DEMOLITION NOTES:

A) DEMOLITION WORK IN DESIGNATED AREAS SHALL INCLUDE REMOVAL OF ALL DESIGNATED INTERIOR FINISHES, INCLUDING BUT NOT LIMITED TO ALL DESIGNATED PANELING, FURRING, HANGERS, UNUSED ATTACHMENTS, CEILING TILE & GRID, FLOOR FINISHES, ETC. WHERE DEMOLITION ACTIVITIES INVOLVE STRUCTURAL ELEMENTS; BEAMS, JOISTS, CMU BEARING WALLS ETC., DEMOLITION WORK SHALL BE CLOSELY COORDINATED WITH NEW CONSTRUCTION WORK. NO WORK SHALL COMMENCE WITHOUT ADEQUATE BRACING OR SHORING AS REQUIRED TO PREVENT MOVEMENT OR SETTLING IN THE EXISTING STRUCTURE. REMOVALS OF A STRUCTURAL NATURE; BEARING WALLS, ROOFS, FOOTINGS ETC., SHALL BE MADE ONLY UNDER THE DIRECT SUPERVISION OF QUALIFIED PERSONNEL AND SHALL BE SECURED OR OTHERWISE BRACED WHERE EVER FEASIBLE, BY INCORPORATION INTO PROPOSED NEW WORK INCLUDING BUT NOT LIMITED TO INSTALLATION OF NEW LINTELS, NEW INFILL OF CONCRETE BLOCK TO FORM NEW OPENINGS, AND NEW STEEL AT ROOF STRUCTURE AND OPENINGS. AS MUCH AS POSSIBLE NEW CONSTRUCTION IN KEEPING WITH THE PROPOSED CONDITIONS SHALL BE INSTALLED IN LIEU OF TEMPORARY BRACING.

B) PRIOR TO COMMENCEMENT OF ANY DEMOLITION WORK, THE CONTRACTOR SHALL MEET WITH THE OWNER TO DETERMINE WHICH ITEMS, IF ANY, ARE OF SALVAGEABLE VALUE TO THE OWNER. THE CONTRACTOR IS ENCOURAGED TO ALSO DOCUMENT ANY EXISTING DAMAGE OR DEFICIENCIES, IN BOTH WRITTEN AND PHOTOGRAPHIC FORMS AS REQUIRED, WHICH ARE EVIDENT IN THE EXISTING BUILDING.

C) ALL ITEMS DESIGNATED TO BE OF SALVAGEABLE VALUE TO THE OWNER SHALL BE REMOVED AS DIRECTED BY THE OWNER. ALL ITEMS DESIGNATED FOR DEMOLITION SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED COMPLETELY FROM THE SITE AND DISPOSED OF AS NECESSARY, IN ACCORDANCE WITH ALL REGULATIONS IN EFFECT.

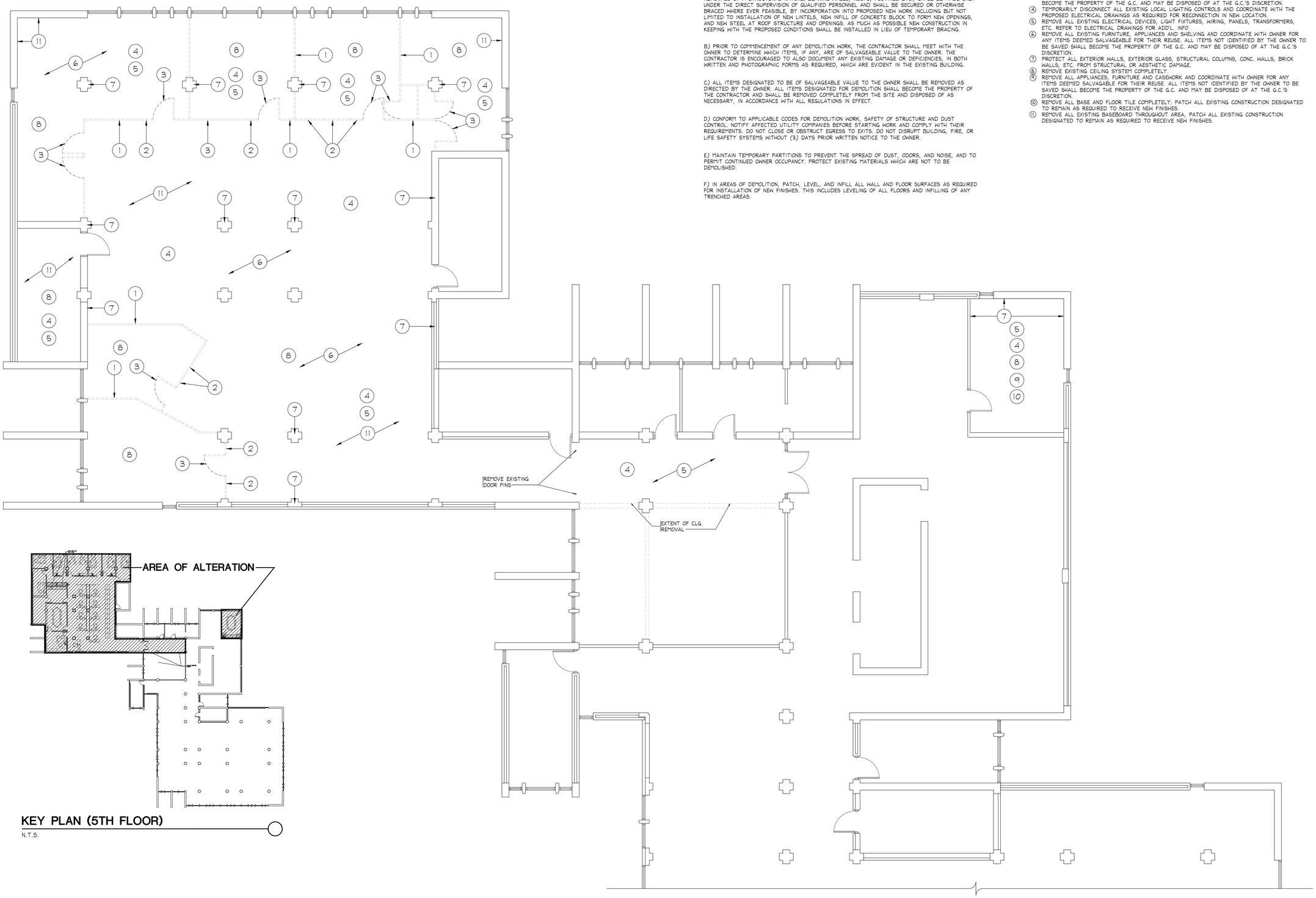
D) CONFORM TO APPLICABLE CODES FOR DEMOLITION WORK, SAFETY OF STRUCTURE AND DUST CONTROL. NOTIFY AFFECTED UTILITY COMPANIES BEFORE STARTING WORK AND COMPLY WITH THEIR REQUIREMENTS. DO NOT CLOSE OR OBSTRUCT EGRESS TO EXITS. DO NOT DISRUPT BUILDING, FIRE, OR LIFE SAFETY SYSTEMS WITHOUT (3) DAYS PRIOR WRITTEN NOTICE TO THE OWNER.

E) MAINTAIN TEMPORARY PARTITIONS TO PREVENT THE SPREAD OF DUST, ODORS, AND NOISE, AND TO PERMIT CONTINUED OWNER OCCUPANCY. PROTECT EXISTING MATERIALS WHICH ARE NOT TO BE DEMOLISHED.

F) IN AREAS OF DEMOLITION, PATCH, LEVEL, AND INFILL ALL WALL AND FLOOR SURFACES AS REQUIRED FOR INSTALLATION OF NEW FINISHES. THIS INCLUDES LEVELING OF ALL FLOORS AND INFILLING OF ANY TRENCHED AREAS.

KEY DEMOLITION / REMOVAL NOTES:

1. DEMOLISH EXISTING WALL PARTITION COMPLETELY, INCLUDING BUT NOT LIMITED TO ALL HARDWARE, ANCHORING, ETC. COORDINATE REMOVAL / DEMOLITION OF ALL ELECTRICAL ITEMS / WIRING WITH ELECTRICAL DRAWINGS.
2. REMOVE AND DISPOSE OF ALL BORROWED LITES PRIOR TO DEMOLITION OF PARTITION WALLS.
3. REMOVE ALL DOORS, WHITE BOARDS, ROOM SIGNS, AND OTHER DECOR MOUNTED TO INTERIOR PARTITIONS PRIOR TO DEMOLITION AND COORDINATE WITH OWNER FOR ANY ITEMS DEEMED SALVAGEABLE FOR THEIR REUSE. ALL ITEMS NOT IDENTIFIED BY THE OWNER TO BE SAVED SHALL BECOME THE PROPERTY OF THE G.C. AND MAY BE DISPOSED OF AT THE G.C.'S DISCRETION.
4. TEMPORARILY DISCONNECT ALL EXISTING LOCAL LIGHTING CONTROLS AND COORDINATE WITH THE PROPOSED ELECTRICAL DRAWINGS AS REQUIRED FOR RECONNECTION IN NEW LOCATION.
5. REMOVE ALL EXISTING ELECTRICAL DEVICES, LIGHT FIXTURES, WIRING, PANELS, TRANSFORMERS, ETC. REFER TO ELECTRICAL DRAWINGS FOR ADD'L. INFO
6. REMOVE ALL EXISTING FURNITURE, APPLIANCES AND SHELVING AND COORDINATE WITH OWNER FOR ANY ITEMS DEEMED SALVAGEABLE FOR THEIR REUSE. ALL ITEMS NOT IDENTIFIED BY THE OWNER TO BE SAVED SHALL BECOME THE PROPERTY OF THE G.C. AND MAY BE DISPOSED OF AT THE G.C.'S DISCRETION.
7. PROTECT ALL EXTERIOR WALLS, EXTERIOR GLASS, STRUCTURAL COLUMNS, CONC. WALLS, BRICK WALLS, ETC. FROM STRUCTURAL OR AESTHETIC DAMAGE.
8. REMOVE EXISTING CEILING SYSTEM COMPLETELY.
9. REMOVE ALL APPLIANCES, FURNITURE AND CASEWORK AND COORDINATE WITH OWNER FOR ANY ITEMS DEEMED SALVAGABLE FOR THEIR REUSE. ALL ITEMS NOT IDENTIFIED BY THE OWNER TO BE SAVED SHALL BECOME THE PROPERTY OF THE G.C. AND MAY BE DISPOSED OF AT THE G.C.'S DISCRETION.
10. REMOVE ALL BASE AND FLOOR TILE COMPLETELY; PATCH ALL EXISTING CONSTRUCTION DESIGNATED TO REMAIN AS REQUIRED TO RECEIVE NEW FINISHES.
11. REMOVE ALL EXISTING BASEBOARD THROUGHOUT AREA, PATCH ALL EXISTING CONSTRUCTION DESIGNATED TO REMAIN AS REQUIRED TO RECEIVE NEW FINISHES.



KEY PLAN (5TH FLOOR)

N.T.S.

DEMOLITION PLAN

SCALE: 3/16" = 1'-0"

(SEE MPE DRAWINGS FOR MPE DEMOLITION)

1

Revisions

No.	Date	Description
1	11/30/21	RELEASED FOR BIDDING

NOT FOR CONSTRUCTION

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Project

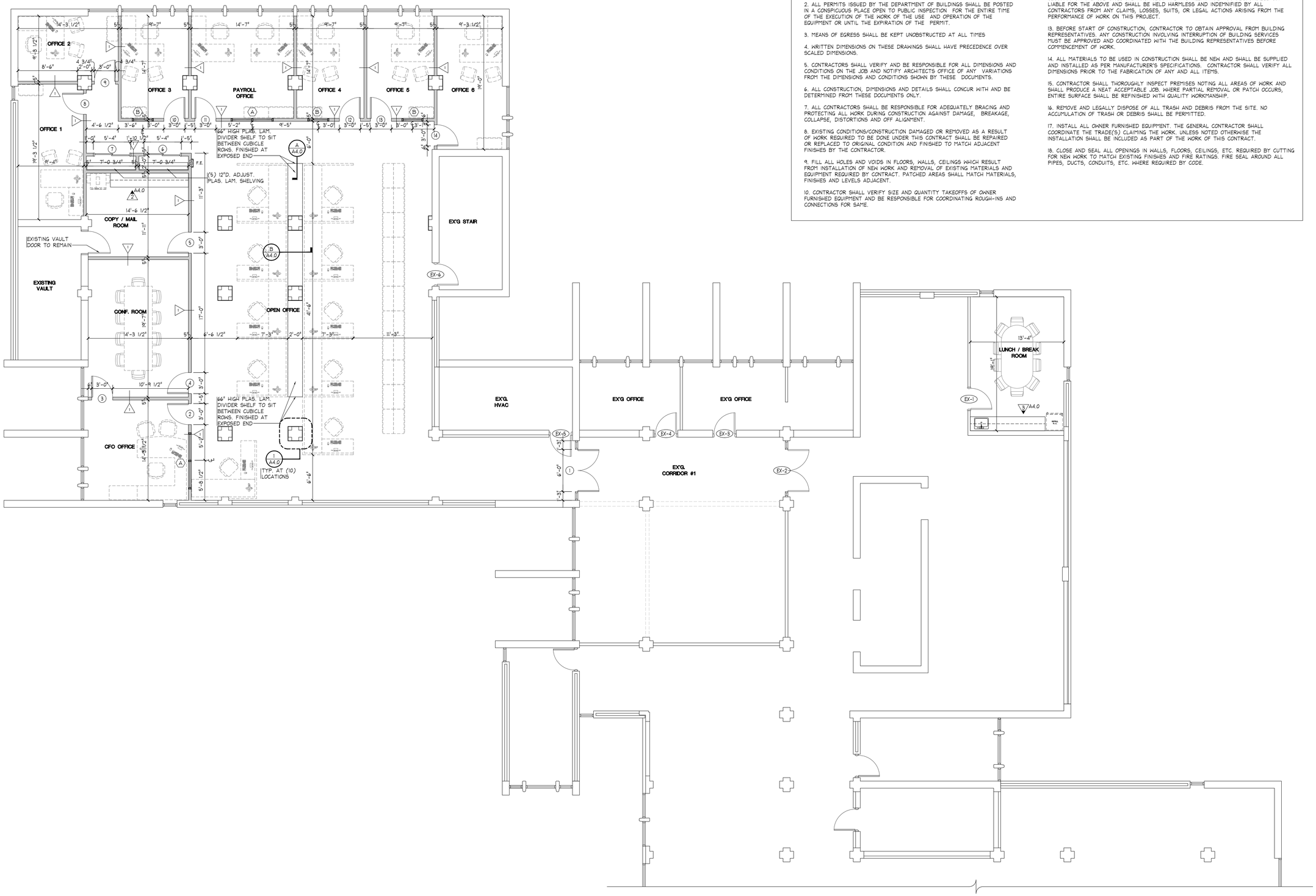
VINELAND CITY HALL
FINANCE DEPT.
RENOVATIONS

640 E WOOD ST.
VINELAND, NJ, 08360

Drawing

KEY PLAN
DEMOLITION PLAN

Scale	Job	Sheet
3/16" = 1'	21.081	D1.0
Drawn	Date	1 of 4
RSM	11/30/21	



PROPOSED FLOOR PLAN

SCALE: 3/16" = 1'-0"

1

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL PERMITS, APPROVALS, TESTING AND INSPECTIONS AS MAY BE REQUIRED BY THE DEPARTMENT OF BUILDINGS. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED DEPARTMENT OF BUILDINGS PERMITS PRIOR TO THE START OF WORK.

2. ALL PERMITS ISSUED BY THE DEPARTMENT OF BUILDINGS SHALL BE POSTED IN A CONSPICUOUS PLACE OPEN TO PUBLIC INSPECTION FOR THE ENTIRE TIME OF THE EXECUTION OF THE WORK OF THE USE AND OPERATION OF THE EQUIPMENT OR UNTIL THE EXPIRATION OF THE PERMIT.

3. MEANS OF EGRESS SHALL BE KEPT UNOBSTRUCTED AT ALL TIMES

4. WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL HAVE PRECEDENCE OVER SCALED DIMENSIONS.

5. CONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND NOTIFY ARCHITECTS OFFICE OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN BY THESE DOCUMENTS.

6. ALL CONSTRUCTION, DIMENSIONS AND DETAILS SHALL CONCUR WITH AND BE DETERMINED FROM THESE DOCUMENTS ONLY.

7. ALL CONTRACTORS SHALL BE RESPONSIBLE FOR ADEQUATELY BRACING AND PROTECTING ALL WORK DURING CONSTRUCTION AGAINST DAMAGE, BREAKAGE, COLLAPSE, DISTORTIONS AND OFF ALIGNMENT.

8. EXISTING CONDITIONS/CONSTRUCTION DAMAGED OR REMOVED AS A RESULT OF WORK REQUIRED TO BE DONE UNDER THIS CONTRACT SHALL BE REPAIRED OR REPLACED TO ORIGINAL CONDITION AND FINISHED TO MATCH ADJACENT FINISHES BY THE CONTRACTOR.

9. FILL ALL HOLES AND VOIDS IN FLOORS, WALLS, CEILINGS WHICH RESULT FROM INSTALLATION OF NEW WORK AND REMOVAL OF EXISTING MATERIALS AND EQUIPMENT REQUIRED BY CONTRACT. PATCHED AREAS SHALL MATCH MATERIALS, FINISHES AND LEVELS ADJACENT.

10. CONTRACTOR SHALL VERIFY SIZE AND QUANTITY TAKEOFFS OF OWNER FURNISHED EQUIPMENT AND BE RESPONSIBLE FOR COORDINATING ROUGH-INS AND CONNECTIONS FOR SAME.

11. THE WORK SHALL INCLUDE ALL THE MATERIAL AND LABOR NECESSARY TO COMPLETE DEMOLITION AND CONSTRUCTION AS SHOWN ON THESE DRAWINGS

12. ALL CONTRACTORS AND SUBCONTRACTORS SHALL BE RESPONSIBLE FOR THE PROPER PERFORMANCE OF THEIR WORK, COORDINATION WITH OTHER TRADES, METHODS, SAFETY AND SECURITY ON THE JOB SITE. THE ARCHITECT AND HIS AGENT ARE NOT RESPONSIBLE OR LIABLE FOR THE ABOVE AND SHALL BE HELD HARMLESS AND INDEMNIFIED BY ALL CONTRACTORS FROM ANY CLAIMS, LOSSES, SUITS, OR LEGAL ACTIONS ARISING FROM THE PERFORMANCE OF WORK ON THIS PROJECT.

13. BEFORE START OF CONSTRUCTION, CONTRACTOR TO OBTAIN APPROVAL FROM BUILDING REPRESENTATIVES. ANY CONSTRUCTION INVOLVING INTERRUPTION OF BUILDING SERVICES MUST BE APPROVED AND COORDINATED WITH THE BUILDING REPRESENTATIVES BEFORE COMMENCEMENT OF WORK.

14. ALL MATERIALS TO BE USED IN CONSTRUCTION SHALL BE NEW AND SHALL BE SUPPLIED AND INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO THE FABRICATION OF ANY AND ALL ITEMS.

15. CONTRACTOR SHALL THOROUGHLY INSPECT PREMISES NOTING ALL AREAS OF WORK AND SHALL PRODUCE A NEAT ACCEPTABLE JOB. WHERE PARTIAL REMOVAL OR PATCH OCCURS, ENTIRE SURFACE SHALL BE REFINISHED WITH QUALITY WORKMANSHIP.

16. REMOVE AND LEGALLY DISPOSE OF ALL TRASH AND DEBRIS FROM THE SITE. NO ACCUMULATION OF TRASH OR DEBRIS SHALL BE PERMITTED.

17. INSTALL ALL OWNER FURNISHED EQUIPMENT. THE GENERAL CONTRACTOR SHALL COORDINATE THE TRADE(S) CLAIMING THE WORK. UNLESS NOTED OTHERWISE THE INSTALLATION SHALL BE INCLUDED AS PART OF THE WORK OF THIS CONTRACT.

18. CLOSE AND SEAL ALL OPENINGS IN WALLS, FLOORS, CEILINGS, ETC. REQUIRED BY CUTTING FOR NEW WORK TO MATCH EXISTING FINISHES AND FIRE RATINGS. FIRE SEAL AROUND ALL PIPES, DUCTS, CONDUITS, ETC. WHERE REQUIRED BY CODE.

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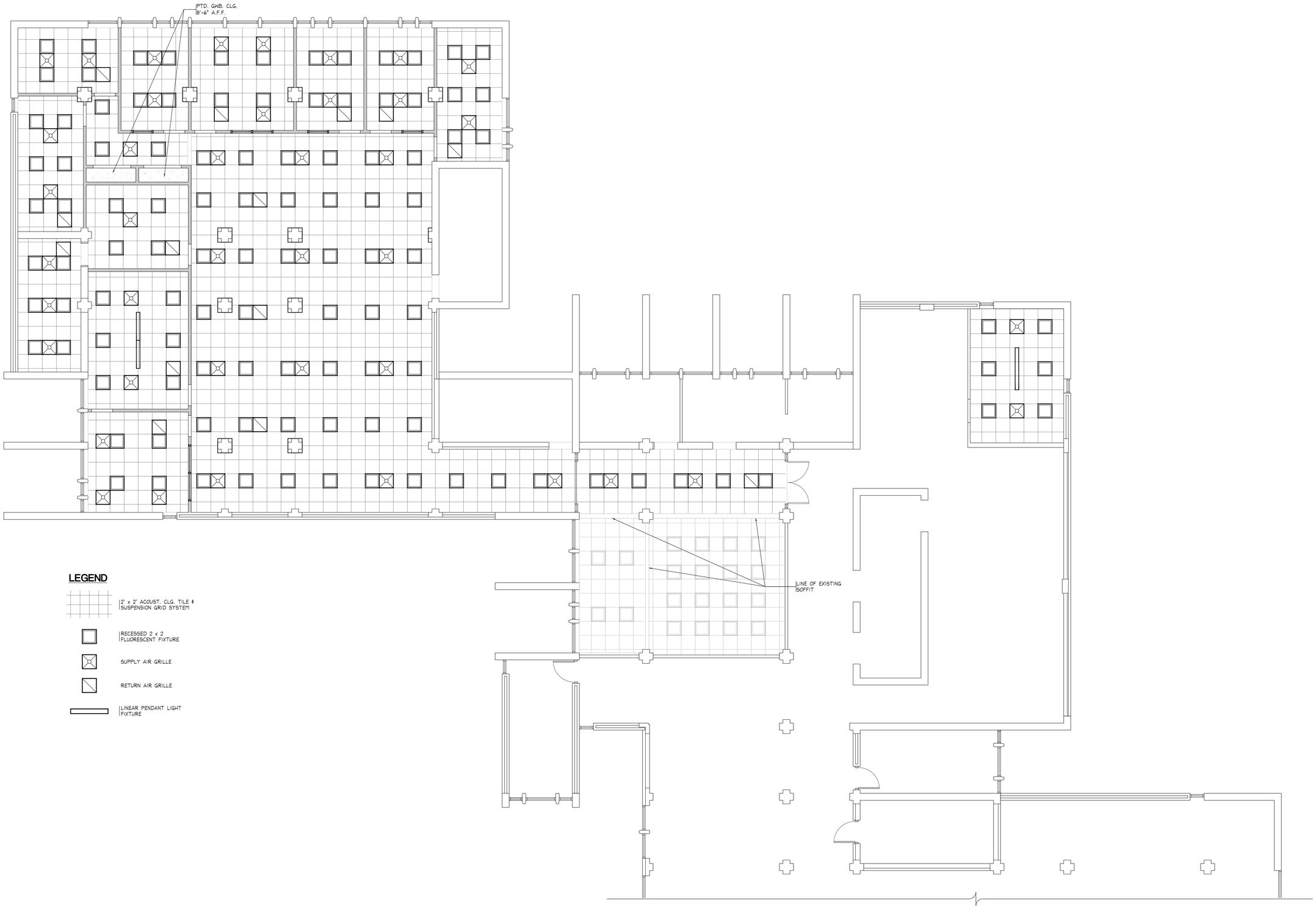
VINELAND CITY HALL FINANCE DEPT. RENOVATIONS

640 E WOOD ST.
VINELAND, NJ, 08360

Drawing

PROPOSED FLOOR PLAN

Scale	Job	Sheet
3/16" = 1'	21.081	A1.0
Drawn: RSM	Date: 11/30/21	2 of 4



LEGEND

- 2' x 2' ACOUST. CLG. TILE & SUSPENSION GRID SYSTEM
- RECESSED 2 x 2 FLUORESCENT FIXTURE
- SUPPLY AIR GRILLE
- RETURN AIR GRILLE
- LINEAR PENDANT LIGHT FIXTURE

PROPOSED REFLECTED CEILING PLAN

SCALE: 3/16" = 1'-0"

①

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Drawing

PROPOSED REFLECTED CEILING PLAN

Scale	Job	Sheet
3/16" = 1'	21.081	A1.1
Drawn: RSM	Date: 11/30/21	3 of 4

ROOM FINISH SCHEDULE

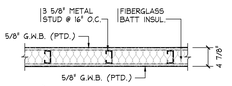
ROOM NAME	FLOOR	BASE	WALL	CLG.	HEIGHT	REMARKS
OPEN OFFICE	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
C.F.O. OFFICE	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
CONF. ROOM	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
COPY / MAIL ROOM	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
OFFICE 1	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
OFFICE 2	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
OFFICE 3	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
PAYROLL OFFICE	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
OFFICE 4	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
OFFICE 5	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
OFFICE 6	CARPET	4" VINYL	PTD. G.W.B./C.M.U.	ACOUST. TILE	8'-10"	
EXISTING CORRIDOR #1	EXISTING CARPET	EXISTING	EXISTING	ACOUST. TILE	8'-10"	
LUNCH / BREAK ROOM	L.V.T.	4" VINYL	C.M.U.	ACOUST. TILE	8'-5"	
EXISTING VAULT	CARPET	4" VINYL	PTD. CMU / CONC.	ACOUST. TILE	MATCH EX'G	

NOTES:
1. COORDINATE ALL FINISH SELECTIONS/LOCATIONS WITH OWNER.
2. PROVIDE 6" UNFACED INSULATION BATTS ABOVE ALL ACOUSTICAL TILE CEILINGS.
3. DO NOT INSTALL VINYL BASE OVER EXISTING BRICK WALLS.
4. NEW FLOORING IS TO BE INSTALLED OVER EXISTING IN ALL ROOMS / AREAS LISTED ON THE ROOM FINISH SCHEDULE UNLESS NOTED OTHERWISE. THE FOLLOWING ROOMS / AREAS WILL HAVE NEW FLOORING INSTALLED OVER THE EXISTING SUBSTRATE AFTER THE REMOVAL OF THE CURRENT FLOOR FINISH:
   A. LUNCH / BREAK ROOM
5. EXISTING BRICK IS NOT TO BE PAINTED; PAINTING IS LIMITED TO THE FOLLOWING MATERIALS / SUBSTRATES:
   A. C.M.U.
   B. G.W.B.
   C. PLASTER
6. IN CORRIDOR #1, EXISTING FINISHES ARE TO REMAIN; WORK IS LIMITED TO THE INSTALLATION OF A NEW CEILING SYSTEM INCLUDING GRID, TILE, LIGHT FIXTURES, DIFFUSERS, ETC. SEE MECH. AND ELECT. DWGS FOR ADDITIONAL INFORMATION.

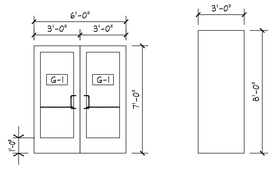
DOOR SCHEDULE

NO.	DOOR WIDTH	DOOR HEIGHT	DOOR THK.	DOOR TYPE	DOOR MATERIAL	DOOR FINISH	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	HDW. NO.	FIRE RATING	REMARKS	NO.
1	6'-0"	7'-4"	2"	AG	ALUM/GLASS	MFR.	1	ALUMINUM	MFR.	4	-		1
2	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	3	-		2
3	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	3	-		3
4	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	1	-		4
5	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	1	-		5
6	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	5	-	BI-PASS DOORS	6
7	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	5	-	BI-PASS DOORS	7
8	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	2	-		8
9	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	1	-		9
10	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	1	-		10
11	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.		-		11
12	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	1	-		12
13	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	1	-		13
14	3'-0"	8'-0"	1 3/4"	F	S.C. WOOD	MFR.	2	HOL. METAL	PTD.	3	-		14
EX-1	EXISTING		-	S.C. WOOD	-		-			-	-	REFINISH EXISTING DOOR AND FRAME	EX-1
EX-2	EXISTING		-	ALUM/GLASS	-		-			-	-		EX-2
EX-3	EXISTING		-	S.C. WOOD	-		-			-	-	REFINISH EXISTING DOOR AND FRAME	EX-3
EX-4	EXISTING		-	S.C. WOOD	-		-			-	-	REFINISH EXISTING DOOR AND FRAME	EX-4
EX-5	EXISTING		-	S.C. WOOD	-		-			-	-	REFINISH EXISTING DOOR AND FRAME	EX-5
EX-6	EXISTING		-	HM+GL	-		-			-	-	REFINISH EXISTING DOOR AND FRAME	EX-6

NOTES:
1. ALL DOOR HARDWARE TO CONFORM TO NJ UCC BARRIER-FREE SUBCODE.
2. SEE SPECIFICATIONS FOR ALL H.M. FRAMES IN CONTACT W/ MASONRY.
3. COORDINATE ALL HARDWARE AND KEYING W/ OWNER.
4. GENERAL CONTRACTOR TO CONFIRM EXISTING KEY SYSTEM WITH OWNER AND TIE NEW CYLINDERS INTO EXISTING SYSTEM.



1 PARTITION TYPE

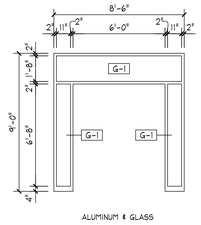


AG F

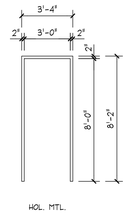
DOOR TYPES
SCALE: 1/4" = 1'-0"

GLAZING SCHEDULE

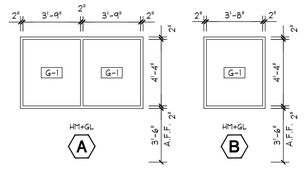
TYPE	DESCRIPTION
G-1	1/4" TEMPERED GLASS



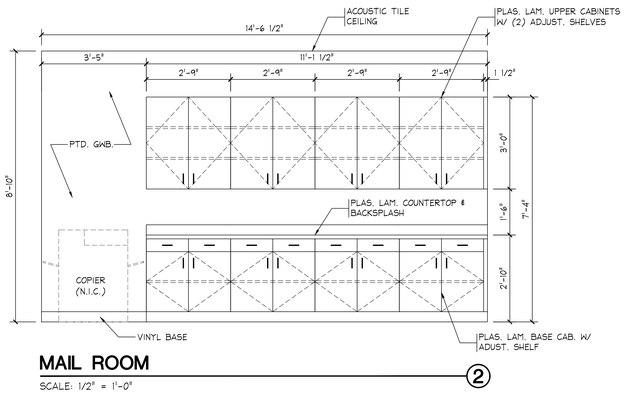
ALUMINUM FRAME TYPES
SCALE: 1/4" = 1'-0"



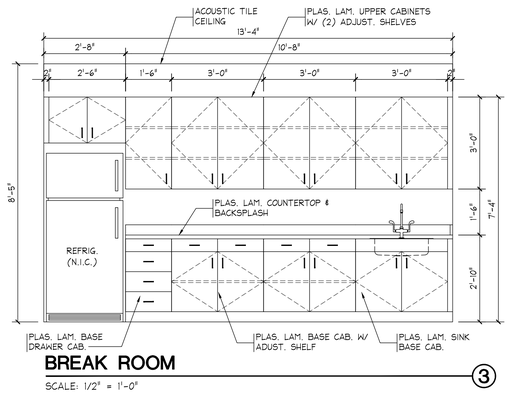
HOLLOW METAL FRAME TYPES
SCALE: 1/4" = 1'-0"



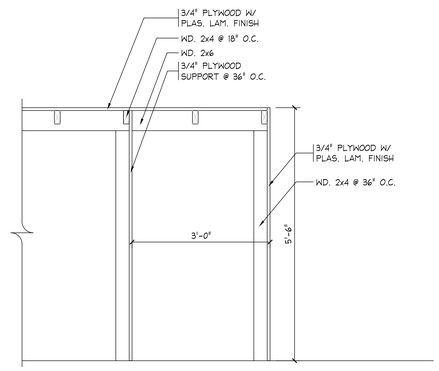
WINDOW TYPES
SCALE: 1/4" = 1'-0"



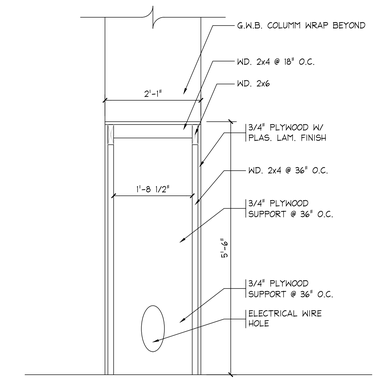
MAIL ROOM
SCALE: 1/2" = 1'-0" 2



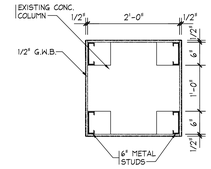
BREAK ROOM
SCALE: 1/2" = 1'-0" 3



DIVIDER SHELF SECTION DETAIL
SCALE: 3/4" = 1'-0" A



DIVIDER SHELF SECTION DETAIL
SCALE: 3/4" = 1'-0" B



COLUMN WRAP DETAIL, TYP. 1
SCALE: 3/4" = 1'-0"

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Drawing
INTERIOR ELEVATIONS
SCHEDULES
DOOR TYPES
PARTITION TYPES

Scale	Job	Sheet
AS NOTED	21.081	A4.0
Drawn: RSM	Date: 11/30/21	4 of 4

ELECTRICAL SYMBOLS LIST

(NOT ALL SYMBOLS ARE NECESSARILY USED ON THIS PROJECT)

LIGHTING SYMBOLS

2'x4'/2'x2'/1'x4' RECESSED CEILING MOUNTED LIGHT FIXTURE
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a
NL = NIGHT LIGHT

SIMILAR TO ABOVE WITH EMERGENCY BACKUP
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

WALL MOUNTED LIGHT FIXTURE
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a
NL = NIGHT LIGHT

STRIP LIGHT FIXTURE – TYPE AS NOTED
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

SIMILAR TO ABOVE WITH EMERGENCY BACKUP
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

UNDERCABINET LIGHT FIXTURE
A = FIXTURE TYPE

CEILING MOUNTED/RECESSED FIXTURE
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

SIMILAR TO ABOVE WITH EMERGENCY BACKUP
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

WALL MOUNTED LIGHT FIXTURE
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

SIMILAR TO ABOVE WITH EMERGENCY BACKUP
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

ACCENT LIGHT OR WALL WASHER
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

SIMILAR TO ABOVE WITH EMERGENCY BACKUP
A = FIXTURE TYPE
a = CONTROLLED BY SWITCH a

LIGHT TRACK–TYPE 'A' WITH TRACK MOUNTED FIXTURE TYPE 'B'

CEILING MOUNTED EXIT LIGHT – DIRECTIONAL ARROWS WHERE INDICATED – SHADED AREAS INDICATE ILLUMINATED FACE/FACES
W = WALL MOUNTED
E = END MOUNTED
C = CEILING MOUNTED

EMERGENCY BATTERY LIGHT UNIT
A = FIXTURE TYPE

REMOTE LIGHT HEADS FOR EMERGENCY BATTERY LIGHT UNIT – TYPE AS NOTED

POWER SYMBOLS

SINGLE POLE SWITCH
2 = DOUBLE POLE
3 = THREE-WAY
4 = FOUR-WAY
a = CONTROLS SWITCH LEG 'a'
D = DIMMER
DR = DOOR
K = KEY OPERATED
MO = MOMENTARY CONTACT
T = TIMER SWITCH
P = PILOT LIGHT
LV = LOW VOLTAGE

DISCONNECT SWITCH – TOGGLE TYPE WITH THERMAL OVERLOAD – HP RATED

DISCONNECT SWITCH – TOGGLE TYPE MOTOR RATED, 20A, 1P, UON

VACANCY SENSOR, WALL MOUNTED

VACANCY SENSOR, CEILING MOUNTED

OCCUPANCY SENSOR, CEILING MOUNTED

OCCUPANCY SENSOR, WALL MOUNTED

PHOTOCELL SENSOR, WALL MOUNTED

CEILING MOUNTED POWER PACK FOR LIGHTING

20A, 125V DUPLEX RECEPTACLE – FLUSH WALL MOUNTED CONTROLLED FROM WALL SWITCH "a"

20A, 125V DUPLEX RECEPTACLE – FLUSH WALL MOUNTED, TAMPER RESISTANT

20A, 125V DUPLEX RECEPTACLE WITH DUAL USB CHARGING OUTLETS FLUSH WALL MOUNTED

20A, 125V DUPLEX RECEPTACLE – FLUSH WALL MOUNTED, CONTROLLED

20A, 125V QUADRUPLEX RECEPTACLE – FLUSH WALL MOUNTED

20A, 125V ISOLATED GROUND, DUPLEX RECEPTACLE, FLUSH WALL MOUNTED

20A, 125V DUPLEX RECEPTACLE, FLUSH WALL MOUNTED, GFI TYPE

20A, 125V EMERGENCY DUPLEX RECEPTACLE, FLUSH WALL MOUNTED

SINGLE RECEPTACLE, FLUSH WALL MOUNTED

20A, 125V DUPLEX RECEPTACLE, FLUSH FLOOR MOUNTED

20A, 125V QUADRUPLEX RECEPTACLE, FLUSH FLOOR MOUNTED

FLOOR MOUNTED 20A, 125V DUPLEX RECEPTACLE

FLOOR MOUNTED 20A, 125V QUADRUPLEX RECEPTACLE

PENDANT MOUNTED 20A, 125V DUPLEX RECEPTACLE

PENDANT MOUNTED 20A, 125V QUADRUPLEX RECEPTACLE

UTILITY METER, UON

WALL MOUNTED FURNITURE FEED WHIP LOCATIONS
(P = POWER, D = DATA)

SPECIAL PURPOSE RECEPTACLE, FLUSH FLOOR MOUNTED, A = TYPE

SPECIAL PURPOSE RECEPTACLE, FLUSH WALL MOUNTED,
A = TYPE

WALL MOUNTED CLOCK
D = DOUBLE FACE

MOTOR CONTROLLER

COMBINATION MOTOR CONTROLLER AND DISCONNECT SWITCH AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED

UNFUSED DISCONNECT SWITCH
SWITCH AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED

FUSED DISCONNECT SWITCH
SWITCH AMPS/FUSE AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED

ENCLOSED CIRCUIT BREAKER
TRIP AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED

POWER POLE

SURFACE MOUNTED PANELBOARD

FLUSH MOUNTED PANELBOARD

CEILING MOUNTED JUNCTION BOX

FLUSH WALL MOUNTED JUNCTION BOX

FLUSH FLOOR MOUNTED JUNCTION BOX

CAP

PUSH BUTTON
K = KEY OPERATED
H = HOLD UP
P = PANIC
EPO = EM. POWER OFF

EXISTING CONDUIT/EQUIPMENT TO BE REMOVED

UNDERGROUND CONDUIT/WIRING

POINT OF CONNECTION

POINT OF DISCONNECTION

FIRE ALARM SYMBOLS

CEILING MOUNTED SPACE SMOKE DETECTOR
F = MOUNTED UNDER RAISED FLOOR

DUCT SMOKE DETECTOR

CEILING MOUNTED CARBON MONOXIDE DETECTOR

SINGLE/MULTI STATION SMOKE ALARM

SINGLE/MULTI STATION CARBON MONOXIDE ALARM

SINGLE/MULTI STATION SMOKE/CARBON MONOXIDE ALARM

THERMAL DETECTOR RATE-OF-RISE
F = FIXED TEMPERATURE

SPRINKLER WATERFLOW SWITCH

SPRINKLER PRESSURE SWITCH

SPRINKLER TAMPER SWITCH

FIRE ALARM PULL STATION

FIRE ALARM TELEPHONE JACK

COMBINATION FIRE ALARM SPEAKER AND STROBE LIGHT UNIT – FLUSH WALL MOUNTED

FIRE ALARM SPEAKER – FLUSH WALL MOUNTED
C = CEILING MOUNTED

COMBINATION FIRE ALARM HORN AND STROBE LIGHT UNIT, FLUSH WALL MOUNTED

FIRE ALARM HORN – FLUSH WALL MOUNTED
C = CEILING MOUNTED

LOW FREQUENCY SOUNDER (520 HZ) – FLUSH WALL MOUNTED
C = CEILING MOUNTED

COMBINATION FIRE ALARM BELL AND STROBE LIGHT UNIT, FLUSH WALL MOUNTED

FIRE ALARM BELL, FLUSH WALL MOUNTED

FIRE ALARM MONITOR MODULE

FIRE ALARM CONTROL MODULE

DOOR HOLDERS

ELECTROMAGNETIC DOOR RELEASE

ELEVATOR RECALL TIE-IN POINT

FLUSH WALL MOUNTED STROBE LIGHT UNIT

CEILING MOUNTED STROBE LIGHT UNIT

REMOTE INDICATOR LIGHT

VOICE/DATA/P.A. SYMBOLS

WALL MOUNTED PUBLIC ADDRESS SPEAKER
D = DUAL HORN

CEILING MOUNTED PUBLIC ADDRESS SPEAKER
D = DUAL HORN

VOICE & DATA OUTLET LOCATION WITH 1" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING
#/# = # OF VOICE JACKS/# OF DATA JACKS

VOICE OUTLET LOCATION WITH 1" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING
P = PUBLIC
F = FAX
W = WALL MOUNTED
# = # OF JACKS

DATA OUTLET LOCATION WITH 1" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING
= # OF JACKS

FLOOR MOUNTED VOICE & DATA OUTLET LOCATION WITH 1" CONDUIT UNDER FLOOR TO NEARBY WALL THEN UP TO ABOVE ACCESSIBLE CEILING
#/# = # OF VOICE JACKS/# OF DATA JACKS

TELEVISION OUTLET LOCATION WITH 3/4" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING

CLOSED CAPTION TV CAMERA OUTLET LOCATION WITH 3/4" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CLG

CARD ACCESS STATION OUTLET LOCATION WITH 3/4" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CLG

CEILING MOUNTED WIRELESS ACCESS POINT

ABBREVIATIONS

(NOT ALL ABBREVIATIONS ARE NECESSARILY USED ON THIS PROJECT)

1P	SINGLE POLE
2P	TWO POLE
3P	THREE POLE
A	AMPERE
AC	ABOVE COUNTER
ACB	AIR CIRCUIT BREAKER
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AIC	AMPERE INTERRUPTING CAPACITY
AL	ALUMINUM
ALM	ALARM
AMM	AMMETER
ARF	ABOVE RAISED FLOOR
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAUGE
BFC	BELOW FINISHED CEILING
BG	BREAK GLASS SWITCH
BIL	BASIC IMPULSE LEVEL
BLDG	BUILDING
CAB	CABINET
CAT	CATALOG
C	CONDUIT
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CL	CENTER LINE
CLG	CEILING
CTL	CONTROL
CO	CONDUIT ONLY
COM	COMMUNICATION
CONN	CONNECTED
CONT	CONTINUATION
CT	CURRENT TRANSFORMER
CU	COPPER
CUH	CABINET UNIT HEATER
DB	DECIBEL
DE	DUAL ELEMENT FUSE(S)
DEG	DEGREE
°C	DEGREE CELSIUS
°F	DEGREE FAHRENHEIT
DIA	DIAMETER
DISC	DISCONNECT
DIV	DIVISION
DN	DOWN
DP	DISTRIBUTION PANEL BOARD
DS	DISCONNECT SWITCH
DWG	DRAWING
(E)	EXISTING TO REMAIN
EA	EACH
EC	ELECTRICAL CONTRACTOR
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
EQ	EQUIPMENT
(ER)	EXISTING SHALL BE REMOVED
(ERR)	EXISTING SHALL BE REMOVED & RELOCATED
ERC	ELECTRIC REHEAT COIL
EWC	ELECTRIC WATER COOLER
EXIST,EX	EXISTING
EXT	EXTERIOR
FA	FIRE ALARM
FAA	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS
FCU	FAN COIL UNIT
FDR	FEEDER
FDS	FUSED DISCONNECT SWITCH
FIXT	FIXTURE
FL	FLOOR
FLA	FULL LOAD AMPERES
FLEX	FLEXIBLE
FLUOR	FLUORESCENT
FP	FIRE PROTECTION
FRZ	FREEZER
FT	FEET OR FOOT
G	GROUND
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
HID	HIGH INTENSITY DISCHARGE
HP	HORSE POWER
HPCS	HIGH PRESSURE CONTACT SWITCH
HT	HEIGHT
HV	HIGH VOLTAGE
HZ	HERTZ
ID	INSIDE DIAMETER
IG	ISOLATED GROUND
INC	INCANDESCENT
INCL	INCLUDED
INST	INSTRUMENT
IPC	ISOLATED POWER CENTER
IPX	ISOLATED POWER CENTER–X–RAY
JB	JUNCTION BOX
KCMIL	THOUSAND CIRCULAR MILS
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWH	KILOWATT HOUR
LFMC	LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT
LFNC	LIQUIDTIGHT FLEXIBLE NON–METALLIC CONDUIT
LIM	LINE ISOLATION MONITOR
LTG	LIGHTING
MAP	MEDICAL GAS ALARM PANEL
MAX	MAXIMUM
MC	METAL CLAD, MECH. CONTRACTOR
MCA	MIN. CIRCUIT AMPERES
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MER	MECHANICAL ROOM
MFR	MANUFACTURER
MFS	MAIN FUSED SWITCH
MH	MANHOLE, METAL HALIDE
MIC	MICROPHONE
MIN	MINIMUM
MLO	MAIN LUG ONLY
MOCP	MAX. OVERCURRENT PROTECTION
MOPD	MAX. OVERCURRENT PROTECTION
MTD	MOUNTED
MTG	MOUNTING
MTS	MANUAL TRANSFER SWITCH
N	NEUTRAL
(N)	NEW
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OCB	OIL CIRCUIT BREAKER
OD	OUTSIDE DIAMETER
OH	OVERHEAD
P	POLE
PA	PUBLIC ADDRESS
PB	PULL BOX
PBS	PUSH BUTTON SWITCH
PC	PLUMBING CONTRACTOR
PHC	PIPE HEATING CABLE
ϕ, PH	PHASE
PNL	PANEL
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PWR	POWER
RCS	REMOTE CONTROL SWITCH
(RE)	RELOCATED EXISTING
REC	RECEPTACLE
REF	REFRIGERATOR
REQ	REQUIRED
RM	ROOM
RGS	RIGID GALVANIZED STEEL CONDUIT
(RRO)	EXISTING SHALL BE REMOVED AND RETURN TO OWNER
SAP	SPRINKLER ALARM PANEL
SCH	SCHEDULE
SE	SERVICE ENTRANCE
SEC	SECONDARY
SECT	SECTION
SN	SOLID NEUTRAL
SPEC	SPECIFICATION
SP	SPEAKER
SPKR	SPRINKLER
SPD	SURGE PROTECTION DEVICE
SW	SWITCH
SWBD	SWITCHBOARD
SYS	SYSTEMS
SUBST	SUBSTATION
SWGR	SWITCHGEAR
TBD	TO BE DETERMINED
TEL	TELEPHONE
TEMP	TEMPERATURE
THERM	THERMOSTAT
TP	TAMPER PROOF
TS	TAMPER SWITCH
TV	TELEVISION
TYP	TYPICAL
UH	UNIT HEATER
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
V	VOLT OR VOLTAGE
VA	VOLT AMPERE
VFD	VARIABLE FREQUENCY DRIVE
VM	VOLTMETER
VP	VAPORPROOF
W	WATT
WP	WEATHERPROOF
WT	WATERTIGHT
XFMR	TRANSFORMER
XP	EXPLOSION PROOF

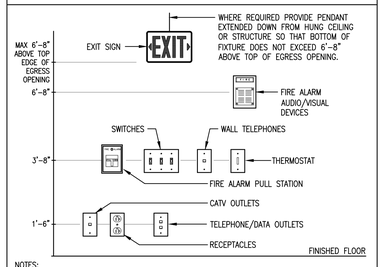
GENERAL FIRESTOPPING NOTE

CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OR EXCEEDING WALL/CEILING/FLOOR FIRE ASSEMBLY RATINGS FOR ALL PENETRATIONS. CONTRACTOR SHALL VERIFY LOCATION AND RATING OF ALL FIRE ASSEMBLIES AND PROVIDE INTUMESCENT COLLARS AT ALL PENETRATIONS AND/OR FIRE RATED CAULKING AS REQUIRED.

GENERAL ELECTRICAL NOTES:

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS AND FIELD DIMENSIONS OF OTHER TRADES TO VERIFY SPACE CONDITIONS. MAINTAIN HEADROOM AND SPACE REQUIREMENTS.
2. PERFORM ALL WORK IN STRICT ACCORDANCE WITH NATIONAL ELECTRICAL CODE (N.E.C.–2017) AS ADOPTED BY THE STATE OF NEW JERSEY, OSHA REQUIREMENTS, ALL FEDERAL, STATE, AND LOCAL CODES AND ALL OWNER REQUIREMENTS.
3. INCLUDE ALL TEMPORARY POWER AND LIGHTING, PERMIT, LICENSE, AND INSPECTION COSTS IN BID.
4. CONTRACTOR SHALL ISSUE IN WRITING TO ARCHITECT/ENGINEER ANY SCOPE OF WORK DISCREPANCIES AND/OR QUESTIONS PRIOR TO SUBMISSION OF BID.
5. CONTRACTOR SHALL EXAMINE ALL DRAWINGS AND SPECIFICATIONS AND VISIT THE SITE TO BECOME ACQUAINTED WITH THE CONSTRUCTION, SITE AND THE EXTENT OF THE WORK PRIOR TO SUBMISSION OF BID.
6. COORDINATE ALL REQUIRED SHUTDOWNS WITH THE OWNER (AND UTILITY COMPANY WHERE APPLICABLE) A MINIMUM OF FOURTEEN (14) DAYS IN ADVANCE. INCLUDE OVERTIME COSTS IN BID TO PERFORM ALL SHUTDOWNS (INCLUDING SHUTDOWNS FOR AREAS WHICH MAY BE UNOCCUPIED DURING CONSTRUCTION) AFTER NORMAL WORKING HOURS AS COORDINATED WITH THE OWNER. NO EXTRA CLAIMS OR COMPENSATION SHALL BE GRANTED FOR OVERTIME COSTS ASSOCIATED WITH PERFORMING SHUTDOWNS.
7. SECURE ALL SUPPORTS TO BUILDING STRUCTURE BY STEEL FOR VERTICAL SUPPORT AND BY MEANS OF TOGGLE BOLTS ON HOLLOW MASONRY UNITS, EXPANSION SHIELDS IN CONCRETE OR BRICK. MACHINE SCREWS ON METAL SURFACE, AND WOOD SCREWS ON WOOD CONSTRUCTION. NAILS, RAWL OR WOOD PLUGS NOT PERMITTED. SUPPORT HORIZONTAL RUNS OR METALLIC CONDUITS NOT MORE THAN 10 FT. APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
8. PASS RACEWAYS OVER WATER, STEAM, OR OTHER PIPING WHEN PULL BOXES ARE NOT REQUIRED. NO RACEWAY WITHIN 3 IN. OF STEAM OR HOT WATERS PIPES, OR APPLIANCES, EXCEPT CROSSINGS WHERE RACEWAY SHALL BE AT LEAST 1 IN. FROM PIPE COVER.
9. FURNISH FISH WIRE IN EACH RACEWAY RUN OVER 10 FT IN WHICH WIRING IS NOT INSTALLED.
10. CUT STEEL CONDUIT ENDS SQUARE, REAM SMOOTH, PAINT MALE THREADS OF FIELD THREADED CONDUIT WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH CONDUIT COUPLINGS.
11. HORIZONTAL OR CROSS RUNS IN PARTITIONS AND WALLS NOT PERMITTED.
12. ROUTE ALL CONDUITS AND CABLES PARALLEL OR PERPENDICULAR TO BUILDING LINES WHERE POSSIBLE.
13. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
14. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF NORMAL AND EMERGENCY CIRCUITS. COMMON BOXES: PROVIDE BARRIERS BETWEEN EMERGENCY AND NORMAL WIRING.
15. LEAVE WIRE SUFFICIENTLY LONG TO PERMIT MAKING FINAL CONNECTIONS
16. WIRE COLOR CODING: PER CODE. WHERE COLOR–CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION FOR OVERLAP COLOR TAPING OF CONDUCTORS (MINIMUM LENGTH 6") IN ACCESSIBLE LOCATIONS. COLOR CODING, ONCE SELECTED, MUST BE USED CONSISTENTLY FOR THE ENTIRE PROJECT
17. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32°F (0°C). PROVIDE CABLE SUPPORTS FOR WIRE IN RISER CONDUITS AS REQUIRED BY CODE.
18. SET BOXES SQUARE AND TRUE WITH BUILDING FINISH. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRONS.
19. VERIFY EXACT LOCATIONS AND MOUNTING HEIGHT OF ALL LIGHT FIXTURES, SWITCHES, RECEPTACLES, OUTLETS, FIRE ALARM DEVICES, VOICE/DATA DEVICES AND OTHER EQUIPMENT WITH ARCHITECTURAL DRAWINGS AND IN THE FIELD PRIOR TO ROUGH–IN. IN CENTERING OUTLETS AND LOCATION BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE, AND CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
20. A "+" SYMBOL NEXT TO A DEVICE INDICATES A NON–STANDARD DEVICE MOUNTING HEIGHT – CONTRACTOR SHALL COORDINATE EXACT MOUNTING HEIGHT PRIOR TO ROUGH–IN.
21. LOCATIONS INDICATED FOR LOCAL WALL SWITCHES ARE SUBJECT TO MODIFICATIONS AT OR NEAR DOORS. COORDINATE WITH ARCHITECT AND INSTALL SWITCH ON SIDE OPPOSITE HINGE. VERIFY FINAL HINGE LOCATIONS IN FIELD PRIOR TO SWITCH OUTLET INSTALLATION.
22. PROVIDE PULL BOXES AS INDICATED AND WHEREVER NECESSARY TO FACILITATE PULLING OF WIRE AND COORDINATE LOCATIONS WITH OTHER TRADES.
23. FOR EMPTY RACEWAY RUNS, PROVIDE PULL BOXES EVERY 100FT AND AS INDICATED. COORDINATE LOCATIONS WITH OTHER TRADES.
24. JUNCTION AND PULL BOXES: LOCATE GENERALLY NOT EXPOSED IN FINISHED SPACES. WHERE NECESSARY, REROUTE CONDUITS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. COVERS OF JUNCTION AND PULL BOXES SHALL BE ACCESSIBLE.
25. SUPPORT JUNCTION AND PULL BOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON CONDUITS.
26. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
27. FIRESTOPPING SHALL BE INSTALLED WHENEVER WIRING OR RACEWAYS CROSS FIRE RATED CONSTRUCTION.
28. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCES THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION, SHOP AND RECORD DRAWINGS AND APPROVALS.
29. DEMONSTRATE PERFORMANCE AND CAPACITY OF ALL SYSTEMS AND EQUIPMENT.
30. AT COMPLETION OF PROJECT, PROVIDE NEW UPDATED TYPE WRITTEN PANELBOARD DIRECTORIES FOR ALL NEW PANELBOARDS AND ANY EXISTING PANELBOARDS THAT HAVE BEEN MODIFIED.
31. PROVIDE REPRODUCIBLE "AS BUILT" DRAWINGS INDICATING AS–INSTALLED CONDITIONS AFTER COMPLETION OF THE INSTALLATION.
32. THE CONTRACTOR SHALL GUARANTEE AND SERVICE THE ENTIRE INSTALLATION FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE FINAL ACCEPTANCE OF THE INSTALLATION.
33. THE CONTRACTOR SHALL, DURING THE PERIOD OF THE GUARANTEE, REPLACE OR REPAIR AT HIS OWN EXPENSE ANY PIECE OF EQUIPMENT AND/OR MATERIAL WHICH IS FOUND TO BE DEFECTIVE. THE REPLACEMENT OR REPAIR SHALL BE DONE AS SOON AS NOTIFIED BY THE ENGINEER OR AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL ALSO REPAIR ALL DAMAGE TO SURROUNDING WORK CAUSED BY THE FAILURE, REPAIR OR REPLACEMENT OF DEFECTIVE EQUIPMENT.
34. THE CONTRACTOR SHALL COORDINATE LOCATION(S) OF ALL PLENUM RATED SPACE(S) WITH THE MC. EC SHALL PROVIDE METAL CONDUIT OR MC CABLE WITHIN PLENUM RATED SPACE(S).
35. THESE DRAWINGS HAVE BEEN DESIGNED AND ENGINEERED BASED ON VISUAL INSPECTIONS OF THE EXISTING BUILDING AND INFRASTRUCTURE PRIOR TO ANY DEMOLITION. SOME ASSUMPTIONS HAVE BEEN MADE AS TO ACTUAL CONSTRUCTION, MATERIALS, AND METHODS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL ACTUAL FIELD CONDITIONS AND SHALL NOTIFY THE OWNER AND ENGINEER OF ANY DISCREPANCIES, CONFLICTS, AND UNFORESEEN CONDITIONS.

TYPICAL DEVICE MOUNTING HEIGHTS DETAIL



NOTES:

1. ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE EXCEPT EXIT SIGNS. EXIT SIGNS SHALL COMPLY WITH NFPA 101, 7.10.1.9.
2. DEVICES SHALL BE INSTALLED ON A COMMON VERTICAL CENTERLINE WHEREVER POSSIBLE.
3. ALL DEVICES SHALL BE INSTALLED AT MOUNTING HEIGHTS AS INDICATED ON THIS DETAIL UNLESS OTHERWISE NOTED OR REQUIRED BY CODE (INCLUDING ADA REQUIREMENTS). FOR DEVICES INDICATED WITH AN ADJACENT "+" SYMBOL, COORDINATE MOUNTING HEIGHT WITH ARCHITECT.
4. COORDINATE ALL LOCATIONS WITH ARCHITECTURAL PLANS.
5. OPERABLE DEVICES INSTALLED IN ALL ACCESSIBLE COMMON AREAS SHALL BE MOUNTED BETWEEN 15" & 44" AFF AND/OR IN ACCORDANCE WITH ANSI A117.1 REQUIREMENTS – CONFIRM EXACT MTG HT AND LOCATION WITH ARCHITECT.

Revisions

No.	Date	Description

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11/12/21

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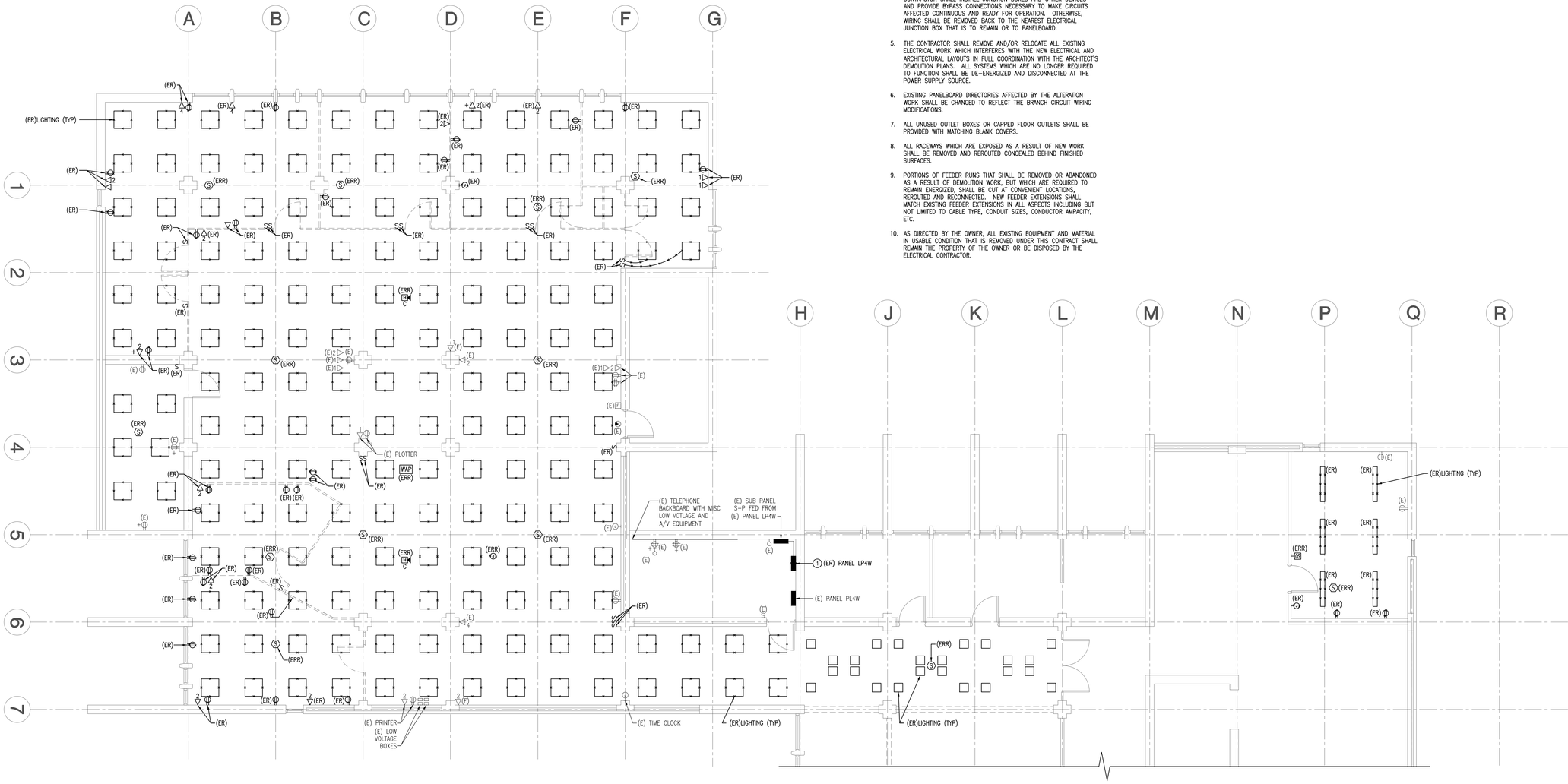
VINELAND CITY HALL FINANCE DEPT. RENOVATIONS

640 E WOOD ST.
VINELAND, NJ, 08360

Drawing

ELECTRICAL COVER SHEET

Scale	Job	Sheet
AS NOTED	21.081	E0.0
Drawn: KJC	Date: 11/12/21	1 of 7



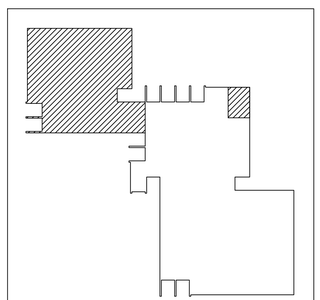
01 ELECTRICAL FLOOR PLAN – DEMO
SCALE: 3/16" = 1'-0"

ELECTRICAL DEMOLITION NOTES

1. THE CONTRACTOR SHALL INCLUDE IN HIS BID ALL COSTS ASSOCIATED WITH RELOCATION AND REMOVAL OF ELECTRICAL WORK AS DESCRIBED IN THE SPECIFICATIONS WITH ALLOWANCES FOR EXPECTED OR UNFORESEEN ISSUES WHEN CONCEALED WORK HAS BEEN EXPOSED. NO ADDITIONAL CLAIMS FOR WORK ASSOCIATED WITH DEMOLITION WILL BE ACCEPTED, UNLESS, IN CERTAIN CASES, CONSIDERED JUSTIFIABLE BY THE ARCHITECT.
2. THE CONTRACTOR SHALL PERFORM REMOVAL AND DEMOLITION WORK WITH MINIMAL INTERFERENCE WITH EXISTING ELECTRICAL SYSTEMS. ALL AFFECTED ELECTRICAL SYSTEMS SHALL BE RESTORED AND RECONNECTED.
3. DEMOLITION AND REMOVAL WORK SHALL BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER. THE CONTRACTOR SHALL PATCH, REPAIR, PAINT OR OTHERWISE RESTORE ANY DAMAGED INTERIOR OR EXTERIOR BUILDING SURFACE TO ITS ORIGINAL CONDITION.
4. THE CONTRACTOR SHALL REMOVE ALL ELECTRICAL OUTLETS, SWITCHES, ETC., INCLUDING ASSOCIATED WIRING, CONDUITS, ETC., FROM PARTITIONS THAT ARE TO BE REMOVED. WHERE THE REMOVAL OF THESE ITEMS DISRUPTS EXISTING WIRING THAT IS TO REMAIN, THE CONTRACTOR SHALL INSTALL JUNCTION BOXES AND OTHER DEVICES AND PROVIDE BYPASS CONNECTIONS NECESSARY TO MAKE CIRCUITS AFFECTED CONTINUOUS AND READY FOR OPERATION. OTHERWISE, WIRING SHALL BE REMOVED BACK TO THE NEAREST ELECTRICAL JUNCTION BOX THAT IS TO REMAIN OR TO PANELBOARD.
5. THE CONTRACTOR SHALL REMOVE AND/OR RELOCATE ALL EXISTING ELECTRICAL WORK WHICH INTERFERES WITH THE NEW ELECTRICAL AND ARCHITECTURAL LAYOUTS IN FULL COORDINATION WITH THE ARCHITECT'S DEMOLITION PLANS. ALL SYSTEMS WHICH ARE NO LONGER REQUIRED TO FUNCTION SHALL BE DE-ENERGIZED AND DISCONNECTED AT THE POWER SUPPLY SOURCE.
6. EXISTING PANELBOARD DIRECTORIES AFFECTED BY THE ALTERATION WORK SHALL BE CHANGED TO REFLECT THE BRANCH CIRCUIT WIRING MODIFICATIONS.
7. ALL UNUSED OUTLET BOXES OR CAPPED FLOOR OUTLETS SHALL BE PROVIDED WITH MATCHING BLANK COVERS.
8. ALL RACEWAYS WHICH ARE EXPOSED AS A RESULT OF NEW WORK SHALL BE REMOVED AND REROUTED CONCEALED BEHIND FINISHED SURFACES.
9. PORTIONS OF FEEDER RUNS THAT SHALL BE REMOVED OR ABANDONED AS A RESULT OF DEMOLITION WORK, BUT WHICH ARE REQUIRED TO REMAIN ENERGIZED, SHALL BE CUT AT CONVENIENT LOCATIONS, REROUTED AND RECONNECTED. NEW FEEDER EXTENSIONS SHALL MATCH EXISTING FEEDER EXTENSIONS IN ALL ASPECTS INCLUDING BUT NOT LIMITED TO CABLE TYPE, CONDUIT SIZES, CONDUCTOR AMPACITY, ETC.
10. AS DIRECTED BY THE OWNER, ALL EXISTING EQUIPMENT AND MATERIAL IN USABLE CONDITION THAT IS REMOVED UNDER THIS CONTRACT SHALL REMAIN THE PROPERTY OF THE OWNER OR BE DISPOSED BY THE ELECTRICAL CONTRACTOR.
11. THE CONTRACTOR SHALL NOTIFY THE OWNER AT THE APPROPRIATE TIME OF THE PROJECTED DEMOLITION AND PHASING SCHEDULE SO THAT REMOVAL OR RELOCATION OF AFFECTED UTILITIES MAY BE CARRIED OUT IN COORDINATION WITH THE PROJECT REQUIREMENTS. THE CONTRACTOR SHALL FOLLOW CLOSELY THE ARCHITECT'S DEMOLITION AND PHASING SCHEDULE AND PROCEED IN THE SPECIFIED SEQUENCE.
12. THE SHUTDOWN OF EXISTING BUILDING ELECTRICAL SERVICES SHALL BE COORDINATED WITH THE OWNER. MAKE APPROPRIATE ARRANGEMENTS AT LEAST 14 DAYS PRIOR TO A SHUTDOWN.
13. DISCONNECT AND REMOVE ALL EXISTING FURNITURE FEEDS BACK TO SOURCE. BLANK OFF ALL EXISTING FLOOR BOXES NON-LONGER IN USE AFTER DEMOLITON OF EXISTING FURNITURE.

KEY NOTES

(1) ALL (E)CIRCUITS REMAINING IN (E)PANEL LP4W AFTER DEMOLTION SHALL BE EXTENDED IN KIND TO (N)PANEL LP4W LOCATED IN SAME LOCATION. SEE PANEL SCHEDULE ON DWG E2.0 FOR ADDITIONAL INFORMATION.



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Revisions

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MCE PROJECT #21149

11/12/21

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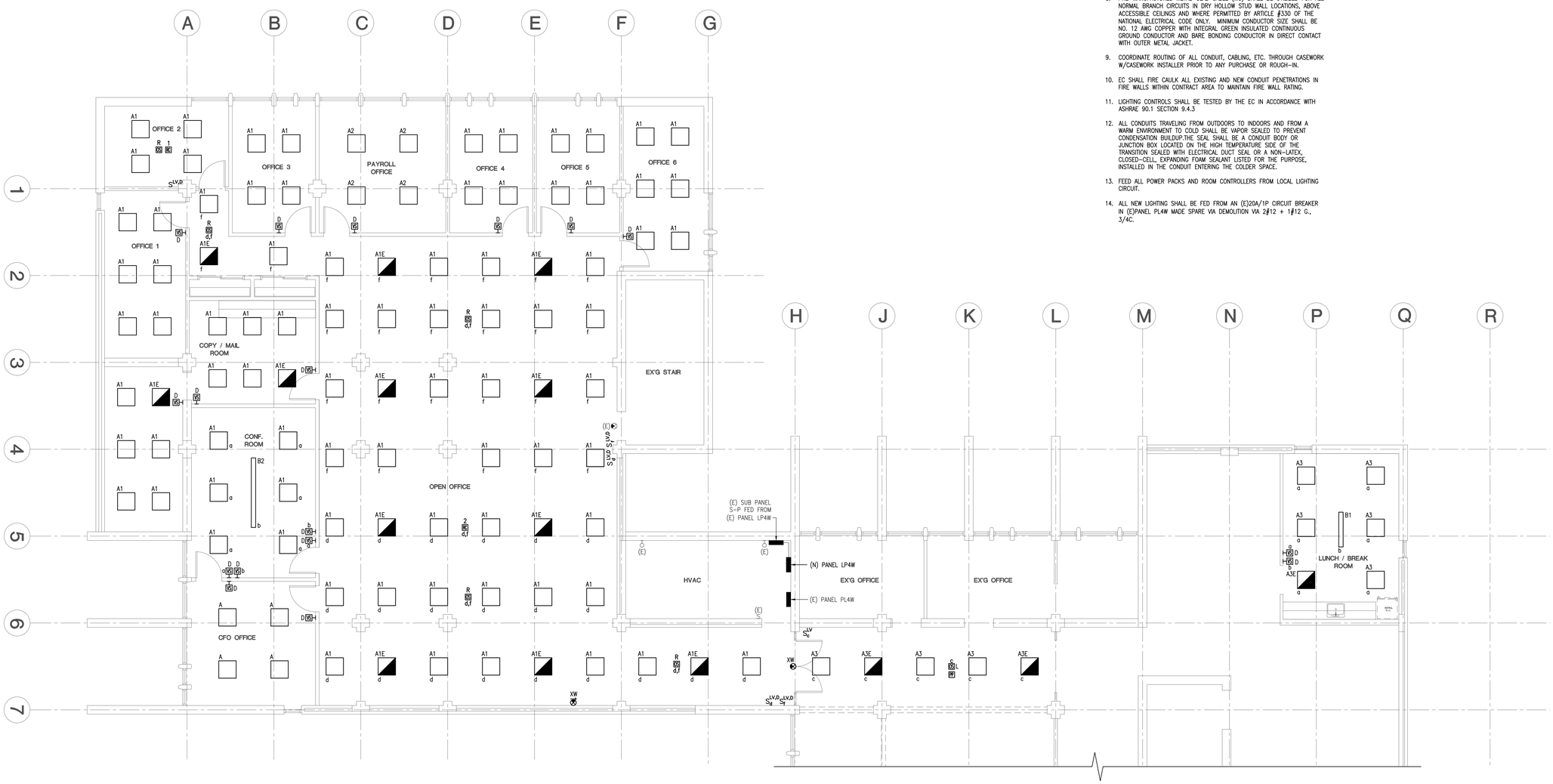
VINELAND CITY HALL FINANCE DEPT. RENOVATIONS

640 E WOOD ST.
VINELAND, NJ, 08360

Drawing
ELECTRICAL FLOOR PLAN - DEMO

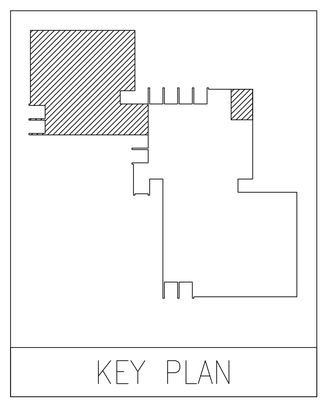
Scale	Job	Sheet
AS NOTED	21.081	ED1.0
Drawn: KJC	Date: 11/12/21	2 of 7



01 ELECTRICAL FLOOR PLAN – LIGHTING
SCALE: 3/16" = 1'-0"

DRAWING NOTES:

1. CONNECT ALL EXIT SIGNS, WALL PACKS, AND EMERGENCY BATTERY BACK-UPS TO LOCAL CONSTANT HOT FEED AHEAD OF ANY SWITCHING UON.
2. ALL LIGHT FIXTURES INDICATED AS EMERGENCY ARE NORMAL/EMERGENCY OPERATION VIA NORMAL POWER W/BATTERY OR INVERTER BACK
3. REFER TO DWG E2.0 FOR THE LIGHT FIXTURE SCHEDULE.
4. REFER TO DWG E2.0 FOR THE LIGHTING CONTROL DEVICE SCHEDULE.
5. CONFIRM ALL DEVICE AND EQUIPMENT LOCATIONS WITH THE ARCHITECT AND OWNER PRIOR TO ANY PURCHASE OR ROUGH-IN.
6. CONTRACTOR SHALL CLOSELY COORDINATE AND ADJUST ALL HVAC EQUIPMENT LOCATIONS WITH THE MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN SUCH THAT LIGHTING LAYOUT REMAINS AS INDICATED.
7. CONFIRM ALL POWER OVERCURRENT PROTECTION, WIRING AND DEVICE/DISCONNECT REQUIREMENTS FOR ALL EQUIPMENT PRIOR TO ROUGH-IN AND REPORT ANY DISCREPANCY WITH THE DESIGN TO THE ARCHITECT AND OWNER FOR RESOLUTION.
8. PRE-MANUFACTURED METAL-CLAD CABLE (MC) SHALL BE UTILIZED FOR ALL NORMAL BRANCH CIRCUITS IN DRY HOLLOW STUD WALL LOCATIONS, ABOVE ACCESSIBLE CEILINGS AND WHERE PERMITTED BY ARTICLE #330 OF THE NATIONAL ELECTRICAL CODE ONLY. MINIMUM CONDUCTOR SIZE SHALL BE NO. 12 AWG COPPER WITH INTEGRAL GREEN INSULATED CONTINUOUS GROUND CONDUCTOR AND BARE BONDING CONDUCTOR IN DIRECT CONTACT WITH OUTER METAL JACKET.
9. COORDINATE ROUTING OF ALL CONDUIT, CABLING, ETC. THROUGH CASEWORK W/CASEWORK INSTALLER PRIOR TO ANY PURCHASE OR ROUGH-IN.
10. EC SHALL FIRE CAULK ALL EXISTING AND NEW CONDUIT PENETRATIONS IN FIRE WALLS WITHIN CONTRACT AREA TO MAINTAIN FIRE WALL RATING.
11. LIGHTING CONTROLS SHALL BE TESTED BY THE EC IN ACCORDANCE WITH ASHRAE 90.1 SECTION 9.4.3
12. ALL CONDUITS TRAVELING FROM OUTDOORS TO INDOORS AND FROM A WARM ENVIRONMENT TO COLD SHALL BE VAPOR SEALED TO PREVENT CONDENSATION BUILDUP.THE SEAL SHALL BE A CONDUIT BODY OR JUNCTION BOX LOCATED ON THE HIGH TEMPERATURE SIDE OF THE TRANSITION SEALED WITH ELECTRICAL DUCT SEAL OR A NON-LATEX, CLOSED-CELL, EXPANDING FOAM SEALANT LISTED FOR THE PURPOSE, INSTALLED IN THE CONDUIT ENTERING THE COLDER SPACE.
13. FEED ALL POWER PACKS AND ROOM CONTROLLERS FROM LOCAL LIGHTING CIRCUIT.
14. ALL NEW LIGHTING SHALL BE FED FROM AN (E)20A/1P CIRCUIT BREAKER IN (E)PANEL PL4W MADE SPARE VIA DEMOLITION VIA 2#12 + 1#12 G., 3/4C.



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Drawing
ELECTRICAL FLOOR PLAN - LIGHTING

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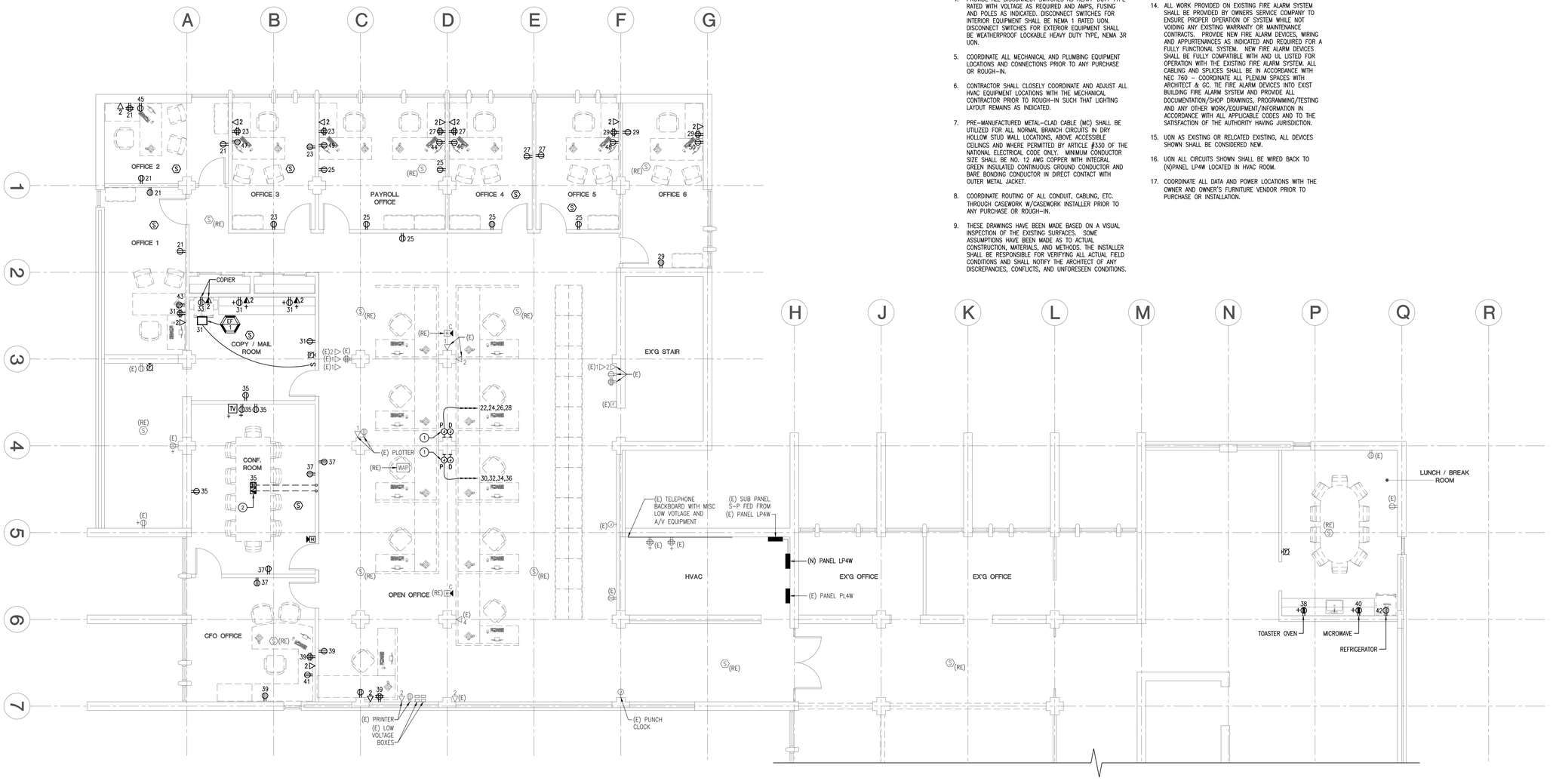


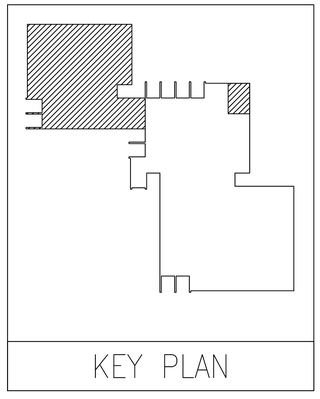
01 ELECTRICAL FLOOR PLAN – POWER
SCALE: 3/16" = 1'-0"

DRAWING NOTES:

1. A 24" MINIMUM SEPARATION SHALL BE MAINTAINED BETWEEN SINGLE AND TWO-GANG OUTLET AND SWITCH BOXES INSTALLED ON OPPOSITE SIDES OF ANY 2-HOUR (MAXIMUM) FIRE-RATED WALL/PARTITION. PROVIDE FIREPROOFING PUTTY PACKS OR OTHER FIREPROOFING LISTED FOR THIS PURPOSE WHERE REQUIRED BY SECTION 713.3.2 OF THE INTERNATIONAL BUILDING CODE. DO NOT INSTALL PANELBOARD BACK BOXES IN FIRE RATED WALLS. ALL EQUIPMENT AND DEVICES ARE NEW UNLESS OTHERWISE NOTED.
2. CONFIRM ALL DEVICE AND EQUIPMENT LOCATIONS WITH THE ARCHITECT AND OWNER PRIOR TO ANY PURCHASE OR ROUGH-IN.
3. CONFIRM ALL POWER OVERCURRENT PROTECTION, WIRING AND DEVICE/DISCONNECT REQUIREMENTS FOR ALL EQUIPMENT PRIOR TO ROUGH-IN AND REPORT ANY DISCREPANCY WITH THE DESIGN TO THE ARCHITECT AND OWNER FOR RESOLUTION.
4. PROVIDE ALL DISCONNECT SWITCHES AS HEAVY-DUTY TYPE RATED WITH VOLTAGE AS REQUIRED AND AMPS, FUSING AND POLES AS INDICATED. DISCONNECT SWITCHES FOR INTERIOR EQUIPMENT SHALL BE NEMA 1 RATED UON. DISCONNECT SWITCHES FOR EXTERIOR EQUIPMENT SHALL BE WEATHERPROOF LOCKABLE HEAVY DUTY TYPE, NEMA 3R UON.
5. COORDINATE ALL MECHANICAL AND PLUMBING EQUIPMENT LOCATIONS AND CONNECTIONS PRIOR TO ANY PURCHASE OR ROUGH-IN.
6. CONTRACTOR SHALL CLOSELY COORDINATE AND ADJUST ALL HVAC EQUIPMENT LOCATIONS WITH THE MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN SUCH THAT LIGHTING LAYOUT REMAINS AS INDICATED.
7. PRE-MANUFACTURED METAL-CLAD CABLE (MC) SHALL BE UTILIZED FOR ALL NORMAL BRANCH CIRCUITS IN DRY HOLLOW STUD WALL LOCATIONS, ABOVE ACCESSIBLE CEILINGS AND WHERE PERMITTED BY ARTICLE #330 OF THE NATIONAL ELECTRICAL CODE ONLY. MINIMUM CONDUCTOR SIZE SHALL BE NO. 12 AWG COPPER WITH INTEGRAL GREEN INSULATED CONTINUOUS GROUND CONDUCTOR AND BARE BONDING CONDUCTOR IN DIRECT CONTACT WITH OUTER METAL JACKET.
8. COORDINATE ROUTING OF ALL CONDUIT, CABLING, ETC. THROUGH CASEWORK W/CASEWORK INSTALLER PRIOR TO ANY PURCHASE OR ROUGH-IN.
9. THESE DRAWINGS HAVE BEEN MADE BASED ON A VISUAL INSPECTION OF THE EXISTING SURFACES. SOME ASSUMPTIONS HAVE BEEN MADE AS TO ACTUAL CONSTRUCTION, MATERIALS, AND METHODS. THE INSTALLER SHALL BE RESPONSIBLE FOR VERIFYING ALL ACTUAL FIELD CONDITIONS AND SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES, CONFLICTS, AND UNFORESEEN CONDITIONS.
10. EC SHALL FIRE CAULK ALL EXISTING AND NEW CONDUIT PENETRATIONS IN FIRE WALLS WITHIN CONTRACT AREA TO MAINTAIN FIRE WALL RATING.
11. COORDINATE FINAL LOCATIONS OF ALL TELECOM OUTLETS AND RECEPTACLES FOR DESKS WITH ARCH, OWNER AND OWNERS FURNITURE PACKAGE PROVIDER PRIOR TO PURCHASE OR ROUGH-IN.
12. PROVIDE LOCKABLE IN-USE WEATHERPROOF (WP) EXTRA DUTY COVER FOR ALL EXTERIOR RECEPTACLES.
13. ALL CONDUITS TRAVELING FROM OUTDOORS TO INDOORS AND FROM A WARM ENVIRONMENT TO COLD SHALL BE VAPOR SEALED TO PREVENT CONDENSATION BUILDUP. THE SEAL SHALL BE A CONDUIT BODY OR JUNCTION BOX LOCATED ON THE HIGH TEMPERATURE SIDE OF THE TRANSITION SEALED WITH ELECTRICAL DUCT SEAL OR A NON-LATEX, CLOSED CELL, EXPANDING FOAM SEALANT LISTED FOR THE PURPOSE, INSTALLED IN THE CONDUIT ENTERING THE COLDER SPACE.
14. ALL WORK PROVIDED ON EXISTING FIRE ALARM SYSTEM SHALL BE PROVIDED BY OWNERS SERVICE COMPANY TO ENSURE PROPER OPERATION OF SYSTEM WHILE NOT VOIDING ANY EXISTING WARRANTY OR MAINTENANCE CONTRACTS. PROVIDE NEW FIRE ALARM DEVICES, WIRING AND APPURTENANCES AS INDICATED AND REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. NEW FIRE ALARM DEVICES SHALL BE FULLY COMPATIBLE WITH AND UL LISTED FOR OPERATION WITH THE EXISTING FIRE ALARM SYSTEM. ALL CABLING AND SPLICES SHALL BE IN ACCORDANCE WITH NEC 760 – COORDINATE ALL PLENUM SPACES WITH ARCHITECT & GC. TIE FIRE ALARM DEVICES INTO EXIST BUILDING FIRE ALARM SYSTEM AND PROVIDE ALL DOCUMENTATION/SHOP DRAWINGS, PROGRAMMING/TESTING AND ANY OTHER WORK/EQUIPMENT/INFORMATION IN ACCORDANCE WITH ALL APPLICABLE CODES AND TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
15. UON AS EXISTING OR RELCATED EXISTING, ALL DEVICES SHOWN SHALL BE CONSIDERED NEW.
16. UON ALL CIRCUITS SHOWN SHALL BE WIRED BACK TO (N)PANEL LP4W LOCATED IN HVAC ROOM.
17. COORDINATE ALL DATA AND POWER LOCATIONS WITH THE OWNER AND OWNER'S FURNITURE VENDOR PRIOR TO PURCHASE OR INSTALLATION.

KEY NOTES

1. PROVIDE JB FOR CONNECTION OF 8-WIRE FURNITURE SYSTEM WHIP. HOMERUN WIRING SHALL CONSIST OF 3#12 + 1#10N + 1#12G. FOR THE MULTI-POLE CIRCUIT (20A/3P) AND 2#12 + 1#12IG FOR THE ISOLATED GROUND CIRCUIT (20A/1P).
2. PROVIDE FLUSH FLOOR BOX W/DEVICE SHOWN (LEGRAND OMNI SERIES CAT#880S2). COORDINATE FINAL LOCATION AND COVER W/GC, ARCH AND OWNER PRIOR TO ANY PURCHASE OR ROUGH-IN. PROVIDE 3/4" CDT FOR DATA AND 3/4" CDT FOR POWER WIRING & ROUTE CDTS IN SLAB AND UP WALL AS SHOWN TO ABOVE ACCESSIBLE CEILING. PROVIDE ALL FLOOR SAWCUTTING AND PATCHING AS REQUIRED.



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VINELAND CITY HALL FINANCE DEPT. RENOVATIONS

640 E WOOD ST.
VINELAND, NJ, 08360

Drawing
ELECTRICAL FLOOR PLAN - POWER

Scale	Job	Sheet
AS NOTED	21.081	E1.1
Drawn: KJC	Date: 11/12/21	4 of 7

PANEL:	(N) PANEL LP4W		208 /120 VOLTS,	3 PHASE	4 WIRE		MAIN BUS AMPS					
LOCATION:	HVAC ROOM		MOUNTING:	SURFACE	FLUSH		MAIN BRK 70 AMPS 3 P					
BUILDING:	VINELAND CITY HALL FINANCE DEPARTMENT		BUS	COPPER	ALUMINUM		NEUTRAL 100% AIC NOTE 1					
FED FROM:	SEE SINGLE LINE DIAGRAM		GROUND BUS		THRU-FEED LUGS		LUGS ONLY					
FEEDER SIZE:	SEE SINGLE LINE DIAGRAM		BOL GND BUS		INTEGRAL SPD							

CKT NO	TRIP AMPS	DESCRIPTION OF LOAD	MIN WIRE & COND SIZE	LOAD (VA)	PER PHASE (VA) A	B	C	LOAD (VA)	MIN WIRE & COND SIZE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO	
1	20/1	(E)LOADS	2A	200	400			200	2A	(E)LOADS	20/1	2	
3	20/1	(E)LOADS	2A	200		400		200	2A	(E)LOADS	20/1	4	
5	20/1	(E)LOADS	2A	200			400	200	2A	(E)LOADS	20/1	6	
7	20/1	(E)LOADS	2A	200	400			200	2A	(E)LOADS	20/1	8	
9	20/1	(E)LOADS	2A	200		400		200	2A	(E)LOADS	20/1	10	
11	20/1	(E)LOADS	2A	200			400	200	2A	(E)LOADS	20/1	12	
13	20/1	(E)LOADS	2A	200	400			200	2A	(E)LOADS	20/1	14	
15	20/1	(E)LOADS	2A	200		400		200	2A	(E)LOADS	20/1	16	
17	20/2	(E)LOADS	2B	200			4200	4000	10B	(E)LOADS	100/2	18	NOTE 2
19				200	4200			4000				20	
21	20/1	REC - OFFICE 1 & 2	2A	1080		2160		1080	2A	OFFICE FURNITURE	20/1	22	
23	20/1	REC - OFFICE 3 & PAYROLL	2A	1080			2160	1080	2A	OFFICE FURNITURE	20/1	24	NOTE 3
25	20/1	REC - OFFICE 4 & PAYROLL	2A	1080	2160			1080	2A	OFFICE FURNITURE	20/1	26	
27	20/1	REC - OFFICE 4 & 5 & PAYROLL	2A	1080		2160		1080	2A	OFFICE FURNITURE ISO GROUND	20/1	28	
29	20/1	REC - OFFICE 5 & 6	2A	1080			2160	1080	2A	OFFICE FURNITURE	20/1	30	NOTE 3
31	20/1	REC - OFFICE 1 & COPY/MAIL ROOM	2A	1080	2160			1080	2A	OFFICE FURNITURE	20/1	32	
33	20/1	REC - COPIER	2A	1200		2280		1080	2A	OFFICE FURNITURE	20/1	34	
35	20/1	REC - COPY/MAIL RM & CONF RM	2A	1080			2160	1080	2A	OFFICE FURNITURE ISO GROUND	20/1	36	
37	20/1	REC - CONF RM & CFO OFFICE	2A	1080	2080			1000	2A	REC - TOASTER OVEN	20/1	38	
39	20/1	REC - CFO OFFICE & OPEN OFFICE	2A	1080		2080		1000	2A	REC - MICROWAVE	20/1	40	
41	20/1	REC - OFFICE DEDICATED	2A	180			1380	1200	2A	REC - REFRIGERATOR	20/1	42	NOTE 4
43	20/1	REC - OFFICE DEDICATED	2A	180	180			0	2A	REC - OFFICE DEDICATED	20/1	44	
45	20/1	REC - OFFICE DEDICATED	2A	180		180		0	2A	REC - OFFICE DEDICATED	20/1	46	
47	20/1	REC - OFFICE DEDICATED	2A	180			180	0	2A	REC - OFFICE DEDICATED	20/1	48	
49	20/1	REC - OFFICE DEDICATED	2A	180	180			0	2A	REC - OFFICE DEDICATED	20/1	50	
51	20/1	SPARE	-	0		0		0	-	SPARE	20/1	52	
53	20/1	SPARE	-	0			0	0	-	SPARE	20/1	54	

	CONNECTED	x	FACTOR	=	DEMAND
TOTAL LTG.	0		1.25		0
TOTAL CONT.	0		1.25		0
TOTAL NON-C	3200		1.00		3200
TOTAL REC.	32060		Per NEC		21030
TOTAL A/C	0		0.00		0
TOTAL MTG	0		1.00		0
TOTAL	35260				24230

TOTAL BY PHASE		
12160	10060	13040

SPARE = 0%

TOTAL DEMAND LOAD = 24230 VA

TOTAL AMPS = 67.335482 AMPS

NOTES:

1. MATCH AIC RATING OF (ER)PANEL LP4W.
2. CONFIRM SIZE AND # OF POLES IN FIELD PRIOR TO PURCHASE AND ROUGH-IN.
3. PROVIDE 3-POLE HANDLE TIE FOR SIMULTANEOUS DISCONNECTION OF THE THREE SINGLE POLE CIRCUITS.
4. PROVIDE GFCI-TYPE CIRCUIT BREAKER AT CIRCUIT INDICATED.

LIGHT FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER/ CATALOG #	LAMP DATA QTY	TYPE	WATTS	FIXT WATTS	FIXT VOLTS	MOUNTING	REMARKS
A	2' X 2' LED TROFFER – 3000 LUMEN	M	INCL	LED	34	34	277V	RECESSED	– –
A1	2' X 2' LED TROFFER – 2000 LUMEN	LITHONIA/#2AVL2-20LSE-ADP-EZ1-LP835	INCL	LED	22	22	277V	RECESSED	– –
A1E	2' X 2' LED TROFFER W/ BATTERY BACK-UP	LITHONIA/#2AVL2-20LSE-ADP-EZ1-LP835-EL14L	INCL	LED	22	22	277V	RECESSED	– –
A2	2' X 2' LED TROFFER – 4000 LUMEN	LITHONIA/#2AVL2-40LSE-ADP-EZ1-LP835	INCL	LED	48	48	277V	RECESSED	– –
A3	2' X 2' LED PANEL – 2000 LUMEN	LITHONIA/#EPANL-2X2-2000LMHE-35-MIN1-ZT-MVOLT	INCL	LED	16	16	277V	RECESSED	– –
A3E	2' X 2' LED PANEL W/ BATTERY BACK-UP	LITHONIA/#EPANL-2X2-2000LMHE-35-MIN1-ZT-MVOLT-E10WCP	INCL	LED	16	16	277V	RECESSED	– –
B1	4' LED INDIRECT/DIRECT LINEAR	PEERLESS/#SBRM9L-4FT-80CRI-35K-ID1200LMF-30/70-NLIGHT	INCL	LED	35	35	277V	SUSPENDED	– –
B2	8' LED INDIRECT/DIRECT LINEAR	PEERLESS/#SBRM9L-8FT-80CRI-35K-ID1200LMF-30/70-NLIGHT	INCL	LED	70	70	277V	SUSPENDED	– –
X	RED LED EXIT SIGN	LITHONIA CAT#LQM-R	INCL	LED	3.7	3.7	UNV	AS NOTED	E=END, C=CLG, W=WALL. PROVIDE W/RED LED LAMP, WHITE THERMOPLASTIC HOUSING, NI-CAD BATTERY AND CHEVRONS INDICATED ON PLANS

LIGHTING CONTROL DEVICE SCHEDULE

SYMBOL	ACUITY CAT #	NOTES
[WSX]-H	WSX PDT	LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON. COLOR BY ARCHITECT
D[WSX]-H	WSX PDT D	LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON AND 0-10V DIMMING CAPABILITIES. COLOR BY ARCHITECT
DR[WSX]-H	WSX PDT 2P	DUAL-RELAY LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON. COLOR BY ARCHITECT
L[WSX]-H	NWSX PDT	LOW-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON. COLOR BY ARCHITECT
[WSX]	CMR PDT [9] OR [10]	LINE VOLTAGE CLG MTD. DUAL-TECH. SENSOR. COLOR BY ARCHITECT
L[WSX]	CM PDT [9] OR [10]	LOW VOLTAGE CLG MTD. DUAL-TECH. SENSOR. COLOR BY ARCHITECT
[WSX]-H	WSX PDT SA	LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON. COLOR BY ARCHITECT. ADJUST DIP SWITCH FOR MANUAL ON "VACANCY "OPERATION
D[WSX]-H	WSX PDT D SA	LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON AND 0-10V DIMMING CAPABILITIES. COLOR BY ARCHITECT. ADJUST DIP SWITCH FOR MANUAL ON "VACANCY "OPERATION
L[WSX]	CM PDT [9] OR [10]	LOW VOLTAGE CLG MTD. DUAL-TECH. SENSOR. COLOR BY ARCHITECT
[PP]	PP20	UNIVERSAL POWER PACK TO FEED LOW-VOLTAGE VACANCY SENSORS. SET POWER PACK TO MANUAL ON OPERATION
1[NC]	NPP16D	SINGLE RELAY 0-10V CEILING MOUNTED DIMMING ROOM CONTROLLER
2[NC]	NPP16D (x2)	DUAL-RELAY 0-10V CEILING MOUNTED DIMMING ROOM CONTROLLER
3[NC]	NPP16D (x3)	3-RELAY 0-10V CEILING MOUNTED DIMMING ROOM CONTROLLER
R[WSX]	NCM PDT [9] OR [10]	LOW VOLTAGE CLG MTD. DUAL-TECH. ROOM CONTROLLER SENSOR. SET FOR MANUAL-ON OPERATION COLOR BY ARCHITECT.
R[WSX]	NCM PDT	LOW VOLTAGE CLG MTD. DUAL-TECH. ROOM CONTROLLER SENSOR. COLOR BY ARCHITECT.
S^{LV}	SPODM	LOW VOLTAGE SWITCH FOR CONTROL OF POWER PACK BZ-250
	NPODM	LOW VOLTAGE SWITCH FOR CONTROL OF ROOM CONTROLLER. PROVIDE # OF BUTTONS AS REQUIRED
$S^{LV,D}$	NPODM DX	DIMMING LOW VOLTAGE SWITCH FOR CONTROL OF ROOM CONTROLLER
[ESRN]	ESRN / ESRB	EMERGENCY LIGHTING CONTROL UNIT
R[NCX]	NCM ADCX	SINGLE ZONE DIMMING CLOSED LOOP ROOM CONTROLLER. PHOTOSENSOR FOR CONTROL OF ROOM CONTROLLER.

NOTES: WIRE ALL LIGHTING CONTROL DEVICES & POWER PACKS PER MANUFACTURER'S INSTRUCTIONS. MAKE ALL SETTING ADJUSTMENTS TO OCCUPANCY/VACANCY SENSORS NECESSARY FOR PROPER OPERATION PER MANUFACTURER'S INSTRUCTIONS AND OWNER'S PREFERENCES.

Revisions

No.	Date	Description

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11/12/21

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Drawing

ELECTRICAL SCHEDULES

Scale	Job	Sheet
AS NOTED	21.081	E2.0
Drawn: KJC	Date: 11/12/21	5 of 7

ELECTRICAL SPECIFICATIONS

1. GENERAL

A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.

B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.

C. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM BUILDING OWNER AND TENANT AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

D. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.

E. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT APPROVAL.

F. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.

G. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.

H. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.

I. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

J. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL. ALL PENETRATIONS THROUGH NEW AND EXISTING RATED FIRE AND SMOKE PARTITIONS AND/OR FLOORS SHALL BE COMPLETELY SEALED USING MATERIALS AND METHODS DESCRIBED IN SUBSEQUENT "FIRE STOPPING" SPECIFICATIONS SECTIONS.

K. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED.

L. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

M. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.

N. ALL WORK SHALL BE PERFORMED AND INSTALLED IN A NEAT AND WORKMANLIKE MANNER IN ACCORDANCE WITH THE GUIDELINES OF NECA STANDARD 1–2015 "GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION".

O. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

P. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

Q. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

R. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS SHALL NOT BE MADE FOR LABOR; EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON–SITE INSPECTION SHALL VERIFY EXISTING CONDUIT (SIZES, CLEARANCES, ETC) AND CONDITIONS.

S. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

T. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

2. SCOPE OF WORK

A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES, UTILITY REQUIREMENTS AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.

B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.

C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION AND UTILITY COMPANIES, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. SHOP DRAWINGS

A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

1) PROJECT NAME AND LOCATION
2) NAME OF ARCHITECT AND ENGINEER
3) ITEM IDENTIFICATION
4) APPROVAL STAMP OF PRIME CONTRACTOR

C. SUBMISSIONS

1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.

2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT THREE PRINTS TO THE ARCHITECT. THE ARCHITECT WILL FORWARD TWO PRINTS TO THE ENGINEER.

D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING: (ADD ANY ADDITIONAL ITEMS WE WANT TO SEE SUBMISSIONS FOR)

1) DISCONNECT SWITCHES
1) FUSES
1) CIRCUIT BREAKERS
2) PANELBOARDS (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS)
1) TRANSFORMERS
1) SURGE PROTECTION DEVICES
3) RACEWAYS
4) WIRE AND CABLE
5) CONDUIT AND FITTINGS
6) WALL SWITCHES
7) INSERTION RECEPTACLES
8) TIME SWITCHES
9) LIGHTING CONTROLS
10) SURFACE METAL RACEWAY
11) LIGHTING FIXTURES
1) ADDRESSABLE FIRE ALARM SYSTEM (PER 2015 IFC 907.1.2)

E. COORDINATION

1) THE CONTRACTOR SHALL ASSURE FULL COOPERATION OF ALL TRADES AND SHALL FURNISH IN WRITING ALL INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTORILY AND WITH LEAST POSSIBLE INTERFERENCE OR DELAY.

2) PREPARE COORDINATED COMPOSITE DRAWINGS AT A SUITABLE SCALE NOT LESS THAN 1/4–INCH EQUALS ONE FOOT, ZERO INCHES, CLEARLY SHOWING HOW THE WORK OF THIS DIVISION IS TO BE INSTALLED IN RELATION TO THE WORK OF ALL TRADES. ANY WORK INSTALLED IN CONFLICT WITH THE WORK OF OTHER TRADES SHALL BE CORRECTED AT NO ADDITIONAL COST TO THE OWNER.

3) THE CONTRACTOR MAY, SUBJECT TO THE ACCEPTANCE OF THE ARCHITECT AND WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF ALL TRADES OR FOR THE PROPER EXECUTION OF THE WORK.

4) ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. COORDINATE WITH THE ARCHITECTURAL DRAWINGS AND DETAILS FOR EXACT LOCATION OF DUCTWORK, PIPING AND EQUIPMENT.

5) THE CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYOUT WORK AND SHALL COORDINATE ALL TRADES TO VERIFY SPACES IN WHICH WORK SHALL BE INSTALLED. MAINTAIN MAXIMUM HEADROOM OR SPACE CONDITIONS. WHERE SPACE CONDITIONS APPEAR INADEQUATE, THE ARCHITECT SHALL BE NOTIFIED BEFORE INSTALLATION. DO NOT PROCEED WITH THE INSTALLATION UNTIL RECEIVING CLARIFYING INSTRUCTIONS.

4. AS–BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

B. THESE INSTRUCTIONS SHALL BE TYPED ON 8–1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.

C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.

D. REPRODUCIBLE "AS–BUILT" DRAWINGS PREPARED IN COMPUTER AIDED DRAFTED (AUTO CAD) FORMAT SHALL BE PROVIDED TO THE OWNER INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. A COMPLETE "AS–BUILT" DRAWING FILE SHALL BE PROVIDED TO THE OWNER AFTER COMPLETION OF THE INSTALLATION.

5. GENERAL PROVISIONS FOR ELECTRICAL WORK

A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

B. DEFINITIONS

1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.

3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.

5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED ITEMS.

6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.

7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT AS DETERMINED BY THE ENGINEER AND ARCHITECT.

C. GENERAL

1) THE DRAWING SHOWS THE APPROXIMATE LOCATIONS OF ALL APPARATUS, THE EXACT LOCATIONS OF WHICH ARE SUBJECT TO THE APPROVAL OF THE OWNER, WHO RESERVES THE RIGHT TO MAKE ANY REASONABLE CHANGES IN THE LOCATION INDICATED WITHOUT EXTRA COST. WHILE THE GENERAL RUN OF CONDUIT AND CABLES ARE INDICATED ON THE DRAWING, IT IS NOT INTENDED THAT THE EXACT ROUTING OR LOCATIONS OF CONDUIT AND CABLES BE DETERMINED THEREFROM.

2) THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED BENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL HIS WORK TO CONFORM TO THE STRUCTURE, MAINTAIN HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR.

3) THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH ALL TRADES.

4) WIRE ALL FIXTURES, DEVICES, ETC., TO RESPECTIVE PANEL AND CONTROLS AS SHOWN ON PLANS IN SYMBOL FORM.

5) THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN–UP AND REMOVAL FROM THE SITE OF RESULTING DEBRIS UPON COMPLETION OF WORK UNDER THIS SECTION.

6) PROVIDE SEPARATE SYSTEMS AND ENCLOSURES FOR 120/208 AND 277/480 VOLT POWER AND CONTROL WIRING AND FOR EMERGENCY AND NORMAL POWER. COMMON PULL BOXES AND JB'S ARE NOT ACCEPTABLE.

7) LOCATIONS INDICATED FOR LOCAL WALL SWITCHES/CONTROLS ARE SUBJECT TO RELOCATIONS. AT OR NEAR DOORS INSTALL SWITCH INSIDE OPPOSITE HINGE, VERIFY FINAL DOOR HINGE LOCATION IN FIELD PRIOR TO SWITCH OUTLET INSTALLATION.

8) HEIGHTS OF OUTLET FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS SHALL CONFORM TO "ADA" CODE REQUIREMENTS UNLESS OTHERWISE NOTED.

9) ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND. PROVIDE BARRIERS BETWEEN NORMAL ONLY AND NORMAL/EMERGENCY SWITCHES INSTALLED WITHIN A COMMON OUTLET BOX.

10) PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR–TO–CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

D. TEMPORARY LIGHT AND POWER

1) PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING HOURS OF ALL TRADES. OWNER WILL PAY FOR COST OF ENERGY. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.

E. QUALITY ASSURANCE

1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR OTHER NATIONALLY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.

2) ON COMPLETION OF THE WORK, THE ENTIRE WIRING SYSTEM SHALL BE ENTIRELY FREE FROM GROUNDS, SHORT CIRCUITS, OPENS, OVERLOADS AND IMPROPER VOLTAGES AND THOROUGH TEST SHALL BE MADE. FURNISH ALL LABOR AND MATERIALS AND INSTRUMENTS.

3) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE.

4) VOLTAGE CHARACTERISTICS

a. SERVICE: 277/480 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

b. DISTRIBUTION: 277/480 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

5) HEIGHTS OF OUTLETS

a. SEE TYPICAL DEVICE MOUNTING HEIGHT DETAIL ON DRAWINGS.
b. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:

(1) RECEPTACLES AND TELEPHONES: 1 FT.–6 IN. UNLESS NOTED OTHERWISE
(2) WALL SWITCHES/CONTROLS: 4 FT.–0 IN.
(3) WALL FIXTURES: 7 FT.–0 IN. UNLESS NOTED OTHERWISE
(4) MOTOR CONTROLLERS: 5 FT.–0 IN.
(5) CLOCKS: 7 FT.–6 IN.
(6) FIRE ALARM STROBE LIGHTS: 6 FT.–8 IN. OR 6 IN. BELOW CEILING (WHICHEVER IS LOWER)
(7) FIRE ALARM GONGS AND HORNS: 6 FT.–8 IN. OR 6 IN. BELOW CEILING (WHICHEVER IS LOWER)
(8) FIRE ALARM STATIONS: 4 FT.–0 IN.

c. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.

d. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND CONFIRMING ALL MOUNTING HEIGHTS WITH ARCHITECT AND ARCHITECTURAL DRAWINGS.

F. PRODUCT DELIVERY, STORAGE AND HANDLING

1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.

2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

G. MATERIALS

1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.

2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.

3) INSERTS AND SUPPORTS

a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.

(1) SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
(2) MULTI–ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
(3) CLIP FORM NAILS FLUSH WITH INSERTS.
(4) MAXIMUM LOADING 75 PERCENT OF RATING.

b. STRUT: GALVANIZED U–CHANNEL (SIMILAR TO UNISTRUT OR KINDORF)

(1) COLD FORMED FROM LOW–CARBON STEEL WITH HOT–DIPPED GALVANIZED FINISH (ASTM 653 33)
(2) MAXIMUM LOADING 75 PERCENT OF RATING
(3) ASSOCIATED FITTINGS (SPRING NUTS, PIPE STRAPS, ETC.) SHALL BE BY SAME MANUFACTURER AS STRUT.
(4) FILE ALL CUT ENDS SMOOTH AND APPLY COLD GALVANIZING COMPOUND SPRAY (ZRC COLD GALVANIZING COMPOUND SPRAY OR EQUAL)

c. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.

d. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.

e. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.

H. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC CHROMATE FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. RED LEAD OR ZINC CHROMATE WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD–APPLIED ZINC CHROMATE PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.

I. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

J. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES/CONTROLS, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT, PRIOR TO ROUGH IN.

K. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

6. DEMOLITION

A. "SELECTIVE DEMOLITION": IS HEREBY DEFINED TO INCLUDE BUT IS NOT NECESSARILY LIMITED TO THE REMOVAL OF THE FOLLOWING EXISTING MATERIALS, ITEMS AND EQUIPMENT.

1) REFER TO ELECTRICAL DEMOLITION PLAN AND RELATED NOTES FOR EXTENT OF DEMOLITION.

2) REFER TO EXISTING DRAWINGS AND SITE CONDITIONS FOR ALL REMOVAL OF WORK NECESSARY FOR COMPLETION OF NEW WORK AS SHOWN. EACH BIDDER SHALL CAREFULLY EXAMINE THE PREMISES AND DOCUMENTS DURING THE BIDDING PERIOD AND ASCERTAIN THE EXTENT OF REMOVAL OF EXISTING WORK. IF THE CONTRACTOR NOTES ADDITIONAL WORK, CALL IT TO THE ATTENTION OF THE ARCHITECT PRIOR TO SUBMITTING BID. BY SUBMITTING A BID, THE CONTRACTOR WILL HAVE DEEMED TO PROVIDE SUCH EXAMINATION, TO HAVE ACCEPTED SUCH CONDITIONS, AND TO HAVE MADE ALLOWANCES IN PREPARING HIS BID.

3) ITEMS OF SALVAGE SHALL BE CAREFULLY REMOVED WITHOUT DAMAGE; NAILS AND OTHER FASTENERS REMOVED THAT ARE NOT INTEGRAL TO THEIR CONSTRUCTION; AND STORED AND PROTECTED AT LOCATIONS DIRECTED BY THE OWNER. IDENTIFY AND TAG ALL SALVAGE MATERIALS REGARDING LOCATION IN EXISTING BUILDING AND RELATIONSHIP OF PARTS.

4) ALL DEMOLISHED AND/OR REMOVED MATERIALS NOT REQUIRED BY OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE PREMISES AND DISPOSED OF IN A LEGAL MANNER, OFF–SITE.

5) CARE MUST BE TAKEN NOT TO DISTURB EXISTING WIRING, WHICH IS NOT EFFECTED BY DEMOLITION. RESTORE ALL CIRCUITS AND EQUIPMENT DISRUPTED OR DISTURBED BY THE REMOVAL OF ONLY PARTS OF EXISTING SYSTEMS. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AFFECTED BY THIS WORK. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED.

6) PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER.

7) CONNECT NEW WORK TO EXISTING IN A NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY BUILDING OWNER.

8) ALL RACEWAYS TO BE ABANDONED SHALL BE REWORKED AS DEFINED WITHIN THE DEMOLITION NOTES. WHERE IT IS IMPRACTICAL TO REMOVE RACEWAY BACK TO SOURCE, DISCONNECT WIRING AT LOAD (EQUIPMENT) AND AT LINE SIDE, CUT AND CAP, FLUSH TO SURFACE. REMOVE CONDUCTORS FROM EXISTING RACEWAYS TO BE REWIRED. CLEAN RACEWAY AS REQUIRED PRIOR TO REWIRING.

9) TEMPORARY SHUTDOWNS WHEN REQUIRED ARE TO BE MADE ONLY WITH WRITTEN CONSENT OF OWNER AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION AND NO ADDITIONAL CHARGE.

10) ALL REQUIRED WORK FOR TIE–IN TO THE EXISTING EQUIPMENT SHALL BE ACCOMPLISHED AFTER HOURS, THE EXACT DAY AND TIME SHALL BE DIRECTED BY OWNER, AND AT NO ADDITIONAL CHARGE.

7. CUTTING AND PATCHING

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF THE EXISTING AND NEW CONSTRUCTION WORK, WHICH MAY BE REQUIRED FOR THE PROPER INSTALLATION OF THE ELECTRICAL WORK. ALL PATCHING SHALL BE OF THE SAME MATERIALS, WORKMANSHIP, AND FINISH, AND SHALL ACCURATELY MATCH ALL SURROUNDING WORK.

B. CORE BORING OF CONCRETE FLOORS AND/OR WALLS IF REQUIRED, IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

8. COORDINATION

A. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EQUIPMENT WITH ARCHITECTURAL DRAWINGS. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS, AND MECHANICAL EQUIPMENT, VARIATIONS IN FIRE PROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS, AND THE LIKE, AND CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSES TO THE OWNER

9. EQUIPMENT FURNISHED BY OTHERS

A. THE CONTRACTOR SHALL FURNISH AND INSTALL WIRING FOR EQUIPMENT FURNISHED BY OTHERS, AS SHOWN ON DRAWINGS. COORDINATE WITH ALL OTHER TRADES OR DETAILS FOR INSTALLATION. THE TERM "WIRING" AS USED HERE–IN, INCLUDES, BUT IS NOT LIMITED TO, FURNISHING AND INSTALLING CONDUIT, WIRE, JUNCTION BOXES, DISCONNECTS AND MAKING CONNECTIONS. CONTRACTOR SHALL CHECK ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS AND SPECIFICATIONS FOR EQUIPMENT TO BE INSTALLED BY OTHERS. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER WIRING AND NECESSARY ELECTRICAL ADJUSTMENTS TO EQUIPMENT TO CONFORM TO SPECIFIED REQUIREMENTS OF THE EQUIPMENT.

10. LOW–VOLTAGE DISTRIBUTION EQUIPMENT

A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.

B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.

A. DISCONNECT SWITCHES SHALL BE FUSED OR NON–FUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NON–FUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 30 AMP AT 600 VOLTS IN AN ALUMINUM NEMA 1 ENCLOSURE UON. TWO–POLE SWITCHES SHALL BE SIMILAR TO HUBBELL #HBL1372D. THREE–POLE SWITCHES SHALL BE SIMILAR TO HUBBELL #HBL1379D.

1) KNIFE–BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK–MAKE–QUICK–BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO SQUARE D CLASS 3110. APPROVED EQUALS BY SQUARE D AND ALLEN–BRADLEY. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.

A. FUSES: DUAL ELEMENT FUSES FOR MOTOR LOADS SHALL BE TIME DELAY HAVING A MAXIMUM RATING OF 600 AMP AT REQUIRED VOLTAGE. 200,000 AMP IC FUSES SHALL BE SIMILAR TO LIMITRON FUSETRON FRN OR FRS (UL CLASS R). CURRENT LIMITING FUSES SHALL BE UTILIZED FOR OTHER LOADS. 200,000 AMP IC SHALL BE SIMILAR TO LIMITRON KTN, KTS, OR KTU (UL CLASS R UP TO 600 AMP; CLASS L OVER 600 AMP). ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER. PROVIDE 1 SPARE MATCHING FUSE FOR EACH SET OF 3.

C. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL–MAGNETIC, QUICK–MAKE–QUICK–BREAK, BOLT–ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP–FREE HANDLE. MULTI–POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT TRIPPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:

1) 120 VOLTS, 100–AMP FRAME: 10,000 AMPS, 1 POLE.
2) 240 VOLTS, 100–AMP FRAME: 18,000 AMPS, 2 AND 3 POLES.
3) 240 VOLTS, 200–AMP FRAME: 50,000 AMPS, 2 AND 3 POLES WITH INTERCHANGEABLE TRIP.
4) 277 VOLTS, 100–AMP FRAME: 14,000 AMPS, 1 POLE.
5) 480 VOLTS, 100–AMP FRAME: 20,000 AMPS, 2 AND 3 POLES.
6) CIRCUIT BREAKERS INSTALLED IN EXISTING PANEL BOARDS, SHALL BE OF THE SAME MANUFACTURER, TYPE AND A.I.C. RATING AS PRESENTLY IN USE.

D. DISTRIBUTION PANELS: SWITCHING UNITS SHALL BE 3 PHASE, 4 WIRE CIRCUIT–BREAKER TYPE UNLESS OTHERWISE NOTED ON PANEL SCHEDULES. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98 PERCENT CONDUCTIVITY, SILVER OR TIN–PLATED JOINTS. CABINETS SHALL BE GALVANIZED SHEET STEEL BACK BOX, WITH DOOR AND TRIM AND LAPPED AND WELDED CORNERS. HARDWARE SHALL BE CHROME–PLATED WITH FLUSH LOCK/LATCH HANDLE ASSEMBLY (UP TO 48 IN. HIGH DOORS) OR VAULT HANDLE, LOCK AND 3–POINT CATCH (LARGER THAN 48 IN. HIGH DOORS). HINGES SHALL BE SEMI–CONCEALED, 5–KNUCKLE STEEL WITH NONFERROUS PINS, 180–DEGREES OPENING, LOCATED A MAXIMUM 26 IN. ON CENTERS. PROVIDE DOOR–IN–DOOR CONSTRUCTION. MINIMUM GUTTER SPACES FOR LIGHTING PANELS SHALL BE 5–3/4 IN. SIDES, TOP AND BOTTOM. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. A TYPEWRITTEN LIST INDICATING FEEDER CABLE AND CONDUIT SIZE, CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.

A. TRANSFORMERS SHALL BE NEMA TP1 COMPLIANT, OPEN–VENTILATED, DRY TYPE, CLASS H (220 DEGREES C) INSULATION, 115 DEGREES C TEMPERATURE RISE AND WINDINGS SHALL BE COPPER. PRIMARY AND SECONDARY VOLTAGES SHALL BE NOTED. PRIMARY TAPS (6 – 2–1/2 PERCENT TAPS, 2 ABOVE AND 4 BELOW RATED VOLTAGE) SHALL BE PROVIDED. ADJUST FOR REQUIRED VOLTAGE. PROVIDE K RATING AND SHIELDING AS SHOWN ON DRAWINGS.

E. BALANCE THE LOAD OVER PHASES WHEN NEW CIRCUITS ARE ADDED TO NEW OR EXISTING PANELS. PROVIDE MULTI–CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING SHALL NOT BE PERMITTED. MOUNTING HEIGHT SHALL BE A MAXIMUM OF 6 FT.–6 IN. FROM FLOOR TO TOP SWITCH UNIT. UPDATE DIRECTORIES ON EXISTING PANELBOARDS WHERE CIRCUITING IS CHANGED.

F. TESTS: OPEN AND CLOSE LOAD BREAK SWITCHING DEVICES UNDER LOAD.

G. IN OTHER THAN DWELLING UNITS PROVIDE DURABLE FIELD MARKING(S) LABEL INDICATING THE MAXIMUM AVAILABLE FAULT CURRENT AND THE DATE THE FAULT–CURRENT CALCULATION WAS PERFORMED IN COMPLIANCE WITH 110.24.

H. MAINTAIN REQUIRED DEDICATED WORKING SPACE AROUND AND IN FRONT OF SERVICE EQUIPMENT.

1. SPD

A. THE INDIVIDUAL SURGE PROTECTION DEVICE (SPD) UNITS SHALL BE UL LISTED UNDER UL1449 STANDARD FOR TRANSIENT VOLTAGE SURGE SUPPRESSIONS AND THE SURGE RATINGS AND SHORT CIRCUIT CAPACITY RATING SHALL BE PERMANENTLY AFFIXED TO THE COVER OF SPD. THE UNIT SHALL ALSO BE COMPLEMENTARY LISTED TO UL 1283 STANDARD FOR EMI/RFI FACILITY FILTERS.

A. SYSTEM DESCRIPTION

1) THE SPD/FILTER SHALL BE CONSTRUCTED USING MULTIPLE SURGE CURRENT DIVERSION ARRAYS OF METAL OXIDE VARISTORS (MOV), MATCHED TO 1 PERCENT VARIANCE. THE ARRAY SHALL CONSIST OF MULTIPLE GAP–LESS METAL OXIDE VARISTORS, WITH EACH MOV INDIVIDUALLY FUSED. THE ARRAYS SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER, WHICH ENSURES MOV SURGE CURRENT SHARING. NO GAS TUBES, SILICON AVALANCHE DIODES OR SELENIUM PLATES/RECTIFIERS SHALL BE USED. THE STATUS OF EACH ARRAY SHALL BE CONTINUOUSLY MONITORED AND A GREEN LED SHALL BE ILLUMINATED IF THE ARRAY IS IN FULL WORKING ORDER. ALL PROTECTION MODES, INCLUDING N–G, SHALL BE CLOSELY MONITORED AND INTERNALLY FUSED, FOR COMPLIANCE TO NEC ARTICLE 110.9, 110.10 AND 280.22.

A. BASIS OF DESIGN (MINIMUM DISCHARGE RATING SHALL BE 20 KA – L–L, 20 KA – L–G, 20 KA – L–N):

1) EMERSON CATALOG NOS.

a. SERVICE ENTRANCE SERIES 570
a. DISTRIBUTION PANEL SERIES 560
a. BRANCH PANEL SERIES 510

A. WARRANTY

1) THE MANUFACTURER SHALL PROVIDE A LIMITED FIVE (5) YEAR WARRANTY FROM THE DATE OF SHIPPING AGAINST FAILURE WHEN INSTALLED IN COMPLIANCE WITH MANUFACTURER'S WRITTEN INSTRUCTION, UL LISTING REQUIREMENTS, AND ANY APPLICABLE NATIONAL OR LOCAL ELECTRICAL CODES. MANUFACTURER SHALL MAKE AVAILABLE FOR CONSULTATION, (LOCAL, NATIONAL) ENGINEERING SERVICE SUPPORT.

A. MANUFACTURER

1) EMERSON 500 SERIES OR APPROVED EQUAL BY THOMAS AND BETTS – CURRENT TECHNOLOGY OR EATON – INNOVATIVE TECHNOLOGY.

A. ACCESSORIES

1) UNIT STATUS INDICATORS

a. THE UNIT SHALL HAVE AN INTEGRAL STATUS CIRCUIT THAT MONITORS THE OPERATIONAL STATUS OF ALL MODES OF PROTECTION, INCLUDING LINE TO NEUTRAL, LINE TO GROUND AND NEUTRAL TO GROUND. NO MANUAL TESTING IS REQUIRED TO CONFIRM THE INTEGRITY OF THE SUPPRESSION AND FILTER SYSTEMS. IF THE SYSTEM DOES FAIL, THE GREEN LED LIGHT WILL GO OUT AND THE RED LED LIGHT WILL BE LIT.

11. GROUNDING

a. AN EQUIPMENT–GROUNDING CONDUCTOR, COMMONLY DESCRIBED AS A "GREEN WIRE" SHALL BE PROVIDED FOR ALL BRANCH CIRCUITS PROTECTED BY OVERCURRENT DEVICES. "GREEN GROUND" WIRE SHALL ALSO BE PROVIDED FOR FLEXIBLE CONDUIT AND MOTOR CIRCUITS.

b. LIGHTING CIRCUITS INCLUDING WHERE REQUIRED AT SWITCH LOCATIONS FOR PROPER LIGHTING CONTROLS OPERATION.

12. RACEWAYS

A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN.

B. MATERIALS

1) RACEWAYS

a. RIGID STEEL CONDUIT: FULL–WEIGHT PIPE, GALVANIZED, THREADED.

b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.

c. RIGID NON–METALLIC CONDUIT (PVC): POLYVINYL CHLORIDE, SCHEDULE 40 OR 80, UL STANDARD ANSI/UL 651

d. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.

e. LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT: GALVANIZED LOW CARBON STEEL CORE WITH UL BONDED STRIP, WITH A FLAME RETARDANT, SUNLIGHT RESISTANT PVC JACKET. UL LISTED AS LIQUIDTIGHT.

f. WIREWAYS: DIMENSIONS AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW–ON.

2) FITTINGS AND ACCESSORIES

a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC–PLATED STEEL ONLY – ZINC DIE CAST NOT PERMITTED.

b. ELECTROMETALLIC TUBING: COMPRESSION TYPE 2 IN. AND UNDER. SET SCREW TYPE 2–1/2 IN. AND LARGER. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER. ZINC–PLATED STEEL ONLY – ZINC DIE CAST NOT PERMITTED. EXTERIOR EMT FITTINGS SHALL BE RAIN–TIGHT TYPE.

c. PVC: SLIP–ON TYPE, UL CATEGORY DWTT, INSTALLED WITH MANUFACTURER RECOMMENDED SOLVENT.

d. FLEXIBLE METALLIC CONDUIT: SQUEEZE TYPE COMPRESSION FITTING WITH INSULATED THROAT. ZINC–PLATED STEEL ONLY – ZINC DIE CAST NOT PERMITTED.

e. LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT: THREADED GASKETED MALLEABLE IRON, STEEL OR ALUMINUM WITH INSULATED THROAT, UL LISTED FOR WET LOCATIONS.

f. BUSHINGS: METALLIC INSULATED TYPE.

3) BOXES

a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1–1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2–3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1–1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED.

(1) WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK–TO–BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.

(2) ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.

(3) OUTLET BOXES FOR LIGHTING FIXTURES: SUITABLE GALVANIZED THREADED FIXTURE STUDS WHERE REQUIRED, INSTALLED IN OR ON VERTICAL SURFACES FOR SUPPORT OF A LUMINAIRE OVER 6 POUNDS MARKED INDICATING BOX IS SUITABLE FOR INSTALLATION OF A LUMINAIRE, INSTALLED IN CEILING INTENDED FOR SUPPORT OF LIGHTING LUMINAIRE OVER 50 POUNDS BE MARKED ON THE INTERIOR WITH THE WEIGHT OF THE LUMINAIRE IT CAN SUPPORT AND INSTALLED CONCEALED IN CEILING OR WALLS PROVIDED WITH PROPER EXTENSION RINGS AND/OR PLASTER COVERS LISTED FOR THE APPLICATION.

b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW–ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN RENOVATED BOXES BETWEEN 120/208 VOLT AND 277/480 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING.

c. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR–TO–CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON OR GALVANIZED STEEL CHANNEL SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

C. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

1) PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAPHANGERS, OR WALL BRACKETS. PROVIDE U–BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH–THE–FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE–THROUGH–FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS, TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

2) SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U–BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT. ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT. ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAW PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

3) EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

4) MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

5) EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

6) RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD–THREADED CONDUIT WITH GRAPHITE–BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD–CUT THREADS, CRC–COLD GALVANIZED.

7) EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL BE PERMITTED FOR FEEDERS WHERE HIDDEN OR NOT EXPOSED TO POTENTIAL DAMAGE. WHERE DAMAGE IS A POSSIBILITY (I.E. WAREHOUSE WALL) USE RIGID ONLY. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS.

8) IN WET LOCATIONS, PROVIDE GALVANIZED RIGID CONDUIT WITH THREADED COUPLING, PVC CONDUITS AND FITTINGS (SCHEDULE 80 WHERE EXPOSED TO DAMAGE) OR LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT.

9) ALL EMERGENCY BRANCH CIRCUIT WIRE SHALL BE RUN IN CONDUIT.

10) FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT. AND MAXIMUM 6 FT. LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

11) CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

12) ALL COUPLINGS ON EMT RACEWAYS SHALL BE COMPRESSION TYPE UP TO AND INCLUDING 2 IN. CONDUIT. SET SCREW TYPE FITTINGS SHALL BE USED ON 2–1/2 IN. EMT CONDUIT AND LARGER EXCEPT FOR EXTERIOR INSTALLATIONS WHERE ALL EMT FITTINGS SHALL BE RAINTIGHT TYPE.

13) EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.

14) RACEWAYS PASSING THROUGH FIRE–RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT APPROPRIATE TO CONSTRUCTION TO MAINTAIN FIRE RATING OF CONSTRUCTION.

15) PROVIDE INTERNAL VAPOR SEALING OF ALL CONDUITS PASSING FROM EXTERIOR TO CONDITIONED INTERIOR SPACES.

16) PROVIDE RACEWAYS CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

13. WIRE AND CABLE

A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.

B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID OR STRANDED (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT. CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 277 VOLTS AND OVER 200 FT. CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.

1) CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT. CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM.

2) OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.

C. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF–2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEGREES C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS–LINKED POLYETHYLENE INSULATION (TYPE XHHW).

D. WITH EXCEPTION TO PATIENT CARE AREAS PRE–MANUFACTURED STEEL ARMOR, SPECIFICATION GRADE METAL CLAD CABLE (MC–TUFF) MAY BE UTILIZED FOR ALL NORMAL BRANCH CIRCUITS IN DRY HOLLOW STUD WALL LOCATIONS, ABOVE ACCESSIBLE CEILING AND WHERE PERMITTED BY ARTICLE #320 & #517 OF THE NATIONAL ELECTRICAL CODE (APPLICABLE EDITION) ONLY. MINIMUM CONDUCTOR SIZE SHALL BE NO. 12 AWG COPPER WITH INTEGRAL GREEN INSULATED CONTINUOUS GROUND CONDUCTOR AND BARE BONDING CONDUCTOR IN DIRECT CONTACT WITH THE OUTER METAL JACKET.

A. TYPE NM–B CABLE ("ROMEX") SHALL BE PERMITTED FOR BRANCH CIRCUIT WIRING (IN DWELLING UNITS) WHERE ALLOWED BY CODE AND THE AUTHORITY HAVING JURISDICTION. TYPE NM–B CABLE SHALL MEET OR EXCEED UL STANDARD 83, UL STANDARD 719, FEDERAL SPECIFICATION A–A–59544 AND THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.

A. TYPE SE CABLE SHALL BE PERMITTED FOR PANELBOARD AND LOAD CENTER FEEDERS WHERE INDICATED ON DRAWINGS. TYPE SE CABLE SHALL MEET OR EXCEED UL STANDARD 44 (FOR XHHW–2) OR UL STANDARD 83 (FOR THHN/THWN), UL STANDARD 854 FEDERAL SPECIFICATION A–A–59544 AND THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.

A. IN ALL PATIENT CARE AREAS WIRING SHALL BE IN METAL CONDUIT OR MC CABLE LISTED FOR USE IN PATIENT CARE AREAS (HEALTHCARE GRADE) IN ACCORDANCE WITH NEC ARTICLE 517.

E. THE INSULATION OF ALL CONDUCTORS SHALL BE 90 DEGREES C RATED THERMOPLASTIC WITH COLOR CODING AS FOLLOWS:

1) 120/208 VOLT SYSTEM

a. BLACK FOR A PHASE
b. RED FOR B PHASE
c. BLUE FOR C PHASE

2) 277/480 VOLT SYSTEM

a. BROWN FOR A PHASE
b. ORANGE FOR B PHASE
c. YELLOW FOR C PHASE

3) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

a. WHERE COLOR–CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

F. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.

Revisions

No.	Date	Description

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11/12/21

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G. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTI-SEIZE COMPOUND ON TANG.

H. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEGREES F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 277/480 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.

I. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

J. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

K. PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

14. POWER WIRING

A. PROVIDE ALL POWER WIRING TO ALL MOTORS AND EQUIPMENT FURNISHED UNDER ALL CONTRACTS ON THE PROJECT. INCLUDE EXTENSIONS FROM CONTROLLERS TO MOTORS AND MOTOR CONNECTIONS. MOUNT AND WIRE ALL CONTACTORS AND POWER DEVICES FURNISHED UNDER ALL CONTRACTS.

15. CONTROL WIRING

A. PROVIDE ALL CONTROL WIRING FOR MOTORS AND EQUIPMENT FURNISHED UNDER ALL CONTRACTS AND AS SPECIFICALLY SHOWN ON THE DRAWINGS, EXCEPT AS NOTED FOR MECHANICAL/PLUMBING EQUIPMENT. INCLUDE MOUNTING AND WIRING OF ALL CONTROL DEVICES FURNISHED WITH EQUIPMENT.

B. CONTROL WIRING LESS THAN 120 VOLTS FOR MOTORS, ALARMS FOR EQUIPMENT FURNISHED UNDER MECHANICAL/PLUMBING WILL BE PROVIDED UNDER DIVISION 15 CONTRACT.

16. DEVICES

A. LOCAL SWITCHES

1) CONVENTIONAL QUITE TOGGLE TYPE, RATED AT 20 AMP, 120/277 VOLT AC SIMILAR TO LEVITON #1221-2, 1223-2, 1224-2 OR EQUAL BY HUBBELL OR PASS & SEYMOUR. THE OWNER OR ARCHITECT SHALL SELECT TOGGLE COLOR.

2) PILOT LIGHT TOGGLE TYPE WITH NEON LAMP, RATED AT 20 AMP, 120/277 VOLT AC SIMILAR TO LEVITON #1221-PLC OR EQUAL BY HUBBELL OR PASS & SEYMOUR..

B. MANUAL MOTOR STARTERS

1) FLUSH OR SURFACE MOUNTED TYPE WITH INTEGRAL THERMAL OVERLOAD PROTECTION AND PILOT LIGHT. SIMILAR TO SQUARE D CLASS 2510 AND 2512 TYPE F.

C. MOTOR-RATED SWITCHES

1) FLUSH OR SURFACE MOUNTED TYPE WITH PILOT LIGHT. SIMILAR TO SQUARE D CLASS 2510, 2511 AND 2512 TYPE F.

D. INSERTION RECEPTACLES

1) CONVENTIONAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLT, 2 POLE, 3 WIRE, 20 AMP WITH U GROUND SLOT GROUNDED, EXCEPT AS NOTED. DEVICE SHALL MEET OR EXCEED:

a. UL 488

b. UL HOSPITAL GRADE

c. UL FEDERAL SPECIFICATION WC-596 LISTING.

d. NEMA WD-1 AND WD-6

e. DEVICE SHALL BE SIMILAR TO HUBBELL HBL5362 OR EQUAL BY LEVITON, PASS & SEYMOUR OR GE. OWNER OR ARCHITECT SHALL SELECT FACE COLOR. DEVICES USED ON EMERGENCY BRANCH CIRCUITS SHALL BE RED FACE ONLY.

2) GROUND FAULT INTERRUPTER WITH SELF-PROTECTION AND LED INDICATOR LIGHT. SIMILAR TO HUBBELL GFR5362 OR EQUAL BY LEVITON, PASS & SEYMOUR OR GE.

3) SPECIAL RECEPTACLES

a. THE TRADE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE SPECIAL RECEPTACLES REQUIRED TO MATCH PROVIDED, EXISTING AND NEW EQUIPMENT PLUGS.

4) LIGHTING CONTROLS (SEE SCHEDULES/NOTES ON DRAWINGS)

5) RECEPTACLE ORIENTATION

a. CONTRACTOR SHALL COORDINATE ORIENTATION OF DEVICE WITH ARCHITECT.

E. DEVICE PLATES

1) BRUSHED 302 STAINLESS STEEL WITH ENGRAVED CIRCUIT IDENTIFICATION PLATE WHEN USED TOGETHER WITH EMERGENCY BRANCH CIRCUIT DEVICE.

2) REINFORCED THERMOPLASTIC BY SAME MANUFACTURER OF DEVICES.

F. DEVICE WIRING

1) ALL DEVICES SHALL BE SIDE-WIRED VIA SCREW TERMINALS – PUSH-IN WIRING (AKA "QUICKWIRE") THROUGH THE BACK OF THE DEVICE IS NOT AN ACCEPTABLE WIRING METHOD.

17. LIGHTING FIXTURES

A. MANUFACTURE AND INSTALL LIGHTING FIXTURES IN ACCORDANCE WITH NEC ARTICLE 410.

B. PROVIDE ALL LIGHTING FIXTURES INDICATED, COMPLETE WITH LAMPS. INCLUDE ALL INTERIOR LIGHTING FIXTURES, AND ALL EXTERIOR FIXTURES MOUNTED ON THE BUILDING.

C. FURNISH ALL PLASTER FRAMES OR DRY WALL AND DELIVER TO PROJECT SITE FOR INSTALLATION UNDER FINISHES, DIVISION 9.

D. USE FIXTURES CONFORMING TO UL STANDARDS, AND BEARING UL LABEL AND UNION LABEL.

A. ALL FLUORESCENT ELECTRONIC BALLASTS SHALL MEET OR EXCEED THE REQUIREMENTS OF:

1) ANSI/IEEE C62.41 (AMERICAN NATIONAL STANDARDS INSTITUTE).

1) FCC PART 18 (RFI AND EMI).

1) CBM (CERTIFIED BALLAST MANUFACTURERS).

1) UL (UNDERWRITERS LABORATORIES).

1) PUBLIC LAW #100-357 (MINIMUM EFFICIENCY STANDARDS).

1) NAECA (NATIONAL APPLIANCE ENERGY CONSERVATION AMENDMENTS).

1) NEC (NATIONAL ELECTRIC CODE).

E. GENERAL CONSTRUCTION

1) PLASTICS: 100 PERCENT VIRGIN ACRYLIC, REFER TO FIXTURE LIST FOR FURTHER DESCRIPTION.

a. METAL

(1) MATERIAL: STEEL, ALUMINUM OR OTHER TYPES MENTIONED.

(2) B & S GAUGE: NO. 22 MINIMUM FOR HOUSINGS, WITH APPROPRIATE CROSS-SECTIONAL CONFIGURATION FOR FIXTURE HOUSING; THINNER SHEET METAL ACCEPTABLE FOR BALLAST ENCLOSURES AND INCIDENTAL PURPOSES.

b. FINISHES

(1) CORROSION PROTECTION: PLATING, BONDERIZING, PRIMING, ELECTROSTATIC PAINTING, OR OTHER APPROVED MEANS.

(2) COLORS: FACTORY STANDARD UNLESS OTHERWISE NOTED.

(3) FINAL COATING: BAKED PAINT OR ENAMEL ON STEEL AND ALUMINUM; BAKED CLEAR LACQUER OR OTHER DURABLE TRANSPARENT FILM ON POLISHED METAL SURFACES.

c. EXTERIOR FIXTURES: ENCLOSED AND GASKETED, UNLESS OTHERWISE NOTED.

a. FLUORESCENT LAMP SOCKETS: WHITE FINISH, SILVER-PLATED CONTACT SURFACES.

a. FLUORESCENT FIXTURE OPERATING TEMPERATURE: NOT TO EXCEED 25 DEGREES C, TEMPERATURE RISE OVER 40 DEGREES C, A MAXIMUM 90 DEGREES C BALLAST HOT SPOT WHEN FLUORESCENT FIXTURE IS OPERATED IN 25 DEGREES C AMBIENT. MAXIMUM CASE TEMPERATURE SHALL NOT EXCEED 85 DEGREES C.

a. FLUORESCENT BALLASTS: REFER TO LIGHTING FIXTURE LIST. UNLESS OTHERWISE NOTED, ALL FLUORESCENT BALLASTS SHALL BE ELECTRONIC HIGH POWER FACTOR WITH LESS THAN 10% THD.

d. LED FIXTURES:

(1) MODULAR TO ALLOW FOR SEPARATE REPLACEMENT OF LED LAMPS AND DRIVERS.

(2) USER SERVICEABLE LED LAMPS AND DRIVERS REPLACEABLE FROM THE ROOM SIDE.

(3) DIMMABLE LED FIXTURES WITH EITHER A 01-10 VOLT, 3-WIRE DIMMING DRIVER OR A TWO-STEP (50%-100%) LINE VOLTAGE, TWO SWITCH CONTROLLED DIMMING DRIVER.

e. LATCHES: QUICK-OPERATING TYPE WITHOUT NEED FOR TOOLS, UNLESS OTHERWISE NOTED; STAINLESS STEEL OR CADMIUM PLATED STEEL.

f. EXPOSED HARDWARE: NOT ACCEPTABLE ON VISIBLE SURFACES OF FIXTURES IN FINISHED AREAS UNLESS OTHERWISE NOTED.

F. PROVIDE APPROPRIATE MOUNTING ACCESSORIES FOR EACH FIXTURE, COMPATIBLE WITH THE VARIOUS STRUCTURAL CONDITIONS THAT WILL BE ENCOUNTERED. PROVIDE FASTENING CLIPS (EARTHQUAKE CLIPS) FOR LIGHTING FIXTURES THAT ARE SUPPORTED FROM FRAMING MEMBERS OF SUSPENDED CEILINGS.

G. ASSEMBLE, WIRE AND INSTALL ALL LIGHTING FIXTURES AT THEIR RESPECTIVE OUTLETS AS INDICATED AND ASSUME RESPONSIBILITY FOR THEIR CONDITION UNTIL ACCEPTANCE BY OWNER. INSTALL PROPER LAMPS IN EACH FIXTURE.

H. FIXTURE CONNECTIONS TO BRANCH CIRCUITS SHALL BE MADE USING STRANDED WIRE WITH INSULATION TEMPERATURE RATING EQUAL TO OR HIGHER THAN THAT OR WIRE SUPPLIED WITH THE FIXTURE, OR SPECIFIED BY FIXTURE MANUFACTURER. FIXTURES ARE TO BE CONNECTED TO BRANCH CIRCUITS VIA JUNCTION BOX USING FLEXIBLE CONDUIT OF LENGTHS BETWEEN 4 FT. MINIMUM AND 6 FT. MAXIMUM.

I. THE USE OF FLEXIBLE CONDUIT, TO FIXTURES IN ANY LENGTH OVER 6 FT. IS PERMITTED ONLY WHEN A SEPARATE GROUND WIRE IS INSTALLED ALONG WITH THE CONDUCTORS INSIDE THE FLEXIBLE CONDUIT. IN THIS APPLICATION THE GROUND WIRE MUST BOND THE LIGHTING FIXTURE HOUSINGS TO EACH OTHER AND/OR TO THE JUNCTION BOX. ALL FLEXIBLE CONDUIT SHALL BE SUPPORTED AS REQUIRED BY NEC AND SHALL BE INSTALLED IN A WORKMANLIKE MANNER.

J. NOTE THAT SPECIFICATIONS FOR RECESSED FIXTURES GENERALLY DO NOT INCLUDE MOUNTING ACCESSORIES, AND THAT EACH FIXTURE TYPE MAY BE USED IN SEVERAL DIFFERENT CEILINGS, SUCH AS LAY-IN EXPOSED GRID, CONCEALED SPLINE TILE, OR DRYWALL. VERIFY MOUNTING DETAILS FOR EACH SPACE BEFORE ORDERING FIXTURES SO THAT PROPER QUANTITIES FOR EACH CONDITION WILL BE DELIVERED IN TIME TO AVOID CONSTRUCTION DELAYS.

K. SECURELY FASTEN LIGHTING FIXTURES TO FRAMING MEMBERS OF SUSPENDED CEILINGS WITH FASTENING CLIPS, AS SPECIFIED. CLIP EACH FIXTURE TO ALL ADJOINING FRAMING MEMBERS TO PREVENT MOVEMENT OF THE MEMBERS AWAY FROM THE FIXTURES.

L. SUPPORT EXIT SIGNS IN TILE CEILINGS WITH RAILS THAT SPAN BETWEEN RUNNERS OF CEILING SUSPENSION SYSTEM. USE FLANGED FIXTURES FOR FINISHED APPEARANCE.

M. SUPPORT FLUIORESCENT AND LED FIXTURES IN DRYWALL CEILINGS FROM PLASTER FRAMES, WITH ADJUSTABLE LUGS ON SIDE OF FIXTURE OR YOKE MOUNTING AS RECOMMENDED BY FIXTURE MANUFACTURER. USE FLANGED FIXTURES FOR FINISHED APPEARANCE, UNLESS OTHERWISE NOTED.

N. LOCATE FIXTURE IN CENTER OF PANEL WHERE USED IN MODULAR TILE CEILINGS, UNLESS OTHERWISE NOTED. REFER TO REFLECTED CEILING PLAN.

A. FLUORESCENT BALLASTS

1) REFER TO LIGHTING FIXTURE LIST. UNLESS OTHERWISE NOTED, ALL FLUORESCENT BALLASTS SHALL BE ELECTRONIC HIGH POWER FACTOR WITH LESS THAN 10% THD.

18. EMPTY RACEWAY SYSTEMS

A. A COMPLETE EMPTY RACEWAY SYSTEM CONSISTING OF BLANK 4-11/16 IN. SQ. X 2-1/8 INCHES DEEP OUTLET BOXES WITH SINGLE OR DOUBLE GANG DRYWALL FINISH COLLAR AS NOTED. METALLIC RACEWAY WITH PULL STRING SHALL BE PROVIDED AND INSTALLED WHERE SHOWN FOR THE FOLLOWING SYSTEMS.

1) TELEPHONE/DATA (SINGLE GANG)

2) CABLE TELEVISION (SINGLE GANG)

B. RACEWAY SIZE SHALL BE A MINIMUM OF 3/4 IN. OR AS DOCUMENTED IN PLANS AND DETAILS.

C. ALL METALLIC RACEWAY SYSTEMS SHALL BE STUBBED UP AND TERMINATE IN ACCESSIBLE CEILING. END BUSHINGS AND PULL WIRES SHALL BE PROVIDED. BONDING OF ALL RACEWAY SYSTEMS TO PROVIDE A COMMON GROUND PATH SHALL BE PROVIDED.

D. ACTUAL DEVICES, CONNECTORS, WIRING COMPLETE WITH TERMINATIONS AND BOX COVERS SHALL BE PROVIDED BY THE OWNER.

19. FIRE STOPPING

A. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION.

B. PROVIDE ALL REQUIRED FIRE STOPPING. WORK INCLUDES FIRE-STOPPING PENETRATIONS OF FIRE-RESISTANCE RATED FLOORS, WALLS AND PARTITIONS IN NEW CONSTRUCTION, AS WELL AS PRE-EXISTING PENETRATIONS IN RENOVATION AREAS OF EXISTING CONSTRUCTION.

C. PRODUCT DATA: SUBMIT MANUFACTURER'S PRODUCT DATA FOR EACH FIRE-STOPPING PRODUCE REQUIRED, INCLUDING INSTRUCTIONS FOR SUBSTRATE PREPARATION AND FIRE-STOPPING INSTALLATION.

D. FIRE RESISTANT JOINT SEALERS: PROVIDE MANUFACTURER'S STANDARD FIRE-STOPPING SEALANT WITH ACCESSORY MATERIALS, HAVING FIRE RESISTANCE RATINGS INDICATED AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES PER ASTM EB14 BY UNDERWRITERS LABORATORY, INC. OR OTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

E. MATERIALS – PROVIDE THE FOLLOWING:

1) ONE-PART FIRE-STOPPING SEALANT: ONE PART LATEX BASED INTUMESCENT SEALANT FORMULATED FOR USE IN A THROUGH-PENETRATION FIRE-STOP SYSTEM FOR SEALING OPENINGS AROUND CABLES, CONDUIT, PIPES AND SIMILAR PENETRATIONS THROUGH WALLS AND FLOORS. ACCEPTABLE PRODUCTS/MANUFACTURERS INCLUDE THE FOLLOWING:

a. SPEC SEAL LC150 SERIES

b. HILTI FS ONE

c. 3M

20. TESTS

A. BEFORE MAKING TESTS, COMPLETE ALL CONNECTIONS AT PANELS, FIXTURES AND OTHER EQUIPMENT. INSTALL FUSES AND HAVE ALL WIRING CONTINUOUS FROM SERVICE EQUIPMENT TO UTILIZATION OUTLETS. CORRECT ALL UNDESIRABLE GROUND, OPEN AND SHORT CIRCUIT CONDITIONS.

B. PROVIDE SOURCE OF TEMPORARY POWER FOR MAKING TESTS IF NORMAL BUILDING POWER IS NOT AVAILABLE AT THE TIME.

C. TAKE AND RECORD THE FOLLOWING READINGS ON SYSTEMS 600 VOLTS AND BELOW:

1) MEGGER TESTS OF ALL FEEDER CIRCUIT CONDUCTORS, GROUND CONDUCTORS, AND CONDUIT GROUND.

2) AMMETER READINGS ON ALL PHASES AND NEUTRAL OF EACH FEEDER TO INDICATE BALANCE.

3) AMMETER READINGS ON ALL PHASES OF EACH POLYPHASE MOTOR. INCLUDE NAMEPLATE FULL LOAD CURRENT OF EACH MOTOR ON DATA SHEET.

4) CERTIFY THAT ALL OVERLOAD DEVICES HAVE BEEN SET IN ACCORDANCE WITH DATA SHOWN ON THE DRAWINGS AND/OR MANUFACTURER'S RECOMMENDED SETTING.

D. SEND FINAL CERTIFIED TEST REPORTS AND CERTIFICATIONS TO THE ARCHITECT FOR APPROVAL AND TRANSMITTAL TO THE OWNER.

E. PROVIDE FUNCTIONAL TESTING FOR OCCUPANT SENSORS AND AUTOMATIC TIME SWITCH IN ACCORDANCE WITH ARTICLE 9.4.3 OF THE 2013 EDITION OF ASHRAE STANDARD 90.1.

21. DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS

A. SUBMIT WRITTEN CERTIFICATION THAT ELECTRICAL SYSTEMS ARE COMPLETE AND OPERATIONAL. SUBMIT CERTIFICATION WITH CONTRACTOR'S REQUEST FOR FINAL REVIEW.

1) AT THE TIME OF FINAL REVIEW OF ELECTRICAL WORK, DEMONSTRATE THE OPERATION OF ELECTRICAL SYSTEMS. FURNISH LABOR, APPARATUS AND EQUIPMENT FOR SYSTEMS' DEMONSTRATION. THE VARIOUS TEST SHALL BE WITNESSED BY AND THE OWNER OR HIS REPRESENTATIVE.

B. THE CONTRACTOR SHALL FURNISH ALL TEST EQUIPMENT, MATERIALS, LABOR, AND TEMPORARY POWER HOOK-UPS TO PERFORM START-UP AND ALL TESTS AS REQUIRED TO OBTAIN FINAL FIELD ACCEPTANCE FROM OWNER. ALL TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE OWNER OR HIS REPRESENTATIVE. ALL TEST PROCEDURES SHALL CONFORM TO THIS SPECIFICATION AND APPLICABLE STANDARDS THE ANSI, IEEE, NEMA, OSHA, NEPA, ETC.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTS AND TEST RECORD. TESTING SHALL BE PERFORMED BY AND UNDER THE IMMEDIATE SUPERVISION OF THE CONTRACTOR. TEST RECORD SHALL BE KEPT FOR EACH PIECE OF EQUIPMENT. COPIES SHALL BE FURNISHED TO THE ENGINEER FOR REVIEW AND/OR APPROVAL.

D. A VISUAL INSPECTION OF ALL ELECTRICAL EQUIPMENT, TO CHECK FOR THE FOREIGN MATERIAL, TIGHTNESS OR WIRING AND CONNECTION, PROPER GROUNDING, MATCHING NAMEPLATE CHARTS WITH SPECIFICATION, ETC., SHALL BE MADE PRIOR TO ACTUAL TESTING.

E. A COMPLETE OPERATIONAL TEST SHALL BE MADE ON THE REVISED LIFE SAFETY FIRE ALARM SYSTEM. THE CONTRACTOR SHALL CONSULT WITH THE EQUIPMENT VENDORS AND THEN SUBMIT FOR APPROVAL A STEP-BY-STEP PROCEDURE DESCRIBING THE METHOD OF MAKING THE TESTS, THE EQUIPMENT TO BE UTILIZED AND THE FEATURE TO BE CHECKED BY THE TEST. ALL INTERLOCKS AND PROTECTIVE FEATURES SHALL BE CHECKED OUT.

22. SPECIAL ENGINEERING SERVICES

A. IN THE INSTANCE OF COMPLEX OR SPECIALIZED ELECTRICAL SYSTEMS SUCH AS EMERGENCY SYSTEM FIRE ALARM OR SIMILAR MISCELLANEOUS SYSTEMS, THE INSTALLATION, FINAL CONNECTIONS AND TESTING OF SUCH SYSTEMS SHALL BE MADE UNDER THE DIRECT SUPERVISION OF COMPETENT AUTHORIZED SERVICE ENGINEERS WHO SHALL BE IN THE EMPLOY OF THE RESPECTIVE EQUIPMENT MANUFACTURER.

B. ANY AND ALL EXPENSES INCURRED BY THESE EQUIPMENT MANUFACTURERS' REPRESENTATIVES RELATED TO THIS PROJECT, SHALL BE BORNE BY THE ELECTRICAL CONTRACTOR.

23. DESIGN MODIFICATIONS

A. THE DRAWINGS SHOW ELECTRICAL SYSTEMS, WHICH SUPPLY, CONTROL, AND/OR MONITOR SYSTEMS SPECIFIED ELSEWHERE. THE ELECTRICAL SYSTEM SHOWN HAS BEEN BASED ON SPECIFIC MANUFACTURERS DATA OR INFORMATION CONVEYED TO THE ELECTRICAL DESIGNER. WHERE ANY AGREEMENT OR CHANGE IS MADE TO SUPPLY EQUIPMENT OF LARGER CAPACITY OR DIFFERENT ELECTRICAL CHARACTERISTICS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE ELECTRICAL SYSTEM TO EFFECT SUCH CHANGES WITHIN THE INTENT OF THESE SPECIFICATIONS AND TO INFORM THE ENGINEER, IN WRITING, OF SUCH CHANGE. FOR EXAMPLE, IF HVAC COMPRESSORS AND/OR MOTORS ARE ALLOWED TO BE CHANGED TO 230 VOLTS RATHER THAN THE ORIGINALLY SPECIFIED 208 VOLTS, BOOSTING OR BUCKING TRANSFORMERS SHALL BE SUPPLIED, INSTALLED, AND WIRED TO ACCOMMODATE THE CHANGE AT NO ADDITIONAL COST.

Revisions

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HVAC BASIC PIPING SYMBOLS

(NOT ALL SYMBOLS ARE NECESSARILY USED ON THIS PROJECT)

- PIPE DROP
- PIPE RISE
- PITCH UP IN DIRECTION OF FLOW
- PITCH DOWN IN DIRECTION OF FLOW
- UNION
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER – FLAT BOTTOM
- ECCENTRIC REDUCER – FLAT TOP
- FLANGED CONNECTION
- FLANGED END
- EXPANSION LOOP
- PIPE EXPANSION JOINT
- PIPE ALIGNMENT GUIDE
- PIPE ANCHOR
- GATE OR SHUTOFF VALVE (AS NOTED)
- ANGLE VALVE
- GLOBE VALVE
- ANGLE GLOBE VALVE
- NEEDLE VALVE COCK
- DRAIN VALVE
- LOCK SHIELD VALVE
- CHECK VALVE, SWING OR LIFT
- SILENT CHECK VALVE
- FLEXIBLE CONNECTOR
- BUTTERFLY VALVE
- BALL VALVE
- SQUARE HEAD COCK
- CALIBRATED BALANCING VALVE
- PLUG VALVE (TYPE AS NOTED)
- AUTOMATIC CONTROL VALVE
- THREE-WAY AUTOMATIC CONTROL VALVE
- "Y" TYPE STRAINER W/BLOW OFF VALVE
- THERMOMETER AND WELL
- PRESSURE GAUGE
- PUMP

HVAC BASIC DUCTWORK SYMBOLS

(NOT ALL SYMBOLS ARE NECESSARILY USED ON THIS PROJECT)

- SINGLE LINE DUCTWORK OR EQUIPMENT – NEW
- SINGLE LINE DUCTWORK OR EQUIPMENT – EXISTING
- SINGLE LINE DUCTWORK OR EQUIPMENT – DEMOLITION
- FLEXIBLE DUCT
- TRANSITION
- DUCTWORK WITH ACOUSTIC LINING
- CEILING DIFFUSER
- RETURN/EXHAUST GRILLE
- SUPPLY AIR DUCT UP
- RETURN AIR DUCT UP
- SUPPLY AIR DUCT DN
- RETURN AIR DUCT DN
- BDD — BACK DRAFT DAMPER
- M — MOTORIZED DAMPER
- M SMK — AUTOMATIC SMOKE DAMPER
- R — RISE IN DUCTWORK (IN DIRECTION OF AIR FLOW)
- D — DROP IN DUCTWORK (IN DIRECTION OF AIR FLOW)
- CENTER LINE
- ℄ OR CFM — CUBIC FEET PER MINUTE
- Ø — DIAMETER
- ØØ — SQUARE FEET
- POINT OF CONNECTION
- POINT OF DISCONNECTION
- DIRECTION OF RETURN AIR
- DIRECTION OF SUPPLY AIR
- F/S — COMBINATION FIRE & SMOKE DAMPER W/ ACCESS DOOR
- FD — FIRE DAMPER (WALL) W/ ACCESS DOOR
- FD — FIRE DAMPER (CEILING) W/ ACCESS DOOR
- VD — VOLUME DAMPER
- C — CARBON DIOXIDE SENSOR
- T — THERMOSTAT
- H — HUMIDISTAT
- S — TEMPERATURE SENSOR
- STEAM TRAP
- S — DUCT SMOKE DETECTOR
- UC — DOOR UNDERCUT
- SECTION DESIGNATION
- SHEET NO. WHERE SECTION IS SHOWN
- DETAIL DESIGNATION
- SHEET NO. WHERE DETAIL IS SHOWN
- EQ — MECHANICAL EQUIPMENT TAG
- 10" / 6" — PROPORTIONAL SPLIT OR EQUAL SPLIT. RADIUS ELBOWS (REFER TO SPECIFICATIONS)
- RADIUS ELBOWS OR SQUARE ELBOWS w/TURNING VANES (REFER TO SPECIFICATIONS)
- PROPORTIONAL SPLIT OR EQUAL SPLIT. RADIUS ELBOWS (REFER TO SPECIFICATIONS)
- 6" — ROUND BRANCH TAKE-OFF w/SPIN FITTING
- BRANCH TAKE-OFF w/HEEL
- 6" — ROUND BRANCH TAKE-OFF w/BELLMOUTH
- TEE-ON-TAPER (DUST COLLECTION ONLY)
- DUCT ELBOW UP
- DUCT ELBOW DN

HVAC ABBREVIATIONS

(NOT ALL ABBREVIATIONS ARE NECESSARILY USED ON THIS PROJECT)

AAV	AUTOMATIC AIR VENT
AC	AIR CONDITIONING
ACU	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
BCU	BLOWER COIL UNIT
BHP	BRAKE HORSEPOWER
BR	BOTTOM REGISTER
BT	BOTTOM THROAT
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CG	CEILING GRILLE
CLG	CEILING
CO	CLEANOUT
COND	CONDENSATE
CR	CEILING REGISTER
CUH	CABINET UNIT HEATER
CV	CONSTANT VOLUME
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DIAM	DIAMETER
DMPR	DAMPER
DN	DOWN
DX	DIRECT EXPANSION
(E)	EXISTING TO REMAIN
(ER)	EXISTING TO BE REMOVED
(ERR)	EXISTING TO BE REMOVED & RELOCATED
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB TEMPERATURE
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EL	ELEVATION
EMS	ENERGY MANAGEMENT SYSTEM
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
°F	DEGREES FAHRENHEIT
FA	FREE AREA (SQ.FT.)
FC	FLEXIBLE CONNECTION
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FIN FL	FINISHED FLOOR
FLA	FULL LOAD AMPERES
FPM	FEET PER MINUTE
GAL	GALLON
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRD	GRILLES, REGISTERS & DIFFUSERS
HT	HEIGHT
HP	HORSEPOWER
HR	HOUR
HV	HEATING AND VENTILATING
HX	HEAT EXCHANGER
HZ	HERTZ (FREQUENCY)
IN.	INCH OR INCHES
LAT	LEAVING AIR TEMPERATURE
LD	LINEAR DIFFUSER
LF	LINEAR FEET
LWB	LEAVING WET BULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MBH	THOUSAND BTU PER HOUR
MER	MECHANICAL EQUIPMENT ROOM
MIN	MINIMUM
MOD	MOTOR OPERATED DAMPER
(N)	NEW
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAI	OUTSIDE AIR INTAKE
OED	OPEN END DUCT
PSI	POUNDS PER SQUARE INCH
PSIA	PSI ABSOLUTE
PSIG	PSI GAUGE
RA	RETURN AIR
(RE)	RELOCATED EXISTING
REFRIG	REFRIGERANT
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RLA	RUNNING LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
RR	RETURN REGISTER
(RRO)	EXISTING TO BE REMOVED AND RETURN TO OWNER
RTU	ROOFTOP AIR HANDLING UNIT
SA	SUPPLY AIR
SD	SMOKE DAMPER
SF	SUPPLY FAN
SP	STATIC PRESSURE
SQFT	SQUARE FEET
SPEC	SPECIFICATION
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TR	TOP REGISTER
TRANS	TRANSITION
T-STAT	THERMOSTAT
TYP	TYPICAL
UH	UNIT HEATER
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VAV	VARIABLE AIR VOLUME
VIV	VARIABLE INLET VANES
W	WIDTH
W/	WITH
WB	WET BULB
W.C.	WATER COLUMN
W.G.	WATER GAUGE
WH	WATER HEATER
WMS	WIRE MESH SCREEN

MECHANICAL NOTES

1. PRIOR TO SUBMITTING A BID THE CONTRACTOR SHALL EXAMINE ALL DRAWINGS AND SPECIFICATIONS AND VISIT THE SITE TO BECOME ACQUAINTED WITH THE CONSTRUCTION AND THE EXTENT OF THE WORK. NO EQUIPMENT OR MATERIAL IS TO BE ORDERED OR FABRICATED PRIOR TO FIELD VERIFICATION OF ALL MEASUREMENTS, CLEARANCES, POTENTIAL CONFLICTS WITH EXISTING CONDITIONS OR THAT OF OTHER TRADES ON THE JOB.
2. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE, WHETHER SPECIFIED OR IMPLIED.
3. CONTRACTOR SHALL VISIT THE JOB PRIOR TO SUBMITTING A BID.
4. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST APPLICABLE INTERNATIONAL BUILDING CODE, MECHANICAL CODE, FUEL GAS CODE, PLUMBING CODE, NEC CODE AND ALL OTHER STATE AND LOCAL AUTHORITIES HAVING JURISDICTION.
5. CONTRACTOR SHALL GIVE ALL NOTICES, OBTAIN AND PAY FOR ALL PERMITS, DEPOSITS AND FEES NECESSARY.
6. DO NOT SCALE THE DRAWINGS FOR EXACT DIMENSIONS. THE DESIGN DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LAYOUT AND CONNECTIONS. CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS, ETC. AT THE JOB SITE.
7. CONTRACTOR SHALL REVIEW THE WORK OF OTHER TRADES TO PREVENT INTERFERENCE BETWEEN BEAMS, STRUCTURES, PIPING, LIGHTING FIXTURES ETC. BEFORE PROCEEDING WITH NEW WORK.
8. CONTRACTOR SHALL GUARANTEE THE ENTIRE JOB AGAINST DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE. THIS GUARANTEE SHALL BE BINDING REGARDLESS OF MANUFACTURER'S GUARANTEE AND CONTRACTOR SHALL REMOVE AND REPLACE ALL DEFECTIVE MATERIAL REGARDLESS OF CAUSE (EXCEPT FOR DEFECTS TRACEABLE TO IMPROPER MAINTENANCE OR MALICIOUS DESTRUCTION OCCURRING AFTER THE SYSTEM HAS BEEN TURNED OVER).
9. ALL MATERIALS USED ANYWHERE IN THE WORK SHALL HAVE NFPA RATING AS FOLLOWS:

   A. FLAME SPREAD– NOT OVER 25
   B. SMOKE DEVELOPED– NOT OVER 50
   C. FUEL CONTRIBUTED– NOT OVER 25
   ALL MATERIALS SHALL BE "SELF-EXTINGUISHING"
10. CONTRACTOR SHALL SUBMIT 1/4" SCALE SHEET METAL SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
11. SUBMIT TO THE ARCHITECT FOR APPROVAL, SPECIFICATION SHEETS OF ALL EQUIPMENT SUPPLIED OR INSTALLED, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

    A. AIR CONDITIONING UNITS
    B. GRILLES, REGISTERS, AND DIFFUSERS
    C. CONTROLS
    D. PIPING
    E. INSULATION
    F. FANS
12. ALL MECHANICAL EQUIPMENT AND APPLIANCES INSTALLED SHALL BEAR THE LABEL OF AN APPROVED AGENCY.
13. EQUIPMENT AND MATERIALS ARE SPECIFIED TO ESTABLISH A STANDARD OF QUALITY. ALL MATERIALS AND EQUIPMENT USED FOR THIS CONTRACT SHALL BE NEW AND UNUSED AND OF THE LATEST MODEL OR DESIGN AVAILABLE.
14. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT INSULATION IS APPLIED.
15. CONTRACTOR SHALL PROVIDE 1–INCH THICK (R–5) FOAM BOARD INSULATION PAINTED TO MATCH THE ROOM'S FINISH FOR ALL THERMOSTAT'S MOUNTED ON MASONRY WALLS.
16. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL STRUCTURAL STEEL, SUPPORTS, BRACES, HANGERS, ETC., REQUIRED FOR HIS CONTRACT UNLESS OTHERWISE NOTED. CONTRACTOR SHALL COORDINATE ALL EQUIPMENT SUPPORT LOCATION AND INSTALLATION WITH ROOFING AND STRUCTURAL CONTRACTORS.
17. ALL DUCT SIZES SHOWN ARE INSIDE CLEAR.
18. MAXIMUM ALLOWABLE LENGTH FOR FLEXIBLE DUCT IS SIX (6') FEET.
19. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING AND PATCHING EITHER ENGAGING HIS OWN GENERAL SUBCONTRACTOR OR ONE QUALIFIED BY THE OWNER.
20. CONTRACTOR SHALL INFORM THE ENGINEER OF ANY QUESTIONS OR DISCREPANCIES PRIOR TO PRECURSOR AND/OR FABRICATION OF ANY MATERIALS AND INSTALLATION.
21. INSTALL ALL EQUIPMENT IN ACCORDANCE TO THE MANUFACTURER'S WRITTEN GUIDELINES.
22. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONNECTIONS, SUPPORTS, TERMINATIONS & ACCESSORIES ASSOCIATED WITH AIR HANDLING UNITS, FANS, ETC.
23. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR WHO WILL PROVIDE POWER WIRING TO ALL MECHANICAL EQUIPMENT. MECHANICAL CONTRACTOR SHALL PROVIDE ALL CONTROL AND INTERLOCK WIRING AND ALL THERMOSTATS AND ACCESSORIES.
24. SUPPORT ALL EQUIPMENT, PIPING AND DUCTWORK WITH VIBRATION ISOLATION HANGERS AS REQUIRED TO PROVIDE A VIBRATION FREE INSTALLATION.
25. ALL EXTERIOR WALL OPENINGS SHALL BE SLEEVED, PROPERLY CAULKED AND SEALED WITH A HIGH QUALITY SEALANT TO PREVENT INFILTRATION OF MOISTURE AND OUTSIDE AIR.
26. PROVIDE VOLUME DAMPERS AT ALL DUCT BRANCHES AND RUNOUTS. PROVIDE OPPOSED BLADE VOLUME DAMPERS AT ALL REGISTERS, GRILLES AND DIFFUSER NECKS IN SUPPLY, RETURN AND EXHAUST DUCTWORK WHETHER SHOWN ON DRAWINGS OR NOT.
27. PROVIDE AT MINIMUM 10 GAUGE STEEL SLEEVES FOR ALL DUCT PENETRATIONS THROUGH FIRE WALLS, FLOORS AND PARTITIONS. PROVIDE PIPE SLEEVES FOR ALL MECHANICAL PIPING PENETRATING THROUGH FIRE WALLS, FLOORS AND PARTITIONS. SEAL ALL ANNULAR SPACE BETWEEN SLEEVES AND DUCTWORK OR PIPING WITH A FIRE BARRIER MATERIAL.
28. PROVIDE FLEXIBLE CONNECTIONS ON ALL DUCTS AND PIPING CONNECTIONS TO ANY MOTOR DRIVEN MECHANICAL EQUIPMENT (I.E. FANS, AIR HANDLERS, PUMPS, ETC.) INSTALL FLEXIBLE COPPER GROUNDING STRAPS ACROSS ALL FLEXIBLE CONNECTIONS.
29. THE INSIDE OF ALL DUCTWORK VISIBLE THROUGH A GRILLE OR DIFFUSER SHALL BE PAINTED FLAT BLACK.
30. ACCESS PANELS SHALL BE PROVIDED TO SERVICE ALL VALVES, DAMPERS, HEATERS, CONCEALED MECHANICAL EQUIPMENT, TRAPS, CLEANOUTS AND DISCHARGE SIDE OF ELECTRIC HEATERS.
31. FINAL LOCATIONS FOR MOUNTING ALL THERMOSTATS SHALL BE COORDINATED WITH THE ENGINEER PRIOR TO INSTALLING ANY CONTROL WORK. ALL COMMON AREA THERMOSTATS SHALL BE EQUIPPED WITH A LOCKING COVERS. MOUNT ALL THERMOSTATS TO COMPLY WITH ADA REQUIREMENTS.
32. UPON COMPLETION OF THE WORK, REMOVE ALL EXCESS MATERIAL, DEBRIS, TOOLS AND EQUIPMENT FROM THE SITE, AND LEAVE THE PREMISES IN A BROOM CLEAN CONDITION.
33. CONTRACTOR SHALL PROVIDE THREE (3) COMPLETE SETS OF BOUND OPERATING AND MAINTENANCE INSTRUCTIONS. CONTRACTOR SHALL INSTRUCT THE OWNER OR HIS AGENT WITH REGARD TO THE PROPER USE OF THE SYSTEM UNTIL SUCH INSTRUCTION IS COMPLETE TO THE OWNER'S SATISFACTION.
34. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC OR NEBB STANDARDS.
35. CONTRACTOR SHALL ENSURE THAT ALL MECHANICAL DEVICES WILL BE INSTALLED IN LOCATIONS WHICH AFFORD ACCESSIBILITY FOR MAINTENANCE AND REPAIR. COORDINATE INSTALLATION AMONG ALL TRADES TO AVOID INTERFERENCES AND LOCATE EQUIPMENT TO PROVIDE CLEARANCES WHICH EXCEED THOSE RECOMMENDED BY THE EQUIPMENT MANUFACTURER.
36. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE SAFETY OF EXISTING STRUCTURE.
37. THERMOSTAT WIRING SHALL BE INSTALLED IN CONCEALED SPACE, WALL OR CHASE – COORDINATE WITH THE OWNER REPRESENTATIVE.
38. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION SCHEDULING AND ASSOCIATED HOISTING STAGING AND ERECTING OF MATERIALS. ALL ELEMENTS OF THE EXISTING PROPERTY SHALL BE PROTECTED AGAINST DAMAGE RESULTING FROM THESE ACTIVITIES.
39. THE LOCATION OF EXISTING SYSTEMS AND SYSTEM COMPONENTS WAS OBTAINED THROUGH EXISTING DRAWINGS AND FIELD SURVEYS. ONLY SYSTEM ELEMENTS THAT WERE CLEARLY VISIBLE HAVE BEEN IDENTIFIED. LOCATIONS AND SIZES OF EXISTING SYSTEMS MUST BE FIELD VERIFIED BY THE CONTRACTOR, PRIOR TO THE REMOVAL OF ANY EXISTING SYSTEM COMPONENTS AND CONNECTING NEW SYSTEMS TO EXISTING.
40. THESE DRAWINGS HAVE BEEN MADE BASED ON A VISUAL INSPECTION OF THE EXISTING SURFACES. SOME ASSUMPTIONS HAVE BEEN MADE AS TO ACTUAL CONSTRUCTION, MATERIALS, AND METHODS. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL ACTUAL FIELD CONDITIONS AND SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES, CONFLICTS, AND UNFORESEEN CONDITIONS. IN ADDITION, THESE DRAWINGS ASSUME THAT ALL EXISTING MATERIALS ARE IN GOOD STRUCTURAL SHAPE, GOOD WORKING ORDER, AND MEET ALL APPLICABLE CODES. THE GENERAL CONTRACTOR IS RESPONSIBLE TO INSPECT ALL THE EXISTING ELEMENTS OF THE STRUCTURE AND REPORT TO THE CLIENT AND TO THE ARCHITECT OF ANY SIGNS OF POTENTIAL PROBLEMS WITH THE STRUCTURE INCLUDING, BUT NOT LIMITED TO, WOOD DECAYING ORGANISMS, WATER PENETRATION, STRUCTURAL FRACTURES, STRESSED SURFACES, BRICK AND MASONRY WEAKENING AND WEAK STRUCTURAL CONNECTIONS.
41. SEQUENCES OF OPERATION SHALL BE FULLY IMPLEMENTED AND BE IN ACCORDANCE WITH ASHRAE GUIDELINE 36.
42. ENGAGE A FACTORY–AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICES. COMPLETE INSTALLATION AND STARTUP CHECKS SHALL BE ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND STARTUP REPORTS SHALL BE PROVIDED TO ARCHITECT/ENGINEER FOLLOWING COMPLETION. STARTUP SHALL BE PROVIDED FOR ALL EQUIPMENT SUPPLIED OR INSTALLED, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

    A. DUAL DUCT VAV UNITS
    B. HEATERS
    C. FANS
    D. BOILERS
    E. CHILLERS
    F. CONDENSERS & HEAT PUMPS
    G. CONTROLS

DUAL DUCT VAV UNIT NOTES:

1. REFER TO SCHEDULE SHEET FOR ADDITIONAL INFORMATION.
2. EXISTING TERMINAL UNITS ARE PRESSURE DEPENDANT WITH PNEUMATIC CONTROLS.
3. CLEAN AND REFURBISH ALL UNITS PRIOR TO STARTING ANY NEW WORK ON THE SYSTEM. CHECK ALL CONTROLS. REPORT ANY DAMAGE OR OPERATION ISSUES TO ARCHITECT AND ENGINEER.
4. PROVIDE NEW ELECTRONIC TO PNEUMATIC WIRELESS THERMOSTATS FOR ALL UNITS.
5. PROVIDE A UNIT PRICE (PER TERMINAL UNIT) FOR RETROFIT/REPLACEMENT OF EXISTING CONSTANT VOLUME REGULATORS.
6. PROVIDE A UNIT PRICE (PER TERMINAL UNITS) TO REPLACE EXISTING DUAL DUCT TERMINAL UNITS WITH NEW SIMILAR TO TITUS PEDC.

GENERAL FIRESTOPPING NOTE

CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OR EXCEEDING WALL/CEILING/FLOOR ASSEMBLY RATINGS FOR ALL PENETRATIONS. CONTRACTOR SHALL VERIFY LOCATION AND RATING OF ALL FIRE ASSEMBLIES AND PROVIDE INTUMESCENT COLLARS AT ALL PENETRATIONS AND FIRE RATED CAULKING AS REQUIRED.

Revisions

No.	Date	Description

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MCE PROJECT #21149

11/12/21

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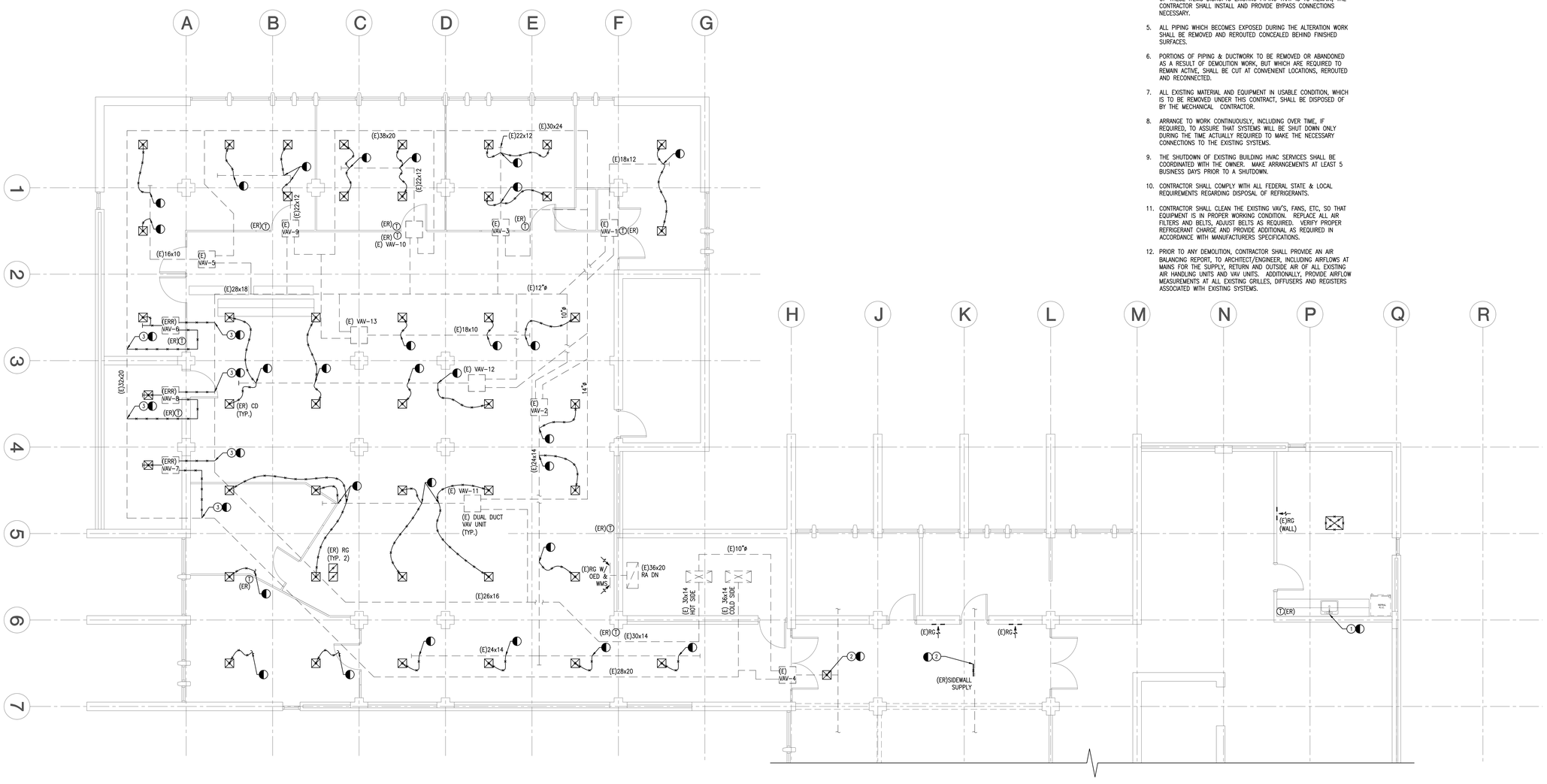
Project

VINELAND CITY HALL FINANCE DEPT. RENOVATIONS

640 E WOOD ST.
VINELAND, NJ, 08360

Drawing
MECHANICAL & PLUMBING COVERSHEET

Scale	Job	Sheet
AS NOTED	21.081	M0.0
Drawn ZCR	**Date** 11/12/21	1 of 7



01 MECHANICAL & PLUMBING FLOOR PLAN – DEMO
SCALE: 3/16" = 1'-0"

DEMOLITION NOTES:

1. THE CONTRACTOR SHALL INCLUDE IN HIS PRICE ALL COSTS ASSOCIATED WITH REMOVALS AND RELOCATIONS OF HVAC WORK AS DESCRIBED ON THE DRAWINGS AND IN THE SPECIFICATIONS WITH ALLOWANCES FOR EXPECTED OR UNFORESEEN DIFFICULTIES WHEN CONCEALED WORK HAS BEEN OPENED. NO CLAIMS FOR ADDITIONAL WORK ASSOCIATED WITH DEMOLITION WILL BE ACCEPTED, EXCEPT IN CERTAIN CASES CONSIDERED JUSTIFIABLE BY THE OWNER/ENGINEER.
2. THE CONTRACTOR SHALL PERFORM DEMOLITION AND REMOVAL WORK WITH MINIMUM INTERFERENCE WITH FUNCTIONING HVAC SYSTEMS. ALL AFFECTED SYSTEMS SHALL BE RECONNECTED AND RESTORED.
3. DEMOLITION AND REMOVAL WORK SHALL BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER. THE CONTRACTOR SHALL PATCH, REPAIR OR OTHERWISE RESTORE ANY DAMAGED INTERIOR OR EXTERIOR BUILDING SURFACE TO ITS ORIGINAL CONDITION. PATCH ALL EXISTING INTERIOR AND EXTERIOR WALLS, LEFT BY DEMOLITION, TO MATCH EXISTING.
4. THE CONTRACTOR SHALL REMOVE ALL DUCT & PIPING SUPPORTS, ETC. FROM PARTITIONS THAT ARE TO BE REMOVED. WHERE THE REMOVAL OF THESE ITEMS DISRUPTS EXISTING PIPING THAT IS TO REMAIN, THE CONTRACTOR SHALL INSTALL AND PROVIDE BYPASS CONNECTIONS NECESSARY.
5. ALL PIPING WHICH BECOMES EXPOSED DURING THE ALTERATION WORK SHALL BE REMOVED AND REROUTED CONCEALED BEHIND FINISHED SURFACES.
6. PORTIONS OF PIPING & DUCTWORK TO BE REMOVED OR ABANDONED AS A RESULT OF DEMOLITION WORK, BUT WHICH ARE REQUIRED TO REMAIN ACTIVE, SHALL BE CUT AT CONVENIENT LOCATIONS, REROUTED AND RECONNECTED.
7. ALL EXISTING MATERIAL AND EQUIPMENT IN USABLE CONDITION, WHICH IS TO BE REMOVED UNDER THIS CONTRACT, SHALL BE DISPOSED OF BY THE MECHANICAL CONTRACTOR.
8. ARRANGE TO WORK CONTINUOUSLY, INCLUDING OVER TIME, IF REQUIRED, TO ASSURE THAT SYSTEMS WILL BE SHUT DOWN ONLY DURING THE TIME ACTUALLY REQUIRED TO MAKE THE NECESSARY CONNECTIONS TO THE EXISTING SYSTEMS.
9. THE SHUTDOWN OF EXISTING BUILDING HVAC SERVICES SHALL BE COORDINATED WITH THE OWNER. MAKE ARRANGEMENTS AT LEAST 5 BUSINESS DAYS PRIOR TO A SHUTDOWN.
10. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL STATE & LOCAL REQUIREMENTS REGARDING DISPOSAL OF REFRIGERANTS.
11. CONTRACTOR SHALL CLEAN THE EXISTING VAV'S, FANS, ETC, SO THAT EQUIPMENT IS IN PROPER WORKING CONDITION. REPLACE ALL AIR FILTERS AND BELTS, ADJUST BELTS AS REQUIRED. VERIFY PROPER REFRIGERANT CHARGE AND PROVIDE ADDITIONAL AS REQUIRED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
12. PRIOR TO ANY DEMOLITION, CONTRACTOR SHALL PROVIDE AN AIR BALANCING REPORT, TO ARCHITECT/ENGINEER, INCLUDING AIRFLOWS AT MAINS FOR THE SUPPLY, RETURN AND OUTSIDE AIR OF ALL EXISTING AIR HANDLING UNITS AND VAV UNITS. ADDITIONALLY, PROVIDE AIRFLOW MEASUREMENTS AT ALL EXISTING GRILLES, DIFFUSERS AND REGISTERS ASSOCIATED WITH EXISTING SYSTEMS.

KEY NOTES:

1. DISCONNECT AND REMOVE EXISTING SINK, INCLUDING TRAP AND VALVES. PREPARE EXISTING HOT AND COLD WATER PIPING, SANITARY, AND VENT PIPING AT WALL FOR CONNECTION TO NEW SINK. REFER TO NEW WORK PLANS FOR RECONNECTION.
2. DISCONNECT AND REMOVE EXISTING DUCT MOUNTED SUPPLY DIFFUSER. REFER TO NEW WORK PLANS FOR RECONNECTION.
3. DISCONNECT AND REMOVE EXISTING DUCT BACK TO POINT SHOWN AND PATCH MAIN AIR TIGHT.

KEY PLAN – N.T.S.

Revisions

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640 E WOOD ST.
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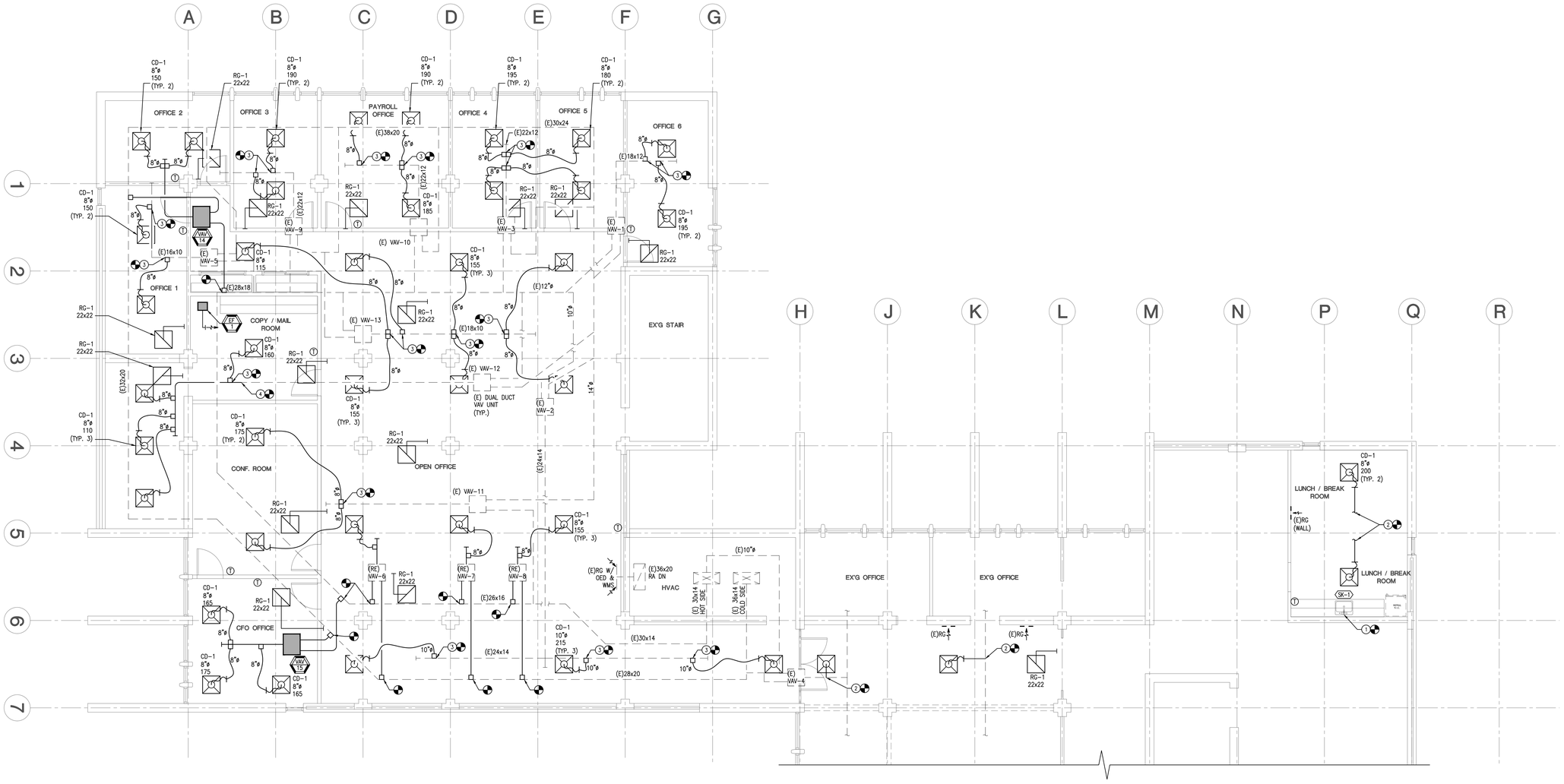
Drawing		
MECHANICAL & PLUMBING FLOOR PLAN - DEMO		
Scale AS NOTED	**Job** 21.081	**Sheet** MD1.0
Drawn ZCR	**Date** 11/12/21	2 of 7

DRAWING NOTES:

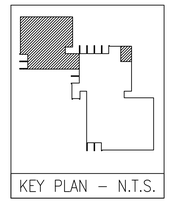
1. DRAWINGS ARE DIAGRAMMATIC. PROVIDE ADDITIONAL OFFSETS, TRANSITIONS, ETC. AS REQUIRED TO AVOID INTERFERENCES ENCOUNTERED.
2. CONTRACTOR SHALL PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AND ACCESS TO ALL EQUIPMENT. COORDINATE LOCATIONS WITH OTHER TRADES TO AVOID CONFLICTS.
3. SPACE ABOVE CEILING IS VERY LIMITED. COORDINATE WITH ALL TRADES FOR DUCTWORK ROUTING PRIOR TO FABRICATION AND INSTALLATION.
4. EXTEND PNEUMATIC CONTROLS AND TUBING TO ALL NEW AND RELOCATED CONSTANT VOLUME DUAL DUCT BOXES.
5. FIELD VERIFY AND PROVIDE ACCESS TO ALL DUAL DUCT BOX CONTROLS.

KEY NOTES:

1. CONNECT EXISTING HOT AND COLD WATER PIPING, SANITARY, AND VENT PIPING AT WALL TO NEW SINK. PROVIDE P-TRAP, STOP VALVES, APPURTENANCES, AND ADDITIONAL PIPING/OFFSETS AS REQUIRED TO MAKE CONNECTIONS.
2. EXTEND NEW 8"ø SUPPLY DUCT FROM EXISTING SUPPLY MAIN TO NEW GRD IN NEW CEILING.
3. CONNECT NEW SUPPLY DUCT TO EXISTING MAIN. VERIFY EXISTING SIZE IN FIELD.
4. EXTEND EXISTING MAIN. VERIFY EXISTING SIZE IN FIELD.



01 MECHANICAL & PLUMBING FLOOR PLAN
SCALE: 3/16" = 1'-0"



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Drawing: MECHANICAL & PLUMBING FLOOR PLAN

Scale	Job	Sheet
AS NOTED	21.061	M1.0
Drawn: ZCR	Date: 11/12/21	3 of 7

AIR DEVICE SCHEDULE

NOTE: NOT ALL DEVICES MAY BE USED ON PROJECT.

TAG	FLOW PATTERN	SUPPLY
CD-1	4-WAY (UNLESS NOTED OTHERWISE)	24x24 FACE CEILING DIFFUSER EQUAL TO TITUS MODEL OMNI, STEEL CONSTRUCTION, FIXED DISCHARGE, PATTERN OPTION A4, 4-WAY (UNLESS NOTED ON PLANS), BORDER TYPE 1 (SURFACE MOUNT) OR BORDER TYPE 3 (LAY-IN) AS REQUIRED, OPPOSED BLADE DAMPER, NECK SIZE AS INDICATED ON DRAWINGS. PROVIDE WITH INSULATED BLANKET (R-6 MIN.). COLOR BY ARCHITECT.
CD-2	4-WAY (UNLESS NOTED OTHERWISE)	12x12 FACE CEILING DIFFUSER EQUAL TO TITUS MODEL OMNI, STEEL CONSTRUCTION, FIXED DISCHARGE, PATTERN OPTION A4, 4-WAY (UNLESS NOTED ON PLANS), BORDER TYPE 1 (SURFACE MOUNT) OR BORDER TYPE 3 (LAY-IN) AS REQUIRED, OPPOSED BLADE DAMPER, NECK SIZE AS INDICATED ON DRAWINGS. PROVIDE WITH INSULATED BLANKET (R-6 MIN.). COLOR BY ARCHITECT.
LD-1	N/A	48" 2 SLOT, 3/4" SLOT LINEAR DIFFUSER EQUAL TO TITUS MODEL ML-38 WITH INSULATED PLENUM, END CAPS, ICE TONG SHAPED PATTERN CONTROLLER CAPABLE OF 180° PATTERN ADJUSTMENT FROM DIFFUSER FACE WHICH ALSO ALLOWS FOR DAMPERING. COLOR BY ARCHITECT.
		RETURN
RG-1	SEE PLANS	24x24 RETURN GRILLE EQUAL TO TITUS MODEL PAR, STEEL CONSTRUCTION, PERFORATED FACE WITH 3/16" DIAMETER HOLES ON 1/4" STAGGERED CENTERS, HEAVY GAUGE STEEL BACKPAN, NECK SIZE AS INDICATED ON DRAWINGS. COLOR BY ARCHITECT.
		TRANSFER GRILLE
TG-1	N/A	TRANSFER GRILLE EQUAL TO HART & COOLEY MODEL 672, STEEL CONSTRUCTION, ROLL-FRAMED STEEL BORDER AND BLADES, OPPOSED BLADE DAMPER. COLOR BY ARCHITECT.

NOTES/ACCESSORIES:
1. FINISH/COLOR OF ALL DIFFUSERS SHALL BE DETERMINED BY OWNER/ARCHITECT.
2. PROVIDE 4-WAY THROW UNLESS NOTED (ARROWS) ON PLANS.
3. MAXIMUM PRESSURE DROP FOR SUPPLY AIR DIFFUSERS SHALL BE 0.10" W.G.
4. MECHANICAL CONTRACTOR SHALL COORDINATE BORDER TYPES WITH CEILING AND WALL CONSTRUCTION. REFER TO ARCH. REFLECTED CEILING PLAN. COORDINATE WITH GENERAL CONTRACTOR.
5. OPPOSED BLADE DAMPERS MAY BE OMITTED WHERE VOLUME DAMPERS ARE PROVIDED AT BRANCH RUNOUTS.
6. DRAWING SYMBOL INFORMATION:

OR
TAG
NECK SIZE
CFM

EXISTING DUAL DUCT VAV BOX SCHEDULE

TAG	BASIS OF DESIGN MANUF.	MODEL NO.	INLET SIZE COLD/HOT	OUTLET SIZE	CFM EXISTING/NEW	REMARKS
(E) VAV-1	BUENSOD	7H LH	7/7	–	480/390	ALL
(E) VAV-2	BUENSOD	9H RH	9/9	–	865/645	ALL
(E) VAV-3	BUENSOD	8H RH	8/8	–	640/750	ALL
(E) VAV-4	BUENSOD	9H LH	9/9	–	995/995	ALL
(E) VAV-5	BUENSOD	5H LH	5/5	–	260/300	ALL
(E) VAV-6	BUENSOD	4H RH	4/4	–	100/155	ALL
(E) VAV-7	BUENSOD	4H RH	4/4	–	125/155	ALL
(E) VAV-8	BUENSOD	4H RH	4/4	–	100/155	ALL
(E) VAV-9	BUENSOD	8H LH	8/8	–	645/380	ALL
(E) VAV-10	BUENSOD	8H LH	8/8	–	645/565	ALL
(E) VAV-11	BUENSOD	7H LH	7/7	–	540/350	ALL
(E) VAV-12	BUENSOD	8H RH	8/8	–	610/490	ALL
(E) VAV-13	BUENSOD	9H LH	9/9	–	1105/1045	ALL
(N) VAV-14	TITUS	PEDV-N	6/6	8X24	–/300	ALL
(N) VAV-15	TITUS	PEDV-N	8/8	10X24	–/505	ALL

NOTES/ACCESSORIES:
1. EXISTING TERMINAL UNITS ARE PRESSURE DEPENDENT WITH PNEUMATIC CONTROLS.
2. CLEAN AND REFURBISH ALL UNITS PRIOR TO STARTING ANY NEW WORK ON THE SYSTEM. CHECK ALL CONTROLS. REPORT ANY DAMAGE OR OPERATION ISSUES TO ARCHITECT AND ENGINEER.
3. COORDINATE LEFT HAND OR RIGHT HAND CONTROLS LOCATION WITH FINAL LAYOUT COORDINATED WITH ALL TRADES.
4. PROVIDE A UNIT PRICE (PER TERMINAL UNIT) FOR RETROFIT/REPLACEMENT OF EXISTING CONSTANT VOLUME REGULATORS.
5. PROVIDE A UNIT PRICE (PER TERMINAL UNIT) TO REPLACE EXISTING DUAL DUCT TERMINAL UNITS WITH NEW SIMILAR TO TITUS PEDV.

FAN SCHEDULE

EF –

TAG	SERVICE	BASIS OF DESIGN MANUF.	MODEL NO.	TYPE	CFM	SP. IN. W.G.	FRPM	HP/(WATTS)	VOLTAGE	NOISE LEVEL (SONES)	CONTROL	REMARKS
EF-1	COPY ROOM	GREENHECK	SP-A90	CEILING	90	0.1	900	(17 WATTS)	120/1ϕ/60	0.3	SWITCH	ALL

NOTES/ACCESSORIES:
1. PROVIDE WITH FACTORY INTEGRAL BACKDRAFT DAMPER, HANGER KIT, AND SPEED CONTROLLER.
2. DISCONNECT SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR.
3. OPERATED BY WALL SWITCH PROVIDED BY ELECTRICAL CONTRACTOR.

PLUMBING FIXTURE SCHEDULE

FIXTURE #	FIXTURE	MANUFACTURER AND EQUIPMENT	MODEL NUMBER	SERVICE CONNECTIONS				REMARKS
				CW	HW	SAN	VENT	
SK-1	PANTRY SINK	ELKAY LUSTERTONE WITH PERFECT DRAIN ELKAY EVERYDAY SINGLE HOLE DECK MOUNT FAUCET	LRAD252165PD LK1500CR	1/2"	1/2"	1-1/2"	1-1/2"	PROVIDE TRAP, SUPPLIES, VALVE STOPS & RISERS

NOTES:
1. ALL EXPOSED WATER AND/OR SANITARY PIPING UNDER SINKS OR LAVATORIES SHALL BE INSULATED WITH "LAV GUARD" INSULATION KIT.
2. PVC CELLULAR CORE (FOAM CORE) PIPE SYSTEMS IS NOT AN APPROVED MATERIAL AND SHALL NOT BE ACCEPTED FOR INSTALLATION UNDER ANY CIRCUMSTANCE.
3. ALL FIXTURE SHUT-OFFS AND STOP VALVES SHALL HAVE BRASS STEMS, PROVIDE ANGLE SUPPLY STOP WITH FLANGE (ESCUTCHEON PLATE) AND FLEXIBLE HOSE.
4. PROVIDE THERMOSTATIC MIXING VALVES (MV-1) BELOW EACH SINK AND/OR LAVATORY.
5. SEE ARCHITECTURAL DRAWING SETS FOR ADDITIONAL FIXTURE AND ACCESSORY REQUIREMENTS. CONTRACTOR SHALL COORDINATE AND PROVIDE FOR ALL FIXTURE AND EQUIPMENT.
6. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL PLUMBING FIXTURES.

Revisions

No.	Date	Description

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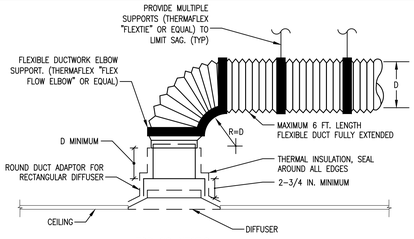
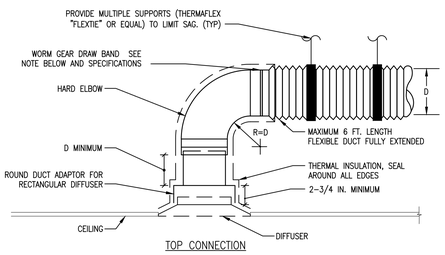
Drawing

MECHANICAL & PLUMBING SCHEDULES

Scale	Job	Sheet
AS NOTED	21.081	M2.0
Drawn	**Date**	
---	11/12/21	4 of 7



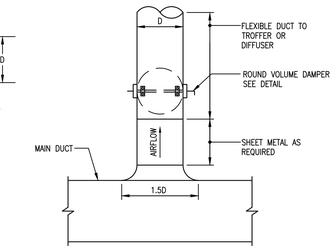
TOP CONNECTION



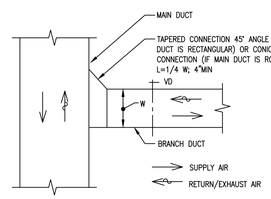
TOP CONNECTION

DETAIL NOTES:
1. SUPPORT FLEXIBLE DUCT TO AVOID DEFLECTION. NO ABRUPT CHANGES IN DIRECTION OF FLEXIBLE DUCTWORK SHALL BE ACCEPTABLE. MAX. CHANGES IN DIRECTION SHALL BE 15 DEGREES.
2. FOLLOW SMACNA STANDARDS FOR SUPPORTS AND HANGERS.

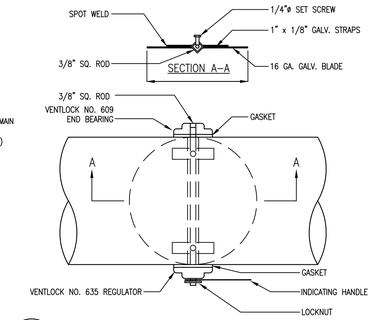
01 ELBOW AT DIFFUSER CONNECTION DETAIL
SCALE: N.T.S.



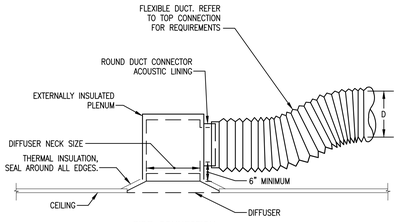
02 CIRCULAR BRANCH CONNECTION
SCALE: N.T.S.



03 BRANCH TAKE-OFFS
SCALE: N.T.S.



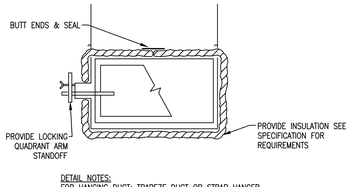
04 TYPICAL ROUND VOLUME DAMPER DETAIL
SCALE: N.T.S.



SIDE CONNECTION

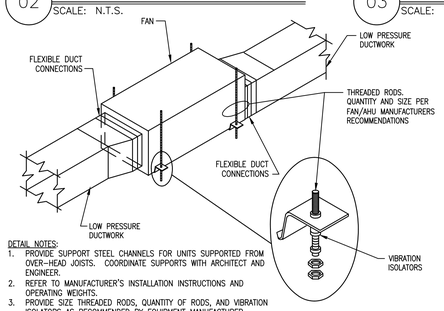
DETAIL NOTES:
1. SUPPORT FLEXIBLE DUCT TO AVOID DEFLECTION. NO ABRUPT CHANGES IN DIRECTION OF FLEXIBLE DUCTWORK SHALL BE ACCEPTABLE. MAX. CHANGES IN DIRECTION SHALL BE 15 DEGREES.
2. FOLLOW SMACNA STANDARDS FOR SUPPORTS AND HANGERS.
3. SIDE CONNECTION WITH HARD DUCT SIMILAR FOR RETURN.

05 DIFFUSER CONNECTION DETAILS
SCALE: N.T.S.



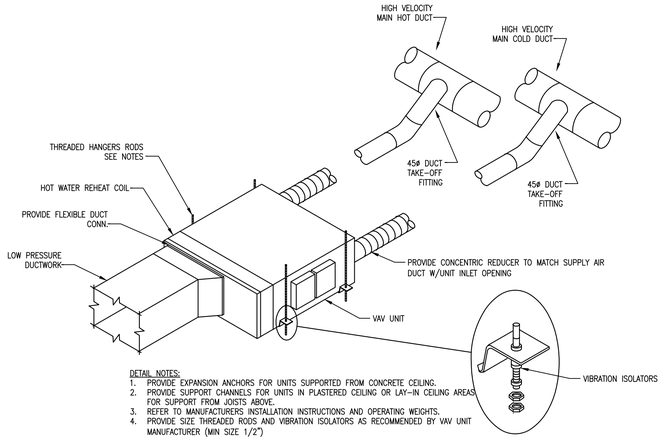
DETAIL NOTES:
FOR HANGING DUCT: TRAPEZE DUCT OR STRAP HANGER AROUND DUCT COMPLETELY. DO NOT USE ANY SCREWS, BECAUSE THEY INTERFERE WITH DAMPER BLADE(S).

TYPICAL DUCT INSULATION & SUPPORTS NEAR VOLUME DAMPER DETAIL 06
SCALE: N.T.S.



DETAIL NOTES:
1. PROVIDE SUPPORT STEEL CHANNELS FOR UNITS SUPPORTED FROM OVER-HEAD JOISTS. COORDINATE SUPPORTS WITH ARCHITECT AND ENGINEER.
2. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS AND OPERATING WEIGHTS.
3. PROVIDE SIZE THREADED RODS, QUANTITY OF RODS, AND VIBRATION ISOLATORS AS RECOMMENDED BY EQUIPMENT MANUFACTURER.

07 FAN/AC MOUNTING DETAIL
SCALE: N.T.S.



DETAIL NOTES:
1. PROVIDE EXPANSION ANCHORS FOR UNITS SUPPORTED FROM CONCRETE CEILING.
2. PROVIDE SUPPORT CHANNELS FOR UNITS IN PLASTERED CEILING OR LAY-IN CEILING AREAS FOR SUPPORT FROM JOISTS ABOVE.
3. REFER TO MANUFACTURERS INSTALLATION INSTRUCTIONS AND OPERATING WEIGHTS.
4. PROVIDE SIZE THREADED RODS AND VIBRATION ISOLATORS AS RECOMMENDED BY VAV UNIT MANUFACTURER (MIN SIZE 1/2")

08 VAV UNIT MOUNTING DETAIL
SCALE: N.T.S.

09 TRANSFER DUCT DETAIL
SCALE: N.T.S.

DETAIL NOTES:
1. COORDINATE RATED CEILING LOCATIONS WITH ARCHITECT PLANS AND PROVIDE MANUFACTURER'S RADIATION DAMPERS WHERE REQUIRED.
2. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.

10 TYPICAL EXHAUST FAN DETAIL
SCALE: N.T.S.

Revisions

No.	Date	Description

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AS NOTED	21.081	M3.0
Drawn: ZCR	Date: 11/12/21	5 of 7

HVAC SPECIFICATIONS

1. GENERAL

A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.

B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.

C. INVESTIGATE EACH SPACE THOROUGHLY WHERE EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM BUILDING OWNER AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

D. DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH THE EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES IS REQUIRED.

E. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75 PERCENT OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER. PROVIDE SEISMIC RESTRAINTS AS REQUIRED BY CODE.

F. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT APPROVAL.

G. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP THE WORK PROPOSAL.

H. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.

I. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

J. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL.

K. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.

L. ALL PRESENT MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

M. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

N. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.

O. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

P. UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

Q. REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR.

R. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

S. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR; EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.

T. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

U. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

V. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

W. DEFINITIONS

1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.

3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.

5) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.

6) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

7) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT AS DETERMINED BY THE ENGINEER AND ARCHITECT.

2. SCOPE OF WORK

A. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.

B. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN TWO YEARS FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

D. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT PROVIDE COMPLETE SET OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, DUCTWORK, PIPING AND CONTROL SYSTEMS INDICATING CAPACITY DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

3. SHOP DRAWINGS

A. INDICATE ON EACH SUBMISSION: PROJECT NAME AND LOCATION, ARCHITECT AND ENGINEER, ITEM IDENTIFICATION AND APPROVAL STAMP OF PRIME CONTRACTOR.

B. SUBMISSIONS

1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.

2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT THREE PRINTS TO THE ARCHITECT. THE ARCHITECT WILL FORWARD TWO PRINTS TO THE ENGINEER.

C. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

1) DUCTWORK LAYOUT DRAWINGS AND SHEET METAL DESIGNS.

2) SHEETMETAL CONSTRUCTION STANDARDS.

3) AIR OUTLETS.

4) AIR BALANCE REPORT.

5) AC UNITS AND FANS.

6) PIPING LAYOUT.

7) OPERATING SEQUENCES.

8) VIBRATION ISOLATION AND SEISMIC RESTRAINTS.

D. COORDINATION

1) THE CONTRACTOR SHALL ASSURE FULL COOPERATION OF ALL TRADES AND SHALL FURNISH IN WRITING ALL INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTORILY AND WITH LEAST POSSIBLE INTERFERENCE OR DELAY.

2) PREPARE COORDINATED COMPOSITE DRAWINGS AT A SUITABLE SCALE NOT LESS THAN 1/4-INCH EQUALS ONE FOOT, ZERO INCHES, CLEARLY SHOWING HOW THE WORK OF THIS DIVISION IS TO BE INSTALLED IN RELATION TO THE WORK OF ALL TRADES. ANY WORK INSTALLED IN CONFLICT WITH THE WORK OF OTHER TRADES SHALL BE CORRECTED AT NO ADDITIONAL COST TO THE OWNER.

3) THE CONTRACTOR MAY, SUBJECT TO THE ACCEPTANCE OF THE ARCHITECT AND WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF ALL TRADES OR FOR THE PROPER EXECUTION OF THE WORK.

4) MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. COORDINATE WITH THE ARCHITECTURAL DRAWINGS AND DETAILS FOR EXACT LOCATION OF DUCTWORK, PIPING AND EQUIPMENT.

5) THE CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYOUT WORK AND SHALL COORDINATE ALL TRADES TO VERIFY SPACES IN WHICH WORK SHALL BE INSTALLED. MAINTAIN MAXIMUM HEADROOM OR SPACE CONDITIONS. WHERE SPACE CONDITIONS APPEAR INADEQUATE, THE ARCHITECT SHALL BE NOTIFIED BEFORE INSTALLATION. DO NOT PROCEED WITH THE INSTALLATION UNTIL RECEIVING CLARIFYING INSTRUCTIONS.

4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH IN ELECTRONIC FORMAT ALL SUBMITTED SHOP DRAWINGS AND THE INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.

C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.

D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.

5. SHEET METAL WORK

A. EXCEPT AS OTHERWISE SHOWN OR NOTED, ALL DUCTWORK AND OTHER SHEET METAL WORK SHALL BE GALVANIZED SHEET STEEL AND SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. DUCT CONSTRUCTION STANDARDS, PRESSURE CLASSIFICATION 2 IN. W.G.

1) FOR RECTANGULAR DUCTS, THE MINIMUM GAUGES SHALL BE:
a. 24 GAUGE FOR DUCTS 30" (MAXIMUM DIMENSION) AND SMALLER.
b. 22 GAUGE FOR DUCTS WITH A MAXIMUM DIMENSION BETWEEN 31" AND 54".
c. 20 GAUGE FOR DUCTS WITH A MAXIMUM DIMENSION BETWEEN 55" AND 84".
d. 18 GAUGE FOR DUCTS WITH A MAXIMUM DIMENSION LARGER THAN 84".

2) MAXIMUM REINFORCING DISTANCES SHALL BE:
a. 7'-10" FOR DUCTS WITH A MAXIMUM DIMENSION OF 30" OR SMALLER.
b. 3'-9" FOR DUCTS WITH A MAXIMUM DIMENSION LARGER THAN 30".

3) PROVIDE MILL PHOSPHATIZED FINISH WHERE DUCTS ARE EXPOSED.

B. ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR DIMENSIONS.

C. ALL DUCTWORK SHALL BE FREE FROM PULSATION, CHATTER AND VIBRATION. IF ANY OF THESE DEFECTS APPEAR AFTER A SYSTEM IS IN OPERATION, CORRECT BY REMOVING AND REPLACING, OR REINFORCING THE DUCTWORK AT NO ADDITIONAL COST TO THE OWNER.

D. ROUND SINGLE AND DOUBLE-WALL DUCTWORK: APPROVED MANUFACTURERS: MCGILL AIRFLOW, SEMCO, LINDAB, AND EASTERN SHEET METAL.

1) PROVIDE FACTORY-FABRICATED ROUND DUCTS. GAUGES AND CONSTRUCTION DETAILS SHALL COMPLY WITH THE REFERENCED SMACNA HVAC DUCT CONSTRUCTION STANDARDS AND SMACNA ROUND INDUSTRIAL DUCT CONSTRUCTION STANDARDS.

2) FOR DUCTWORK DIAMETERS UP TO AND INCLUDING 60 INCHES, PROVIDE SPIRAL LOCK-SEAM CONSTRUCTION. FOR DUCTWORK DIAMETERS OVER 60 INCHES, PROVIDE WELDED LONGITUDINAL SEAMS.

3) PROVIDE DUCTS OF SPIRAL LOCK-SEAM CONSTRUCTION.

4) USE SLIP JOINTS, JOINTS WITH A DOUBLE-LIPPED EPDM JACKET, OR THE FOLLOWING JOINING SYSTEM FOR TRANSVERSE DUCT JOINTS AND FITTINGS.
a. UP TO 20" DIAMETER: INTERIOR SLIP COUPLING BEADED AT CENTER AND FASTENED TO DUCT WITH SCREWS SHALL BE USED TO JOIN DUCTS. SEAL JOINT WITH A SEALING COMPOUND, CONTINUOUSLY APPLIED AROUND JOINT PRIOR TO ASSEMBLING AND AFTER FASTENING, MAKING CERTAIN THAT MAJORITY OF SEALANT RESIDES ON INTERIOR OF THE JOINT.
b. 21" DIAMETER & ABOVE: INSTALL USING A THREE-PIECE, GASKETED FLANGED-JOINT CONSISTING OF TWO INTERNAL FLANGES, WITH INTEGRAL MASTIC SEALANT, AND ONE EXTERNAL CLOSURE BAND TO COMPRESS THE GASKET BETWEEN THE INTERNAL FLANGES. APPROVED SYSTEMS: DUCTMATE SPIRALMATE.

5) ELBOWS FOR 3 THROUGH 12 INCH DIAMETER AND 90° BENDS SHALL BE TWO-SECTION STAMPED WITH WELDED SEAMS. ALL OTHER ELBOWS SHALL BE CONSTRUCTED OF MITERED SECTIONS WITH ALL SEAMS AND JOINTS WELDED IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:
a. THRU 35 DEGREES/2 GORES
b. 36 THRU 71 DEGREES/3 GORES
c. OVER 71 DEGREES/5 GORES

6) ELBOWS SHALL BE TWO-SECTION STAMPED WITH WELDED SEAMS.

7) CONSTRUCT ALL ELBOWS WITH A CENTERLINE RADIUS EQUAL TO 1.5 TIMES THE DIAMETER.

8) MAKE ALL TAKE-OFF CONNECTIONS TO DUCT HEADERS USING TEE (90°), LATERAL (45°), TEE CROSS, LATERAL CROSS AND "Y" BRANCH FITTINGS OF THE CONICAL TYPE. ALL FITTINGS FABRICATED AS SEPARATE FITTINGS SHALL HAVE CONTINUOUS WELDS ALONG ALL SEAMS AND JOINTS.

9) THE USE OF TWO-PIECE, MITERED, VANED ELBOWS SHALL NOT BE PERMITTED.

10) THE USE OF BULLHEAD TEE FITTINGS IS NOT PERMITTED.

11) THE USE OF SQUARE THROAT RADIUS HEEL ELBOWS IS NOT PERMITTED.

12) SHOP-FABRICATED AND CONTRACTOR-DESIGNED FITTINGS ARE NOT PERMITTED.

E. DUCTWORK SCHEDULE:

1) SUPPLY AIR: +2", 3% LEAKAGE
2) RETURN AIR: -2", 3% LEAKAGE
3) EXHAUST AIR: -2", 3% LEAKAGE

F. DUCT LEAKAGE TESTING

1) DISASSEMBLE, REASSEMBLE, AND SEAL SEGMENTS OF SYSTEMS TO ACCOMMODATE LEAKAGE TESTING AND FOR COMPLIANCE WITH TEST REQUIREMENTS. SEAL ALL DUCTWORK WITH UL181 MASTIC OR APPROVED EQUAL.

2) CONDUCT LEAKAGE TESTS, ON ALL DUCTWORK, AT STATIC PRESSURES EQUAL TO MAXIMUM DESIGN PRESSURE OF SYSTEM BEING TESTED. IF PRESSURE CLASSES ARE NOT INDICATED, TEST ENTIRE SYSTEM AT MAXIMUM SYSTEM DESIGN PRESSURE. DO NOT PRESSURIZE SYSTEMS ABOVE MAXIMUM DESIGN OPERATING PRESSURE. GIVE SEVEN DAYS' ADVANCE NOTICE FOR TESTING.

3) MAXIMUM ALLOWABLE LEAKAGE: DUCTWORK LEAKAGE SHALL NOT EXCEED 4 PERCENT OF TOTAL SUPPLY AIRFLOW.

4) REMAKE LEAKING JOINTS; APPLY ADDITIONAL SEALANT AND RETEST UNTIL LEAKAGE IS EQUAL TO OR LESS THAN MAXIMUM ALLOWABLE. ALL TESTS MUST BE WITNESSED AND RESULTS VERIFIED BY THE OWNER'S REPRESENTATIVE. SUBMIT FIELD TEST REPORT CERTIFYING THAT THE DUCTWORK DOES NOT EXCEED THE MAXIMUM ALLOWABLE LEAKAGE.

G. VOLUME DAMPERS: GALVANIZED STEEL, PER SMACNA "LOW VELOCITY MANUAL," EXCEPT PROVIDE BEARING AT ONE END OF DAMPER ROD AND QUADRANT, WITH LEVER AND LOCKSCREW AT THE OTHER END. FOR INSULATED DUCTS, QUADRANTS MOUNTED ON COLLAR TO CLEAR INSULATION. INSTALL WITH LEVERS ACCESSIBLE.

H. ACCESS DOORS: INSULATED OR UNINSULATED, SAME AS DUCT

1) PROVIDE MINIMUM 20 IN. X 14 IN. ON MAIN DUCTS, AND 12 IN. X 6 IN. ON BRANCH DUCTS, UNLESS OTHERWISE APPROVED, AT FIRE DAMPERS, AND AT ALL DUCT ACCESSORIES SUCH AS HUMIDIFIERS, DUCT SMOKE DETECTORS, AUTO DAMPERS, AND LOUVERS.

2) ALL ACCESS DOORS TO BE HINGED, WITH LATCH SIMILAR TO VENTLOCK NO. 100.

I. FLEXIBLE CONNECTIONS: NEOPRENE-COATED GLASS FABRIC, 30 OUNCES PER SQ. YD. WITH SEWED AND CEMENTED SEAMS, SIMILAR TO VENT FABRICS. PROVIDE WITH METAL COLLARS. ALLOW MINIMUM MOVEMENT OF 1 IN.

J. TURNING VANES: GALVANIZED STEEL SMALL DOUBLE-THICKNESS VANES WITH 2 IN. INSIDE RADIUS.

K. ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR DIMENSIONS.

L. WIRE MESH SCREEN (WMS): NO. 16 USSG, 3/4 SQUARE MESH, IN 1 IN. WIDE GALVANIZED STEEL ENCLOSING FRAME. FLANGED DUCT OPENING TO RECEIVE FRAME.

M. LOW-PRESSURE FLEXIBLE DUCT: SHALL BE CONSTRUCTED WITH A CPE INNER FILM LINER LOCKED TO GALVANIZED STEEL HELIX WITH 1" THICK FIBERGLASS ENCLOSED WITH A REINFORCED FOIL/MYLAR SLEEVE. UL 181 LISTED AS CLASS 1 AIR DUCT COMPLYING WITH NFPA STANDARD 90A. SIMILAR TO FLEXMASTER TYPE 1M.

N. FIRE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION, DYNAMIC CURTAIN TYPE, SPRING LOADED, EQUIPPED WITH FUSIBLE LINK AND SLEEVE, CONFORMING TO NFPA STANDARD 90A. SIMILAR TO RUSKIN DIBD2 OR DIBD23, RATED AS REQUIRED. SEE INSTALLATION ON DRAWING.

O. COMBINATION FIRE AND SMOKE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION MULTI-BLADED TYPE WITH SLEEVE. EQUIPPED WITH FUSIBLE LINK CONFORMING TO NFPA STANDARD 90A. SIMILAR TO RUSKIN MODEL FSD 60.

P. SMOKE DAMPERS: UNLISTED GALVANIZED STEEL CONSTRUCTION MULTI-BLADED TYPE WITH SLEEVE. EQUIPPED WITH PNEUMATIC OPERATOR AND E/P SWITCH. SIMILAR TO RUSKIN MODEL SD50.

Q. CLEANING NEW AND EXISTING SYSTEMS

1) MARK POSITION OF DAMPERS AND AIR-DIRECTIONAL MECHANICAL DEVICES BEFORE CLEANING, AND PERFORM CLEANING BEFORE AIR BALANCING.
a. USE SERVICE OPENINGS, AS REQUIRED, FOR PHYSICAL AND MECHANICAL ENTRY AND FOR INSPECTION.
b. CREATE OTHER OPENINGS TO COMPLY WITH DUCT STANDARDS.
c. DISCONNECT FLEXIBLE DUCTS AS NEEDED FOR CLEANING AND INSPECTION.
d. REMOVE AND REINSTALL CEILING SECTIONS TO GAIN ACCESS DURING THE CLEANING PROCESS.

2) VENT VACUUMING SYSTEM TO THE OUTSIDE. INCLUDE FILTRATION TO CONTAIN DEBRIS REMOVED FROM HVAC SYSTEMS, AND LOCATE EXHAUST DOWN WIND AND AWAY FROM AIR INTAKES AND OTHER POINTS OF ENTRY INTO BUILDING.

3) CLEAN THE FOLLOWING METAL DUCT SYSTEMS BY REMOVING SURFACE CONTAMINANTS AND DEPOSITS:
a. AIR OUTLETS AND INLETS (REGISTERS, GRILLES, AND DIFFUSERS).
b. SUPPLY, RETURN, AND EXHAUST FANS INCLUDING FAN HOUSINGS, PLENUMS (EXCEPT CEILING SUPPLY AND RETURN PLENUMS), SCROLLS, BLADES OR VANES, SHAFTS, BAFFLES, DAMPERS, AND DRIVE ASSEMBLIES.
c. AIR-HANDLING UNIT INTERNAL SURFACES AND COMPONENTS INCLUDING MIXING BOX, COIL SECTION, AIR WASH SYSTEMS, SPRAY ELIMINATORS, CONDENSATE DRAIN PANS, HUMIDIFIERS AND DEHUMIDIFIERS, FILTERS AND FILTER SECTIONS, AND CONDENSATE COLLECTORS AND DRAINS.
d. COILS AND RELATED COMPONENTS.
e. RETURN-AIR DUCTS, DAMPERS, AND ACTUATORS EXCEPT IN CEILING PLENUMS AND MECHANICAL EQUIPMENT ROOMS.
f. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.

4) MECHANICAL CLEANING METHODOLOGY:
a. CLEAN METAL DUCT SYSTEMS USING MECHANICAL CLEANING METHODS THAT EXTRACT CONTAMINANTS FROM WITHIN DUCT SYSTEMS AND REMOVE CONTAMINANTS FROM BUILDING.
b. USE VACUUM-COLLECTION DEVICES THAT ARE OPERATED CONTINUOUSLY DURING CLEANING. CONNECT VACUUM DEVICE TO DOWNSTREAM END OF DUCT SECTIONS SO AREAS BEING CLEANED ARE UNDER NEGATIVE PRESSURE.
c. USE MECHANICAL AGITATION TO DISLODGE DEBRIS ADHERED TO INTERIOR DUCT SURFACES WITHOUT DAMAGING INTEGRITY OF METAL DUCTS, DUCT LINER, OR DUCT ACCESSORIES.
d. CLEAN FIBROUS-GLASS DUCT LINER WITH HEPA VACUUMING EQUIPMENT; DO NOT PERMIT DUCT LINER TO GET WET.
e. CLEAN COILS AND COIL DRAIN PANS ACCORDING TO NADCA 2013. KEEP DRAIN PAN OPERATIONAL. RINSE COILS WITH CLEAN WATER TO REMOVE LATENT RESIDUES AND CLEANING MATERIALS; COMB AND STRAIGHTEN FINS.
f. CLEANLINESS VERIFICATION:
(1) VISUALLY INSPECT METAL DUCTS FOR CONTAMINANTS.
(2) WHERE CONTAMINANTS ARE DISCOVERED, RE-CLEAN AND REINSPECT DUCTS.

6. AIR OUTLETS

A. GENERAL

1) MARGIN TYPES, COLORS, FINISH AND METHODS OF ATTACHMENT FOR ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE COORDINATED WITH ARCHITECTURAL CEILING AND WALL DETAILS AND SPECIFICATIONS.

2) FRAME TYPE SUITABLE FOR MOUNTING IN CEILING OR WALL CONSTRUCTION AS INDICATED ON ARCHITECTURAL PLANS.

3) EXACT LOCATION OF ALL AIR OUTLETS AS PER ARCHITECTURAL PLANS.

4) SUITABLE FOR OPERATION AT 20 PERCENT EXCESS AND 20 PERCENT LESS THAN NOTED CAPACITY FOR CONSTANT VOLUME SYSTEMS AND AT 20 PERCENT EXCESS AND 60 PERCENT LESS THAN NOTED CAPACITY FOR VARIABLE VOLUME SYSTEMS. MANUFACTURER RESPONSIBLE FOR EXAMINING APPLICATION OF EACH OUTLET AND GUARANTEE THAT EACH WILL PROVIDE REQUIRED NC LEVELS AND COMFORT SPACE CONDITIONS WITHOUT DRAFTS THROUGHOUT OPERATING RANGE.

5) DIFFUSERS, GRILLES AND REGISTERS SHALL BE SELECTED TO ACHIEVE NC 30 OR LESS WHEN INSTALLED.

6) ALL REGISTERS AND DIFFUSERS SHALL BE PROVIDED WITH OPPOSED BLADE VOLUME DAMPERS. DAMPER OPERATING LEVERS SHALL BE ACCESSIBLE AT THE FACE OF AIR OUTLETS.

7) REFER TO DRAWING SCHEDULES FOR SPECIFIC MODELS AND REQUIREMENTS. PROVIDE SCHEDULED MANUFACTURER AND MODELS OR COMPARABLE MODELS BY MANUFACTURER APPROVED BY ENGINEER.

7. NOISE CONTROL

A. ALL ROOM NC LEVELS SHALL BE 35 OR LESS.

B. PROVIDE SOUNDLINING FOR THE FOLLOWING DUCTWORK.

1) ALL DUCTWORK WITHIN MECHANICAL ROOMS AND NOT LESS THAN 10 FT. ON EACH SIDE OF ALL FANS AND AC UNITS.

2) AIR TRANSFER DUCTS.

3) ALSO, WHERE NOTED ON A DRAWING.

C. SOUNDLINING IN DUCTWORK: FIBROUS GLASS, MINIMUM 3 LB DENSITY, 1 1/2 IN. THICKNESS, MAXIMUM 0.25 K FACTOR AT 75 DEGREES F MEAN TEMPERATURE WITH ACRYLIC COATED FINISH FACTORY APPLIED EDGE COATING AND STENCILED IN ACCORDANCE WITH NFPA 90. FLAMESPREAD SHALL BE A MAXIMUM OF 25. LINING SHALL NOT SUPPORT MICROBIAL GROWTH AND SHALL BE TESTED IN ACCORDANCE WITH ASTM C 1071, ASTM C 423 AND ASTM G21/G22. SIMILAR TO JOHNS MANVILLE LINACOUSTIC RC HP.

D. ALL SOUNDLINING, ADHESIVES, FACES AND ACCESSORIES TO BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, EXCEPT AS OTHERWISE NOTED.

8. TESTING AND BALANCING

A. ALL AIR AND WATER BALANCING SHALL BE IN ACCORDANCE WITH AABC AND NEBB STANDARDS.

B. AIR BALANCING SHALL BE ACCOMPLISHED BY ADJUSTMENT OF FANS AND BRANCH DAMPERS FOR MAJOR ADJUSTMENTS. ADJUSTMENT OF TERMINAL DAMPERS AND DEVICES SHALL BE FOR TRIM OR MINOR ADJUSTMENT ONLY. THIS SHALL BE DONE TO PERMIT THE LEAST NOISE GENERATION IN THE TERMINAL AREAS AND UTILIZE MINIMUM FAN ENERGY.

C. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL REBALANCE ANY EXISTING PORTIONS OF AIR DISTRIBUTION SYSTEM AND WATER DISTRIBUTION SYSTEM AFFECTED BY THE RENOVATION AND ALSO BALANCE ALL NEW WORK.

D. THE CONTRACTOR SHALL PROVIDE ALL LABOR, PRESSURE GAUGES, FLOW METERS, SHEAVES, AND BELTS REQUIRED TO BALANCE SYSTEMS.

E. BALANCING REPORT SHALL BE PROVIDED ON AABC-TYPE FORMS.

F. FANS, AIR HANDLING UNITS AND COILS SHALL BE BALANCED TO WITHIN +5 PERCENT OF THEIR DESIGN CAPACITIES. ALL OTHER AIR AND WATER QUANTITIES SHALL BE BALANCED TO WITHIN +10 PERCENT OF THE DESIGN QUANTITIES.

G. BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY A CERTIFIED NEBB OR AABC TECHNICIAN.

H. THE PERFORMANCE AND CAPACITY OF ALL SYSTEMS AND EQUIPMENT TO BE DEMONSTRATED BY THE CONTRACTOR.

9. INSULATION – GENERAL REQUIREMENTS

A. ALL INSULATION MATERIALS, INCLUDING JACKETS, FACING, ADHESIVE, COATINGS, AND ACCESSORIES ARE TO BE FIRE HAZARD RATED AND LISTED BY UNDERWRITERS LABORATORIES, INC. USING STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723 (ASTM E-84), (ASA A2.5-1963). FLAMESPREAD MAXIMUM IS 25 AND FUEL CONTRIBUTED AND SMOKE DEVELOPED MAXIMUM IS 50. FLAMEPROOFING TREATMENTS SUBJECT TO DETERIORATION FROM MOISTURE OR HUMIDITY ARE NOT ACCEPTABLE.

B. DEFINITIONS

1) EXPOSED: INDOOR DUCTS, PIPING OR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS AND IN AREAS, WHICH WILL BE VISIBLE WITHOUT REMOVING CEILINGS OR OPENING ACCESS PANELS.

2) CONCEALED: INDOOR DUCTS, PIPING OR EQUIPMENT, WHICH IS NOT EXPOSED.

10. DUCTWORK INSULATION

A. INSULATE ALL NEW DUCTWORK IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

1) DUCTWORK INSULATION SCHEDULE

a. CONCEALED SUPPLY /OUTSIDE AIR SHALL BE 1.5 IN., TYPE D-1 WITH VAPORSEAL.

b. EXPOSED AND UNCONDITIONED AREAS (INCLUDING MECHANICAL EQUIPMENT ROOMS) AND OUTSIDE THE BUILDING ENVELOPE SUPPLY/RETURN/OUTSIDE AIR SHALL BE 2 IN., TYPE D-1 WITH VAPORSEAL. MINIMUM R-VALUE OF 6.3.

B. NON-INSULATED DUCTWORK

1) WHERE SOUNDLINING IS OF MINIMUM THICKNESS AND R-VALUE SPECIFIED FOR INSULATION.

2) AIR CONDITIONING RETURN AIR DUCTWORK EXPOSED IN AIR-CONDITIONED SPACES AND INSTALLED IN HUNG CEILINGS WHERE SPACE IMMEDIATELY ABOVE AND BELOW ARE BOTH AIR CONDITIONED.

C. MATERIAL

1) TYPE D-1: MINIMUM 1.5-LB DENSITY FIBERGLASS BLANKET WITH FACTORY-APPLIED FOIL SKRIM-KRAFT FACING SIMILAR TO JOHNS MANVILLE MICROLITE FSK.

2) TYPE D-2: 3 LB. FIBERGLASS BOARD WITH A MINIMUM DENSITY OF 3 LB. THE INSULATION SHALL BE PROVIDED WITH A FACTORY-APPLIED ALL-PURPOSE OR ALL SERVICE FACING. THE INSULATION SHALL BE EQUAL TO JOHNS MANVILLE TYPE 814 SPIN-GLAS AP.

3) TYPE D-3: MINIMUM 6 LB FIBERGLASS BOARD WITH FACTORY APPLIED ALL-PURPOSE OR ALL SERVICE FACING. SIMILAR TO JOHNS MANVILLE 817 SPIN-GLAS AP.

D. INSTALLATION

1) FIBERGLASS BLANKET: 2 IN. LAP STRIPS AT ALL SEAMS. SECURE BOTTOM OF ALL DUCTS OVER 24 IN. WIDE WITH MIN. 2 ROWS OF WELD PINS 12 IN. ON CENTER. SECURE ALL SEAMS WITH FOIL VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE.

2) FIBERGLASS BOARD: SEAL JOINTS AND BREAKS IN FACING WITH 3 IN. WIDE TAPE TO MATCH FACING AND ADHERE WITH VAPOR SEAL ADHESIVE. APPLY 5 IN. WIDE TAPE AT CORNERS; WELD PINS ON TOP, SIDES AND BOTTOM.

11. PIPING INSULATION

A. INSULATE ALL NEW PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

1) PIPING INSULATION SCHEDULE

a. LOW TEMP 40 TO 100 DEGREES F, UP TO 4 IN., SHALL BE 1-IN. THICK, TYPE P-1 WITH VAPORSEAL.

b. LOW TEMP FITTINGS & VALVES 40 TO 100 DEGREES F, UP TO 4-IN., SHALL BE 1-IN. THICK, TYPE P-4 WITH VAPORSEAL AND F-1 FINISH.

c. ALL REFRIGERANT LIQUID & SUCTION LINES SHALL BE ½-IN. THICK, TYPE P-6 WITH VAPORSEAL.

12. PIPING, VALVES AND FITTINGS TO BE INSULATED

A. LOW TEMPERATURE PIPING SYSTEMS – 40 TO 100 F INCLUDING:

1) CONDENSATE DRAIN PIPING.

B. MATERIAL

1) TYPE P-1: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS, MAXIMUM 0.23 K-FACTOR AT 75 DEGREES F MEAN TEMPERATURE WITH FACTORY-APPLIED FIRE-RETARDANT FOIL-SKRIM-KRAFT FACING. ALL SERVICE JACKET. SIMILAR TO JOHNS MANVILLE MICRO-LOK HP.

2) TYPE P-4: MINIMUM 1 LB DENSITY FIBERGLASS FITTING INSERTS, MAXIMUM 0.28 K-FACTOR AT 75 DEGREES F MEAN TEMPERATURE SIMILAR TO MANVILLE HI-LO TEMP INSULATION INSERTS

3) TYPE P-6: MINIMUM 6 LB MOLDED FOAMED PLASTIC. MAXIMUM 0.27 K-FACTOR AT 75 DEGREES F MEAN TEMPERATURE. MAXIMUM 0.17 PERMEANCE. SIMILAR TO ARMSTRONG ARMAFLEX II.

C. FINISH

1) TYPE F-1: FITTING COVER, MOLDED WHITE PVC JACKET, UL CLASS 1, MAXIMUM PERMEANCE 0.05 SIMILAR TO MANVILLE ZESTRON.

2) TYPE F-4: ALUMINUM JACKETING WITH MINIMUM 0.016 IN. WALL THICKNESS AND LONGITUDINAL JOINTS WITH LOCK SEAMS.

D. OUTDOOR PIPING

1) FOR ALL PIPING, FITTINGS AND VALVES LOCATED OUTDOORS INCREASE SCHEDULED INSULATION THICKNESS BY A MINIMUM OF 1 IN. AND PROVIDE F-4 FINISH. PROVIDE VAPORSEAL ON ALL OUTDOOR PIPES, VALVES AND FITTINGS SUBJECT TO CONDENSATION.

E. INSTALLATION

1) BEFORE APPLYING INSULATION, ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED.

2) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED. REFRIGERANT PIPING INSULATION SHALL HAVE MITERED FITTINGS.

3) ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH SLEEVES, HANGERS, ETC., OR OTHER OPENINGS. PROVIDE SADDLES OR SHIELDS FOR PROTECTION.

4) INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE AND REPLACEABLE WITHOUT DAMAGE.

13. VIBRATION ISOLATION, WIND AND SEISMIC RESTRAINTS

A. GENERAL

1) PROVIDE ISOLATION FOR EQUIPMENT, PIPING AND DUCTWORK.

2) INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

3) PROVIDE LEVELING DEVICES AND APPROVED RESILIENT RESTRAINING DEVICES AS REQUIRED TO LIMIT EQUIPMENT AND PIPING MOTION IN EXCESS OF 1/4 IN.

4) ACCEPTABLE MANUFACTURERS

a. MASON INDUSTRIES, INC.

b. VIBRATION ELIMINATOR CO.

c. KORFUND DYNAMICS CORP.

B. CEILING-HUNG FANS AND EQUIPMENT

1) PROVIDE SPRING HANGER ROD ISOLATORS. STEEL COMPRESSION SPRING AND NEOPRENE SOUND PAD WITHIN A STEEL RETAINER BOX. SIMILAR TO MASON TYPE PCHS.

2) 1 IN. MINIMUM STATIC DEFLECTION. 1/2 IN. MINIMUM RESERVE DEFLECTION. FACTORY-PRELOADED TO 75 PERCENT OF RATED LOAD.

3) PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE EQUIPMENT OR STRUCTURE CANNOT SUPPORT POINT LOADS.

C. SEISMIC RESTRAINTS

1) PROVIDE SEISMIC RESTRAINTS FOR ALL MECHANICAL EQUIPMENT AS REQUIRED BY CODE. SEISMIC RESTRAINTS SHALL BE CAPABLE OF SAFELY ACCEPTING EXTERNAL FORCES AS REQUIRED BY CODE WITHOUT FAILURE, AND SHALL MAINTAIN EQUIPMENT, PIPING, CONDUIT, DUCT AND PRESSURE REDUCING BOXES IN A CAPTIVE POSITION. SEISMIC RESTRAINTS SHALL NOT SHORT CIRCUIT ISOLATION SYSTEMS OR TRANSMIT OBJECTIONABLE VIBRATION OR NOISE, AND SHALL BE PROVIDED ON ALL EQUIPMENT SCHEDULES ON DRAWINGS.

D. WIND RESTRAINTS

1) ALL ROOF AND GROUND MOUNTED EQUIPMENT SHALL BE FASTENED TO STRUCTURE OR BASE PER MANUFACTURERS MOUNTING RECOMMENDATIONS. PROVIDE INSTALLATION DETAILS SIGNED BY LICENSED PROFESSIONAL STRUCTURAL ENGINEER TO MEET 100 MPH WIND LOADING.

14. PIPING – GENERAL REQUIREMENTS

A. COMPLETE WITH PIPE, FITTINGS, VALVES, STRAINERS, MOTORIZED VALVE OPERATORS, STRAINERS, HANGERS, SUPPORTS, GUIDE, SLEEVES, AND ACCESSORIES.

B. ALL ITEMS SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE FOLLOWING CODES AND STANDARDS.

1) AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME).

2) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).

3) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).

4) MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTING INDUSTRY (MSS).

C. ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 150 PSI OR 150 PERCENT OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED FOR TEMPERATURE CHANGE. REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST.

D. PROVIDE DIELECTRIC FITTINGS WHERE DISSIMILAR METALS ARE TO BE JOINED.

15. CONDENSATE DRAIN PIPING

A. PIPE: ASTM B88, HARD DRAWN COPPER TUBING TYPE "L".

B. FITTINGS: SOLDERED JOINT FITTINGS, 95/5 SOLDER.

C. PITCH, EXCEPT AS NOTED.

1) 1 IN. IN 4 FT. PREFERRED.

2) 1 IN. IN 8 FT. MINIMUM.

D. SWING CHECK VALVES: AT CONDENSATE PUMP DISCHARGE. 300 LB WOG, BRONZE BODY SOLDER ENDS, REGRIND BRONZE DISC TO BE USED WITH COPPER TUBING. JENKINS FIG. 1222.

16. MOTORS

A. MOTORS (UNDER HVAC WORK): IN ACCORDANCE WITH NEMA, IEEE AND ANSI C 50 STANDARDS.

1) STANDARD EFFICIENCY UNLESS OTHERWISE NOTED.

2) 1.15 SERVICE FACTOR.

3) SQUIRREL CAGE INDUCTION; OPEN DRIP-PROOF TYPE, 1750 RPM, NEMA TYPE B INSULATION CLASS AND CONTINUOUS DUTY, EXCEPT AS NOTED.

17. MOTOR CONTROLLERS

A. PROVIDED BY HVAC CONTRACTOR AND INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.

B. NEMA ENCLOSURE, WEATHERPROOF WHERE MOUNTED OUTDOORS.

C. WITH OVERLOAD PROTECTION. COORDINATE ALL MOTOR CONTROLLER TYPES AND SIZES WITH MOTOR TYPES AND SIZES.

D. 1/3 HP AND SMALLER: PROVIDE MANUAL STARTER EXCEPT USE MAGNETIC TYPE WHERE AUTOMATICALLY CONTROLLED.

1) MANUAL TYPE: 2-POLE TOGGLE SWITCH WITH OVERLOAD PROTECTION AND PILOT LIGHT.

E. 1/2 HP AND LARGER: PROVIDE MAGNETIC STARTER.

1) COMBINATION UNFUSED DISCONNECT SWITCH AND MAGNETIC STARTER EXCEPT AS NOTED.

2) OVERLOAD PROTECTION IN EACH PHASE LEG WITH RESET IN ENCLOSURE.

3) HOA SELECTOR SWITCH FOR AUTOMATICALLY OPERATED MOTORS. SAFETY CONTROLS COMMON TO BOTH CONTROLS.

4) RED, GREEN AND AMBER PILOT LIGHTS.

5) SWITCHES: HORSE-POWER-RATED, EXTERNAL PADLOCKING TYPE.

6) HOLDING COILS: 10 WATT, 120 VOLT.

7) CONTACTS: MAIN LINE AND MINIMUM (2) – NORMALLY OPEN, (2) – NORMALLY CLOSED 10 AMP AUXILIARIES, IN ADDITION TO CONTACTS REQUIRED FOR CONTROLS SPECIFIED.

Revisions

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8) CONTROL TRANSFORMER: FOR MOTORS OVER 120 VOLTS, TO STEP DOWN CONTROL VOLTAGE TO 120 VOLTS; OF THE REQUIRED CAPACITY, WITH FUSE AND GROUND CONNECTION ON VOLTAGE SIDE.

9) FUSES: SIMILAR TO BUSSMAN.

10) RELAYS TO SUPPLEMENT AUXILIARY CONTACTS IN CONTROLLER. MINIMUM 10-WATT COIL AND TWO 10 AMP CONTACTS.

11) TERMINALS: SUITABLE FOR CONDUCTORS NOTED AND AS APPROVED.

F. ACCEPTABLE MANUFACTURERS

1) CUTLER-HAMMER.

2) SQUARE D.

3) ALLEN BRADLEY.

18. EQUIPMENT

A. FANS

1) CABINET FANS SHALL HAVE ACOUSTICALLY INSULATED GALVANIZED STEEL FAN HOUSING, DIRECT DRIVEN CENTRIFUGAL FAN (S), INTERNAL VIBRATION ISOLATION, INTEGRAL LOUVERED FACE GRILLE WITH LIGHT, AND OUTLET DUCT CONNECTION WITH SELF-ACTING BACKDRAFT DAMPER. PROVIDE WALL VENTS OR ROOF CAPS AS REQUIRED ON PLANS. FANS SHALL BE SIMILAR TO GREENHECK SP.

B. SINGLE/DUAL DUCT TERMINAL UNITS

1) FURNISH AND INSTALL DUAL DUCT, VARIABLE AIR VOLUME TERMINALS OF THE SIZES AND CAPACITIES SHOWN IN THE PLANS.

2) TERMINALS SHOULD BE CERTIFIED UNDER THE ARI STANDARD 880 CERTIFICATION PROGRAM AND CARRY THE ARI SEAL. NONCERTIFIED TERMINALS MAY BE SUBMITTED AFTER TESTING AT AN INDEPENDENT TESTING LABORATORY UNDER CONDITIONS SELECTED BY THE ENGINEERING CONSULTANT IN FULL COMPLIANCE WITH ARI STANDARD 880. THESE TESTS MUST BE WITNESSED BY THE ENGINEERING CONSULTANT WITH ALL COSTS TO BE BORNE BY THE TERMINAL MANUFACTURER. TESTING DOES NOT ENSURE ACCEPTANCE.

3) THE TERMINAL CASING SHALL BE MINIMUM 22-GAUGE GALVANIZED STEEL, INTERNALLY LINED WITH ENGINEERED POLYMER FOAM INSULATION WHICH COMPLIES TO UL181 AND NFPA 90A. INSULATION SHALL BE 1½ POUND DENSITY, CLOSED CELL FOAM. EXPOSED FIBERGLASS IS NOT ACCEPTABLE. THE INSULATION SHALL BE MECHANICALLY FASTENED TO THE UNIT CASING. THE CASING SHALL BE CONSTRUCTED TO HOLD LEAKAGE TO THE MAXIMUM VALUES SHOWN IN THE CASING LEAKAGE TABLE.

4) COOLING AND HEATING INLETS SHALL HAVE SEPARATE DAMPER ASSEMBLIES FOR COMPLETE PRESSURE INDEPENDENT CONTROL OF EACH AIRSTREAM FOR VARIABLE OR CONSTANT VOLUME TOTAL DISCHARGE APPLICATIONS. TERMINALS WITH INLET DAMPERS MECHANICALLY INTERCONNECTED ARE NOT ACCEPTABLE. THE DAMPERS SHALL BE HEAVY GAUGE STEEL WITH SOLID SHAFT ROTATING IN DELRIN® SELF-LUBRICATING BEARINGS. NYLON BEARINGS ARE NOT ACCEPTABLE. SHAFT SHALL BE CLEARLY MARKED ON THE END TO INDICATE DAMPER POSITION. STICKERS OR OTHER REMOVABLE MARKINGS ARE NOT ACCEPTABLE. THE DAMPER SHALL INCORPORATE A MECHANICAL STOP TO PREVENT OVERSTROKING AND A SYNTHETIC SEAL TO LIMIT CLOSE-OFF LEAKAGE TO THE MAXIMUM VALUES SHOWN IN THE DAMPER LEAKAGE TABLE.

5) ACTUATORS SHALL BE CAPABLE OF SUPPLYING AT LEAST 35 INCHES PER POUND OF TORQUE TO THE DAMPER SHAFT AND SHALL BE MOUNTED EXTERNALLY FOR SERVICE ACCESS. TERMINALS WITH INTERNAL ACTUATOR MOUNTING OR LINKAGE CONNECTION MUST INCLUDE GASKETED ACCESS PANEL, REMOVABLE WITHOUT DISTURBING DUCTWORK. CASING WITH ACCESS PANEL SHALL BE CONSTRUCTED TO HOLD LEAKAGE TO THE MAXIMUM VALUES SHOWN IN THE CASING LEAKAGE TABLE.

6) SOUND RATINGS FOR THE TERMINAL SHALL NOT EXCEED 16 NC AT 1 INCH STATIC PRESSURE. SOUND PERFORMANCE SHALL BE ARI CERTIFIED.

19. AUTOMATIC CONTROLS – GENERAL REQUIREMENTS

A. FURNISH AND INSTALL A COMPLETE ELECTRIC OR ELECTRONIC CONTROL SYSTEM TO PROVIDE TEMPERATURE CONTROL AS SPECIFIED UNDER DESCRIPTION OF OPERATION.

B. WORK SHALL INCLUDE ALL WIRING, CONTROL EQUIPMENT, AND ACCESSORIES NECESSARY TO MAKE THIS SYSTEM COMPLETE. ALL WIRING SHALL BE 24 VOLT. COORDINATE WITH MANUFACTURER FOR INTERCONNECTION WITH CONTROLS INCLUDED IN EQUIPMENT. ALL CONTROL WORK SHALL BE INSTALLED BY THE HVAC CONTRACTOR.

C. ACCEPTABLE MANUFACTURERS

1) JOHNSON CONTROLS.

2) HONEYWELL, INC.

3) OR APPROVED EQUAL

D. OPERATION OF TYPICAL CONTROL SAFETY DEVICES.

1) EXHAUST FANS, SUCH AS GENERAL OR TOILET (OPERATING INDEPENDENTLY): ALL SAFETY DEVICES SHALL BE INTERLOCKED WITH "HAND" AND "AUTOMATIC" POSITIONS IN SERIES WITH MOTOR CONTROLLER HOLDING COIL CIRCUIT. REMOTE STARTING SHALL BE THROUGH AUTOMATIC POSITION ONLY. "HAND" POSITION SHALL BE FOR MAINTENANCE OPERATION ONLY.

2) SAFETY DEVICES FOR ALL SYSTEMS, EXCEPT AS OTHERWISE NOTED BELOW.

a. ONE FREEZE PROTECTION THERMOSTAT PER COIL SECTION, WIRED TO STOP SUPPLY FAN. THERMOSTAT SHALL BE AUTOMATIC RESET TYPE.

b. FOR SYSTEMS OVER 2,000 CFM, A DUCT MOUNTED SMOKE DETECTOR OF THE IONIZATION TYPE LOCATED IN THE RETURN DUCT SHALL STOP THE SUPPLY FAN AND ASSOCIATED INTERLOCKED EQUIPMENT SHOULD PRODUCTS OF COMBUSTION BE SENSED.

E. SEQUENCE

1) CONSTANT VOLUME SYSTEM

a. A 7/24 PROGRAMMABLE THERMOSTAT SHALL BE CAPABLE OF RUNNING THE UNIT AT BOTH OCCUPIED AND UNOCCUPIED MODES. WHILE IN OCCUPIED MODE, THE FAN SHALL RUN CONTINUOUSLY. IN UNOCCUPIED MODE, THE FAN SHALL CYCLE AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

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