions, recommendations, requirements, mandates, etc., including providing all required outlet boxes, raceways, cabling, jacks, faceplates, terminations, connections, etc., and in strict accordance with the requirements of all applicable codes and governing

authorities. Each telephone (voice) cable shall be the exact cable which is approved in advance by the local-telephone-service-company for the respective application. Make all required connections in strict accordance with all telephone-service-company requirements and recommendations. Verify all parameters and requirements in advance and provide accordingly. Coordinate directly and fully with the local telephone-service-company, request them to make an inspection of the work, and make the work meet entirely with their approval.

- J. Provide cable-television-station outlets in the apartment units, where and as shown on the drawings, and where and as required. The exact locations for all cable-television-station outlets shall be as respectively determined by the architect and the owner (verify in advance). Each cable-television-station outlet shall consist of an outlet box; the appropriate, local-cable-television-service-company-compliant, cable-television connector, and the appropriate faceplate. Verify all parameters and requirements in advance and provide accordingly.
- K. Pre-wire each apartment unit for cable-television service, from the respective, above-referenced, combination, telephone/internet/cable-television box, to each cable-television-station outlet, in strict accordance with all local-cable-television-service-company standards, instructions, recommendations, requirements, mandates, etc., including providing all required outlet boxes, raceways, cabling, connectors, faceplates, terminations, connections, etc., and in strict accordance with the requirements of all applicable codes and governing authorities. Each cable-television cable shall be the exact cable which is approved in advance by the local-cable-television-service-company for the respective application. Make all required connections in strict accordance with all local-cable-television-service-company requirements and recommendations. Verify all parameters and requirements in advance and provide accordingly. Coordinate directly and fully with the local-cable-television-service-company, request them to make an inspection of the work, and make the work meet entirely with their approval.
- L. Provide internet-station outlets in the apartment units, where and as shown on the drawings, and where and as required. The exact locations for all internet-station outlets shall be as respectively determined by the architect and the owner (verify in advance). Each internet-station outlet shall consist of an outlet box; the appropriate, local-internet-service-company-compliant, internet jack, and the appropriate faceplate. Verify all parameters and requirements in advance and provide accordingly.
- M. Pre-wire each apartment unit for internet service, from the respective, above-referenced, combination, telephone/internet/cable-television box, to each internet-station outlet, in strict accordance with all local-internet-service-company standards, instructions, recommendations, requirements, mandates, etc., including providing all required outlet boxes, raceways, cabling, connectors, faceplates, terminations, connections, etc., and in strict accordance with the requirements of all applicable codes and governing authorities. Each internet cable shall be the exact cable which is approved in advance by the local-internet-service-company for the respective application. Make all required connections in strict accordance with all local-internet-service-company requirements and recommendations. Verify all parameters and requirements in advance and provide accordingly. Coordinate directly and fully with the local-internet-service-company, request them to make an inspection of the work, and make the work meet entirely with their approval.

- N. For all other project spaces (i.e., other than apartment units), provide an "all-communication outlet (ACO)", consisting of a single-gang outlet box (which is recessed to the full extent that is practicable) and a blank cover plate, at each location where telephone (voice), computer (data), and/or cable-television/internet service(s) is/are required.
- O. Provide an empty raceway, which is similar to a 1" conduit, with pull wire, from each ACO to an accessible location above the respective ceiling which has a contiguous, above-ceiling path to the nearest telecommunication backboard (verify in advance), unless shown on the drawings otherwise.
- P. Communication raceways shall be as that which is specified herein for power with bushed ends. Each raceway shall not contain more than two (2) elbows or 90-degree angle bends between pull points, or more than one hundred (100) feet in length between pull points. Each bend shall be the "long-radius" type. Leave a #9 galvanized pull wire, or a nylon pull cord, in each raceway.
- Q. Coordinate fully with the local-telephone-service company, with the local-cable-television-service company, with the local-internet-service company, and with the owner, request them to make an inspection of the work, and make the respective work meet entirely with their approval.

END OF DIVISION 27 00 00

## DIVISION 28 00 00 - ELECTRONIC SAFETY AND SECURITY

### 1.1 BASIC ELECTRICAL REQUIREMENTS

- A. The specifications for the project electrical work are included in Divisions 26 00 00, 27 00 00, and 28 00 00. The separation of the project electrical specifications into such divisions is for the sole purpose of convenience. The specifications of any of these divisions shall hold for all such divisions the same as if they were stated in each division.
- B. The word "shall", where used, is to characterize mandatory requirements, and the word "should", where used, is to characterize advisories. The word "may" is used in the permissive sense.
- C. Unless noted otherwise, the word "provide" shall be interpreted to mean "furnish, install, and connect as required to be complete and ready for the intended use" when referencing connectible items, equipment, and/or materials which are associated with the electrical work; shall be interpreted to mean "furnish and install as required to be complete and ready for the intended use" when referencing unconnectible items, equipment, and/or materials which are associated with the electrical work; and shall be interpreted to mean "furnish as required to be complete and ready for the intended use" when referencing electrical work which is neither installable nor connectible.

### 1.2 APARTMENT-UNIT SMOKE ALARMS

- A. Whether so indicated on the drawings or not, in and for each apartment unit, provide in each sleeping room, and in each area leading to (a) sleeping room(s), the appropriate (as respectively applicable; verify in advance and provide accordingly) smoke alarm which is equipped with auxiliary alarm contacts and which will alarm (with an approved audible alarm) the occupants of the respective apartment unit for the entire duration of every alarm condition in such apartment unit.
- B. In addition, each such smoke alarm which is provided in an apartment unit that is designated as being for the hearing impaired (verify in advance exactly which apartment units are so designated) shall be code-approved for the application, as required to accommodate persons who are hearing impaired, and shall be equipped with a visual alarm having the proper candela rating for the application, in strict accordance with the requirements of all applicable codes (including, but not limited to, ADA-ABA, NFPA 101, NFPA 72, NFPA 70, IBC) and governing authorities. Verify all such requirements in advance and provide accordingly.
- C. Each apartment-unit smoke alarm (verify all parameters and requirements in advance, and provide accordingly):
  - 1. Shall be U.L. listed, and shall be in strict accordance with the requirements of all applicable codes (including, but not limited to, IBC 2009, Section 907.2.11.2) and governing authorities, for the respective application for which it is provided;
  - 2. Shall produce an audible alarm which can easily be heard in all portions of the respective apartment unit above all ambient noises;

3. Shall be connected (i.e., "hard wired") as required to be fed for 120-volt, incoming power from the electrical power system in the respective apartment unit (whether so indicated on the drawings or not); and
4. (In and for apartment units which are designated as being for the hearing impaired) shall produce a visual alarm of proper intensity for the respective application, as required by all applicable codes and governing authorities.

### 1.3 FIRE ALARM, CONTROL, AND MONITORING SYSTEM

- A. Submittals of any kind (e.g., shop drawings, etc.) which are involved with the "Fire Alarm, Control, and Monitoring System", as specified herein and/or on the drawings, shall include adequate verbiage and/or other information, as required to indicate that all specified characteristics, features, options, etc. will be provided. In addition, the verbiage and/or other information verifying each specified characteristic, feature, option, etc. shall be highlighted and shall be labeled with a number corresponding to the respective paragraph number which is contained in these specifications, or in the respective addendum or change order, for such specified characteristic, feature, option, etc. Submittals which are received without all such required verbiage and/or other information, and/or without all such highlighting and labeling, will not be reviewed and will be considered informal.
- B. Complete shop drawing information (both equipment brochures and drawings) shall be submitted to the architect for review, and all corrections which are required thereto shall be made prior to the submission of such documentation to the state fire marshal's office.
- C. Furnish all documentation (e.g., certification and/or proof of the possession of the proper licensing; shop drawings, system riser diagrams, and battery and power-supply calculations; submittal application forms; etc.) which is required by the state fire marshal's office, and by all other applicable governing authorities.
- D. Modify and/or augment the existing, fire alarm, control, and monitoring system at this facility as required to extend all required fire-alarm-system protection and service to all areas and equipment which are involved in any way with this project.
- E. All new equipment, devices, interconnecting wiring, programming, etc. which are provided for such modifications and/or augmentations shall be completely compatible with all portions of the existing system that are being retained and reused, as determined by UNDERWRITERS' LABORATORIES, by the state fire marshal, and by all other applicable governing authorities.
- F. Disconnect, relocate, and reconnect existing fire-alarm-control-and-monitoring-system components where and as required to accommodate the project construction/work, whether so indicated on the drawings or not.
- G. The modified and/or augmented, existing, fire alarm, control, and monitoring system (which is herein referenced as "the system") shall be fully-operational; shall be a U.L.-listed, electrically-supervised, non-coded system; and shall retain or improve all of the operational features that are possessed by the existing system.

- H. The system shall, during the times of all general fire-alarm conditions, produce in all areas of the facility a general alarm consisting of audible indications (utilizing speakers with the appropriate pre-recorded evacuation message) and visual indications (utilizing strobes) that are completely code-approved and approved by the state fire marshal.
- I. The system shall implement all control functions which are required by all applicable codes and governing authorities, whether so indicated on the drawings and/or specified herein, or not. Provide all equipment and items of work which are required to accomplish such, whether so indicated on the drawings and/or specified herein, or not.
- J. The system shall continue to implement remote, general-alarm and trouble-alarm signals from auxiliary, general-alarm and trouble-alarm contacts which are located at the modified and augmented, existing, fire-alarm, control, and monitoring system main control panel (that is herein referenced as "the fire-alarm panel"), via the facility telecommunication system, to the existing remote monitoring station.
- K. The system shall cause recall of the new elevator upon activation of any of the smoke detectors which are located in the new elevator lobbies, in the new elevator shaft, and/or in the new elevator machine room.
- L. The system shall implement the proper signals which will automatically disconnect the main-line power supply to the new elevator-control equipment, by tripping the shunt-trip-type, circuit breaker feeding the elevator-control equipment, upon activation of any of the heat detectors that are located in the new elevator machine room and/or in the new elevator shaft, and then, and only then (as required and allowed by all applicable codes and governing authorities), shall implement the proper signals which will open the electrically-operated valve(s) on the "dry-pipe" portions of the sprinkler system in order to allow water to flow to the sprinkler heads that are located in the new elevator machine room and/or in the new elevator shaft.
- M. Whether so indicated on the drawings or not, the system shall cause the required shutdown of all project air-handling units upon activation of the appropriate duct-type, smoke detectors; provide all electrical work, devices, and equipment which are required to accomplish such, including all required control relays, etc.
- N. Whether so indicated on the drawings or not, the system shall, upon activation, cause the closing of all project fire and smoke dampers; provide all electrical work, devices, and equipment which are required to accomplish such, including all required control relays, etc.
- O. Whether so indicated on the drawings or not, the system shall, upon activation, cause the muting of all sound systems at and for the project areas of the facility; provide all electrical work, devices, and equipment which are required to accomplish such, including all required control relays, etc.
- P. The system, upon activation, shall cause the electric release of all doors at and for the project areas of the facility which are equipped with electrically-operated locking mechanisms or hold-open devices (that shall be provided), and shall cause the closing of all doors at and for the project areas of the facility which are equipped with electrically-

operated closing mechanisms, via the respective, system, door-release control relays (that shall be provided), whether so indicated on the drawings or not; verify all parameters and requirements in advance, and provide accordingly.

- Q. The system, upon activation, shall cause the closing of all horizontal-sliding, accordion-folding, fire doors (which are referenced hereinafter as "fire doors"), via the respective, system, fire-door-closing, control relays (that shall be provided), whether so indicated on the drawings or not:
1. Contact directly, and coordinate directly with, the project, fire-door vendor/subcontractor, in advance, as required to determine all parameters and requirements, and provide all required construction, work, connections, circuiting, communications, signaling, monitoring, etc., accordingly;
  2. Provide all smoke detectors which are required for proper fire-door operation, whether indicated on the drawings or not (verify with the project, fire-door vendor/subcontractor);
  3. Provide all of the communication cables (e.g., Category 5, 18-gauge twisted-pair, etc.) and associated raceways, jacks, connectors, terminations, terminal blocks, end-of-line resistors, etc. which are required for proper fire-door operation, whether indicated on the drawings or not (verify with the project, fire-door vendor/subcontractor); and
  4. Provide all 120-volt power circuits and connections which are required for proper fire-door operation, whether indicated on the drawings or not (verify with the project, fire-door vendor/subcontractor).
- R. The system shall continue to implement the required monitoring of the existing, facility, sprinkler system (i.e., at all flow switches, tamper switches, etc.), in strict accordance with the requirements of all applicable codes and governing authorities.
- S. The system shall continue to implement the required monitoring of the existing, facility-sprinkler-system, fire-pump equipment (i.e., all flow switches and tamper switches; all disconnecting means and controllers, including continually monitoring the presence of available electrical power; etc.), in strict accordance with the requirements of all applicable codes and governing authorities.
- T. The system shall implement the required monitoring of the exterior, cooking-hood, fire-extinguishing system, including providing the proper signals for de-energizing all electrically-operated equipment which is located beneath such hood, and for closing the main gas solenoid valve. Provide all shunt-trip-type circuit breakers, (addressable-type) relays, and contactors, and all other appurtenances, which are required to accomplish such, whether so indicated on the drawings or not. As a clarification, the hood exhaust fan, if operating at the time, shall not be de-energized and shall continue to operate; and the hood, exhaust fan, if not operating at the time, shall be energized and shall be caused to operate.
- U. The system shall be in strict accordance with all applicable codes, including, but not limited to, NFPA 70, NFPA 72, NFPA 101, the International Building Code, and the Americans with Disabilities Act (ADA-ABA); and shall be in strict accordance with all requirements of the state fire marshal's office and all other governing authorities, and with all requirements and instructions of the owner.

- V. Install all new interconnecting wiring in raceways which are dedicated for such wiring (i.e., so as to be separate from all other wiring), except that interconnecting wiring that is located above accessible ceilings (only) may be routed without raceways, as long as such wiring is rated for use in spaces for environmental air (plenums) where required, is supported from the true ceiling above (via "J" hooks, etc.) and not from the drop ceiling, does not interfere with the removal of any ceiling tiles, and is totally accessible. As a clarification, only suspended, grid-type ceilings having easily-removal ceiling tiles are considered to be "accessible ceilings" (as referenced in this paragraph).
- W. The system shall continue to be capable of supervising short circuits and open circuits within circuit-wiring loops, and of giving the appropriate trouble indications at the fire-alarm panel, and at the existing remote annunciation panel which is located at the existing fireman control center (that shall be provided).
- X. New interconnections shall be in strict accordance with wiring diagrams which are supplied by the system manufacturer; request and obtain all relevant information in advance. The conductor sizes shall be as recommended and required by the system manufacturer/supplier, taking voltage drop into account, and shall meet all requirements of Article 760 of the National Electrical Code for fire-alarm use.
- Y. The new system wiring and equipment, including all circuits which are controlled and powered by the system, shall be installed and connected in accordance with the requirements of NFPA 72 and of NFPA 70, National Electrical Code, Article 760.
- Z. Label all new interconnecting wiring, and termination points, using a method which is approved in advance by the architect. The exact designation which is used for each run of interconnecting wiring, and for each termination point, shall be as approved in advance by the architect.
- AA. The fire-alarm panel shall have a see-through, lockable door and shall have the number of addressable modules which is required by all applicable codes and governing authorities; which is dictated by good practice; and which is needed to accommodate all remaining-existing system devices, and all system devices that are indicated on the drawings, specified herein, and required for this project.
- BB. Whenever any initiating device is activated:
  - 1. A red LED at the fire-alarm panel shall light;
  - 2. A red LED at the existing, remote, annunciation panel shall light;
  - 3. A full LCD readout at the fire-alarm panel and at the existing, remote, annunciation panel shall display the respective initiating-device type, the respective initiating-device location, and the date and time of the respective initiating condition;
  - 4. An audible alarm at the fire-alarm panel shall sound, until manually silenced;
  - 5. A general alarm which is completely code-approved and approved by the state fire marshal shall occur in all project areas of the facility;
  - 6. The muting of all sound systems at the project areas of the facility shall occur;
  - 7. The electric release of all doors at the project areas of the facility which are equipped with electrically-operated locking mechanisms or hold-open devices,

- and the closing of all doors at the project areas of the facility which are equipped with electrically-operated closing mechanisms, shall occur;
8. All other required control functions shall occur; and
  9. The appropriate general-alarm signal shall be sent to the above-referenced, existing, remote, monitoring station.
- CC. Whenever trouble is detected by any supervising or monitoring circuit:
1. An amber LED at the fire-alarm panel shall light;
  2. An amber LED at the existing, remote, annunciation panel shall light;
  3. A full LCD readout at the fire-alarm panel and at the existing, remote, annunciation panel shall display the troubled-device type, the troubled-device location, and the date and time of the trouble condition;
  4. An audible trouble alarm at the fire-alarm panel shall sound, until manually-silenced; and
  5. The appropriate trouble-alarm signal shall be sent to the above-referenced, existing, remote, monitoring station.
- DD. Whenever any smoke detector which is located in a new elevator lobby, in the new elevator shaft, or in the new elevator-machine room is activated, it shall, in addition to the actions that are stipulated herein for all initiating devices, cause "recall" of the new elevator, in strict accordance with all requirements of all applicable codes and governing authorities.
- EE. Whenever any heat detector which is located in the new elevator-machine room or in the new elevator shaft is activated, it shall, in addition to the actions that are stipulated herein for all initiating devices, disconnect automatically the main-line power supply to the new elevator equipment.
- FF. After, and only after (as required and allowed by all applicable codes and governing authorities), the above-mentioned, automatic disconnection of the main-line power supply to the new elevator equipment has been accomplished, whenever any heat detector which is located in the new elevator-machine room or in the new elevator shaft is activated, it shall, in addition to the actions that are stipulated herein for all initiating devices, implement the proper signal which will open the electrically-operated valve(s) on the "dry-pipe" portions of the facility sprinkler system in order to allow water to flow to the sprinkler head(s) that are located in the new elevator-machine room and/or in the new elevator shaft.
- GG. The fire-alarm panel shall have rechargeable, long-life, battery backup. Such battery capacity shall be in strict accordance with all applicable codes, including, but not limited to, NFPA 70, NFPA 72, NFPA 101, and the Americans with Disabilities Act (ADA-ABA), and in strict accordance with all requirements of the state fire marshal's office and all other governing authorities, as required to accommodate all remaining-existing system devices, and all system devices which are shown on the drawings, specified herein, and required for this project. Under maximum normal load of the system, such battery backup shall be sufficient to operate the system for twenty-four (24) hours (longer if so required by any applicable code and/or governing authority; verify in advance) and then, at the end of such period, be sufficient to operate all notification appliances which are used for evacuation or to direct aid to the location of an emergency for five (5) minutes

- (longer if so required by any applicable code and/or governing authority; verify in advance). In addition, such battery capacity, where and as used for emergency-voice/alarm-communication service (verify in advance), shall be capable of operating the system under maximum normal load for twenty-four (24) hours (longer so if required by any applicable code and/or governing authority; verify in advance) and then be capable of operating the system during a fire or other emergency condition for a period of two (2) hours (longer if so required by any applicable code and/or governing authority; verify in advance). Reference NFPA72:1-5.2.5 for additional information.
- HH. The integral power-supply capacity shall be in strict accordance with all applicable codes, including, but not limited to, NFPA 70, NFPA 72, NFPA 101, and the Americans with Disabilities Act (ADA-ABA), and in strict accordance with all requirements of the state fire marshal's office and all other governing authorities, as required to accommodate all remaining-existing system devices, and all system devices which are shown on the drawings, specified herein, and required for this project.
- II. Each initiating device and each monitoring device shall be an individual addressable point.
- JJ. The outlet box for each new smoke detector and for each new heat detector shall be flush-mounted; each new smoke detector and each new heat detector shall have an LED indicator; and each new smoke detector and each new heat detector shall be an individual analog-addressable (head).
- KK. Whether so indicated on the drawings or not, provide a smoke detector at the appropriate location near each piece of new system equipment including, but not limited to, each new auxiliary fire-alarm panel, each new fireman control center (if any; verify), each new remote power supply unit, each new battery-booster unit, each new telecommunication backboard (if any; verify), etc., in strict accordance with the requirements of all applicable codes and governing authorities. Verify all parameters and requirements, and provide accordingly.
- LL. In each location where a new smoke detector is indicated on the drawings and/or specified herein to be provided, and, for any reason, a new smoke detector would not operate properly for the application, provide, instead, a new heat detector (verify all parameters and requirements in advance, and provide accordingly).
- MM. Each new duct-type, smoke detector shall be complete with a duct-detector housing, a sampling tube, and contacts as required for alarm initiation and air-handling-unit shutdown, and shall be an individual addressable point. Whether so indicated on the drawings or not, provide a new, strategically-located, remote signal indicator for each new duct-type, smoke detector which is located in an equipment room or in another area that is hidden from normal view.
- NN. Whether so indicated on the drawings or not, provide a new duct-type smoke detector at and for the supply-air duct of each project air-handling unit, and at and for the return-air duct of each project air-handling unit. Also, whether so indicated on the drawings or not, provide additional, new, duct-type smoke detectors at and for the supply-air ducts of each project air-handling unit as required to accommodate air-duct configurations which

cannot prudently be accommodated by a single duct-type smoke detector; and at and for the return-air ducts of each project air-handling unit as required to accommodate air-duct configurations which cannot prudently be accommodated by a single duct-type smoke detector. Verify all parameters and requirements in advance, and provide accordingly.

- OO. Each new heat detector shall be the rate-of-rise type with a fixed temperature setting of 135 degrees F., except that each detector which is located in a new elevator-machine room or located in a new elevator shaft shall have both a lower temperature rating and a higher sensitivity (characterized by a lower Response Time Index [RTI]) when compared to the respective sprinkler. Whether so indicated on the drawings or not, provide such a new heat detector within two feet (2'-0") of each new sprinkler head which is located in a new elevator-machine room or in a new elevator shaft.
- PP. Where ambient conditions prohibit installation of a new smoke detector, provide a new heat detector instead.
- QQ. Where possible, each new alarm-indicating device shall be the flush-mounted type.
- RR. Each new visual device shall produce the illumination intensity that is respectively required by all applicable codes (including A.D.A. and NFPA 72) and by all applicable governing authorities for the particular application. Provide new visual devices having the illumination intensities which are respectively required to meet such requirements. As a clarification, the locations which are respectively indicated on drawings for the new visual devices are presented only as a general guide, with no guaranty as to accuracy. It is this contractor's responsibility to provide new visual devices in the proper locations, and having the respectively-proper intensity ratings, which are required for the respective applications, at no additional cost to the owner. Verify all parameters and requirements in advance of producing the system shop drawings, and in advance of making the required system-shop-drawing submittal to the fire marshal's office; indicate the respectively-required, new, visual-alarm-device locations and intensity ratings in such shop drawings; and provide all such required, new devices accordingly. Provide all additional, new, system visual devices which subsequently become required (e.g., as a result of the fire marshal office's review of the system shop drawings, during the project construction, during and/or following the fire marshal office's project final inspection, etc.), at no additional cost to the owner.
- SS. Provide new speakers (audible devices), with the appropriate taps, which will produce the sound levels that are respectively required so that the messages will be heard above all ambient noise. The total sound pressure which is produced by combining the ambient sound pressure level with all audible notification appliances operating shall not exceed 110 dBA at the minimum hearing distance. Where new audible appliances are provided in mechanical equipment rooms, the average ambient sound level which is used for design guidance shall be 85 dBA. To ensure that audible signals are clearly heard, they shall have a sound level at least 15 dB above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least sixty (60) seconds, whichever is greater, measured at 5 feet above the floor in the area which is required to be served by the system, using the A-weighted scale (dBA).

- TT. Further, provide new audible devices (speakers) which are located as respectively required, which are equipped with the respectively-required taps, and which have the respectively-required, sound-producing intensities and sound-producing characteristics as necessary to meet all intelligibility requirements of all applicable codes (including ADA-ABA and NFPA 72) and applicable governing authorities for the particular applications. As a clarification, the locations which are respectively indicated on drawings for the new audible devices are presented only as a general guide, with no guaranty as to accuracy. It is this contractor's responsibility to provide new audible devices in the proper locations, and having the respectively-proper sound-intensity ratings and characteristics, which are required for the respective applications, at no additional cost to the owner. Verify all parameters and requirements in advance of producing the system shop drawings, and in advance of making the required system-shop-drawing submittal to the fire marshal's office; indicate the respectively-required, audible-alarm-device locations and intensity ratings in such shop drawings; and provide all such required new devices accordingly. Provide all additional, new, system audible devices which subsequently become required (e.g., as a result of the fire marshal office's review of the system shop drawings, during the project construction, during and/or following the fire marshal office's project final inspection, etc.), at no additional cost to the owner.
- UU. Where practicable, provide combination audible-visual-type, alarm-indicating devices in lieu of providing two (2) separate devices.
- VV. To the full extent which is practicable (i.e., where allowed by all applicable codes and governing authorities), provide new system devices which respectively match the similar, remaining-existing, system devices at the facility.
- WW. Locate new audible-visual type and visual-only type, system alarm-indicating devices in strict accordance with the applicable articles, sections, and paragraphs of NFPA72.
- XX. Wall mount each new, system, pull station at 4'-0" A.F.F.
- YY. For each new, system, pull station which is required to be mounted to the framing of an aluminum-framed or steel-framed, glass wall, provide a new, pull-station, back box (PSB) which is manufactured and rated for the exact application. Each such PSB shall be a SPACE AGE ELECTRONICS, INC. Part No. SSU03171 (Red), Part No. SSU03172 (White), Part No. SSU03173 (Black), or Part No. SSU03174 (Bronze) PSB, depending on the required color (which shall be as selected in advance by the architect; verify), or approved equivalent.
- ZZ. Provide a new vandal-resistant cover, with a local audible-visible (detering) alarm, at and for each new, system, pull station.
- AAA. Whether indicated on the drawings or not, provide a new audible-visual alarm device, or a new visual-only alarm device, within fifteen feet (15'-0") of each end of each new corridor, as per the requirements of all applicable codes and governing authorities.
- BBB. Fully test and certify the system, including activating all alarm, monitoring, and control initiating devices, and all equipment, under simulated fire and power-failure conditions, prior to acceptance. The tests shall be conducted by the system supplier, and shall be

witnessed by the architect and/or the owner, or by their authorized representative (as determined in advance by the architect; schedule all such testing well in advance with the architect). The system shall be proven to operate in strict accordance with the requirements of all applicable codes and governing authorities, with all performance criteria which are stipulated herein and required, and with good practice. The system shall be proven to perform satisfactorily after a single break or ground-fault condition.

CCC. Furnish to the owner, to the owner's complete satisfaction, system orientation and training by authorized factory representatives, at the times and on the dates which are stipulated by the architect and the owner, without limit, until the termination of the project one-year warranty period.

**1.4 Area-of-Refuge, Two-Way, Audio/Visual, Communication Systems (Rescue-Assistance Systems)**

- A. Submittals of any kind (e.g., shop drawings, prior-approval requests, etc.) which are involved with the "Area-of-Refuge, Two-Way, Audio/Visual, Communication Systems (Rescue-Assistance Systems)", as specified herein below and/or on the drawings, shall include adequate verbiage and/or other information, as required to indicate that all specified characteristics, features, options, etc. will be provided. In addition, the verbiage and/or other information verifying each specified characteristic, feature, option, etc. shall be highlighted and shall be labeled with a number corresponding to the respective paragraph number which is contained in these specifications, or in the respective addendum or change order, for that specified characteristic, feature, option, etc. Submittals received without all such required verbiage and/or other information, and/or without all such highlighting and labeling, will not be reviewed and will be considered informal.
- B. Provide the area-of-refuge, two-way, audio/visual, communication systems (rescue-assistance systems; each of which is referenced herein as "each system" or "the system") that are specified herein, intended, and required, for audio/visual, two-way communication between the respective areas of refuge on the building second-floor level, third-floor level, fourth-floor level, fifth-floor level, sixth-floor level, seventh-floor level, and penthouse level, and the respective central control point at the building first-floor level, such central control point being as located in coordination with the local fire-protection bureau, with all applicable governing authorities, with the architect, and with the owner, and in accordance with all applicable codes, etc. (verify the exact location in advance), whether so indicated on the drawings or not.
- C. Each system shall:
  - 1. Include directions for the use of the system;
  - 2. Include instructions for summoning assistance via the two-way communication system;
  - 3. Include written identification of the respective location, and such identification shall be posted adjacent to the two-way communication system; and
  - 4. Be in strict accordance with ADA-ABA 207 and 216.
- D. Each system shall be in strict accordance with the requirements of all applicable codes, including the Americans with Disabilities Act (ADA-ABA; particularly ADA-ABA 207

and 216), NFPA 101:Life Safety Code (particularly 101:7.2.12.1.1), and the International Building Code (particularly IBC 1007.8), and of all applicable governing authorities (verify all parameters and requirements in advance, and provide accordingly).

- E. Each system shall include all equipment, devices, signage, materials, hardware, software, interconnections, certifications, commissioning, etc. which are generally and specifically required for such a system, for "single-source responsibility".
- F. Provide (completely under this division of the project), and be completely responsible for, each entire system as specified herein, as required, and as intended.
- G. Each system shall be complete in every respect. Provide all equipment, materials, signage, labor, supervision, inspections, testing, calibrations, certifications, etc. which are required for each system to be a complete and functioning system, as per the requirements of all applicable codes and governing authorities, and as per the owner's needs, whether so indicated on the drawings and/or specified herein or not.
- H. Each system shall be installed and connected in strict accordance with installation and connection instructions, including interconnecting diagrams, from the system manufacturer. Request and obtain all required installation and connection instructions directly from such manufacturer in advance of the commencement of the system installation.
- I. Provide all required system rough-ins, including outlet boxes, junction boxes, pull boxes, raceways, electrical power cables, signal cables, monitoring cables, control cables, etc. where and as required.
- J. After the installation and connection of each system is complete, test, adjust, calibrate, and certify the system (all components), as required for first-class operation.
- K. The specifications for each system require that code-compliant, two-way, audio/visual communication be established and maintained between each, respective, area of refuge on the building second-floor level, third-floor level, fourth-floor level, fifth-floor level, sixth-floor level, seventh-floor level, and penthouse level, and the respective central control point at the building first-floor level, such central control point being as located in coordination with the local fire-protection bureau, with all applicable governing authorities, with the architect, and with the owner, and in accordance with all applicable codes, etc. (verify the exact location in advance), whether so indicated on the drawings or not. Locate the respective, system, master control panel and the respective, system, power supply in the exact location(s) which is/are respectively stipulated by the architect (subject, of course, to approval by the governing authorities) at such, respective, central control point (the respective, system, master control panel and the respective, system, power supply might not be indicated on the drawings at such location).
- L. Before ordering the proposed systems, furnish complete shop-drawing information, relative to all system components, to the architect for approval and obtain the resulting comments.

- M. All interconnecting wiring for the systems shall be run in raceways which are dedicated for such wiring (i.e., so as to be separate from all other wiring).
- N. Provide to the owner, to the owner's complete satisfaction, system orientation and training by authorized factory representatives, at the times and on the dates which are stipulated by the architect and the owner.
- O. Each system shall be a CORNELL Series 4200 system, or approved equivalent, which is modified and augmented as necessary to meet all project requirements (verify in advance) and which comprises a CORNELL Model A-42XX (XX = based on the respectively-required system capacity for the respectively-required number of system call stations; verify in advance and provide accordingly), or approved equivalent, master control panel; the appropriate CORNELL, or approved equivalent, power supply/control unit (provide more than one [1] power supply if, where, and as required for the respectively-required system capacity; verify in advance); CORNELL Model 4201B/VM, or approved equivalent, call stations (the quantity which is respectively required; one [1] for each area of refuge, whether so indicated on the drawings or not; verify in advance and provide accordingly); all required ADA-compliant, rescue-assistance signage (illuminated, where and as required; verify in advance and provide accordingly); and all other required appurtenances.
- P. Whether so indicated on the drawings or not, provide a 20A, 120V, dedicated, branch circuit, which emanates from the nearest, existing, 120/208V, emergency-power, branch-circuit panelboard, and connect such circuit where and as required to feed the systems for incoming emergency power; provide the required, branch, circuit breaker. Also whether so indicated on the drawings or not, provide an additional, 20A, 120V, dedicated, branch circuit, which emanates from the nearest, existing, emergency-power, branch-circuit panelboard, and connect such circuit where and as required to feed all illuminated signage for the systems for incoming emergency power; provide the required, branch, circuit breaker (verify all parameters and requirements in advance, and provide accordingly).

END OF DIVISION 28 00 00