Appendix B: Detailed Design Plan

SOUND GEOTHERMAL CORPORATION
9657 S. Lily Garden Ct.
South Jordan, Utah 84095
Tel: (801) 942-6100
www.soundgt.com

PROJECT
CARBONDALE COMMUNITY GEOTHERMAL SYSTEM
PHASE 1 - 3RD STREET CENTER & 2ND STREET TOWNHOUSES
520 S 3RD STREET
CARBONDALE, CO 81623

Revisions
Description Date

NOT FOR CONSTRUCTION

Date: August 28, 2024
Issued for: Schematic Design
Designed By: Mark A Smith
CGD # 329
Drawn By: Mark A Smith
Checked By: Mark A Smith

OVERALL GEOTHERMAL SITE PLAN
XG101

VERIFY SCALE
THIS BAR IS ONE INCH ON ORIGINAL DRAWING
0" —— 1"
ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

0" 20' 40' 80'
1" = 40'

Drawing: C:\USERS\MARK\ONEDRIVE - SOUND GEOTHERMAL CORP\CARBONDALE\ACAD\CARBONDALE SITE PLAN 082824.DWG Date: 08/30/2024 Time: 03:23:52 PM

PHASE 2 EXTENSION TO BRIDGES HIGH SCHOOL

FUTURE WEST EXTENSION

FUTURE SOUTH EAST EXTENSION

FUTURE NORTH EAST EXTENSION

SUBFIELD A

SUBFIELD B

SUBFIELD C

SUBFIELD D

SUBFIELD E

SUBFIELD F

SUBFIELD G

SUBFIELD H

SUBFIELD I

SUBFIELD J

LOT 18 (SEC. 34)

LOT 21 (SEC. 34)

LOT 2 (SEC. 3)

LOT 3 (SEC. 3)

CAPITAL AVENUE

TRIANGLE PARK

COLORADO STATE HIGHWAY NO. 133

SOPRIS PARK TOWNHOMES

Sopris Meadows Subdivision Filing No. 3

KEYED NOTES (ALL GT SHEETS)

1. RUN SUPPLY AND RETURN PIPING IN COMMON TRENCH INSTALL PIPING SIMILAR TO ARRANGEMENT SHOWN IN TRENCH DETAIL.
2. RUN PIPING AT A MINIMUM DEPTH OF 5'-0" AT TOP OF PIPE.
3. GSS AND GSR TO SUBFIELD HEADERS SEE CONTINUATIONS IN DETAILS 3 AND 4 XG501.
4. BOREHOLE SPACING TO BE ~25'-0" O.C. EACH DIRECTION.
5. BOREHOLE DEPTH IS 450', SEE SPECIFICATIONS AND DETAILS, TYPICAL.
6. GSS AND GSR PIPING TO VAULT FROM ALL SUBFIELDS.
7. GSS AND GSR PIPING FROM VAULT TYPICAL.
8. FOR COMPACTION REQUIREMENTS AND TYPE OF BEDDING MATERIAL REFER TO APPROPRIATE EARTH WORK SECTION OF SPECIFICATIONS.
9. ENGINEERS DRAWING WILL CONTROL FINAL LAY-OUT.
10. SUPPORT HDPE PIPING AS SHOWN MAXIMUM DISTANCE BETWEEN SUPPORTS IS 36" C/C.
11. MINIMUM WALKWAY WIDTH 36".
12. CIRCUIT TO BE BALANCED AS SPECIFIED IN MECHANICAL SPECIFICATIONS.
13. INSTALL CBV IN VAULT TO MATCH DIRECTIONAL FLOW MANIFOLD CONFIGURATION IN MECHANICAL ROOM. SEE DETAIL 15 XG502.
14. INSTALL PT PORT ON SUBFIELD GSS AND GSR PRIOR TO ANY CBV OR BFV IN VAULT AND BEFORE PURGE PORT IN MECHANICAL ROOM.
15. COORDINATE ALL GEOTHERMAL PIPING WITH EXISTING AND NEW UTILITIES, SEE DETAIL 10 XG501.
16. CONTRACTOR TO VERIFY INVERT OF STORM DRAIN TO ENSURE PROPER SLOPE OF VAULT DRAIN.
17. CONNECT ENDS OF EACH FUTURE SUBFIELD WITH ELBOWS.

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0" 12.5' 25' 50'

1" = 25'

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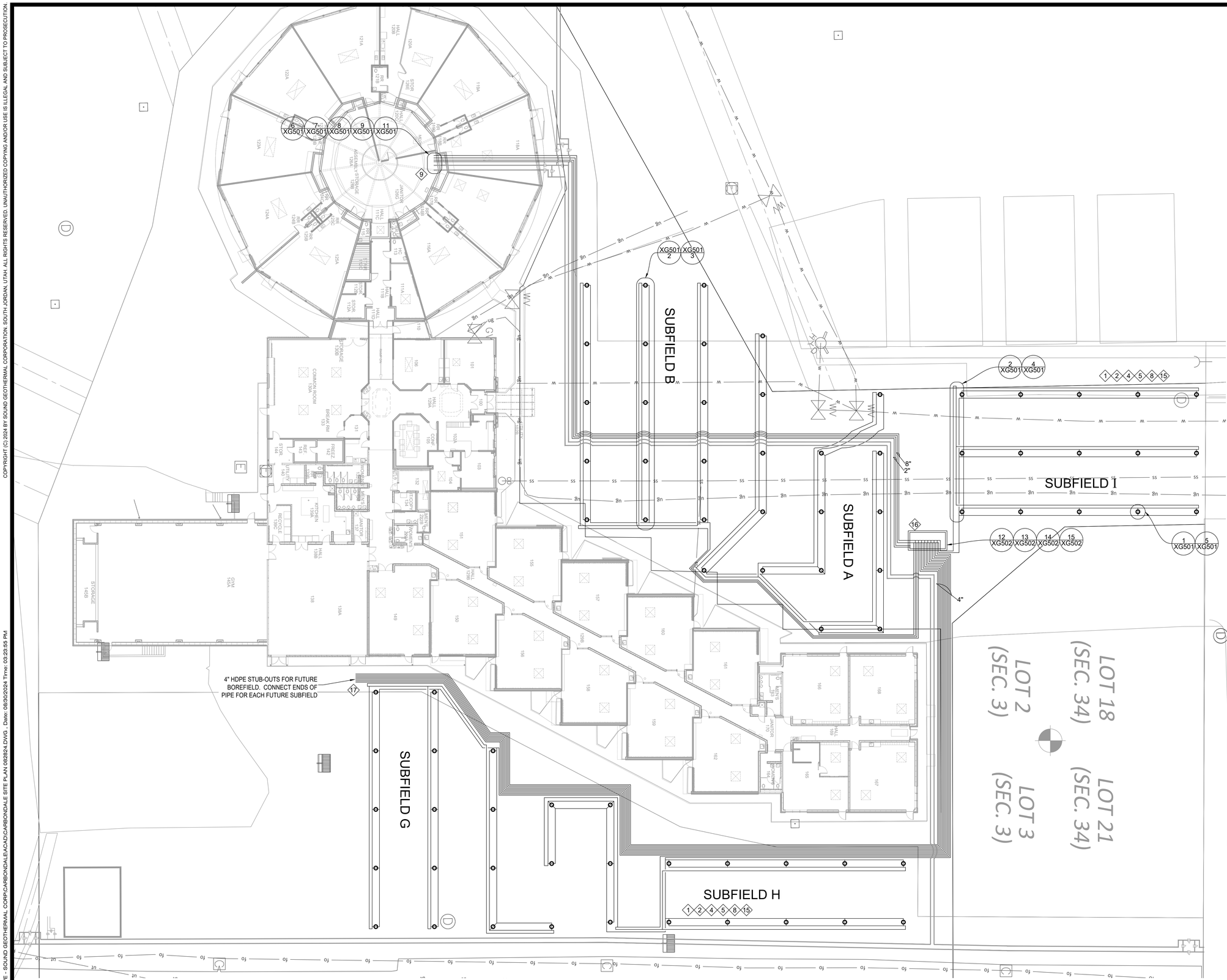
GEOTHERMAL ATL SITE PLAN

XG102

Drawing: C:\USERS\MARK\ONEDRIVE - SOUND GEOTHERMAL CORP\CARBONDALE\ACAD\CARBONDALE SITE PLAN 082824.DWG , Date: 08/30/2024 Time: 03:23:55 PM



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17. CONNECT ENDS OF EACH FUTURE SUBFIELD WITH ELBOWS.

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0" 8' 16' 32'

1" = 16'

N

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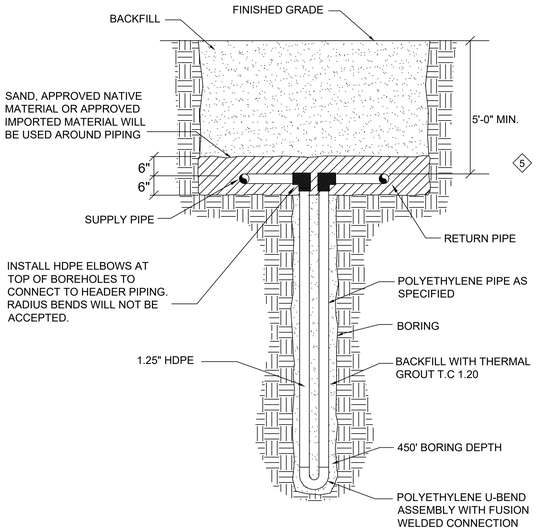
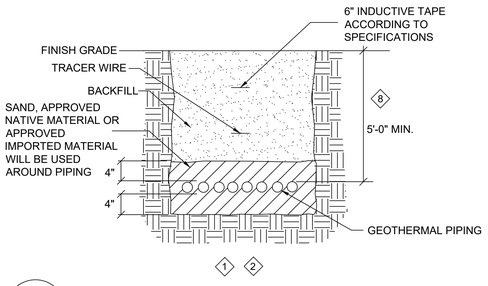
GEOTHERMAL BOREFIELD SITE PLAN

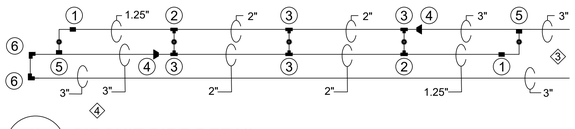
XG103



1 BOREHOLE DETAIL
Scale: NTS (TYPICAL)



2 BOREFIELD TRENCH DETAIL
Scale: NTS (TYPICAL)



3 CIRCUIT PIPE DETAIL
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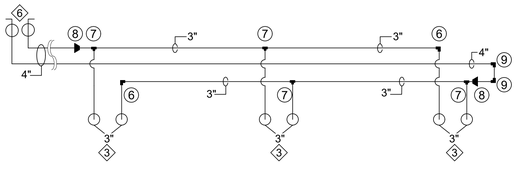
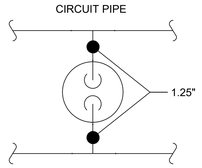
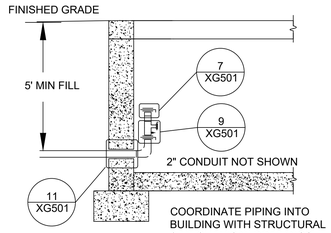


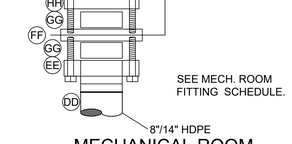
4 SUBFIELD HEADER DETAIL
Scale: NTS (TYPICAL)



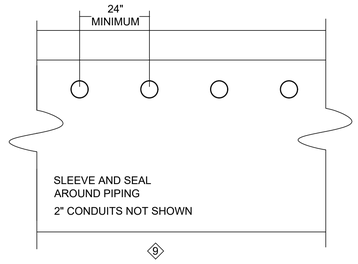
5 BOREHOLE CONNECTION
Scale: NTS (TYPICAL)



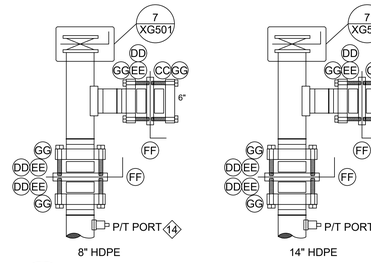
6 MECHANICAL ROOM PENETRATION
Scale: NTS (TYPICAL)



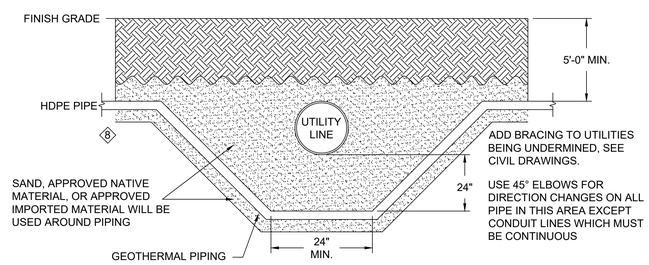
7 MECHANICAL ROOM TERMINATION DETAIL
Scale: NTS (TYPICAL)



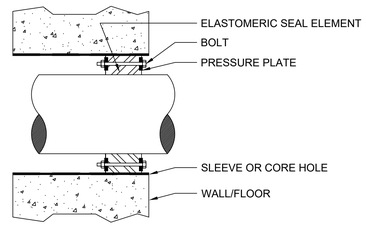
8 PENETRATION SCEMATIC
Scale: NTS (TYPICAL)



9 MECHANICAL ROOM PURGE PORT DETAIL
Scale: NTS (TYPICAL)



10 UTILITY CROSSING DETAIL
Scale: NTS (TYPICAL)



11 WALL/FLOOR PENETRATION DETAIL
Scale: NTS (TYPICAL)

MECH ROOM FITTING SCHEDULE

	SIZE
AA	2" SHORT NIPPLE
BB	2" BALL VALVE
CC	6"/10" BLIND FLANGE
DD	6"/8"/10"/14" HDPE x BEVELED FLANGE ADAPTOR
EE	6"/8"/10"/14" IRON BACK-UP RING
FF	6"/8"/10"/14" LUG BUTTERFLY VALVE
GG	6"/8"/10"/14" LUG KIT
HH	6"/10" x 2" TAPPED BLIND FLANGE
II	8" x 6"/14" x 10" HDPE SADDLE

KEYED NOTES (ALL GT SHEETS)

1. RUN SUPPLY AND RETURN PIPING IN COMMON TRENCH INSTALL PIPING SIMILAR TO ARRANGEMENT SHOWN IN TRENCH DETAIL.
2. RUN PIPING AT A MINIMUM DEPTH OF 5'-0" AT TOP OF PIPE.
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17. CONNECT ENDS OF EACH FUTURE SUBFIELD WITH ELBOWS.

GENERAL NOTES (ALL GT SHEETS)

1. BORE FIELD SUPPLY LINES ARE IDENTIFIED BY THE DIRECTIONAL CIRCUIT BALANCING VALVES.
2. DEPTH OF THE HORIZONTAL PIPING SHALL BE INCREASED AS NEEDED TO INSURE MINIMUM CODE SEPARATION FROM UTILITIES.
3. INDIVIDUAL BOREHOLES MAY BE MOVED +/- 4'-5' TO AVOID UTILITIES. RELOCATED BOREHOLES MUST BE SPECIFICALLY IDENTIFIED ON AS-BUILT DRAWINGS.
4. COORDINATE LOCATIONS AND ELEVATIONS WITH CIVIL PLANS.
5. ALL EXCAVATION SHALL COMPLY WITH OSHA REGULATIONS.

HDPE PIPE SCHEDULE

1.25" U-BEND x 910' SDR 11
1.25" HDPE SDR 11
2" HDPE SDR 11
3" HDPE SDR 17
4" HDPE SDR 17
6" HDPE SDR 17
8" HDPE SDR 17
14" HDPE SDR 17

LABEL KEY (ALL GT SHEETS)

GSR	GROUND SOURCE RETURN - TO BLDG
GSS	GROUND SOURCE SUPPLY - FROM BLDG

BOREFIELD FITTING SCHEDULE

	SIZE
1	1.25" HDPE COUPLING OR ELBOW
2	2" x 1.25" x 1.25" HDPE TEE
3	2" x 2" x 1.25" HDPE TEE
4	3" x 2" HDPE REDUCER
5	3" x 1.25" HDPE SADDLE
6	4" x 3" HDPE REDUCER
7	4" x 1.25" HDPE SADDLE
8	4" HDPE ELBOW

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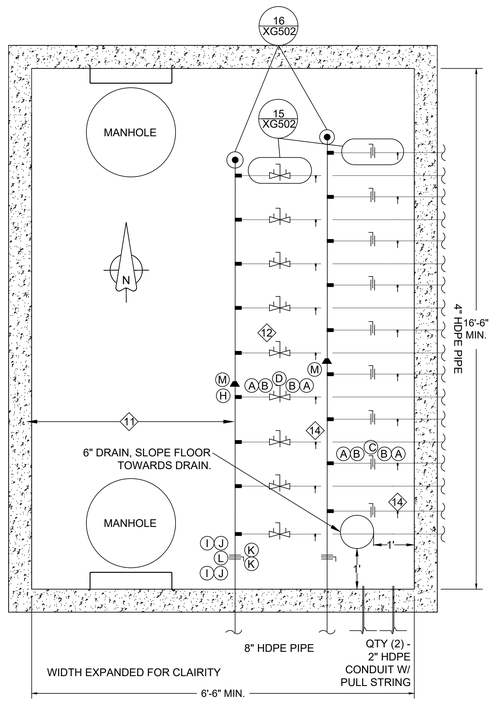
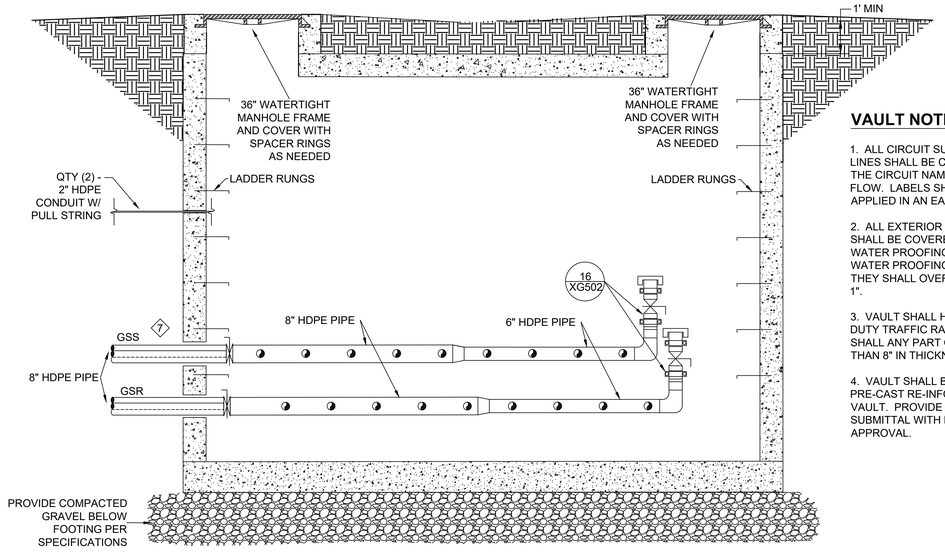
GEOTHERMAL DETAILS

XG501



12 VAULT MANIFOLD DETAIL
Scale: NTS (TYPICAL)



14 SIDE VIEW
VAULT DETAIL TYPICAL
Scale: NTS (TYPICAL)

VAULT NOTES

1. ALL CIRCUIT SUPPLY AND RETURN LINES SHALL BE CLEARLY LABELED WITH THE CIRCUIT NAME AND DIRECTION OF FLOW. LABELS SHALL BE PERMANENTLY APPLIED IN AN EASILY VISIBLE LOCATION.

2. ALL EXTERIOR SURFACES OF VAULT SHALL BE COVERED WITH A PAINT ON WATER PROOFING. WHERE DIFFERENT WATER PROOFING MATERIALS MEET THEY SHALL OVERLAP BY A MINIMUM OF 1".

3. VAULT SHALL HAVE HS-20 HEAVY DUTY TRAFFIC RATING, BUT IN NO CASE SHALL ANY PART OF THE VAULT BE LESS THAN 8" IN THICKNESS.

4. VAULT SHALL BE ENGINEERED, PRE-CAST RE-INFORCED CONCRETE VAULT. PROVIDE ENGINEERED SUBMITTAL WITH ENGINEER STAMP FOR APPROVAL.

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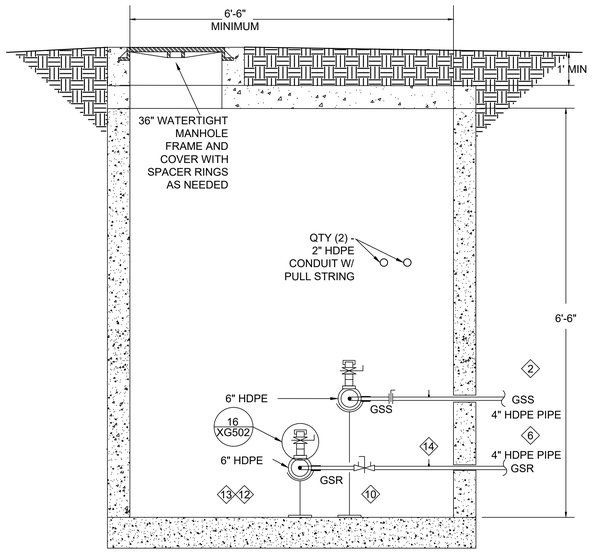
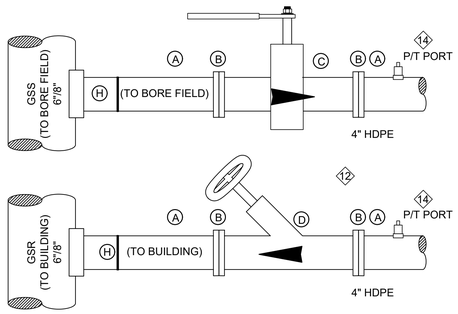
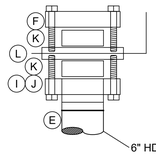


13 END VIEW
VAULT DETAIL TYPICAL
Scale: NTS (TYPICAL)



15 GROUND SOURCE RETURN
CIRCUIT BALANCING VALVE
Scale: NTS (TYPICAL)



16 VAULT PURGE
PORT DETAIL
Scale: NTS (TYPICAL)

HDPE PIPE SCHEDULE

1.25" U-BEND x 910' SDR 11
1.25" HDPE SDR 11
2" HDPE SDR 11
3" HDPE SDR 17
4" HDPE SDR 17
6" HDPE SDR 17
8" HDPE SDR 17
14" HDPE SDR 17

LABEL KEY (ALL GT SHEETS)

GSR	GROUND SOURCE RETURN - TO BLDG
GSS	GROUND SOURCE SUPPLY - FROM BLDG

VAULT FITTING SCHEDULE

	SIZE
A	4" HDPE x GROOVED TRANSITION
B	4" GROOVED CLAMP
C	4" GROOVED BUTTERFLY VALVE
D	4" GROOVED CIRCUIT BALANCING VALVE
E	6" HDPE ELBOW
F	6" BLIND FLANGE
G	NOT USED
H	6"/8" x 4" HDPE BRANCH SADDLE
I	6"/8" HDPE x BEVELED FLANGE ADAPTOR
J	6"/8" IRON BACK-UP RING
K	6"/8" LUG KIT
L	6"/8" LUG BUTTERFLY VALVE
M	8" x 6" HDPE REDUCER

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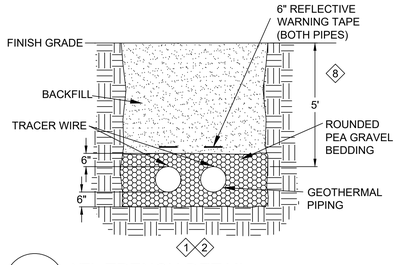
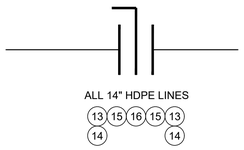
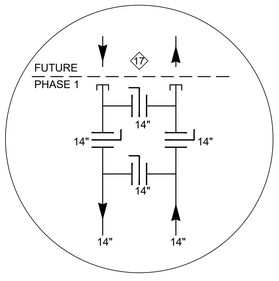
GEOTHERMAL VAULT DETAILS
XG502



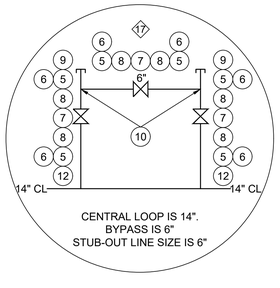
17 ATL TRENCH DETAIL
Scale: NTS (TYPICAL)



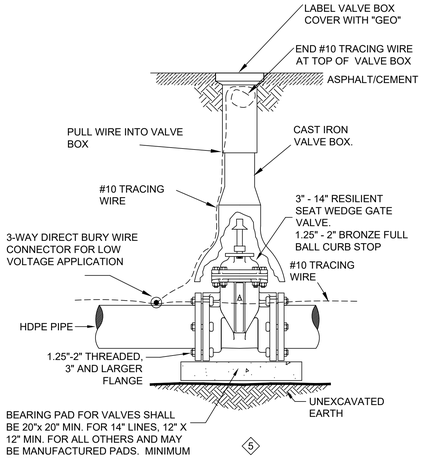
18 ATL VALVE SCHEMATIC
Scale: NTS



19 ATL 14" TERMINATIONS
Scale: NTS



21 ATL 6" STUB-OUT DETAIL
Scale: NTS (TYPICAL)



22 ISOLATION VALVE OR CURB STOPS ELEV. DETAIL
Scale: NTS (TYPICAL)

NOTES:
ALL VALVES 3" AND LARGER TO BE RESILIENT SEAT WEDGE GATE VALVE, EPOXY COATED INSIDE AND OUT PER AWWA SPECS.

ALL VALVES 1.25" - 2" TO BE BRONZE FULL BALL CURB STOP PER AWWA SPECS.

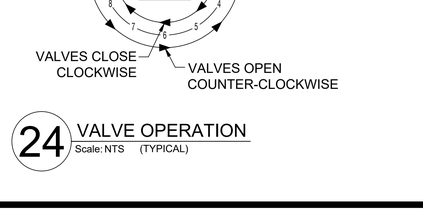
ALL VALVE BOXES TO BE OF CAST IRON CONSTRUCTION, TWO PIECE SLIDE CASING ADJUSTABLE DESIGN.

ALL VALVES 3" AND LARGER TO BE 8 MIL POLY WRAPPED.

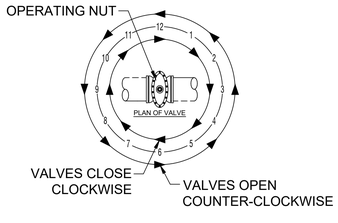
ALL PACKING BOLTS AND VALVE BONNET BOLTS SHALL BE STAINLESS STEEL. ALL BOLTS FOR MECHANICAL JOINTS SHALL BE COR-BLUE OR APPROVED EQUAL. ALL BOLTS FOR FLANGE CONNECTIONS SHALL BE STAINLESS STEEL BOLTS COATED WITH ANTI-SEIZE.

MPT TRANSITION FOR 1.25"-2" PIPING SHALL BE STAINLESS STEEL.

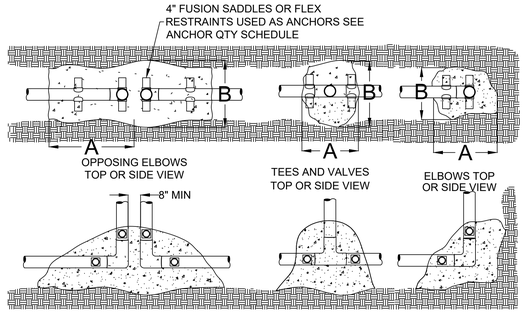
INSTALL TRACING WIRE IN ALL VALVE BOXS AS SHOWN.



23 ISOLATION VALVE OR CURB STOPS ELEV. DETAIL
Scale: NTS (TYPICAL)



24 VALVE OPERATION
Scale: NTS (TYPICAL)



25 CONCRETE THRUST BLOCK TYPICAL
Scale: NTS (TYPICAL)

SPECIFICATIONS FOR LARGE DIAMETER PIPE THRUST BLOCKS

1. ALL LARGE DIAMETER PIPES (10" - 14"): FINAL CONNECTIONS AT THE SPOTS MARKED ON XG102 WITH "TB" SHALL BE MADE WHEN THE PIPING IS WITHIN ± 10°F OF THE ANTICIPATED OPERATING TEMPERATURE OF THE SYSTEM (80°F TO 35°F).

2. SHALLOW BURRIAL OF LARGE DIAMETER HDPE PIPING CAN RESULT IN EXCESSIVE LATERAL FORCES BEING EXERTED ON TRANSITION AND DIRECTIONAL CHANGE FITTINGS. LARGE DIAMETER PIPING SHALL BE FILLED WITH FLUID AND TESTED AT THE EARLIEST POSSIBLE TIME IN ORDER TO MINIMIZE THE LATERAL EXPANSION AND CONTRACTION.

3. THRUST BLOCKS OR ENCASEMENTS SHALL BE USED ON THE MAIN CIRCULATING LOOP AS SHOWN ON THE DRAWING. ALL BURIED, LARGE DIAMETER (10" OR LARGER), DIRECTIONAL FITTINGS AND TEES WILL REQUIRE THRUST BLOCKS. THE ENCASEMENT OR THRUST BLOCK IS CONSTRUCTED OF REINFORCED CONCRETE AND ACTS AS AN ANCHOR BETWEEN THE PIPE OR FITTING AND THE UNDISTURBED WALL OR BOTTOM OF THE TRENCH. SEE THE CHART FOR MINIMUM THRUST BLOCK SIZE. POURED THRUST BLOCKS WILL INCLUDE 3/8" REBAR PLACED HORIZONTALLY AND VERTICALLY ON 9" CENTERS WITH A MINIMUM OF TWO PIECES OF REBAR USED IN EACH ORIENTATION.

4. PIPING SHOULD BE COVERED TO WITHIN TEN FEET (10') OF THE LOCATION OF THE THRUST BLOCK TO PREVENT EXCESSIVE MOVEMENT WHILE THE CONCRETE IS CURING.

KEYED NOTES (ALL GT SHEETS)

1. RUN SUPPLY AND RETURN PIPING IN COMMON TRENCH INSTALL PIPING SIMILAR TO ARRANGEMENT SHOWN IN TRENCH DETAIL.
2. RUN PIPING AT A MINIMUM DEPTH OF 5'-0" AT TOP OF PIPE.
3. GSS AND GSR TO SUBFIELD HEADERS SEE CONTINUATIONS IN DETAILS 3 AND 4 XG501.
4. BOREHOLE SPACING TO BE ~25'-0" O.C. EACH DIRECTION.
5. BOREHOLE DEPTH IS 450', SEE SPECIFICATIONS AND DETAILS, TYPICAL.
6. GSS AND GSR PIPING TO VAULT FROM ALL SUBFIELDS.
7. GSS AND GSR PIPING FROM VAULT TYPICAL.
8. FOR COMPACTION REQUIREMENTS AND TYPE OF BEDDING MATERIAL REFER TO APPROPRIATE EARTH WORK SECTION OF SPECIFICATIONS.
9. ENGINEERS DRAWING WILL CONTROL FINAL LAY-OUT.
10. SUPPORT HDPE PIPING AS SHOWN MAXIMUM DISTANCE BETWEEN SUPPORTS IS 36" C/C.
11. MINIMUM WALKWAY WIDTH 36".
12. CIRCUIT TO BE BALANCED AS SPECIFIED IN MECHANICAL SPECIFICATIONS.
13. INSTALL CBV IN VAULT TO MATCH DIRECTIONAL FLOW MANIFOLD CONFIGURATION IN MECHANICAL ROOM. SEE DETAIL 15 XG502.
14. INSTALL PT PORT ON SUBFIELD GSS AND GSR PRIOR TO ANY CBV OR BFV IN VAULT AND BEFORE PURGE PORT IN MECHANICAL ROOM.
15. COORDINATE ALL GEOTHERMAL PIPING WITH EXISTING AND NEW UTILITIES, SEE DETAIL 10 XG501.
16. CONTRACTOR TO VERIFY INVERT OF STORM DRAIN TO ENSURE PROPER SLOPE OF VAULT DRAIN.
17. CONNECT ENDS OF EACH FUTURE SUBFIELD WITH ELBOWS.

GENERAL NOTES (ALL GT SHEETS)

1. BORE FIELD SUPPLY LINES ARE IDENTIFIED BY THE DIRECTIONAL CIRCUIT BALANCING VALVES.

2. DEPTH OF THE HORIZONTAL PIPING SHALL BE INCREASED AS NEEDED TO INSURE MINIMUM CODE SEPARATION FROM UTILITIES.

3. INDIVIDUAL BOREHOLES MAY BE MOVED +/- 4'-5' TO AVOID UTILITIES. RELOCATED BOREHOLES MUST BE SPECIFICALLY IDENTIFIED ON AS-BUILT DRAWINGS.

4. COORDINATE LOCATIONS AND ELEVATIONS WITH CIVIL PLANS.

5. ALL EXCAVATION SHALL COMPLY WITH OSHA REGULATIONS.

CURB STOP / ISOLATION VALVE FITTING SCHEDULE

	SIZE
1	NOT USED
2	NOT USED
3	NOT USED
4	NOT USED
5	6" HDPE x BEVELED FLANGE ADAPTER
6	6" IRON BACK-UP RING
7	6" LUG STYLE BUTTERFLY VALVE
8	BOLT KIT FOR 6" FLANGE, STAINLESS STEEL
9	6" HDPE END CAP
10	6" HDPE TEE
11	14" x 1.25" HDPE SADDLE
12	14" X 6" HDPE SADDLE
13	14" HDPE x BEVELED FLANGE ADAPTOR
14	14" IRON BACK-UP RING
15	BOLT KIT FOR 14" FLANGE, STAINLESS STEEL
16	14" LUG STYLE BUTTERFLY VALVE

THRUST BLOCK DIMENSIONS

PIPE SIZE	DIMENSION A	DIMENSION B	MIN REQUIRED AREA
14"	26"	26"	676 SQUARE INCHES

ANCHOR QTY SCHEDULE (SADDLE OR FLEX)

QTY	PIPE SIZE
3	14" HDPE SDR 17

HDPE PIPE SCHEDULE

1.25" U-BEND x 910' SDR 11
1.25" HDPE SDR 11
2" HDPE SDR 11
3" HDPE SDR 17
4" HDPE SDR 17
6" HDPE SDR 17
8" HDPE SDR 17
14" HDPE SDR 17

LABEL KEY (ALL GT SHEETS)

GSR	GROUND SOURCE RETURN - TO BLDG
GSS	GROUND SOURCE SUPPLY - FROM BLDG

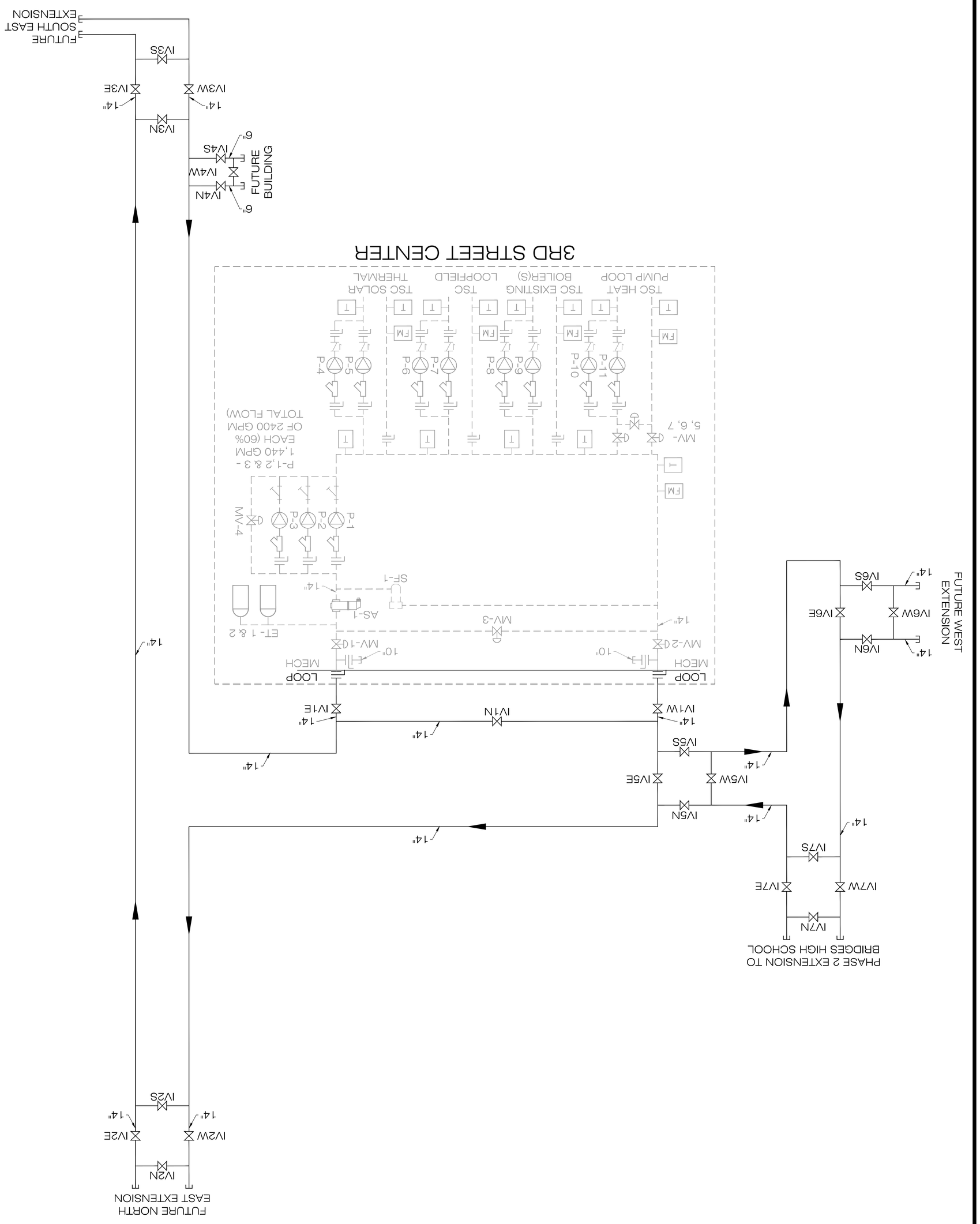
SOUND GEOTHERMAL CORPORATION
9657 S. Lily Garden Ct.
South Jordan, Utah 84095
Tel: (801) 942-6100
www.soundgt.com

PROJECT
CARBONDALE COMMUNITY GEOTHERMAL SYSTEM
PHASE 1 - 3RD STREET CENTER & 2ND STREET TOWNHOUSES
520 S 3RD STREET
CARBONDALE, CO 81623

Revisions
Description Date
NOT FOR CONSTRUCTION

Date: August 28, 2024
Issued for: Schematic Design
Designed By: Mark A Smith
CGD # 329
Drawn By: Mark A Smith
Checked By: Mark A Smith

GEOTHERMAL ATL DETAILS
XG503



GEOTHERMAL ATL SCHEMATIC

XG601

Revisions

#	Description	Date

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Date: August 28, 2024
Issued for: Schematic Design
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CGD # 329
Drawn By: Mark A Smith
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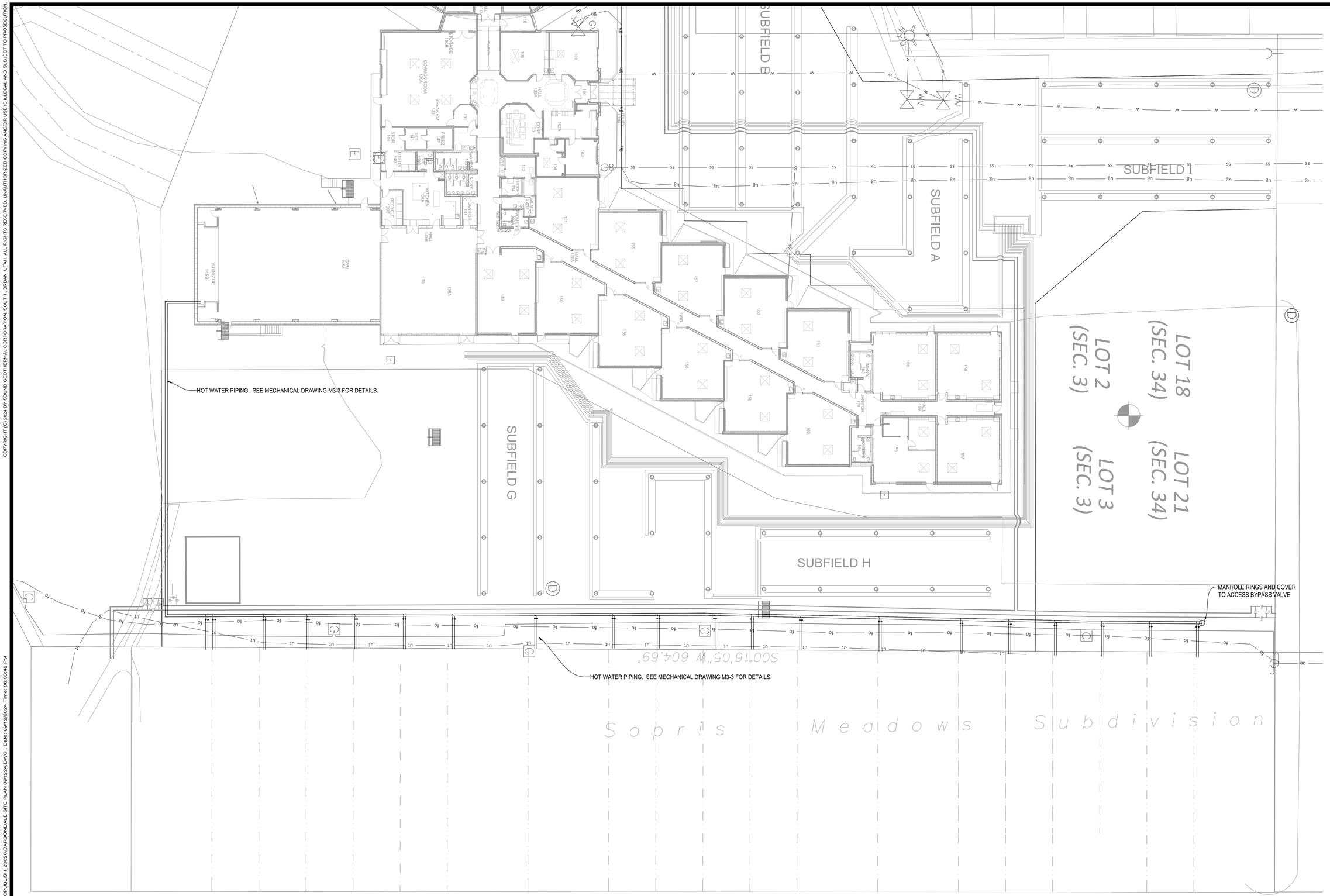

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" ——— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

0" 8' 16' 32'

1" = 16'

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CGD # 329
Drawn By: Mark A Smith
Checked By: Mark A Smith

CONCEPTUAL MECHANICAL SITE PLAN

MS100

MECHANICAL ELEMENTS / VALVING

EXISTING EQUIPMENT OR PIPE TO BE REMOVED.

GATE VALVE

GLOBE VALVE

PLUG VALVE

BUTTERFLY VALVE

BALL VALVE

SWING CHECK VALVE

LIFT CHECK VALVE

GATE VALVE, ANGLE

GLOBE VALVE, ANGLE

DIAPHRAGM VALVE

BALANCING VALVE

CBV — CIRCUIT SETTING BALANCING VALVE

THREE WAY CONTROL VALVE

TWO WAY CONTROL VALVE

S — SOLENOID VALVE

PRV — PRESSURE REDUCING VALVE (PRV)

TPV — TEMPERATURE/PRESSURE RELIEF VALVE

AIR VENT — HYDRAULIC SEPARATOR

RELIEF/SAFETY VALVE

GAS COCK

AUTOMATIC FILL VALVE

MV — MANUAL AIR VENT

AV — AUTOMATIC AIR VENT (EXTEND DISCHARGE TO DRAIN)

FLOW METER-VENTURI

FLOW METER-ORIFICE

DIRECTION OF FLOW

R D — DIRECTION OF PITCH-RISE OR DROP

STRAINER

STRAINER WITH BLOW OFF VALVE

PIPE RISING UP

PIPE DROPPING DOWN

CONCENTRIC REDUCER

ECCENTRIC REDUCER

UNION - SCREWED OR FLANGED

STEAM LEAK DETECTOR

FSD — FIRE SMOKE DAMPER

CO — CARBON MONOXIDE

CD — CARBON DIOXIDE

AIR SEPARATOR

A — ANCHOR

G — GUIDE

EJ — EXPANSION JOINT

FS — FLOW SWITCH

TT — TEMPERATURE TRANSMITTER

PT/PS — PRESSURE TRANSMITTER OR PRESSURE SWITCH

TH — THERMOMETER

GAUGE WITH GAUGE COCK & SYPHON (STEAM)

AQUASTAT

GAS PRESSURE REGULATOR

FLOAT OPERATED CONTROL VALVE

STEAM TRAP

EXPANSION LOOP

VB — VACUUM BREAKER

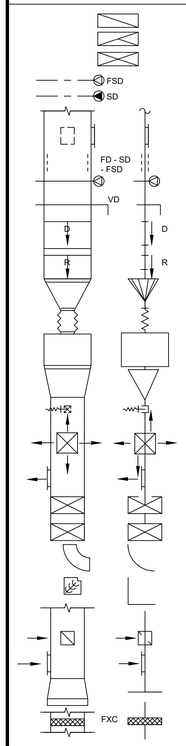
T — THERMOSTAT

S — DIGITAL SENSOR

OR — PUMP

HEAT EXCHANGER

HVAC & DUCTWORK SYMBOLS



SECTION THROUGH RETURN DUCT

SECTION THROUGH EXHAUST AIR DUCT

SECTION THROUGH SUPPLY OR OUTSIDE AIR DUCT

FIRE / SMOKE DAMPER

SMOKE DAMPER

SUPPLY OR OUTSIDE AIR DUCT

ACCESS DOOR (BOTTOM OR SIDE)

ACOUSTICALLY LINED DUCT

FIRE DAMPER, SMOKE DAMPER, FIRE/SMOKE DAMPER

MANUAL VOLUME DAMPER

INCLINED DROP IN DIRECTION OF ARROW

INCLINED RISE IN DIRECTION OF ARROW

TRANSITION, RECTANGULAR TO ROUND

FLEXIBLE DUCT

IN-LINE FAN

TRANSITION, RECTANGULAR

SPIN-IN COLLAR INTO ADAPTER ON TOP OF DUCT

CEILING SUPPLY AIR REGISTER/GRILLE

SIDEWALL SUPPLY AIR REGISTER (SR)

ELBOW TURNED DOWN

ELBOW TURNED UP

ELBOW, RADIUS TYPE

ELBOW, SQUARE OR RECTANGULAR TYPE WITH AIRFOIL TURNING VANES

CEILING RETURN AIR REGISTER (RR)

SIDEWALL RETURN AIR REGISTER (RR)

OPEN END DUCT

FLEXIBLE CONNECTION

LINE DESIGNATION SYMBOLS

CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CA	COMPRESSED AIR
CR	CONDENSER WATER RETURN
CS	CONDENSER WATER SUPPLY
D	DRAIN
HPR	HEAT PUMP RETURN
HPS	HEAT PUMP SUPPLY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
G	NATURAL GAS
RH	REFRIGERANT HIGH PRESSURE VAPOR
R	REFRIGERANT LIQUID AND VAPOR LINE
RS	REFRIGERANT SUCTION / VAPOR
SMR	SNOWMELT RETURN
SMS	SNOWMELT SUPPLY
V	VENT PIPING

RESPONSIBLE DIVISION:

UNLESS OTHERWISE INDICATED ALL HEATING, VENTILATING, AIR CONDITIONING, PLUMBING, AND OTHER MECHANICAL EQUIPMENT, MOTORS, AND CONTROLS SHALL BE FURNISHED, SET IN PLACE AND WIRED AS FOLLOWS:

ITEM	FURNISHED	SET	POWER WIRED	CONTROL WIRED
EQUIPMENT	23	23	26	--
COMBINATION MAGNETIC MOTOR STARTERS, MAGNETIC MOTOR STARTERS, VFD'S AND CONTACTORS	23(1)	26	26(2)	23
FUSED AND UNFUSED DISCONNECT SWITCHES, THERMAL OVERLOAD SWITCHES AND HEATERS, MANUAL MOTOR STARTERS	26	26	26	--
MANUAL-OPERATING AND MULTI-SPEED SWITCHES	23	26	26	26
CONTROLS, RELAYS, TRANSFORMERS	23	23	26	23
THERMOSTATS (LOW VOLTAGE) AND TIME SWITCHES	23	23	26	23
THERMOSTATS (LINE VOLTAGE)	23	23	26	26
TEMPERATURE CONTROL PANELS	23	23	26	23
MOTOR AND SOLENOID VALVES, DAMPER MOTORS, PE & EP SWITCHES	23	23(2)	--	23(2)
PUSH-BUTTON STATIONS AND PILOT LIGHTS	23	23(2)	--	23(2)
HEATING, COOLING, VENTILATION AND AIR CONDITIONING CONTROLS	23	23	26	23
EXHAUST FAN SWITCHES	23	26	26	23(2)

SUBSCRIPT FOOTNOTES:

1. MOTOR STARTER TO INCLUDE CONTROL TRANSFORMER, HOA SWITCH, (1) NO AND (1)NC AUXILIARY CONTACT, AND "ON" AND "OFF" PILOT LIGHTS.
2. IF ITEM IS FOR LINE VOLTAGE, SET IN PLACE AND CONNECT UNDER DIVISION 26. WHERE FACTORY MOUNTED ON EQUIPMENT OR ATTACHED TO PIPING OR DUCTS AND USING LINE VOLTAGE FURNISH AND SET UNDER DIVISION 23, CONNECT UNDER DIVISION 26.

ABBREVIATIONS:

44"	MOUNTING HEIGHT ABOVE FINISHED FLOOR TO CENTER OF DEVICE
A	AMPS
A.D.	ACCESS DOOR
AAV	AIR ADMITTANCE VALVE
ABV	ABOVE
AC	AIR CONDITIONING UNIT
AC	ABOVE COUNTER
AD	AREA DRAIN (SEE SYMBOLS)
A.F.C.	ABOVE FINISHED CEILING
A.F.G.	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTING CAPACITY
A.F.F.	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
AP	ACCESS PANEL OR DOOR
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO / VIDEO
AVG	AVERAGE
AWG	AMERICAN WIRE GAGE
BAS	BUILDING AUTOMATION SYSTEM
BB	BASEBOARD
BD	BACK DRAFT DAMPER
BFP	BACK FLOW PREVENTOR
BL	BOILER
BLDG	BUILDING
BLW	BELOW
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
C	CHILLER
CAP	CAPACITY
CB	CIRCUIT BREAKER
CBV	CIRCUIT BALANCING VALVE
CCT	CORRELATED COLOR TEMPERATURE
CKT	CIRCUIT
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CI	CAST IRON
CL	CENTER LINE
CLG	CEILING
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
COMP	COMPRESSOR
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
CONTR	CONTRACTOR
CRI	COLOR RENDERING INDEX
CT	COOLING TOWER
CT	CURRENT TRANSFORMER
CU	CONDENSING UNIT
CU	COPPER
CUH	CABINET UNIT HEATER
CVB	CONSTANT VOLUME BOX
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DB	DRY BULB
DEPT	DEPARTMENT
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGRAM
DIFF	DIFFERENTIAL
DISCH	DISCHARGE
DIV	DIVISION
DN	DOWN
DS	DUCT SILENCER
DWG	DRAWING
DX	DIRECT EXPANSION
(A)	EXISTING
EA	EXHAUST AIR GRILLE/REGISTER
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECC	ECCENTRIC
EF	EXHAUST FAN
EFF	EFFICIENCY
EL	ELEVATION
ELEC	ELECTRIC
ELEV	ELEVATOR
EM	EMERGENCY FUNCTION
ENT	ENTERING
EMT	ELECTRIC METALLIC TUBE
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ES	END SWITCH
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EX	EXHAUST
EXPAN	EXPANSION
EXT	EXTERNAL
F	DEGREES FAHRENHEIT
FA	FREE AREA
FC	FAN COIL UNIT
FC	FOOTCANDLE
FCV	FLOW CONTROL VALVE
FD	FIRE DAMPER
FD	FLOOR DRAIN
FIN	FINISHED
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FP	FIRE PROTECTION
FP	FIRE PUMP
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FS	FLOW SWITCH
FSD	FIRE/SMOKE DAMPER
FT	FEET
FXC	FLEXIBLE CONNECTION
GND	GROUND
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GEC	GROUND ELECTRODE CONDUCTOR
GFCI / GFI	GROUND FAULT CIRCUIT INTERRUPTER
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRS/LB	GRAINS PER POUND
H 2O	WATER
HB	HOSE BIBB
HD	HEAD (SEE SCHEDULES)
HP	HEAT PUMP
HP	HORSEPOWER
HR	HOUR
HT	HEIGHT
HTR	HEATER
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
HX	HEAT EXCHANGER
HZ	HERTZ
ID	INSIDE DIAMETER
IG	ISOLATED GROUND
IN	INCHES
INV	INVERT
JBOX	JUNCTION BOX
K	KELVIN
KW	KILOWATT
KVA	KILO VOLT - AMPS
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LV	LAVATORY
LB	POUND
LD	LINEAR DIFFUSER
LF	LINEAR FEET
LIN	LINEAR
LIQ	LIQUID
LM	LUMEN
LRA	LOCKED ROTOR AMPS
LV	LOUVER
LVG	LEAVING
LWT	LEAVING WATER TEMPERATURE
MBH	THOUSANDS OF BTU PER HOUR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MD	MOTORIZED DAMPER
MDP	MAIN DISTRIBUTION PANEL
MED	MEDIUM
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUG ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
MUA	MAKE-UP AIR UNIT
N	NEUTRAL
NC	NORMALLY CLOSED
NEG	NEGATIVE
NIC	NOT IN CONTRACT
NL	NIGHT / SECURITY LIGHT - DO NOT SWITCH
NO	NORMALLY OPEN
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OCC	OCCUPIED
OCP	OVER CURRENT PROTECTION
OD	OUTSIDE DIAMETER
OL	OVERLOAD
ORD	OVERFLOW ROOF DRAIN
OZ	OUNCE
PBD	PARALLEL BLADE DAMPER
PD	PRESSURE DROP
PH	PHASE
POS	POSITIVE PRESSURE
POS	POINT OF SALES
PRV	PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TRANSMITTER
PTAC	PACKAGED TERMINAL AIR CONDITIONER
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RA	RETURN AIR GRILLE / REGISTER
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REL	RELIEF
REQD	REQUIRED
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RLA	RATED LOAD AMPS
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR GRILLE / REGISTER
SC	SHORT CIRCUIT
SCA	SHORT CIRCUIT AVAILABLE
SCCR	SHORT CIRCUIT CURRENT RATING
SCH	SCHEDULE
SD	SMOKE DAMPER
SEF	SMOKE EXHAUST FAN
SF	SUPPLY FAN
SH	SENSIBLE HEAT
SH	SHOWER
SP	STATIC PRESSURE
SPD	SURGE PROTECTION DEVICE
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
SS	SAFETY SHOWER
STD	STANDARD
STL	STEEL
SYS	SYSTEM
TEMP	TEMPERATURE
TR	TRANSFER GRILLE / REGISTER
TR	TAMPER RESISTANT
TT	TEMPERATURE TRANSMITTER
TTB	TELECOMMUNICATIONS TERMINAL BACKBOARD
TYP	TYPICAL
TX	TRANSFORMER
UC	UNDERCUT DOOR
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UNOCC	UNOCCUPIED
UR	URINAL
V	VOLTS
VA	VOLT AMPERE
VA	VALVE
VAV	VARIABLE AIR VOLUME UNIT
VFD	VARIABLE FREQUENCY DRIVE
VRF	VARIABLE REFRIGERANT FLOW
VOLT	VOLTAGE
VTR	VENT THROUGH ROOF
W	WIDTH
W	WATTS
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN
WC	WATER CLOSET
WG	WATER GAUGE
WP	WEATHERPROOF
WPIU	WEATHERPROOF IN-USE
WSR	WITHSTAND RATING
XFMR	TRANSFORMER

SUBSTITUTIONS:

A. SUBSTITUTIONS: SUBSTITUTION OF SPECIFIED EQUIPMENT WILL BE ALLOWED THROUGH A PRIOR APPROVAL PROCESS INITIATED BY THE CONTRACTOR. CONTRACTOR SHALL SUBMIT INTENDED SUBSTITUTION AT LEAST FIVE DAYS PRIOR TO BID FOR APPROVAL FROM ENGINEER. SUBMITTAL SHALL INCLUDE CAPACITIES, DIMENSIONS AND OPERATING INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT. SUBSTITUTION SHALL OCCUR AT NO COST TO THE OWNER. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF APPROVED SUBSTITUTION AND SHALL INCUR ALL COSTS ASSOCIATED WITH THE SUBSTITUTION INCLUDING STRUCTURAL MODIFICATIONS, SPACE LAYOUT AND REDESIGN COSTS. SEE ALSO DIVISION I GENERAL REQUIREMENTS.

EXAMINATION OF SITE, DRAWINGS, SPECIFICATIONS:

A. EXAMINE CAREFULLY THE SITE AND CONDITIONS OF THE SITE. PROVIDE ALL NECESSARY EQUIPMENT AND LABOR TO INSTALL A COMPLETE WORKING SYSTEM WITHIN THE SITE CONDITIONS.

B. EXAMINE THE DRAWINGS AND SPECIFICATIONS AND 5 DAYS PRIOR TO BIDDING REPORT ANY ERRORS, OMISSIONS, INCONSISTENCIES, AND CONFLICTS TO THE ENGINEER TO BE REMEDIED IN AN ADDENDUM TO THE PROJECT PRIOR TO BID TIME.

C. DRAWINGS ARE DIAGRAMMATIC AND CATALOG NUMBERS GIVEN ARE FOR REFERENCE ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE CAPACITY OF THE EQUIPMENT MEETS THE DRAWING REQUIREMENTS AND SHALL NOT DIMENSION FROM THE MECHANICAL, PLUMBING, OR PIPING DRAWINGS.

D. THE CODES THAT WILL BE ADHERED TO ARE THE 2018 INTERNATIONAL MECHANICAL, 2023 COLORADO PLUMBING CODE, AND 2018 INTERNATIONAL ENERGY CONSERVATION CODE, AS WELL AS THE 2023 NATIONAL ELECTRICAL CODE. ALL METHODS AND MATERIALS REQUIRED BY THESE CODES SHALL BE REQUIRED BY THESE SPECIFICATIONS UNLESS INDICATED OTHERWISE. OTHER APPLICABLE LOCAL CODES AND ORDINANCES SHALL BE AS REQUIRED AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO BE KNOWLEDGEABLE OF THESE REQUIREMENTS. (REFERENCE ARCHITECTURAL DRAWINGS FOR CODE PLANS FOR GOVERNING CODES AND REGULATIONS.)

E. WHERE INSTALLATION PROCEDURES OR ANY PART THEREOF ARE REQUIRED TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL BEING INSTALLED, PRINTED COPIES OF THESE RECOMMENDATIONS SHALL BE FURNISHED TO THE ENGINEER PRIOR TO INSTALLATION. INSTALLATION OF THE ITEM WILL NOT BE ALLOWED TO PROCEED UNTIL THE RECOMMENDATIONS ARE RECEIVED. FAILURE TO FURNISH THESE RECOMMENDATIONS CAN BE CAUSE FOR REJECTION OF THE MATERIAL.

Bighorn Consulting Engineers, Inc.
Mechanical & Electrical Engineers
386 Indian Road
Grand Junction, CO 81501
Phone: (970) 241-8709

CARBONDALE COMMUNITY GEOTHERMAL

MECHANICAL - COVER SHEET

520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN

SHEET NUMBER:
M0-1

September 18, 2024 - 10:05:26am

MECHANICAL - AIR SIDE BASEMENT PLAN

NORTH

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

Bighorn Consulting Engineers, Inc.
Mechanical & Electrical Engineers
386 Indian Road
Grand Junction, CO 81501
Phone: (970) 241-8709

CARBONDALE COMMUNITY GEOTHERMAL

MECHANICAL - BASEMENT PLAN

520 S. 3RD STREET
CARBONDALE, COLORADO

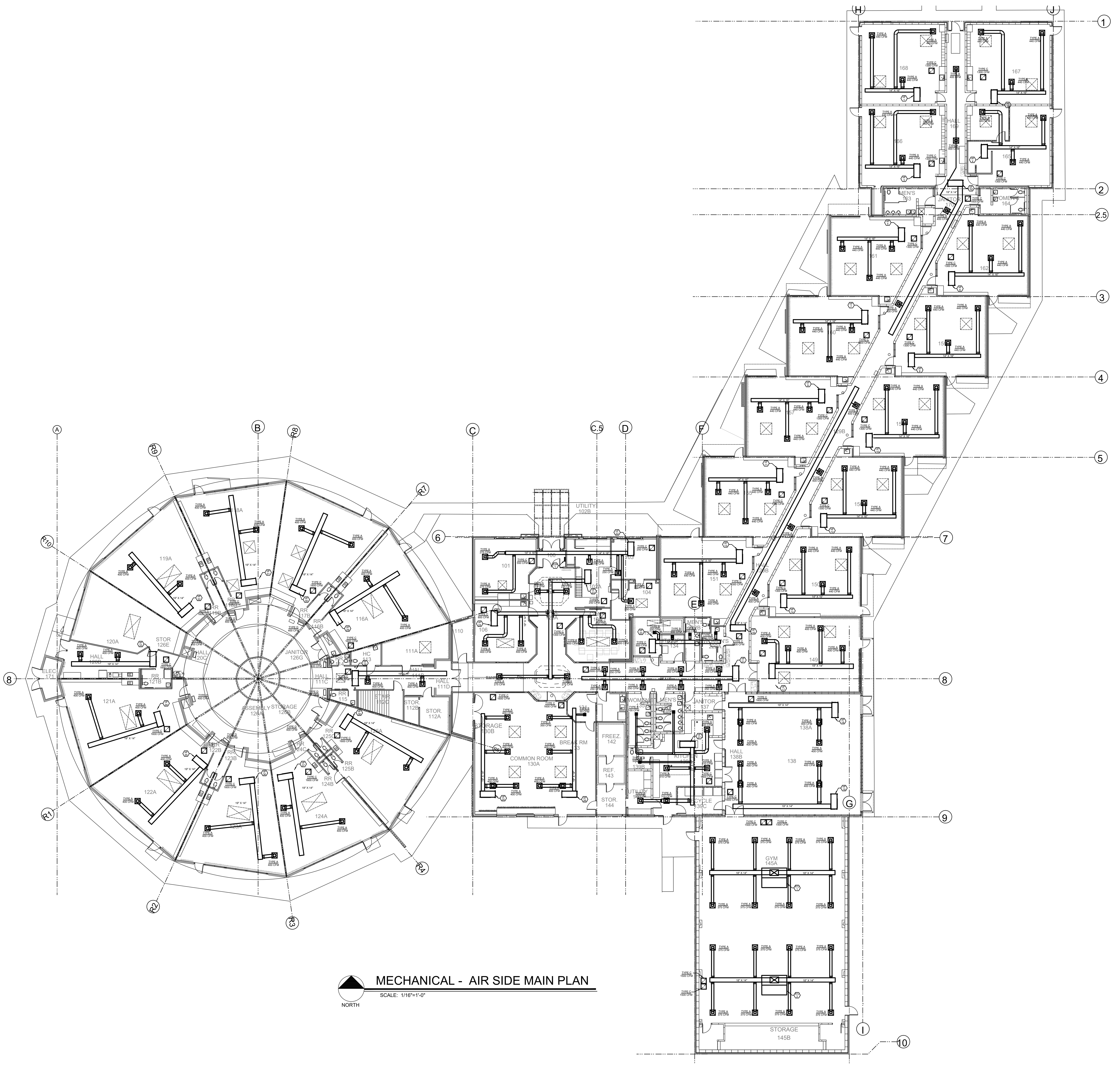
DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN

SHEET NUMBER:

M1-1

September 18, 2024 - 10:05:27am



MECHANICAL - AIR SIDE MAIN PLAN

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

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CARBONDALE COMMUNITY GEOTHERMAL

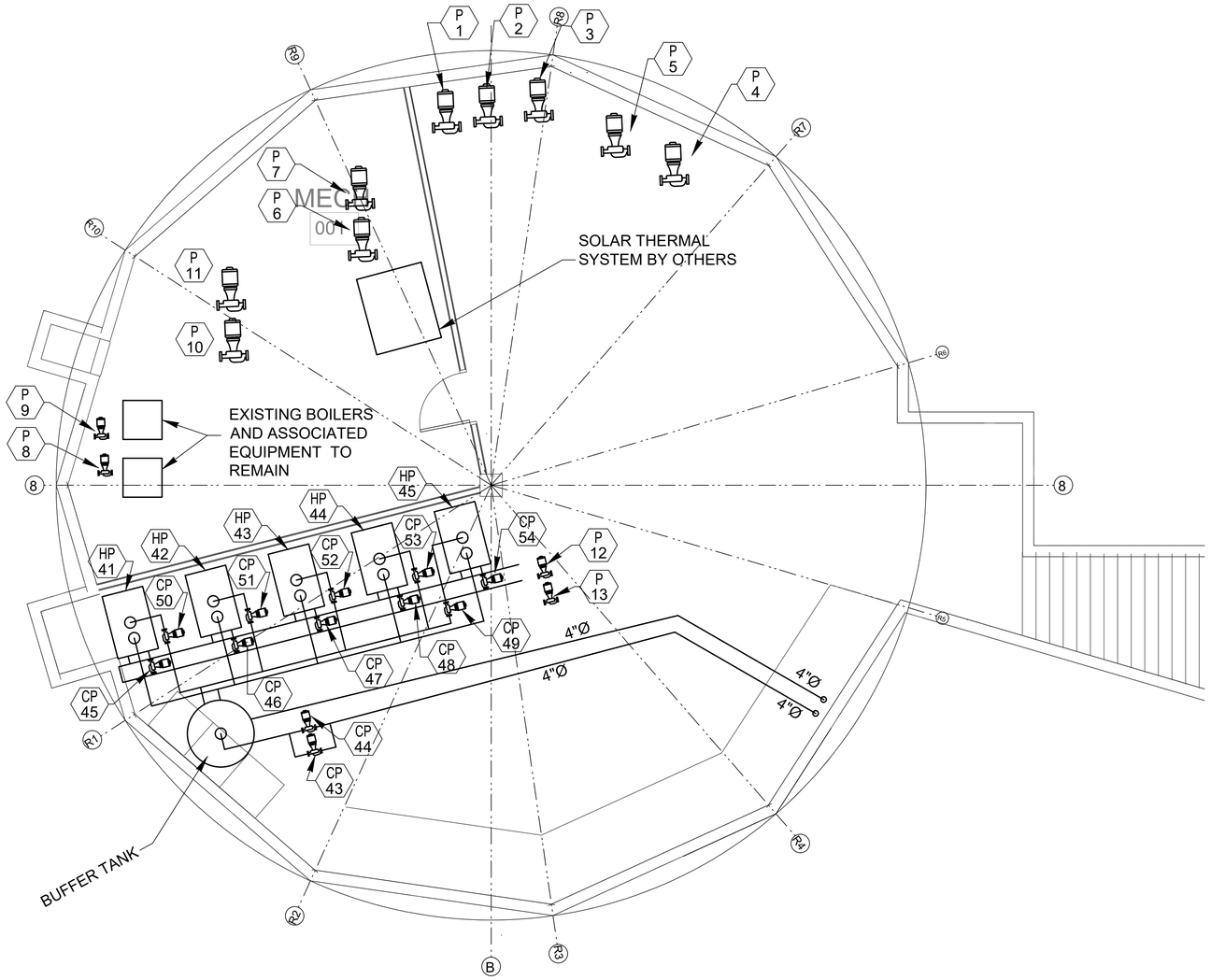
MECHANICAL - MAIN PLAN

520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN
SHEET NUMBER:	M1-2

September 18, 2024 - 10:05:29am



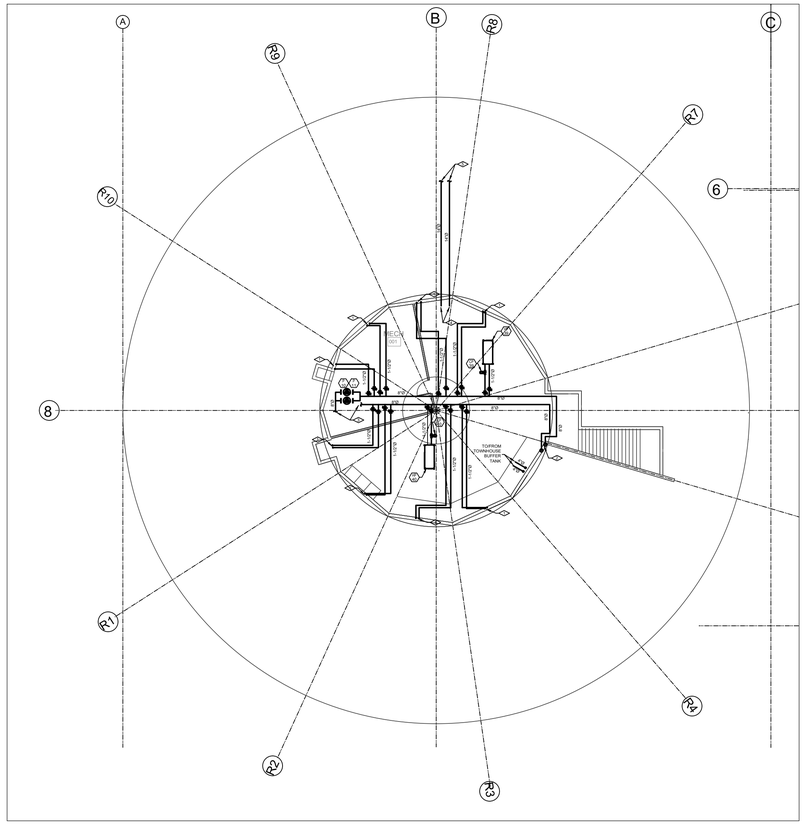
MECHANICAL - ENLARGED MECH ROOM EQUIPMENT PLAN

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

NORTH

MECHANICAL PIPING KEYNOTES:

1. 1-1/2"Ø HWS AND HWR UP TO FLOOR ABOVE.
2. 8"Ø GEOTHERMAL LOOP PIPE UP/DOWN.
3. 8"Ø GEOTHERMAL LOOP FOR BUILDING TO/FROM GROUND LOOP. REFER TO GEOTHERMAL DESIGN PLANS FOR CONNECTION.
4. GEOTHERMAL SUPPLY LINES TO BE ROUTED TO GEOTHERMAL EQUIPMENT IN MECHANICAL ROOM. REFER TO GEOTHERMAL DESIGN PLANS FOR CONNECTIONS AND EQUIPMENT.
5. TWO 14"Ø GEOTHERMAL SUPPLY LINES ROUTED SUB-GRADE FROM GEOTHERMAL FIELD.



MECHANICAL - PIPING BASEMENT PLAN

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

NORTH

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CARBONDALE COMMUNITY GEOTHERMAL

MECHANICAL - MAIN PLAN

520 S. 3RD STREET
CARBONDALE, COLORADO

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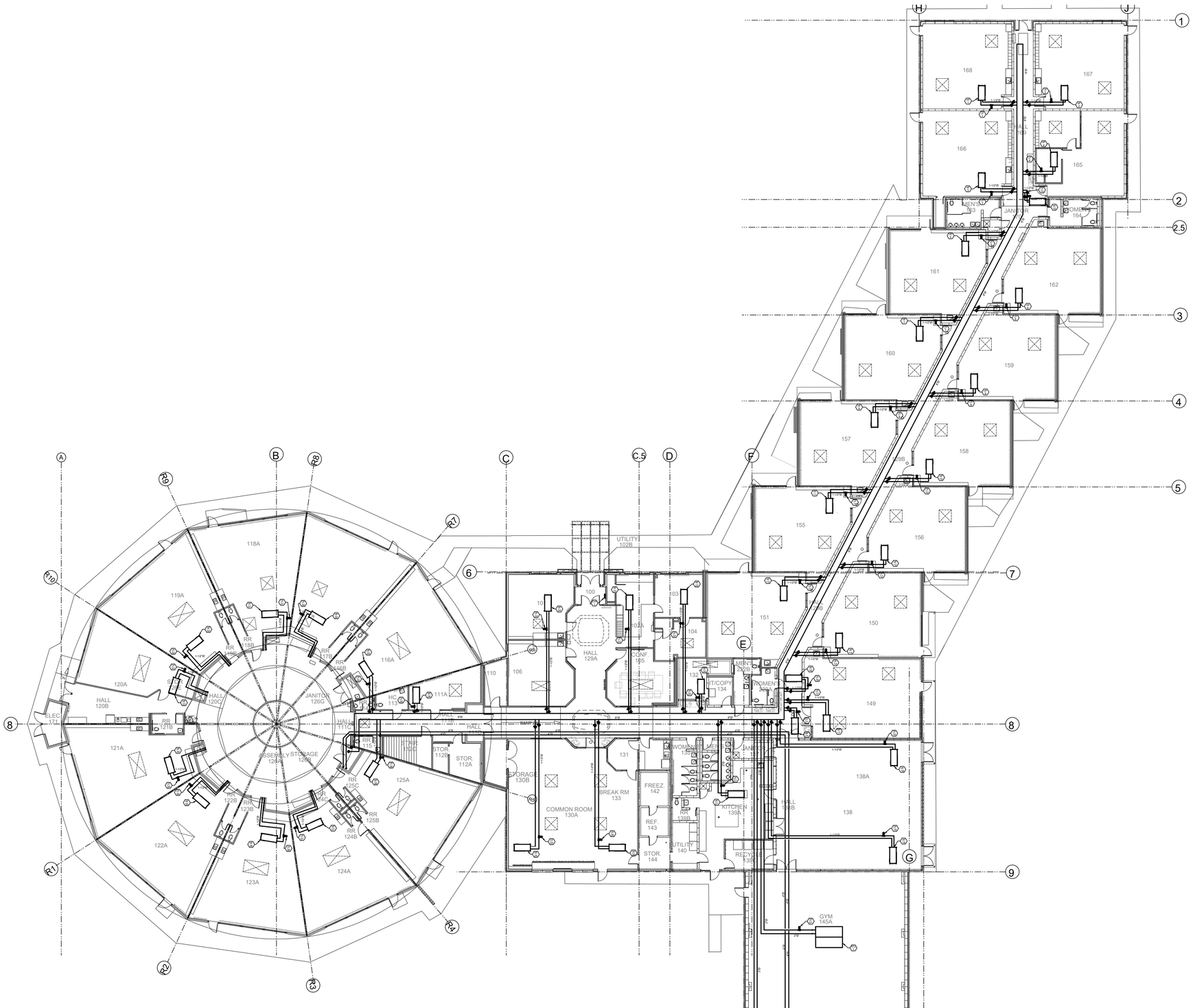
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN
SHEET NUMBER:	M2-1

September 18, 2024 - 10:05:31am



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CARBONDALE COMMUNITY GEOTHERMAL

MECHANICAL - MAIN PLAN

520 S. 3RD STREET
CARBONDALE, COLORADO

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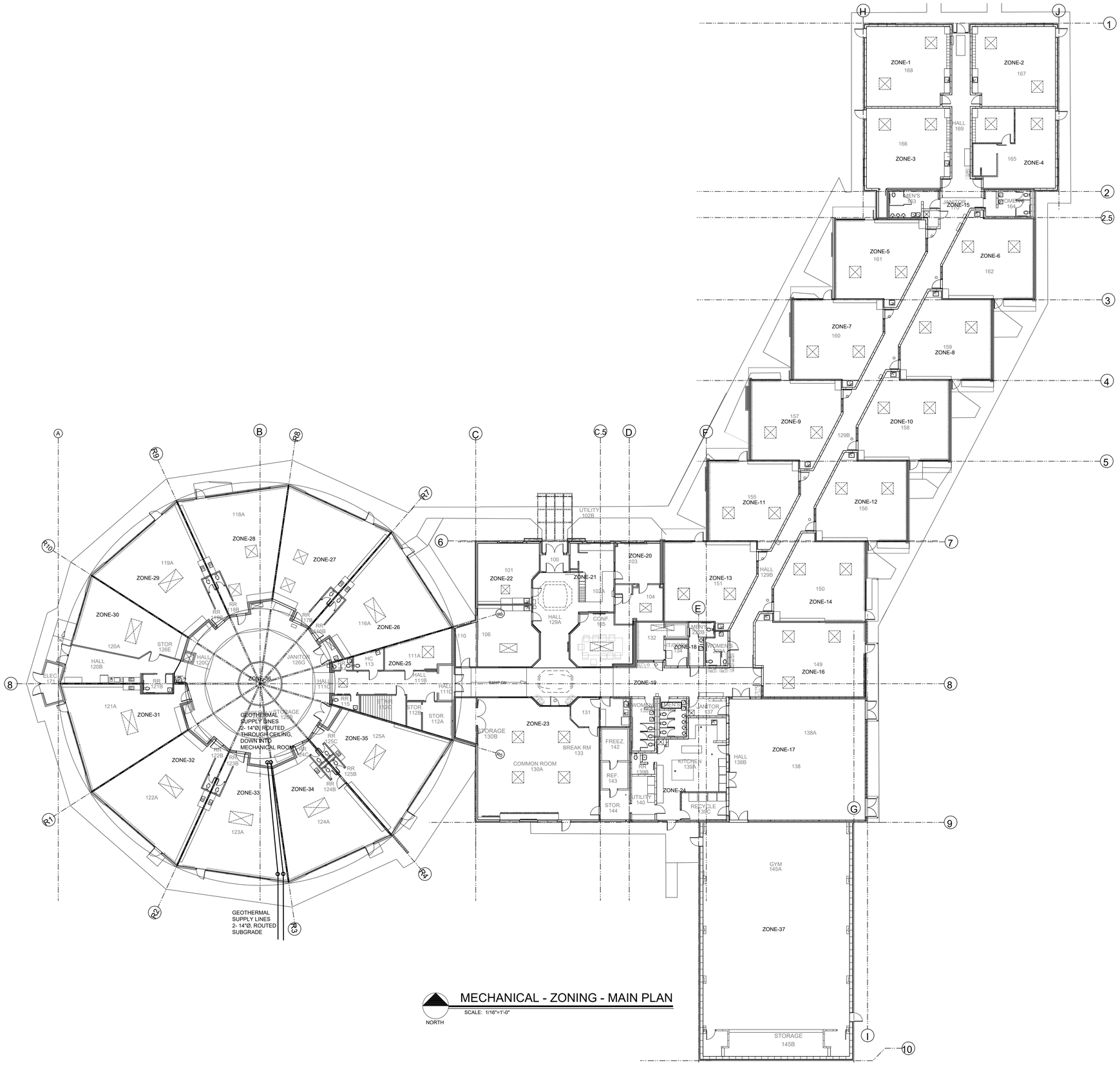
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN
SHEET NUMBER:	M2-2

September 18, 2024 - 10:05:32am



MECHANICAL - ZONING - MAIN PLAN

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

NORTH

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CARBONDALE COMMUNITY GEOTHERMAL

MECHANICAL - MAIN PLAN

520 S. 3RD STREET
CARBONDALE, COLORADO

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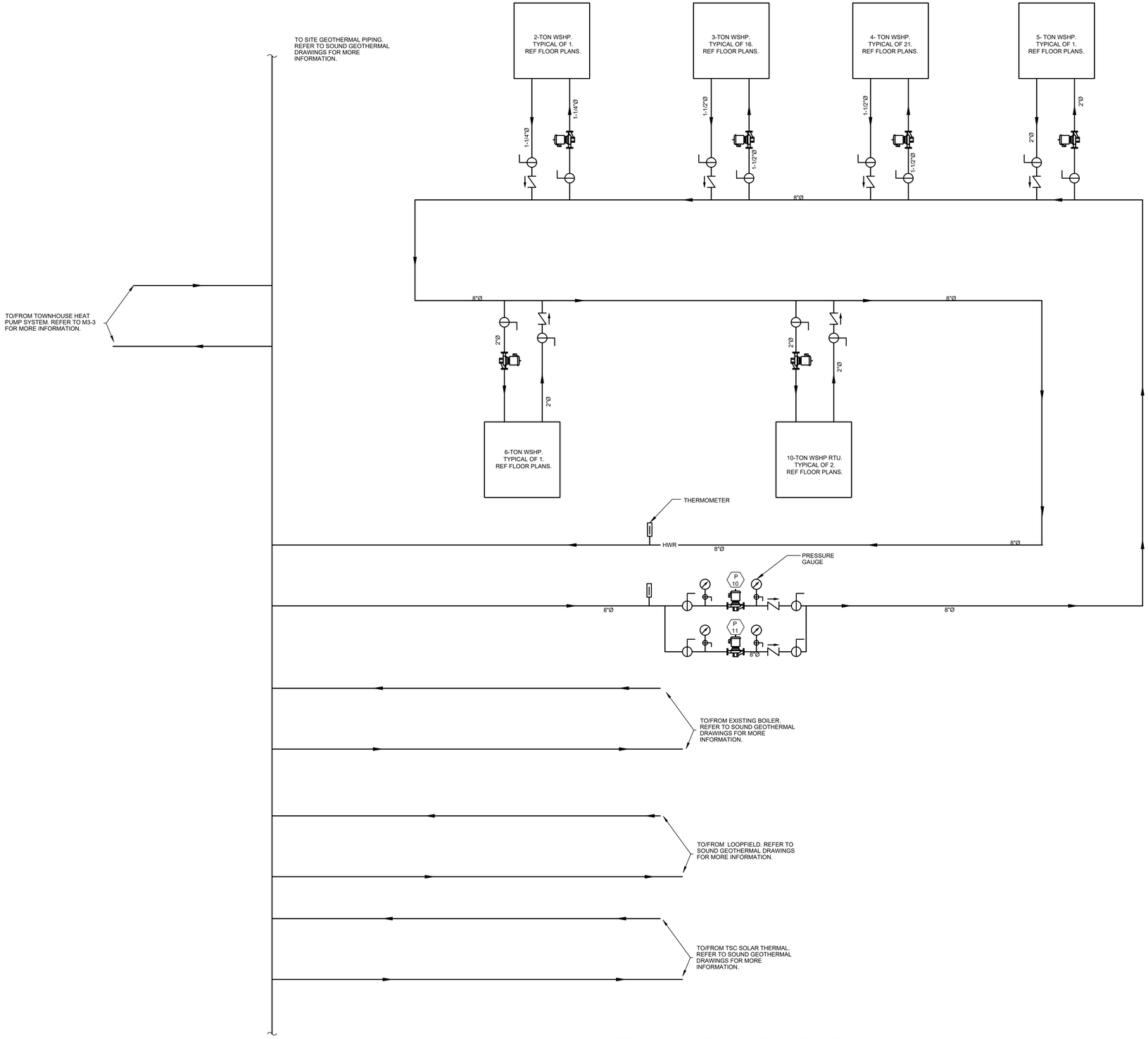
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN
SHEET NUMBER:	M3-1

September 18, 2024 - 10:05:34am



MECHANICAL - BUILDING LOOP DETAIL

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

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CARBONDALE COMMUNITY GEOTHERMAL

MECHANICAL - MAIN PLAN

520 S. 3RD STREET
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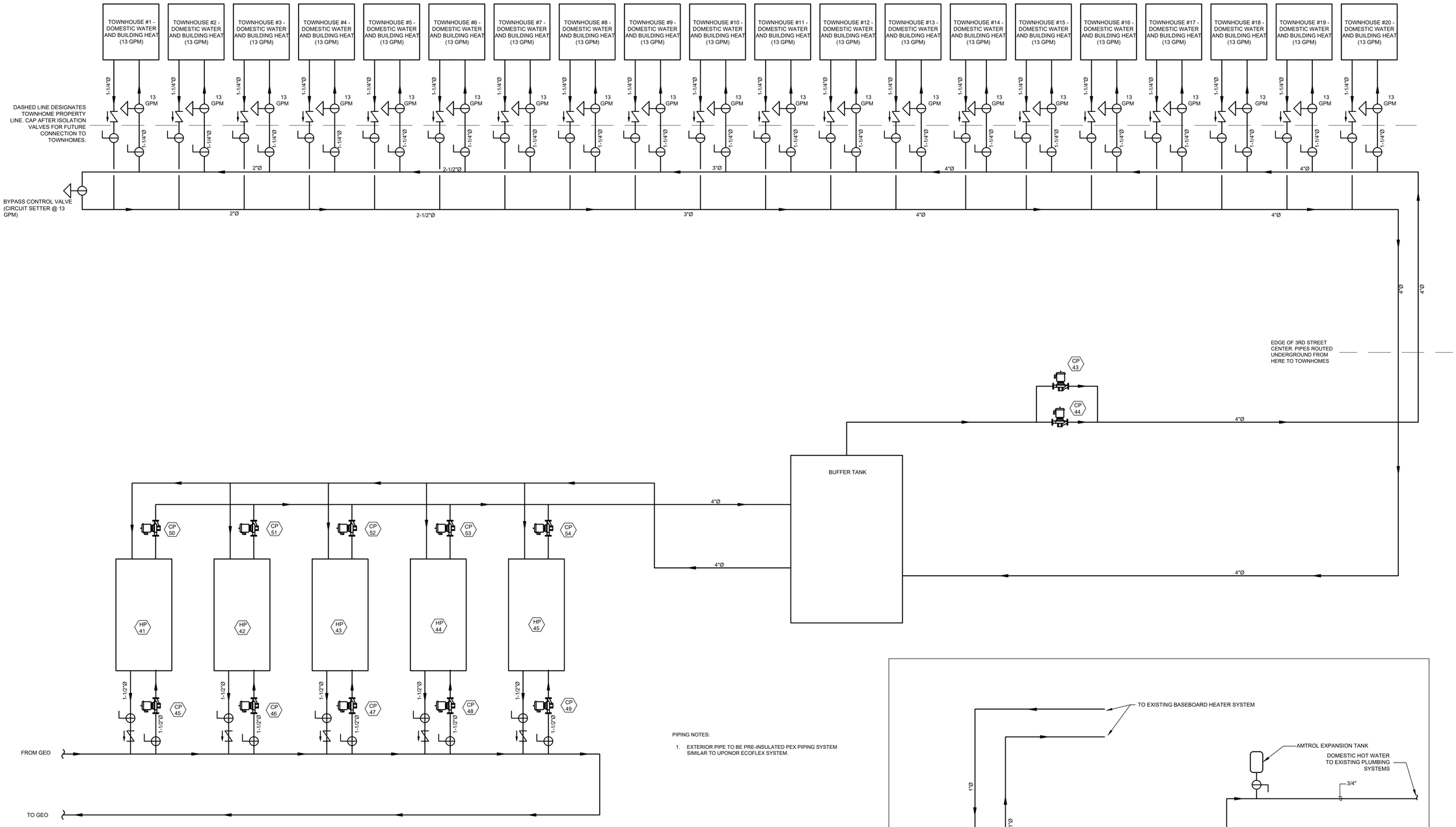
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN

SHEET NUMBER:
M3-2

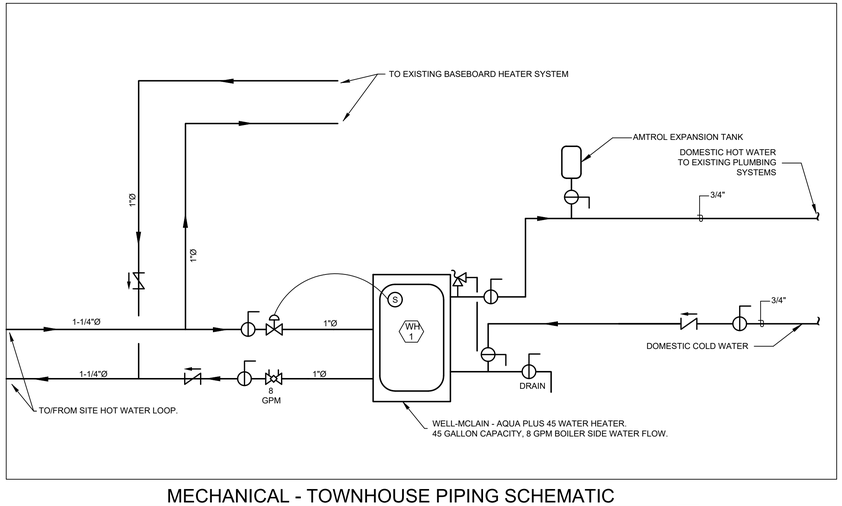
September 18, 2024 - 10:05:34am



PIPING NOTES:

1. EXTERIOR PIPE TO BE PRE-INSULATED PEX PIPING SYSTEM SIMILAR TO UPONOR ECOFLEX SYSTEM.

MECHANICAL - TOWNHOUSE SITE LOOP PIPING SCHEMATIC



MECHANICAL - TOWNHOUSE PIPING SCHEMATIC

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CARBONDALE COMMUNITY GEOTHERMAL

MECHANICAL - MAIN PLAN

520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
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DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN
SHEET NUMBER:	M3-3

WATER SOURCE HEAT PUMP SCHEDULE

EQUIPMENT NO.	SERVICE	COOLING CYCLE							HEATING CYCLE						CONDENSER		FAN SECTION				ELECTRIC			MANUFACTURER & MODEL	OPTIONS/ACCESSORIES
		MBH			TOTAL TONS	ENT. AIR		WATER TEMP (°F)	MBH		AIR TEMP. (°F DB)		WATER TEMP (°F)		GPM	P.D. (FT)	CFM	E.S.P	HP	FLA	V./PH/HZ	MCA (A)	MOCP (A)		
		SENS.	TOTAL	HEAT OF REJECTION		°F DB	°F WB	ENT.	LVG.	TOTAL	HEAT OF EXTRACTION	ENT	LVG.	ENT.	LVG.											
HP-1	ZONE 1 (168)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SR0	NOTE-1
HP-2	ZONE 2 (167)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-3	ZONE 3 (166)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SR0	NOTE-1
HP-4	ZONE 4 (165)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-5	ZONE 5 (161)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-6	ZONE 6 (162)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-7	ZONE 7 (160)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-8	ZONE 8 (159)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-9	ZONE 9 (157)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-10	ZONE 10 (158)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-11	ZONE 11 (155)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-12	ZONE 12 (156)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-13	ZONE 13 (151)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-14	ZONE 14 (150)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-15	ZONE 15 (163,170,164,129B)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-16	ZONE 15 (163,170,164,129B)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-17	ZONE 16 (149)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-18	ZONE 17 (138)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-19	ZONE 17 (138)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SL0	NOTE-1
HP-20	ZONE 18 (132,134,222B,222A)	21.3	28.3	12.4	2	80.6	66.2	93	103	17.8	15.8	68	88.7	50	40	6	1.09	800	0.07	1/2	4.3	208/1/60	15.4	20	WATER FURNACE UVH024SL0	NOTE-1
HP-21	ZONE 19 (129B)	54.6	78.3	92.4	6	80.6	66.2	93	103	58	52.3	68	101	50	40	20	12.3	2000	0.19	1	7.7	208/1/60	38.2	60	WATER FURNACE UVH072SL0	NOTE-1
HP-22	ZONE 20 (103,104,105)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-23	ZONE 21 (100,102A,129A)	33.2	43.6	50	3	80.6	66.2	93	103	29	26.4	68	93.2	50	40	9	2.62	1300	0.14	1/2	4.3	208/1/60	19.3	30	WATER FURNACE UVH036SL0	NOTE-1
HP-24	ZONE 22 (101,106,110)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-25	ZONE 23 (130A,130B,133)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-26	ZONE 23 (130A,130B,133)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-27	ZONE 24 (142,143,144,140,139A,139B,139C)	49.1	68.35	70.4	5	80.6	66.2	93	103	45	41.1	68	96.8	50	40	17	9.18	1800	0.16	1	7.7	208/1/60	32.7	50	WATER FURNACE UVH060SL0	NOTE-1
HP-28	ZONE 25 (111,112,113,114,115)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-29	ZONE 26 (116)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-30	ZONE 27 (117)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-31	ZONE 28 (118)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-32	ZONE 29 (119)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-33	ZONE 30 (120A,120B,121B,126E)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-34	ZONE 31 (121A)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-35	ZONE 32 (122A,122B)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-36	ZONE 33 (123A,123B)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-37	ZONE 34 (124A,124B)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-38	ZONE 35 (125 A,125B)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-39	ZONE 36 (126)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-40	ZONE 36 (126)	41.2	55.2	60.7	4	80.6	66.2	93	103	38	34.4	68	94.5	50	40	12	4.5	1600	0.15	1	7.7	208/1/60	27.7	40	WATER FURNACE UVH048SR0	NOTE-1
HP-41	TOWNHOMES	-	340.0	-	-	-	-	86	180	477	-	-	-	180	54	76	-	-	-	-	162	208/3/60	224		LYNC 500	NOTE-2
HP-42	TOWNHOMES	-	340.0	-	-	-	-	86	180	477	-	-	-	180	54	76	-	-	-	-	162	208/3/60	224		LYNC 500	NOTE-2
HP-43	TOWNHOMES	-	340.0	-	-	-	-	86	180	477	-	-	-	180	54	76	-	-	-	-	162	208/3/60	224		LYNC 500	NOTE-2
HP-44	TOWNHOMES	-	340.0	-	-	-	-	86	180	477	-	-	-	180	54	76	-	-	-	-	162	208/3/60	224		LYNC 500	NOTE-2
HP-45	TOWNHOMES	-	340.0	-	-	-	-	86	180	477	-	-	-	180	54	76	-	-	-	-	162	208/3/60	224		LYNC 500	NOTE-2

NOTES:
1. HEAT PUMP LOCATED ABOVE CEILING. UNPAINTED CABINET, FLOW METER, MERV 13 FILTER.
2. HEAT PUMP LOCATED IN MECHANICAL ROOM. PROVIDE WITH CENTRAL CONTROLS FOR PARALLEL UNITS.

WATER SOURCE HEAT PUMP ROOF TOP UNIT SCHEDULE

EQUIPMENT NO.	SERVICE	COOLING CYCLE							HEATING CYCLE						CONDENSER		FAN SECTION				ELECTRIC			MANUFACTURER & MODEL	OPTIONS/ACCESSORIES
		MBH			TOTAL TONS	ENT. AIR		WATER TEMP (°F)		MBH		AIR TEMP. (°F DB)		WATER TEMP (°F)		GPM	P.D. (FT)	CFM	E.S.P	HP	FLA	V./PH/HZ	MCA (A)	MOCP (A)		
		SENS.	TOTAL	HEAT OF REJECTION		°F DB	°F WB	ENT.	LVG.	TOTAL	HEAT OF EXTRACTION	ENT	LVG.	ENT.	LVG.											
RTU-1	ZONE 37 (GYM)	67.4	90.8	111.6	10	80.6	66.2	93	83	89.4	68	68	97.2	50	40	24	17.8	3000	0.5	4.8	9.2	208/3/60	43.2	50	WATER FURNACE URT096B3	NOTE-1
RTU-2	ZONE 37 (GYM)	67.4	90.8	111.6	10	80.6	66.2	93	83	89.4	68	68	97.2	50	40	24	17.8	3000	0.5	4.8	9.2	208/3/60	43.2	50	WATER FURNACE URT096B3	NOTE-1

NOTES:
1. PROVIDE WITH ROOF CURB, MODULATING ECONOMIZER,POWERED EXHAUST.

ELECTRIC UNIT HEATER SCHEDULE

EQUIPMENT NO.	SERVICE	CFM	BTU/HR	KW	AIR TEMP. RISE (F)	FULL LOAD AMPS (FLA)	V/PH/HZ	MANUFACTURER & MODEL	OPTIONS/ACCESSORIES
EUH-1	VEST 100	65	6,826	2	50	9.6	208/1/60	QMARK CWH1208DSAF	NOTE-1

NOTES:
1. PROVIDE WITH INTEGRAL THERMOSTAT, RECESS MOUNTING FRAME, TERMAL OVERALOAD PROTECTION. ARCHITECT TO CONFIRM FINISH COLOR.

GRILLE-REGISTER-DIFFUSER SCHEDULE

EQUIPMENT NO.	SIZE	MODEL	MANUFACTURER	FINISH	OPTIONS/ACCESSORIES
TYPE - A	24"X24"	SPD	PRICE	WHITE	NOTE-1
TYPE - B	12"X12"	SPD	PRICE	WHITE	NOTE-1
TYPE - C	24"X24"	SPD	PRICE	WHITE	NOTE-2
TYPE - D	24"X10"	500	PRICE	WHITE	NOTE-3

NOTES:
1. CEILING MOUNTED SUPPLY GRILLE. PROVIDE MOUNTING BRACKET FOR CEILING.
2. CEILING MOUNTED RETURN GRILLE. PROVIDE MOUNTING BRACKET FOR CEILING.
3. FLOOR MOUNTED SUPPLY GRILLE. PROVIDE MOUNTING BRACKET FOR FLOOR.

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CARBONDALE COMMUNITY GEOTHERMAL
MECHANICAL - DETAILS
520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN

SHEET NUMBER:
M4-1

September 18, 2024 - 10:05:35am

PUMP SCHEDULE

EQUIPMENT NO.	SERVICE	LOCATION	GPM	HEAD (FT.)	MOTOR					MANUFACTURER & MODEL	OPTIONS/ACCESSORIES
					WATTS	RPM	V./PH./HZ.	HP	FLA		
CP-1	HP-1	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-2	HP-2	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-3	HP-3	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-4	HP-4	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-5	HP-5	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-6	HP-6	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-7	HP-7	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-8	HP-8	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-9	HP-9	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-10	HP-10	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-11	HP-11	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-12	HP-12	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-13	HP-13	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-14	HP-14	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-15	HP-15	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-16	HP-16	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-17	HP-17	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-18	HP-18	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-19	HP-19	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-20	HP-20	INLINE IN SPACE	6	2	480	1600	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-21	HP-21	INLINE IN SPACE	20	20	480	3000	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-22	HP-22	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-23	HP-23	INLINE IN SPACE	9	5	480	1700	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-24	HP-24	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-25	HP-25	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-26	HP-26	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-27	HP-27	INLINE IN SPACE	17	20	480	3100	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-28	HP-28	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-29	HP-29	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-30	HP-30	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-31	HP-31	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-32	HP-32	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-33	HP-33	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-34	HP-34	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-35	HP-35	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-36	HP-36	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-37	HP-37	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-38	HP-38	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-39	HP-39	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-40	HP-40	INLINE IN SPACE	12	9	480	2200	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-41	RTU-1	INLINE IN SPACE	24	20	480	3100	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-42	RTU-2	INLINE IN SPACE	24	20	480	3100	120/1/60	0.6	4	TACO VR15M	NOTE-1
CP-43	TOWNHOMES	MECHANICAL ROOM	215	60	-	1760	208/3/60	10	30.8	TACO SKV4009D	NOTE-2
CP-44	TOWNHOMES	MECHANICAL ROOM	215	60	-	1760	208/3/60	10	30.8	TACO SKV4009D	NOTE-2
CP-45	HP-41 GEO SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-46	HP-42 GEO SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-47	HP-43 GEO SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-48	HP-44 GEO SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-49	HP-45 GEO SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-50	HP-41 SUPPLY SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-51	HP-42 SUPPLY SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-52	HP-43 SUPPLY SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-53	HP-44 SUPPLY SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2
CP-54	HP-45 SUPPLY SIDE	MECHANICAL ROOM	35	50	-	1760	208/1/60	2	13.2	TACO SKV1507D-A-4P-PD	NOTE-2

NOTES:
1. HIGH EFFICENCY PUMP 3PH PUMP. PROVIDE WITH VFD, BMS INTERFACE, SUPPORT STAND, TEFC MOTOR ENCLOSURE, AND FLANGED PIPE CONNECTIONS.
2. VARIABLE SPEED PUMP. PROVIDE WITH EC MOTOR, BMS INTERFACE, .TEFC MOTOR ENCLOSURE, AND FLANGED PIPE CONNECTIONS.

GEOTHERMAL SYSTEM PUMP SCHEDULE (REFER TO SHEET XG601)

EQUIPMENT NO.	SERVICE	LOCATION	GPM	HEAD (FT.)	MOTOR					MANUFACTURER & MODEL	OPTIONS/ACCESSORIES
					WATTS	RPM	V./PH./HZ.	HP	FLA		
P-1	MAIN GEOTHERMAL LOOP PUMP	3RD STREET CENTER MECH ROOM	1440	50	-	1760	208/3/60	25	74.8	TACO - SKV8011D	NOTE-1
P-2	MAIN GEOTHERMAL LOOP PUMP	3RD STREET CENTER MECH ROOM	1440	50	-	1760	208/3/60	25	74.8	TACO - SKV8011D	NOTE-1
P-3	MAIN GEOTHERMAL LOOP PUMP	3RD STREET CENTER MECH ROOM	1440	50	-	1760	208/3/60	25	74.8	TACO - SKV8011D	NOTE-1
P-4	TSC SOLAR THERMAL LOOP	3RD STREET CENTER MECH ROOM	100	25	-	3900	208/1/60	2.1	13.8	TACO - VR25H	NOTE-2
P-5	TSC SOLAR THERMAL LOOP	3RD STREET CENTER MECH ROOM	100	25	-	3900	208/1/60	2.1	13.8	TACO - VR25H	NOTE-2
P-6	TSC LOOPFILED SYSTEM PUMP	3RD STREET CENTER MECH ROOM	405	35	-	1760	208/3/60	7.5	24.2	TACO - SKV5007D	NOTE-1
P-7	TSC LOOPFILED SYSTEM PUMP	3RD STREET CENTER MECH ROOM	405	35	-	1760	208/3/60	7.5	24.2	TACO - SKV5007D	NOTE-1
P-8	TSC EXISTING BOILERS	3RD STREET CENTER MECH ROOM	-	-	-	-	-	-	-	EXISTING TO REMAIN	NOTE-3
P-8	TSC EXISTING BOILERS	3RD STREET CENTER MECH ROOM	-	-	-	-	-	-	-	EXISTING TO REMAIN	NOTE-3
P-10	TSC HEAT PUMP LOOP	3RD STREET CENTER MECH ROOM	825	50	-	1760	208/3/60	15	46.2	TACO KV6011D-4P-PM	NOTE-1
P-11	TSC HEAT PUMP LOOP	3RD STREET CENTER MECH ROOM	825	50	-	1760	208/3/60	15	46.2	TACO KV6011D-4P-PM	NOTE-1
P-12	TOWNHOUSE CO2 HEAT PUMPS	3RD STREET CENTER MECH ROOM	175	10	-	3900	208/1/60	2.1	13.8	TACO - VR25H	NOTE-2
P-13	TOWNHOUSE CO2 HEAT PUMPS	3RD STREET CENTER MECH ROOM	175	10	-	3900	208/1/60	2.1	13.8	TACO - VR25H	NOTE-2

NOTES:
1. HIGH EFFICENCY PUMP 3PH PUMP. PROVIDE WITH VFD, BMS INTERFACE, SUPPORT STAND, TEFC MOTOR ENCLOSURE, AND FLANGED PIPE CONNECTIONS.
2. VARIABLE SPEED PUMP. PROVIDE WITH EC MOTOR, BMS INTERFACE, .TEFC MOTOR ENCLOSURE, AND FLANGED PIPE CONNECTIONS.
3. EXISTING PUMPS ARE TO REMAIN. FEED INTO GEO LOOP AS SHOWN ON GEOTHERMAL DRAWINGS. VERIFY GOOD WORKING CONDITION OF PUMPS.

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CARBONDALE COMMUNITY GEOTHERMAL

MECHANICAL - DETAILS

520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
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SCALE:	AS SHOWN
SHEET NUMBER:	M4-2

September 18, 2024 - 10:05:36am

FIRE ALARM EQUIPMENT LEGEND

FACP	FIRE ALARM CONTROL PANEL
F	FIRE ALARM PULL STATION
	FIRE ALARM HORN
	FIRE ALARM STROBE
	FIRE ALARM HORN/STROBE
	CEILING MOUNTED SPEAKER
D	DUCT DETECTOR
RL	REMOTE LAMP
S P	SMOKE DETECTOR - PHOTOELECTRIC
H 135°	135° STANDARD HEAT DETECTOR
PIR	PIR DETECTOR
DH	DOOR HOLD - MAGNETIC HOLD
FS	FLOW SWITCH
TS	TAMPER SWITCH

COMMUNICATION LEGEND

	CLOCK ONLY
	CLOCK / PA SPEAKER WALL MOUNTED
S	ROUND CEILING MOUNTED SPEAKER
S	SQUARE SPEAKER
C	INTERCOM PUSH TO CALL SWITCH
WAP	WIRELESS ACCESS POINT ABOVE THE CEILING
PROJECTOR	ABOVE THE CEILING PROJECTOR CONNECTION
HDMI	WALL MOUNTED HDMI
	PLAIN DATA OUTLET
80"	PLAIN DATA OUTLET WITH MOUNTING HEIGHT
	COMBINATION DATA/TELEPHONE
	FLOOR MOUNTED COMBINATION DATA/TELEPHONE
	CEILING MOUNTED COMBINATION DATA/TELEPHONE
	TELEVISION OUTLET

SECURITY SYSTEM LEGEND

	SECURITY CAMERA
HC	ADA DOOR OPERATOR PUSH BUTTON
DS	ELECTRIC DOOR STRIKE
CR	CARD READER FOR DOOR OPERATOR

LIGHTING LEGEND

NOTES:

SYMBOLS SHOWN ARE STANDARD. VARIATION AND/OR COMBINATIONS MAY BE USED ON THE PLANS. THIS LIST SHOWS STANDARD SYMBOLS AND ALL MAY NOT APPEAR ON THE PROJECT DRAWINGS; HOWEVER, WHEREVER THE SYMBOL ON THE PROJECT DRAWINGS OCCUR, THE ITEM SHALL BE PROVIDED AND INSTALLED.

VARIATION AND/OR COMBINATION MAY BE USED ON THE PLANS.

A NUMBER NEXT TO A RECEPTACLE OR DEVICE INDICATES A CIRCUIT NUMBER.

AN UPPER CASE LETTER NEXT TO A SWITCH INDICATES THE FUNCTION OF THE SWITCH. A LOWER CASE LETTER INDICATES THE SWITCH CIRCUIT.

AN UPPER CASE LETTER NEXT TO A LIGHT FIXTURE INDICATES THE TYPE OF FIXTURE. REFER TO THE LUMINAIRE SCHEDULE FOR FIXTURE SPECIFICATIONS. A LOWER CASE LETTER NEXT TO A LIGHT CORRESPONDS TO THE SWITCH DESIGNATION.

SWITCHES

$	SINGLE POLE SWITCH
$2	TWO POLE SWITCH
$3	THREE-WAY SWITCH
$4	FOUR-WAY SWITCH
$D	DIMMER SWITCH
$3D	3 WAY DIMMER SWITCH - (4D INDICATES A 4WAY DIMMER)
$DR	DOOR ACTIVATED SWITCH
$MA	WALL MOUNTED DUAL TECHNOLOGY MANUAL ON / AUTO OFF VACANCY SENSOR SWITCH
$LV	LOW VOLTAGE LIGHT SWITCH
$TO	MANUAL MOTOR STARTER
$P	PILOT LIGHT SWITCH
$DS	AUTO ON / AUTO OFF LIGHT SWITCH
$MO	DUAL TECHNOLOGY MOTION / OCCUPANCY SENSOR LIGHT SWITCH
$DMA	MANUAL ON / AUTO OFF DIMMING LIGHT SWITCH
$K	KEY OPERATED LIGHT SWITCH
$T	MANUAL ON - TIMED OFF LIGHT SWITCH
OS OS	CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCH
MA MA	CEILING MOUNTED DUAL TECHNOLOGY MANUAL ON / AUTO OFF VACANCY SENSOR
DH	CEILING MOUNTED DAYLIGHT RESPONSIVE CONTROL (DAYLIGHT HARVESTING)
$SC	SCENE CONTROL STATION
$MS	UNIT LIGHTING MANAGEMENT CONTROL STATION,

LIGHT FIXTURES

A	1'x4' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE GRID, FLANGE OR SURFACE MOUNTED
A	2'x4' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE GRID, FLANGE OR SURFACE MOUNTED
A	2'x2' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE GRID, FLANGE OR SURFACE MOUNTED
	OPEN STRIP FIXTURE
	WALL BRACKET LINEAR FIXTURE
A	WALL MOUNTED SCONCE LIGHT FIXTURE
A	RECESSED DOWNLIGHT CAN FIXTURE
A	SURFACE CEILING OR PENDANT MOUNTED FIXTURE
EX2	DOUBLE FACE EXIT SIGN, WALL AND CEILING MOUNTED
EX1	SINGLE FACE EXIT SIGN, WALL AND CEILING MOUNTED
EM	WALL MOUNTED EMERGENCY LIGHT
EMR	EMERGENCY EXTERIOR EGRESS FIXTURE

GENERAL ELECTRICAL NOTES:

1. ALL ELECTRICAL WORK TO COMPLY WITH LATEST EDITION OF NEC, IECC AND ALL APPLICABLE GOVERNING CODES.
2. FIELD COORDINATION DURING CONSTRUCTION IS IMPERATIVE. CONTRACTORS BIDDING THIS WORK MUST MAKE REASONABLE ALLOWANCES FOR UNFORESEEN CONTINGENCIES.
3. ELECTRIC UTILITY TO ADVISE OWNER AND/OR THE ELECTRICAL ENGINEER PRIOR TO SERVICE MODIFICATION REQUIRING COST TO THE OWNER.

WIRING:

1. ALL WIRING IS SHOWN DIAGRAMMATICALLY ON DRAWING, FIELD VERIFY ALL CONDITIONS PRIOR TO ROUGH-IN.
2. ALL CONDUITS AND CONVEYANCES SHALL BE CONCEALED. IN THE EVENT THAT A NEW DEVICE IS BEING INSTALLED IN AN EXISTING DRYWALL PARTITION, PROVIDE A CUT IN TYPE BOX AND FISH FLEXIBLE CONDUIT DOWN INSIDE THE WALL FROM ABOVE THE CEILING AND REPAIR THE DRYWALL AROUND THE CONDUIT. TRANSITION TO EMT ONCE ABOVE THE CEILING.
3. SIZES OF WIRE AND CABLES ARE BASED UPON COPPER CONDUCTORS, UNLESS OTHERWISE INDICATED. ALL CIRCUITS SHALL CONTAIN (2) #12 AWG WITH (1) #12 GND IN 1/2" CONDUIT UNLESS NOTED OTHERWISE.
4. ALL BRANCH CIRCUITS WITH HOME RUNS OVER 50 FEET, WILL BE SIZED ONE SIZE LARGER.
5. ALL PENETRATIONS IN OR THROUGH FIRE RATED PARTITIONS SHALL BE FIRE STOPPED IN SUCH A WAY THAT THE PENETRATION MATCHES THE FIRE RATING OF THE WALL.
6. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION BETWEEN THE APPROPRIATE DISCIPLINES AND CONTRACTORS.
7. COORDINATE ALL DEVICE, FIXTURE AND HARDWARE COLOR SELECTIONS WITH THE ARCHITECT PRIOR TO MAKING SHOP DRAWING SUBMITTALS.
8. COORDINATE THE MOUNTING HEIGHTS OF ALL RECEPTACLES MOUNTED ABOVE COUNTERS, CASEWORK AND APPLIANCE RECEPTACLES WITH ARCHITECTURAL ELEVATIONS.
9. BRANCH CIRCUIT AND SPECIAL SYSTEMS WIRING FOR DEVICES ON WALLS IN FINISHED AREAS WHICH CANNOT BE CONCEALED SHALL BE INSTALLED IN SURFACE MOUNTED RACEWAY.
10. ALL EXPOSED CONDUITS, BOXES, ETC. IN ROOMS TO BE PAINTED SHALL BE PAINTED TO MATCH THE SURROUNDING SURFACE. EXPOSED CONDUITS, BOXES, ETC. IN ROOMS WHICH ARE NOT PAINTED MAY BE LEFT UN-PAINTED. EXPOSED CONDUIT, BOXES, ETC. ON THE EXTERIOR OF BUILDINGS SHALL BE PAINTED TO MATCH THE SURROUNDING SURFACE AS CLOSELY AS POSSIBLE.
11. THE CONTRACTOR IS RESPONSIBLE FOR PATCHING, PAINTING, REPAIRING OR REPLACEMENT OF ALL WALLS, CEILING OR OTHER BUILDING ELEMENTS WHICH ARE DISTURBED AS PART OF THE DEMOLITION AND/OR INSTALLATION OF ELECTRICAL WORK.
12. PROVIDE ELECTRICAL CONNECTION TO ALL FIRE, SMOKE, AND FIRE / SMOKE DAMPERS INCLUDING POWER AND FIRE ALARM. VERIFY EXACT SIZE AND FINAL LOCATION OF ALL DAMPERS WITH THE MECHANICAL CONTRACTOR. ALL ROOFTOP UNITS RATED AT MORE THAN 2000 CFM WILL BE OUTFITTED WITH A DUCT DETECTOR IN THE RETURN DUCT. ALL ROOFTOP UNITS RATED AT MORE THAN 15000 CFM WILL BE OUTFITTED WITH A DUCT DETECTOR IN BOTH THE SUPPLY AND RETURN DUCT AT ROOFTOP LEVEL AND IN THE RETURN DUCT AT EVERY LEVEL THAT IS SERVED. ELECTRICAL CONTRACTOR WILL PROVIDE A REMOTE TEST STATION AND ALL WIRING NECESSARY TO COMPLETE INSTALLATION.
13. REFER TO THE MECHANICAL EQUIPMENT SCHEDULE FOR ADDITIONAL REQUIREMENTS ASSOCIATED WITH PLUMBING AND HVAC EQUIPMENT AND OWNER/GENERAL CONTRACTOR FURNISHED EQUIPMENT.

ELECTRICAL EQUIPMENT LEGEND

	BRANCH CIRCUIT PANELBOARD
	TELEPHONE TERMINAL BOARD
	ELECTRIC MOTOR
F	FUSED SAFETY SWITCH / DISCONNECT COMBINATION
	MOTOR STARTER
	CONTACTOR
LA-7	CIRCUITRY HOMERUN: PANEL LA - CIR. #7
	CONDUIT OR WIRE CONCEALED IN WALL/CLG. (SOLID LINE TYPE)
	CONDUIT OR WIRE UNDERFLOOR/UNDERGND. (CENTER LINE TYPE)

MAIN DISTRIBUTION GEAR

	CIRCUIT BREAKER IN A PANEL BOARD
	PAD MOUNTED UTILITY TRANSFORMER
100 A 2 POLE FUSED DISCONNECT	FUSED DISCONNECT 100A = AMP RATING 2P = NUMBER OF POLES
M	ELECTRICAL METER SHOWN ON ONE-LINE DIAGRAMS
PP1 225A MCB 120/208V 3PH, 4W / PP1 225A MLO 120/208V 3PH, 4W	ELECTRICAL POWER PANEL WITH MAIN LUG OR MAIN BREAKER PP1= PANEL NAME 225A MLO = MAIN LUG OR BREAKER SIZE 120/208V = PANEL VOLTAGE 3PH, 4 WIRE = PANEL PHASE, DISTRIBUTION TYPE

ELECTRICAL DEVICE LEGEND

J	CEILING JUNCTION BOX - SURFACE/FLUSH
J	WALL JUNCTION BOX - SURFACE/FLUSH
	DUPLEX RECEPTACLE
	FLOOR MOUNTED RECEPTACLE
	SPLIT WIRED DUPLEX RECEPTACLE
	CEILING MOUNTED DUPLEX RECEPTACLE
	FOURPLEX RECEPTACLE
	FLOOR MOUNTED FOURPLEX RECEPTACLE
	APPLIANCE RECEPTACLE - 3 WIRE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
USB	RECEPTACLE WITH USB CHARGING CAPABILITES
AC	RECEPTACLE MOUNTED ABOVE COUNTER
CW	RECEPTACLE MOUNTED IN CASEWORK
D	ELECTRIC HAND DRYER
T	THERMOSTAT
	OPEN/CLOSE/STOP PUSH BUTTON
1	DRAWING KEY NOTES
ROOM 100	ROOM DESIGNATION
GFCI WP	GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE WITH A WEATHER PROOF COVER
GFCI 44"	GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE MOUNTED AT 44" ABOVE FINISHED FLOOR

LUMINAIRES:

1. COORDINATE THE LOCATION OF ALL LIGHTING EQUIPMENT INCLUDING BUT NOT LIMITED TO THE LUMINAIRES, SWITCHES WITH THE ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS AND ALL OTHER TRADES AS REQUIRED. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLANS FOR DIMENSIONAL LOCATION OF LIGHT FIXTURES.
2. LIGHTING FIXTURES SHALL BE SUPPORTED FROM THE STRUCTURE ABOVE AND SHALL NOT BE SUPPORTED FROM THE T-BAR CEILING GRID.
3. THE ELECTRICAL CONTRACTOR IS TO CONFIRM THE LIGHT FIXTURES ORDERED WILL BE COMPATIBLE WITH THE CEILING TYPES AS SHOWN ON THE ARCHITECTURAL REFLECTED CEILING PLANS. NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING THE FIXTURES.
4. VERIFY LUMINAIRE MOUNTING REQUIREMENTS AND OVERALL HEIGHT OF ALL PENDANT MOUNTED FIXTURES PRIOR TO ORDERING.
5. ALL LIGHT FIXTURES NEED TO BE COMPATIBLE WITH THE SWITCHES AND CONTROLS BEING PROVIDED.
6. THE LIGHTING PACKAGE SHALL BE APPROVED BY BOTH THE ARCHITECT AND ENGINEER AS APPROVED EQUAL BEFORE BID. NO LIGHT FIXTURE SHALL BE ORDERED UNTIL THE LIGHT FIXTURE SUBMITTAL PACKAGE HAS BEEN APPROVED IN WRITING BY THE ARCHITECT, GENERAL CONTRACTOR AND ELECTRICAL ENGINEER.
7. COORDINATE LUMINAIRE MOUNTING REQUIREMENTS PRIOR TO PLACING ORDER.

RESPONSIBLE DIVISION:

UNLESS OTHERWISE INDICATED ALL HEATING, VENTILATING, AIR CONDITIONING, PLUMBING, AND OTHER MECHANICAL EQUIPMENT, MOTORS, AND CONTROLS SHALL BE FURNISHED, SET IN PLACE AND WIRED AS FOLLOWS:

ITEM	FURNISHED	SET	POWER WIRED	CONTROL WIRED
EQUIPMENT	23	23	26	--
COMBINATION MAGNETIC MOTOR STARTERS, MAGNETIC MOTOR STARTERS, VFD'S AND CONTACTORS	23(1)	26	26(2)	23
FUSED AND UNFUSED DISCONNECT SWITCHES, THERMAL OVERLOAD SWITCHES AND HEATERS, MANUAL MOTOR STARTERS	26	26	26	--
MANUAL-OPERATING AND MULTI-SPEED SWITCHES	23	26	26	26
CONTROLS, RELAYS, TRANSFORMERS	23	23	26	23
THERMOSTATS (LOW VOLTAGE) AND TIME SWITCHES	23	23	26	23
THERMOSTATS (LINE VOLTAGE)	23	23	26	26
TEMPERATURE CONTROL PANELS	23	23	26	23
MOTOR AND SOLENOID VALVES, DAMPER MOTORS, PE & EP SWITCHES	23	23(2)	--	23(2)
PUSH-BUTTON STATIONS AND PILOT LIGHTS	23	23(2)	--	23(2)
HEATING, COOLING, VENTILATION AND AIR CONDITIONING CONTROLS	23	23	26	23
EXHAUST FAN SWITCHES	23	26	26	23(2)

SUBSCRIPT FOOTNOTES:
1. MOTOR STARTER TO INCLUDE CONTROL TRANSFORMER, HOA SWITCH, (1) NO AND (1)NC AUXILIARY CONTACT, AND "ON" AND "OFF" PILOT LIGHTS.
2. IF ITEM IS FOR LINE VOLTAGE, SET IN PLACE AND CONNECT UNDER DIVISION 26. WHERE FACTORY MOUNTED ON EQUIPMENT OR ATTACHED TO PIPING OR DUCTS AND USING LINE VOLTAGE FURNISH AND SET UNDER DIVISION 23, CONNECT UNDER DIVISION 26.

SUBSTITUTIONS:

A. SUBSTITUTIONS: SUBSTITUTION OF SPECIFIED EQUIPMENT WILL BE ALLOWED THROUGH A PRIOR APPROVAL PROCESS INITIATED BY THE CONTRACTOR. CONTRACTOR SHALL SUBMIT INTENDED SUBSTITUTION AT LEAST FIVE DAYS PRIOR TO BID FOR APPROVAL FROM ENGINEER. SUBMITTAL SHALL INCLUDE CAPACITIES, DIMENSIONS AND OPERATING INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT. SUBSTITUTION SHALL OCCUR AT NO COST TO THE OWNER. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF APPROVED SUBSTITUTION AND SHALL INCUR ALL COSTS ASSOCIATED WITH THE SUBSTITUTION INCLUDING STRUCTURAL MODIFICATIONS, SPACE LAYOUT AND REDESIGN COSTS. SEE ALSO DIVISION I GENERAL REQUIREMENTS.

EXAMINATION OF SITE, DRAWINGS, SPECIFICATIONS:

A. EXAMINE CAREFULLY THE SITE AND CONDITIONS OF THE SITE. PROVIDE ALL NECESSARY EQUIPMENT AND LABOR TO INSTALL A COMPLETE WORKING SYSTEM WITHIN THE SITE CONDITIONS.

B. EXAMINE THE DRAWINGS AND SPECIFICATIONS AND 5 DAYS PRIOR TO BIDDING REPORT ANY ERRORS, OMISSIONS, INCONSISTENCIES, AND CONFLICTS TO THE ENGINEER TO BE REMEDIED IN AN ADDENDUM TO THE PROJECT PRIOR TO BID TIME.

C. DRAWINGS ARE DIAGRAMMATIC AND CATALOG NUMBERS GIVEN ARE FOR REFERENCE ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE CAPACITY OF THE EQUIPMENT MEETS THE DRAWING REQUIREMENTS AND SHALL NOT DIMENSION FROM THE MECHANICAL, PLUMBING, OR PIPING DRAWINGS.

D. THE CODES THAT WILL BE ADHERED TO ARE THE 2018 INTERNATIONAL MECHANICAL, 2023 COLORADO PLUMBING CODE, AND 2018 INTERNATIONAL ENERGY CONSERVATION CODE, AS WELL AS THE 2023 NATIONAL ELECTRICAL CODE. ALL METHODS AND MATERIALS REQUIRED BY THESE CODES SHALL BE REQUIRED BY THESE SPECIFICATIONS UNLESS INDICATED OTHERWISE. OTHER APPLICABLE LOCAL CODES AND ORDINANCES SHALL BE AS REQUIRED AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO BE KNOWLEDGEABLE OF THESE REQUIREMENTS. (REFERENCE ARCHITECTURAL DRAWINGS FOR CODE PLANS FOR GOVERNING CODES AND REGULATIONS.)

E. WHERE INSTALLATION PROCEDURES OR ANY PART THEREOF ARE REQUIRED TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL BEING INSTALLED, PRINTED COPIES OF THESE RECOMMENDATIONS SHALL BE FURNISHED TO THE ENGINEER PRIOR TO INSTALLATION. INSTALLATION OF THE ITEM WILL NOT BE ALLOWED TO PROCEED UNTIL THE RECOMMENDATIONS ARE RECEIVED. FAILURE TO FURNISH THESE RECOMMENDATIONS CAN BE CAUSE FOR REJECTION OF THE MATERIAL.

ABBREVIATIONS:

44"	MOUNTING HEIGHT ABOVE FINISHED FLOOR TO CENTER OF DEVICE
A	AMPS
A.D.	ACCESS DOOR
AAV	AIR ADMITTANCE VALVE
ABV	ABOVE
AC	AIR CONDITIONING UNIT
AC	ABOVE COUNTER
AD	AREA DRAIN (SEE SYMBOLS)
A.F.C.	ABOVE FINISHED CEILING
A.F.G.	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTING CAPACITY
A.F.F.	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
AP	ACCESS PANEL OR DOOR
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO / VIDEO
AVG	AVERAGE
AWG	AMERICAN WIRE GAGE
BAS	BUILDING AUTOMATION SYSTEM
BB	BASEBOARD
BD	BACK DRAFT DAMPER
BFP	BACK FLOW PREVENTOR
BL	BOILER
BLDG	BUILDING
BLW	BELOW
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
C	CHILLER
CAP	CAPACITY
CB	CIRCUIT BREAKER
CBV	CIRCUIT BALANCING VALVE
CCT	CORRELATED COLOR TEMPERATURE
CKT	CIRCUIT
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CI	CAST IRON
CL	CENTER LINE
CLG	CEILING
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
COMP	COMPRESSOR
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
CONTR	CONTRACTOR
CRI	COLOR RENDERING INDEX
CT	COOLING TOWER
CT	CURRENT TRANSFORMER
CU	CONDENSING UNIT
CU	COPPER
CUH	CABINET UNIT HEATER
CVB	CONSTANT VOLUME BOX
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DB	DRY BULB
DEPT	DEPARTMENT
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGRAM
DIFF	DIFFERENTIAL
DISCH	DISCHARGE
DIV	DIVISION
DN	DOWN
DS	DUCT SILENCER
DWG	DRAWING
DX	DIRECT EXPANSION
(A)	EXISTING
EA	EXHAUST AIR GRILLE/REGISTER
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECC	ECCENTRIC
EF	EXHAUST FAN
EFF	EFFICIENCY
EL	ELEVATION
ELEC	ELECTRIC
ELEV	ELEVATOR
EM	EMERGENCY FUNCTION
ENT	ENTERING
EMT	ELECTRIC METALLIC TUBE
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ES	END SWITCH
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EX	EXHAUST
EXPAN	EXPANSION
EXT	EXTERNAL
F	DEGREES FAHRENHEIT
FA	FREE AREA
FC	FAN COIL UNIT
FC	FOOTCANDLE
FCV	FLOW CONTROL VALVE
FD	FIRE DAMPER
FD	FLOOR DRAIN
FIN	FINISHED
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FP	FIRE PROTECTION
FP	FIRE PUMP
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FS	FLOW SWITCH
FSD	FIRE/SMOKE DAMPER
FT	FEET
FXC	FLEXIBLE CONNECTION
GND	GROUND
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GEC	GROUND ELECTRODE CONDUCTOR
GFCI / GFI	GROUND FAULT CIRCUIT INTERRUPTER
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRS/LB	GRAINS PER POUND
H 2O	WATER
HB	HOSE BIBB
HD	HEAD (SEE SCHEDULES)
HP	HEAT PUMP
HP	HORSEPOWER
HR	HOUR
HT	HEIGHT
HTR	HEATER
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
HX	HEAT EXCHANGER
HZ	HERTZ
ID	INSIDE DIAMETER
IG	ISOLATED GROUND
IN	INCHES
INV	INVERT
JBOX	JUNCTION BOX
K	KELVIN
KW	KILOWATT
KVA	KILO VOLT - AMPS
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LV	LAVATORY
LB	POUND
LD	LINEAR DIFFUSER
LF	LINEAR FEET
LIN	LINEAR
LIQ	LIQUID
LM	LUMEN
LRA	LOCKED ROTOR AMPS
LV	LOUVER
LVG	LEAVING
LWT	LEAVING WATER TEMPERATURE
MBH	THOUSANDS OF BTU PER HOUR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MD	MOTORIZED DAMPER
MDP	MAIN DISTRIBUTION PANEL
MED	MEDIUM
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUG ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
MUA	MAKE-UP AIR UNIT
N	NEUTRAL
NC	NORMALLY CLOSED
NEG	NEGATIVE
NIC	NOT IN CONTRACT
NL	NIGHT / SECURITY LIGHT - DO NOT SWITCH
NO	NORMALLY OPEN
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OCC	OCCUPIED
OCP	OVER CURRENT PROTECTION
OD	OUTSIDE DIAMETER
OL	OVERLOAD
ORD	OVERFLOW ROOF DRAIN
OZ	OUNCE
PBD	PARALLEL BLADE DAMPER
PD	PRESSURE DROP
PH	PHASE
POS	POSITIVE PRESSURE
POS	POINT OF SALES
PRV	PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TRANSMITTER
PTAC	PACKAGED TERMINAL AIR CONDITIONER
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RA	RETURN AIR GRILLE / REGISTER
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REL	RELIEF
REQD	REQUIRED
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RLA	RATED LOAD AMPS
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR GRILLE / REGISTER
SC	SHORT CIRCUIT
SCA	SHORT CIRCUIT AVAILABLE
SCCR	SHORT CIRCUIT CURRENT RATING
SCH	SCHEDULE
SD	SMOKE DAMPER
SEF	SMOKE EXHAUST FAN
SF	SUPPLY FAN
SH	SENSIBLE HEAT
SH	SHOWER
SP	STATIC PRESSURE
SPD	SURGE PROTECTION DEVICE
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
SS	SAFETY SHOWER
STD	STANDARD
STL	STEEL
SYS	SYSTEM
TEMP	TEMPERATURE
TR	TRANSFER GRILLE / REGISTER
TR	TAMPER RESISTANT
TT	TEMPERATURE TRANSMITTER
TTB	TELECOMMUNICATIONS TERMINAL BACKBOARD
TYP	TYPICAL
TX	TRANSFORMER
UC	UNDERCUT DOOR
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UNOCC	UNOCCUPIED
UR	URINAL
V	VOLTS
VA	VOLT AMPERE
VA	VALVE
VAV	VARIABLE AIR VOLUME UNIT
VFD	VARIABLE FREQUENCY DRIVE
VRF	VARIABLE REFRIGERANT FLOW
VOLT	VOLTAGE
VTR	VENT THROUGH ROOF
W	WIDTH
W	WATTS
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN
WC	WATER CLOSET
WG	WATER GAUGE
WP	WEATHERPROOF
WPIU	WEATHERPROOF IN-USE
WSR	WITHSTAND RATING
XFMR	TRANSFORMER

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Phone: (970) 241-8709

CARBONDALE COMMUNITY GEOTHERMAL

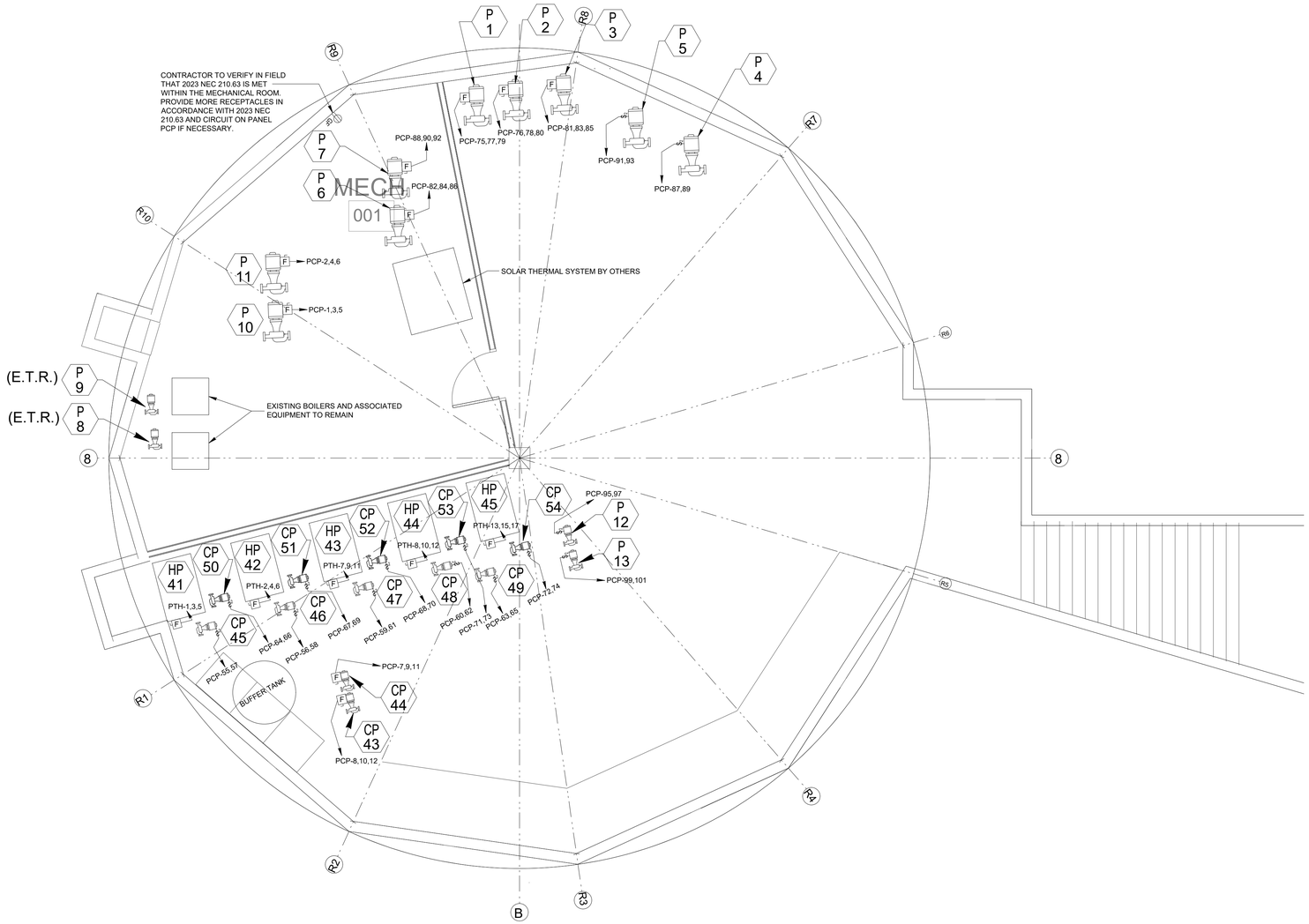
ELECTRICAL - COVER SHEET

520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN
SHEET NUMBER:	E0-1

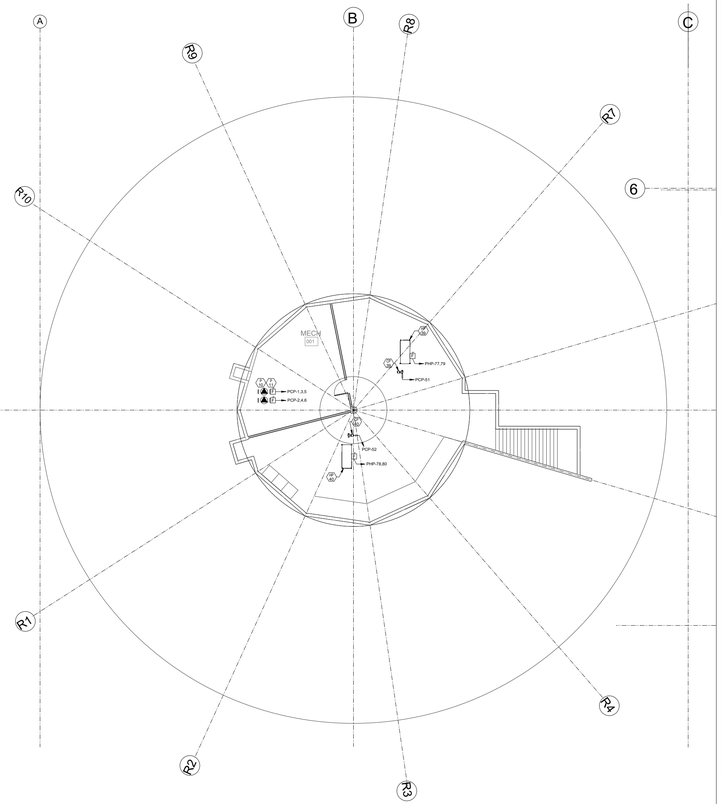
September 17, 2024 - 4:42:48pm



ELECTRICAL - ENLARGED MECHANICAL ROOM EQUIPMENT PLAN

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

NORTH



ELECTRICAL - BASEMENT PLAN

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

NORTH

Bighorn Consulting Engineers, Inc.
Mechanical & Electrical Engineers
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CARBONDALE COMMUNITY GEOTHERMAL

ELECTRICAL - BASEMENT PLAN

520 S. 3RD STREET
CARBONDALE, COLORADO

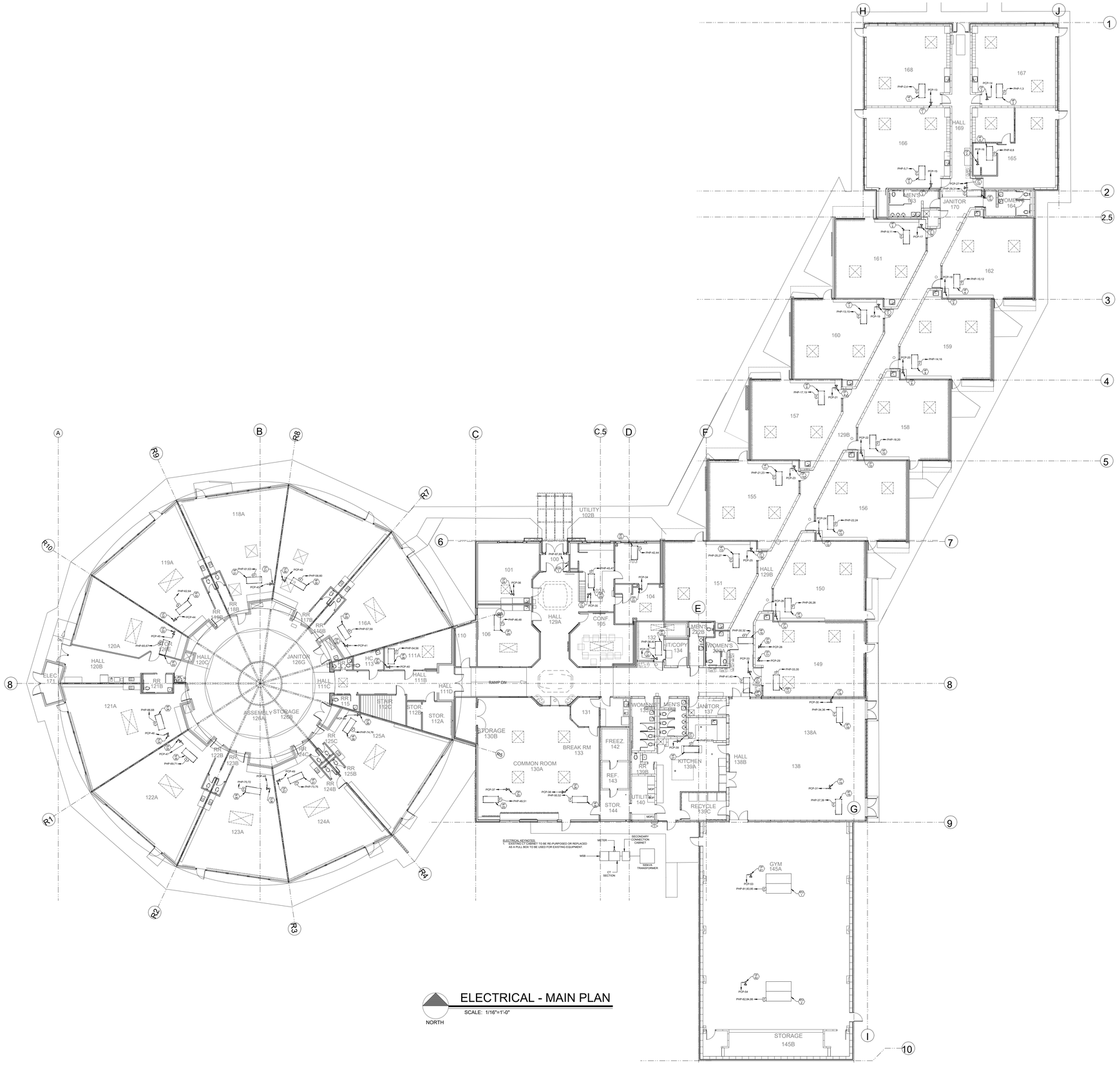
DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN

SHEET NUMBER:

E2-1

September 17, 2024 - 4:42:49pm



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Mechanical & Electrical Engineers
386 Indian Road
Grand Junction, CO 81501
Phone: (970) 241-8709

CARBONDALE COMMUNITY GEOTHERMAL

ELECTRICAL - MAIN PLAN

520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN
SHEET NUMBER:	E2-2

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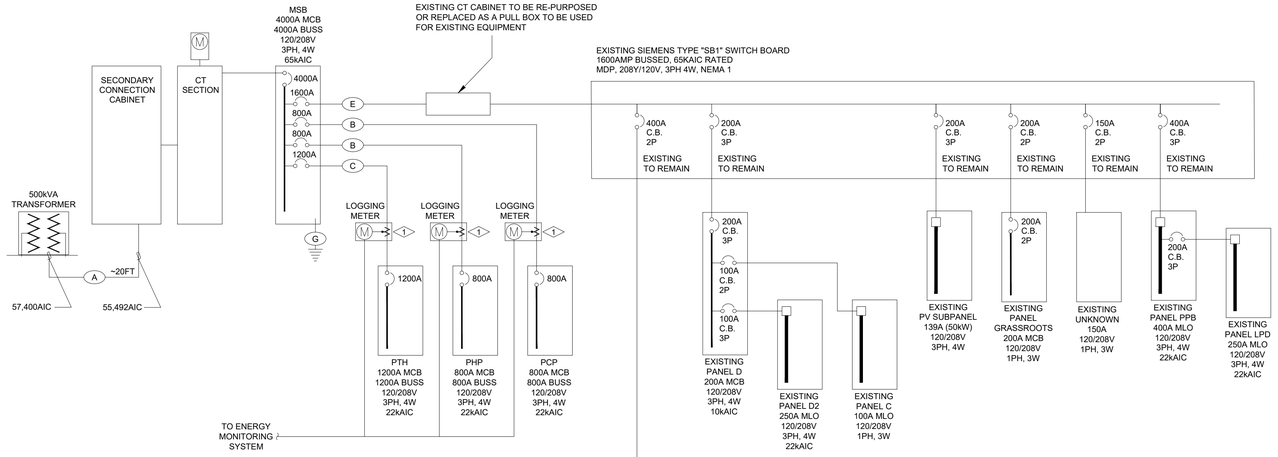

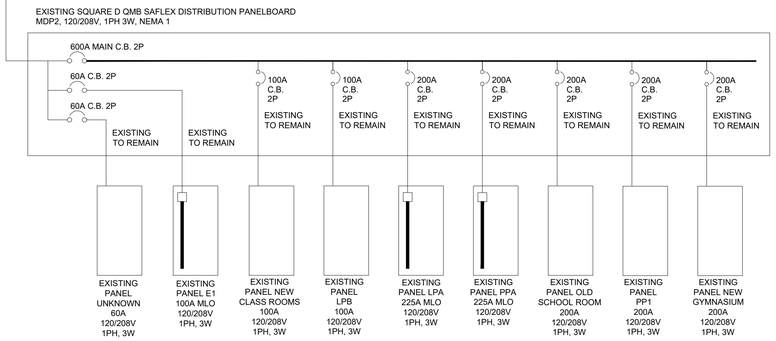

ONE-LINE DIAGRAM

NOT TO SCALE

NOTES:
1. PROVIDE GROUNDING AND BONDING TO MEET THE REQUIREMENTS OF 2023 NEC 250.
2. PROVIDE DISCONNECTING MEANS FOR FEEDER IN ACCORDANCE WITH 2023 NEC 225.30.
3. PROVIDE LABELING TO MEET THE REQUIREMENTS OF 2023 NEC 110.21 AND 230.85.
4. PROVIDE SURGE PROTECTION FOR SERVICE TO MEET THE REQUIREMENTS OF 2023 NEC 230.67. PROVIDE SURGE PROTECTIVE DEVICES TO MEET THE REQUIREMENTS OF 2023 NEC 215.18.
5. PROVIDE SERIES RATED COMBINATIONS FOR FEEDER CIRCUIT BREAKERS TO REDUCE DOWNSTREAM AVAILABLE FAULT CURRENT.

KEYNOTES: <#>
1. LOGGING METERS SHALL COMPLY WITH ALL OF THE FOLLOWING:
   - 1.1. BE FULLY ELECTRONIC WITH DIGITAL 8-DIGIT LCD DISPLAY WITHOUT MULTIPLIER DISPLAYING CUMULATIVE KWH AND "REAL-TIME" KW LOAD.
   - 1.2. PROVIDE RATE OF CONSUMPTION INDICATION AND ALSO A SEGMENT TEST BUTTON (CPU) TO ENSURE INTEGRITY OF THE DISPLAY.
   - 1.3. PROVIDE A LOAD INDICATOR TO INDICATE REAL-TIME CONSUMPTION LEVELS FOR FIELD TESTING AND CERTIFICATION.
   - 1.4. BE EQUIPPED WITH CURRENT SENSOR DIAGNOSTIC INDICATOR FOR INSTALLATION VERIFICATION.
   - 1.5. BE PROVIDED WITH A NON-VOLATILE MEMORY TO MAINTAIN READING DURING POWER OUTAGES.
   - 1.6. BE AVAILABLE WITH OPTIONAL TERMINAL BLOCK FOR FIXED-VALUE PULSE OUTPUT.

WIRE SCHEDULE:
- (A) (13) 3-1/2"C - (4#500kCMIL(AL,XHHW))
- (B) (3) 3-1/2"C - (4#400kCMIL(AL,THWN) + 1#1/0AWG(CU)G)
- (C) (4) 3-1/2"C - (4#500kCMIL(AL,THWN) + 1#3/0AWG(CU)G)
- (E) EXISTING TO REMAIN
- (G) #3/0AWG CU TO METAL WATER PIPES AND STRUCTURAL STEEL
  #4AWG CU TO 20' UNCOATED CONCRETE ENCASED ELECTRODE
  #6AWG CU TO GROUND ROD MEETING NEC 250.53

GENERAL NOTES

1. ALL PENETRATIONS IN OR THROUGH FIRE RATED PARTITIONS SHALL BE FIRE STOPPED IN SUCH A WAY THAT THE PENETRATION MATCHES THE FIRE RATING OF THE WALL.
2. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION BETWEEN THE APPROPRIATE DISCIPLINES AND CONTRACTORS. ALL EQUIPMENT IS TO BE INSTALLED TO STRICTLY CONFORM TO MANUFACTURER'S INSTALLATION GUIDELINES. ALL EQUIPMENT IS TO BE INSTALLED WITH ALL NECESSARY CONTROL/ACCESSORY OPTIONS TO FUNCTION AS INTENDED. IT IS THE RESPONSIBILITY OF THE EQUIPMENT MANUFACTURER/SUPPLIER AND THE CONTRACTOR/INSTALLER TO PROVIDE COMPLETE INSTALLATION AND FUNCTIONALITY OF ALL EQUIPMENT BASED ON DESIGN SPECIFICATIONS AS OUTLINED BY THE ARCHITECT/ENGINEER.
3. COORDINATE ALL DEVICE, FIXTURE AND HARDWARE COLOR SELECTIONS WITH THE ARCHITECT/OWNER PRIOR TO MAKING SHOP DRAWING SUBMITTALS.
4. ALL EXPOSED CONDUITS, BOXES, ETC. IN ROOMS TO BE PAINTED SHALL BE PAINTED TO MATCH THE SURROUNDING SURFACE. EXPOSED CONDUITS, BOXES, ETC. IN ROOMS WHICH ARE NOT PAINTED MAY BE LEFT UN-PAINTED. EXPOSED CONDUIT, BOXES, ETC. ON THE EXTERIOR OF BUILDINGS SHALL BE PAINTED TO MATCH THE SURROUNDING SURFACE AS CLOSELY AS POSSIBLE.
5. ALL SERVICEABLE MECHANICAL EQUIPMENT IS TO BE INSTALLED WITH AN ACCEPTABLE DISCONNECTING MEANS AND/OR SERVICE OUTLET AS REQUIRED BY GOVERNING CODES.
6. ALL INSTALLED EQUIPMENT THAT REQUIRES MARKING, TAGGING, OR OTHER IDENTIFICATION SHALL BE SO MARKED, TAGGED, OR OTHERWISE IDENTIFIED BY THE CONTRACTOR/INSTALLER AT THE TIME OF INSTALLATION IN COMPLIANCE WITH ALL GOVERNING CODES.
7. ALL 120V, SINGLE-PHASE, 15- AND 20-AMPERE BRANCH CIRCUITS SUPPLYING ELECTRICAL OUTLETS OR DEVICES SHALL BE PROVIDED WITH ARC-FAULT CIRCUIT-INTERRUPTER PROTECTION IN ACCORDANCE WITH 2023 NEC 210.12(B). ELECTRICAL CONTRACTOR TO DETERMINE MEANS OF PROTECTION LISTED IN 2023 NEC 210.12(A) BEFORE ORDERING EQUIPMENT.
8. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL REQUIRED GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION FOR PERSONNEL IN ACCORDANCE WITH 2023 NEC 210.8, OR AS MAY BE REQUIRED BY OTHER SECTIONS OF 2023 NEC. ELECTRICAL CONTRACTOR TO DETERMINE IF GFCI PROTECTION IS REQUIRED AT THE BREAKER OR AT THE RECEPTACLE BEFORE ORDERING EQUIPMENT. ALL GFCI PROTECTION SHALL BE RESETTABLE IN ROOMS WHERE PROTECTION IS REQUIRED INCLUDING OUTSIDE RECEPTACLES.
9. ELECTRICAL CONTRACTOR SHALL PROVIDE REQUIRED GROUND-FAULT PROTECTION OF EQUIPMENT FOR ALL ELECTRIC HEAT TRACING AND HEATING PANELS IN ACCORDANCE WITH 2023 NEC 426.28, OR AS MAY BE REQUIRED BY OTHER SECTIONS OF 2023 NEC. ELECTRICAL CONTRACTOR SHALL ALSO PROVIDE FOR ANY REQUIRED AT-GRADE ACCESSIBLE SHUTOFF DEVICE(S) OR DISCONNECT(S) FOR ELECTRIC HEAT TRACE INSTALLED ON THE ROOF. ELECTRICAL CONTRACTOR TO DETERMINE MEANS OF PROTECTION BEFORE ORDERING ELECTRICAL EQUIPMENT AND DEVICES.
10. ELECTRICAL CONTRACTOR SHALL FOLLOW THE APPLICABLE INSTALLATION REQUIREMENTS OF 2023 NEC 406.12; AS AMENDED BY AHJ.
11. ELECTRICAL CONTRACTOR SHALL PROVIDE WEATHER-PROOF IN-USE COVERS FOR ALL EXTERIOR RECEPTACLES.
12. REFER TO MECHANICAL AND PLUMBING DESIGN DRAWINGS FOR ADDITIONAL EQUIPMENT INFORMATION.
13. CIRCUIT EXHAUST FANS WITH ITS RESPECTIVE LIGHTING CIRCUIT.
14. RECEPTACLES THAT ARE INSTALLED TO SERVE AN ISLAND OR PENINSULAR COUNTERTOP SHALL BE INSTALLED IN ACCORDANCE WITH 2023 NEC 210.52(C)(3).

FAULT CURRENT NOTES:
UTILITY FAULT CURRENT VALUES BASED UPON AN ASSUMED EXISTING TRANSFORMER OF 500kVA LOCATED AT AN ESTIMATED DISTANCE OF 20FT WITH AVAILABLE SECONDARY FAULT CURRENT OF 57,400A. IF EXISTING TRANSFORMER IS DIFFERENT THAN DESCRIBED VALUES ABOVE, RECALCULATE THE FAULT CURRENT TO VERIFY AIC VALUES OF PANELS.

FAULT CURRENT CALCULATIONS:

$$F = \frac{Lxlx3^{1/2}}{NxCxE}$$

L - LENGTH OF CABLE IN FEET
I - AVAILABLE FAULT CURRENT
N - NUMBER OF CONDUCTORS PER PHASE
C - CONDUCTANCE CONSTANT
E - VOLTAGE LINE TO LINE
F - INTERMEDIARY VALUE FOR COMPUTATION
M = 1/(1+F)
M - MULTIPLIER TO ACHIEVE AVAILABLE FAULT
I(SC) = I(SC)*M

TRASNFORMER TO MSB
C - CONDUCTANCE CONSTANT
- 500kCMIL ALUMINUM: 21,391

$$F = \frac{Lxlx3^{1/2}}{NxCxE} = \frac{20FT \times 57,400\ A \times 3^{1/2}}{13 \times 21,391 \times 208\ V} = 0.034$$

$$M = \frac{1}{1+F} = \frac{1}{1+0.034} = 0.967$$

I(SC) = IxM = 57,400A x 0.967 = 55,492 A

PANEL SCHEDULE - MSB

TYPE: SWITCHBOARD
VOLTAGE: 120/208
ENCLOSURE: NEMA3R
BUS SIZE: 4000
MAIN BRKR: 4000
MOUNTING: SURFACE
PHASES: 3
WIRES: 4
SC RATING: 65000
NEUTRAL BUS: YES
GROUND BUS: YES

LOAD TYPE	LOAD DESCRIPTION	AMPS POLES	CKT# LOAD	Ø	CKT# LOAD	AMPS POLES	LOAD TYPE	LOAD DESCRIPTION
SUBFEED	--- ---	--- ---	1 153714	A	2 81752	--- ---	SUBFEED	--- ---
SUBFEED	PANEL MDP ---	1600A 3P	3 153714	B	4 75379	800A 3P	SUBFEED	PANEL PHP ---
SUBFEED	--- ---	--- ---	5 153714	C	6 79143	--- ---	SUBFEED	--- ---
SUBFEED	--- ---	--- ---	7 73259	A	8 134500	--- ---	SUBFEED	--- ---
SUBFEED	PANEL PCP ---	800A 3P	9 73384	B	10 134500	1200A 3P	SUBFEED	PANEL PTH ---
SUBFEED	--- ---	--- ---	11 71949	C	12 134500	--- ---	SUBFEED	--- ---
SPACE	--- ---	--- ---	13 0	A	14 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	15 0	B	16 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	17 0	C	18 0	--- ---	SPACE	--- ---

LOADS BY TYPE:

LOAD TYPE	CONNECTED LOAD (VA)	DEMAND FACTOR	DEMAND LOAD (VA)
LIGHTING	0.00	1.25	0.00
KITCHEN	0.00	0.80	0.00
PROCESS	0.00	1.00	0.00
RECEPTACLES	0.00	1.00	0.00
MECH HEATING	2000.00	1.00	2000.00
MECH COOLING	0.00	1.00	0.00
MECH YEAR ROUND	1098915.00	1.00	1098915.00
APPLIANCE	0.00	1.00	0.00
MISCELLANEOUS	0.00	1.00	0.00
MOTOR	218592.00	1.00	327888.00
SPARE	0.00	1.00	0.00
LARGEST MOTOR [1]	ABOVE	0.25	115285.25
TOTAL	1319508.00		1434792.00

LOADS BY PHASE:

PHASE	CONNECTED LOAD (VA)	CONNECTED LOAD (AMPS)	BALANCE (PERCENT)
A	443224.70	3693.54	A-B: 98.6
B	436976.70	3641.47	B-C: 99.5
C	439306.20	3660.88	C-A: 99.1
TOTAL/AVERAGE	1319508.00	3665.30	99.1

NOTES:
1. THE LARGEST CONNECTED MOTOR LOAD IS INCLUDED IN MECHANICAL, PROCESS, OR MOTOR LOADS.

MECHANICAL EQUIPMENT SCHEDULE

COMB: COMBINATION MOTOR STARTER
MAG: MAGNETIC MOTOR STARTER
NR: NONE REQUIRED
P/I: PLUG-IN UNIT
CONT: CONTRACTOR
MAN: MANUAL MOTOR STARTER
W/U: SUPPLIED WITH UNIT:

UNIT NO	FUNCTION (NOTES)	LOAD	VOLTS	Ø	FULL LOAD AMPS	BRANCH CIRCUIT CONDUIT SIZE	BRANCH CIRCUIT NO. CONDUCTOR	BRANCH CIRCUIT WIRE SIZE	GRND WIRE SIZE	BRKR SIZE	START	DISC FUSE
HP-20	WATER SOURCE HEAT PUMP (UVH024)	3.203kW	208	1	15.4A	3/4"	3	12	12	20A	CONT	$\frac{1}{2}$
HP-1	WATER SOURCE HEAT PUMP (UVH036) TYPICAL OF UNITS 2-14, 22, 23	4.014kW	208	1	19.3A	3/4"	3	10	10	25A	CONT	30A 25A
HP-15	WATER SOURCE HEAT PUMP (UVH048) TYPICAL OF UNITS 16-19, 24-26, 28-40	5.761kW	208	1	27.7A	1"	3	8	10	35A	CONT	60A 35A
HP-27	WATER SOURCE HEAT PUMP (UVH060)	6.801kW	208	1	32.7A	1"	3	8	10	45A	CONT	60A 45A
HP-21	WATER SOURCE HEAT PUMP (UVH072)	7.945kW	208	1	38.2A	1"	3	8	10	50A	CONT	60A 50A
RTU-1	WATER SOURCE HEAT PUMP RTU (URT096) TYPICAL OF RTU-2	15.56kW	208	3	43.2A	1"	3	8	10	50A	CONT	60A 50A
CP-1	CIRCULATION PUMP TYPICAL OF UNITS 2-42	480W	120	1	4.0A	3/4"	2	14	14	15A	CONT	$
CP-43	CIRCULATION PUMP TYPICAL OF UNIT 44	11.1kW	208	3	30.8A	1"	3	8	10	40A	CONT	60A 40A
HP-41	WATER SOURCE HEAT PUMP RTU (W500) TYPICAL OF UNITS 42-45	80.7kW	208	3	224A	3-1/2"	3	400k CMIL	3	350A	CONT	400A 350A
CP-45	CIRCULATION PUMP TYPICAL OF UNITS 46-54	2.745kW	208	1	13.2A	3/4"	3	12	12	20A	CONT	$\frac{1}{2}$
P-1	CIRCULATION PUMP TYPICAL OF UNIT 2-3	26.95kW	208	3	74.8A	1-1/4"	3	3	8	100A	CONT	100A 100A
P-4	CIRCULATION PUMP TYPICAL OF UNITS 5, 12-13	2.87kW	208	1	13.8A	3/4"	3	12	12	20A	CONT	$\frac{1}{2}$
P-6	CIRCULATION PUMP TYPICAL OF UNIT 7	8.718kW	208	3	24.2A	1"	3	8	10	35A	CONT	60A 35A
P-10	CIRCULATION PUMP TYPICAL OF UNIT 11	16.64kW	208	3	46.2A	1"	3	6	10	60A	CONT	60A 60A
EUH-1	ELECTRIC UNIT HEATER	2.0kW	208	1	9.6A	3/4"	3	14	14	15A	CONT	$\frac{1}{2}$

MECHANICAL EQUIPMENT SCHEDULE NOTES:
1. HACR CIRCUIT BREAKER IN USA ONLY (REFERENCE MANUFACTURER'S DOCUMENTATION)
2. ELECTRICAL CONTRACTOR TO VERIFY EQUIPMENT START IS PROVIDE WITH UNIT OR IF IT IS TO BE PROVIDED BY CONTRACTOR.
3. REFER TO MECHANICAL PLANS FOR MORE INFORMATION REGARDING MECHANICAL AND PLUMBING EQUIPMENT.

Bighorn Consulting Engineers, Inc.
Mechanical & Electrical Engineers
386 Indian Road
Grand Junction, CO 81501
Phone: (970) 241-8709

CARBONDALE COMMUNITY GEOTHERMAL

ELECTRICAL - DETAILS

520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE: 08/01/2024
JOB NO: 23-396
DRAWN BY: EB/GW
CHECKED BY: DB/MH
SCALE: AS SHOWN
SHEET NUMBER: E3-1

September 17, 2024 - 4:42:51pm

PANEL SCHEDULE - PHP

TYPE: PANELBOARD | VOLTAGE: 120/208 | ENCLOSURE: NEMA3R | BUS SIZE: 800 | MAIN BRKR: 800 | MOUNTING: SURFACE | PHASES: 3 | WIRES: 4 | SC RATING: 22000 | NEUTRAL BUS: NO | GROUND BUS: YES

LOAD TYPE	LOAD DESCRIPTION	AMPS POLES	CKT# LOAD	Ø	CKT# LOAD	AMPS POLES	LOAD TYPE	LOAD DESCRIPTION
MECH YEAR ROUND	HP-1	25A 2P	1 2007	A	2 2007	25A 2P	MECH YEAR ROUND	HP-2
MECH YEAR ROUND	--- ---	--- ---	3 2007	B	4 2007	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-3 ---	25A 2P	5 2007	C	6 2007	25A 2P	MECH YEAR ROUND	HP-4 ---
MECH YEAR ROUND	--- ---	--- ---	7 2007	A	8 2007	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-5 ---	25A 2P	9 2007	B	10 2007	25A 2P	MECH YEAR ROUND	HP-6 ---
MECH YEAR ROUND	--- ---	--- ---	11 2007	C	12 2007	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-7 ---	25A 2P	13 2007	A	14 2007	25A 2P	MECH YEAR ROUND	HP-8 ---
MECH YEAR ROUND	--- ---	--- ---	15 2007	B	16 2007	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-9 ---	25A 2P	17 2007	C	18 2007	25A 2P	MECH YEAR ROUND	HP-10 ---
MECH YEAR ROUND	--- ---	--- ---	19 2007	A	20 2007	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-11 ---	25A 2P	21 2007	B	22 2007	25A 2P	MECH YEAR ROUND	HP-12 ---
MECH YEAR ROUND	--- ---	--- ---	23 2007	C	24 2007	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-13 ---	25A 2P	25 2007	A	26 2007	25A 2P	MECH YEAR ROUND	HP-14 ---
MECH YEAR ROUND	--- ---	--- ---	27 2007	B	28 2007	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-15 ---	35A 2P	29 2881	C	30 2881	35A 2P	MECH YEAR ROUND	HP-16 ---
MECH YEAR ROUND	--- ---	--- ---	31 2881	A	32 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-17 ---	35A 2P	33 2881	B	34 2881	35A 2P	MECH YEAR ROUND	HP-18 ---
MECH YEAR ROUND	--- ---	--- ---	35 2881	C	36 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-19 ---	35A 2P	37 2881	A	38 1602	20A 2P	MECH YEAR ROUND	HP-20 ---
MECH YEAR ROUND	--- ---	--- ---	39 2881	B	40 1602	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-21 ---	50A 2P	41 3973	C	42 2007	25A 2P	MECH YEAR ROUND	HP-22 ---
MECH YEAR ROUND	--- ---	--- ---	43 3973	A	44 2007	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-23 ---	25A 2P	45 2007	B	46 2881	35A 2P	MECH YEAR ROUND	HP-24 ---
MECH YEAR ROUND	--- ---	--- ---	47 2007	C	48 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-25 ---	35A 2P	49 2881	A	50 2881	35A 2P	MECH YEAR ROUND	HP-26 ---
MECH YEAR ROUND	--- ---	--- ---	51 2881	B	52 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-27 ---	45A 2P	53 3401	C	54 2881	35A 2P	MECH YEAR ROUND	HP-28 ---
MECH YEAR ROUND	--- ---	--- ---	55 3401	A	56 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-29 ---	35A 2P	57 2881	B	58 2881	35A 2P	MECH YEAR ROUND	HP-30 ---
MECH YEAR ROUND	--- ---	--- ---	59 2881	C	60 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-31 ---	35A 2P	61 2881	A	62 2881	35A 2P	MECH YEAR ROUND	HP-32 ---
MECH YEAR ROUND	--- ---	--- ---	63 2881	B	64 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-33 ---	35A 2P	65 2881	C	66 2881	35A 2P	MECH YEAR ROUND	HP-34 ---
MECH YEAR ROUND	--- ---	--- ---	67 2881	A	68 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-35 ---	35A 2P	69 2881	B	70 2881	35A 2P	MECH YEAR ROUND	HP-36 ---
MECH YEAR ROUND	--- ---	--- ---	71 2881	C	72 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-37 ---	35A 2P	73 2881	A	74 2881	35A 2P	MECH YEAR ROUND	HP-38 ---
MECH YEAR ROUND	--- ---	--- ---	75 2881	B	76 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	HP-39 ---	35A 2P	77 2881	C	78 2881	35A 2P	MECH YEAR ROUND	HP-40 ---
MECH YEAR ROUND	--- ---	--- ---	79 2881	A	80 2881	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	--- ---	--- ---	81 5187	B	82 5187	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	RTU-1 ---	50A 3P	83 5187	C	84 5187	50A 3P	MECH YEAR ROUND	RTU-2 ---
MECH YEAR ROUND	--- ---	--- ---	85 5187	A	86 5187	--- ---	MECH YEAR ROUND	--- ---
SPACE	--- ---	--- ---	87 0	B	88 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	89 0	C	90 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	91 0	A	92 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	93 0	B	94 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	95 0	C	96 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	97 0	A	98 0	--- ---	SPACE	--- ---

LOADS BY TYPE:

LOAD TYPE	CONNECTED LOAD (VA)	DEMAND FACTOR	DEMAND LOAD (VA)
LIGHTING	0.00	1.25	0.00
KITCHEN	0.00	0.00	0.00
PROCESS	0.00	1.00	0.00
RECEPTACLES	0.00	1.00	0.00
MECH HEATING	0.00	1.00	0.00
MECH COOLING	0.00	1.00	0.00
MECH YEAR ROUND	234274.00	1.00	234274.00
APPLIANCE	0.00	1.00	0.00
MISCELLANEOUS	0.00	1.00	0.00
MOTOR	0.00	1.00	0.00
SPARE	0.00	1.00	0.00
LARGEST MOTOR [1]	ABOVE	0.25	3890.00
TOTAL	234274.00		238164.00

LOADS BY PHASE:

PHASE	CONNECTED LOAD (VA)	CONNECTED LOAD (AMPS)	BALANCE (PERCENT)
A	81751.91	681.27	A-B: 91
B	74378.91	619.82	B-C: 95.2
C	78143.41	651.20	C-A: 95.6
TOTAL/AVERAGE	234274.00	650.76	93.9

NOTES:

1. THE LARGEST CONNECTED MOTOR LOAD IS INCLUDED IN MECHANICAL, PROCESS, OR MOTOR LOADS.

PANEL SCHEDULE - PCP

TYPE: PANELBOARD | VOLTAGE: 120/208 | ENCLOSURE: NEMA3R | BUS SIZE: 800 | MAIN BRKR: 800 | MOUNTING: SURFACE | PHASES: 3 | WIRES: 4 | SC RATING: 22000 | NEUTRAL BUS: YES | GROUND BUS: YES

LOAD TYPE	LOAD DESCRIPTION	AMPS POLES	CKT# LOAD	Ø	CKT# LOAD	AMPS POLES	LOAD TYPE	LOAD DESCRIPTION
MOTOR	--- ---	--- ---	1 5548	A	2 5548	--- ---	MOTOR	--- ---
MOTOR	P-10 ---	60A 3P	3 5548	B	4 5548	60A 3P	MOTOR	P-11 ---
MOTOR	--- ---	--- ---	5 5548	C	6 5548	--- ---	MOTOR	--- ---
MOTOR	--- ---	--- ---	7 3699	A	8 3699	--- ---	MOTOR	--- ---
MOTOR	CP-43 ---	40A 3P	9 3699	B	10 3699	40A 3P	MOTOR	CP-44 ---
MOTOR	--- ---	--- ---	11 3699	C	12 3699	--- ---	MOTOR	--- ---
MOTOR	CP-1 ---	15A 1P	13 480	A	14 480	15A 1P	MOTOR	CP-2 ---
MOTOR	CP-3 ---	15A 1P	15 480	B	16 480	15A 1P	MOTOR	CP-4 ---
MOTOR	CP-5 ---	15A 1P	17 480	C	18 480	15A 1P	MOTOR	CP-6 ---
MOTOR	CP-7 ---	15A 1P	19 480	A	20 480	15A 1P	MOTOR	CP-8 ---
MOTOR	CP-9 ---	15A 1P	21 480	B	22 480	15A 1P	MOTOR	CP-10 ---
MOTOR	CP-11 ---	15A 1P	23 480	C	24 480	15A 1P	MOTOR	CP-12 ---
MOTOR	CP-13 ---	15A 1P	25 480	A	26 480	15A 1P	MOTOR	CP-14 ---
MOTOR	CP-15 ---	15A 1P	27 480	B	28 480	15A 1P	MOTOR	CP-16 ---
MOTOR	CP-17 ---	15A 1P	29 480	C	30 480	15A 1P	MOTOR	CP-18 ---
MOTOR	CP-19 ---	15A 1P	31 480	A	32 480	15A 1P	MOTOR	CP-20 ---
MOTOR	CP-21 ---	15A 1P	33 480	B	34 480	15A 1P	MOTOR	CP-22 ---
MOTOR	CP-23 ---	15A 1P	35 480	C	36 480	15A 1P	MOTOR	CP-24 ---
MOTOR	CP-25 ---	15A 1P	37 480	A	38 480	15A 1P	MOTOR	CP-26 ---
MOTOR	CP-27 ---	15A 1P	39 480	B	40 480	15A 1P	MOTOR	CP-28 ---
MOTOR	CP-29 ---	15A 1P	41 480	C	42 480	15A 1P	MOTOR	CP-30 ---
MOTOR	CP-31 ---	15A 1P	43 480	A	44 480	15A 1P	MOTOR	CP-32 ---
MOTOR	CP-33 ---	15A 1P	45 480	B	46 480	15A 1P	MOTOR	CP-34 ---
MOTOR	CP-35 ---	15A 1P	47 480	C	48 480	15A 1P	MOTOR	CP-36 ---
MOTOR	CP-37 ---	15A 1P	49 480	A	50 480	15A 1P	MOTOR	CP-38 ---
MOTOR	CP-39 ---	15A 1P	51 480	B	52 480	15A 1P	MOTOR	CP-40 ---
MOTOR	CP-41 ---	15A 1P	53 480	C	54 480	15A 1P	MOTOR	CP-42 ---
MOTOR	CP-45 ---	20A 2P	55 1373	A	56 1373	20A 2P	MOTOR	CP-46 ---
MOTOR	--- ---	--- ---	57 1373	B	58 1373	--- ---	MOTOR	--- ---
MOTOR	CP-47 ---	20A 2P	59 1373	C	60 1373	20A 2P	MOTOR	CP-48 ---
MOTOR	--- ---	--- ---	61 1373	A	62 1373	--- ---	MOTOR	--- ---
MOTOR	CP-49 ---	20A 2P	63 1373	B	64 1373	20A 2P	MOTOR	CP-50 ---
MOTOR	--- ---	--- ---	65 1373	C	66 1373	--- ---	MOTOR	--- ---
MOTOR	CP-51 ---	20A 2P	67 1373	A	68 1373	20A 2P	MOTOR	CP-52 ---
MOTOR	--- ---	--- ---	69 1373	B	70 1373	--- ---	MOTOR	--- ---
MOTOR	CP-53 ---	20A 2P	71 1373	C	72 1373	20A 2P	MOTOR	CP-54 ---
MOTOR	--- ---	--- ---	73 1373	A	74 1373	--- ---	MOTOR	--- ---
MOTOR	--- ---	--- ---	75 8983	B	76 8983	--- ---	MOTOR	--- ---
MOTOR	P-1 ---	100A 3P	77 8983	C	78 8983	100A 3P	MOTOR	P-2 ---
MOTOR	--- ---	--- ---	79 8983	A	80 8983	--- ---	MOTOR	--- ---
MOTOR	--- ---	--- ---	81 8983	B	82 2906	--- ---	MOTOR	--- ---
MOTOR	P-3 ---	100A 3P	83 8983	C	84 2906	35A 3P	MOTOR	P-6 ---
MOTOR	--- ---	--- ---	85 8983	A	86 2906	--- ---	MOTOR	--- ---
MOTOR	P-4 ---	20A 2P	87 1435	B	88 2906	--- ---	MOTOR	--- ---
MOTOR	--- ---	--- ---	89 1435	C	90 2906	35A 3P	MOTOR	P-7 ---
MOTOR	P-5 ---	20A 2P	91 1435	A	92 2906	--- ---	MOTOR	--- ---
MOTOR	--- ---	--- ---	93 1435	B	94 1435	20A 2P	MOTOR	SOLAR PUMP SPARE ---
MOTOR	P-12 ---	20A 2P	95 1435	C	96 1435	--- ---	MOTOR	--- ---
MOTOR	--- ---	--- ---	97 1435	A	98 1435	20A 2P	MOTOR	SOLAR PUMP SPARE ---
MOTOR	P-13 ---	20A 2P	99 1435	B	100 1435	--- ---	MOTOR	--- ---
MOTOR	--- ---	--- ---	101 1435	C	102 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	103 0	A	104 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	105 0	B	106 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	107 0	C	108 0	--- ---	SPACE	--- ---

LOADS BY TYPE:

LOAD TYPE	CONNECTED LOAD (VA)	DEMAND FACTOR	DEMAND LOAD (VA)
LIGHTING	0.00	1.25	0.00
KITCHEN	0.00	0.00	0.00
PROCESS	0.00	1.00	0.00
RECEPTACLES	0.00	1.00	0.00
MECH HEATING	0.00	1.00	0.00
MECH COOLING	0.00	1.00	0.00
MECH YEAR ROUND	0.00	1.00	0.00
APPLIANCE	0.00	1.00	0.00
MISCELLANEOUS	0.00	1.00	0.00
MOTOR	218592.00	1.00	327888.00
SPARE	0.00	1.00	0.00
LARGEST MOTOR [1]	ABOVE	0.25	6737.00
TOTAL	218592.00		225329.00

LOADS BY PHASE:

PHASE	CONNECTED LOAD (VA)	CONNECTED LOAD (AMPS)	BALANCE (PERCENT)
A	73259.09	610.49	A-B: 99.8
B	73384.09	611.53	B-C: 98
C	71949.09	599.58	C-A: 98.2
TOTAL/AVERAGE	218592.00	607.20	98.7

NOTES:

1. THE LARGEST CONNECTED MOTOR LOAD IS INCLUDED IN MECHANICAL, PROCESS, OR MOTOR LOADS.

PANEL SCHEDULE - PTH

TYPE: SWITCHBOARD | VOLTAGE: 120/208 | ENCLOSURE: NEMA3R | BUS SIZE: 1200 | MAIN BRKR: 1200 | MOUNTING: SURFACE | PHASES: 3 | WIRES: 4 | SC RATING: 22000 | NEUTRAL BUS: YES | GROUND BUS: YES

LOAD TYPE	LOAD DESCRIPTION	AMPS POLES	CKT# LOAD	Ø	CKT# LOAD	AMPS POLES	LOAD TYPE	LOAD DESCRIPTION
MECH YEAR ROUND	--- ---	--- ---	1 26900	A	2 26900	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	TOWNHOMES HEAT PUMP (HP-41) ---	350A 3P	3 26900	B	4 26900	350A 3P	MECH YEAR ROUND	TOWNHOMES HEAT PUMP (HP-42) ---
MECH YEAR ROUND	--- ---	--- ---	5 26900	C	6 26900	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	--- ---	--- ---	7 26900	A	8 26900	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	TOWNHOMES HEAT PUMP (HP-43) ---	350A 3P	9 26900	B	10 26900	350A 3P	MECH YEAR ROUND	TOWNHOMES HEAT PUMP (HP-44) ---
MECH YEAR ROUND	--- ---	--- ---	11 26900	C	12 26900	--- ---	MECH YEAR ROUND	--- ---
MECH YEAR ROUND	--- ---	--- ---	13 26900	A	14 0	--- ---	SPACE	--- ---
MECH YEAR ROUND	TOWNHOMES HEAT PUMP (HP-45) ---	350A 3P	15 26900	B	16 0	--- ---	SPACE	--- ---
MECH YEAR ROUND	--- ---	--- ---	17 26900	C	18 0	--- ---	SPACE	--- ---
SPACE	--- ---	--- ---	19 0	A	20 0	--- ---	SPACE	--- ---

LOADS BY TYPE:

LOAD TYPE	CONNECTED LOAD (VA)	DEMAND FACTOR	DEMAND LOAD (VA)
LIGHTING	0.00	1.25	0.00
KITCHEN	0.00	0.00	0.00
PROCESS	0.00	1.00	0.00
RECEPTACLES	0.00	1.00	0.00
MECH HEATING	0.00	1.00	0.00
MECH COOLING	0.00	1.00	0.00
MECH YEAR ROUND	403500.00	1.00	403500.00
APPLIANCE	0.00	1.00	0.00
MISCELLANEOUS	0.00	1.00	0.00
MOTOR	0.00	1.00	0.00
SPARE	0.00	1.00	0.00
LARGEST MOTOR [1]	ABOVE	0.25	20175.00
TOTAL	403500.00		423675.00

LOADS BY PHASE:

PHASE	CONNECTED LOAD (VA)	CONNECTED LOAD (AMPS)	BALANCE (PERCENT)
A	134500.00	1120.83	A-B: 100
B	134500.00	1120.83	B-C: 100
C	134500.00	1120.83	C-A: 100
TOTAL/AVERAGE	403500.00	1120.83	100.0

NOTES:

1. THE LARGEST CONNECTED MOTOR LOAD IS INCLUDED IN MECHANICAL, PROCESS, OR MOTOR LOADS.

Bighorn Consulting Engineers, Inc.
Mechanical & Electrical Engineers
386 Indian Road
Grand Junction, CO 81501
Phone: (970) 241-8709

CARBONDALE COMMUNITY GEOTHERMAL

ELECTRICAL - DETAILS

520 S. 3RD STREET
CARBONDALE, COLORADO

DATE:	ISSUED FOR:
08/29/2024	BID SET
09/17/2024	UPDATED BID SET

DATE:	08/01/2024
JOB NO:	23-396
DRAWN BY:	EB/GW
CHECKED BY:	DB/MH
SCALE:	AS SHOWN
SHEET NUMBER:	E3-1

September 17, 2024 - 4:42:51pm