ELECTRICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION	HEIGHT
$ / $3 / $4	SINGLE POLE SINGLE THROW / THREE-WAY /OCCUPANCY-SENSING SWITCH (NOTE L-1)	46"
$M / $K / $T	MOTOR RATED SWITCH / KEYED SWITCH / TIMER SWITCH	46"
D / D3	DIMMER SWITCH (NOTE L-1) / THREE-WAY DIMMER SWITCH (NOTE L-1)	46"
/ /	SINGLE / DUPLEX / QUAD RECEPTACLE OUTLET (NOTE L-1)	18"
/ /	GFCI DUPLEX / GFCI DUPLEX ABOVE COUNTER / GFCI QUAD RECEPTACLE (NOTE L-1)	18"/43"
/ /	DUPLEX / QUAD / GFCI QUAD RECEPTACLE OUTLET ABOVE COUNTER MOUNTED (NOTE L-1)	43"
	ISOLATED GROUND DUPLEX RECEPTACLE OUTLET	18"
/AC	DUPLEX RECEPTACLE OUTLET WITH (2) DC USB CHARGING PORTS / ABOVE COUNTER	18"/43"
/AC	DUPLEX GF PROTECTED RECEPTACLE OUTLET WITH (2) DC USB CHARGING PORTS / ABOVE COUNTER	18"/43"
	SPECIAL PURPOSE RECEPTACLE OUTLET, NEMA CONFIGURATION TO MATCH PLUG. (NOTE L-1)	18"
	SPLIT WIRED DUPLEX RECEPTACLE. ONE RECEPTACLE SHALL BE CONTROLLED (NOTE L-1) WHERE USED TO CONSERVE ENERGY, RECEPTACLE SHALL BE SUITABLY MARKED PER NEC REQUIREMENTS.	18"
/ /	DUPLEX RECEPTACLE OUTLET, CEILING MOUNTED / FLOOR MOUNTED / CLOCK (WALL RECESSED)	
	MULTI-OUTLET ASSEMBLY WITH OUTLETS ON CENTERS AS INDICATED IN NOTES OR SPECIFICATIONS MOUNT 6" ABOVE COUNTER OR AS INDICATED	
	FIRE-RATED POKE-THRU DEVICE	
/ /	JUNCTION BOX, CEILING/WALL/FLOOR MOUNTED	
X-1,3,5	ARROWHEAD INDICATES HOMERUN. X-1,3,5 ADJACENT TO HOMERUN ARROWHEADS INDICATES HOMERUN TO PANEL X CIRCUIT NUMBERS 1,3, AND 5.	
	INDICATES CIRCUIT CONTINUATION ELSEWHERE	
	MARKS ACROSS RACEWAY SYMBOLS INDICATE THE NUMBER OF #12 CONDUCTORS (2 PHASE, 1 NEUTRAL) UNLESS OTHERWISE NOTED. NO MARKS INDICATES TWO #12 CONDUCTORS. EQUIPMENT GROUNDING CONDUCTORS ARE NOT INDICATED BY MARKS.	
	RACEWAY/CABLE CONCEALED IN WALL AND/OR ABOVE CEILING	
	RACEWAY CONCEALED BELOW GRADE OR IN-SLAB	
	RACEWAY/CABLE CONCEALED IN WALL AND/OR ABOVE CEILING - EMERGENCY CIRCUIT	
	RACEWAY INSTALLED EXPOSED	
	GROUNDING CONNECTION (SYSTEM AND/OR EQUIPMENT)	
/	CONDUIT TURNING UP/DOWN	
	CONDUIT STUB. TERMINATE IN INSULATED BUSHING OR CAP IF UNDERGROUND	
	FLUORESCENT LIGHTING FIXTURE, 2X4, 1X4, 2X2	
	FLUORESCENT LIGHTING FIXTURE, 2X4, 1X4, 2X2 - PROVIDING EMERGENCY ILLUMINATION	
/ /	LIGHTING FIXTURE RECESSED / SURFACE MOUNTED/ OVERHEAD/WALL MOUNTED	
/ /	EMERGENCY LIGHTING FIXTURE RECESSED / SURFACE MOUNTED/ OVERHEAD/WALL MOUNTED	
	FLUORESCENT STRIP FIXTURE - OVERHEAD/WALLMOUNTED	
	DIRECTIONAL OR WALL WASH LIGHTING FIXTURE	
	LIGHT TRACK AND LIGHT TRACK FIXTURES	
	POLE MOUNTED LIGHT FIXTURE WITH ARM. SEE PLANS FOR NUMBER OF LUMINAIRES.	
	POST TOP OR BOLLARD LIGHT FIXTURE	
	CEILING/PENDANT MOUNTED PADDLE FAN	
/	EXIT SIGN, CEILING/WALL MOUNTED. SHADED QUADRANT INDICATES FACE(S). PROVIDE ARROWS PER PLANS.	
	EMERGENCY LIGHTING FIXTURE	
C / TC	LIGHTING CONTACTOR / TIMECLOCK	
/	PANELBOARD - WALL MOUNTED (RECESSED) / WALL MOUNTED (SURFACE)	
	MOTOR	
60/3/3R	NONFUSIBLE DISCONNECT SWITCH, RATING/POLES/NEMA ENCLOSURE	
60/3/3R/40	FUSIBLE DISCONNECT SWITCH, RATING/POLES/NEMA ENCLOSURE/FUSE RATING	
CT	CURRENT TRANSFORMER CABINET	
M	POWER METER AND SOCKET	
F	FIRE ALARM MANUAL STATION	46"
110 / S 110	FIRE ALARM HORN/SPEAKER WITH VISUAL DEVICE, WALL MOUNTED (NOTE L-3, L-5) NUMERAL INDICATES CANDELA RATING	
/	FIRE ALARM HORN/SPEAKER, WALL MOUNTED (NOTE L-3, L-5)	
110 C / S 110 C	FIRE ALARM HORN/SPEAKER WITH VISUAL DEVICE, CEILING MOUNTED (NOTE L-3, L-5) NUMERAL INDICATES CANDELA RATING	
/	FIRE ALARM HORN/SPEAKER, CEILING MOUNTED (NOTE L-3, L-5)	
110	FIRE ALARM VISUAL DEVICE (CEILING / WALL), NUMERAL INDICATES CANDELA RATING (NOTE L-3)	
/	FIRE ALARM SMOKE DETECTOR, CEILING/WALL MOUNTED (NOTE L-4, L-6)	
/ A	HEAT DETECTOR/ANALOG HEAT DETECTOR	
WF / VS	CONNECTION TO FIRE PROTECTION SYSTEM WATER FLOW / VALVE SUPERVISORY	
DS /	DUCT MOUNTED SMOKE DETECTOR / REMOTE TEST STATION / REMOTE INDICATOR LIGHT	
FACP / TACPT	FIRE ALARM CONTROL PANEL, SURFACE/RECESSED	
/	TELEPHONE AND/OR DATA OUTLET, WALL MOUNTED (NOTE L-1, L-2)/FLOOR MOUNTED	18"
/ / TV	TELEVISION OUTLET WALL MOUNTED (NOTE L-1) / CEILING MOUNTED / FLOOR MOUNTED	18"

LEGEND NOTES

L-1 MOUNTING HEIGHTS NOTED ARE TO THE CENTER OF DEVICE ABOVE FINISHED FLOOR, UNLESS NOTED OTHERWISE.

L-2 STUB 3/4" CONDUIT 6" ABOVE ACCESSIBLE CEILING AND TERMINATE WITH NYLON GROMMET.

L-3 WHERE FIRE ALARM VISUAL DEVICES ARE WALL-MOUNTED, THE ENTIRE LENS SHALL BE MOUNTED A MINIMUM OF 80" AFF AND NOT GREATER THAN 96" AFF. TOPS OF WALL-MOUNTED AUDIBLE-ONLY DEVICES SHALL NOT BE LESS THAN 90" AFF AND NOT LESS THAN 6" BELOW FINISHED CEILING.

L-4 CEILING/WALL MOUNTED SMOKE AND CO ALARMS SHALL HAVE BATTERY BACKUP. WALL MOUNTED DEVICE SHALL BE LOCATED 4" MIN. AND 12" MAX. FROM CEILING.

ELECTRICAL ABBREVIATIONS

A	AMPERE	MCB	MAIN CIRCUIT BREAKER
AC	ALTERNATING CURRENT	MCC	MOTOR CONTROL CENTER
AFCI	ARC FAULT CIRCUIT INTERRUPTER	MF	MAIN FUSE
AFF	ABOVE FINISHED FLOOR	MH	MOUNTING HEIGHT
AIC	AMPERE INTERRUPTING CAPACITY	MLO	MAIN LUGS ONLY
AL	ALUMINUM	MT	MOUNT
ATS	AUTOMATIC TRANSFER SWITCH	MTG	MOUNTING
AWG	AMERICAN WIRE GAUGE	NC	NORMALLY CLOSED
BKR	BREAKER	NEC	NATIONAL ELECTRICAL CODE
CB	CIRCUIT BREAKER	NF	NON FUSED
CATV	COMMUNITY ANTENNA TELEVISION	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
CCTV	CLOSED CIRCUIT TELEVISION	NIC	NOT IN CONTRACT
CKT	CIRCUIT	NL	NIGHT LIGHT
CLG	CEILING	NO	NORMALLY OPEN
CPU	CENTRAL PROCESSING UNIT	NTS	NOT TO SCALE
CU	COPPER	P	POLE
CT	CURRENT TRANSFORMER	PNL	PANELBOARD
DC	DIRECT CURRENT	PVC	POLY-VINYL CHLORIDE
DN	DOWN	RC	REMOTE CONTROL
EX	EXISTING	RECPT	RECEPTACLE
E	EMERGENCY	REF	REFERENCE
FA	FIRE ALARM	RMS	ROOT MEAN SQUARE
FACP	FIRE ALARM CONTROL PANEL	ST	SHUNT TRIP
FDR	FEEDER	SYM	SYMMETRICAL
FL	FLOOR	SW	SWITCH
F	FUSE OR FUSED	SWBD	SWITCHBOARD
FVNR	FULL VOLTAGE NON REVERSING	TB	TERMINAL BOX
GEN	GENERATOR	TC	TIME CLOCK
GF	GROUND FAULT (DETECTOR)	TEL	TELEPHONE
GFCI/GFI	GROUND FAULT CIRCUIT INTERRUPTER	TV	TELEVISION
GRC	GALVANIZED RIGID STEEL CONDUIT	TYP	TYPICAL
G OR GND	GROUND	UG	UNDERGROUND
HT	HEIGHT	UL	UNDERWRITERS LABORATORY
HID	HIGH INTENSITY DISCHARGE	UNO	UNLESS NOTED OTHERWISE
HP	HORSE POWER	UPS	UNINTERRUPTED POWER SUPPLY
HOA	HAND-OFF-AUTOMATIC	V	VOLTS
HZ	HERTZ	VA	VOLT-AMPERE
ISO	ISOLATED	W	WATTS
JB	JUNCTION BOX	WP	WEATHERPROOF COVER (RECEPTACLES SHALL BE WEATHER-RESISTANT TYPE)
K	KILO, THOUSAND		
KCMIL	THOUSAND CIRCULAR MILS	XFMR	TRANSFORMER
LED	LIGHT EMITTING DIODE	XP	EXPLOSION PROOF
M	MOTOR	Y	WYE
MATV	MASTER ANTENNA TELEVISION	Z	IMPEDANCE

ELECTRICAL GENERAL NOTES

G1 PROJECT DESIGN IS BASED UPON THE 2014 EDITION OF THE NATIONAL ELECTRICAL CODE AND THE 2015 EDITION OF THE INTERNATIONAL ENERGY CONSERVATION CODE, AND THE CITY OF NOVI ZONING ORDINANCE.

G2 WHEN CONDUCTOR OR CONDUIT SIZE IS INDICATED FOR BRANCH CIRCUIT HOMERUN, THE CONDUCTOR AND CONDUIT SIZE INDICATED SHALL BE USED FOR THE COMPLETE CIRCUIT.

G3 REFER TO THE APPROPRIATE DRAWINGS (INCLUDING ARCHITECTURAL DRAWINGS) FOR THE EXACT LOCATION OF EQUIPMENT INSTALLED UNDER OTHER DIVISIONS OF THE DOCUMENTS WHICH REQUIRE ELECTRICAL SERVICE.

G4 CAPITAL LETTER BESIDE LIGHTING SYMBOL INDICATES FIXTURE TYPE. REFER TO LIGHTING FIXTURE SCHEDULE FOR FIXTURE SELECTION.

G5 EQUIPMENT GROUNDING CONDUCTORS ARE TO BE INCLUDED IN ALL RACEWAYS AND CABLES.

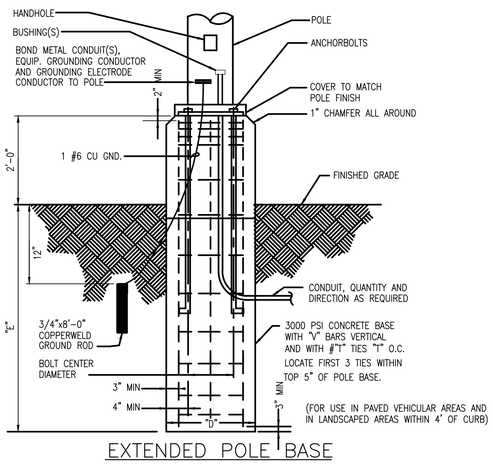
G6 REFER TO SPRINKLER FIRE PROTECTION SHOP DRAWINGS FOR ALL FLOW AND TAMPER SWITCH LOCATIONS AND CONNECTIONS FOR THE FIRE ALARM SYSTEM.

G7 ANY CABLE ROUTED TO A WALL SWITCH CONTROLLING LIGHTING SHALL CONTAIN A GROUNDED CONDUCTOR (NEUTRAL), IN ADDITION TO AN EQUIPMENT GROUNDING CONDUCTOR. EXCEPTION: SWITCHES IN ROOMS WITH ACCESSIBLE CEILINGS GIVING ACCESS TO OPEN WALL CAVITIES.

G8 CONTRACTOR SHALL ENSURE TO THE GREATEST EXTENT POSSIBLE THAT LOADS ON THE ELECTRICAL DISTRIBUTION SYSTEM ARE PHASED-BALANCED. WHERE MULTI-METER PACKS ARE INSTALLED, EQUIPMENT LUGS SHALL BE ADJUSTED ACCORDINGLY TO BALANCE PHASES.

WIND SPEED OF 90 MPH OR LESS

POLE HEIGHT	≤ 2 LIGHT FIXTURES ON POLE		3 OR 4 LIGHT FIXTURES ON POLE			
	DIAMETER (D)	EMBEDMENT (E)	DIAMETER (D)	EMBEDMENT (E)	"V" BARS	"T" BARS
≤ 15'	1'-6"	4'-6"	1'-6"	4'-9"	(6) #5	#3@10"
16' ~ 25'	2'-0"	5'-3"	2'-0"	5'-6"	(6) #6	#3@12"
26' ~ 35'	2'-6"	5'-9"	2'-6"	6'-3"	(6) #7	#3@14"
36' ~ 40'	3'-0"	6'-0"	3'-0"	6'-3"	(6) #8	#3@16"



EXTENDED POLE BASE

NOT TO SCALE

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Project Number: 1730254
Drawn By: EMR Checked By: SHD

ISSUE DATE:

AUGUST 18, 2017
PERMIT SET

REVISION:

MARK N. BIGBIE 83876 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

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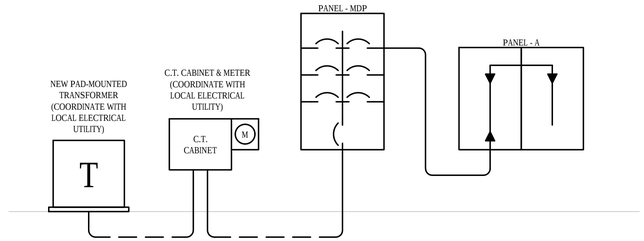


1 ELECTRICAL RISER DIAGRAM

SCALE: NONE

DISTRIBUTION PANEL SCHEDULE - "MDP"

MAIN: 600A MCB | VOLTAGE: 208/120 | PHASE: 3 | WIRE: 4
MTG: SURFACE | AIC: 28,696

CKT #	OVERCURRENT DEVICE FRAME	TRIP	FUSE	POLE	DESCRIPTION	LOAD (KVA) LTG	REC	MTR	A/C	HTG	KIT	MISC	PHASE A	B	C
1	200A	200A	-	3	PANEL 'A'	3.0	13.9	0.0	0.0	3.0	0.0	0.0			
	-	-	-	-	-	3.8	12.8	3.5	0.0	4.5	0.0	0.0			
	-	-	-	-	-	3.8	15.0	2.0	0.0	4.0	0.0	0.0			
2			-	3	SPACE										
	-	-	-	-	-										
	-	-	-	-	-										
3	100A	45A	-	2	CU -- 1				5.1						
	-	-	-	-	-				5.1						
4	100A	45A	-	2	CU -- 2				5.1						
	-	-	-	-	-				5.1						
5	100A	60A	-	2	CU -- 3				6.4						
	-	-	-	-	-				6.4						
6	100A	60A	-	2	CU -- 4A				6.4						
	-	-	-	-	-				6.4						
7	100A	60A	-	2	CU -- 4B				6.4						
	-	-	-	-	-				6.4						
8	100A	60A	-	2	CU -- 5				6.4						
	-	-	-	-	-				6.4						
9			-	3	SPACE										
	-	-	-	-	-										
10			-	3	SPACE										
	-	-	-	-	-										
	-	-	-	-	-										
						10.6	41.6	5.5	71.6	11.5	0.0	0.0			

CONNECTED LOAD (KVA):	140.8			
DEMAND LOAD (KVA):	125.0	PHASE A	357.0	42.8
		PHASE B	407.0	48.8
CONNECTED LOAD (AMPS)	390.7	PHASE C	409.2	49.1
DEMAND LOAD (AMPS):	346.9		AMPS	KVA
AMPACITY REQUIRED:	354.2			

NOTES:
FOR ANY BREAKER 1200A OR HIGHER, AN ARC-ENERGY REDUCING SWITCH SHALL BE PROVIDED, OR A PLACARD STATING "WHEN WORKING WITHIN THE ARC-FLASH BOUNDARY, BREAKER INSTANTANEOUS SETTING SHOULD BE MINIMIZED FOR ARC-ENERGY REDUCTION PURPOSES. ORIGINAL SETTING SHALL BE RESTORED UPON WORK COMPLETION".

PANELBOARD SCHEDULE - "A"

MAIN: 200A MLO | VOLTAGE: 208/120 | PHASE: 3 | WIRE: 4 | MOUNTING: SURFACE | AIC:

CKT #	TRIP POLE	DESCRIPTION	LOAD (KVA) LTG	REC	MTR	A/C	HTG	KIT	MISC	PHASE A	B	C	LOAD (KVA) LTG	REC	MTR	A/C	HTG	KIT	MISC	DESCRIPTION	TRIP POLE	CKT #
1	20/1	LTG - EXTERIOR	0.2										1.4							RECEPTACLES	20/1	2
3	20/1	LTG - EXTERIOR	0.5										1.8							RECEPTACLES	20/1	4
5	20/1	LTG - EXTERIOR	0.5										1.6							RECEPTACLES	20/1	6
7	20/1	LTG - EXTERIOR	0.5										1.3							RECEPTACLES	20/1	8
9	20/1	LTG - FUTURE FANS	1.0														1.0			WATER HEATER	20/1	10
11	20/1	LIGHTING	1.9										1.3							RECEPTACLES	20/1	12
13	20/1	LIGHTING	1.6										1.3							RECEPTACLES	20/1	14
15	20/1	LIGHTING	1.9										1.3							RECEPTACLES	20/1	16
17	20/1	LIGHTING	0.9										1.3							RECEPTACLES	20/1	18
19	20/2	LTG - EXTERIOR	0.4										1.3							RECEPTACLES	20/1	20
21	--	--	0.4										1.3							RECEPTACLES	20/1	22
23	20/2	LTG - EXTERIOR	0.3										1.3							RECEPTACLES	20/1	24
25	--	--	0.3										1.3							RECEPTACLES	20/1	26
27	20/1	EF -- 1 & 2, MTRZD DMPRS			1.5								1.0							FRIDGE - G.F.C.I. BREAKER	20/1	28
29	20/1	JBOX - FUTURE RETORT		1.3									1.3							RECEPTACLES	20/1	30
31	20/1	JBOX - MORTUARY CABINET		1.3									1.3							RECEPTACLES	20/1	32
33	20/1	RECEPTACLES		1.3									1.3							RECEPTACLES	20/1	34
35	20/1	RECEPTACLES		1.3									1.3							RECEPTACLES	20/1	36
37	20/1	RECEPTACLES		1.4									1.3							RECEPTACLES	20/1	38
39	20/1	RECEPTACLES		0.7									1.3							RECEPTACLES	20/1	40
41	20/1	RECEPTACLES		1.3									1.3							RECEPTACLES	20/1	42
		SECTION 2																		SECTION 2		
43	20/1	GF -- 1					0.3						0.2							RECEPTACLES	20/1	44
45	20/1	GF -- 2					0.3						0.7							RECEPTACLES	20/1	46
47	20/1	GF -- 3					0.3						0.5							RECEPTACLES	20/1	48
49	20/1	GF -- 4A					0.3						1.0							DISPOSAL	20/1	50
51	20/1	GF -- 4B					0.3						1.0							CATERING 111	20/1	52
53	20/1	GF -- 5					0.3						1.0							CATERING 111	20/1	54
55	20/1	LTG - ATTIC	0.1										0.5							RECEPTACLES	20/1	56
57	20/1	JBOX - FIREPLACE		0.5									0.7							RECEPTACLES	20/1	58
59	20/1	LTG - EXT EMERGENCY	0.3										0.5							RECEPTACLES	20/1	60
61	15/2	EH -- 1					1.0						0.5							RECEPTACLES	20/1	62
63	--	--					1.0						0.0		2.0					FOUNTAIN	40/2	64
65	20/2	EH -- 2					1.5								2.0					--	--	66
67	--	--					1.5													SPACE		68
69	25/2	EH -- 3					2.0													SPACE		70
71	--	--					2.0													SPACE		72
73		SPACE																		SPACE		74
75		SPACE																		SPACE		76
77		SPACE																		SPACE		78
79		SPACE																		SPACE		80
81		SPACE																		SPACE		82
83		SPACE																		SPACE		84

| | | | | | | | | | | | | | | | | | |

GENERAL NOTES:

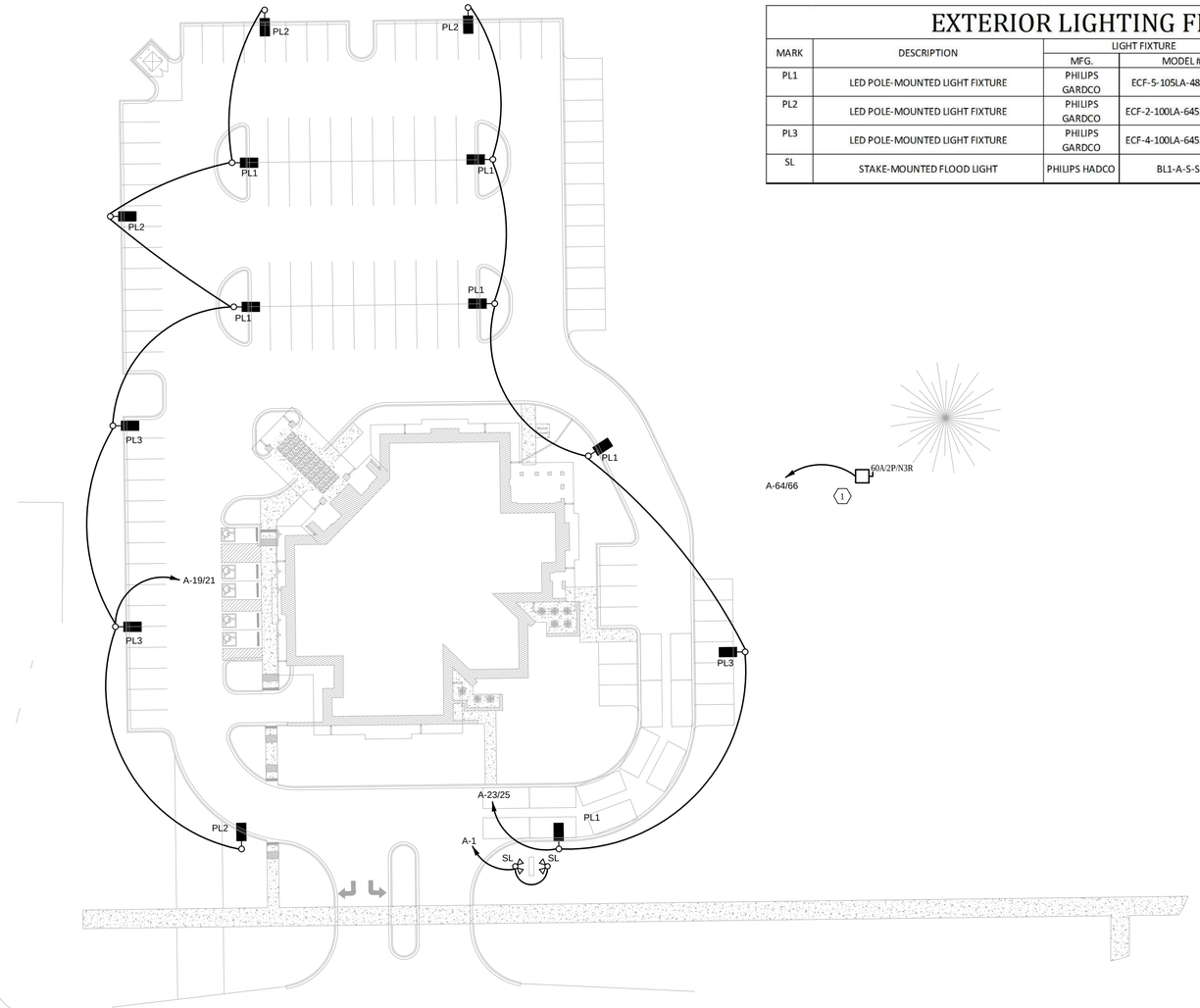
1. CONDUCTOR SIZE FOR ALL SITE LIGHTING CIRCUITS SHALL BE #8 AWG TO MINIMIZE VOLTAGE DROP.

KEY NOTES: (DESIGNATED BY "⟨#⟩")

1. PROVIDE NEMA 3R DISCONNECTING MEANS FOR FLOATING FOUNTAIN. VERIFY ELECTRICAL REQUIREMENTS WITH OWNER AND VENDOR DRAWINGS PRIOR TO INSTALLATION.

EXTERIOR LIGHTING FIXTURE SCHEDULE

MARK	DESCRIPTION	LIGHT FIXTURE		MOUNTING	LAMPS	VOLTS	WATTS	NOTES
		MFG.	MODEL #					
PL1	LED POLE-MOUNTED LIGHT FIXTURE	PHILIPS GARDCO	ECF-5-105LA-4870-NW	POLE	LED	UNV	104	CONTROL VIA TIMECLOCK
PL2	LED POLE-MOUNTED LIGHT FIXTURE	PHILIPS GARDCO	ECF-2-100LA-6453-NW-IS	POLE	LED	UNV	103	CONTROL VIA TIMECLOCK
PL3	LED POLE-MOUNTED LIGHT FIXTURE	PHILIPS GARDCO	ECF-4-100LA-6453-NW-IS	POLE	LED	UNV	103	CONTROL VIA TIMECLOCK
SL	STAKE-MOUNTED FLOOD LIGHT	PHILIPS HADCO	BL1-A-S-S7	STAKE	MR 16	120	75	CONTROL VIA TIMECLOCK



1 SITE PLAN - ELECTRICAL
SCALE: 1" = 30'-0"

NORTH

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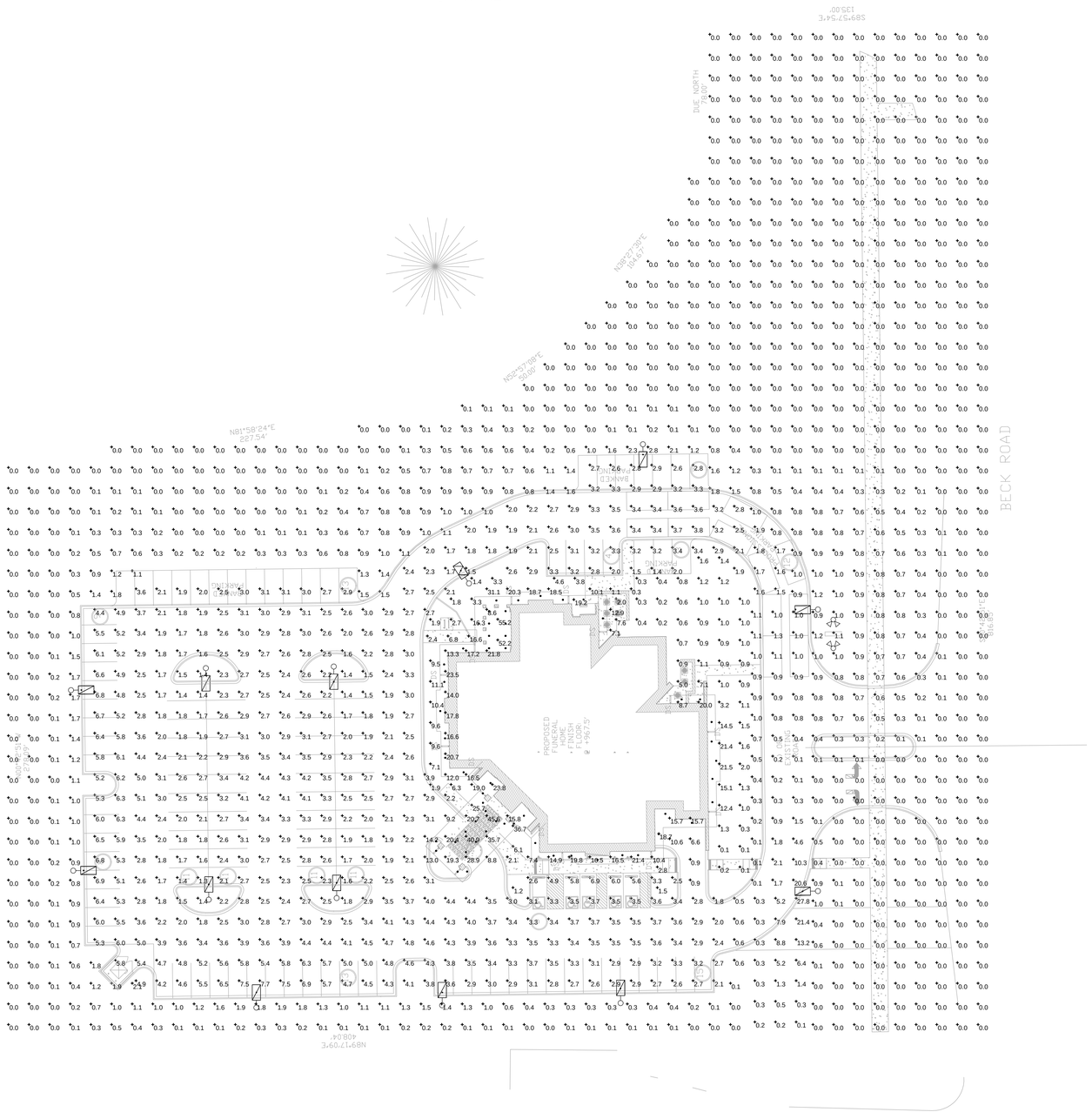

1 PHOTOMETRIC PLAN

SCALE: 1" = 30'-0"

NORTH

Statistics							
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
Grass		4.3 fc	36.7 fc	0.1 fc	367.0:1	43.0:1	0.1:1
Parking		3.3 fc	27.8 fc	0.1 fc	278.0:1	33.0:1	0.1:1
Porch		53.7 fc	55.2 fc	52.2 fc	1.1:1	1.0:1	1.0:1
Property		0.2 fc	2.8 fc	0.0 fc	N/A	N/A	0.1:1
Sidewalks		15.4 fc	47.3 fc	0.0 fc	N/A	N/A	0.3:1
Soffit N W		17.5 fc	31.1 fc	7.1 fc	4.4:1	2.5:1	0.6:1
Soffit S E		15.9 fc	21.9 fc	2.6 fc	8.4:1	6.1:1	0.7:1
Unlit Driveway		1.8 fc	20.6 fc	0.1 fc	206.0:1	18.0:1	0.1:1

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Project Number: 1730254
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PHILIPS

GARDCO

Site & Area

EcoForm

Project:

Location:

Cat.No.

Type:

Qty:

Notes:

Philips Gardco EcoForm LED luminaire combines economy with performance. Capable of delivering up to 20,000 lumens or more in a compact, low profile housing, EcoForm offers a new level of customer value. EcoForm features an innovative retrofit arm kit, simplifying site conversions to LED by eliminating the need to drill additional holes in most existing poles. Integral control systems, including motion response and wireless controls are available for further energy savings during off peak hours.

Ordering guide

example: ECF–APD–MRO–1–4–75LA–NW–120–NP–LF

Prefix	Controls	Mounting	Optical System	Wattage	Color Temp	Voltage	Finish	Options
ECF –	–	–	–	–	–	–	–	

ECF EcoForm

Controls

— Standard luminaire (leave blank)

DIM 0-10V Dimming

APD[1] Auto Profile Dimming

APD–MRO[1] Auto Profile Dimming and Motion Response Override pole mounted motion sensor

APD–MRI[1,2] APD with Motion Response Override luminaire sensor

MRI[1,2] Motion Response at 50% low, pole mounted sensor

MRS[1] Motion Response at 50% low, pole mounted sensor

Wireless Controls (Remote wireless controller available. See p.2 for details)

LLC2[1,4] #2 lens for 8' mounting heights

LLC3[1,4] #3 lens for 9-20' mounting heights

LLC4[1,4] #4 lens for 21-40' mounting heights

Mounting

1 Standard

2 2@180

2@90 2@90

3 3@90

3@120 3@120

4 4@90

WS Wall mount Including surface conduit rear entry permitted

MA Mast Arm Fitter (requires 2-3/8" O.D. Mast Arm)

Optical System

2 Type 2

3 Type 3

4 Type 4

5 Type 5

Wattage

530 mA

55LA–3253[3]

75LA–4853

100LA–6453

700mA

70LA–3270

105LA–4870

135LA–6470

1050mA

105LA–321A

160LA–481A

215LA–641A

Color Temp

CW Cool White 5,700 K 70 CRI (nominal)

NW Neutral White 4,000 K 70 CRI (nominal)

WW[5] Warm White 3,000 K 70 CRI (nominal)

Voltage

120 120V

208 208V

240 240V

277 277V

347 347V

480 480V

UNV 120-277V 50hz/60hz

HVU 347-480V 50hz/60hz

Finish

BRP Bronze Paint

BLP Black Paint

WP White Paint

NP Natural Paint

OC Optional Color Specify optional color or RAL (ex: OC-LGP or OC-RAL7024)

SC Special color Specify, must supply color chip. Requires factory quote.

Options

TL Tool-Less entry and driver removal hardware

TB[11] Terminal Block

IS[12] Internal Shield

LF[7] Line Fusing

LFC[7] Line Fusing for Canada

PC[6,7,8] Receptacle with Photocell (includes PCR5)

PCB[6,7,8] Photocell Button

PCR5[6,8,9] Photocell Receptacle only with 2 dimming connections

PCR7[6,8,9] Photocell Receptacle only with 2 dimming and 2 auxiliary connections

RAM Retrofit Arm Mount kit

PTF2[10] Pole Top Fitter for 2 1/4"- 3" Tenon

PTF3[10] Pole Top Fitter for 3"- 3 1/2" Tenon

PTF4[10] Pole Top Fitter for 3 1/2"- 4" Tenon

RPA[13] Round Pole Adapter for 3"- 3.9" O.D.

BD Bird Deterrent (field installed only)

1. Available in 120V–277V Voltages only (UNV, 120, 208, 240 & 277).
2. MRS0 and APD–MRO luminaires require one motion sensor per pole, ordered separately. See page 2 for Accessories. Available in 120V or 277V only.
3. ECF–MRI requires outboarded sensor when used with Terminal Block (TB) Option.
4. LLC2/LLC3/LLC4 Wireless Controls are not configurable with PC/PCB/PCR5/PCR7 Options. See page 6–7 for more Info.
5. Contact factory for lead times on warm white.
6. Not configurable with Type 5 (5) Optics.
7. Not configurable with 120–277V (UNV) Voltage. Voltage must be specified.
8. Not configurable with 480V (480) Voltage.
9. Works with 3-pin or 5-pin NEMA photocell/dimming device.
10. If ordered with DIM, APD, MRI, MRS0, APD–MRI, APD–MRO, dimming will not be connected to NEMA receptacle.
11. Works with 3-pin or 5-pin NEMA photocell/dimming device and auxiliary connections are not connected (for future use only).
12. Not configurable with 3@120 (3@120) Mounting.
13. No adaptor required for 4" round poles. RPAs provided with Black Paint standard.

ECF EcoForm LED luminaire

EcoForm Accessories (order separately)

FS1R-100

MR hand held programmer

For use with 'MRI' motion response when field programming is required. If desired, only one is needed per job.

MS–A–120V

120V Input Area Motion Sensor

For MRS0 (Motion Response) or APD–MRO (Automatic Profile Dimming with Motion Response Override)

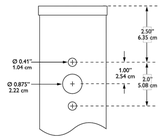
MS–A–277V

277V Input Area Motion Sensor

For MRS0 (Motion Response) or APD–MRO (Automatic Profile Dimming with Motion Response Override)

Note: Motion Sensors are ordered separately, with one (1) motion sensor required per pole location for MRS0 or APD–MRO luminaires. See Luminaire Configuration Information on page 5 for more details. Area motion sensor color is Arctic White. MRI and APD–MRI luminaires include an integral motion sensor.

EcoForm Drill Template (standard arm mount)



EcoForm Wireless Controls Accessories (for wall or pole mount)[1,2,3,4]

LLCR2–(F)

Standalone wall or pole wireless controller with #2 Lens.

LLCR3–(F)

Standalone wall or pole wireless controller with #3 Lens.

LLCR4–(F)

Standalone wall or pole wireless controller with #4 Lens.

1. When using the wireless remote accessory option (LLCR–F) in a pole mount application, specify pole option (CL=Coupling Internal Thread, 3/4" size)
2. 120–277V only.
3. Must specify finish (F=Specify matching finish)
4. Luminaire configuration must include 0–10V Dimming 'ECF–DIM' option when Wireless Controls Accessories are specified

LED Wattage and Lumen Values (standard EcoForm luminaire)

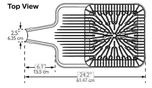
Ordering Code	No. of LED Modules (16 LEDs per Module)	Total LEDs	LED Current (mA)	Average System Watts[5]	Color Temp.	Type 2 Delivered Lumens[6]	Type 2 Efficacy (LPW)	Type 2 BUG Rating	Type 3 Delivered Lumens[6]	Type 3 Efficacy (LPW)	Type 3 BUG Rating	Type 4 Delivered Lumens[6]	Type 4 Efficacy (LPW)	Type 4 BUG Rating	Type 5 Delivered Lumens[6]	Type 5 Efficacy (LPW)	Type 5 BUG Rating
55LA-3253	2	32	530	52	4000K	6,294	122	B1-U0-G1	6,190	120	B2-U0-G2	6,106	118	B1-U0-G2	5,867	114	B3-U0-G2
70LA-3270	2	32	700	69	4000K	7,754	112	B2-U0-G2	7,555	115	B2-U0-G2	7,659	111	B2-U0-G2	7,421	107	B3-U0-G2
75LA-4853	3	48	530	77	4000K	9,344	121	B2-U0-G2	9,191	119	B2-U0-G2	9,086	117	B2-U0-G2	8,712	113	B3-U0-G2
105LA-321A	2	32	1050	107	4000K	10,709	100	B2-U0-G2	10,981	103	B3-U0-G2	10,576	99	B2-U0-G2	10,255	96	B4-U0-G2
105LA-4870	3	48	700	104	4000K	11,513	111	B2-U0-G2	11,812	114	B3-U0-G2	11,373	110	B2-U0-G2	11,019	106	B4-U0-G2
100LA-6453	4	64	530	103	4000K	12,491	121	B2-U0-G2	12,285	119	B3-U0-G2	12,129	118	B2-U0-G2	11,645	113	B4-U0-G2
135LA-6470	4	64	700	139	4000K	15,390	111	B3-U0-G2	15,789	114	B3-U0-G2	15,192	110	B3-U0-G3	14,729	106	B4-U0-G2
160LA-481A	3	48	1050	158	4000K	15,901	101	B3-U0-G3	16,343	103	B3-U0-G2	15,696	99	B3-U0-G3	15,188	96	B4-U0-G2
215LA-641A	4	64	1050	211	4000K	21,255	101	B3-U0-G3	21,265	100	B4-U0-G3	20,984	99	B3-U0-G3	20,874	99	B5-U0-G3

5. System input wattage may vary based on input voltage, by up to +/- 10%, and based on manufacturer forward voltage, by up to +/- 8%.
6. Lumen values based on photometric tests performed in compliance with IESNA LM-79.

Note: Some data may be scaled based on tests of similar, but not identical, luminaires.

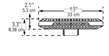
Dimensions – Standard EcoForm luminaire

Top View



Side View

End View



EPA (ft²/m²)

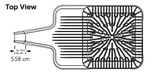
Single	Twin (2@180)	3/4@90
0.2 / 0.019	0.5 / 0.046	0.5 / 0.046

Approximate Luminaire Weight: 20 Lbs (9.07 Kg)

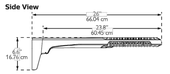
ECF EcoForm LED luminaire

Dimensions – EcoForm with Retrofit Arm Mount (RAM)

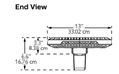
Top View



Side View



End View



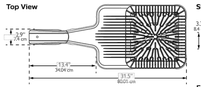
EPA (ft²/m²)

Single	Twin (2@180)	3/4@90
0.3 / 0.028	0.6 / 0.056	0.7 / 0.065

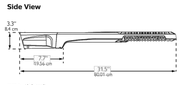
Approximate Luminaire Weight: 21 Lbs (9.53 Kg)

Dimensions – EcoForm with Mast Arm Fitter (MA)

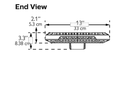
Top View



Side View



End View



EPA (ft²/m²)

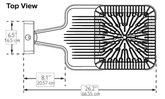
Single

0.51 / 0.047

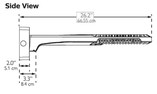
Approximate Luminaire Weight: 21.5 Lbs (9.77 Kg)

Dimensions – EcoForm with Wall Mount (WS)

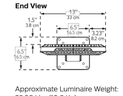
Top View



Side View



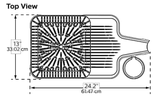
End View



Approximate Luminaire Weight: 23.36 Lbs (10.6 Kg)

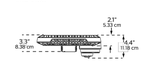
Dimensions – EcoForm with wireless controls (luminaire mounted controller)

Top View



Side View

End View



ECF EcoForm LED luminaire

Luminaire Configuration Information

ECF

Philips Gardco EcoForm LED standard luminaire providing constant wattage and constant light output when power to the luminaire is energized.

ECF–DIM

Philips Gardco EcoForm LED luminaire provided with 0–10V dimming for connection to a control system provided by others.

ECF–APD

Philips Gardco EcoForm LED luminaire with Automatic Profile Dimming. Luminaire is provided with a Philips DynaDimmer module, programmed to go to 50% power, 50% light output two (2) hours prior to night time mid-point and remain at 50% for six (6) hours after night time mid-point. Mid-point is continuously recalculated by the Philips DynaDimmer module based on the average mid-point of the last two full night cycles. Short duration cycles, and power interruptions are ignored and do not affect the determination of mid-point.

ECF–APD is available in 120V–277V input only.

ECF–APD Dimming Profile:

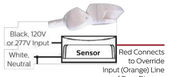
100%	2 hours	6 hours	100%
	50%	50%	
Power On	Mid Point		Power Off

ECF–MR50

Philips Gardco EcoForm LED luminaire with motion response, providing a 50% power reduction on low and a commensurate reduction in light output. The power and light output reduction is accomplished utilizing the Philips DynaDimmer module, programmed for a constant 50% power. Power supplied by the motion sensor connected to the override line on the DynaDimmer takes the luminaire to high setting, 100% power and light output, when motion is detected. The luminaire remains on high until no motion is detected for the motion sensor duration period, after which the luminaire returns to low. Duration period is factory set at 15 minutes, and is field adjustable from 5 minutes up to 15 minutes.

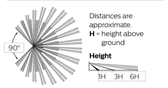
ECF–MR50 is available in 120V–277V input only to the luminaire. Motion sensors require single voltage 120V or 277V input.

The Area PIR motion sensor is the WattStopper EW–200–120–W (120V Input – MSA–120V) or the WattStopper EW–200–277–W (277V Input – MSA–277V.) One motion sensor per pole is required and is ordered separately. Area sensors require single voltage 120V or 277V input.



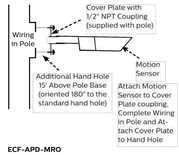
The area motion detector provides coverage equal to up to 6 times the sensor height above ground, 270° from the front-center of the sensor.

Area PIR Motion Sensor Coverage Pattern:



Motion response requires that the pole include an additional hand hole 15 feet above the pole base, normally oriented 180° to the standard hand hole. For Philips Gardco poles, order the pole with the Motion Sensor Mounting (MSM) option which includes the hand hole and a special hand hole cover plate for the sensor with a 1/2" NPT receptacle centered on the hand hole cover plate into which the motion sensor mounts. Once the motion sensor is connected to the hand hole cover plate, then wiring connections are completed in the pole. The plate (complete with motion sensor attached and wired) is then mounted to the hand hole. If poles are supplied by others, the customer is responsible for providing suitable mounting accommodations for the motion sensor in the pole.

Mounting to a Philips Gardco Pole:



ECF–APD–MRO

Philips Gardco EcoForm LED luminaire with Automatic Profile Dimming, with Motion Response Override. The ECF–APD–MRO combines the benefits of both automatic profile dimming and motion response, using the Philips DynaDimmer module. The luminaire will dim to 50% power, 50% light output, per the dimming profile shown for the ECF–APD. If motion is detected during the time that the luminaire is operating at 50%, the luminaire returns to 100% power and light output. The luminaire remains on high until no motion is detected for the duration period, after which the luminaire returns to low. Duration period is factory set at 15 minutes, and is field adjustable from 5 minutes up to 15 minutes.

Notes:

ECF–APD–MRO is available in 120V through 277V input only to luminaire. The motion sensor requires either 120V or 277V input to the motion sensor.

The ECF–APD–MRO has the same pole requirements and utilizes the same motion sensors as the ECF–MR50. The motion sensor mounts and wires identically as well. The ECF–APD–MRO utilizes the identical dimming profile as shown for the ECF–APD.

By combining the benefits of automatic profile dimming and motion response, the ECF–APD–MRO assures maximum energy savings, and insures that adequate light is present if motion is detected.

All motion sensors utilized consume 0.0 watts in the off state.

ECF EcoForm LED luminaire

Luminaire Configuration Information (Continued)

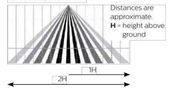
ECF–MRI

Luminaires with Motion Response include a LED driver and an integral programmable motion sensor. The motion sensor is set to a constant 50%. When motion is detected, the luminaire goes to 100%. The luminaire remains on high until no motion is detected for the motion sensor duration period, after which the luminaire returns to low. Duration period is factory set at 5 minutes. Available with 120V or 277V only.

Luminaires include a passive infrared (PIR) motion sensor, WattStopper® FSP–211 equipped with an FSP–L3 lens, capable of detecting motion within 20 feet of the sensor, 180° around the luminaire, when placed at a 20 foot mounting height, or mounted on a wall. Available in 120V or 277V input only. Motion sensor off state power is 0.0 watts.

The approximate motion sensor coverage pattern is as shown below.

Side Coverage Pattern



Top Coverage Pattern

ECF–APD–MRI

Luminaires with Automatic Profile Dimming and Motion Response Override combine the benefits of both automatic profile dimming and motion response. APD–MRI luminaires utilize Philips DynaDimmer. The luminaire will dim to 50% power, 50% light output, per the dimming profile shown for APD luminaires (see page 4). If motion is detected during the time that the luminaire is operating at 50%, the luminaire goes to 100% power and light output. The luminaire remains on high until no motion is detected for the duration period, after which the luminaire returns to low. Duration period is factory set at 5 minutes.

APD–MRI luminaires are available with 120V or 277V input voltages only.

APD–MRI luminaires use the identical motion sensor as MRI luminaires. See motion sensor details for ECF–MRI.

FS1R-100 Wireless Remote Programming Tool

The FS1R-100 Remote Programming Tool accessory permits adjustment of ECF–MRI and ECF–APD–MRI sensor settings, including duration and dimming level on low, without the need to connect any wires to the luminaire.

The FS1R-100 Wireless IR Programming Tool is a handheld tool for setup and testing of WattStopper FSP–211. It provides wireless access to the FSP–211 sensors for setup and parameter changes.

The FS1R-100 display shows menus and prompts to lead you through each process. The navigation pad provides a familiar way to navigate through the customization fields.

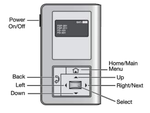
Within a certain mounting height of the sensor, the FS1R-100 allows modification of the system without requiring ladders or tools simply with a touch of a few buttons.

The FS1R-100 IR transceiver allows bi-directional communication between the FSP–211 and the FS1R-100 programming tool. Simple menu screens let you see the current status of the system and make changes. It can change FSP–211 sensor parameters such as high/low mode, sensitivity, time delay, cut off and more. With the FS1R-100 you can also establish and store FSP–211 parameter profiles.

The FS1R-100 operates on three standard 1.5V AAA Alkaline batteries or three rechargeable AAA NiMH batteries. The battery status displays in the upper right corner of the display. Three bars next to BAT= indicates a full battery charge. A warning appears on the display when the battery level falls below a minimum acceptable level. To conserve battery power, the FS1R-100 automatically shuts off 10 minutes after the last key press.

You navigate from one field to another using (up) or (down) arrow keys. The active field is indicated by flashing (alternates between yellow text on black background and black text on yellow background.)

Once active, use the Select button to move to a menu or function within the active field. Value fields are used to adjust parameter settings. They are shown in "less-than/greater-than" symbols <value>. Once active, change them using (left) and (right) arrow keys. In general the up key increments and the down key decrements a value. Selections wrap-around if you continue to press the key beyond maximum or minimum values. Moving away from the value field overwrites the original value. The Home button takes you to the main menu. The Back button can be thought of as an undo function. It takes you back one screen. Changes that were in process prior to pressing the key are lost.More information on the FS1R-100 Remote Programming Tool is available at wattstopper.com.



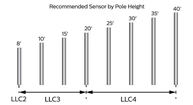
ECF EcoForm LED luminaire

Luminaire Configuration Information – EcoForm with wireless controls

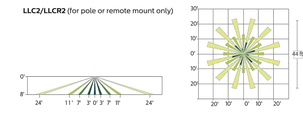
ECF–LLC2/3/4 Luminaire Mounted Controller

Wireless controller attached to luminaire and Includes radio, photocell and motion sensor with #2, 3, or 4 lens for 8–40' mounting heights.

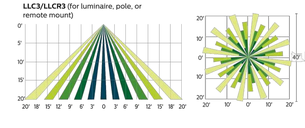
Recommended Sensor by Pole Height



LLC2/LLCR2 (for pole or remote mount only)

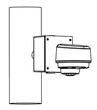


LLC3/LLCR3 (for luminaire, pole, or remote mount)



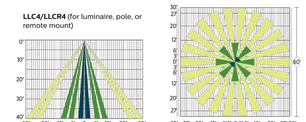
LLCR2/3/4 Pole Mounted Controller

In this configuration, the wireless controller will be mounted to the pole at a fifteen foot mounting height. The number of luminaires on each pole, as well as the specific wattage chosen, will determine how many controllers will be required.



When using the wireless remote accessory option (LLCR–F) in a pole mount application, specify pole option (CL=Coupling Internal Thread, 3/4" size). Confirm required orientation of luminaire and wireless controller. Indicate height above pole base and orientation to handhold. Recommended min pole height is 18ft, with option (CL) 15ft above pole base. Other heights are possible when choosing the appropriate sensor lens type. See pole specification sheets for more information.

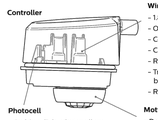
LLC4/LLCR4 (for luminaire, pole, or remote mount)



Remote Mount Wireless Controller

Used to extend the communication on site, to extend motion response and add other luminaires that are not pole mounted. Consult factory for more information.

Controller



Photocell

- Ambient light photocell on every wireless radio that averages the light levels of up to 5 controllers for an accurate reading and optimal light harvesting activity.
- Reports ambient light readings to 1500 Fc.

Wireless Radio

- 1.8 Watts max (no load draw)
- Operating voltage 120–277 VAC RMS
- Communicates using the ZigBee protocol
- Carries out dimming commands from Gateway
- Reports ambient light readings to 1500 Ft–Cd
- Transmission Systems Operating within the band 2400–2483.5Mhz
- ROHS Compliant

Motion Response

- Detects motion through passive infrared sensing technology with three different lens configurations
- Motion sensor coverage can be adjusted from a narrow to a wide detection range, which helps reduce false triggers to further increase energy savings.
- Sensing profiles can be updated to adapt to activity levels in the environment, such as occupancy level, wind, and mounting height

ISSUE DATE:

AUGUST 18, 2017

PERMIT SET

REVISION:

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83876
LICENSED
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STATE OF TEXAS

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L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

SHEET NO.

E1.2

JOB NUMBER: 16238

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Texas Registered Engineering Firm F-4990
Project Number: 1730254
Drawn By:EMR Checked By:SHD

ECF EcoForm LED luminaire

Luminaire Configuration Information (EcoForm with wireless controls)

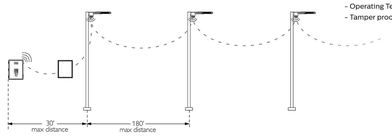
Gateway

Overview: One gateway is included with the wireless controls system. The gateway opens up communication with the wireless radios installed with the EcoForm luminaires (or pole), allowing you to control your fixtures straight from the web. One gateway can communicate with up to 800 fixtures. Typically one unit is required per parking lot.

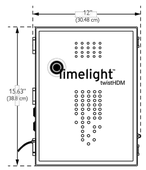
Installation: Gateway has 4 blind threaded holes on the back side that accept 10-32 screws. Mount spacing is 10.41" across and 14.19" vertical.

Requirements: The gateway must be mounted in a secure on-site location. The gateway requires 120V. Distance of gateway to the first radio varies upon application; contact factory. Strong Internet connection required.

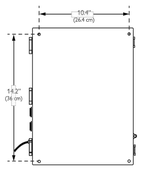
Specifications:
- High density RF Mesh coordinator
- Ethernet or wireless internet connection to server
- Proprietor of software "rules of operation"
- Watertight Ethernet connections
- Highly protected, long life ac/dc power supply
- Single board, ARM compliant 520Mhz Intel computer.
- Operating Temperature -20°C to 55°C
- Tamper proof housing



Front View



Back View



Side View

ECF EcoForm LED luminaire

Specifications

Housing
One piece die cast aluminum housing with integral arm and separate,self retained hinged, one piece die cast door frame.

IP Rating
LED light engine rated IP66.

Vibration Resistance
EcoForm with Standard Arm carries a 3G vibration rating that conforms to standards set forth by ANSI C136.31. Testing includes vibration to 3G acceleration in three axes, all performed on the same luminaire.

Electrical
Driver efficiency (>90% standard). 120–480V available (restrictions apply). Open/short circuit protection. Optional 0-10V dimming to 10% power. RoHS compliant. Surge protector standard. 10KA per ANSI/IEEE C62.41.2.

LED Board and Array
32, 48, or 64 LEDs. Color temperatures: 3000K, 4000K, 5700K +/- 250K. Minimum CRI of 70. Aluminum metal clad board. RoHS compliant.

LED Thermal Management
The housing design allows the one piece housing to provide excellent thermal management critical to long LED system life.

Energy Saving Benefits
System efficacy up to 95 lms/W with significant energy savings over Pulse Start Metal Halide luminaires. Optional control options provide added energy savings during unoccupied periods.

LED Performance

Predicted Lumen Depreciation Data[1]

Ambient Temperature °C	Driver (mA)	Calculated L_{70} Hours[2,3]	L_{70} Per TM-21[2,3]	Lumen Maintenance % @ 60,000 hours
Up to 40 °C	Up to 1050 mA	> 350,000 hours	> 60,000 hours	97%

1. Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM–80 methodology. Actual experience may vary due to field application conditions.
2. L70 is the predicted time when LED performance depreciates to 70% of initial lumen output.
3. Calculated per IESNA TM21-11. Published L70 hours limited to 6 times actual LED test hours.

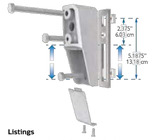
Wireless Controls
The wireless controls system includes: gateway, controller (with wireless radio, motion response, and photocell), and commissioning/ training. This intelligent web–based system operates through a high density mesh (HDM) wireless technology. Wireless radios with motion response and photocell sensors are integrated with PureForm luminaires, and enable the fixtures to communicate via the ZigBee protocol. The gateway is a mini computer that connects to the internet, and is located in a secure location. The central database channels communication to and from the gateway, allowing data to be viewed or managed through the web–based graphical user interface (GUI). See wireless controls pages 6–7 for details and technical information.

Motion Sensors
ECF–MRSO, ECF–APD–MRO, ECF–MRI, ECF–APD–MRI luminaires may be specified for additional energy savings during unoccupied periods. See pages 4–6 for complete details.

Optical Systems
Type 2, 3, 4, and 5 distributions available. Internal Shield option mounts to LED optics and is available with Type 2, 3, and 4 distributions to control backlight.

Mounting
Standard luminaire arm mounts to 4" round poles. Square pole adapter included with every luminaire. Round Pole Adapter (RPA) required for 3–3.9" poles.

Retrofit Arm Mount
EcoForm features an innovative retrofit arm kit. When specified with the retrofit arm (RAM) option, EcoForm seamlessly simplifies site conversions to LED by eliminating the need for additional pole drilling on most existing poles. RAM will be boxed separately.



Listings
ETL/cETL listed to the UL 1598 standard, suitable for Wet Locations. Suitable for use in ambients from -40° to 40°C (-40° to 104°F). The quality systems of this facility have been registered by UL to the ISO 9001 series standards. All EcoForm luminaires equipped with NW and CW are DesignLights Consortium® qualified.

Finish
Each standard color luminaire receives a fade and abrasion resistant, electrostatically applied, thermally cured, triglycidal isocyanurate (TGIC) textured polyester powdercoat finish. Standard colors include bronze (BRP), black (BLP), white (WP), and natural aluminum (NP). Consult factory for specs on optional or custom colors.

Warranty
EcoForm luminaires feature a 5 year limited warranty. Philips Gardco LED luminaires with LED arrays feature a 5 year limited warranty covering the LED arrays. LED Drivers also carry a 5 year limited warranty. Motion sensors are covered by warranty for 5 years by the motion sensor manufacturer.

Philips Lighting North America Corporation
200 Franklin Square Drive, Somerset, NJ 08873
Tel. 855-486-2216

Philips Lighting Canada Ltd.
281 Hillmount Rd, Markham, ON, Canada L6C 2S3
Tel. 800-668-9008

Halo Commercial

PD610/PD615/PD620/PD630
PDM6A
61V

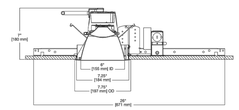
ORDERING INFORMATION

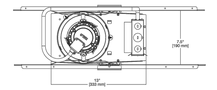
SAMPLE NUMBER: PD610ED010REM-PDM6A827-61VC
A complete luminaire consists of a housing, LED module and reflector, order separately.

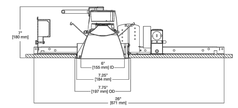
Housing	Lumens	Driver	Options	LED Module	CRI/CCT
PD6 = 6" aperture LED downlight **PD6CP** = 6" aperture LED downlight, CCEA listed for City of Chicago plenum requirements	**10** = 1,000 lumens (nominal) **15** = 1,500 lumens (nominal) **20** = 2,000 lumens (nominal) **30** = 3,000 lumens (nominal)	**ED010** = 120-277V 50/60Hz, 0-10V and LE/TE phase cut dimming **D010** = 120-277V 50/60Hz, 0-10V dimming (3,000 lumen only)	**REM** = Emergency operation with remote indicator and test switch **IEM** = Emergency operation with integral indicator and test switch, 60 Hz only (REM and IEM options not available with PDKCP housing)	**PDM6A** = Downlight LED module for PD6 housing, provides 1,000, 1,500, 2,000, or 3,000 lumens (nominal) depending on connected housing type	**827** = 80 CRI, 2700K CCT **927** = 90 CRI, 2700K CCT **830** = 80 CRI, 3000K CCT **930** = 90 CRI, 3000K CCT **835** = 80 CRI, 3500K CCT **935** = 90 CRI, 3500K CCT **840** = 80 CRI, 4000K CCT **940** = 90 CRI, 4000K CCT

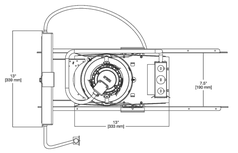
Reflector	Finish Option	Flange Option	Accessories
61V = 6" vertical parabolic reflector **61VEM** = 6" vertical parabolic reflector for IEM	**C** = Specular clear **G** = Specular gold **H** = Semi-specular clear **W** = White (white flange) **BB** = Black baffle (white flange) **WB** = White baffle (white flange)	**Blank** = Polished flange standard with C, G & H reflector finishes **Blank** = White flange standard with W, BB, & WB **WF** = White flange option available with C, G, & H reflector finishes	**HB128ABPK** = L channel hanger bar, 26", 'No-Fuss', pair (replacement) **RMB22** = 22" long wood joist mounting bars, pair **H347** = Step down transformer for 347V input **H347** = Step down transformer for 347V input, 75VA max **H347200** = Step down transformer for 347V input, 200VA max **PORLWTPD1** = LumaWatt Pro Wireless Sensor Kit (0-10V only)

DIMENSIONS









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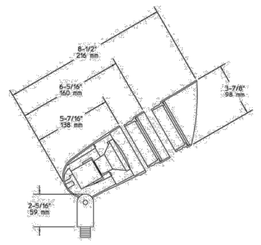
Powering Business Worldwide

Aluminum Bullyte (BL1) Specification Sheet

Project Name:	Location:	MFG: Philips Hadco
Fixture Type:	Catalog No.:	Qty:



Ordering Guide

Example: BL1 A S S7

Product Code	BL1	Aluminum Bullyte
Finish	A H	Black Bronze
Shroud	S L	Short Shroud Long Shroud
Mounting	S7	Mounting Stake

Specifications

HOUSING:
Die-cast aluminum. Fully rotatable shroud, gasketed, cast aluminum. Fasteners are 300 series stainless steel. Fully-adjustable swivel arm with vibration-proof locking teeth. ½" NPS male threads to screw onto accessory mounting stake or junction box, sold separately.

FINISH:
Thermoset polyester powdercoat is electrostatically applied after a five-stage conversion cleaning process and bonded by heat fusion thermosetting.

OPTICAL ASSEMBLY:
Clear tempered glass lens.

LAMPING:
75W maximum MR16 bi-pin lamp. Covered MR16 are recommended to protect lamps inner capsule. Lower wattage lamps are acceptable. Lamp is not included.

ELECTRICAL ASSEMBLY:
Bi-pin socket type (GU5.3) with 250° C high temperature teflon coated wire leads. 12 Volt fixture is pre-wired with 3-ft pigtail of 18-2 AWG, 105° C, SPT-1W wire. Low voltage quick connector, catalog #LVC3 included for easy hook-up to the low voltage supply cable, not included. 12 Volt system requires remote transformer, not included.

WARRANTY:
Three-year limited warranty.

CERTIFICATIONS:
ETL listed to U.S. safety standards for wet locations. cETL listed to Canadian safety standards for wet locations. Manufactured to ISO 9001:2008 Standards.

Width:
3 7/8" (98mm)

Length:
8 1/2" (216mm)

Max. Weight:
1.4 lb

PHILIPS HADCO

Halo Commercial

DESCRIPTION

Recessed 6-inch LED lens downlight is available in various distributions, lumen and CRI/CCT options. Suitable for commercial construction and can be used for both new or renovation work. Insulation must be kept 3" from top and sides of housing. Use for general area lighting where high efficiency and visual comfort are required.

Catalog #		Type	
Project			
Comments		Date	
Prepared by			

SPECIFICATION FEATURES

MECHANICAL
Frame
Boat shaped galvanized steel frame with adjustable plaster lip accommodates ceilings up to ½ – 2" thick. May be used for new construction or remodeling installations. Provided with (2) remodel clips to secure frame when installed from below the ceiling.

Mounting Brackets
Bar hanger receivers adjusts 2" vertically from above the ceiling or thru the aperture. Use with No Fuss™ bar hangers or with ½" EMT. Removable to facilitate installation from below the ceiling.

No Fuss™ Bar Hangers
Captive preinstalled bar hanger locks to tee grid with a screwdriver or pliers. Centering mechanism allows consistent positioning of fixtures.

OPTICAL
LED Module
Proximity phosphors over chip on board LEDs provide a uniform source with high efficiency and no pixilation. Available in 80 or 90 CRI minimum, accuracy within 3 SDCM provides color uniformity. See ordering information for available CRI / CCT options. Passive thermal management achieves L70 at 50,000 hours in non IC applications. Integral diffuse lens provides visual shielding. Integral connector allows quick connection to housing flex.

Reflector
One piece parabolic aluminum reflector provides cutoff for a visually comfortable optic. Attaches to LED module with (3) speed clamps minimizing light leaks to lens. Self-flanged standard with an optional white painted flange.

Trim Retention
Reflectors are retained with two torsion springs holding the flange tightly to the finished ceiling surface.

ELECTRICAL
Junction Box
(6) ½" and (2) ¾" trade size pry outs positioned to allow straight conduit runs. Listed for (12) #12 AWG (six in, six out) 90°C conductors and feed thru branch wiring.

Driver
Integral UNV 120 - 277V 50/60 Hz constant current driver provides noise free operation. For 347V input use Halo transformer H347 or H347200. Continuous, flicker-free dimming from 100% to 10% with leading or trailing edge phase cut at 120V or 0 -10V analog control.

Emergency Option
Provides 90 minutes of standby lighting meeting most life safety codes for egress lighting. Available with both integral or remote charge indicator and test switch.

Compliance
- cULus listed for wet location
- IP66 Ingress Protection Rated
- Insulation must be kept 3" from top and sides.
- Airtight per ASTM-E283.
- Optional City of Chicago environmental air (CCEA) marking for plenum applications.
- EMI/RFI emissions per FCC 47CFR Part 18 non-consumer limits.
- Contains no mercury or lead and RoHS compliant.
- Photometric testing in accordance with IES LM-79-08.
- Lumen maintenance projections in accordance with IES LM-80-08 andTM-21-11.
- Can be used to comply with California Title 24 Non-Residential Lighting Controls requirements as a LED Luminaire.
- ENERGY STAR® listed for commercial applications, reference database for current listings.

PD610
PD615
PD620
PD630

PDM6A

61V

1000, 1500, 2000 & 3000 Lumen Series

LED 6-Inch Aperture Lens Downlight

THD: ≤ 20%
PF: ≥ 0.90
T Ambient -30 - +40°C
Sound Rating ≤ 22dba

Lumens	1000 Series	
Input Voltage	120V	277V
Input Current	.103 A	.058 A
Input Power	12.1 W	13.2 W
Efficiency	88 LPW	88 LPW
Inrush Current	0.37 A	0.77 A

Lumens	1500 Series	
Input Voltage	120V	277V
Input Current	.146 A	0.072 A
Input Power	17.1 W	17.9 W
Efficiency	87 LPW	87 LPW
Inrush Current	0.47 A	1.04 A

Lumens	2000 Series	
Input Voltage	120V	277V
Input Current	.175 A	0.086 A
Input Power	20.78 W	21.06 W
Efficiency	89 LPW	89 LPW
Inrush Current	0.54 A	1.21 A

Lumens	3000 Series	
Input Voltage	120V	277V
Input Current	.299 A	.145 A
Input Power	35.72 W	36.4 W
Efficiency	82 LPW	82 LPW
Inrush Current	0.85 A	2.0 A

EATON
Powering Business Worldwide

TD517003EN
11/03/2016

Halo Commercial

PD610/PD615/PD620/PD630
PDM6A
61V

COMPLIANCE TABLE

1000 LUMEN

80 CRI															
Catalog #	PD610ED010- PDM6A827				PD610ED010- PDM6A830				PD610ED010- PDM6A835				PD610ED010- PDM6A840			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1032	77			1109	83			1177	88			1187	89		
61VCWF	1005	75			1080	81			1146	86			1156	86		
61VG	1003	75			1078	80			1144	85			1154	86		
61VGWF	966	72			1039	78			1102	82			1111	83		
61VH	924	69			993	74			1053	79			1062	79		
61VHWF	921	69			990	74			1051	78			1060	79		
61VW	960	72			1032	77			1095	82			1104	82		
61VBB	897	67			964	72			1023	76			1031	77		
61VWB	980	73			1053	79			1118	83			1127	84		

90 CRI																
Catalog #	PD610ED010- PDM6A927				PD610ED010- PDM6A930				PD610ED010- PDM6A935				PD610ED010- PDM6A940			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	795	59			853	64			917	68			1017	76		
61VCWF	775	58			831	62			894	67			990	74		
61VG	773	58			829	62			892	67			988	74		
61VGWF	745	56			799	60			859	64			952	71		
61VH	712	53			763	57			821	61			910	68		
61VHWF	710	53			761	57			819	61			908	68		
61VW	740	55			794	59			854	64			946	71		
61VBB	691	52			741	55			797	59			884	66		
61VWB	755	56			810	60			871	65			966	72		

1500 LUMEN

80 CRI																
Catalog #	PD615ED010- PDM6A827				PD615ED010- PDM6A830				PD615ED010- PDM6A835				PD615ED010- PDM6A840			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1417	77			1523	82			1616	87			1630	88		
61VCWF	1380	75			1483	80			1574	85			1587	86		
61VG	1377	74			1480	80			1570	85			1584	86		
61VGWF	1327	72			1426	77			1513	82			1526	82		
61VH	1268	69			1363	74			1446	78			1458	79		
61VHWF	1265	68			1359	73			1442	78			1455	79		
61VW	1318	71			1417	77			1503	81			1516	82		
61VBB	1231	67			1323	72			1404	76			1416	77		
61VWB	1346	73			1446	78			1534	83			1548	84		

90 CRI																
Catalog #	PD615ED010- PDM6A927				PD615ED010- PDM6A930				PD615ED010- PDM6A935				PD615ED010- PDM6A940			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1092	59			1171	63			1260	68			1396	75		
61VCWF	1064	57			1141	62			1227	66			1360	74		
61VG	1061	57			1138	62			1224	66			1357	73		
61VGWF	1022	55			1096	59			1179	64			1307	71		
61VH	977	53			1048	57			1127	61			1249	68		
61VHWF	975	53			1045	57			1124	61			1246	67		
61VW	1016	55			1090	59			1172	63			1299	70		
61VBB	949	51			1018	55			1095	59			1213	66		
61VWB	1037	56			1112	60			1196	65			1326	72		

ES ES = ENERGY STAR® Compliant

T24 T24 = Can be used to comply with California Title 24 Non-Residential

EATON
Powering Business Worldwide

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Project Number: 1730254
Drawn By:EMR Checked By:SHD

ISSUE DATE:
AUGUST 18, 2017
PERMIT SET

REVISION:

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2919 WELBORN STREET, SUITE 101, DALLAS, TEXAS 75219 | 214.522.4033

L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

SHEET NO.
E1.3

JOB NUMBER: 16238

Halo Commercial

PD610/PD615/PD620/PD630
PDM6A
61V

COMPLIANCE TABLE continued

2000 LUMEN

80 CRI																
Catalog #	PD620ED010- PDM6A827				PD620ED010- PDM6A830				PD620ED010- PDM6A835				PD620ED010- PDM6A840			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1724	78			1853	84			1966	89			1983	90		
61VCWF	1679	76			1805	82			1915	87			1931	88		
61VG	1675	76			1801	82			1910	87			1927	88		
61VGWF	1614	73			1735	79			1841	84			1856	84		
61VH	1543	70			1658	75			1759	80			1774	81		
61VHWF	1539	70			1654	75			1755	80			1770	80		
61VW	1604	73			1724	78			1829	83			1845	84		
61VBB	1498	68			1610	73			1708	78			1723	78		
61VWB	1637	74			1759	80			1867	85			1883	86		

90 CRI																
Catalog #	PD620ED010- PDM6A927				PD620ED010- PDM6A930				PD620ED010- PDM6A935				PD620ED010- PDM6A940			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1328	60			1425	65			1532	70			1698	77		
61VCWF	1294	59			1388	63			1493	68			1654	75		
61VG	1291	59			1385	63			1489	68			1651	75		
61VGWF	1244	57			1334	61			1435	65			1590	72		
61VH	1189	54			1275	58			1371	62			1520	69		
61VHWF	1186	54			1272	58			1368	62			1516	69		
61VW	1236	56			1325	60			1426	65			1580	72		
61VBB	1154	52			1238	56			1332	61			1476	67		
61VWB	1262	57			1353	61			1455	66			1613	73		

3000 LUMEN

80 CRI																
Catalog #	PD630D010- PDM6A827				PD630D010- PDM6A830				PD630D010- PDM6A835				PD630D010- PDM6A840			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	2576	72			2768	78			2937	82			2963	83		
61VCWF	2509	70			2697	76			2861	80			2886	81		
61VG	2503	70			2691	75			2855	80			2879	81		
61VGWF	2412	68			2592	73			2750	77			2774	78		
61VH	2305	65			2477	69			2629	74			2651	74		
61VHWF	2299	64			2471	69			2622	73			2645	74		
61VW	2397	67			2576	72			2733	77			2757	77		
61VBB	2238	63			2406	67			2553	72			2575	72		
61VWB	2446	69			2629	74			2790	78			2814	79		

90 CRI																
Catalog #	PD630D010- PDM6A927				PD630D010- PDM6A930				PD630D010- PDM6A935				PD630D010- PDM6A940			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1985	56			2129	60			2290	64			2538	71		
61VCWF	1934	54			2074	58			2231	62			2472	69		
61VG	1929	54			2069	58			2226	62			2466	69		
61VGWF	1859	52			1993	56			2144	60			2376	67		
61VH	1776	50			1905	53			2049	57			2271	64		
61VHWF	1772	50			1900	53			2044	57			2265	63		
61VW	1847	52			1981	55			2131	60			2361	66		
61VBB	1725	48			1850	52			1990	56			2205	62		
61VWB	1885	53			2022	57			2175	61			2410	68		

ES = ENERGY STAR® Compliant

T24 = Can be used to comply with California Title 24 Non-Residential

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Halo Commercial

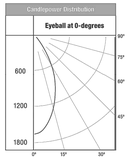
PD610/PD615/PD620/PD630
PDM6A
61V

PHOTOMETRY - 1000 lumen / 80 CRI

PD610ED010- PDM6A835-61VC

Spacing Criteria = 0.76
Lumens per Watt = 97.3 Lm/W
Test No. P137037
Test Model: PD610ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution

Degrees Vertical	Candela
0°	1665
5	1614
10	1469
20	1057
30	609
40	166
50	18
60	3
70	1
80	0
90	0

*CBCP

Luminance

(Average Candela/M²) Degree	Avg. 0° Luminance
45	4791
55	497
65	221
75	191
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	55.1	4	4
7	34	5.2	5.2
8	26	6	6
9	20.6	6.8	6.8
10	16.7	7.6	7.6
12	11.6	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

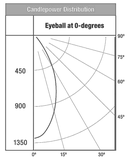
Zone	Lumens	% Fixture
0-30	886	75.3
0-40	1113	94.6
0-60	1175	99.8
0-90	1177	100

PHOTOMETRY - 1000 lumen / 90 CRI

PD610ED010- PDM6A935-61VC

Spacing Criteria = 0.76
Lumens per Watt = 75.8 Lm/W
Test No. P137041
Test Model: PD610ED010- PDM6A935-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution

Degrees Vertical	Candela
0°	1298
5	1258
10	1146
20	824
30	475
40	130
50	14
60	2
70	1
80	0
90	0

*CBCP

Luminance

(Average Candela/M²) Degree	Avg. 0° Luminance
45	3737
55	392
65	182
75	148
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5'	52	4.4	4.4
7'	32.1	5.8	5.8
8'	24.6	6.6	6.6
9'	19.4	7.4	7.4
10'	15.7	8.2	8.2
12'	10.9	10	10

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	691	75.3
0-40	868	94.6
0-60	916	99.8
0-90	917	100

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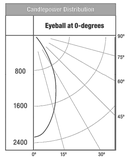
PHOTOMETRY - 1500 lumen / 80 CRI

PD615ED010- PDM6A835-61VC

Spacing Criteria = 0.76
Lumens per Watt = 87.3 Lm/W
Test No. P169938
Test Model: PD615ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution

Degrees Vertical	Candela
0°	2287
5	2216
10	2018
20	1452
30	836
40	228
50	25
60	4
70	1
80	0
90	0

*CBCP

Luminance

(Average Candela/M²) Degree	Avg. 0° Luminance
45	6582
55	688
65	311
75	254
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	75.6	4	4
7	46.7	5.2	5.2
8	35.7	6	6
9	28.2	6.8	6.8
10	22.9	7.6	7.6
12	15.9	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

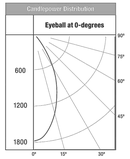
Zone	Lumens	% Fixture
0-30	1217	75.3
0-40	1529	94.6
0-60	1613	99.8
0-90	1616	100

PHOTOMETRY - 1500 lumen / 90 CRI

PD615ED010- PDM6A935-61VC

Spacing Criteria = 0.76
Lumens per Watt = 66.1 Lm/W
Test No. P166942
Test Model: PD615ED010- PDM6A935-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution

Degrees Vertical	Candela
0°	1783
5	1728
10	1573
20	1132
30	652
40	178
50	20
60	3
70	1
80	0
90	0

*CBCP

Luminance

(Average Candela/M²) Degree	Avg. 0° Luminance
45	5132
55	535
65	246
75	191
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	58.9	4	4
7	36.4	5.2	5.2
8	27.9	6	6
9	22	6.8	6.8
10	17.8	7.6	7.6
12	12.4	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	948	75.3
0-40	1192	94.6
0-60	1257	99.8
0-90	1280	100

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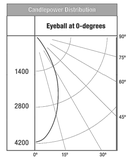
PHOTOMETRY - 3000 lumen / 80 CRI

PD630ED010- PDM6A835-61VC

Spacing Criteria = 0.76
Lumens per Watt = 82.3 Lm/W
Test No. P137053
Test Model: PD630ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution

Degrees Vertical	Candela
0°	4157
5	4028
10	3668
20	2639
30	1520
40	415
50	46
60	6
70	2
80	0
90	0

*CBCP

Luminance

(Average Candela/M²) Degree	Avg. 0° Luminance
45	11970
55	1242
65	558
75	466
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	137.4	4	4
7	84.8	5.2	5.2
8	65	6	6
9	51.3	6.8	6.8
10	41.6	7.6	7.6
12	28.9	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

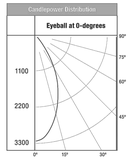
Zone	Lumens	% Fixture
0-30	2212	75.3
0-40	2779	94.6
0-60	2932	99.8
0-90	2937	100

PHOTOMETRY - 3000 lumen / 90 CRI

PD630ED010- PDM6A935-61VC

Spacing Criteria = 0.76
Lumens per Watt = 64.1 Lm/W
Test No. P137057
Test Model: PD630ED010- PDM6A935-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution

Degrees Vertical	Candela
0°	3240
5	3140
10	2859
20	2058
30	1185
40	324
50	36
60	5
70	2
80	0
90	0

*CBCP

Luminance

(Average Candela/M²) Degree	Avg. 0° Luminance
45	9327
55	975
65	441
75	360
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	107.1	4	4
7	66.1	5.2	5.2
8	50.6	6	6
9	40	6.8	6.8
10	32.4	7.6	7.6
12	22.5	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	1724	75.3
0-40	2166	94.6
0-60	2286	99.8
0-90	2290	100

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www.eaton.com/lighting

Halo Commercial

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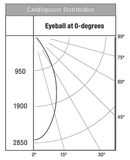
PDM6A
61V

PHOTOMETRY - 2000 lumen / 80 CRI

PD620ED010- PDM6A835-61VC

Spacing Criteria = 0.76
Lumens per Watt = 89.4 Lm/W
Test No. P137021
Test Model: PD620ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution

Degrees Vertical	Candela
0°	2782
5	2696
10	2454
20	1766
30	1017
40	278
50	31
60	4
70	2
80	0
90	0

*CBCP

Luminance

(Average Candela/M²) Degree	Avg. 0° Luminance
45	8009
55	832
65	376
75	318
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	92	4	4
7	56.8	5.2	5.2
8	43.5	6	6
9	34.3	6.8	6.8
10	27.8	7.6	7.6
12	19.3	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

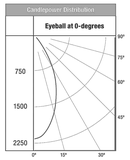
Zone	Lumens	% Fixture
0-30	1480	75.3
0-40	1860	94.6
0-60	1962	99.8
0-90	1966	100

PHOTOMETRY - 2000 lumen / 90 CRI

PD620ED010- PDM6A935-61VC

Spacing Criteria = 0.76
Lumens per Watt = 69.7 Lm/W
Test No. P137025
Test Model: PD620ED010- PDM6A935-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution

Degrees Vertical	Candela
0°	2168
5	2102
10	1913
20	1377
30	793
40	217
50	24
60	3
70	1
80	0
90	0

*CBCP

Luminance

(Average Candela/M²) Degree	Avg. 0° Luminance
45	6241
55	650
65	298
75	233
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	71.7	4	4
7	44.3	5.2	5.2
8	33.9	6	6
9	26.8	6.8	6.8
10	21.7	7.6	7.6
12	15.1	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	1154	75.3
0-40	1450	94.6
0-60	1530	99.8
0-90	1532	100

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ISSUE DATE:
AUGUST 18, 2017
PERMIT SET

REVISION:

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ARCHITECTURE | PLANNING | MAUSOLEUM | CEMETERY | INTERIORS
WWW.JSTARCHITECTS.COM
J. STUART TODD, INC.
2919 WELBORN STREET, SUITE 101, DALLAS, TEXAS 75219 | 214.522.4033

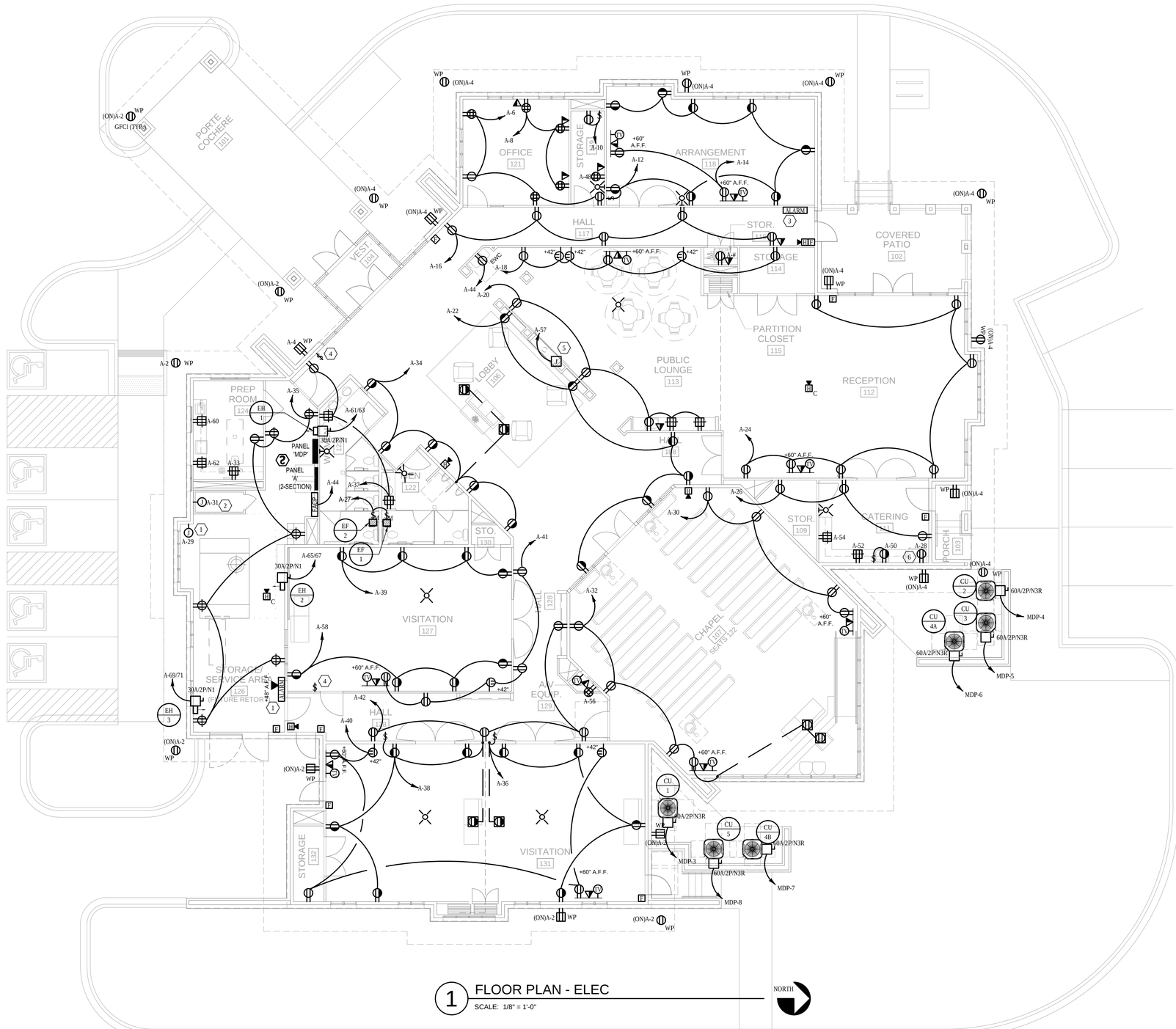
L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

SHEET NO.

E1.4

JOB NUMBER: 16238

JSE
Jordan & Skala Engineers
17855 North Dallas Parkway • Suite 320
Dallas, TX, 75287
p. 469.385.1616 • f. 469.385.1615
Texas Registered Engineering Firm F-4990
Project Number: 1730254
Drawn By: EMR Checked By: SHD



1 FLOOR PLAN - ELEC

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

KEY NOTES: (DESIGNATED BY "⟨#⟩")

1. PROVIDE JUNCTION BOX FOR FUTURE RETORT. COORDINATE ELECTRICAL REQUIREMENTS WITH EQUIPMENT VENDOR PRIOR TO INSTALLATION.
2. PROVIDE JUNCTION BOX FOR MORTUARY CABINET. COORDINATE ELECTRICAL REQUIREMENTS WITH EQUIPMENT VENDOR PRIOR TO INSTALLATION.
3. PROVIDE ALARM PANEL AT THIS LOCATION. COORDINATE ELECTRICAL REQUIREMENTS WITH EQUIPMENT VENDOR PRIOR TO INSTALLATION.
4. CONTROL SWITCHED RECEPTACLES IN THIS ROOM WITH SWITCH ON WALL VIA CONTACTOR IN CEILING.
5. PROVIDE JUNCTION BOX AND DEDICATED CIRCUIT FOR FIREPLACE. COORDINATE ELECTRICAL REQUIREMENTS WITH EQUIPMENT VENDOR PRIOR TO INSTALLATION.
6. CONNECT REFRIGERATOR TO GFCI BREAKER.

ISSUE DATE:

AUGUST 18, 2017
PERMIT SET

REVISION:

STATE OF TEXAS
MARK N. BIGBIE
83876
LICENSED
PROFESSIONAL ENGINEER

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ARCHITECTURE | PLANNING | MAUSOLEUM | CEMETERY | INTERIORS
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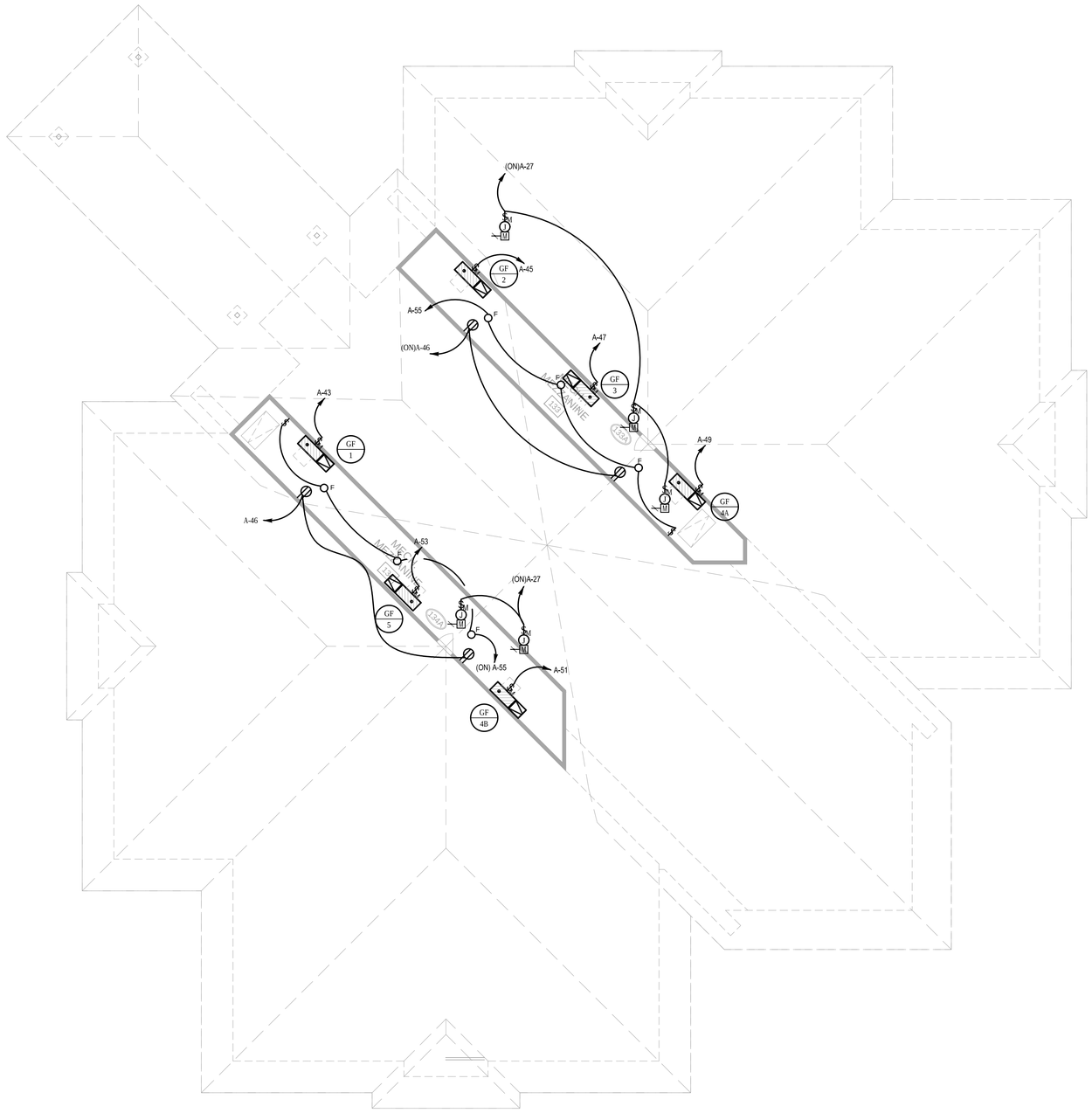
L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

SHEET NO.

E2.0

JOB NUMBER: 16238

JSE
Jordan & Skala Engineers
17855 North Dallas Parkway • Suite 320
Dallas, TX, 75287
p. 469.385.1616 • f. 469.385.1615
Texas Registered Engineering Firm F-4950
Project Number: 1730254
Drawn By:EMR Checked By:SHD



1 MEZZANINE PLAN - ELEC

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

NORTH

ISSUE DATE:

AUGUST 18, 2017
PERMIT SET

REVISION:

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Texas Registered Engineering Firm F-4990

Project Number: 1730254
Drawn By:EMR Checked By:SHD

SHEET NO.

E2.1

JOB NUMBER: 16238

OCCUPANCY SENSOR SCHEDULE

DESCRIPTION	SYMBOL	WATTSTOPPER MODEL NUMBER	UNOBSTRUCTED RATED COVERAGE	MOUNTING	WATTAGE/ VOLTAGE	TIME DELAY	NOTES
PASSIVE INFRARED SWITCH	$PIR	PW–100	300 SF	WALL	800W/120V 1200W/277V	30 MIN.	
PASSIVE INFRARED AREA SENSOR	IR300	WPIR	300 SF	CORNER OF CEILING	24VDC	30 MIN.	1
	IR1000	CX–100	1000 SF	CORNER OF WALL/CEILING	24VDC	30 MIN.	1,2
	IR1200	CI–200	1200 SF	CEILING	24VDC	30 MIN.	1
ULTRASONIC AREA SENSOR	U500 U1000 U2000	UT–305–1 UT–305–2 UT–305–3	500 SF 1000 SF 2000 SF	CEILING	24VDC	30 MIN.	1
	U500L U1000L U2000L	UT–355–1 UT–355–2 UT–355–3	500 SF 1000 SF 2000 SF	CEILING	800W/120V 1200W/277V	30 MIN.	
DUAL TECHNOLOGY AREA SENSOR	DT2000	DT–200	2000 SF	CORNER OF WALL/CEILING	24VDC	30 MIN.	1,2
	DT1000	DT–305	1000 SF	CEILING	24VDC	30 MIN.	1
	DT1000L	DT–355	1000 SF	CEILING	800W/120V 1200W/277V	30 MIN.	

NOTES:
1. SENSOR REQUIRES POWER PACK (INSTALL IN ACCESSIBLE LOCATION)
2. SWIVEL MOUNTING BRACKET INCLUDED.

APPROVED ALTERNATES*: COOPER CONTROLS, PASS & SEYMOUR, LEVITON
* ALTERNATE MANUFACTURER SHALL SUBMIT SHOP DRAWINGS INCLUDING SCALED FLOOR PLANS OF DEVICE LOCATIONS AND CUT SHEETS OF DEVICES.

GENERAL NOTES:

1. ALL EMERGENCY LIGHTS AND EXIT SIGNS SHALL BE CONNECTED TO THE UNSWITCHED PHASE CONDUCTOR OF THE CIRCUIT SERVING THE RESPECTIVE AREA.

KEY NOTES: (DESIGNATED BY "⟨#⟩")

1. ROUTE CIRCUIT THROUGH TIMECLOCK.
2. FIXTURES IN THE DAYLIGHT ZONE SHALL BE CONTROLLED BY DAYLIGHT SENSOR PER 2015 IECC, SECTION C405.2.3.
3. SEE ARCHITECTURAL SHEET A1.3, DETAIL 02 FOR DIMMER STATION INFORMATION.

1 LIGHTING PLAN - ELEC
SCALE: 1/8" = 1'-0"

NORTH

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ISSUE DATE:
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L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

SHEET NO.
E3.0

JOB NUMBER: 16238

HVAC GENERAL NOTES

HVAC GENERAL NOTES:

1. ALL MECHANICAL EQUIPMENT AND INSTALLATIONS SHALL CONFORM WITH THE REQUIREMENTS OF THE 2012 UNIFORM MECHANICAL CODE, THE 2012 INTERNATIONAL BUILDING CODE, THE 2012 INTERNATIONAL ENERGY CONSERVATION CODE, STATE AND LOCAL AMENDMENTS, NFPA 90A, 101, UNDERWRITERS LABORATORIES (OR ETL) AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.
2. THE LOCATIONS, ARRANGEMENT AND EXTENT OF EQUIPMENT, PIPING, SUPPORTS, DEVICES, CONDUIT, AND OTHER APPURTENANCES RELATED TO THE INSTALLATION OF THE MECHANICAL AND ELECTRICAL WORK SHOWN ARE APPROXIMATE. THE DRAWINGS ARE DIAGRAMMATIC. DO NOT SCALE THE DRAWINGS, BUT REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS OF BUILDING COMPONENTS. SHOULD A CONFLICT EXIST BETWEEN THE ARCHITECTURAL AND ENGINEERING DRAWINGS REGARDING DIMENSIONS, SCALE, ETC., NOTIFY THE ARCHITECT IMMEDIATELY.
3. MATERIALS, EQUIPMENT OR LABOR NOT INDICATED, BUT WHICH CAN BE REASONABLY INFERRED TO BE NECESSARY FOR A COMPLETE INSTALLATION SHALL BE PROVIDED. THE DRAWINGS AND SPECIFICATIONS DO NOT UNDERTAKE TO INDICATE EVERY ITEM OF MATERIAL, EQUIPMENT OR LABOR REQUIRED TO PRODUCE A SAFE, COMPLETE AND PROPERLY OPERATING SYSTEM.
4. PRIOR TO PURCHASING ANY MATERIALS OR STARTING ANY WORK, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, DUCTWORK SIZES AND LOCATIONS, EQUIPMENT, ETC. SHOWN ON THE DRAWINGS OR AFFECTING THIS WORK AND SHALL REPORT ANY DEVIATIONS TO THE ARCHITECT.
5. SHOP DRAWINGS SHALL BE SUBMITTED TO AND APPROVED BY THE ARCHITECT PRIOR TO ORDERING, PURCHASING, OR FABRICATING ANY MECHANICAL EQUIPMENT. SHOP DRAWINGS SHALL INCLUDE: ALL EQUIPMENT SCHEDULED OR SPECIFIED ON THE DRAWINGS; DUCTWORK DRAWN TO 1/8" SCALE OR THE SCALE SHOWN ON THE DRAWINGS; REFRIGERANT PIPING AND CONTROL WIRING SCHEMATICS CERTIFIED BY THE AIR CONDITIONING EQUIPMENT MANUFACTURER. FAILURE TO SUBMIT REFRIGERANT PIPING DRAWINGS SHALL BE CAUSE FOR REJECTION OF THE ENTIRE SUBMITTAL. LONG LINE REFRIGERANT PIPING APPLICATIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT SPLIT SYSTEM LONG-LINE APPLICATION GUIDELINE. SHOP DRAWINGS SHALL BE SUBMITTED SIMULTANEOUSLY IN ONE PACKAGE WITH EACH ITEM CLEARLY NOTED BY THE TAG USED ON THE DRAWINGS.
6. ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. ALL MECHANICAL EQUIPMENT AND SYSTEMS SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE BY OWNER.
8. ALL HVAC COMPRESSORS SHALL HAVE EXTENDED 4-YEAR MANUFACTURER'S WARRANTY FOR A 5-YEAR TOTAL WARRANTY.
9. FOR EXACT LOCATION OF OUTDOOR AIR CONDITIONING UNITS, SEE ARCHITECTURAL DRAWINGS.
10. INSTALL GRADE MOUNTED OUTDOOR AIR CONDITIONING EQUIPMENT LEVEL ON 4" THICK REINFORCED CONCRETE EXTENDING 4" BEYOND UNIT PERIMETER. INSTALL GRADE MOUNTED OUTDOOR AIR CONDITIONING EQUIPMENT LEVEL ON 4" THICK REINFORCED CONCRETE EXTENDING 4" BEYOND UNIT PERIMETER.
11. PORTIONS OF DUCTWORK AND PIPE INSULATION VISIBLE THROUGH AIR DISTRIBUTION DEVICES IN FINISHED AREAS SHALL BE PAINTED FLAT BLACK.
12. MOUNT TOP OF THERMOSTATS 46" AFF UNLESS NOTED OTHERWISE. PROVIDE CLEAR LOCKING GUARD ASSEMBLIES FOR ALL PUBLIC AREA THERMOSTATS. COORDINATE THERMOSTAT LOCATIONS WITH OTHER TRADES. ALL THERMOSTATS SHALL BE ADA COMPLIANT.
13. ALL WORK SHALL BE COORDINATED AND PERFORMED WITH PRIOR APPROVAL FROM THE OWNER TO SUIT HIS OPERATING CONDITIONS.
14. ANY EXISTING WALL, FLOOR, OR CEILING SURFACE THAT IS DISTURBED DURING THE COURSE OF THE HVAC WORK SHALL BE REPAIRED TO MATCH NEW AND/OR EXISTING CONDITIONS.
15. CAREFULLY COORDINATE ALL PENETRATIONS THROUGH EXTERIOR WALLS WITH ARCHITECTURAL DRAWINGS AND FINISHES. THE PENETRATIONS SHALL NOT BE LOCATED WHERE THEY WILL CONFLICT WITH ARCHITECTURAL FEATURES, TRANSITIONS IN MATERIALS, OR COLOR CHANGES IN MATERIALS. HORIZONTALLY ALIGN PENETRATIONS WHEREVER POSSIBLE UNLESS NOTED OTHERWISE. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO ANY WORK BEING DONE.
16. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL MECHANICAL EQUIPMENT, DUCTWORK, PIPING, ETC. TO FIT WITHIN THE SPACE ALLOWED BY THE ARCHITECTURAL AND STRUCTURAL CONDITIONS. CUTTING OR OTHERWISE ALTERING ANY STRUCTURAL MEMBERS SHALL NOT BE PERMITTED WITHOUT WRITTEN PERMISSION FROM THE ARCHITECT.
17. FOR ROOF AND ATTIC MOUNTED EQUIPMENT REQUIRING ROUTINE MAINTENANCE, ALLOW FOR AN UNOBSTRUCTED PATH FROM THE ROOF/ATTIC SERVICE ENTRY POINT TO THE EQUIPMENT. THE PATH AREA SHALL BE A MINIMUM OF 6'-0" HIGH BY 3'-0" WIDE
18. REFER TO ARCHITECTURAL PLANS FOR FLOOR AND CEILING ASSEMBLY UL RATINGS AND DETAILS.
19. DUCTWORK AND PIPING SHALL NOT BE INSTALLED IN ELECTRICAL ROOMS, TELECOMM ROOMS, OR ELEVATOR EQUIPMENT ROOMS EXCEPT FOR DUCTWORK AND PIPING SERVING THAT SPECIFIC ROOM. DUCTWORK AND PIPING SHALL NOT BE ROUTED ABOVE ELECTRICAL EQUIPMENT PER THE NATIONAL ELECTRICAL CODE ARTICLE 110.

TESTING, ADJUSTING AND BALANCING

1. AFTER CONSTRUCTION, THE ENTIRE HVAC SYSTEM SHALL BE TESTED, ADJUSTED, AND BALANCED TO DELIVER THE AIR QUANTITIES SHOWN ON THE DRAWINGS. SUBMIT THE CERTIFIED (AABC OR NEBB) TEST AND BALANCE REPORT TO THE ARCHITECT FOR APPROVAL.
2. VENTILATION AIR DISTRIBUTION SYSTEMS (OUTDOOR AIR AND EXHAUST AIR) SHALL BE BALANCED TO ACHIEVE THE AIRFLOW RATES INDICATED ON THE DRAWINGS.
3. THESE AIRFLOW RATES SHALL BE CONSIDERED MINIMUM RATES. THE MEASURED AIR BALANCE TOLERANCE FOR BOTH OUTDOOR AIR AND EXHAUST AIR RATES SHALL BE 0% TO +10%.

MECHANICAL/ELECTRICAL COORDINATION:

1. CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT OR SUBMITTING SHOP DRAWINGS, AND SHALL FURNISH EQUIPMENT WIRED FOR THE VOLTAGES SHOWN THEREIN. SHOP DRAWING SUBMITTALS SHALL CLEARLY STATE THAT THE ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT HAS BEEN COORDINATED WITH THE ELECTRICAL CONTRACT DOCUMENTS AND THE ELECTRICAL CONTRACTOR.
2. ALL MECHANICAL EQUIPMENT REQUIRING ELECTRICAL POWER SHALL BE INSTALLED WITH DISCONNECT SWITCHES AT EACH PIECE OF EQUIPMENT. COORDINATE SWITCH TYPE (FUSED OR NON-FUSED) WITH EQUIPMENT CHARACTERISTICS, MANUFACTURER'S RECOMMENDATIONS AND THE ELECTRICAL DRAWINGS.
3. PROVIDE ALL SYSTEM CONTROLS AND ASSOCIATED CONTROL AND INTERLOCK WIRING FOR COMPLETE AND OPERABLE SYSTEMS. 120 VOLT AND HIGHER WIRING SHALL BE MC CABLE OR IN CONDUIT IN ACCORDANCE WITH LOCAL CODES AND THE MATERIALS AND INSTALLATION REQUIREMENTS OF DIVISION 26 - ELECTRICAL.
4. ALL REQUIRED CONTROL WIRING (INCLUDING POWER WIRING REQUIRED FOR CONTROL PANELS, DEVICES, ETC.) NOT INDICATED ON THE ELECTRICAL DRAWINGS SHALL BE INCLUDED AS PART OF THE MECHANICAL WORK.
5. UNLESS NOTED OTHERWISE, TRANSFORMERS, CONTROLS AND CONTROL WIRING REQUIRED FOR ALL MECHANICAL SYSTEMS SHALL BE FURNISHED WITH THE EQUIPMENT IT SERVES AND INSTALLED BY THE MECHANICAL CONTRACTOR. MOTOR STARTERS FOR HVAC EQUIPMENT SHALL BE FURNISHED WITH THE MOTOR OR APPARATUS WHICH IT OPERATES. MOTOR STARTER INSTALLATION SHALL BE BY THE DIVISION 26 CONTRACTOR.

AIR DISTRIBUTION:

1. SUPPLY, RETURN AND O.A. DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEETMETAL IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS, LATEST EDITION. SNAP-LOCK LONGITUDINAL SEAMS ARE NOT ALLOWED UNLESS SECURED WITH SHEET METAL FASTENING SCREWS AS RECOMMENDED BY SMACNA. ALL JOINTS AND SEAMS IN ALL SHEETMETAL DUCTWORK SHALL BE SEALED WITH DUCT SEALER.
   a. SEAL, INSPECT AND TEST SHEETMETAL DUCTWORK PRIOR TO INSULATING OR CONCEALING. SEAL ALL DUCTWORK TO MEET SMACNA SEAL CLASS A.
   b. SEAL ALL TRANSVERSE JOINT, LONGITUDINAL SEAMS, AND DUCT WALL PENETRATIONS.
   c. PRESSURE-SENSITIVE TAPE SHALL NOT BE USED AS THE PRIMARY SEALANT, UNLESS IT HAS BEEN CERTIFIED TO COMPLY WITH UL-181A OR UL-181B BY AN INDEPENDENT TESTING LABORATORY AND THE TAPE IS USED IN ACCORDANCE WITH THAT CERTIFICATION.
   d. ALL CONNECTIONS SHALL BE SEALED, INCLUDING BUT NOT LIMITED TO SPIN-IN FITTINGS, TAPS, OTHER BRANCH CONNECTIONS, ACCESS DOORS, AND DUCT CONNECTIONS TO EQUIPMENT.
   e. SEALING THAT WOULD VOID PRODUCT LISTINGS IS NOT REQUIRED.
   f. SPIRAL LOCK SEAMS NEED NOT BE SEALED.
2. SUPPLY AND RETURN DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS, LATEST EDITION. ALL JOINTS AND SEAMS IN ALL SHEETMETAL DUCTWORK SHALL BE SEALED WITH DUCT SEALER.
3. EXHAUST DUCTWORK SHALL BE GALVANIZED SHEET METAL CONSTRUCTED TO SMACNA STANDARDS AND SHALL NOT BE INSULATED UNLESS NOTED OTHERWISE.
4. ALL DUCTWORK SHALL BE SUPPORTED BY THE BUILDING STRUCTURE AND SHALL NOT REST ON CEILING TILES OR CEILING STRUCTURE. DUCT SUPPORTS AND ATTACHMENT TO STRUCTURE SHALL BE PER SMACNA STANDARDS.
5. ROUND AND FLEXIBLE SUPPLY AIR DUCTWORK SHALL BE CONNECTED TO MAIN DUCTS WITH A CONICAL TYPE SPIN-IN FITTING WITH MANUAL VOLUME DAMPER (EXCEPT WHERE INSTALLED ABOVE INACCESSIBLE CEILINGS, THE DAMPER SHALL BE OMITTED AND PROVIDED IN THE AIR DEVICE NECK).
6. DUCTWORK DIMENSIONS SHOWN ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.
7. EXTERNAL STATIC PRESSURE (ESP) DOES NOT INCLUDE COIL, CASING OR FILTER PRESSURE DROP.
8. PROVIDE ALL OUTDOOR AIR INTAKES AND EXHAUST OPENINGS WITH MOTORIZED OR GRAVITY DAMPERS IN ACCORDANCE WITH THE LOCAL ENERGY CODE. DAMPERS SHALL CLOSE WHEN THE VENTILATION SYSTEM IS NOT OPERATING.
9. LOCATIONS OF GRILLES, REGISTERS, AND DIFFUSERS SHOWN ON THE DRAWINGS ARE APPROXIMATE. COORDINATE EXACT LOCATIONS WITH LIGHTS, CEILING GRID, ETC. AND ARCHITECTURAL REFLECTED CEILING PLAN.
10. WHERE BALANCING DAMPERS CANNOT BE ACCESSED FROM BELOW THE CEILING, PROVIDE A REMOTE OPERATED DAMPER; YOUNG REGULATOR OR EQUAL.
11. FLEXIBLE DUCT CONNECTORS SHALL BE USED TO CONNECT DUCTWORK AND PLENUMS TO FAN-ROTATING EQUIPMENT; DURODYNE EXCELON OR APPROVED EQUAL. FLEXIBLE CONNECTORS EXPOSED TO THE WEATHER SHALL BE UV AND OZONE RESISTANT. FABRICS, COATING AND ADHESIVES SHALL BE TESTED IN ACCORDANCE WITH UL 701 AND HAVE A FLAME SPREAD/ SMOKE DEVELOPED RATING OF 25/50.

PIPING:

1. REFRIGERANT CIRCUIT ACCESS PORTS LOCATED OUTDOORS SHALL BE FITTED WITH LOCKING-TYPE TAMPER-RESISTANT CAPS.
2. CONDENSATE FROM ALL AIR CONDITIONING EQUIPMENT SHALL BE TRAPPED AND ROUTED TO THE NEAREST PLUMBING DRAIN OR TO EXTERIOR DRY WELLS. CONDENSATE PIPING SHALL BE TYPE M COPPER OR SCHEDULE 40 PVC (IN HVAC PLENUMS USE INSULATED TYPE M COPPER). CONDENSATE SHALL BE PUMPED AS REQUIRED. PVC EXPOSED TO THE WEATHER SHALL BE PAINTED WITH A LIGHT COLORED ACRYLIC OR LATEX ULTRAVIOLET (UV) AND OZONE INHIBITOR PAINT THAT IS CHEMICALLY COMPATIBLE WITH PVC.

SMOKE DETECTORS:

1. ALL FANS SUPPLYING MORE THAN 2000 CFM OF AIR TO ANY SPACE SHALL BE INSTALLED WITH A SMOKE DETECTOR IN THE SUPPLY DUCTWORK. DUCT SMOKE DETECTORS SHALL BE INSTALLED IN THE RETURN AIR PATH OF AIR DISTRIBUTION SYSTEMS UTILIZING A COMMON SUPPLY AND/OR RETURN AIR PLENUM WITH A COMBINED DESIGN CAPACITY GREATER THAN 2000 CFM.
2. THE SMOKE DETECTOR SHALL BE WIRED TO STOP THE FAN UPON DETECTION OF SMOKE, AND SIGNAL THE BUILDING FIRE ALARM CONTROL PANEL. THE SMOKE DETECTOR SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR, MOUNTED IN THE DUCT BY THE MECHANICAL CONTRACTOR, AND WIRED BY THE ELECTRICAL CONTRACTOR.

INSULATION:

1. DUCT INSULATION:
   a. DUCT WRAP SHALL BE UL LISTED FIBERGLASS BLANKET INSULATION WITH FOIL VAPOR BARRIER, JOHNS MANVILLE MICROLITE EQ FSK OR APPROVED EQUAL. PUNCTURES AND TEARS IN THE FOIL JACKET SHALL BE PATCHED WITH FOIL TAPE TO MAINTAIN THE INTEGRITY OF THE VAPOR BARRIER. INSULATE SHEET METAL DUCTWORK IN THE THICKNESSES AND DENSITIES AS LISTED BELOW:
      i. SHEET METAL SUPPLY AND OUTSIDE AIR DUCTWORK: 2" THICK, 1 LB/FT3 DENSITY, R-6 MINIMUM INSTALLED.
      ii. SHEET METAL RETURN DUCTWORK IN NON-AIR CONDITIONED AREAS (SUCH AS INTERSTITIAL SPACES AND FLOOR/CEILING ASSEMBLIES): 2" THICK, 1 LB/FT3 DENSITY, R-6 MINIMUM INSTALLED.
      iii. ALL SHEET METAL DUCTWORK LOCATED OUTSIDE OF THE THERMAL ENVELOPE OF THE BUILDING (INCLUDING CRAWL SPACES AND ATTIC SPACES): 3" THICK, ¾" LB/FT3 DENSITY, R-8 MINIMUM INSTALLED.
   b. KITCHEN HOOD EXHAUST DUCTWORK SHALL BE INSULATED, WHERE REQUIRED, PER NFPA 96 AND LOCAL CODE REQUIREMENTS. KITCHEN HOOD SUPPLY DUCTWORK SHALL BE INSULATED AS SPECIFIED FOR HVAC SUPPLY DUCTWORK. EXPOSED DUCT WRAP INSULATION SYSTEMS SHALL BE PROTECTED WHERE SUBJECT TO PHYSICAL DAMAGE.
   c. DUCT LINER FOR ACOUSTICS: LINE ALL SHEETMETAL DUCTWORK A MINIMUM OF 15'_0" (OR AS INDICATED) UPSTREAM AND DOWNSTREAM OF ALL AIR HANDLING UNITS. DUCT LINER FOR RECTANGULAR DUCTS SHALL BE 1½" THICK, (MINIMUM R-6 OR GREATER WHERE REQUIRED BY APPLICABLE ENERGY CODE), JOHNS MANVILLE LINACOUSTIC RC OR EQUAL. THE LEADING EDGE OF THE DUCT LINER SHALL HAVE A SHEETMETAL NOSING. LINED DUCTWORK DOES NOT REQUIRE ADDITIONAL EXTERIOR INSULATION WHERE LINER MEETS REQUIRED R-VALUES.
   d. DUCTWORK SERVING SMOKEPROOF ENCLOSURES SHALL BE WRAPPED USING A U.L. LISTED AND APPROVED 2-HOUR RATED FIRE WRAP INSULATING SYSTEM OR ENCLOSED IN AN APPROVED ASSEMBLY. [DESIGNER NOTE: COORDINATE WITH THE ARCHITECT. RE: 2012 IBC 909.20.6.1]
2. PIPE INSULATION:
   a. REFRIGERANT SUCTION PIPING INSULATION SHALL BE FLEXIBLE ELASTOMERIC TUBING, AP/ARMAFLEX PIPE INSULATION WITH REINFORCED LAP SEAL AS MANUFACTURED BY ARMACELL OR EQUAL. INSULATION THICKNESS SHALL BE PER SPECIFICATION 23 23 00. INSULATION SHALL BE SLID OVER PIPING FROM ONE END BEFORE PIPE ENDS ARE JOINED AND SHALL NOT BE SLIT OR CUT. ALL JOINTS AND SEAMS SHALL BE SEALED WEATHER-TIGHT. FINISH COAT FOR FLEXIBLE ELASTOMERIC INSULATION INSTALLED OUTDOORS SHALL BE WATER-BASED LATEX ENAMEL DESIGNED FOR USE OVER ALL FORMS OF FLEXIBLE ELASTOMERIC INSULATION. FINISH COAT SHALL PROVIDE A PROTECTIVE FINISH SUITABLE TO BOTH INDOOR AND OUTDOOR APPLICATIONS, FORMULATED FOR COLD WEATHER FLEXIBILITY TO RESIST CRACKING AND WEATHER-RESISTANT TO ULTRAVIOLET (UV) AND OZONE. COATING SHALL BE ARMAFLEX WB FINISH OR EQUIVALENT.
   b. INSULATE ALL CONDENSATE DRAIN PIPING AND FITTINGS WITHIN THE BUILDING'S THERMAL ENVELOPE WITH SECTIONAL PREFORMED FIBERGLASS PIPE INSULATION WITH VAPOR BARRIER JACKET; JOHNS MANVILLE MICRO-LOK OR APPROVED EQUAL. THICKNESS SHALL BE MANUFACTURER'S RECOMMENDED THICKNESS TO PREVENT CONDENSATION ON THE EXTERIOR OF THE JACKET; MINIMUM THICKNESS SHALL BE ½" FOR PIPE SIZES UP TO 1¼" AND 1" THICKNESS FOR PIPE SIZES 1½" AND LARGER.

GAS FLUES (U.L. LISTED):

1. GAS FLUE MATERIAL SHALL BE AS FLUE MATERIAL SHALL BE AS RECOMMENDED BY THE HEATING APPLIANCE MANUFACTURER EXCEPT THAT WHERE VINYL CHLORIDE (PVC) IS ALLOWABLE FOR CATEGORY II AND IV APPLIANCES, PROVIDE A UL TESTED AND LISTED POLYPROPYLENE (PP) GAS VENTING SYSTEM; POLYFLUE, POLYPRO, INNOFLUE OR APPROVED EQUAL. PVC IS ACCEPTABLE FOR COMBUSTION AIR PIPING. CERTAIN APPLIANCES MAY REQUIRE AL29-4C VENTING MATERIAL IN CONFORMANCE WITH UL 1738.
2. SIZING AND ROUTING RESTRICTIONS SHALL BE PER MANUFACTURER'S REQUIREMENTS.
3. TERMINATE ALL GLASS FLUE PIPING TO THE OUTDOORS THROUGH ROOF OR EXTERIOR WALL. TERMINATION SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS AND FLASHED AND SEALED WEATHERTIGHT.

LEGEND

SYMBOL	DESCRIPTION	ABBREVIATIONS	SYMBOL	DESCRIPTION	ABBREVIATIONS
	CEILING DIFFUSER W/FLEX DUCT	CD	---	OUTSIDE AIR	OA
	CEILING RETURN GRILLE W/FLEX DUCT	RAG	---	RETURN AIR	RA
	SIDEWALL SUPPLY AIR GRILLE	S. REG	---	SUPPLY AIR	SA
	SIDEWALL RETURN AIR GRILLE	RAG	---	ABOVE FINISHED FLOOR	AFF
	MANUFACTURER	MFG	---	EXTERNAL STATIC PRESSURE (IN W.C.)	ESP
	EXHAUST FAN	EF-__	---	DRY BULB	DB
T S	THERMOSTAT / SENSOR	T-STAT	---	WET BULB	WB
	EQUIPMENT DESIGNATION	---	---	ENTERING AIR TEMPERATURE	EAT
	CONNECT NEW TO EXISTING	---	---	LEAVING AIR TEMPERATURE	LAT
	FIRE SMOKE DAMPER	FSD	A 200 14x6	14x6 TYPE 'A' AIR DISTRIBUTION DEVICE TAG, BALANCED TO 200 CFM	---
	SMOKE DETECTOR	SD	---	CONDENSATE	CD
	MANUAL VOLUME DAMPER	MVD	---	CONSTRUCTION PROJECT MANAGER	CPM

MECH/ELEC COORDINATION

THE MECHANICAL CONTRACTOR SHALL COORDINATE THE ELECTRICAL CHARACTERISTICS OF ALL HVAC EQUIPMENT (VOLTAGE, PHASE, MCA, MOCP, ETC.) WITH THE ELECTRICAL CONTRACTOR AND THE ELECTRICAL PLANS PRIOR TO SUBMITTING OR ORDERING ANY MECHANICAL EQUIPMENT. ANY SUBSEQUENT MISMATCH BETWEEN THE MECHANICAL EQUIPMENT ELECTRICAL REQUIREMENTS AND THE ELECTRICAL SERVICE, AS DESIGNED AND PROVIDED, SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR WITH NO ADDITIONS TO THE CONTRACT.

MECHANICAL/ELECTRICAL COORDINATION STATEMENTS REQUIRED BY HVAC GENERAL NOTES [AND SPECIFICATION SECTION 230000 , PARAGRAPH 1.06.E] SHALL BE INCLUDED WITH HVAC EQUIPMENT SUBMITTALS/SHOP DRAWINGS.

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NOVI, MI

SHEET NO.
M0.1

JOB NUMBER: 16238

OUTSIDE AIR CALCULATION

HVAC SYSTEM	SPACE SERVED	OCCUPANCY CLASSIFCATION	OCCUPANCY SUBCLASSIFICATION	ESTIMATED MAXIMUM OCCUPANT LOAD (PERSONS/ 1000 SF)	AREA (SQ. FT.)	OUTDOOR AIR REQUIREMENTS		OUTDOOR AIR CALCULATED	ASHRAE 62.1 REQUIRED OUTSIDE AIR	OUTSIDE AIR PROVIDED
						CFM/SQ.FT.	CFM/PERSON			
GF - 1	LOBBY 106	OFFICES	MAIN ENTRY LOBBIES	13	1333	0.06	5	145	181	190
	VESTIBULE 104	PUBLIC SPACES	CORRIDORS	0	91	0.06	0	5	7	20
									TOTAL OA:	210
GF - 2	OFFICE 121	OFFICES	OFFICE SPACE	2	306	0.06	5	28	35	40
	STORAGE 119	RETAIL STORES	STORAGE ROOMS	0	82	0.12	0	10	12	15
	HALL 117	PUBLIC SPACES	CORRIDORS	0	361	0.06	0	22	27	30
	ARRANGEMENT	OFFICES	OFFICE SPACE	4	604	0.06	5	56	70	75
									TOTAL OA:	160
GF - 3	PUBLIC SPACES 113	OFFICES	MAIN ENTRY LOBBIES	8	767	0.06	5	86	108	110
	STORAGE 114	RETAIL STORES	STORAGE ROOMS	0	82	0.12	0	10	12	15
	RECEPTION 112	OFFICES	RECEPTION AREA	32	1057	0.06	5	223	279	280
	STORAGE 109	RETAIL STORES	STORAGE ROOMS	0	67	0.12	0	8	10	10
	CATERING 111	OFFICES	OFFICE SPACE	1	243	0.06	5	20	24	30
									TOTAL OA:	445
GF - 4A / GF - 4B	CHAPEL 107	PUBLIC SPACE	PLACES OF RELIGIOUS WORSHIP	122	1505	0.06	5	700	875	875
									TOTAL OA:	875
GF - 5	VISITATION 127	OFFICES	RECEPTION AREA	22	730	0.06	5	154	192	195
	VISITATION 131	OFFICES	RECPETION AREA	35	1161	0.06	5	245	306	310
	STORAGE 132	GENERAL	STORAGE ROOMS	0	72	0.06	0	4	5	5
	HALL 128	GENERAL	CORRIDOR	0	536	0.06	0	32	40	40
									TOTAL OA:	550

NOTES (APPLY TO ALL):
A. OCCUPANT COUNT BASED ON FURNITURE/ ARCHITECTURAL COUNTS AND OCCUPANT LOAD PER SQUARE FOOT (RETAIL SPACE)
B. OUTSIDE AIR BASED ON 2012 INTERNATIONAL MECHANICAL CODE CHAPTER 4 SECTION 403.3

ELECTRIC HEATERS

TAG	SERIES	TYPE	MOUNTING	CAPACITY (KW)	MOUNTING HEIGHT AFF	APPROX. WEIGHT (LBs)	ACCESSORIES
EH - 1	AFA	WALL HEATER	SURFACE	2.0	12"	30	1, 2, 3, 4
EH - 2	AFA	WALL HEATER	SURFACE	3.0	12"	30	1, 2, 3, 4
EH - 3	AFA	WALL HEATER	SURFACE	4.0	12"	30	1, 2, 3, 4

NOTES:
A. ALL HEATERS SHALL BE UL LISTED
B. CAPACITY SCHEDULED IS AT INSTALLED VOLTAGE. COORDINATE WITH ELECTRICAL DWGS.
C. ALL HEATERS SHALL HAVE THERMAL OVERLOAD PROTECTION
D. STAIRWELL AND SPRINKLER RISER ROOM HEATERS - THERMOSTAT SETPOINT SHALL BE 45°F.

ACCESSORIES:
1. INTEGRAL TAMPERPROOF THERMOSTAT
2. INTEGRAL DISCONNECT SWITCH
3. SURFACE MOUNTING KIT
4. COMPLETE INSTALLATION TO INCLUDE ALL SPLICES, END CAPS, MOUNTING HARDWARE, ETC.

SELECTIONS BASED ON PRODUCTS BY RAYWALL
EQUAL PRODUCTS BY MARKEL, BERKO, QMARK

SPLIT SYSTEM 100% OA HEAT RECOVERY SYSTEM

TAG	MODEL No.		TONS	OUTDOOR AIR CFM	TOTAL CFM	EDH-1 HEATING (KW) (OUTPUT)	EDH-2 HEATING (KW) (OUTPUT)	SUPPLY & RETURN ESP	SUPPLY & RETURN FAN HP	DX COIL AREA	ACCESSORIES
	AH	CU									
AH/CU-6	G2-5	24ANA724	2.0	600/300/0	600/300/0	9.0	9.0	0.7"	3/4	3.28 SF	1 THROUGH 14

NOTES
A. SYSTEM INCLUDES HEAT EXCHANGER, TWO ELECTRIC HEAT COILS, HEAT EXCHANGER, AND DAMPERS.
B. COORDINATE PROPER SERVICE ACCESS SIDE.
C. ROUTE INDOOR UNIT CONDENSATE TO FLOOR DRAIN PER PLANS AND DETAILS. PROVIDE SECONDARY DRAIN PAN UNDER DX COIL WITH FLOAT SWITCH.
D. MECHANICAL CONTRACTOR TO REVIEW INSTALLATION MANUAL PRIOR TO CONSTRUCTION AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

ACCESSORIES:
1. MANUFACTURER'S CONTROL/THERMOSTAT PANEL WITH ALL REQUIRED DAMPER, COIL, HEATER, AND CONDENSER INTERLOCKS.
2. INDOOR UNIT TO BE COMPLETE SYSTEM WITH DX COIL, ELECTRIC HEAT COILS, FANS, HEAT EXCHANGER, FILTER SECTIONS, AND RECIRCULATING SECTION.
3. UNIT SHALL BE COMPATIBLE WITH PURON REFRIGERANT, AS REQUIRED.
4. AIR HANDLING UNIT / CONDENSING UNIT INTERLOCK.
5. FAN SPEED CONTROLLER SHALL ALLOW FOR HI-LOW-OFF OPERATION.
6. INDOOR UNIT TO HAVE FACTORY MOUNTED (TXV) THERMAL EXPANSION VALVE IF REQUIRED TO MEET EER.
7. MOTORIZED DAMPERS AS SHOWN IN DETAIL.
8. EXTERNAL REFRIGERANT FILTER DRYER AT OUTDOOR CONDENSING UNIT.
9. DISCONNECT SWITCH FOR OUTDOOR UNIT BY DIVISION 16. DISCONNECT FOR INDOOR UNIT AND HEATERS BY DIVISION 15.
10. ELECTRIC DUCT HEATERS TO HAVE FUSED DOOR INTERLOCK DISCONNECTS, AIR FLOW SWITCHES, CONTROL TRANSFORMERS, QUIET ACTING CONTACTORS, AND DISCHARGE TEMPERATURE SENSORS. EACH HEATER TO HAVE 3 STAGE HEATING.
11. VIBRATION ISOLATION SUPPORT FOR SUSPENDED INDOOR UNIT, HEATERS, AND DX COIL.
12. DX COIL TO HAVE A 56DB/55WB LEAVING AIR TEMPERATURE.
13. CONDENSER TO HAVE FREEZESTAT, TIME DELAY RELAY, 2 SPEED CONTROLS, HI/LO PRESSURE SWITCHES, LOW AMBIENT CONTROLS, LOUVERED GRILLES.
14. COORDINATE CONTROL PANEL LOCATION WITH ARCHITECT.

CONTACT DUNCAN STUART TODD (1-720-583-1886) FOR THE INDOOR AIR HANDLER/HEAT EXCHANGER.
SELECTIONS ARE BASED ON PRODUCTS BY: CARRIER (CU) AND DUNCAN STEWART TODD (AH).
EQUAL PRODUCTS: TRANE AND LENNOX (OUTDOOR UNIT ONLY). THERE ARE NO EQUALS FOR THE INDOOR UNIT.

SPLIT SYSTEM COOLING UNITS (NATURAL GAS HEAT)

TAG	MODEL NUMBER GAS FURNACE/COOLING COIL/CONDENSING UNIT	FURNACE						CAPACITY				SEER	AFUE	APPROX. WEIGHT (GF/CU) (LBS)	ACCESSORIES
		TYPE	TOTAL CFM	OA SOURCE	OA CFM	MAX FAN HP	ESP (IN WC)	TOTAL COOLING (MBH)	SENSIBLE COOLING (MBH)	HEATING INPUT (MBH)	HEATING OUTPUT (MBH)				
GF/CU-1	EL296UH090XV48C / CH33-48C-2F / XC16S048-230	H	1645	M	280	0.75	0.7	50	36	88	85	15.5	96	163/268	1,2,3,4,5,6,7,8,9,10,11,12,13
GF/CU-2	EL296UH090XV48C / CH33-48C-2F / XC16S048-230	H	1145	M	200	0.75	0.7	50	26	88	85	15.5	96	163/268	1,2,3,4,5,6,7,8,9,10,11,12,13
GF/CU-3	EL296UH090XV60C / CH33-50/60C-2F / XC16S060-230	H	2010	M	600	1.00	0.5	65	45	88	85	15	96	164/332	1,2,3,4,5,6,7,8,9,10,11,12,13, 14
GF/CU-4A	EL296UH090XV60C / CH33-50/60C-2F / XC16S060-230	H	1860	M	575	1.00	0.6	63	43	88	85	15	96	164/332	1,2,3,4,5,6,7,8,9,10,11,12,13, 14
GF/CU-4B	EL296UH090XV60C / CH33-50/60C-2F / XC16S060-230	H	1860	M	575	1.00	0.6	63	43	88	85	15	96	164/332	1,2,3,4,5,6,7,8,9,10,11,12,13, 14
GF/CU-5	EL296UH090XV60C / CH33-50/60C-2F / XC16S060-230	H	2010	M	600	1.00	0.5	65	45	88	85	15	96	164/332	1,2,3,4,5,6,7,8,9,10,11,12,13, 14

NOTES (APPLY TO ALL UNITS):
A. COOLING CAPACITIES ARE BASED ON AN INDOOR EAT OF 80°F DB/67°F WB AND 90°F DB ENTERING OUTDOOR UNIT.
B. 14 SEER MINIMUM UNITS WITH R-410A. SUBMIT AHRI CERTIFIED CAPACITIES FOR ACTUAL EQUIPMENT TO BE INSTALLED.
C. ESP DOES NOT INCLUDE COIL, FILTER, CASING AND ACCESSORY LOSSES.
D. REFER TO HVAC GENERAL NOTES AND DETAILS FOR ADDITIONAL INFORMATION.
E. ADJUST MOTOR SPEED TAP IN FIELD TO PROVIDE TOTAL CFM LISTED FOR EACH AIR HANDLER.
F. INDOOR AND OUTDOOR UNITS SHALL BE INSTALLED PER PLANS, MANUFACTURER'S RECOMMENDATIONS AND LOCAL CODE REQUIREMENTS.
G. SEE PLANS FOR FURNACE ORIENTATION.
H. FOR LONG LINE APPLICATIONS, PROVIDE ACCESSORIES AS RECOMMENDED BY THE MANUFACTURER.

TYPE:	OA SOURCE:
H - HORIZONTAL	M - MECHANICAL

ACCESSORIES (THIS LIST IS NOT ALL INCLUSIVE. IN ADDITION, PROVIDE MANUFACTURER RECOMMEND ACCESSORIES FOR SAFE AND PROPER OPERATION):
1. 7-DAY PROGRAMMABLE THERMOSTAT; AUTO CHANGEOVER WITH COMPRESSOR ANTI-RECYCLE PROTECTION
2. DISCONNECT FURNISHED BY MECHANICAL
3. EVAPORATOR COIL WITH COIL ADAPTER KIT AND THERMAL EXPANSION VALVE TO ACHIEVE 14 SEER RATING (IF REQUIRED)
4. REFRIGERANT FILTER DRIER (LOCATE PER MANUFACTURER'S RECOMMENDATION)
5. SAF-T-SWITCH INSTALLED IN SECONDARY CONDENSATE DRAIN FOR OVERFLOW PROTECTION OR ROUTE FULL SIZE OUTLET CONNECTION THRU CEILING WITH ESCUTCHEON.
6. HARD START KIT
7. CRANKCASE HEATER
8. CONDENSATE NEUTRALIZER KIT
9. POLYPROPYLENE (POLYFLUE) FLUE ROUTED PER MANUFACTURING RECOMMENDATION.
10. EVAPORATOR FREEZE PROTECTION KIT
11. FILTER TRACK WITH 1" THICK DISPOSABLE MERV 6 FILTER
12. LOW AMBIENT OPERATION TO 0°F.
13. FILTER TRACK WITH MERV 8 DURING CONSTRUCTION AND MERV 6 PRIOR TO PROJECT TURNOVER TO THE OWNER
14. 5 TON UNITS WILL REQUIRE ENTHALPY BASED ECONOMIZERS FOR CONTROL.

SELECTIONS BASED ON PRODUCTS BY LENNOX
EQUAL PRODUCTS BY CARRIER, GOODMAN, BRYANT, TRANE, YORK, RHEEM

GRILLE, REGISTERS & DIFFUSERS

TAG	SERIES	CFM	DUTY	NECK SIZE	FACE SIZE	DAMPER	MATERIAL	TYPE	NOTES/ACCESSORIES
A	TMS	SEE DWGS	SUPPLY	SEE DWGS	24X24	YES	STEEL	SQUARE CONE CEILING DIFFUSER	1, 2
B	TMS	SEE DWGS	SUPPLY	SEE DWGS	12X12	YES	STEEL	SQUARE CONE CEILING DIFFUSER	1, 2
C	300RS	SEE DWGS	SUPPLY	SEE DWGS	30X6	YES	ALUMINUM	1/2 x 1/2 x 1/2 CORE	1, 2
D	350RL	SEE DWGS	RETURN	SEE DWGS	24X20	YES	ALUMINUM	LINEAR SLOT RETURN	1, 2
E	50F	SEE DWGS	RETURN	SEE DWGS	12X24	YES	STEEL		1, 2
F	50F	SEE DWGS	RETURN	SEE DWGS	22X24	YES	STEEL		1, 2
G	MLT-TZ	SEE DWGS	SUPPLY	SEE DWGS	48"	YES	STEEL	LINEAR SLOT	1, 2
H	TDCA	SEE DWGS	SUPPLY	SEE DWGS	24X24	YES	ALUMINUM	HIGH CAPACITY DIFFUSER	1,2
L	355FL	SEE DWGS	EXHAUST	SEE DWGS	SEE DWGS	YES	ALUMINUM	LOUVERED EXHAUST GRILLE	1,2

NOTES (APPLY TO ALL DEVICES):
1. REFER TO ARCHITECTURAL DRAWINGS FOR TYPE OF CEILING, SUSPENSION SYSTEM AND FINISHES WHERE DEVICE WILL BE MOUNTED. FRAME AND BORDER TYPE SHALL BE COMPATIBLE WITH ADJACENT SURFACES AND FINISHES.
2. FINISH SHALL BE MANUFACTURER'S STANDARD. REFER TO ACCESSORIES/NOTES FOR CUSTOM FINISHES, IF ANY. SUBMIT COLOR CHART WITH SHOP DRAWINGS.
3. WHEN A DAMPER IS CALLED FOR ABOVE AND THE DEVICE IS TO BE MOUNTED IN AN INACCESSIBLE CEILING, EITHER A FACE ADJUSTABLE OR REMOTE CABLE OPERATED BALANCING DAMPER SHALL BE INCLUDED.

ACCESSORIES:
1. MOLDED INSULATION (R-6) BLANKET ON BACK PAN
2. BALANCING DAMPER IN INLET FOR AIR DEVICES IN INACCESSIBLE CEILINGS.

SELECTIONS ARE BASED ON PRODUCTS BY: TITUS.
EQUAL PRODUCTS: KRUEGER, CARNES, ANEMOSTAT, TUTTLE & BAILEY, PRICE, METALAIRE.

RELIEF & INTAKE HOODS

TAG	MODEL No.	SIZE WxLxH	CFM	THROAT SIZE DIA.	IN. W.C. PRES. DROP	OPERATOR	FRAME	ACCESSORIES
RH-1	GRSR-16	30x30x10	600	16"Ø	0.04"	ELECTRIC	ALUMINUM	1,2,3
IH-1	GRSI-16	30x30x10	600	16"Ø	0.04"	GRAVITY	ALUMINUM	1,3

NOTES:
A. FINAL COLOR SELECTION SHALL BE MADE BY ARCHITECT AT TIME OF SHOP DRAWING APPROVAL. SUBMIT COLOR CHART WITH SHOP DRAWINGS.

ACCESSORIES:
1. BIRD SCREEN, CURB SEAL, HOOD INSULATION, DUCT TRANSITION, AND 12" CURB.
2. INTERLOCK MOTORIZED DAMPER PER DETAILS.
3. MOUNT ON BACK SIDE OF RIDGE.

SELECTION BASED ON GREENHECK.

FANS

TAG	MODEL	DUTY	CFM	ESP (IN. WG)	MOTOR SIZE (HP)	RPM	DRIVE	WEIGHT (Lb)	ACCESSORIES
EF-1	SP-A150	TOILET ROOM	336	0.375	1/4	1070	DIRECT	31	1,2,3,4
EF-2	SP-A150	TOILET ROOM	336	0.375	1/4	1070	DIRECT	31	1,2,3,4

ACCESSORIES:
1. GRAVITY BACKDRAFT DAMPER
2. SPEED CONTROLLER
3. DISCONNECT SWITCH
4. TO BE INTERLOCKED WITH RR LIGHTS

SELECTIONS ARE BASED ON PRODUCTS BY: GREENHECK
EQUAL PRODUCTS: PENN, CARNES, COOK

ISSUE DATE:
AUGUST 18, 2017
PERMIT SET

REVISION:

ANDREW H. SMITH ENGINEER No. 6201054517 LICENSED PROFESSIONAL ENGINEER
8-18-17

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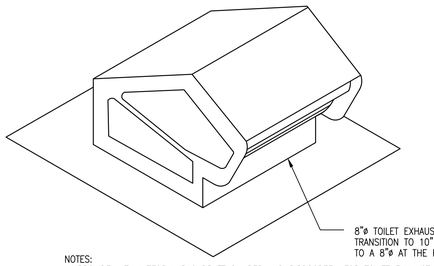
Project Number 1730254
Drawn By:DW Checked By:JM

SHEET NO.
M0.2

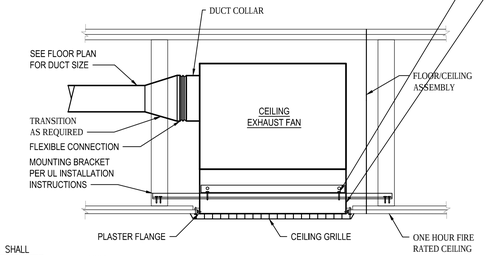
JOB NUMBER: 16238



NOTES:
1. PROVIDE WITH INTEGRAL BACKDRAFT DAMPER AND BIRDSCREEN FOR TOILET EXHAUST.
2. ROOF CAP BY BROAN (634), OR APPROVED EQUAL.
3. PROVIDE CAP WITH PAINT GRIP COATING FOR FIELD PAINTING.
4. COORDINATE INSTALLATION WITH ROOFING CONTRACTOR.
5. PROVIDE 10" SQUARE ADAPTER.

TOILET EXHAUST ROOF CAP DETAIL

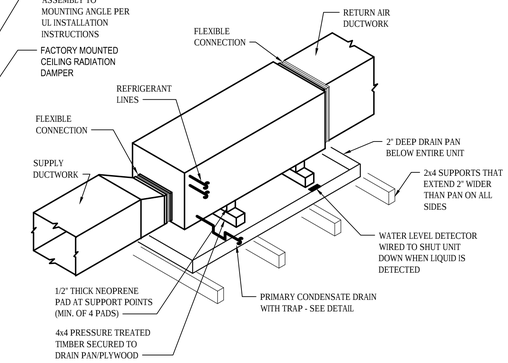
SCHEMATIC – NO SCALE



NOTES:
1. INSTALLATION SHALL BE IN STRICT COMPLIANCE WITH UL OR OTHER CERTIFICATION AGENCY'S INSTALLATION INSTRUCTIONS. SUBMIT INSTALLATION INSTRUCTIONS WITH SHOP DRAWINGS.
2. AT THE CONTRACTOR'S OPTION, THE CRD MAY BE SHIPPED LOOSE FOR FIELD INSTALLATION.
3. MOUNT THE CEILING GRILLE TO THE UNDERSIDE OF THE CRD USING THE HARDWARE FURNISHED WITH THE FAN.

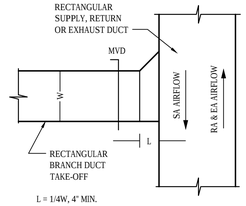
CEILING EXHAUST FAN WITH CRD DETAIL

NOT TO SCALE



HORIZONTAL AIR HANDLER (ATTIC) MOUNTING DETAIL

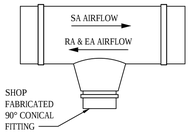
NOT TO SCALE



NOTE:
1. APPLIES TO COMMERCIAL SPACES AND MULTIFAMILY AMENITY AND COMMON SPACES.

LOW PRESSURE BRANCH DUCT TAKE-OFF (RECTANGULAR 45° ENTRY)

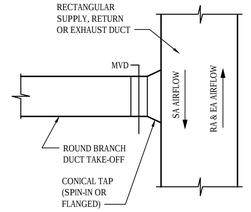
NOT TO SCALE



NOTE:
1. ACCEPTABLE ALTERNATES ARE CONICAL TAPS AND CONICAL SADDLE TAPS PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

LOW PRESSURE BRANCH DUCT TAKE-OFF (ALTERNATIVE ROUND 90° BRANCH)

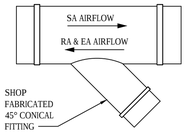
NOT TO SCALE



NOTE:
1. APPLIES TO COMMERCIAL SPACES AND MULTIFAMILY AMENITY AND COMMON SPACES.

LOW PRESSURE BRANCH DUCT TAKE-OFF (ROUND BRANCH ENTRY)

NOT TO SCALE

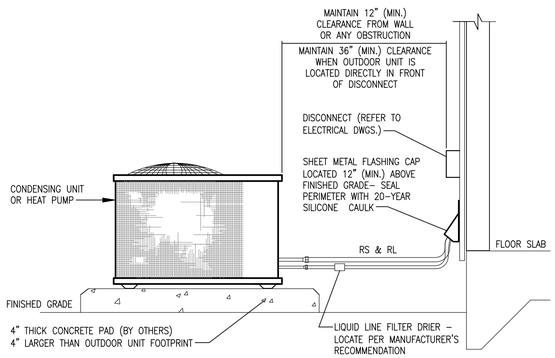


NOTE:
1. ACCEPTABLE ALTERNATES ARE CONICAL TAPS AND CONICAL SADDLE TAPS PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

LOW PRESSURE BRANCH DUCT TAKE-OFF (ALTERNATIVE ROUND 45° BRANCH)

NOT TO SCALE

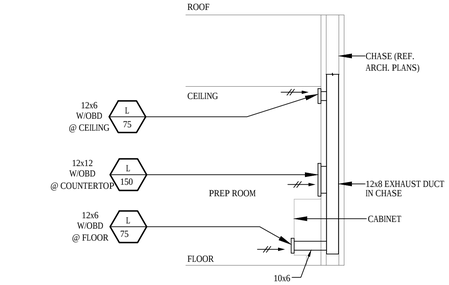
PREP ROOM SYSTEM CONTROL SETTINGS			
MODE	UNOCCUPIED	OCCUPIED	PURGE
OUTSIDE AIR DAMPER	CLOSED	OPEN	OPEN
EXHAUST AIR DAMPER	CLOSED	OPEN	OPEN
RECIRCULATION DAMPER	OPEN	CLOSED	CLOSED
UNIT SUPPLY FAN	LOW	LOW	HIGH
UNIT SUPPLY FAN	ENABLED	ON	ON
UNIT EXHAUST FAN	OFF	LOW	HIGH
UNIT EXHAUST FAN	OFF	ON	ON
HEATER "EDH-1"	OFF	ENABLED	ENABLED
HEATER "EDH-2"	ENABLED	ENABLED	ENABLED
CONDENSING UNIT	ENABLED	ENABLED	ENABLED



NOTES:
1. MAINTAIN 30"x30" CLEARANCE ON SERVICE SIDE OF ALL OUTDOOR UNITS.
2. IF REQUIRED BY LOCAL CODE, SECURE UNIT TO CONCRETE PAD PER MANUFACTURER'S RECOMMENDATIONS.
3. SEAL SPACE BETWEEN PIPING AND FLASHING CAP WEATHER TIGHT WITH EXPANDING FOAM INSULATION.
4. ALL REFRIGERANT LINE SET PENETRATIONS SHALL BE LOCATED AT THE SAME ELEVATION AROUND THE BUILDING.
5. ALL ELECTRICAL DISCONNECTS SHALL BE LOCATED AT THE SAME ELEVATION AROUND THE BUILDING (COORDINATE WITH ELECTRICAL CONTRACTOR).

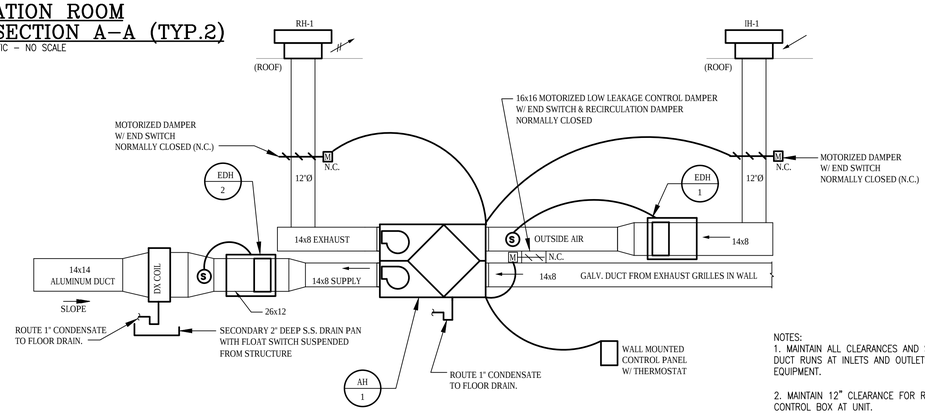
GRADE MOUNTED OUTDOOR UNIT DETAIL

NOT TO SCALE



PREPARATION ROOM EXHAUST RISER SECTION A–A (TYP.2)

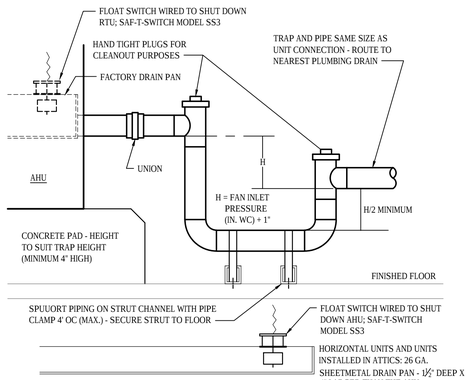
SCHEMATIC – NO SCALE



NOTES:
1. MAINTAIN ALL CLEARANCES AND STRAIGHT DUCT RUNS AT INLETS AND OUTLETS OF ALL EQUIPMENT.
2. MAINTAIN 12" CLEARANCE FOR REMOVAL OF CONTROL BOX AT UNIT.

PREP ROOM SYSTEM DETAIL

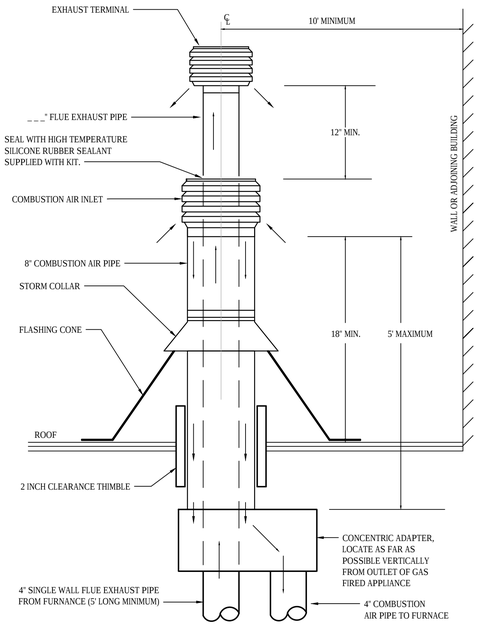
SCHEMATIC – NO SCALE



NOTES:
1. SLOPE PIPING DOWN TOWARDS PLUMBING DRAIN AT ¼" PER FOOT.
2. RUNNING TRAPS ARE NOT ALLOWED.
3. ALL PIPING LOCATED WITHIN A RETURN AIR PLENUM MUST MEET FLAME SPREAD/SMOKE DEVELOPED RATINGS OF 25/50.
4. TEST THE FLOAT SWITCH IN THE DRAIN PAN FOR PROPER OPERATION AT LEAST ONCE A YEAR.

CONDENSATE DRAIN TRAP DETAIL

NOT TO SCALE



NOTE:
1. FOLLOW MANUFACTURER'S VENT LENGTH TABLE FOR MAXIMUM LENGTHS.

CONCENTRIC FLUE EXHAUST / COMBUSTION AIR ASSEMBLY

NOT TO SCALE

ISSUE DATE:
AUGUST 18, 2017
PERMIT SET

REVISION:

ANDREW H. SMITH ENGINEER No. 6201054517 8.18.17

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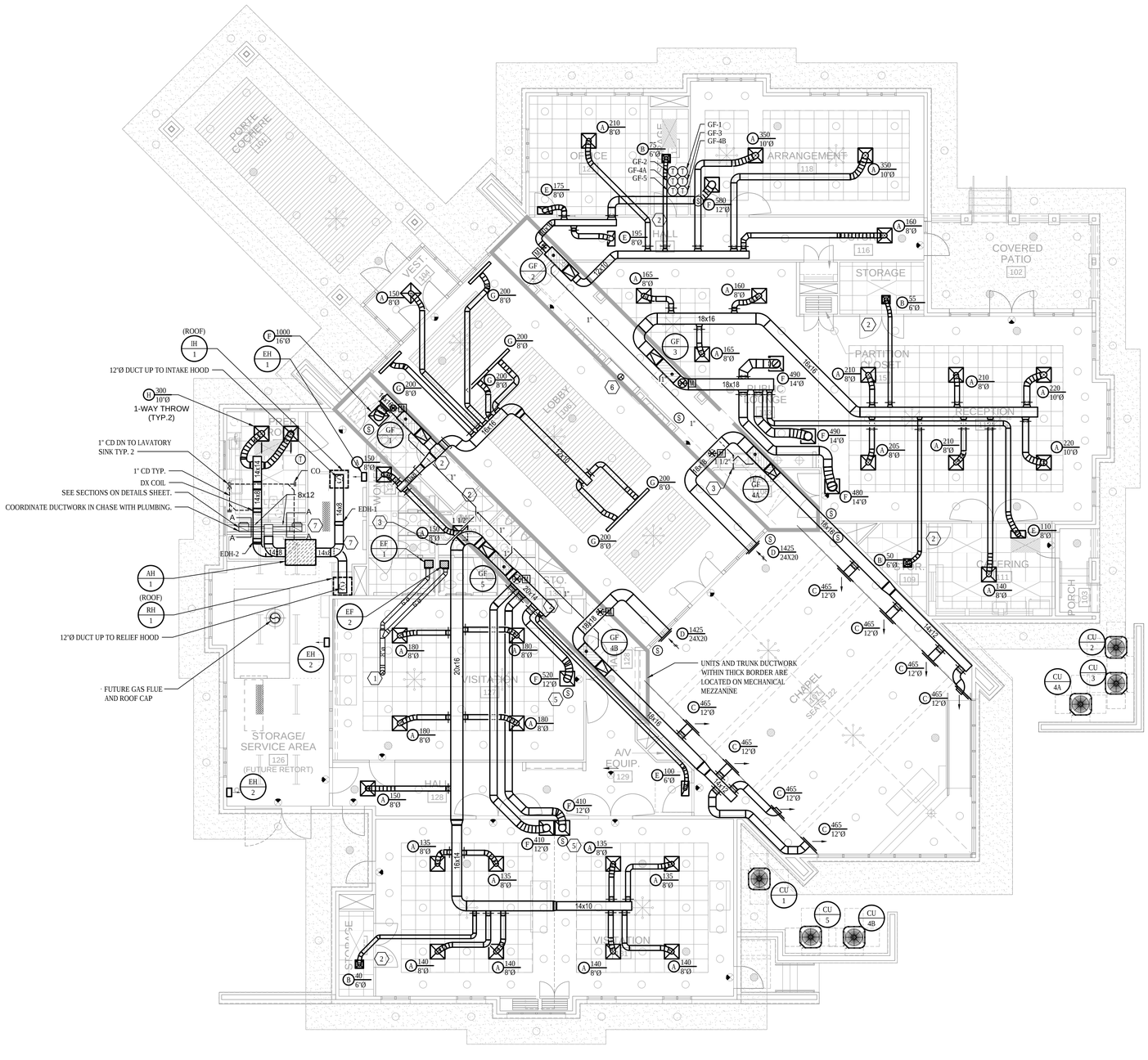

1 FLOOR PLAN - HVAC

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

NORTH

GENERAL NOTES:

1. PROVIDE ALL OFFSETS AND TRANSITIONS IN DUCTWORK AS NEEDED TO MAINTAIN CEILING HEIGHTS AND TRANSITIONS OVER OR UNDER NEW DUCTWORK AND OTHER BUILDING SYSTEMS WHETHER SHOWN ON DRAWINGS OR NOT. NOT ALL TRANSITIONS ARE SHOWN TO EQUIPMENT.
2. COORDINATE DUCTWORK AND EQUIPMENT WITH ALL BUILDING SYSTEMS, ETC. PRIOR TO CONSTRUCTION.
3. COORDINATE ALL THERMOSTAT LOCATIONS IN FIELD AND WITH OWNER PRIOR TO CONSTRUCTION. MOUNT 8' AWAY FROM THE EDGE OF A WALL.
4. COORDINATE WORK ON MECHANICAL SHEETS WITH ALL TRADES. WORK SHOWN ON THE DRAWINGS IS INTENDED TO PROVIDE THE OVERALL ENGINEERING DESIGN CONCEPT AND DOES NOT ACCOUNT FOR RELOCATIONS, OFFSETS, ETC. THAT ARE REQUIRED BY THE COORDINATION OF TRADES. THESE SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
5. THE LOCATIONS, ARRANGEMENT AND EXTENT OF EQUIPMENT, DEVICES, AND OTHER APPURTENANCES RELATED TO THE INSTALLATION OF MECHANICAL WORK SHOWN ON DRAWINGS ARE APPROXIMATE. THE DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY DEPICT EXACT CONDITIONS. THE LOCATION OF EQUIPMENT, DUCTWORK, ETC. IS APPROXIMATE ONLY. SCALES ARE SHOWN FOR REFERENCE ONLY. THE CONTRACTOR SHALL NOT SCALE DRAWINGS, BUT SHALL REFER TO THE ARCHITECTURAL DRAWINGS FOR DIMENSIONAL DATA OF BUILDING COMPONENTS. SHOULD A CONFLICT EXIST BETWEEN THE ARCHITECTURAL AND ENGINEERING DRAWINGS REGARDING DIMENSIONS AND SCALE, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF THE DISCREPANCY.
6. CONTRACTOR SHALL REPAIR AND/OR REPLACE, WITHOUT ANY COST TO THE OWNER, ANY SYSTEMS DAMAGED DUE TO HIS WORK.
7. ALL MECHANICAL EQUIPMENT REQUIRING ACCESS THAT IS LOCATED ABOVE GYP. BOARD OR OTHERWISE INACCESSIBLE CEILINGS SHALL BE PROVIDED WITH A CEILING ACCESS PANEL SUPPLIED AND INSTALLED BY THE GENERAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF THESE ACCESS PANELS WITH THE GENERAL CONTRACTOR AND ARCHITECT PRIOR TO INSTALLATION.
8. COORDINATE ALL ROOF PENETRATIONS WITH STRUCTURAL. DUCT OPENINGS THROUGH ROOF SHALL BE THE SAME REQUIRED FOR THE DUCT AND INSULATION ONLY. DUCTWORK SHALL BE COORDINATED WITH STRUCTURE, LIGHTING, SPRINKLERS, ETC. PRIOR TO FABRICATION AND INSTALLATION. ADJUST DUCTWORK ROUTING AND LOCATIONS AS REQUIRED.
9. ALL DUCTWORK SHALL BE SEALED PER SPECIFICATIONS.
10. VOLUME DAMPERS LOCATED ABOVE GYP. BOARD OR OTHERWISE INACCESSIBLE CEILINGS SHALL BE PROVIDED WITH A REMOTE DAMPER ACTUATOR IN THE CEILING.
11. PROVIDE BALANCE DAMPERS IN SUPPLY, RETURN, AND EXHAUST DUCTS AT ALL TAKE-OFFS TO INDIVIDUAL DIFFUSERS, GRILLES, AND REGISTERS.
12. PROVIDE FILTER ELEMENT OVER RETURN AIR GRILLES TO PROTECT DUCTWORK FROM CONTAMINATION DURING START-UP.
13. REFER TO ARCHITECTURAL PLANS FOR EXACT PLACEMENT OF MECHANICAL EQUIPMENT ON ROOF. COORDINATE WITH STRUCTURAL.
14. CONTRACTOR SHALL OBSERVE ALL MANUFACTURER CLEARANCE AND INSTALLATION GUIDELINES FOR MECHANICAL EQUIPMENT.
15. MATERIALS, EQUIPMENT OR LABOR NOT INDICATED BUT WHICH CAN BE REASONABLY INFERRED TO BE NECESSARY FOR A COMPLETE INSTALLATION SHALL BE PROVIDED. DRAWINGS AND SPECIFICATIONS DO NOT UNDERTAKE TO INDICATE EVERY ITEM OF MATERIAL, EQUIPMENT, OR LABOR REQUIRED TO PRODUCE A COMPLETE AND PROPERLY OPERATING INSTALLATION.
16. CONTRACTOR SHALL MAKE EVERY EFFORT TO INSTALL DUCTWORK IN ORDER TO MINIMIZE DUCT TRANSITIONS, FITTINGS, AND ELBOWS AS MUCH AS POSSIBLE TO REDUCE SYSTEM STATIC PRESSURE.
17. ROUND AND RECTANGULAR ELBOWS SHALL BE IN STRICT CONFORMANCE OF THE SPECIFICATIONS. SEGMENTED ELBOWS ARE NOT ALLOWED.

KEY NOTES: (DESIGNATED BY "⟨#⟩")

1. ROUTE 8'Ø EXHAUST UP TO ROOF CAP SIMILAR TO BROAN MODEL 634. LOCATION OF EXHAUST CAP MUST BE GREATER THAN 10' FROM FRESH AIR INTAKE.
2. UNDERCUT DOOR 1" TO ALLOW FOR RETURN PATH, BY OTHERS.
3. ROUTE 1 1/2'Ø CONDENSATE DOWN WALL TERMINATE IN SINK TAIL PIECE.
4. LOCATE (6) PROGRAMMABLE THERMOSTATS IN STORAGE ROOM FOR GAS FURNACES. LABEL THERMOSTAT FOR AREA SERVED. VERIFY FINAL LOCATION WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
5. PROVIDE AVERAGING SENSORS. TIE INTO THERMOSTAT IN STORAGE AREAS.
6. ROUTE FIRE PLACE EXHAUST TO ROOF. PROVIDE MANUFACTURER APPROVED DUCTWORK AND ROOF CAP.
7. CONFIRM SIZING REQUIREMENTS OF DUCTWORK AND EQUIPMENT WITH DUNCAN STUART TODD.

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SHEET NO.
M2.0

JOB NUMBER: 16238

DRAINAGE PRODUCTS/SPECIALTIES

UNLESS OTHERWISE INDICATED NUMBERS ARE JAY R. SMITH. EQUAL PRODUCTS: ZURN, JOSAM, WADE AND WATTS.

CO–EXPOSED CLEANOUT – UNFINISHED AREAS
JAY R. SMITH FIG. 4420 CAST BRONZE COUNTERSUNK PLUG WITH SLOT TO RECEIVE 1/2" THICK STEEL BAR STOCK.

WCO–WALL CLEANOUT – FINISHED AREAS
JAY R. SMITH FIG. 4436 C.I. FERRULE FOR NO HUB OR SERVICE WEIGHT PIPE, NICKEL BRONZE ROUND FRAME AND COVER WITH SECURING SCREWS.

FCO–CONCRETE FLOORS
JAY R. SMITH FIG. 4220 C.I. CLEANOUT WITH GASKET SEAL THREADED PLUG FOR EASY REMOVAL, ADJUSTABLE ROUND CAST IRON TOP WITH SECURING SCREW, SPEEDI–SET OUTLET CONNECTION.

FCO–TILE FLOORS
JAY R. SMITH FIG. 4151 C.I. CLEANOUT WITH GASKET SEAL THREADED PLUG FOR EASY REMOVAL, ADJUSTABLE ROUND NICKEL BRONZE TOP RECESSED FOR TILE WITH SECURING SCREW, SPEEDI–SET OUTLET CONNECTION.

FCO–CARPETED FLOORS
JAY R. SMITH FIG. 4020–Y C.I. CLEANOUT WITH GASKET SEAL THREADED PLUG, ADJUSTABLE ROUND NICKEL BRONZE TOP COMPLETE WITH STAINLESS STEEL CARPET MARKER WITH SECURING SCREW, SPEEDI–SET OUTLET CONNECTION.

YCO–EXTERIOR PAVED/CONCRETE AREAS
JAY R. SMITH FIG. 4261–U C.I. FLANGED HOUSING WITH HEAVY DUTY C.I. COVER, LIFTING DEVICE, GASKET SEAL THREADED PLUG, V.P. SCREWS IN COVER.

YCO–EXTERIOR UNSURFACED AREAS
JAY R. SMITH FIG. 4261–U C.I. FLANGED HOUSING WITH HEAVY DUTY C.I. COVER, LIFTING DEVICE, GASKET SEAL THREADED PLUG, V.P. SCREWS IN COVER. PROVIDE 24" x 12" CONCRETE PAD FLUSH WITH SURFACE.

FD "G" – FLOOR DRAINS–GENERAL/RESTROOMS
JAY R. SMITH FIG. 2005–B6 SERIES C.I. FLOOR DRAIN WITH 6" DIAMETER SQUARE NICKEL BRONZE STRAINER, SPEEDI–SET OUTLET CONNECTION AND TRAP PRIMER CONNECTION.

FD "M" –FLOOR DRAINS–GENERAL PURPOSE/MECHANICAL ROOM
JAY R. SMITH FIG. 3715 SERIES CAST IRON 12" DIAMETER DRAIN WITH SEDIMENT BUCKET, CAST IRON GRATE WITH INTEGRAL 4" FUNNEL, SPEEDI–SET OUTLET CONNECTION.

LAVATORY–WALL HUNG SUPPORT
JAY R. SMITH #700 FOR MASONRY WALLS AND #700–M31 FOR METAL STUD WALLS.

ELECTRIC WATER COOLER CARRIER–WALL HUNG
JAY R. SMITH FIG. 830 SUPPORT WITH UPRIGHTS OF HIGH STRENGTH STEEL WITH WELDED BASES BOLTED TO FLOOR. FOR STEEL STUD WALLS, USE M31 RECTANGULAR UPRIGHTS.

TP–AUTOMATIC TRAP PRIMER
PPP PRIME–RITE SERIES AUTOMATIC TRAP PRIMER WITH MULTIPLE OUTLET DISTRIBUTION UNITS AS REQUIRED.

WATER HAMMER ARRESTORS
JAY R. SMITH 5000 SERIES ALL STAINLESS STEEL "HYDROTROLS". INSTALL IN AN UPRIGHT POSITION AT ALL FLUSH VALVES, WASHING MACHINE SUPPLIES, DISHWASHERS, PRV STATIONS, AND OTHER QUICK CLOSING VALVES, SOLENOIDS AND PLUMBING FIXTURES. LOCATE AND SIZE AS INDICATED ON DRAWINGS. WHERE NOT SHOWN ON DRAWINGS, LOCATE AND SIZE IN ACCORDANCE WITH PDI STANDARD WH–201.

HB–HOSE BIBB
WOODFORD #24P HOSE BIBB WITH WHEEL HANDLE WITH VACUUM BREAKER, ROUGH BRASS, FOR USE IN NON–PUBLIC AREAS.

HB–HOSE BIBB LOOSE KEY
WOODFORD #24P WITH LOOSE TEE KEY AND VACUUM BREAKER HOSE BIBB, CHROME PLATED FOR USE IN PUBLIC AREAS.

NFWH–WALL HYDRANT–EXPOSED
JAY R. SMITH FIG. 5509–QT NON FREEZE 3/4" CAST BRONZE HYDRANT WITH RECESSED STAINLESS STEEL BOX AND FRAME INTEGRAL VACUUM BREAKER, NICKEL BRONZE FACE, AND SIZED IN ACCORDANCE WITH WALL THICKNESS.

IMB–ICE MAKER SUPPLY CONNECTION
GUY GRAY MODEL BIM875 16 GAUGE SUPPLY WITH 1/2" INLET, AND 1/4" OUTLET ANGLE VALVE. PROVIDE FR–12 SERIES IN ALL FIRE RATED WALLS.

TMV–1 – THERMOSTATIC MIXING VALVE BRADLEY HL80 MODEL S59–3080, 2 GPM MINIMUM FLOW CAPACITY, LEAD FREE.

PLUMBING DRAWING INDEX

PLUMBING FIXTURE & CONNECTION SCHEDULE

FIXTURE #	DESCRIPTION	FIXTURE MFG.	DESCRIPTION AND SPECIFICATIONS	WASTE	HOT WATER SUPPLY	COLD WATER SUPPLY	NOTES
WC–1	WATER CLOSET	KOHLER #K–3519 "HIGHLINE"	VITREOUS CHINA, TANK TYPE, ELONGATED BOWL, 1.0 GPF CHURCH #9500SSC SEAT W/SELF–SUSTAINING CHECK HINGES	4"	---	3/4"	1,2,3
WC–2	WATER CLOSET–HC–ADA	KOHLER #K–3519 "HIGHLINE"	VITREOUS CHINA, TANK TYPE, ELONGATED BOWL, CHURCH #9500SSC SEAT W/SELF–SUSTAINING CHECK HINGES, ADA COMPLIANT	4"	---	3/4"	1,2,3
L–1	UNDER DECK MOUNT LAVATORY–HC	KOHLER "CAXTON" #K–2210	1–1/4" BRASS P–TRAP WITH CLEANOUT KOHLER FAUCET "DEVONSHIRE" # K394–4BRE PROVIDE TEMPERED WATER TO ALL PUBLIC AND EMPLOYEE LAVATORIES WITH A THERMOSTATIC MIXING MEETING ASSE 1070 PER IPC 416.5	2"	1/2"	1/2"	1,2,4
EWC	ELECTRIC WATER COOLER	ELKAY EBFATL8C BEIGE	HIGH–LOW ADA COMPLIANT COOLER WITH COLOR OPTION, CAPACITY OF 8.0 GPH 80°F TO 50°F , K–8998 1–1/2"x1–1/2" P–TRAP, REFER TO ARCHITECT'S DRAWINGS FOR MOUNTING HEIGHTS. COLOR–BEIGE	2"	---	1/2"	1,2,4
IMB	ICE MAKER BOX	OATEY MODEL 38811	--- ---	---	---	1/2"	---
SK–1	COUNTERTOP SINGLE COMPARTMENT PREP SINK	DST 301 HAND SINK HAWS 7611 EYE WASH	DST 301 HAND SINK SYSTEM. HIHJ QUALITY STAINLESS STEEL. GOOSENECK SPOUIT AND HEAVY DUTY DOUBLE CAP–STRAINER. REFILLABLE PUMP SOAP DISPENSER. HANDS–FREE OPERATION VIA FLOOR PEDAL VALVE. PROVIDE EMERGENCY EYE WASH 7611 EYE WASH. PROVIDE "TEPID" WATER WITH A THERMOSTATIC MIXING VALVE MEETING ASSE 1071 PER ANSI Z358.1	2"	1/2"	1/2"	1,2,4
SK–2	COUNTERTOP SINGLE COMPARTMENT SINK	ELKAY PSR1918 W/2 HOLES	SINGLE COMPARTMENT STAINLESS STEEL 22"x 19" TYPE 302 SELF RIM, FAUCET LK–4121 SINGLE LEVER FAUCET W/8" GOOSENECK, LK–35 STRAINER, K–9000 P–TRAP	2"	1/2"	1/2"	1,2,4
SK–3	COUNTERTOP SINGLE COMPARTMENT SINK	ELKAY PSR–3121 W/3 HOLES	SINGLE COMPARTMENT STAINLESS STEEL 31"x 22" TYPE 302 SELF RIM, ADA COMPLAINT, LK–232–S GOOSENECK FAUCET, LK–18 GRID DRAIN, K–9000 1–1/2"x1–1/2" P–TRAP AND IN–SINK–ERATOR MODEL 333 1/2HP DISPOSER.	2"	1/2"	1/2"	1,2,4
MTR	MORGUE TABLE RECEPTOR	TODD MODEL MTR 5000	THE MORGUE TABLE RECEPTOR 5000 IS A RINSING RIM DIRECT DRAIN SYSTEM FOR WASTE REMOVAL AT FOOT END OF THE TABLE. REMOVABLE 3" ROUND STRAINER SLEEVE WITH EAST–LIFT HANDLE CAPTURES COTTON AND OTHER LARGE WASTE. 16 GAYGE STAINLESS STEEL. HEIGHT 26" ABOVE FLOOR TO TOP OF UNIT.	3"	---	1–1/4"	5
WCU	WATER CONTROL UNIT	TODD WATER CONTROL UNIT 2100	COMPLETE WITH A HYDRO–ASPIRATOR , HW & CW EMBALMING MACHINE FILL AND HW & CW FOR THE MORGUE TABLE. USE RT. MTD. SWING SPOUT DST 218.	–	1/2"	1/2"	5
SH–1	EMEREGENCY DRENCH SHOWER	SPEAKMAN SE–238 DRENCH SHOWER	CEILING MOUNTED EMERGENCY SHOWER. 8" BRASS SHOWERHEAD WITH EXTENEDED SUPPLY PIPE . VERTICAL SUPPLY. INTERNAL 20 GPM REGULATOR FLOW CONTROL, 18 GAUGE STAINLESS STEEL CABINET. PROVIDE TEPID WATER WITH A THERMOSTATIC MIXING VALVE MEETING ASSE 1071 PER ANSI Z358.1	–	1/2"	1/2"	5

NOTES:
1. PROVIDE OATEY 3/8" CLADFLEX RISERS.
2. PROVIDE BRASS CRAFT CHROME PLATED 1/2" x 3/8" COMPRESSION STOPS.
3. FLUSH LEVER SHALL BE LOCATED ON THE APPROACH SIDE OF THE TANK AT ACCESSIBLE INSTALLATIONS.
4. PROVIDE 1–1/2" x 1–1/2" P–TRAP WITH UNION.
5. PROVIDE RPZBFP IN WATER SUPPLIES, ROUGH–INS & FINAL CONNECTIONS. EQUIPMENT FURNISHED BY OWNER, INSTALLED BY PLUMBER, PER CODE.

PUMP SCHEDULE

TAG	SERVICE\ LOCATION	TYPE	FLOW (GPM)	HEAD (FT)	RPM	HP	NOTES
HWRP–1	HOT WATER RECIRCULATION	IN–LINE	5	20	2650	1/6	BELL & GOSSETT NBF–36 CIRCULATOR PUMP 3–SPEED 115V/1PH/60HZ

GAS FIRED WATER HEATER SCHEDULE

SYMBOL	MODEL	STORAGE CAPACITY (GAL)	INPUT (KW)	RECOVERY 100° RISE (GPH)	TEMP OF WATER TO BE DEL. (°F)	ACCESORIES	BTU/HR	LOCATION
WHG–1	A.O SMITH BTU–120 MXI	60	–	138	140	1–6	120,000	STORAGE ROOM
ET–1	AMTROL EX–30	4.4						

ACCESSORIES:
1. T&P RELIEF VALVE.
2. DIELECTRIC FITTINGS ON INLET & OUTLET.
3. BALL VALVES WITH UNIONS ON WATER INLET AND OUTLET CONNECTIONS.
4. ROUTE DRAIN PAN AND T&P RELIEF TO FLOOR DRAIN
5. APPROVED ALTERNATES: BRADFORD WHITE, RHEEM, STATE
6. INSTALL PER MANUFACTURE SPECIFICATIONS
7. PROVIDE DIRECT VENTING WITH CONCENTRIC ROOF TERMINATION COORDINATE ROUTING WITH MECHANICAL

GAS DEMAND SCHEDULE

COUNT	SERVICE	INPUT (CFH)	NOTES
6	GAS FURANCE – 88,000 BTUH EA.	528	
1	GAS FIRED WATER HEATER	120	
1	GAS FIREPLACE	50	
1	CREMATORY	3,000	
2015 IFGC – TABLE 402.4(5), INLET PRESSURE 2.0 PSI, SPECIFIC GRAVITY 0.60	SITE TOTAL	3,698 CFH	
	LENGTH TOTAL	APPROX. 200'	

PLUMBING NOTES

1. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS AND ELEVATIONS OF ALL PLUMBING FIXTURES.
2. ALL PLUMBING WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE 2015 MICHIGAN PLUMBING CODE WITH ALL LOCAL AMENDMENTS AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.
3. ALL PIPING ABOVE GRADE SHALL BE PROPERLY SUPPORTED FROM THE BUILDING STRUCTURE AND SHALL NOT REST ON CEILING TILES OR BE SUPPORTED FROM CEILING TILES.
4. WATER PIPING ROUTED ABOVE CEILING AND IN EXTERIOR WALLS SHALL BE ROUTED ON HEATED SIDE (UNDERSIDE) OF CEILING INSULATION AND HEATED SIDE (INSIDE) OF WALL INSULATION.
5. SANITARY AND DRAINAGE PIPING 2" AND SMALLER SHALL BE SLOPED AT 1/4" PER FOOT MINIMUM, PIPING 3" AND LARGER SHALL BE SLOPED AT 1/8" PER FOOT MINIMUM.
6. TOPS OF ALL FLOOR DRAINS AND CLEANOUTS SHALL BE SET FLUSH WITH FINISHED FLOOR.
7. TRAP PRIMERS ARE TO BE PROVIDED ON ALL FLOOR DRAINS AND HUB DRAINS WHICH DO NOT RECEIVE A CONTINUOUS DISCHARGE. TP "L" LAVATORY WASTE TRAP PRIMERS ARE TO BE PROVIDED ON DRAINS IN PUBLIC RESTROOMS, GUEST ROOMS, AND OTHER AREAS WITH DRAINS ADJACENT TO LAVATORIES TP "A" AUTOMATIC TRAP PRIMERS ARE TO BE PROVIDED IN ALL OTHER REQUIRED LOCATIONS.
8. PLUMBING AND FIRE PROTECTION PIPING IS NOT TO BE INSTALLED IN ELECTRICAL ROOMS, CLOSETS, TELEPHONE ROOMS, OR ELEVATOR EQUIPMENT ROOMS EXCEPT PIPING SERVING THAT SPECIFIC ROOM.
9. LOCATE ALL SECTIONAL OR MAIN CONTROL VALVES WITHIN 1'–0" FROM ACCESS PANELS, CEILING TILES, OR OTHER POINT OF ACCESS.
10. ALL COLD WATER, HOT WATER AND DRAIN PIPING AT HANDICAPPED FIXTURES SHALL BE INSULATED WITH HANDI–LAV GUARD MODELS 102 AND 105 INSULATION KITS.
11. PROVIDE SHOCK ABSORBERS SIZED PER PDI SPECIFICATIONS ON ALL DOMESTIC WATER LINES SERVING FLUSH VALVE FIXTURES, WASHING MACHINES SUPPLIES, PRV STATIONS AND OTHER INSTALLATIONS WITH QUICK CLOSING VALVES.
12. PROVIDE A BASE CLEANOUT AT THE LOWEST LEVEL OF ALL SANITARY AND WASTE STACKS. BASE.
13. PROVIDE MANUFACTURED EXPANSION DEVICE OR FABRICATED EXPANSION LOOP ON ALL PIPING SYSTEMS CROSSING BUILDING EXPANSION JOINTS.
14. CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL PLUMBING EQUIPMENT WITH THE ELECTRICAL DRAWINGS AND THE ELECTRICAL CONTRACTOR, AND SHALL FURNISH EQUIPMENT WIRED FOR THE VOLTAGES SHOWN THEREIN.
15. ALL PLUMBING EQUIPMENT, PIPING, INSULATION, ETC. INSTALLED IN HVAC PLENUM SPACES SHALL MEET CODE REQUIREMENTS FOR SMOKE AND COMBUSTIBILITY.
16. ALL PLUMBING EQUIPMENT AND SYSTEMS SHALL BE GUARANTEED FOR A MINIMUM PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE.
17. ALL PIPE PENETRATIONS OF FIRE AND/OR SMOKE RATED ASSEMBLIES SHALL BE FIRE STOPPED AS REQUIRED TO RESTORE ASSEMBLY TO ORIGINAL INTEGRITY. FIRE BARRIER PRODUCTS SHALL BE AS MANUFACTURED BY 3M COMPANY, CP25 CAULK, CS195 COMPOSITE PANEL, FS195 WRAP/STRIK, OR PSS 7900 SERIES SYSTEMS AS RECOMMENDED BY MANUFACTURER FOR PARTICULAR APPLICATIONS, OR EQUIVALENT SYSTEM AS APPROVED BY LOCAL CODE OFFICIALS.
18. ALL VENT THRU ROOF PENETRATIONS SHALL BE ROUTED TO TERMINATE AT THE LEAST VISIBLE LOCATION FROM THE ENTRY VIEW.
19. ALL SANITARY VENTS THRU ROOF SHALL BE LOCATED A MINIMUM OF 10'–0" FROM ANY OUTSIDE AIR INTAKE.

FIRE PROTECTION NOTES

1. ALL SPRINKLERS IN SPACES VISIBLE TO PUBLIC VIEW SHALL BE LOCATED SYMMETRICALLY IN RELATION TO CEILING DESIGN ELEMENTS, LIGHTING FIXTURES, SPEAKERS, DIFFUSERS, ETC. ALL CEILING COMPONENTS ARE TO BE INDICATED ON THE SUBMITTAL DRAWINGS AS NOTED PREVIOUSLY TO INSURE COORDINATION WITH ALL CEILING ELEMENTS AND DEVICES. PIPING TO SPRINKLERS IN THESE AREAS IS TO BE PROVIDED WITH RETURN BENDS IF REQUIRED TO ALLOW FOR EXACT PLACEMENT.
2. SPRINKLER HEADS INSTALLED IN LAY IN ACOUSTICAL TILE CEILINGS SHALL BE CENTERED IN THE CEILING TILES OR INSTALLED ON QUARTER POINTS OF THE FOUR FOOT DIMENSIONS OF 2' X 4' TILES.
3. ALL FIRE PROTECTION WORK SHALL COMPLY WITH ALL APPLICABLE SECTIONS OF NFPA STANDARDS AND SHALL MEET THE APPROVAL OF THE OWNERS INSURANCE UNDERWRITER, AND LOCAL AUTHORITIES HAVING JURISDICTION.
4. SHOP DRAWINGS SHALL BE SUBMITTED TO AND APPROVED BY THE ARCHITECT PRIOR TO ORDERING, PURCHASING, OR FABRICATION ANY FIRE PROTECTION EQUIPMENT. SHOP DRAWINGS SHALL INCLUDE: SPRINKLER DRAWINGS AND CALCULATIONS BEARING THE SEAL OF A REGISTERED PROFESSIONAL ENGINEER OR EQUIVALENT CONTRACTORS FIRE SPRINKLER CERTIFICATE SEAL AND APPROVAL STAMP OF LOCAL CODE AUTHORITY; SPRINKLER PIPING; SPRINKLER HEADS; HOSE RACKS, HYDRANTS AND VALVES; PUMPS, CONTROLLERS AND ACCESSORIES; TANKS AND ACCESSORIES. SHOP DRAWINGS SHALL BE SUBMITTED TO AND APPROVED BY THE OWNERS INSURANCE UNDERWRITER PRIOR TO BEING SUBMITTED TO THE ARCHITECT.
5. CONTRACTOR SHALL COORDINATE THE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL FIRE PROTECTION EQUIPMENT WITH THE ELECTRICAL DRAWINGS AND SHALL FURNISH EQUIPMENT WIRED FOR THE VOLTAGES SHOWN THEREIN.
6. ALL FIRE PROTECTION EQUIPMENT AND SYSTEMS SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE.
7. ALL PIPING ABOVE GRADE SHALL BE SUPPORTED BY THE BUILDING STRUCTURE AND SHALL NOT REST ON CEILING TILES OR CEILING STRUCTURE. PIPING HUNG FROM JOISTS SHALL BE HUNG FROM THE TOP CHORDS OF THE JOISTS.
8. ALL SPRINKLER SYSTEMS SHALL BE DESIGNED TO THE AVAILABLE CITY WATER SUPPLY. CONTRACTOR SHALL HAVE CURRENT FLOW TEST PERFORMED PRIOR TO DESIGN.
9. ALL SPRINKLER SYSTEM RISERS SHALL INCLUDE AN ALARM CHECK VALVE, WATER MOTOR GONG, FLOW SWITCH, ETC.
10. HYDRAULIC CALCULATIONS SHALL INCLUDE AN ALLOWANCE FOR INSIDE AND OUTSIDE HOSE STREAMS.
11. FIRE PROTECTION SUBCONTRACTOR SHALL FURNISH AND INSTALL 2A RATED 10 LB. FIRE EXTINGUISHERS FOR EVERY 3000 SQ. FT. OF FLOOR AREA. EXTINGUISHERS SHALL BE LOCATED TO MINIMIZE TRAVEL DISTANCE TO 75 FEET.
12. ALL MAJOR VALVES SHALL HAVE U.L. LISTED SUPERVISORY SWITCHES COMPATIBLE WITH THE OWNERS CENTRAL ALARM SYSTEM. WIRING OF THE SWITCHES SHALL BE BY OTHERS.
13. GROOVED (VICTAULIC) COUPLINGS SHALL NOT BE USED OVER OR NEAR ELECTRICAL SWITCHGEAR, PANELS, TRANSFORMERS, ETC.
14. ALL SPRINKLER PIPING SHALL BE ROUTED TO MAINTAIN MINIMUM CLEAR HEIGHTS INDICATED ON ARCHITECTURAL DRAWINGS.
15. ALL DRY PIPE SPRINKLER SYSTEMS SHALL BE COMPLETE WITH OS&Y GATE VALVES AND DRY PIPE VALVES, AIR COMPRESSORS, WATER MOTOR GONGS, ACCESSORIES AND PRESSURE SWITCHES COMPATIBLE WITH THE OWNERS CENTRAL ALARM SYSTEM. WIRING OF THE SWITCHES WILL BE BY OTHERS.
16. ALL PIPING ON THE SYSTEM SIDES OF DRY PIPE OR PREACTION VALVES SHALL BE GALVANIZED CLASS 150 AND 300 MALLEABLE IRON THREADED FITTINGS, ANSI B16.1.

PLUMBING LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
	A/C	ABOVE CEILING
	AD	AREA DRAIN
	A/F	ABOVE FLOOR
	AFF	ABOVE FINISHED FLOOR
	AFG	ABOVE FINISHED GRADE
	A/P	ACCESS PANEL
	B/C	BELOW COUNTER
	B/F	BELOW FLOOR
	B/G	BELOW GRADE
	BV	BALL VALVE
	FAAV	FRESH AIR AUXILIARY VENT
—CA—	CA	COMPRESSED AIR
—CD—	CD	CONDENSATE DRAIN
	CV	CHECK VALVE
—SCW—	SCW	SOFTENED COLD WATER PIPING
— — —	CW	COLD WATER PIPING
—CWV—	CWV	COMBINATION WASTE & VENT
	DCO	DOUBLE (2–WAY) CLEANOUT
	DCV	DOUBLE CHECK VALVE
	DN	PIPING TURNING DOWN
	DS	DOWNSPOUT NOZZLE
—ERL—	ERL	EMERGENCY RAIN LEADER
	FCO	FLOOR CLEANOUT
	FD	FLOOR DRAIN
	FS	FLOOR SINK
—G—	G	GAS PIPING – LOW PRESSURE
—GW—	GW	GREASE WASTE PIPING
—MG—	MG	GAS PIPING – MEDIUM PRESSURE
	GV	GATE VALVE
	HB/NFHB	HOSE BIBB/NON–FREEZE HOSE BIBB
	H.C.	HANDICAPPED
	HD	HUB DRAIN
	HT	HEAT TRACED PIPING
— — —	HW	HOT WATER PIPING
— — —	HWR	HOT WATER RETURN PIPING
	HWBV	HOT WATER RETURN BALANCING VALVE
—HZ—	HZ	HIGH ZONE (BOOSTED) COLD WATER
—LZ—	LZ	LOW ZONE COLD WATER (STREET PRESSURE)
	O/H	OVER HEAD
	POC	POINT OF CONNECTION NEW TO EXISTING
—PD—	PD	PUMPED DISCHARGE
	---	P–TRAP
	PRV	PRESSURE REDUCING VALVE
	RD/ERD	ROOF DRAIN / EMERGENCY ROOF DRAIN
	RPZ	REDUCED PRESSURE BACKFLOW PREVENTOR
— S —	S,W	SOIL, WASTE PIPING (ABOVE GROUND)
— –S– —	S,W	SOIL, WASTE PIPING (BELOW GROUND)
	SA	SHOCK ABSORBER
—ST—	ST	STORM DRAINAGE PIPING
	TP	TRAP PRIMER
	---	UNION
	UP	PIPING TURNING UP
	V	VENT PIPING
	VTR	VENT THRU ROOF
	WCO	WALL CLEANOUT
	WH/NFWH	WALL HYDRANT/NON–FREEZE WALL HYDRANT
	YCO	YARD CLEANOUT

NOTE: NOT ALL SYMBOLS SHOWN ARE NECESSARILY USED.

FIRE PROTECTION LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
—F—	F	FIRE PROTECTION SUPPLY
	FCV	FLOOR CONTROL VALVE
	FSP	FIRE STANDPIPE
	FDV	FIRE DEPARTMENT VALVE
F	FSW	FLOW SWITCH
	RCV	RISER CONTROL VALVE
—SP—	SP	SPRINKLER PIPING
	TSW	TAMPER SWITCH
	SFDC	SIAMESE FIRE DEPARTMENT CONNECTION

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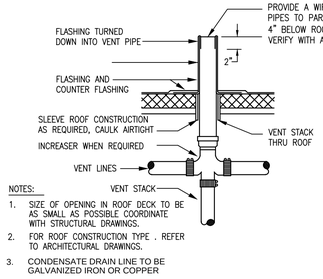
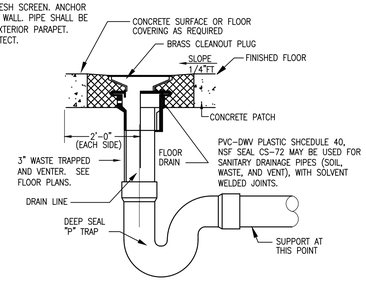
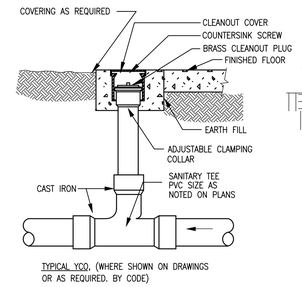


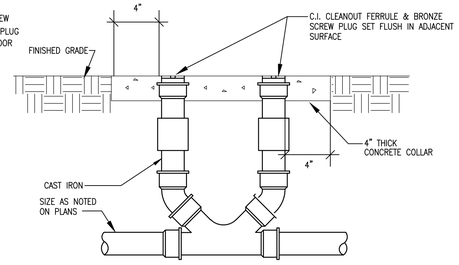
1 VENT STACK-DETAIL
NOT TO SCALE



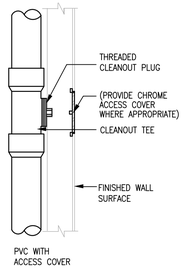
2 FLOOR DRAIN-DETAIL
NOT TO SCALE



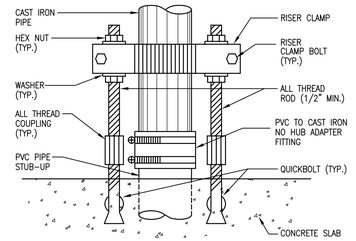
3 FLOOR CLEANOUT - DETAIL
NOT TO SCALE



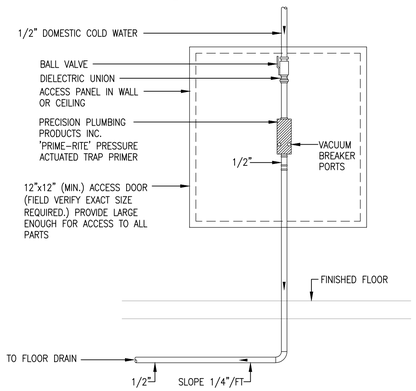
4 TWO WAY CLEANOUT-DETAIL
NOT TO SCALE



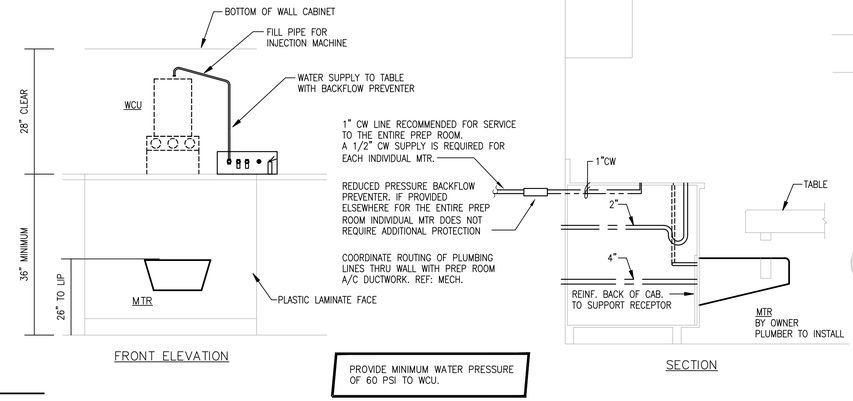
5 WALL CLEANOUT-DETAIL
NOT TO SCALE



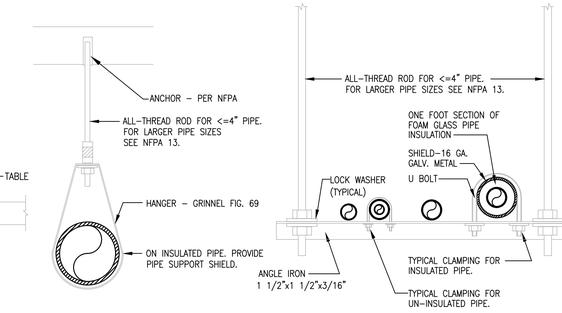
6 PVC TO CAST IRON SUPPORT-DETAIL
NOT TO SCALE



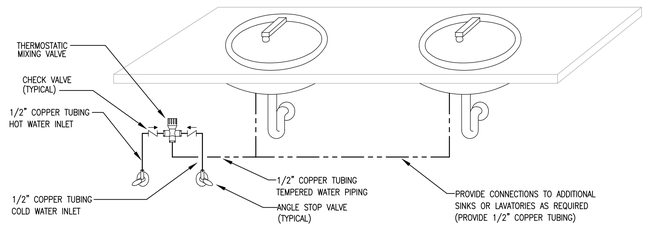
7 TRAP PRIMER DETAIL
NOT TO SCALE



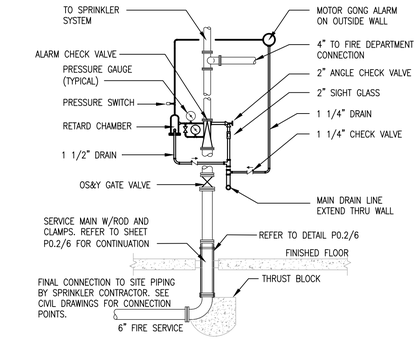
8 PREP ROOM WATER CONTROL UNIT DETAIL
NOT TO SCALE



9 PIPE HANGER SUPPORT-DETAIL
NOT TO SCALE



10 LAVATORY MIXING VALVE -DETAIL
NOT TO SCALE



11 FIRE SERVICE ENTRANCE -DETAIL
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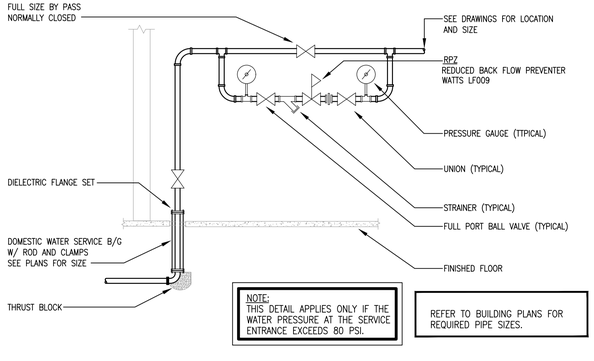
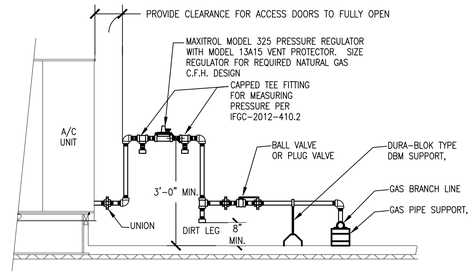
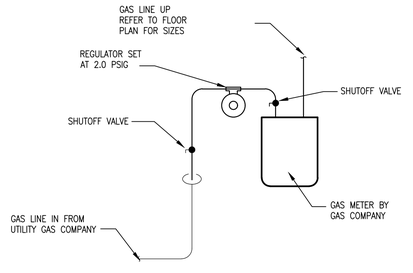


12 DOMESTIC WATER SERVICE ENTRANCE-DETAIL
NOT TO SCALE



13 GAS CONNECTION -DETAIL
NOT TO SCALE



14 GAS METER -DETAIL
NOT TO SCALE

ISSUE DATE:
AUGUST 18, 2017
PERMIT SET

REVISION:

ANDREW H. SMITH ENGINEER No. 6201054517 LICENSED PROFESSIONAL ENGINEER
8-18-17

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L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

JSE
Jordan & Skala Engineers
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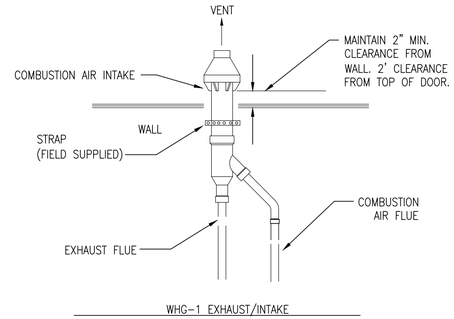
p. 469.385.1616 • f. 469.385.1615
Texas Registered Engineering Firm F-4950
Project Number: 1730254
Drawn By:NC Checked By:TC

SHEET NO.
P0.2

JOB NUMBER: 16238

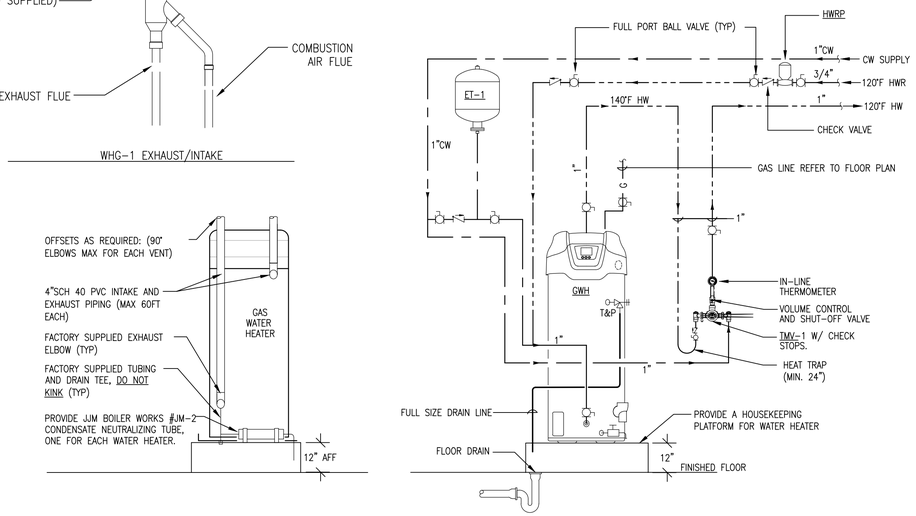


WHG-1 EXHAUST/INTAKE

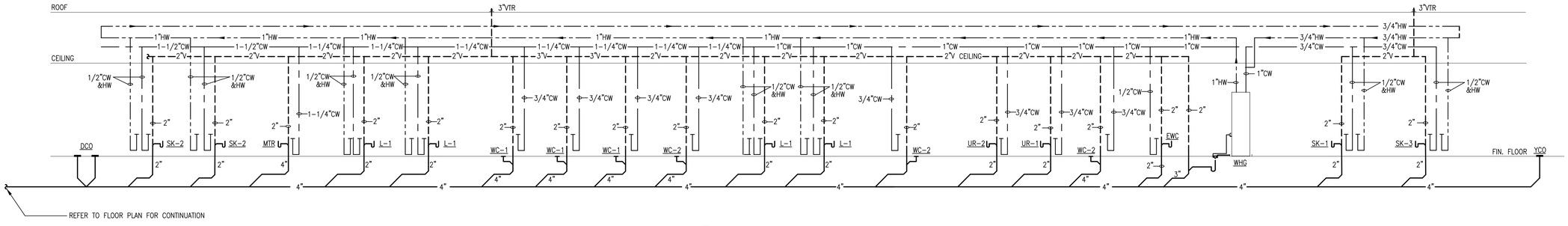
NOTES:

PREFERRED PIPING DIAGRAM.

1. THE TEMPERATURE AND PRESSURE RELIEF VALVE SETTING SHALL NOT EXCEED PRESSURE RATING OF ANY COMPONENT IN THE SYSTEM.
2. SERVICE VALVES ARE SHOWN FOR SERVICING UNIT. HOWEVER, LOCAL CODES SHALL GOVERN THEIR USAGE.
3. THIS DRAWING SHOWS SUGGESTED PIPING CONFIGURATION AND OTHER DEVICES; CHECK WITH LOCAL CODES AND ORDINANCES FOR ADDITIONAL REQUIREMENTS.
4. PROVIDE A.O. SMITH COMBINED CONCENTRIC VENT KIT #9006328005 WITH GWH-1& GWH-2. PENETRATION AND FLASHING BY MECHANICAL CONTRACTOR.



2 GAS WATER HEATER-DETAIL
NOT TO SCALE



1 PLUMBING RISER DIAGRAM
NOT TO SCALE

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Texas Registered Engineering Firm F-4990
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SHEET NO.
P0.3

JOB NUMBER: 16238

SPECIFICATIONS

PART 1 - GENERAL

1.01 SCOPE

A. INSTALL ALL PLUMBING WORK COVERED IN THESE SPECIFICATIONS AND APPROVED DRAWINGS. PROVIDE ALL MATERIAL, LABOR TRANSPORTATION, TOOLS, SUPERVISION, ETC, NECESSARY TO COMPLETE THE TOTAL PLUMBING JOB. ALL ITEMS NOT SPECIFICALLY MENTIONED HEREIN WHICH ARE NECESSARY TO MAKE A COMPLETE WORKING INSTALLATION SHALL BE PROVIDED.

B. EACH BIDDER SHALL EXAMINE THE BIDDING DOCUMENTS CAREFULLY AND MAKE WRITTEN REQUESTS TO THE ARCHITECT FOR INTERPRETATION OR CORRECTION OF ANY DISCREPANCIES, AMBIGUITY, INCONSISTENCY, OR ERROR THEREIN. ANY INTERPRETATION OR CORRECTION WILL BE ISSUED BY THE ARCHITECT AS AN ADDENDUM. ONLY WRITTEN INTERPRETATION OR CORRECTIONS BY ADDENDUM SHALL BE BINDING. CONTRACTOR SHALL INCLUDE IN HIS BID, LABOR, MATERIALS AND METHODS OF CONSTRUCTION FOR COMPLETE INSTALLATION. AFTER AWARD OF CONTRACT, NO ALLOWANCE OR EXTRA COMPENSATION WILL BE MADE IN BEHALF OF THE CONTRACTOR DUE TO HIS FAILURE TO MAKE THE WRITTEN REQUESTS AS DESCRIBED ABOVE.

1.02 PERMITS

A. THE CONTRACTOR SHALL OBTAIN ALL PERMITS AND INSPECTIONS REQUIRED FOR THE INSTALLATION OF THIS WORK AND PAY ALL CHARGES INCIDENT THERETO.

1.03 WORK INCLUDED

A. SYSTEMS:

THE PLUMBING SYSTEMS INSTALLED AND WORK PERFORMED UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, THE FOLLOWING AS NOTED BELOW. THE CONNECTION POINT FOR ALL SYSTEMS FROM THE SITE UTILITIES SHALL BE AS 5'-0" FROM THE EXTERIOR OF THE BUILDING UNLESS SPECIFICALLY OTHERWISE NOTED.

A. DOMESTIC COLD, HOT AND HOT WATER RECIRCULATION SYSTEMS
B. SANITARY, DRAINAGE, WASTE AND VENT SYSTEMS
C. NATURAL GAS/PROPANE GAS SYSTEM
D. PRIMARY AND EMERGENCY STORM DRAINAGE SYSTEMS
E. GREASE WASTE AND WASTE SYSTEMS FROM FOOD SERVICE AREAS

1.04 DRAWINGS

A. THE LOCATIONS, ARRANGEMENT AND EXTENT OF EQUIPMENT, DEVICES, AND OTHER APPURTENANCES RELATED TO THE INSTALLATION OF WORK SHOWN ON DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL NOT SCALE DRAWINGS, BUT SHALL REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS OF BUILDING COMPONENTS. SHOULD A CONFLICT EXIST BETWEEN THE ARCHITECTURAL AND ENGINEERING DRAWINGS REGARDING DIMENSIONS AND SCALE, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF THE DISCREPANCY FOR RESOLUTION.

B. MATERIALS, EQUIPMENT OR LABOR NOT INDICATED BUT WHICH ARE REASONABLY INFERRED TO BE NECESSARY FOR A COMPLETE INSTALLATION SHALL BE PROVIDED. DRAWINGS AND SPECIFICATIONS DO NOT UNDERTAKE TO INDICATE EVERY ITEM OF MATERIAL, EQUIPMENT, OR LABOR REQUIRED TO PRODUCE A COMPLETE AND PROPERLY OPERATING INSTALLATION.

1.05 OPERATION AND MAINTENANCE MANUALS

A. THE CONTRACTOR SHALL PREPARE A MINIMUM OF TWO (2) INSTRUCTION MANUALS, ONE OF WHICH SHALL BE SUBMITTED TO THE ARCHITECT FOR THE ENGINEER'S REVIEW, DESCRIBING INSTALLATION, OPERATION AND MAINTENANCE OF ALL PLUMBING EQUIPMENT. MANUALS SHALL INCLUDE COPIES OF CONTROL SCHEMATICS, SEQUENCES OF OPERATIONS, INDICATE THE FUNCTION AND OPERATIONS OF ALL COMPONENTS, AS WELL AS THE CONTRACTOR'S NAME, ADDRESS, AND TELEPHONE NUMBER. MANUALS SHALL ALSO CONTAIN ONE COPY OF ALL MANUFACTURERS' DRAWINGS, PAMPHLETS, DATA, PARTS LISTS AND INSTRUCTIONS MANUAL FOR EACH PIECE OF EQUIPMENT. UPON APPROVAL, ONE COPY SHALL BE DELIVERED TO THE OWNER; ONE COPY SHALL BE KEPT BY THE CONTRACTOR. THE PAMPHLETS AND DRAWINGS ARE TO BE NEATLY BOUND IN A 3-RING BINDER(S).

B. THE CONTRACTOR SHALL GIVE DETAILED INSTRUCTIONS FOR A PERIOD OF NOT LESS THAN TWO (2) DAYS TO THE RESPONSIBLE PERSONNEL DESIGNATED BY THE OWNER IN THE OPERATION AND MAINTENANCE OF ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT. A LETTER CONTAINING THE NAME OF THE PERSON OR PERSONS TO WHOM THE INSTRUCTIONS WERE GIVEN AND THE DATES OF INSTRUCTION PERIOD SHALL BE SUBMITTED TO THE ENGINEER IN THE AS-BUILT SUBMITTAL.

C. PRIOR TO FINAL ACCEPTANCE BY THE OWNER, THE CONTRACTOR SHALL TRANSMIT A COMPLETE AS-BUILT DRAWING SUBMITTAL, THREE (3) SETS OF OPERATING AND MAINTENANCE MANUALS, SPARE PARTS LISTS, DRAWINGS, WIRING DIAGRAMS, TROUBLE SHOOTING DATA, MANUFACTURER'S BULLETINS, AND OTHER PERTINENT DATA ON ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT. EACH SET SHALL BE ENCLOSED IN A SUITABLE HARD COVER BINDER.

D. PROVIDE NAME, ADDRESS AND TELEPHONE NUMBERS OF THE MANUFACTURER'S REPRESENTATIVE AND SERVICE COMPANY FOR EACH PIECE OF EQUIPMENT INSTALLED IN THE AS-BUILT SUBMITTAL PACKAGE. PROVIDE ALL LOOSE KEYS FOR SUPPLY VALVES, WALL HYDRANTS AND HOSE BIBS INSTALLED. PROVIDE A FULL REPAIR SET (TOTAL RELIEF VALVE KIT, FIRST CHECK AND SECOND CHECK KITS) FOR EACH REDUCED PRESSURE BACKFLOW PREVENTER INSTALLED.

1.06 AS BUILT DRAWINGS

A. THE CONTRACTOR SHALL MAINTAIN A RECORD OF ALL CHANGES IN THE WORK FROM THAT SHOWN IN THE CONTRACT DOCUMENTS. AFTER ALL WORK IS COMPLETED, THE CONTRACTOR SHALL PREPARE A SET OF "AS-BUILT" REPRODUCIBLE VELUM/MYLAR DRAWINGS THAT REFLECT ALL CHANGES AND THAT ACCURATELY SHOW ACTUAL FINAL CONSTRUCTION, AND TRANSMIT THESE DRAWINGS TO THE ARCHITECT.

1.07 EQUIPMENT, MATERIAL BID BASIS

A. MANUFACTURERS' NAMES, MODEL NUMBERS, ETC. AS SPECIFIED ON THE DRAWINGS AND HEREIN ARE FOR THE PURPOSE OF DESCRIBING TYPE, CAPACITY, FUNCTION AND QUALITY OF EQUIPMENT AND MATERIALS REQUIRED.

B. UNLESS "APPROVED EQUAL" IS SPECIFICALLY STATED, BIDS SHALL BE BASED ON EQUIPMENT NAMED IN SPECIFICATIONS OR ON DRAWINGS AS "BASE" PRODUCTS. PROPOSED ALTERNATE EQUIPMENT AND MATERIALS MAY BE SUBMITTED ALONG WITH THE "BASE" PRODUCTS, PROVIDED DEDUCTIVE PRICING IS INCLUDED WITH THE ALTERNATE.

C. ALTERNATE "APPROVED EQUAL" ITEMS LISTED SHALL CONFORM TO SPECIFIED BASE ITEMS AND SHALL BE SUBSTANTIALLY EQUAL IN QUALITY, SIZE, WEIGHT, CONSTRUCTION, CAPACITIES AND PERFORMANCE. THE ALTERNATE EQUIPMENT AND MATERIALS SHALL BE SUBMITTED AS FULL EQUIVALENT TO THE EQUIPMENT AND MATERIALS SPECIFIED, WITH SUFFICIENT SUPPORTIVE DOCUMENTATION AND TECHNICAL LITERATURE TO DEMONSTRATE QUALITY, PERFORMANCE, AND WORKMANSHIP WITHOUT DOUBT OR QUESTION. THE ENGINEER SHALL CONSIDER THE USE OF THE ALTERNATE EQUIPMENT BASED ON THE SUPPORTIVE DOCUMENTATION AND OTHER INFORMATION AVAILABLE TO HIM, AND SHALL APPROVE OR DISAPPROVE ANY ALTERNATES.

D. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL PLUMBING EQUIPMENT PROPOSED FOR USE IN THIS PROJECT WITH ALL BUILDING TRADES (ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL). COORDINATION SHALL BE ACCOMPLISHED PRIOR TO, AND SHALL BE REFLECTED IN, THE SUBMITTAL OF SHOP DRAWINGS FOR APPROVAL. ANY MODIFICATIONS OR REVISIONS REQUIRED BY OTHER TRADES AS A RESULT OF THE USE OF EQUIPMENT OTHER THAN THE BASIS OF DESIGN SHALL BE MADE AT NO ADDITIONAL COST. WHEN SUBSTITUTION OF EQUIPMENT IS MADE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COSTS OF ANY ITEM AND ENGINEERING AND CONSTRUCTION REVISIONS NECESSARY IN HIS OR ANY OTHER CONTRACT OR TRADE THAT MAY BE REQUIRED TO SATISFY PLANS AND SPECIFICATIONS.

1.08 SUBMITTALS

A. THE CONTRACTOR SHALL PREPARE, SUBMIT, AND OBTAIN ENGINEER'S REVIEW OF MANUFACTURERS' SUBMITTALS ON THE FOLLOWING EQUIPMENT AND SYSTEMS PRIOR TO ORDERING, PURCHASING, OR INSTALLATION OF ANY EQUIPMENT OR MATERIALS. ALL REQUIRED SUBMITTALS SHALL BE TRANSMITTED SIMULTANEOUSLY IN HARD RING BINDERS WITH THE ASSOCIATED SPECIFICATION SECTION AND THE ITEM SUBMITTED CLEARLY IDENTIFIED. PARTIAL SUBMITTALS WILL BE RETURNED WITHOUT REVIEW.

1. PLUMBING FIXTURES, FAUCETS AND TRIM
2. WATER HEATERS AND STORAGE TANKS
3. DOMESTIC WATER PRESSURE SYSTEM
4. INSULATION
5. FLOOR DRAINS AND DRAINAGE ACCESSORIES
6. HYDRANTS AND HOSE BIBBS
7. MIXING VALVES
8. HOT WATER RETURN PUMPS
9. BACKFLOW PREVENTERS
10. PIPE AND FITTINGS
11. VALVES
12. PIPE SUPPORTS
13. PIPING ACCESSORIES
14. PIPE LABELS AND VALVE TAGS

B. ALL APPROVALS REQUIRED BY ANY CODE OR ENFORCEMENT AUTHORITY, INSURANCE UNDERWRITER, ETC. SHALL BE OBTAINED PRIOR TO EQUIPMENT BEING SUBMITTED TO THE ENGINEER.

C. REVIEW OF SUBMITTALS BY THE ENGINEER DOES NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY FOR COMPLYING WITH ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS. FURTHERMORE, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE REQUIREMENTS OF ALL APPROVED EQUIPMENT WITH OTHER TRADES AND DISCIPLINES SUCH AS ROOF OPENINGS, WALL OPENINGS, ELECTRICAL CHARACTERISTICS, ETC.

D. INCLUDED WITH SUBMITTALS OF PLUMBING EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS SHALL BE A WRITTEN STATEMENT CONFIRMING COORDINATION OF VOLTAGE REQUIREMENTS, BEARING THE NAMES AND SIGNATURES OF THE PLUMBING AND ELECTRICAL CONTRACTORS. A PHOTOCOPIED REPRODUCTION OF THE BELOW STATEMENT IS ACCEPTABLE.

VOLTAGE COORDINATION STATEMENT

THIS STATEMENT IS TO CONFIRM THAT THE VOLTAGES OF THE EQUIPMENT PROVIDED UNDER THIS SPECIFICATION HAVE BEEN COORDINATED WITH THE ELECTRICAL DRAWINGS, AS WELL AS WITH THE ELECTRICAL CONTRACTOR.

PLUMBING CONTRACTOR: _____
PROJECT MANAGER NAME: _____
PROJECT MANAGER SIGNATURE/DATE: _____

ELECTRICAL CONTRACTOR: _____
PROJECT MANAGER NAME: _____
PROJECT MANAGER SIGNATURE/DATE: _____

1.10 COORDINATION OF TRADES

A. PIPING AND OTHER PLUMBING EQUIPMENT SHALL NOT BE INSTALLED WITHOUT FIRST COORDINATING THE INSTALLATION OF SAME WITH OTHER TRADES. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL RELOCATE ALL UNCOORDINATED PIPING AND OTHER PLUMBING EQUIPMENT INSTALLED SHOULD THEY INTERFERE WITH THE PROPER INSTALLATION AND MOUNTING OF ELECTRICAL, HVAC EQUIPMENT, CEILINGS AND OTHER ARCHITECTURAL OR STRUCTURAL FINISHES.

B. IN AREAS WHERE MORE THAN ONE TRADE IS REQUIRED TO USE COMMON OPENINGS IN BEAMS, JOISTS, CHASES, SHAFTS AND SLEEVES FOR THE PASSAGE OF CONDUITS, RACEWAYS, PIPING, DUCTWORK AND OTHER MATERIALS, THE CONTRACTOR MUST COORDINATE THE POSITIONS OF ALL PIPING AND EQUIPMENT TO BE FURNISHED UNDER THIS SECTION SO THAT ALL ITEMS INCLUDING THE MATERIALS AND EQUIPMENT OF OTHER TRADES MAY BE ACCOMMODATED WITHIN THE SPACE AVAILABLE.

1.11 WARRANTY

A. ALL EQUIPMENT FURNISHED AND INSTALLED UNDER THIS CONTRACT SHALL BE PROVIDED WITH THE MANUFACTURER'S STANDARD WARRANTY UNLESS OTHERWISE NOTED.

B. THE CONTRACTOR SHALL MAKE GOOD ALL DEFECTS IN MATERIAL, EQUIPMENT, OR WORKMANSHIP DISCLOSED WITHIN A PERIOD OF ONE (1) YEAR FROM DATE OF FINAL BUILDING ACCEPTANCE BY THE OWNER. THE PHRASE "MAKE GOOD" SHALL MEAN TO FURNISH PROMPTLY, WITHOUT CHARGE, ALL WORK NECESSARY TO REMEDY THE DEFECTS TO THE SATISFACTION OF THE ENGINEER.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. ALL EQUIPMENT, MATERIALS, ACCESSORIES, ETC. USED SHALL BE NEW AND OF CURRENT PRODUCTION UNLESS SPECIFIED OTHERWISE. EQUIPMENT NOT SPECIFIED IN THE CONTRACT DOCUMENTS SHALL BE SUITABLE FOR THE INTENDED USE AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

B. ALL EQUIPMENT SHALL BEAR THE INSPECTION LABEL OF UNDERWRITERS LABORATORIES INC.

C. ALL EQUIPMENT AND MATERIAL FOR SIMILAR APPLICATIONS OR SYSTEMS SHALL BE PROVIDED FROM THE SAME MANUFACTURER UNLESS NOTED OTHERWISE.

D. CAST IRON SOIL PIPE AND FITTINGS SHALL BEAR THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE.

2.02 PIPING SYSTEMS

A. DOMESTIC COLD WATER SYSTEM, UNDERGROUND, SUITABLE FOR WORKING PRESSURE OF 125 PSIG.

1. PIPING SYSTEMS
   A. CLASS 50 OR 51 DUCTILE IRON PIPIN ANSI A21.51, ASTM A746 WITH BITUMINOUS COATING OUTSIDE AND CEMENT MORTAR LINING INSIDE, DUCTILE IRON MECHANICAL OR PUSH-ON JOINTS AND FITTINGS.
   B. POLYVINYL CHLORIDE (PVC), 160 OR 200 PSI WATER PIPING WITH MECHANICAL OR PUSH-ON JOINTS WITH NEOPRENE "O" RINGS, ASTM D3139.
2. TRENCHING CONDITIONS: CLASS B1 BEDDING WITH 4" MINIMUM THICKNESS OF CLEAN GRANULAR FILL.

B. DOMESTIC COLD WATER AND HOT WATER SYSTEMS ABOVE GROUND:

1. PIPING SYSTEMS
   A. TYPE "L" COPPER TUBING, ASTM B-88. SOLDER OR BRAZED COPPER FITTINGS, B16.18 OR 16.22. GROOVED COPPER FITTINGS WITH FULL FLOW RADIUS ELBOWS, ASTM B-75, ASTM B-584, RIDGID VIEGA PROPRESS AND PROPRESS XL SYSTEMS. DUCTILE IRON MECHANICAL COUPLINGS WITH BOLTED CONNECTION FOR GROOVED PIPING, ASTM A-536, SOLDERED OR BRAZED JOINTS WITH LEAD-FREE BRAZING FILLER MATERIALS AND COMPATIBLE ALLOYS.
   B. CHLORINATED POLYVINYL CHLORIDE (CPVC) SCHEDULE 80, ASTM F-441 AND D-2846 (100 PSI AT 180 DEGREES F), WITH SCHEDULE 40 SOCKET TYPE CPVC FITTINGS, ASTM F-439 AND F-441.
   C. HOT AND COLD WATER SYSTEMS WITHIN LIVING UNITS ONLY: CROSS-LINKED POLYETHYLENE (PEX) PLASTIC TUBING, PEX-A GRADE, ASTM F-876; ASTM F-877 (100 PSI AT 180 DEGREES F).
      A) ACCEPTABLE PEX MANUFACTURERS/SYSTEMS:
         (1) UPONOR WIRSBRO AQUAPEX TUBING WITH PROPEX FITTINGS
         (2) REHAU RAUPEX TUBING WITH EVERLOC FITTINGS

C. SANITARY, WASTE AND VENT AND STORM DRAIN SYSTEMS, BELOW GROUND TO 5'-0" OUTSIDE BUILDING:

1. SERVICE WEIGHT HUB AND SPIGOT CAST IRON SOIL PIPE PER ASTM A-74, COATED ON OUTSIDE WITH SERVICE WEIGHT HUB AND SPIGOT CAST IRON SOIL PIPE FITTINGS PER ASTM-A-74.
2. SCHEDULE 40 DWV PVC PIPE, ASTM 1785, WITH SCHEDULE 40 DWV PVC, SOCKET TYPE FITTINGS, (PVC PIPING IS NOT ACCEPTABLE FOR WASTE PIPING RECEIVING DISCHARGE HIGHER THAN 130 DEGREES F, CAST IRON PIPING IS TO BE INSTALLED AT THE CENTRAL PLANT, MECHANICAL ROOMS AND AT ALL LAUNDRY AND KITCHEN EQUIPMENT DISCHARGES.)
3. FOAM CORE PVC IS NOT ACCEPTABLE FOR ANY DRAINAGE SYSTEM.

D. SANITARY WASTE AND VENT SYSTEM AND STORM DRAINAGE SYSTEM ABOVE GROUND

1. NO-HUB CAST IRON SOIL PIPE, CISPI 301 AND ASTM A888, WITH NO-HUB CAST IRON FITTINGS PER CISPI 301 AND ASTM A888. JOINTS FOR NO-HUB PIPE AND FITTINGS SHALL BE PER CISPI 310, WITH STAINLESS STEEL CLAMPS AND NEOPRENE SLEEVE.
2. POLYVINYL CHLORIDE (PVC), SCHEDULE 40 DWV PVC PIPE, ASTM 1785, WITH SCHEDULE 40 DWV PVC, SOCKET TYPE FITTINGS, ASTM 2665. PVC PIPING IS NOT ACCEPTABLE IN PLENUM CEILINGS OR FOR WASTE PIPING RECEIVING WASTE DISCHARGE HIGHER THAN 130 DEGREES F, SUCH AS FROM LAUNDRY AND KITCHEN EQUIPMENT.
3. FOAM CORE PVC PIPING IS NOT ACCEPTABLE FOR ANY DRAINAGE SYSTEM.

2.03 VALVES, FLANGES AND UNIONS

A. GENERAL

1. ALL SYSTEMS UNDER THIS SECTION SHALL BE PROVIDED WITH VALVES TO PERMIT COMPLETE AND SECTIONAL CONTROL OF THE SYSTEM. THEY SHALL BE LOCATED TO PERMIT EASY OPERATION, REPLACEMENT AND REPAIR. THEY SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS AND AS SPECIFIED.
2. CONTROL VALVES SHALL BE PROVIDED FOR THE DOMESTIC HOT AND COLD WATER SUPPLY TO ALL RISERS AND SPECIFIC AREAS SUCH AS RESTROOMS, FIXTURE GROUPS, EQUIPMENT, HOSE BIBBS AND WALL HYDRANTS, FOOD SERVICE AREAS AND BUILDING SEPARATIONS. VALVES SHALL BE LOCATED IN BACK-OF-HOUSE OR SERVICE AREAS WITH ACCESS PANELS OR ABOVE LAY-IN CEILINGS. NO ACCESS PANELS WILL BE PERMITTED IN PUBLIC SPACES.

B. BALANCING VALVES (HOT WATER RECIRCULATION)

1. BALANCING VALVES SHALL BE BRONZE BODY WITH BRASS BALL, 200 PSI WORKING PRESSURE. VALVES SHALL BE ADJUSTABLE TO POSITIVE SHUTOFF WITH MEMORY STOP DEVICE. BALANCING VALVES SHALL BE BELL AND GOSSETT CIRCUIT SETTER "RF" SERIES OR GERAND BALVALVE INDICATOR.

C. BACKFLOW PREVENTORS

1. BACKFLOW PREVENTERS SHALL BE INSTALLED IN ALL LOCATIONS REQUIRED BY CODE AND LOCAL AUTHORITIES, AT ALL CONNECTIONS TO MECHANICAL AND LAUNDRY EQUIPMENT, AND ELSE WHERE AS SHOWN ON THE DRAWINGS. BACKFLOW PREVENTERS SHALL BE REDUCED PRESSURE PRINCIPLE TYPE AND SHALL BE A COMPLETE ASSEMBLY INCLUDING TIGHT CLOSING SHUTOFF VALVES BEFORE AND AFTER THE DEVISE. A STRAINER SHALL BE LOCATED UPSTREAM OF THE DEVICE. ROUTE RELIEF OUTLET FROM CONE RECEPTOR TO AN AIR GAP FITTING FOR DISCHARGE TO SANITARY SEWER.
2. ACCEPTABLE MANUFACTURERS ARE AME'S COMPANY, APOLLO VALVES, HERSEY PRODUCTS, WATTS REGULATOR, AND ZURN-WILKINS.
3. CLASS II TURBINE TYPE WATER METERS SHALL BE INSTALLED DOWNSTREAM OF THE BACKFLOW PREVENTER, ON THE DOMESTIC WATER SUPPLY TO HVAC EQUIPMENT MAKE-UP, IRRIGATION SUPPLY, AND POOL/FOUNTAIN SUPPLY TO ALLOW FOR A REDUCTION IN SEWER RATE CHARGES.
4. PRESSURE REDUCING VALVES
   A. A DUPLEX PRESSURE REDUCING VALVE STATION SHALL BE PROVIDED ON ALL DOMESTIC WATER SYSTEMS GREATER THAN 80 PSI. THE STATION SHALL BE PROVIDED WITH A FULL SIZE BYPASS.
5. UNIONS AND JOINTS
   A. UNIONS ON DRAINAGE PIPES ON FIXTURE SIDE OF TRAPS MAY BE SLIP OR FLANGED JOINTS WITH SOFT RUBBER WASHERS OR GASKETS. UNIONS 2" AND SMALLER ON COPPER PIPE SHALL BE ALL BRASS WITH GROUND JOINT AND SHALL BE 250# COPPER TO COPPER. UNIONS ABOVE 2" SHALL BE FLANGED WITH GASKETS. PROVIDE UNION AT WATER AND GAS CONNECTION TO ALL EQUIPMENT, EXCEPT PLUMBING FIXTURES.
   B. BATHTUB WASTE AND OVERFLOW JOINTS SHALL BE SOLDERED IF REQUIRED BY LOCAL AUTHORITIES TO ELIMINATE THE REQUIREMENT FOR AN ACCESS PANEL TO BATHTUB DRAIN CONNECTION.

2.04 FLOOR DRAINS

A. DRAIN TYPES

1. FLOOR DRAINS NOTED AS FD "CI" FOR USE AT COOLING TOWERS SHALL BE JAY R. SMITH FIGURE 3970 CAST IRON DRAIN WITH DOMED STRAINER, 10-½" DIAMETER.
2. FLOOR DRAINS NOTED AS FD "DD" FOR USE IN DECK DRAINAGE APPLICATIONS SHALL BE JAY R. SMITH FIGURE 1412-HP, C.I. DRAIN WITH 13" SQUARE HEEL PROOF GRATE, D.I. UNDERGRATE WITH NICKEL BRONZE STRAINER.
3. FLOOR DRAINS NOTED AS FD "G" FOR USE IN PUBLIC SPACES SUCH AS RESTROOMS, LOCKER ROOMS, SHOWERS, ETC., SHALL BE GENERAL PURPOSE TYPE. DRAINS SHALL BE CAST IRON WITH 6" SQUARE NICKEL BRONZE STRAINER AND TRAP PRIMER CONNECTION. DRAINS SHALL BE JAY R. SMITH FIGURE 2005B-L-B6-P050 OR APPROVED EQUAL.
4. FLOOR DRAINS NOTED AS FD "K" FOR USE IN FOOD SERVICE AREAS SHALL BE GENERAL DUTY TYPE, CAST IRON, WITH FLASHING COLLAR, SEDIMENT BUCKET, NICKEL BRONZE, AND 6" SQUARE NICKEL BRONZE STRAINER. DRAINS SHALL BE JAY R. SMITH 2010-B6-B OR APPROVED EQUAL.
5. FLOOR DRAINS NOTED AS FD "M" FOR USE IN MECHANICAL ROOMS SHALL BE HEAVY DUTY TYPE. DRAINS SHALL BE CAST IRON SHALLOW TYPE, 12" DIAMETER WITH DUCTILE IRON TRACTOR GRATE, SEDIMENT BUCKET, AND TRAP PRIMER CONNECTION. SECURED FUNNELS SHALL BE PROVIDED ON ALL DRAINS RECEIVING CONDENSATE DISCHARGE TO ELIMINATE OVERFLOW OR SPILLAGE. DRAINS SHALL BE JAY R. SMITH FIGURE 2141 SERIES OR APPROVED EQUAL.
6. FLOOR SINKS NOTED AS "FS" FOR USE IN FOOD SERVICE AREAS SHALL BE CAST IRON WITH ACID RESISTANT COATING, 12" SQUARE X 8" DEEP, ALUMINUM DOME BOTTOM STRAINER, NICKEL BRONZE HALF OR THREE-QUARTER GRATE AS REQUIRED BY THE EQUIPMENT SERVED. FLOOR SINKS SHALL BE JAY R. SMITH FIGURE 3430 SERIES.
7. FLOOR DRAINS NOTED AS FD "P" FOR USE IN PLANTER DRAINS WITH STANDPIPES SHALL BE JAY R. SMITH FIGURE 2685, C.I. DRAIN WITH BRONZE STANDPIPE AND DOME, FIELD-VERIFY EXACT HEIGHT REQUIRED.
8. FLOOR DRAINS NOTED AS FD "PD" FOR USE IN PARKING DECK DRAINAGE AREAS SHALL BE JAY R. SMITH FIGURE 2142-M, C.I. DRAIN WITH 11-½" DUCTILE IRON GRATE SEDIMENT BUCKET.
9. FLOOR DRAINS NOTED AS FD "TD" FOR USE AT TRENCH DRAINS IN PARKING DECK AREAS SHALL BE ZURN FLOW-THRU SYSTEM, Z-812 SERIES, 12" WIDE, 4" OUTLETS, Z-812-HPD DUCTILE IRON HEEL PROOF GRATE.
10. UNLESS OTHERWISE NOTED, ACCEPTABLE MANUFACTURERS SHALL BE JOSAM, JAY R. SMITH, MIFAB, WATTS, AND ZURN.

B. TRAP PRIMERS

1. DRAINS NOT RECEIVING A CONTINUOUS DISCHARGE ARE TO BE PROVIDED WITH AN AUTOMATIC TRAP PRIMER, PRECISION PLUMBING PRODUCTS DUAL FLOW SERIES.

C. ROOF DRAINS

1. ROOF DRAINS LABELED "RD" INSTALLED IN POURED CONCRETE SLAB SHALL HAVE A CAST IRON BODY WITH COMBINED FLASHING AND GRAVEL STOP, CAST-IRON DOME. JAY R. SMITH 1010 OR APPROVED EQUAL.
2. ROOF DRAINS LABELED "RD" INSTALLED IN STEEL CONSTRUCTION OR BUILT-UP ROOF SHALL HAVE A CAST IRON BODY WITH COMBINED FLASHING AND GRAVEL STOP, UNDERDECK CLAMP AND SUMP RECEIVER, ADJUSTABLE EXTENSION AND CAST IRON DOME. JAY R. SMITH 1015-R-C OR APPROVED EQUAL.
3. EMERGENCY ROOF DRAINS LABELED "ERD" SHALL HAVE A CAST IRON BODY, COMBINED FLASHING AND GRAVEL STOP, CAST-IRON DOME, PVC STANDPIPE UNDER DOME, UNDER DECK CLAMP, SUMP RECEIVER AND EXTENSION AS REQUIRED. JAY R. SMITH 1070-C-R OR APPROVED EQUAL.
4. UNLESS OTHERWISE NOTED, ACCEPTABLE MANUFACTURERS SHALL BE JOSAM, SIOUX CHIEF, J.R. SMITH, MIFAB, WATTS, AND ZURN.

2.05 INSULATION

A. THE FOLLOWING SHALL BE INSULATED:

1. ALL DOMESTIC COLD WATER PIPING ABOVE GRADE EXCEPT AT HORIZONTAL CHASE BRANCH PIPING TO INDIVIDUAL PLUMBING FIXTURES.
2. ALL HOT WATER AND HOT WATER RETURN PIPING EXCEPT AT HORIZONTAL CHASE BRANCH PIPING TO INDIVIDUAL PLUMBING FIXTURES.
3. ALL HORIZONTAL STORM DRAIN PIPING AND ROOF DRAIN BODIES.

B. DOMESTIC HOT, COLD, HOT WATER RECIRCULATION, PRIMARY STORM DRAINAGE, AND WASTE DRAINAGE PIPING SHALL BE INSULATED WITH 4 LB. DENSITY SECTIONAL FIBERGLASS INSULATION WITH A THERMAL CONDUCTIVITY NOT TO EXCEED 0.24 WITH WHITE ALL SERVICE JACKET AND VAPOR BARRIER. ALL JOINTS AND SEAMS SHALL BE SEALED VAPOR TIGHT. ALL SEAMS AND STAPLES SHALL THEN BE COVERED WITH "ALL SERVICE JACKET" THREE-INCH WIDE TAPE.

C. ALL INTERIOR HORIZONTAL STORM DRAINAGE PIPING SYSTEMS AND ROOF DRAIN BODIES ARE TO BE INSULATED WITH BLANKET TYPE GLASS FIBER BONDED WITH THERMOSETTING RESIN WITH WHITE VINYL VAPOR RETARDING FACING, 2" WIDE STAPLING/TAPING TAB.

D. MATERIALS AS SPECIFIED IN THIS SECTION SHALL BE MANUFACTURED BY CERTAINTEED, JOHNS MANVILLE, KNAUF, OWENS CORNING OR EQUAL. INSULATION THICKNESSES SHALL BE AS SHOWN IN THE FOLLOWING TABLE:

MINIMUM PIPE INSULATION			INSULATION THICKNESS FOR PIPE SIZES				
PIPING SYSTEM TYPES	FLUID TEMPERATURE RANGE		1 IN. AND LESS	1-1/4 TO 2 IN.	2-1/2 TO 4 IN.	5 AND 6 IN.	8 IN. AND LARGER
	°C	F	IN.	IN.	IN.	IN.	IN.
PLUMBING							
DOMESTIC WATER	AMBIENT	AMBIENT	0.5	1.0	1.0	1.0	--
DOMESTIC HOT WATER AND HOT WATER RECIRCULATION	43-71	110-160	1.0	1.0	1.5	1.5	--
ABOVE GRADE DRAINS AND PIPING RECEIVING CONDENSATE OR ICE MACHINE DISCHARGE	4.5-15.5	40-60	0.5	1.0	1.0	1.5	--
HORIZONTAL STORM DRAINAGE	AMBIENT	AMBIENT	--	--	1.0	1.0	1.0

2.06 HEAT CABLE FOR FREEZE PROTECTION OF PIPING

A. PROVIDE ELECTRIC HEAT TRACING ON ALL DOMESTIC WATER PIPING AND SANITARY TRAPS EXPOSED TO AREAS SUBJECT TO FREEZING.

B. PROVIDE A COMPLETE UL LISTED, CSA CERTIFIED, OR FM APPROVED SYSTEM OF HEATING CA LES, COMPONENTS, AND CONTROLS TO PREVENT PIPES FROM FREEZING.

2.07 PIPE SUPPORTS & HANGERS

A. ALL PIPING SHALL BE SUPPORTED BY MEANS OF HANGER RODS AND PIPE HANGERS FROM ROOF OR FLOOR STRUCTURE USING SUPPLEMENTARY STEEL AND/OR LAGBOLTS. WATER SUPPLY PIPE CONNECTING FIXTURES OR FIXTURE SUPPLIES SHALL BE MADE RIGID.

B. BRANCH PIPING TO FIXTURES IN CHASES SHALL BE SUPPORTED WITH PLASTIC OR COPPER CLAMP TYPE SUPPORTS EQUAL TO:

1. B-LINE RUFFIN SERIES.
2. HOLDRITE SYSTEMS

C. MAXIMUM SPACING BETWEEN PIPE HANGERS SHALL BE:

1. STEEL PIPE
   A. 1-1/4" AND SMALLER: 6'-0"
   B. 1-1/2" - 2": 8'-0"
   C. 2-1/2" AND LARGER: 10'-0"
2. CAST IRON SOIL PIPE: 2" AND LARGER: 10'-0"
3. COPPER TUBING:
   A. 1/2" - 1": 5'-0"
   B. 1-1/4" - 2": 8'-0"
   C. 2-1/2" AND LARGER: 10'-0"
4. PVC/CPVC AND ALL PLASTIC PIPE:
   A. 1-1/4" AND SMALLER: 3'-0"
   B. 1-1/2" AND LARGER: 4'-0"

D. AT LEAST ONE HANGER SHALL OCCUR WITHIN 2'-0" FROM WHERE CHANGE IN DIRECTION TAKES PLACE. WHERE PIPES EXTEND DOWN OR UP TO OTHER FLOORS, PIPE CLAMPS SHALL BE PROVIDED ON EACH FLOOR TO SUPPORT VERTICAL RISERS.

2.08 WATER HEATERS - ELECTRIC

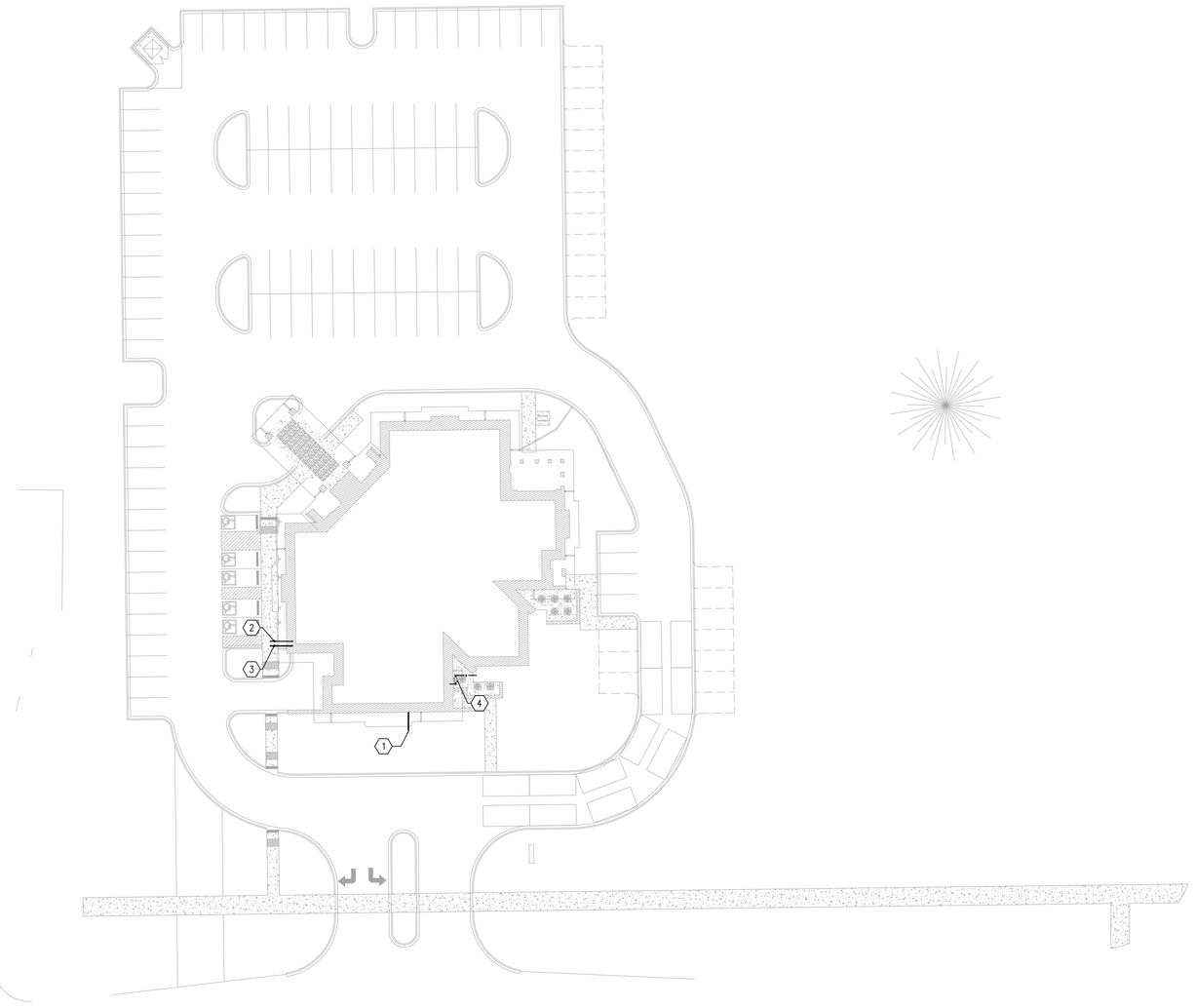
A. PROVIDE ELECTRIC STORAGE TYPE WATER HEATERS AS SPECIFIED ON THE DRAWINGS.

B. WATER HEATER SHALL CARRY A UL CERTIFICATION FOR 150 PSI WORKING PRESSURE, AN ASME TEMPERATURE AND PRESSURE RELIEF VALVE (T AND P) SIZED FOR THE HEATER, VACUUM RELIEF VALVE, IMMERSION THERMOSTAT, GLASS LINED TANK, TEMPERATURE GAUGE ON OUTLET, AND MANUAL RESET HIGH LIMIT CONTROL.

C. PROVIDE A COMBINATION BALL/RELIEF VALVE ON THE DOMESTIC WATER SUPPLY SIZED AS INDICATED ON THE DRAWINGS, WATTS SERIES BRV OR APPROVED EQUAL. THE WATER HEATER SHALL CARRY A FIVE-YEAR MINIMUM LIMITED

KEYED NOTES:

1. NEW 4" SANITARY WASTE LINE. APPROXIMATE ELEVATION 4'-0" B.F.F. REFER TO CIVIL FOR CONTINUATION.
2. 2" DOMESTIC WATER LINE. TERMINATE 5'-0" OUTSIDE OF BUILDING. REFER TO CIVIL FOR CONTINUATION.
3. FIRE LINE TERMINATE 5'-0" OUTSIDE OF BUILDING. REFER TO CIVIL DRAWING FOR COORDINATION.
4. NEW GAS METER WITH LOADS FOR EXISTING BUILDING COORDINATE INSTALLATION REQUIREMENTS WITH GAS COMPANY. PRIOR TO CONSTRUCTION. (NEW ADDITIONAL GAS LOAD – 3,698 CFH NATURAL GAS, 2"GAS LINE @ 2PSI, MAX DISTANCE 200FT.)



1 SITE PLAN - PLUMBING
SCALE: 1" = 30'-0"

NORTH

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Texas Registered Engineering Firm F-4990

Project Number: 1730254
Drawn By:NC Checked By:TC

ISSUE DATE:
AUGUST 18, 2017
PERMIT SET

REVISION:

ANDREW H. SMITH
ENGINEER
No. 6201054517
LICENSED PROFESSIONAL ENGINEER
8.18.17

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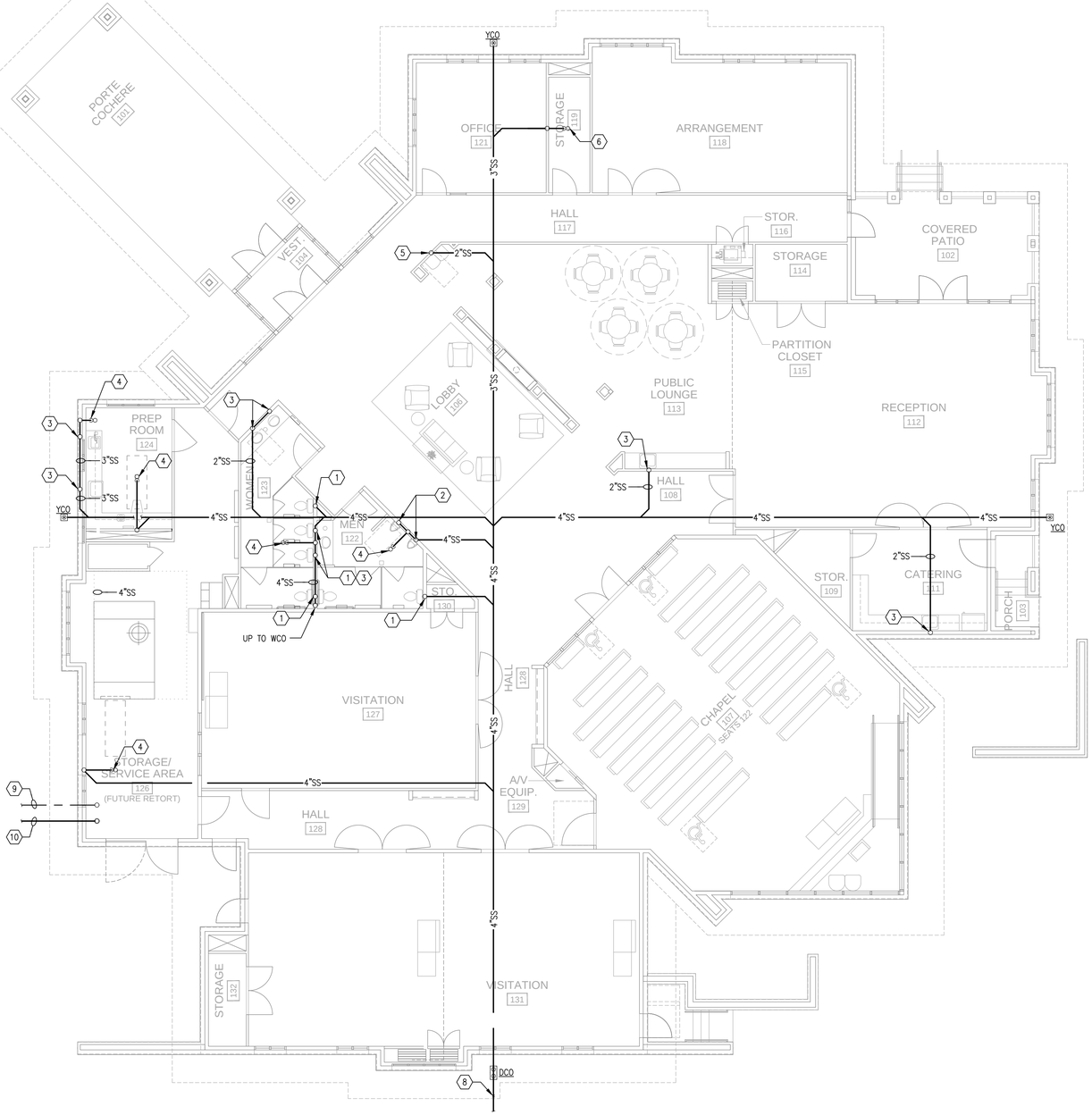
L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

SHEET NO.
P1.0

JOB NUMBER: 16238

KEYED NOTES:

1. PROVIDE 4" SANITARY WASTE LINE UP TO WATER CLOSET
2. PROVIDE 2" SANITARY WASTE LINE UP TO URINAL
3. PROVIDE 2" SANITARY WASTE UP TO LAV/SINK
4. PROVIDE 3" SANITARY WASTE UP TO FLOOR DRAIN/FLOOR SINK
5. PROVIDE 2" SANITARY WASTE UP TO ELECTRIC WATER COOLER
6. 3" SANITARY WASTE UP TO FLOOR DRAIN
7. PROVIDE 3" SANITARY WASTE UP TO FLOOR DRAIN/FLOOR SINK
8. 4" SANITARY WASTE LINE. APPROXIMATE ELEVATION 4'-0" B.F.F. REFER TO CIVIL FOR CONTINUATION.
9. 2" DOMESTIC WATER LINE. TERMINATE 5'-0" OUTSIDE OF BUILDING. REFER TO CIVIL FOR CONTINUATION.
10. FIRE LINE TERMINATE 5'-0" OUTSIDE OF BUILDING. REFER TO CIVIL DRAWING FOR COORDINATION.



1 FLOOR PLAN - UNDERFLOOR

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

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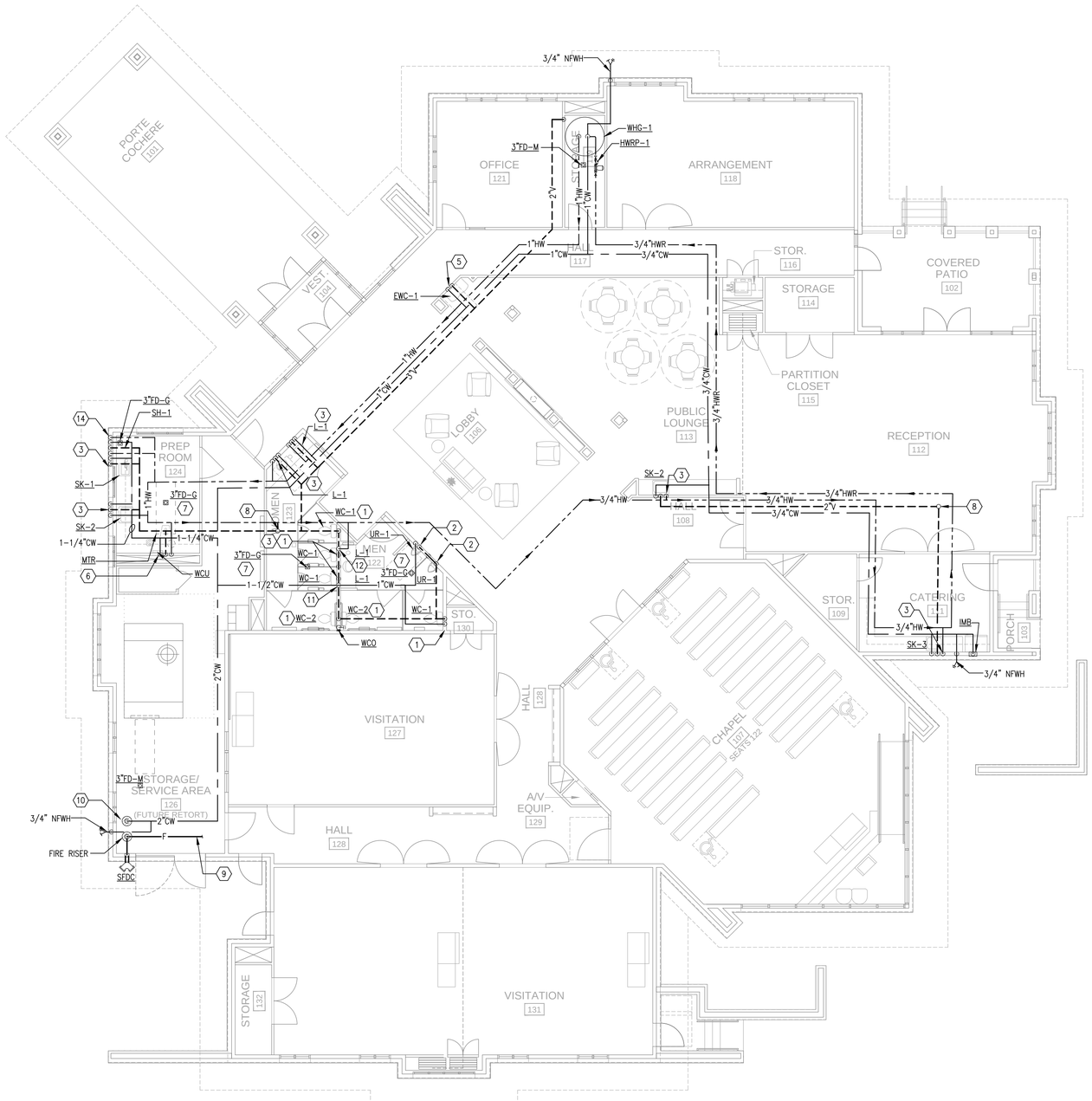
L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

SHEET NO.
P2.0

JOB NUMBER: 16238

KEYED NOTES:

1. WATER CLOSET: PROVIDE 3/4" COLD WATER LINE WITH SHUT-OFF VALVE & WATER HAMMER. 2: VENT AND 4" WASTE LINE.
2. URINAL: PROVIDE 3/4" COLD WATER WITH SHUT OFF VALVE & WATER HAMMER. 2" VENT AND A 2" WASTE LINE.
3. LAVATORY/SINK: PROVIDE 1/2" HOT & COLD WATER WITH SHUT OFF VALVES & WATER HAMMER. 2" VENT AND A 2" WASTE LINE.
4. SERVICE SINK: PROVIDE 1/2" HOT & COLD WATER WITH SHUT OFF VALVES & WATER HAMMER. 2" VENT AND 3" WASTE LINE..
5. ELECTRIC WATER COOLER: PROVIDE 1/2" COLD WATER WITH SHUT OFF VALVE & WATER HAMMER. 2" VENT AND A 2" WASTE LINE.
6. MTR (MORGUE TABLE RECEPTOR): PROVIDE 1-1/4" COLD WATER, 1/2" HOT WATER WITH SHUT OFF VALVE & WATER HAMMER. 2" VENT AND A 4" WASTE LINE.
7. 3" FLOOR DRAIN - TYPE"G". PROVIDE 1/2" TRAP TRAP PRIMER.
8. 3"VTR
9. 4" FIRE LINE TO SPRINKLER SYSTEM.
10. 12" DOMESTIC WATER SYSTEM. REFER TO DETAIL SHEET P0.2/12.
11. PROVIDE 1-1/4" COLD WATER LINE DOWN TO RESTROOM FIXTURES
12. PROVIDE 1/2" HOT WATER LINE DOWN TO SERVE LAVATORIES
13. PROVIDE 3/4" COLD WATER LINE DOWN TO HOSE BIBB. COORDINATE FINAL LOCATION WITH ARCHITECT.
14. PROVIDE 3/4" HOT AND 1-1/4" COLD WATER LINE DOWN TO EMERGENCY SHOWER. PROVIDE MIXING VALVE.



1 FLOOR PLAN - PLUMBING - WATER & VENT

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

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L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

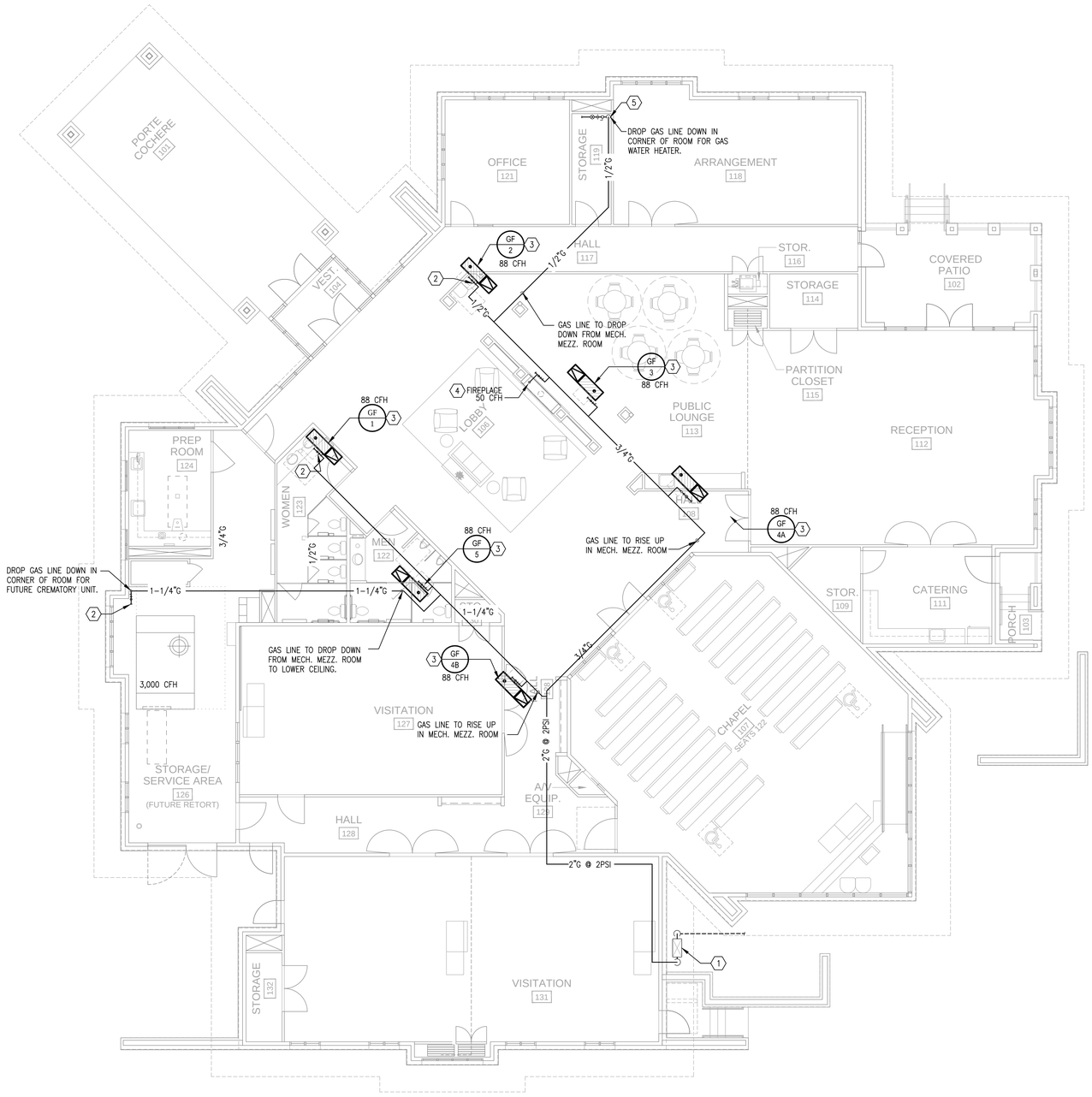
SHEET NO.

P2.1

JOB NUMBER: 16238

KEYED NOTES:

1. GAS METER TO BE REPLACED TO ACCOMMODATE NEW GAS LOADS FOR EXISTING BUILDING COORDINATE INSTALLATION REQUIREMENTS WITH GAS CO. PRIOR TO CONSTRUCTION. (NEW ADDITIONAL GAS LOAD – 3,698 CFH NATURAL GAS, 2"GAS LINE @ 2PSI, MAX DISTANCE 200FT.)
2. 1-1/4" GAS LINE TO CREMATORY UNIT. PROVIDE SHUT-OFF VALVE, GAS REGULATOR AND UNION PER MANUFACTURE RECOMMENDATIONS FOR FUTURE CREMATIORY.
3. PROVIDE 1/2" GAS LINE TO GAS FURNACE. PROVIDE SHUT-OFF VALVE, GAS REGULATOR AND UNION PER MANUFACTURE RECOMMENDATIONS.
4. PROVIDE 1/2" GAS LINE TO FIRE PLACE. PROVIDE SHUT-OFF VALVE, GAS REGULATOR AND UNION PER MANUFACTURE RECOMMENDATIONS.
5. PROVIDE 1/2" GAS LINE TO WATER HEATER. PROVIDE SHUT-OFF VALVE, GAS REGULATOR AND UNION PER MANUFACTURE RECOMMENDATIONS.



1 NATURAL GAS FLOOR PLAN - PLUMBING

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

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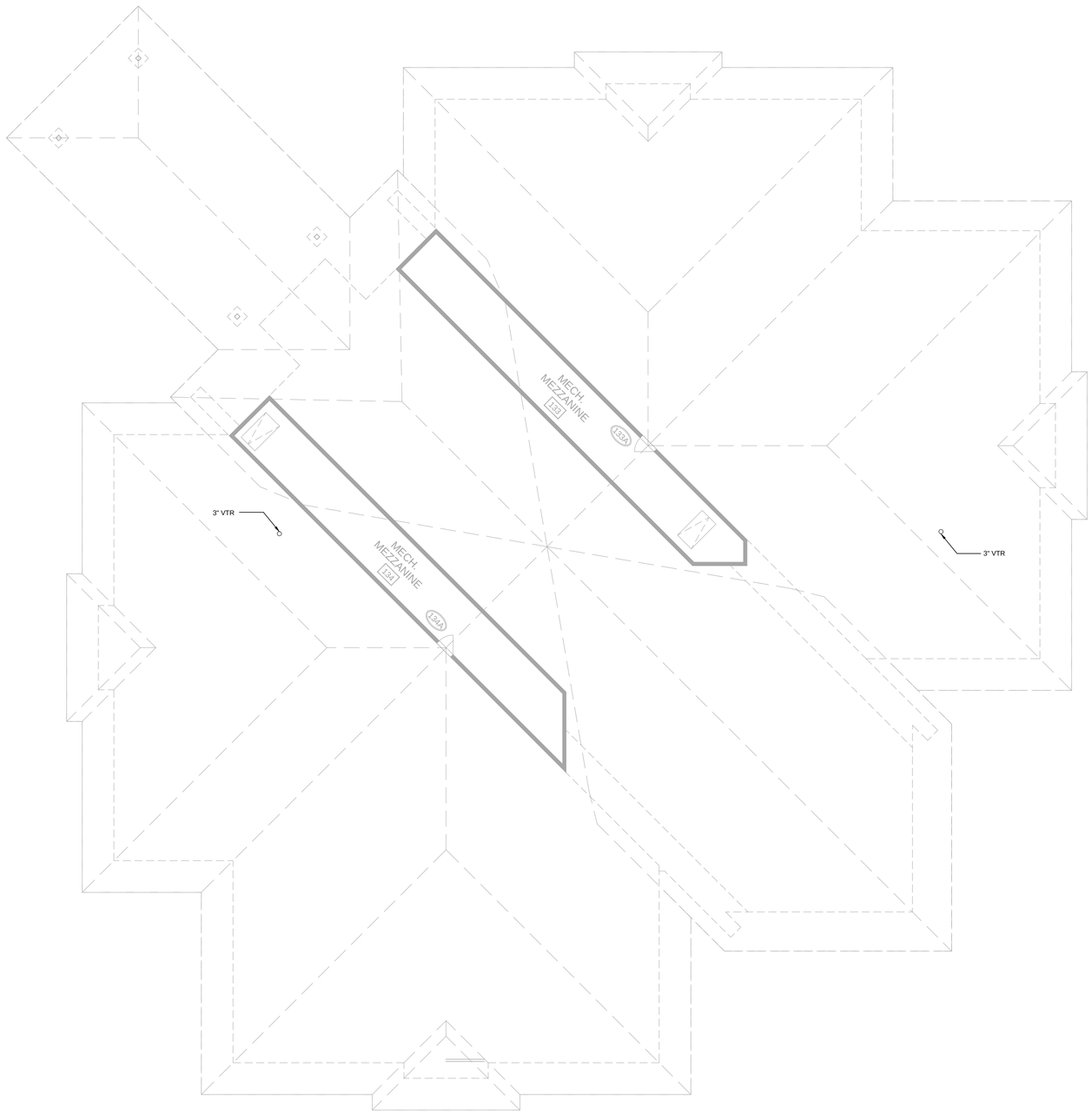
JOB NUMBER: 16238



1 ROOF AND MEZZANINE PLAN - PLUMBING

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

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