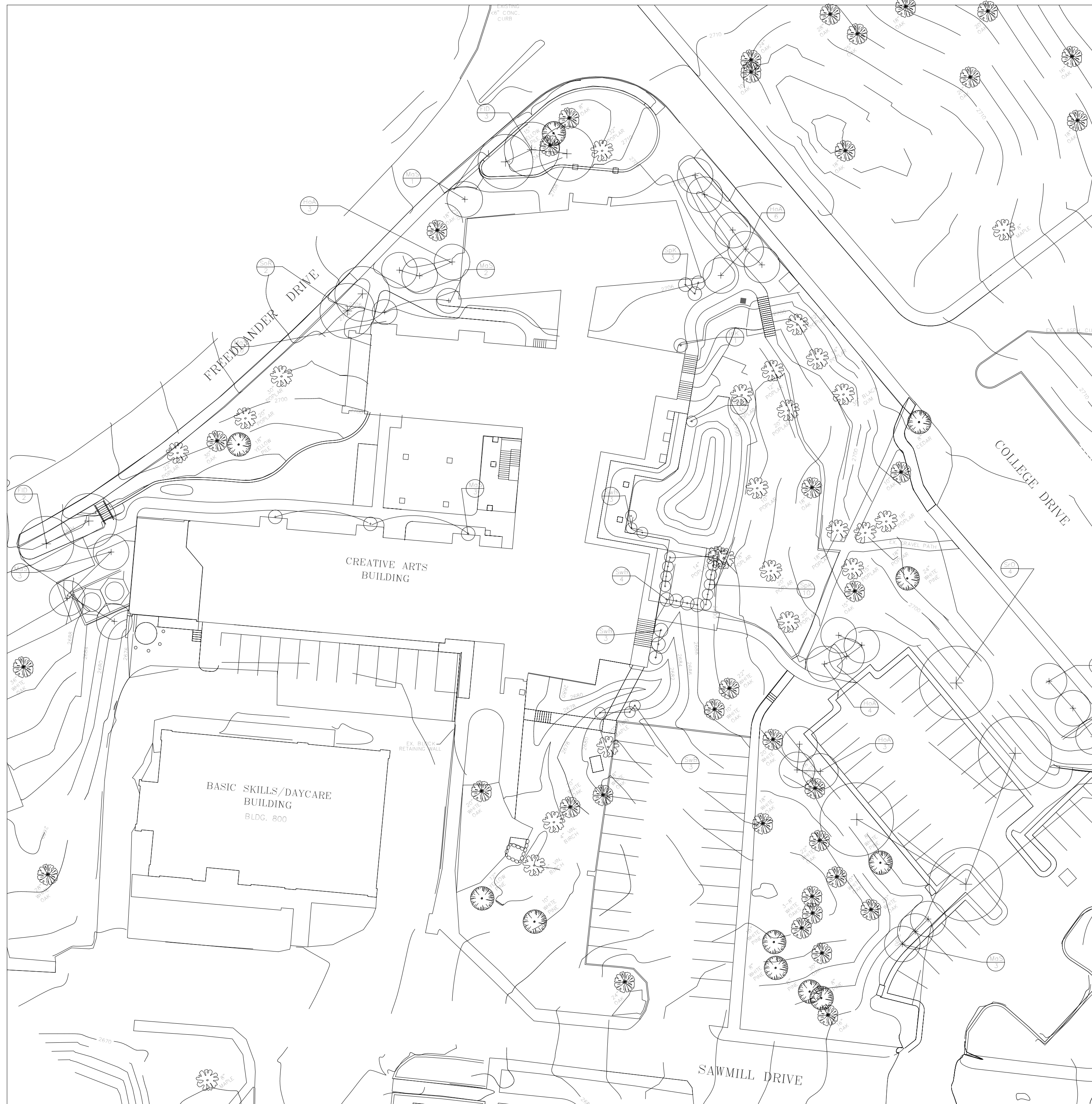


PLANT LIST FOR CREATIVE ARTS BUILDING

Quantity	Code	Common Name	Scientific Name	Plant Height	Size Caliper	Notes
DECIDUOUS TREES						
5	FD	Flowering Dogwood	<i>Cornus florida</i>	14 - 16	2.5	Specimen - 48 inch root ball
2	SR	Sourwood	<i>Oxydendrum arboreum</i> 'chameleon'	14 - 16	2.5	Specimen - 48 inch root ball
4	SO	Southern Red Oak	<i>Quercus rubra</i>	16 - 18	4.5	Specimen - 60 inch root ball
LARGE EVERGREEN TREES						
16	HA	Holly, American	<i>Ilex opaca</i> var. <i>Nellie R. Stevens</i>	12 - 14	4.5	Specimen - 48 inch root ball
15	MS	Magnolia, Little Gem	<i>Magnolia grandiflora</i> cv. <i>Little Gem</i>	12 - 14	4.5	Specimen - 48 inch root ball
SMALL EVERGREEN TREES						
3	IK	Inkberry	<i>Ilex glabra</i> cv. <i>Compacta</i>	8 - 10	2	Specimen - Multi-Stem 3
13	SP	Sparkleberry	<i>Vaccinium arboreum</i>	8 - 10	2	Specimen - Multi-Stem 3
14	SW	Sweet Bay	<i>Magnolia virginiana</i>	8 - 10	2	Specimen - Multi-Stem 3
DECIDUOUS SHRUBS						
11	AR	Arrowwood, southern	<i>Viburnum dentatum</i> cv. <i>Morton</i>		3 gal	Size Container
19	AP	Azalea, pinkshell	<i>Rhododendron vaseyi</i>		3 gal	
15	APx	Azalea, pinxterbloom	<i>Rhododendron perilymenoides</i>		3 gal	
19	AFa	Azalea, flame	<i>R. calendulaceum</i> cv. <i>Auranflacum</i>		3 gal	
7	AFc	Azalea, flame	<i>R. calendulaceum</i> cv. <i>Croceum</i>		3 gal	
11	AS	Azalea, sweet	<i>Rhododendron arborescens</i>		3 gal	
19	BB	Beautyberry	<i>Callicarpa dichotoma</i> cv. <i>Early Amethyst</i>		3 gal	
5	CA	Carolina Allspice	<i>Calycanthus floridus</i>		3 gal	
9	MO	Mockorange, Natchez	<i>Philadelphus x virginalis</i> cv. <i>Natchez</i>		3 gal	
10	MS	Mountain Snowbell	<i>Ceanothus americanus</i>		3 gal	
6	SPB	Spice Bush	<i>Lindera benzoin</i>		3 gal	
5	SNB	Snowbell	<i>Styrax americana</i>		3 gal	
42	SH	Sweetpire, Henry's Garnet	<i>Itea virginica</i> cv. <i>Henry's Garnet</i>		3 gal	
73	TD	Drooping Leucothoe	<i>L. fontanesiana</i> cv. <i>Trivar</i>		3 gal	
7	VW	Viburnum, witherod	<i>Viburnum cassinoides</i>		3 gal	
7	WV	Wichazel, Vernal	<i>Hamamelis vernalis</i>		3 gal	
EVERGREEN SHRUBS						
48	FA	Florida Anise	<i>Illicium floridanum</i>		3 gal	
6	MLF	Mountain Laurel	<i>Kalmia latifolia</i> cv. <i>Fuscata</i>		7 gal	
10	MLR	Mountain Laurel	<i>Kalmia latifolia</i> cv. <i>Rubra</i>		7 gal	
45	CaRa	Carolina Rhododendron	<i>R. carolinianum</i> cv. <i>Album</i>		3 gal	
27	CaRI	Carolina Rhododendron	<i>R. carolinianum</i> cv. <i>Luteum</i>		3 gal	
28	CaRa	Catawba Rhododendron	<i>R. catawbiense</i> cv. <i>Albert</i>		3 gal	
14	CaRc	Catawba Rhododendron	<i>R. catawbiense</i> cv. <i>Charles Dickens</i>		3 gal	
11	CaRp	Catawba Rhododendron	<i>R. catawbiense</i> cv. <i>Punireum Grandiflorum</i>		3 gal	
47	RoR	Rosebay Rhododendron	<i>R. maucinum</i>		7 gal	
116	SHL	Sheep Laurel	<i>Kalmia angustifolia</i>		3 gal	
GC-1 Pond Edge Plants						
25	BuW	Butterfly weed	<i>Asclepias tuberosa</i>		1 gal	16-inch OC
25	LIT	Lizard tail	<i>Saururus cernuus</i>		1 gal	16-inch OC
25	LoC	Lobelia, cardinal	<i>Lobelia cardinalis</i>		1 gal	16-inch OC
25	LoB	Lobelia, blue	<i>Lobelia elongata</i>		1 gal	16-inch OC
25	LoG	Lobelia, great blue	<i>Lobelia siphilitica</i>		1 gal	16-inch OC
25	ThP	Thái, powdery	<i>Thalia dealbata</i>		1 gal	16-inch OC
GC-2 Pond Marsh Plants						
175	FIS	Flag, sweet variegated	<i>Acorus calamus</i> variegated		1 gal	16-inch OC
175	IRY	Iris, yellow	<i>Iris pseudacorus</i>		1 gal	16-inch OC
175	IRB	Iris, blue	<i>Iris versicolor</i>		1 gal	16-inch OC
GC-3 WILDFLOWER/GRASS MIX						
350	BIS	Blue Star	<i>Amsonia tabernaemontana</i>		plug	24-inch OC
350	BuG	Bottlebrush Grass	<i>Hystrix patula</i>		plug	24-inch OC
350	GwM	Golden Wood Millet	<i>Milium effusum</i> 'Aureum'		plug	24-inch OC
350	HuG	Hairgrass	<i>Deschampsia flexuosa</i>		plug	24-inch OC
350	RO	River Oats	<i>Chasmanthium latifolium</i>		plug	24-inch OC
350	WRG	Wild Rye Grass	<i>Elymus hystrix</i>		plug	24-inch OC
GROUND COVER						
1150	FG	Confederate Fescue Sod			SY	

2 SD - Tree Schedule
12" = 1'-0"



1 SD - Shading Site Plan
1/32" = 1'-0"



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919-832-3339 FAX

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Not For Construction

SEAL:



Solar Developer Package
Creative Arts Building
Haywood Community College
Freedlander Dr. Clyde, NC 28721

1	Bid Set	4/08/10
NO.	SUBMISSION	DATE

CHECKED BY: **MN**

DRAWN BY: **JJ**

PROJECT NUMBER: **2815**

SHEET NAME:

Site Plan

SHEET NUMBER: **SD0.1**



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Creative Arts Building**
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Freedlander Dr. Clyde, NC 28721

1 Bid Set 4/08/10

NO. SUBMISSION DATE

CHECKED BY: MN

DRAWN BY: JJ

PROJECT NUMBER: 2815

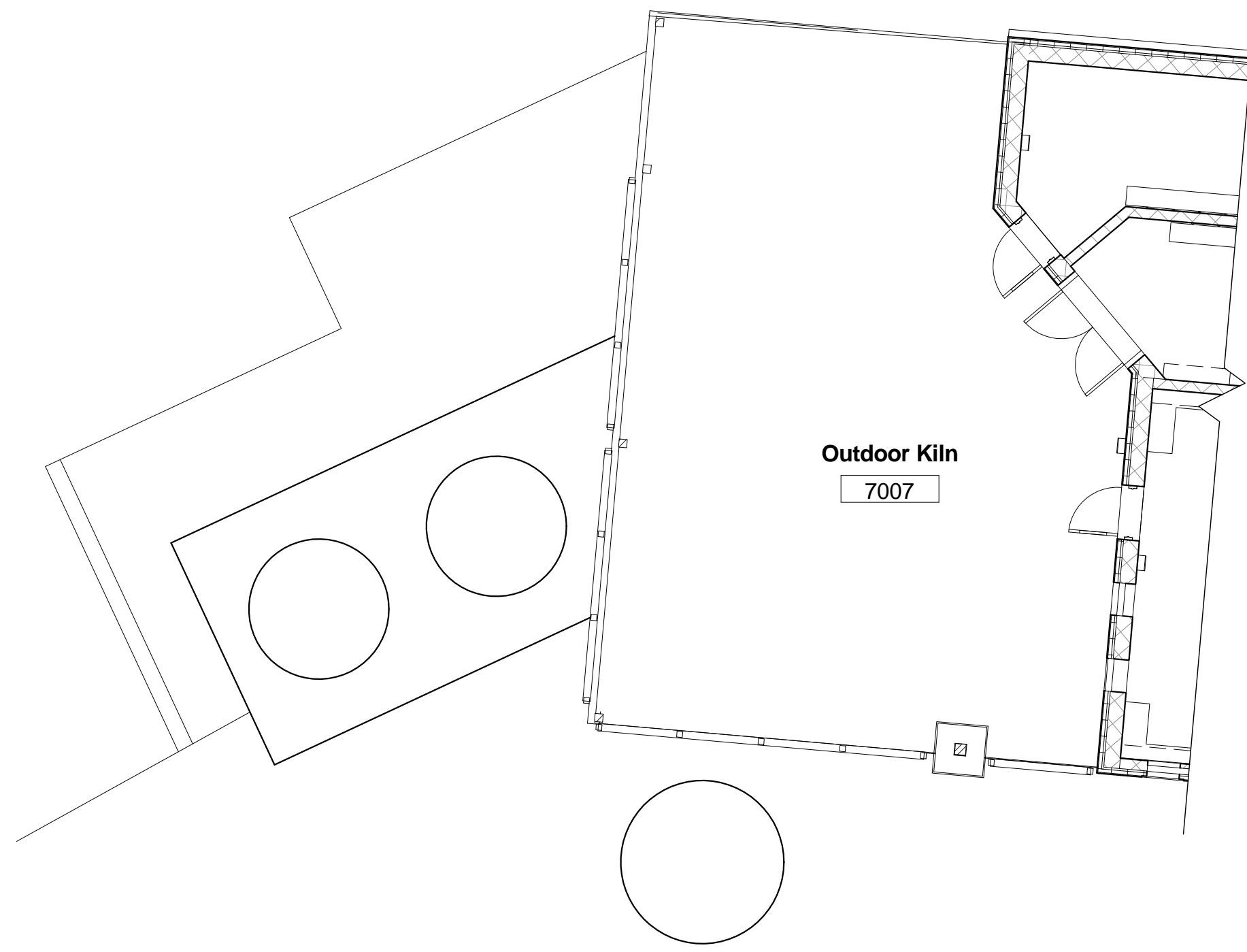
SHEET NAME:

Second Floor Plan

SHEET NUMBER:

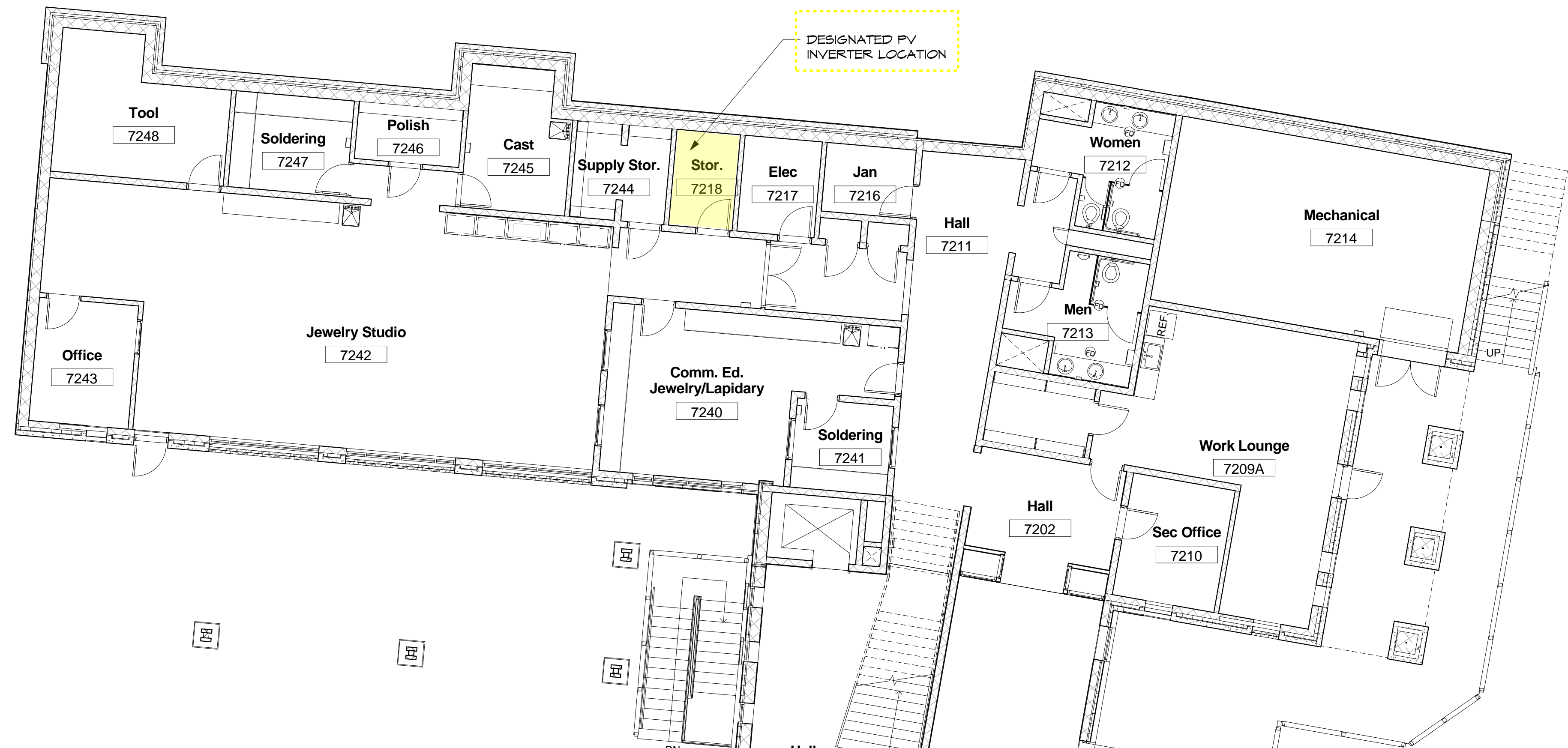
SD1.2

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Outdoor Kiln
7007

1 Second Floor Plan - West of Outdoor Kiln
1/8" = 1'-0"



DESIGNATED PV
INVERTER LOCATION

Tool
7248

Soldering
7247

Polish
7246

Cast
7245

Supply Stor.
7244

Stor.
7218

Elec
7217

Jan
7216

Hall
7211

Women
7212

Mechanical
7214

Office
7243

Jewelry Studio
7242

Comm. Ed.
Jewelry/Lapidary
7240

Soldering
7241

Men
7213

Work Lounge
7209A

Sec Office
7210

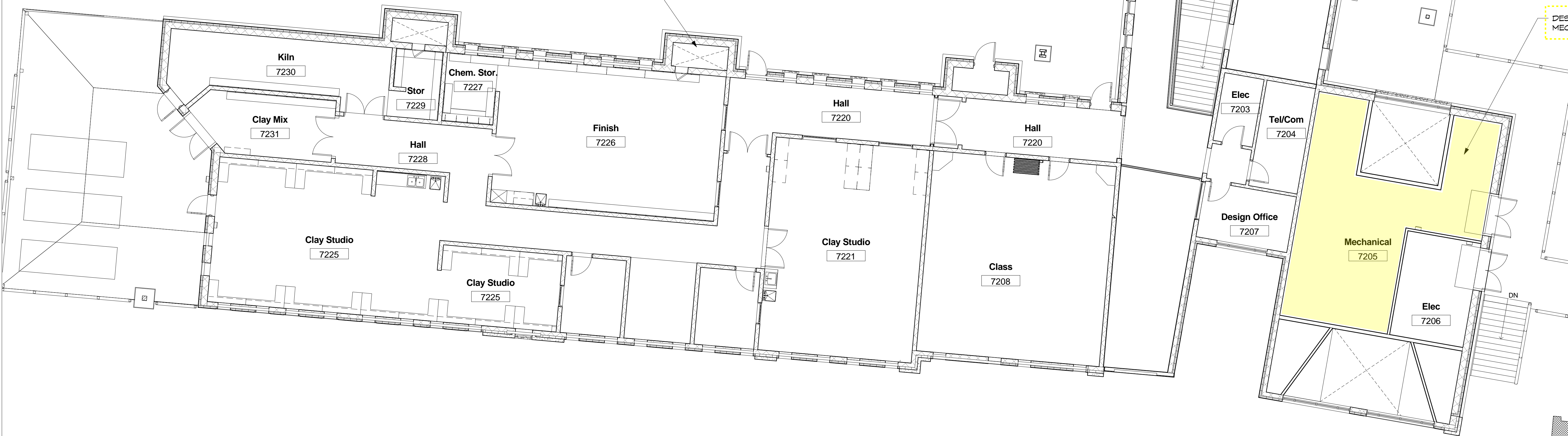
Hall
7202

Hall
7200

Hall
7201

ROOF ACCESS THROUGH
VERTICAL CHASE

DESIGNATED
MECHANICAL ROOM



Kiln
7230

Stor
7229

Chem. Stor.
7227

Clay Mix
7231

Hall
7228

Finish
7226

Hall
7220

Hall
7220

Elec
7203

Tel/Com
7204

Design Office
7207

Mechanical
7205

Elec
7206

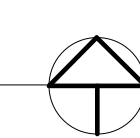
Clay Studio
7225

Clay Studio
7221

Class
7208

Clay Studio
7225

2 Second Floor Plan
1/8" = 1'-0"





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Freedlander Dr. Clyde, NC 28721

1 Bid Set 4/08/10

NO. SUBMISSION DATE

CHECKED BY: MN

DRAWN BY: JJ

PROJECT NUMBER: 2815

SHEET NAME:

Third Floor Plan

SHEET NUMBER:

SD1.3

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2 Mezzanine Floor Plan
1/8" = 1'-0"

1 Third Floor Plan
1/8" = 1'-0"

AVAILABLE ROOF AREAS:

OPTION 1:
 SOLAR WATER HEATING SYSTEM - 1020 SF AT SOUTHEAST ROOF
 AND
 SOLAR HEATING AND COOLING SYSTEM - 1151 SF AT SOUTH WEST ROOF

OPTION 2:
 PHOTOVOLTAIC SYSTEM - 10720 SF OVER 6 ROOF SURFACES

NOTE:
 THE AREAS LISTED ARE MAXIMUM ROOF AREAS AVAILABLE. IT IS IMPORTANT TO PROVIDE ACCESS FOR MAINTENANCE TO EACH SOLAR THERMAL COLLECTOR, AS WELL AS PERIMETER WALKWAY ACCESS ON EACH ROOF AREA.



SEAL:
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Creative Arts Building
 Haywood Community College
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1	Bid Set	4/08/10
NO.	SUBMISSION	DATE
CHECKED BY:		MN
DRAWN BY:		JJ
PROJECT NUMBER:		2815
SHEET NAME:		
Roof Plan		
SHEET NUMBER:		
SD1.5		

1 Roof Plan with Solar Collectors
 3/32" = 1'-0"



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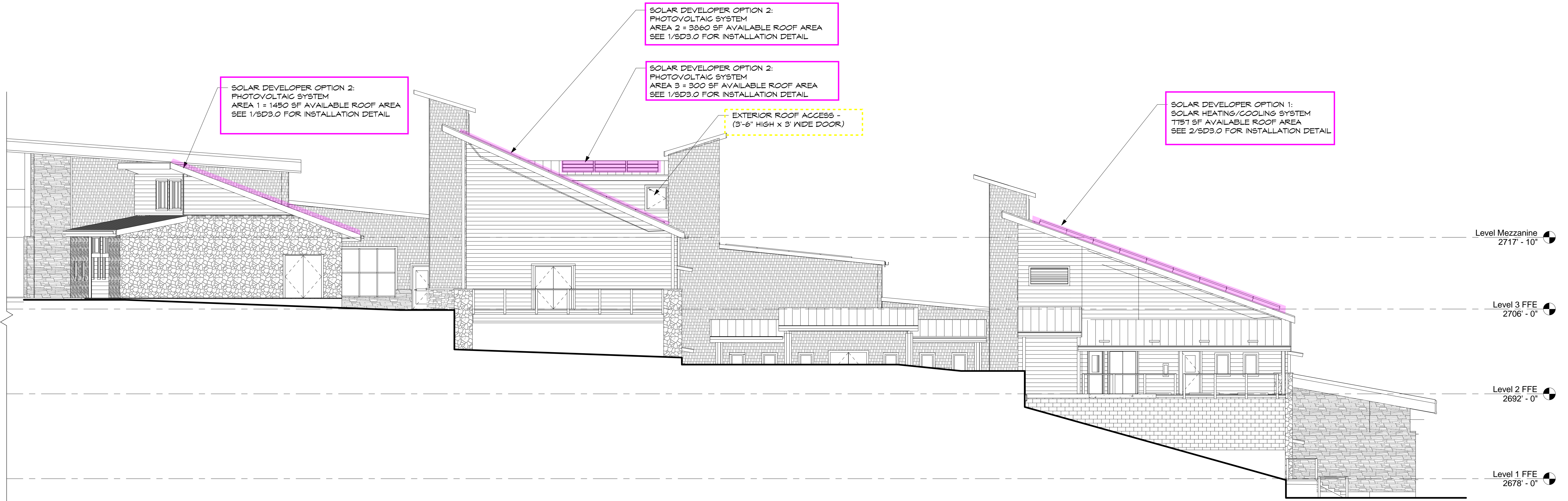
SEAL:

Not For Construction

SEAL:

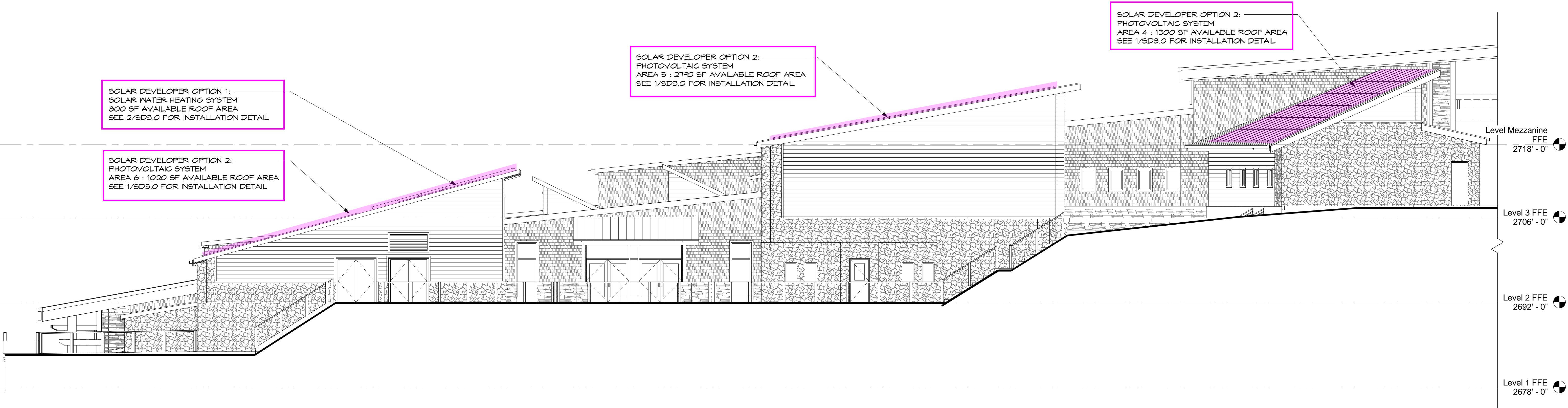


Solar Developer Package
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Haywood Community College
Freedlander Dr. Clyde, NC 28721



Level Mezzanine
2717' - 10"
Level 3 FFE
2706' - 0"
Level 2 FFE
2692' - 0"
Level 1 FFE
2678' - 0"

② Solar Elevation - West
1/8" = 1'-0"



Level Mezzanine
FFE
2718' - 0"
Level 3 FFE
2706' - 0"
Level 2 FFE
2692' - 0"
Level 1 FFE
2678' - 0"

① Solar Elevation - East
1/8" = 1'-0"

1	Bid Set	4/08/10
NO.	SUBMISSION	DATE
CHECKED BY:		MN
DRAWN BY:		JJ
PROJECT NUMBER:		2815
SHEET NAME:		

Building Elevations

SHEET NUMBER:

SD2.1



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ALLOWABLE LOADING - THE FOLLOWING LOADING RESTRICTIONS SHALL APPLY:

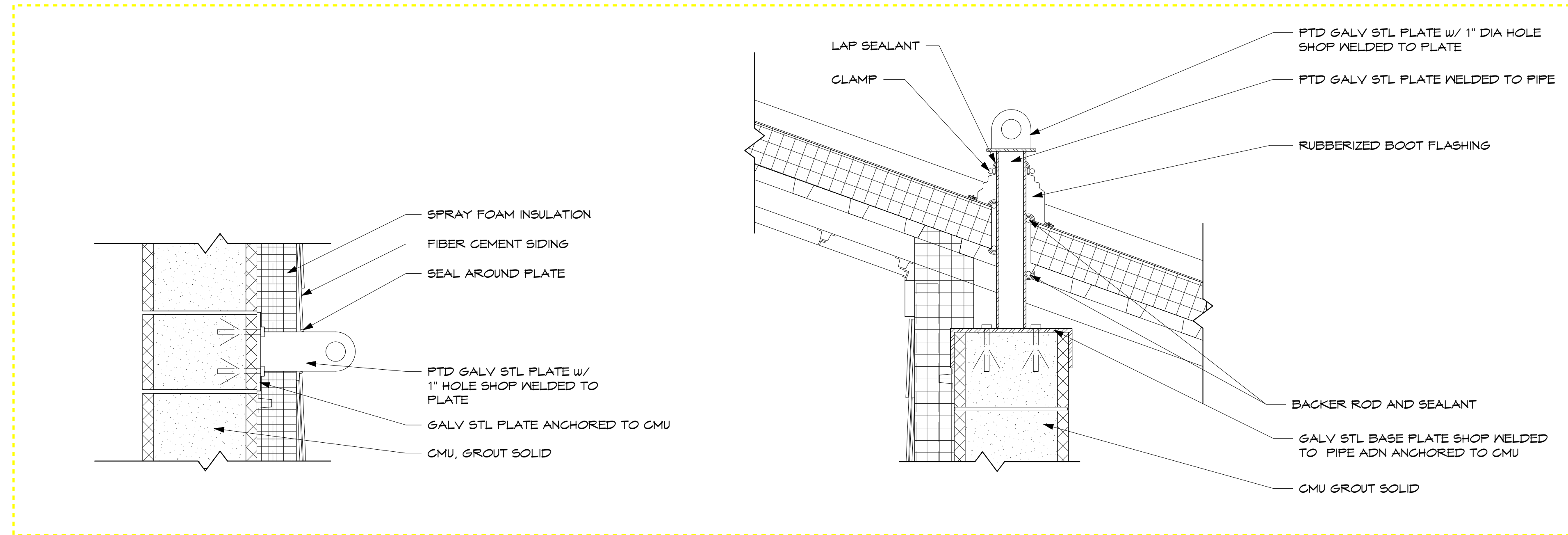
1. MAXIMUM ALLOWABLE DEAD LOAD OF COLLECTORS, FLUID, PIPING, CONDUIT IS 6LBS/SF.
2. MAXIMUM ALLOWABLE POINT LOAD APPROVED DURING CONSTRUCTION OR MAINTENANCE IS 3 LBS/SF. MAXIMUM CONCENTRATED ROOF LOAD FOR MAINTENANCE IS 300LBS.
3. MAXIMUM LOADING ON EACH FALL PROTECTION ANCHOR IS 5000 LBS.
4. MAXIMUM LOADING ON STANDING SEAM ROOFING, BOTH UPLIFT AND POINT LOAD, IS PER MANUFACTURER'S RECOMMENDATIONS.

FALL PROTECTION NOTES:

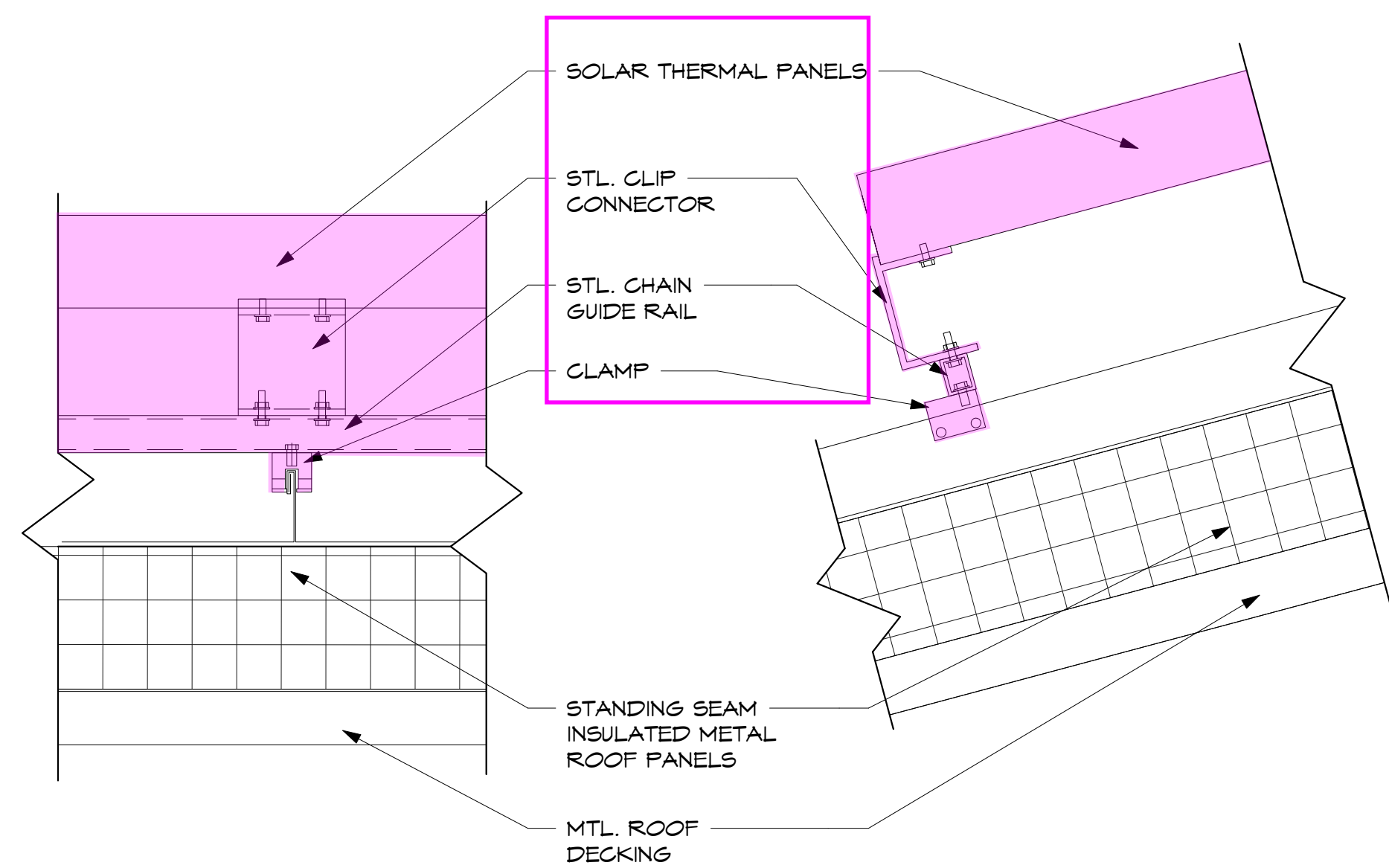
1. FALL PROTECTION INSTALLATION WILL BE PROVIDED BY GENERAL CONTRACTOR AND IS NOT IN THE SCOPE OF THIS CONTRACT. DRAWINGS ARE INCLUDED HERE FOR REFERENCE ONLY.
2. FALL PROTECTION ANCHOR SHALL BE ENGINEERED AND SEALED BY AN ENGINEER LICENSED IN NORTH CAROLINA TO WITHSTAND 5000 LBS OF ULTIMATE LOAD.
3. SEE SHEET SD 2.0 FOR FALL PROTECTION LOCATIONS.

SOLAR PANEL INSTALLATION NOTES:

1. SOLAR SYSTEM INSTALLER IS RESPONSIBLE FOR PROVIDING STRUCTURAL SEALED DRAWINGS ON COMPLETE MOUNTING REQUIREMENTS FOR EACH INSTALLED ARRAY. SEALED DRAWINGS AND CALCULATIONS TO BE PROVIDED BY A NORTH CAROLINA LICENSED PROFESSIONAL ENGINEER.
2. SEE SHEET SD 2.0 FOR SOLAR PANEL LOCATIONS.

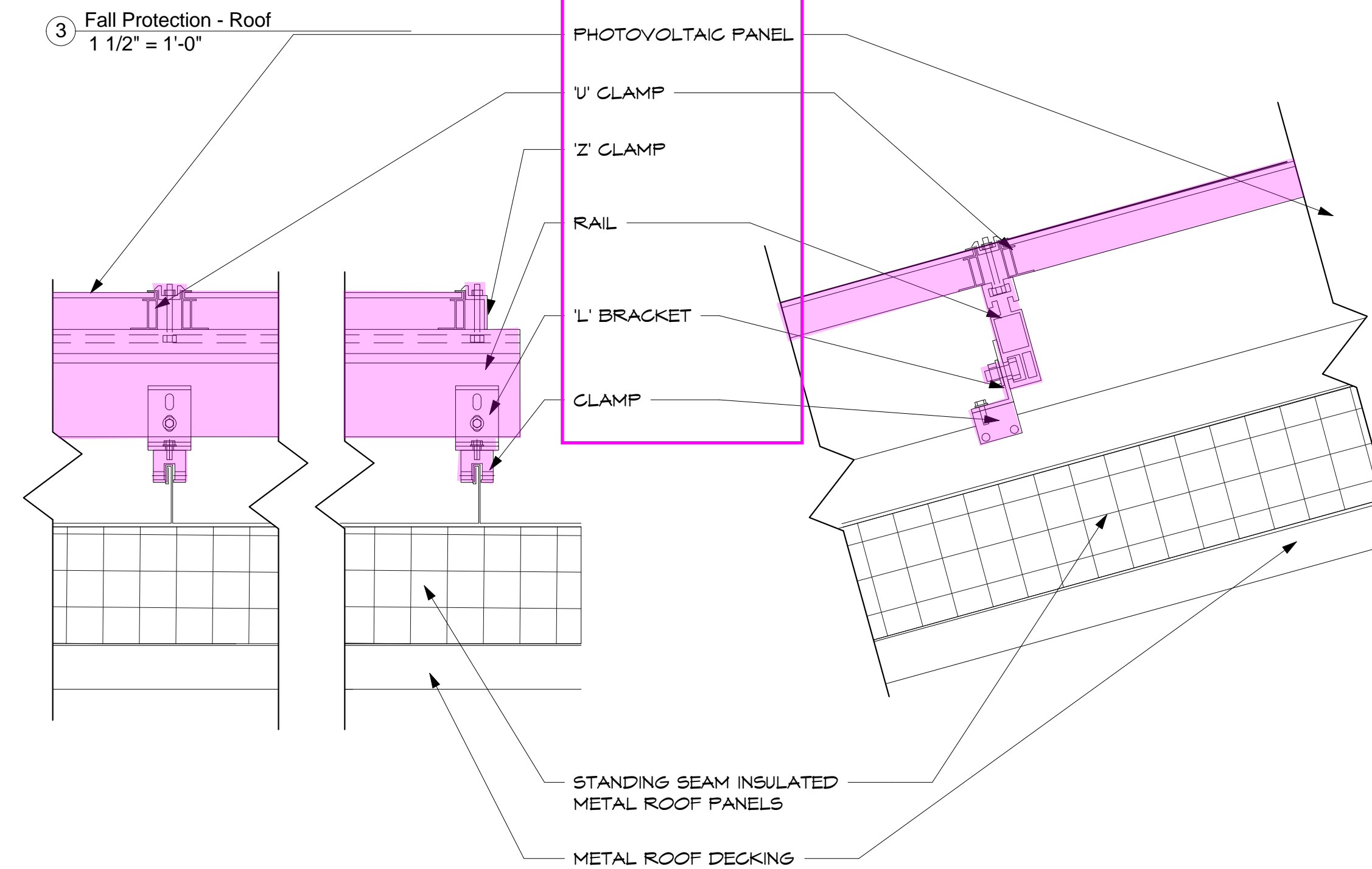


4 Fall Protection - Wall
1 1/2" = 1'-0"



2 Solar Thermal Panel Detail - OPTION 1
3" = 1'-0"

3 Fall Protection - Roof
1 1/2" = 1'-0"



1 PV Panel Installation Detail - OPTION 2
3" = 1'-0"

SEAL:

Not For Construction

SEAL:



Solar Developer Package
Creative Arts Building
 Haywood Community College
 Freedlander Dr. Clyde, NC 28721

1	Bid Set	4/08/10
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NO.	SUBMISSION	DATE
-----	------------	------

CHECKED BY: MN

DRAWN BY: JJ

PROJECT NUMBER: 2815

SHEET NAME:

Details

SHEET NUMBER:

SD3.0

WATER HEATER SCHEDULE												
MARK	BASIS OF DESIGN		LOCATION	INPUT GAS (BTUH)	OUTPUT (BTUH)	GALLONS	RECOVERY		VENT SIZE (IN)	AIR INTAKE SIZE (IN)	ELECTRICAL	
	MANUFACTURER	MODEL-SIZE					TEMP RISE (°F)	GPH			V/ø/HZ	MCA
DWH-1	HEAT TRANSFER	PH199-119S	MECHANICAL 164	119,000	114,000	119	65	366	3"	3"	120/1/60	6

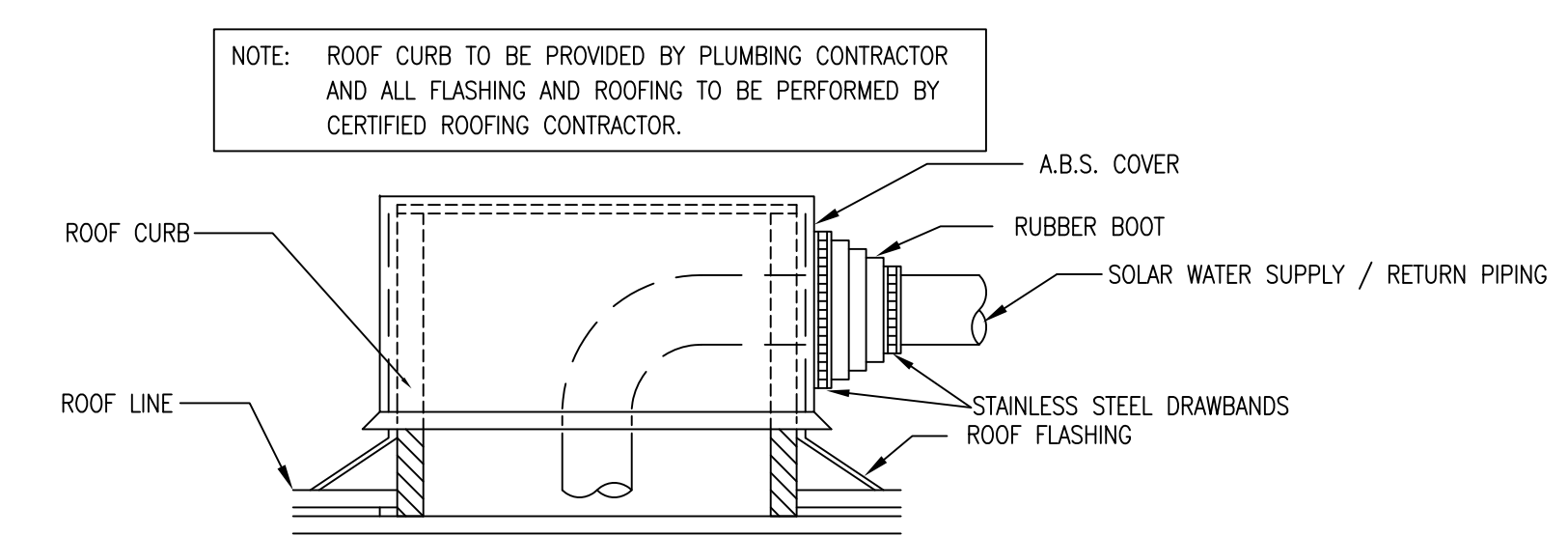
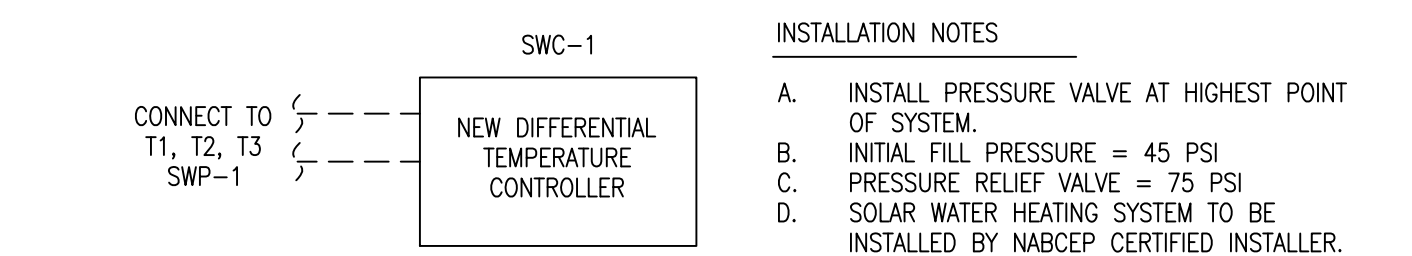
1. MINIMUM 14" WC (0.5 PSI) OF GAS PRESSURE FOR 100% RATED OUTPUT (FULL FIRE)
2. DO NOT EXCEED MANUFACTURERS MAXIMUM ALLOWED VENT PIPE LENGTH FOR INTAKE/EXHAUST SYSTEMS.
3. PROVIDE MANUFACTURERS SPECIFIC CONCENTRIC VENT KIT.

STORAGE TANK SCHEDULE												
MARK	TANK	EXTERIOR INSULATION			TANK LINING							
		MAKE/MODEL	ORIENTATION	HEIGHT		DIA.	GAL.	MATERIAL	R-VALUE	JACKET	INTERNAL	
ST-1	HIGHLAND TANK & MFG CO./ HighDRO	CARBON STEEL	VERTICAL	65"	48"	500	MIN. WOOL/FIBERGLASS/CERAMIC	R-16	24 GAUGE ALUMINIUM			
DBT-1	LOCHINVAR EGS075	STEEL	VERTICAL	59	24	75	2" CFC FREE					GLASS

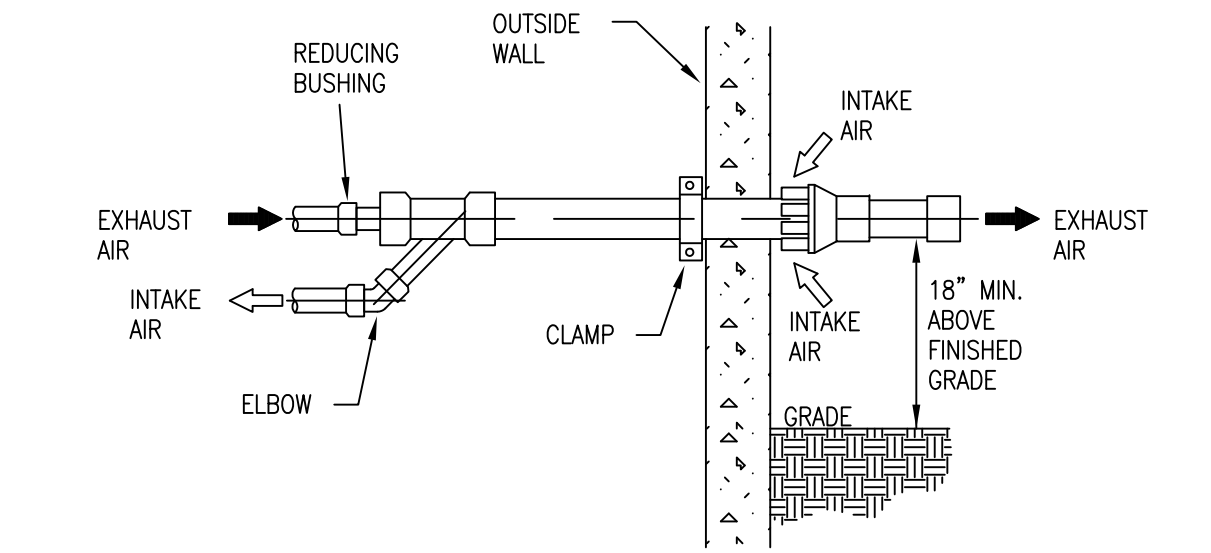
SOLAR WATER COLLECTORS	
MARK	SC-1
SERVICE	DOMESTIC WATER HEATING
LOCATION	ROOF
ABSORBER AREA (SQ. FEET)	22
DRY WEIGHT (POUNDS)	160
FLOW RATE	0.6 GPM

SOLAR WATER CONTROLLER	
MARK	SWC-1
INPUTS	3
OUTPUTS	1
VOLTAGE	120
PHASE (HERTZ)	60

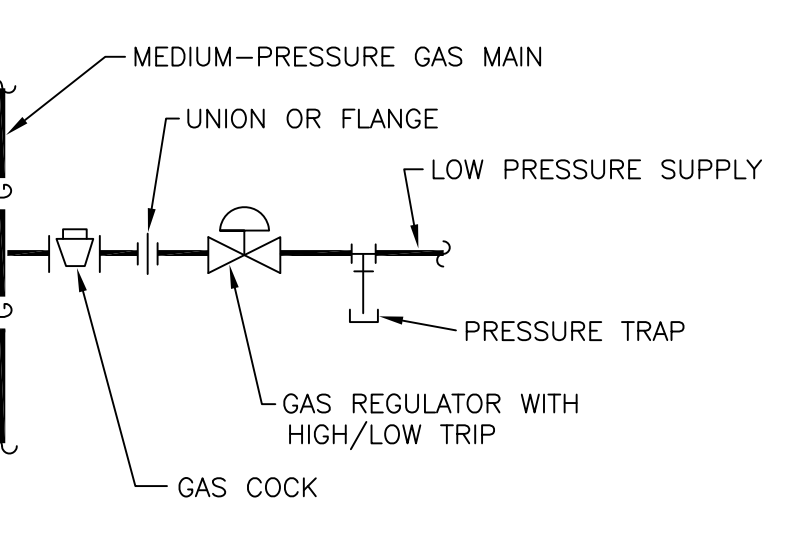
NOTES:
1. TANK SHALL INCLUDE ONE (1) HIGH-MOUNT SENSOR AND ONE (1) LOW-MOUNT TANK SENSOR.
2. SOLAR WATER RETURN PIPE MUST EXTEND BELOW TANK OPERATING LEVELS TO REDUCE SPLASHING AND AERATION.



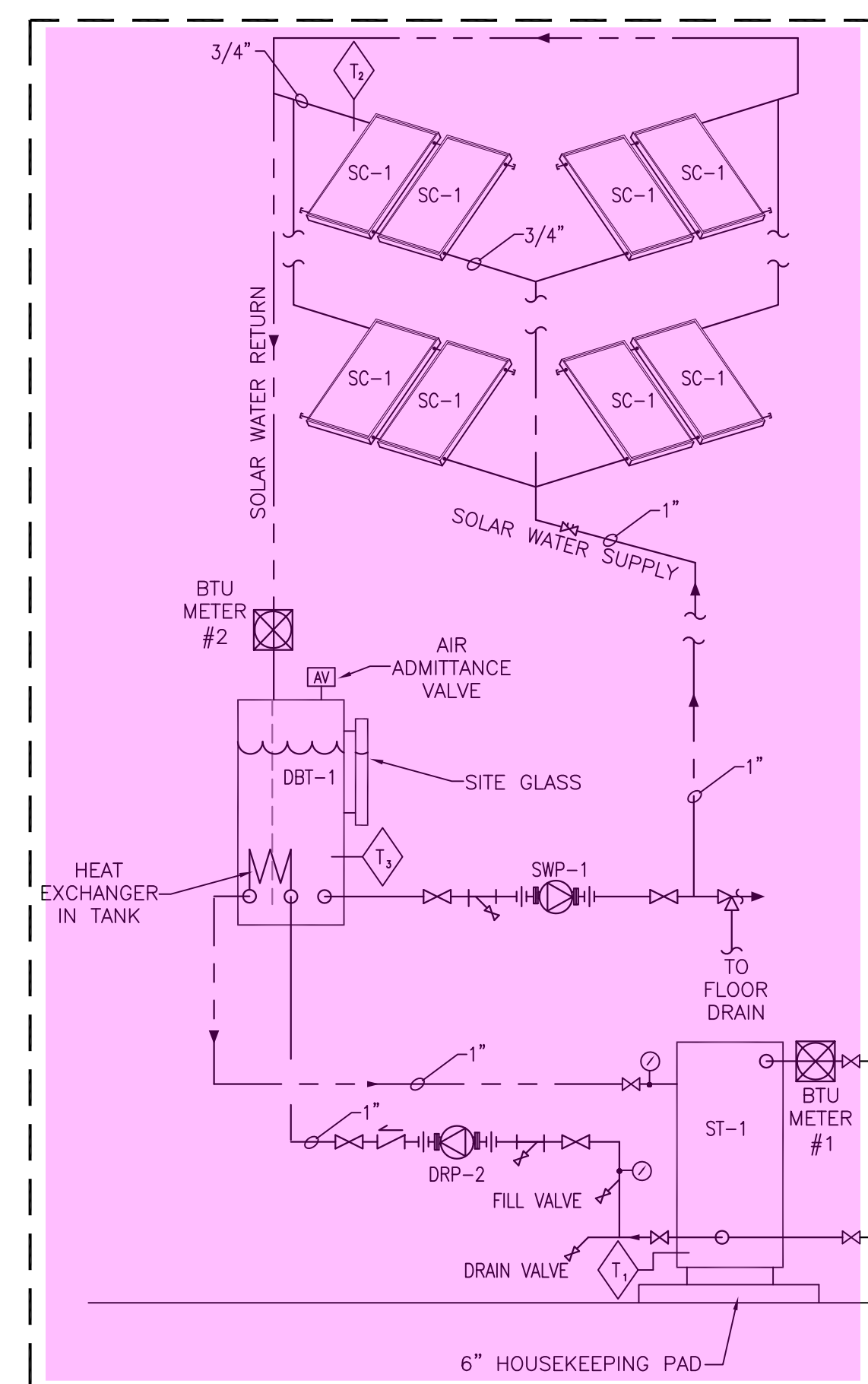
7 ROOF CURB FOR PIPING PENETRATION
NOT TO SCALE



6 CONCENTRIC VENT THRU WALL
NOT TO SCALE

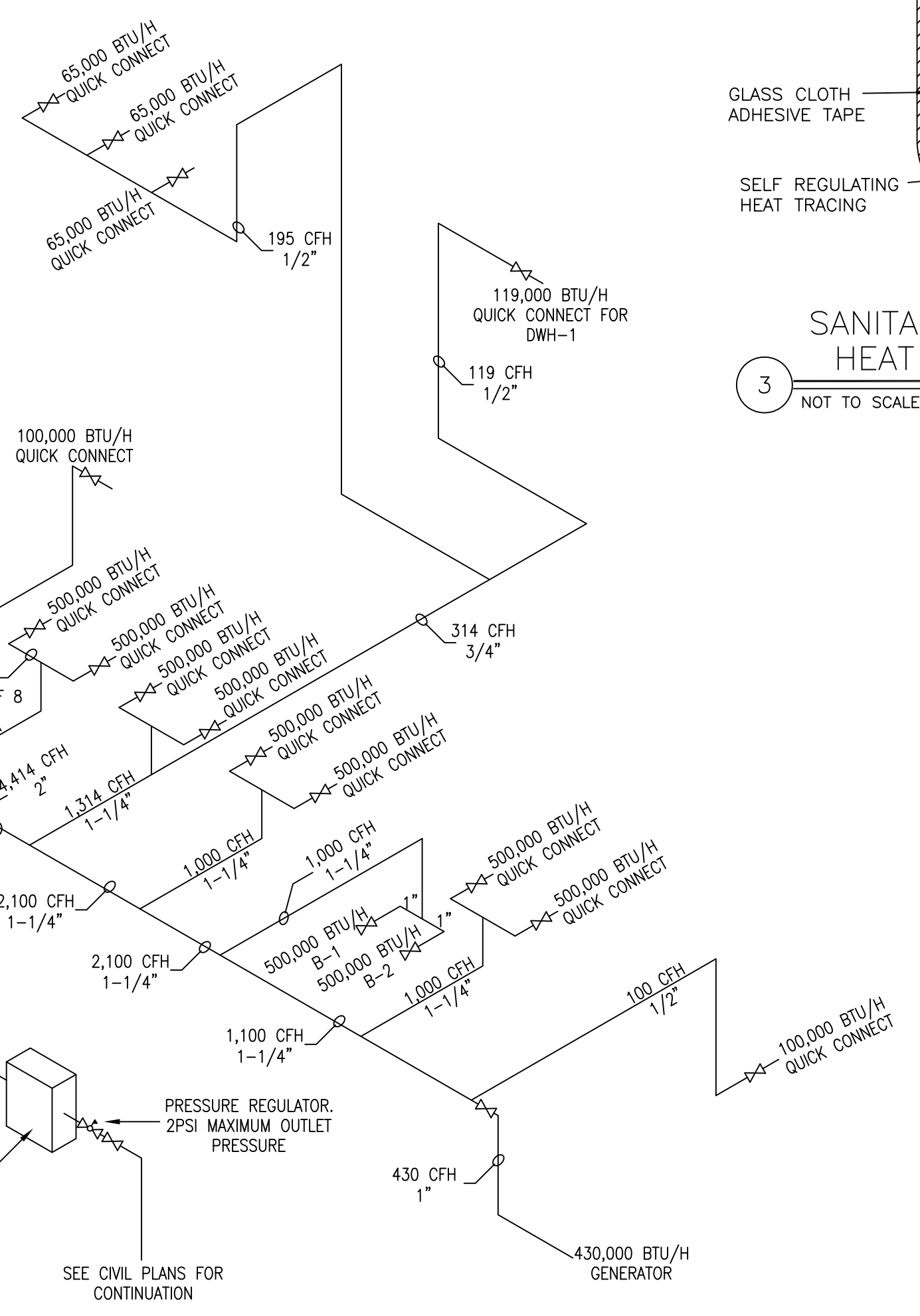


5 MEDIUM TO LOW PRESSURE GAS REGULATOR DETAIL
NOT TO SCALE



4 SOLAR DOMESTIC WATER HEATING SCHEMATIC
NOT TO SCALE

SCOPE OF:
GC ALT. 3.1
SD OPTION 1

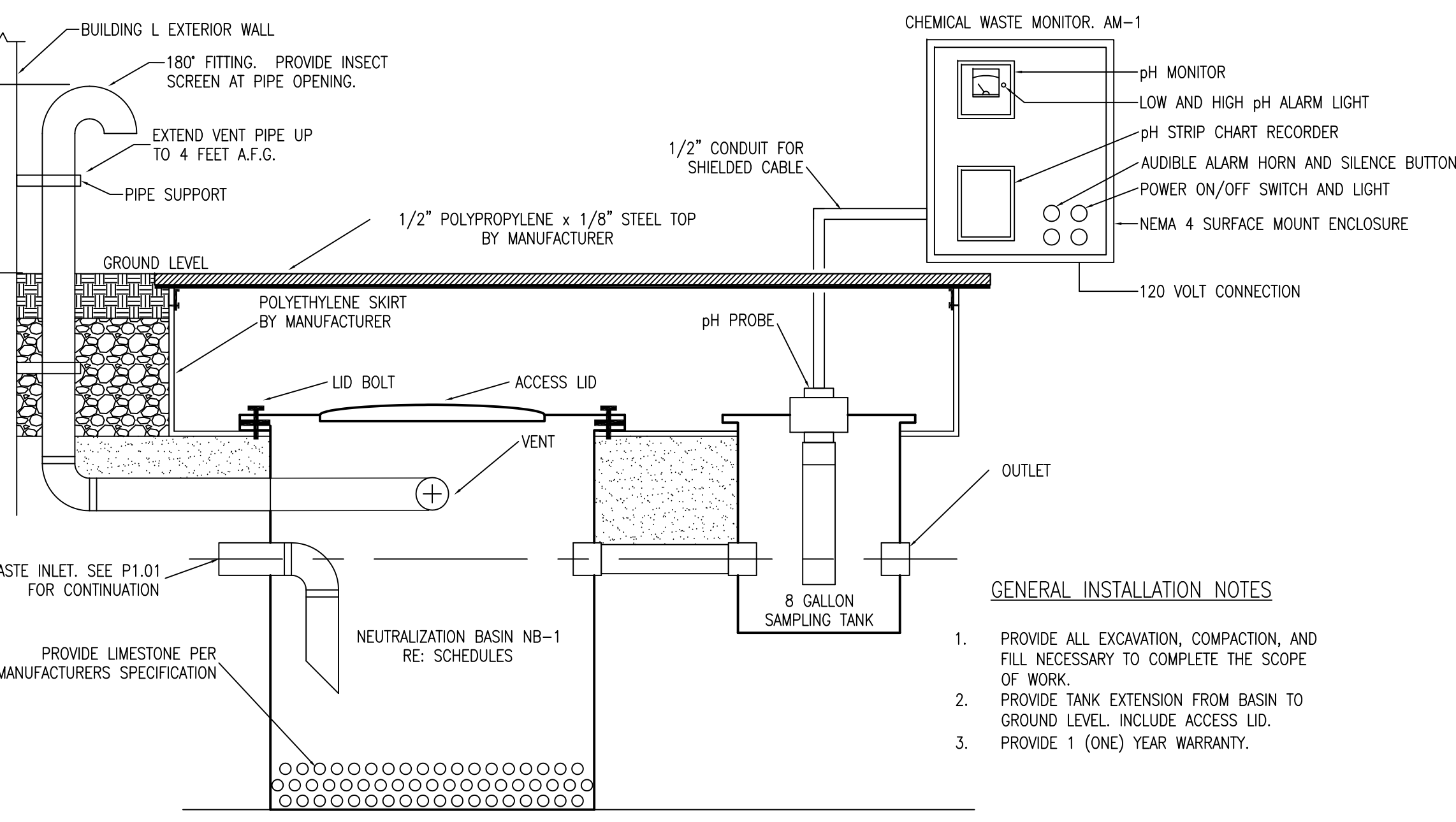


1 GAS PIPE SIZING ISOMETRIC
NOT TO SCALE

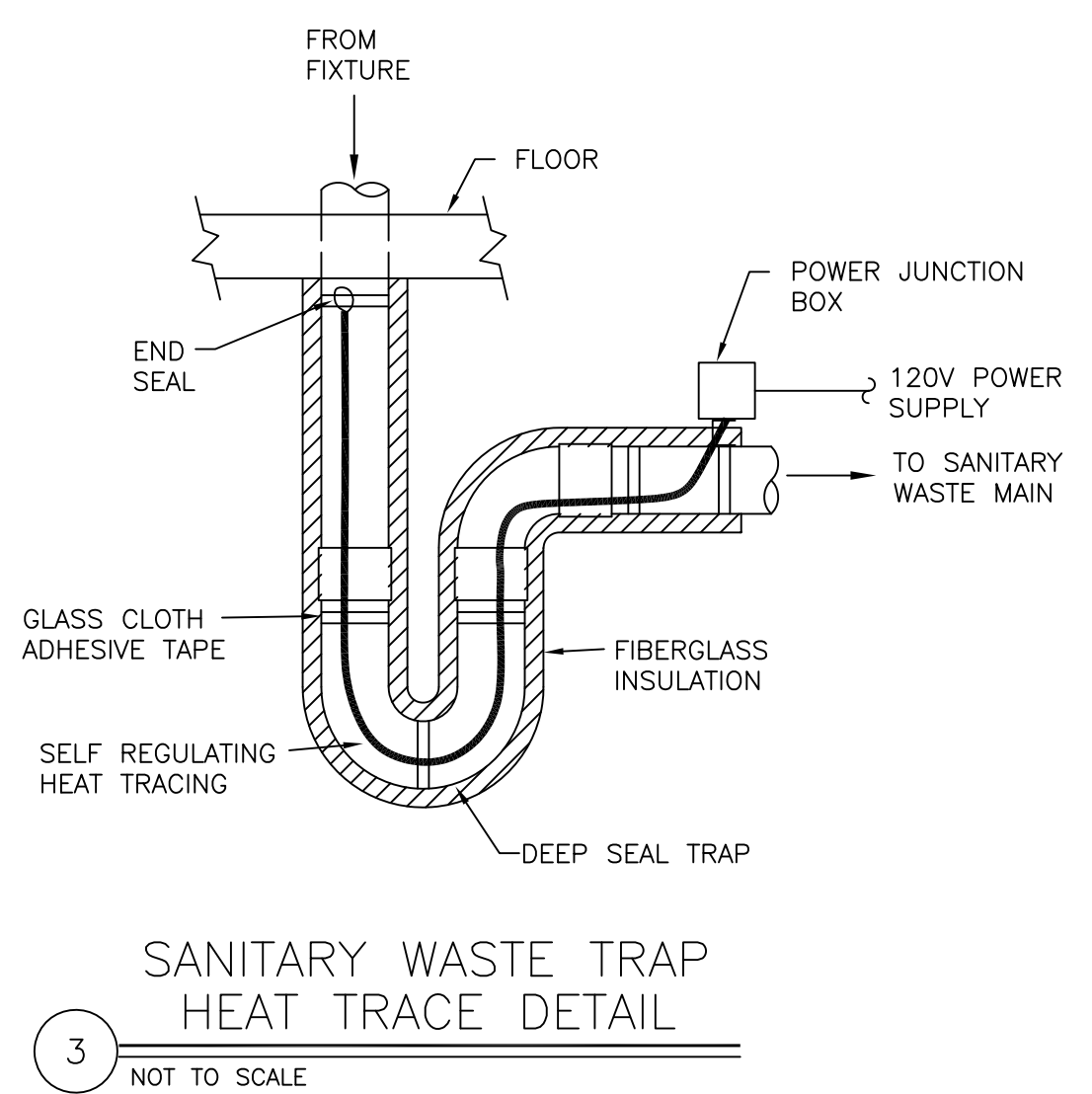
GAS PIPING INSTALLATION NOTES

- GAS PIPING SIZED USING TABLE 402.4(3) FROM THE 2009 IFGC. INLET PRESSURE 2PSI WITH 1.0 PSI PRESSURE DROP.
- ALL PIPES SIZED ON THE LONGEST RUN OF 450'
- PROVIDE PRESSURE REGULATION VALVES AT EACH PIECE OF EQUIPMENT INCLUDING QUICK DISCONNECTS.
- PROVIDE DIRT LEGS AT EQUIPMENT PER MANUFACTURERS RECOMMENDATIONS.
- ALL METAL PIPING TO BE BONDED ACCORDING TO CURRENT NEC CODES.

NATURAL GAS DEMAND		
APPLIANCE	APPLIANCE (CFH)	TOTAL (CFH)
LARGE GAS FIRED KILNS	1,000	4,000
SMALL GAS FIRED KILNS	100	200
WATER HEATER	119	119
GAS BURNERS FOR KETTLES	65	195
OUTDOOR WORK CONNECTION	100	100
BOILER	500	1,000
GENERATOR	430	430
TOTAL DEMAND		6,044 CFH



2 ACID WASTE NEUTRALIZATION AND MONITORING STATION
NOT TO SCALE



3 SANITARY WASTE TRAP HEAT TRACE DETAIL
NOT TO SCALE

SEAL:

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1	Bid Set	4/08/10

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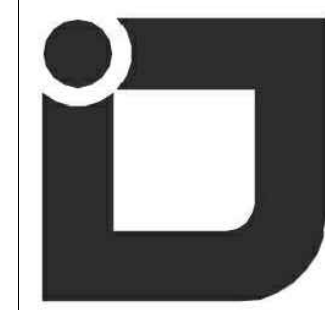
DRAWN BY: **DKF**

PROJECT NUMBER: **208064.00**

SHEET NAME: **PLUMBING DETAILS**

SHEET NUMBER: **P0.03**

FIREWALL LEGEND	
1 HR	---
3 HR	---

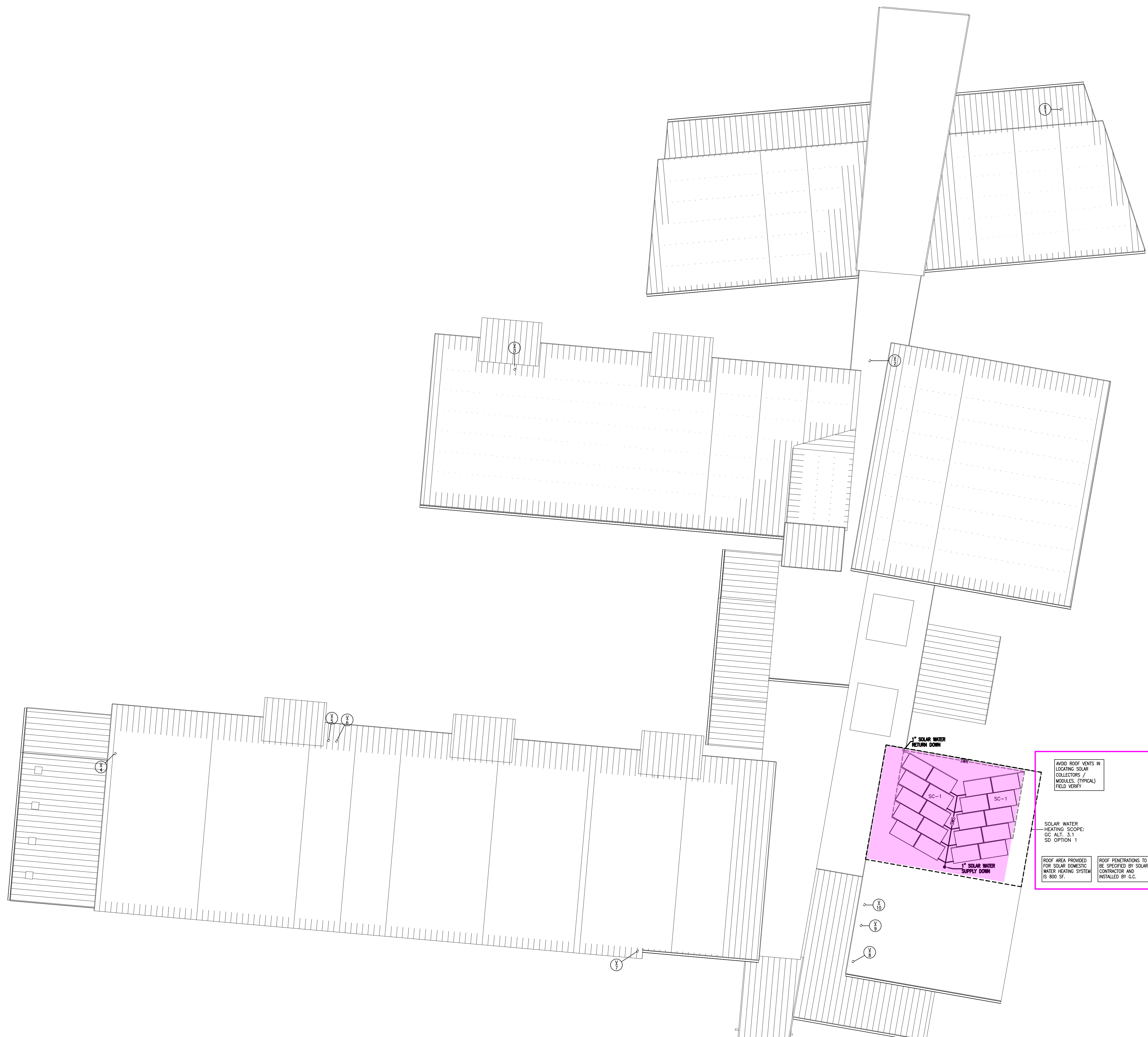


SEAL:

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Haywood Community College
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AVOID ROOF VENTS IN LOCATING SOLAR COLLECTORS / MODULES. (TYPICAL) FIELD VERIFY.

SOLAR WATER HEATING SCOPE:
GC ALT. 3.1
SD OPTION 1

ROOF AREA PROVIDED FOR SOLAR DOMESTIC WATER HEATING SYSTEM IS 800 SF.

ROOF PENETRATIONS TO BE SPECIFIED BY SOLAR CONTRACTOR AND INSTALLED BY G.C.

FIREWALL LEGEND

1 HR	-----
3 HR	-----

1	Bid Set	4/08/10
NO.	SUBMISSION	DATE
CHECKED BY:		WLA
DRAWN BY:		DKF
PROJECT NUMBER:		208064.00
SHEET NAME:		ROOF PLAN
SHEET NUMBER:		P0.21



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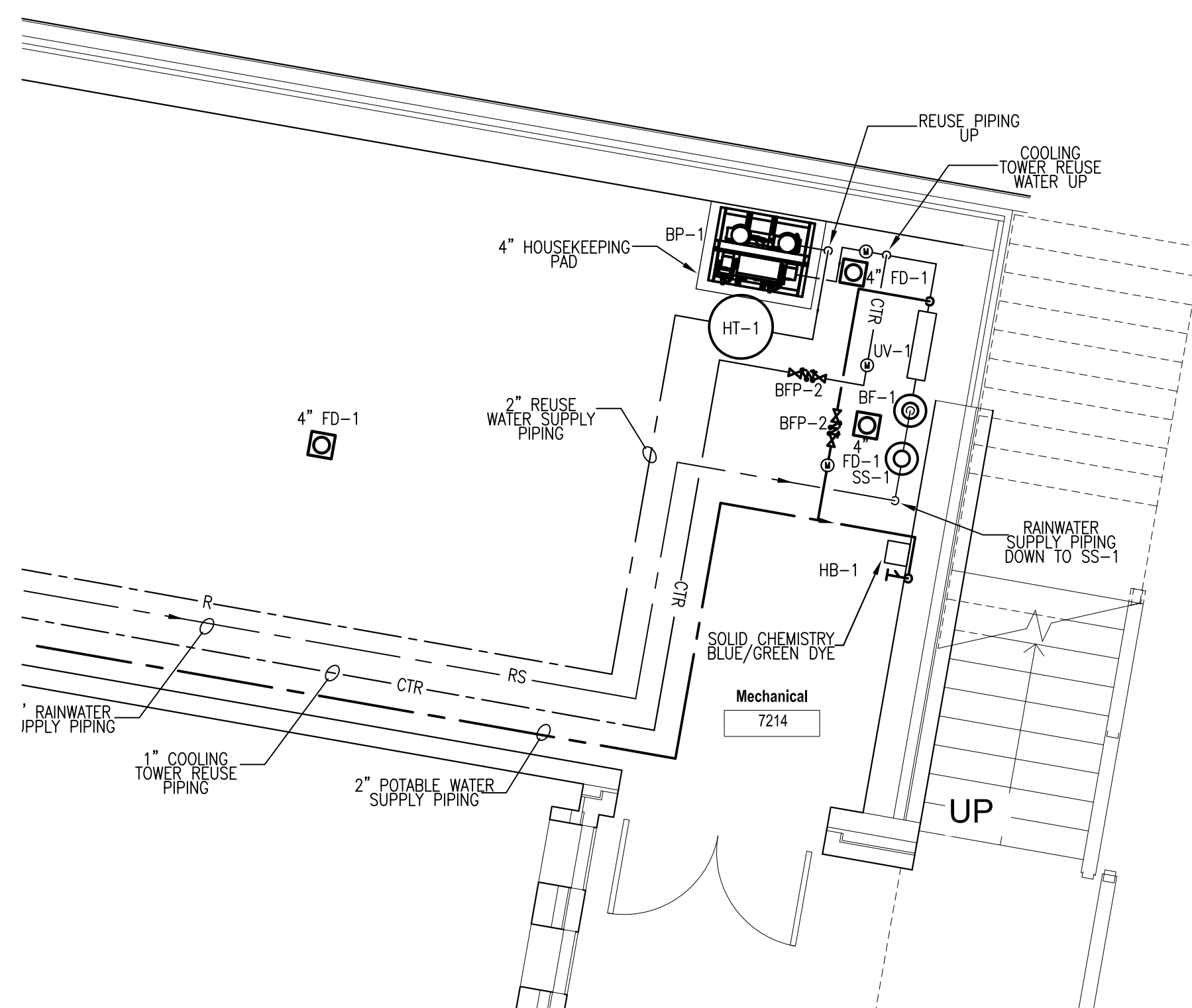
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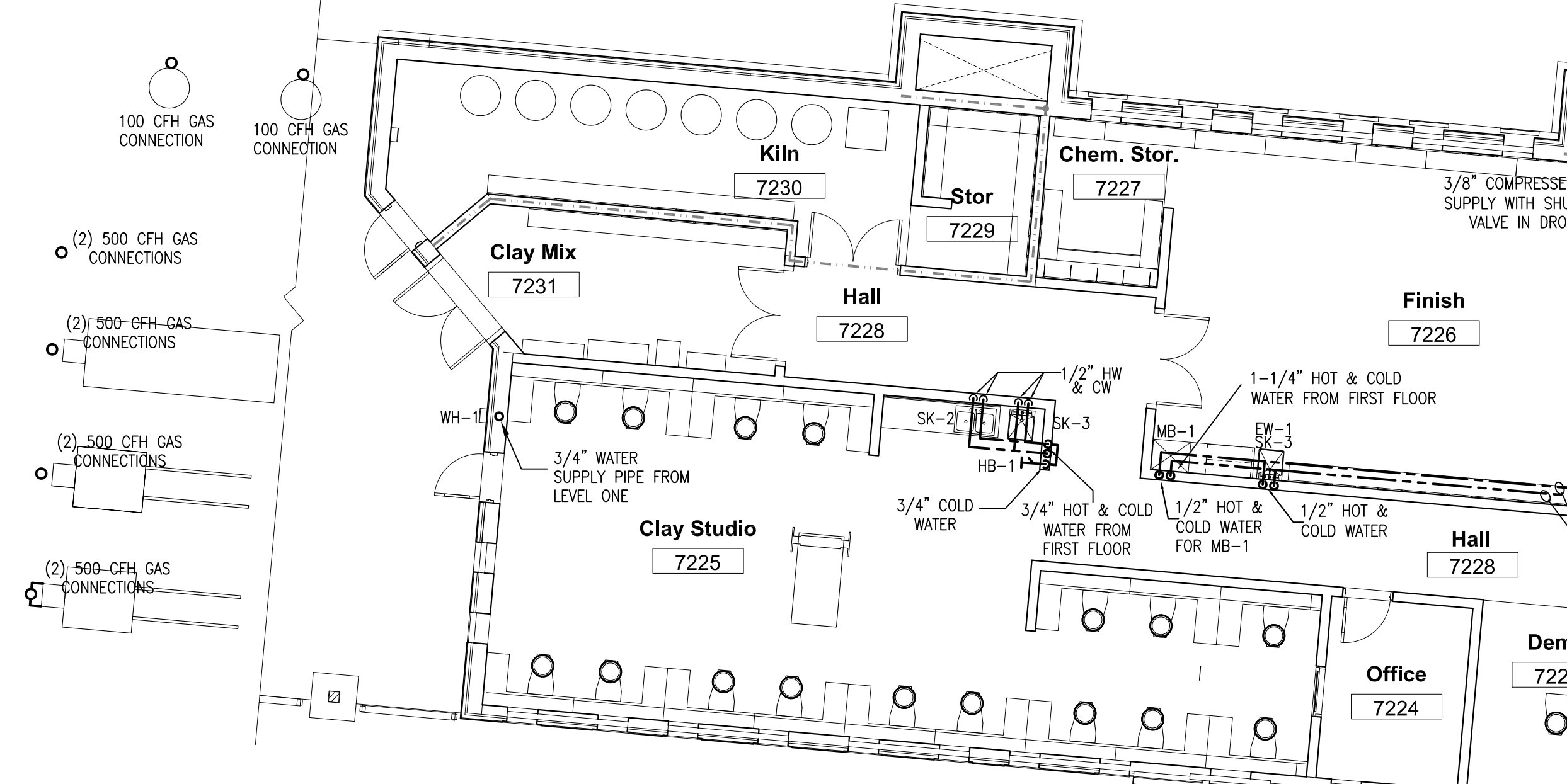
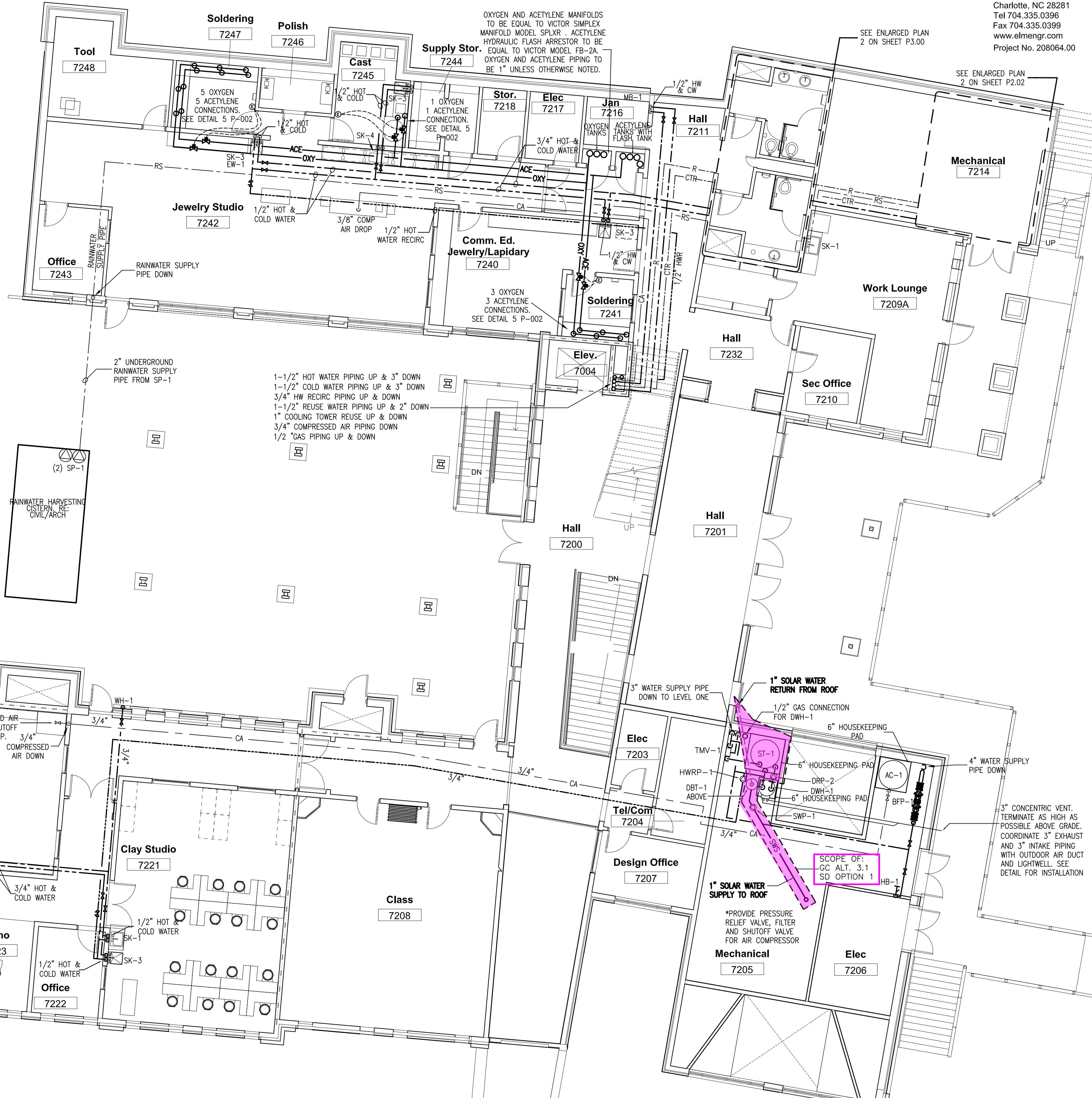


**HAYWOOD
COMMUNITY COLLEGE**

**Solar Development Package
Creative Arts Building
Haywood Community College
Freedlander Dr. Clyde, NC 28721**



2 ENLARGE MECHANICAL 7215 - WATER
SCALE: 1/4"=1'-0"

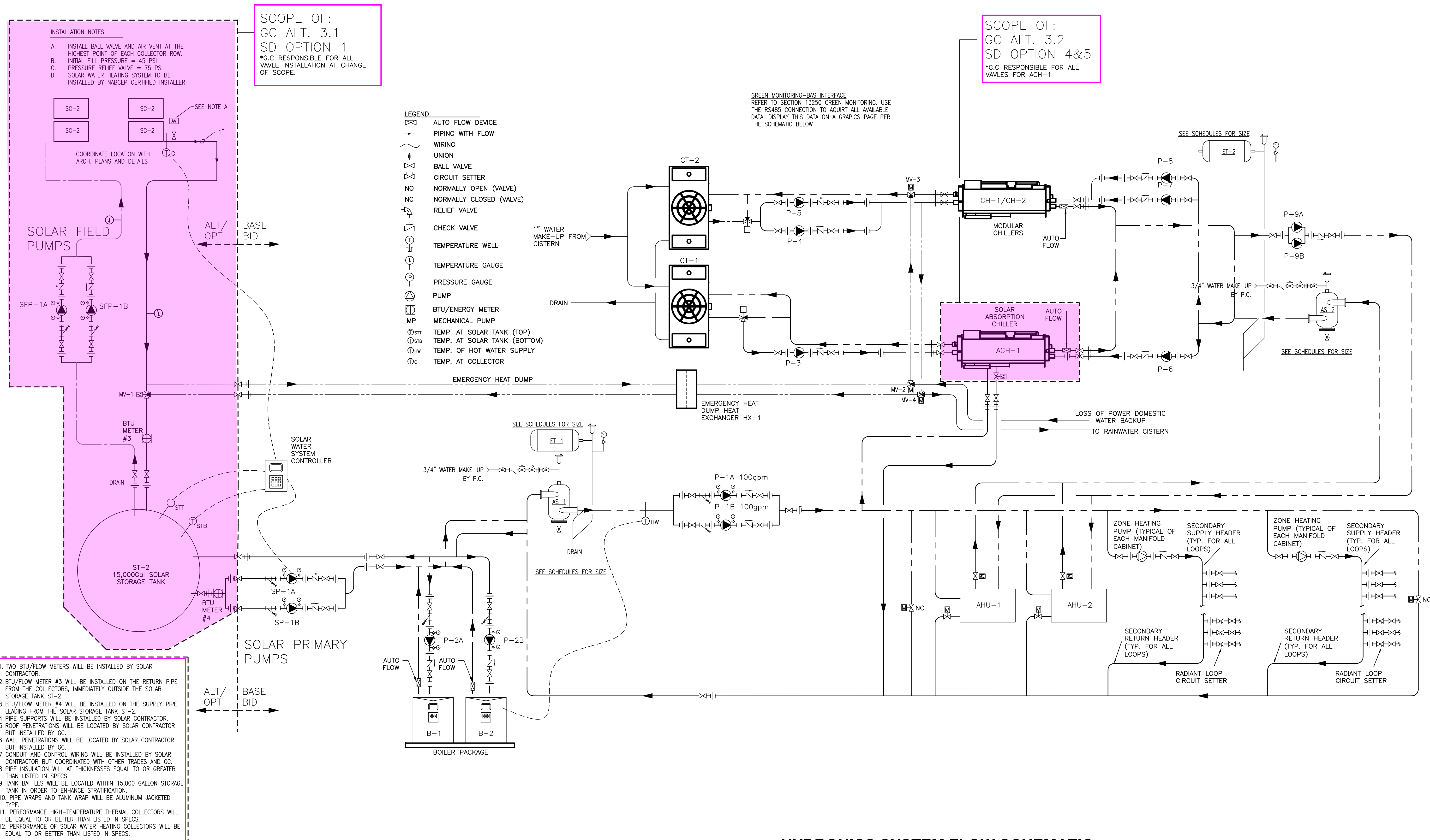


1 SECOND FLOOR PLUMBING PLAN - WATER
SCALE: 1/8"=1'-0"

FIREWALL LEGEND

1 HR	-----
3 HR	-----

1	Bid Set	4/08/10
NO.	SUBMISSION	DATE
CHECKED BY:	WLA	
DRAWN BY:	DKF	
PROJECT NUMBER:	208064.00	
SHEET NAME:	SECOND FLOOR PLUMBING PLAN - WATER	
SHEET NUMBER:	P2.02	



SEAL:

SEAL:



Solar Development Package
Creative Arts Building
Haywood Community College
Freedlander Dr. Clyde, NC 28721

1	Bid Set	4/08/10
NO.	SUBMISSION	DATE

CHECKED BY: **WLA**

DRAWN BY: **DKF**

PROJECT NUMBER:
208064.00

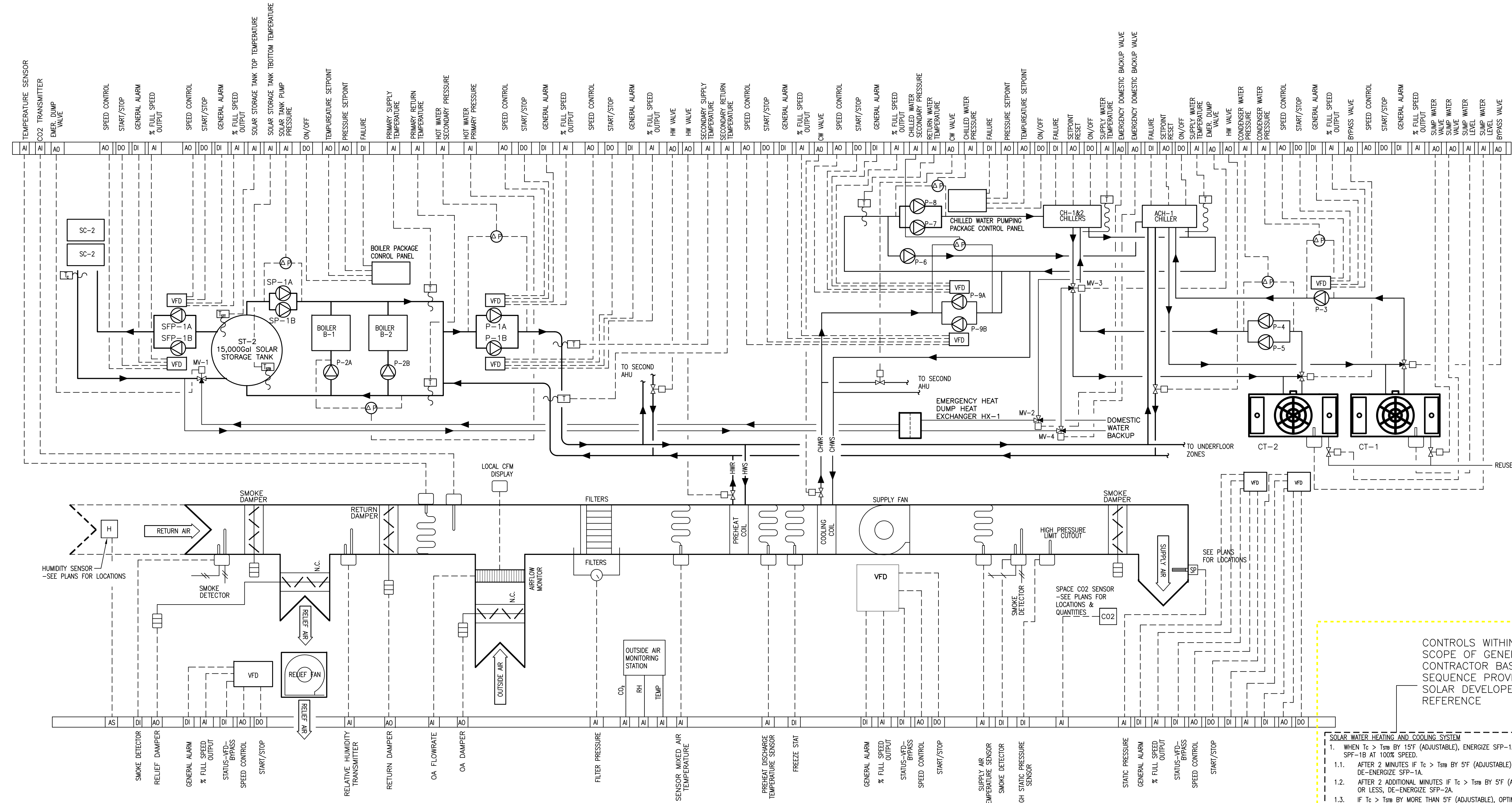
SHEET NAME:
SCHEMATICS

SHEET NUMBER:
M0.10

1 HYDRONICS SYSTEM FLOW SCHEMATIC
SCALE: NTS

FIREWALL LEGEND

1 HR	-----
3 HR	-----



CONTROLS WITHIN THE SCOPE OF GENERAL CONTRACTOR BASE BID. SEQUENCE PROVIDED FOR SOLAR DEVELOPER REFERENCE

- CHILLED WATER SYSTEM**
- ENERGIZE THE CHILLED WATER SYSTEM WHEN ANY AIR HANDLING UNIT IS ENERGIZED IN THE UNOCCUPIED HIGH LIMIT MODE, OR COOL DOWN MODE.
 - ENERGIZE THE CHILLED WATER SYSTEM IF THE AIR HANDLING UNIT IS IN THE OCCUPIED MODE AND ANY AIR HANDLER'S MIXED AIR TEMPERATURE IS ABOVE THE AIR HANDLER'S DISCHARGE TEMPERATURE SETPOINT.
 - If $T_c > T_m$
 - ENERGIZE THE LEAD PUMP OF SP-1A OR SP-1B.
 - ENERGIZE THE LEAD SECONDARY HOT WATER PUMP, P-1A OR P-1B.
 - If $T_c < T_m$
 - MODULATE THE LEAD PUMP'S VFD SPEED TO CONTROL THE HOT WATER PIPING DIFFERENTIAL PRESSURE SETPOINT. IF THE LEAD PUMP CANNOT MAINTAIN THE DIFFERENTIAL SETPOINT, THE LEAD PUMP SHALL DE-ENERGIZE AND THE LEAD AND LAG PUMP'S VFD'S SHALL MODULATE IN UNISON TO CONTROL THE PIPING DIFFERENTIAL PRESSURE SETPOINT, (ADJUSTABLE).
 - IF THE SPEED OF THE PUMPS IN UNISON FALLS BELOW 75% (ADJUSTABLE) THE LAG PUMP SHALL BE DE-ENERGIZED AND THE LEAD PUMP ONLY SHALL RUN. THE ADEQUACY OF THE SINGLE PUMP SHALL BE VERIFIED AS DESCRIBED ABOVE.
 - ENERGIZE CHILLER ACH-1.
 - CHILLER SHOULD ENERGIZE CT-1, ASSOCIATED P-3 AND CHILLED WATER PUMP, P-6.
 - If $T_c < T_m$
 - ENERGIZE LEAD CHILLER CH-1 OR CH-2 AS REQUIRED TO MEET CHILLED WATER LOAD.
 - ALTERNATE LEAD CHILLER WEEKLY.
 - ENERGIZED SECOND LAG CHILLER CH-1 OR CH-2 AS REQUIRED TO MEET CHILLED WATER LOAD.
 - ONCE CHILLED WATER HAS BEEN VERIFIED IN THE PRIMARY LOOP, ENERGIZE THE LEAD SECONDARY CHILLED WATER PUMP.
 - THE LEAD CHILLED WATER PUMP'S VFD SPEED SHALL BE MODULATED TO CONTROL THE CHILLED WATER PRESSURE SETPOINT, (ADJUSTABLE). WHEN THE LEAD PUMP IS AT 100% SPEED AND THE PRESSURE SETPOINT CANNOT BE MAINTAINED, THE LEAD PUMP SHALL BE DE-ENERGIZED AND THE LEAD AND LAG PUMPS SHALL BE MODULATED IN UNISON TO MAINTAIN THE SETPOINT. THE PUMPS SHALL OPERATE IN UNISON UNTIL THE SYSTEM IS DE-ENERGIZED.
 - IF THE SPEED OF THE PUMPS IN UNISON FALLS BELOW 75% (ADJUSTABLE) THE LAG PUMP SHALL BE DE-ENERGIZED AND THE LEAD PUMP ONLY SHALL RUN. THE ADEQUACY OF THE SINGLE PUMP SHALL BE VERIFIED AS DESCRIBED ABOVE.
 - EACH DAY THE BEGINNING SETPOINT SHALL BE THE LAST SETPOINT FROM THE PREVIOUS DAY.
 - THE LEAD PUMP SHALL BE ALTERNATED WEEKLY.
 - ALARMS
 - HIGH PRESSURE DEVIATION FROM SET POINT
 - LOW PRESSURE DEVIATION FROM SET POINT
 - HIGH TEMPERATURE DEVIATION FROM SET POINT
 - LOW TEMPERATURE DEVIATION FROM SET POINT
 - PUMP FAILURE (VFD ALARM)
 - PUMP FAILURE (CURRENT TRANSFORMER)

- SOLAR WATER HEATING AND COOLING SYSTEM**
- WHEN $T_c > T_m$ BY 15F (ADJUSTABLE), ENERGIZE SFP-1A AND SFP-1B AT 100% SPEED.
 - AFTER 2 MINUTES IF $T_c > T_m$ BY 5F (ADJUSTABLE) OR LESS, DE-ENERGIZE SFP-1A.
 - AFTER 2 ADDITIONAL MINUTES IF $T_c > T_m$ BY 5F (ADJUSTABLE) OR LESS, DE-ENERGIZE SFP-1A.
 - IF $T_c > T_m$ BY MORE THAN 5F (ADJUSTABLE), OPTIMIZE SINGLE PUMP SPEED TO MAINTAIN 10F AT (ADJUSTABLE).
 - IF AFTER 2 MINUTES, BOTH PUMPS ARE ENERGIZED AND $T_c > T_m$ BY MORE THAN 5F (ADJUSTABLE), OPTIMIZE DUAL PUMP SPEED TO MAINTAIN 10F AT (ADJUSTABLE).
 - SOLAR TANK ST-2 SETPOINT, 240F (ADJUSTABLE).
 - IF $T_m > 240F$, DE-ENERGIZE BOTH SFP-1 AND SFP-2.
 - EMERGENCY HEAT DUMP SEQUENCE
 - LEAD PUMP OF SFP-1A OR 1B WILL TURN ON WHEN T_c REACHES WITHIN 10 DEGREES OF THE MAXIMUM DESIGN STAGNATION TEMPERATURE (ADJUSTABLE) ALLOWED BY THE MANUFACTURER OF THE COLLECTORS. WHEN THIS CONDITION OCCURS, IT WILL BE NECESSARY TO ENERGIZE MOTORIZED VALVE MV#1 SO THAT THE RETURN FLOW OF FLUID FROM THE COLLECTORS IS DIVERTED TO THE EMERGENCY HEAT DUMP HEAT EXCHANGER HX-1.
 - ADDITIONALLY MV#2, MV#3 AND MV#4 ARE ALSO ENERGIZED TO DIVERT THE FLOW FROM THE OTHER SIDE OF THE HX-1 TO THE COOLING TOWER CT-2. SIMULTANEOUSLY, THE LEAD PUMP OF P-4 AND P-5 WILL ALSO TURN ON. THIS CONDITION WILL CONTINUE UNTIL T_m (THE TEMPERATURE IN THE BOTTOM OF TANK ST-2) DROPS BELOW 230 DEGREES (ADJUSTABLE) AND T_c IS 15 DEGREES (ADJUSTABLE) BELOW THE MAXIMUM STAGNATION TEMPERATURE.
 - IN THE EVENT THAT THE STAGNATION CONDITION OCCURS AND T_c REACHES WITHIN 10 DEGREES OF MAXIMUM DESIGN STAGNATION TEMPERATURE AT THE SAME TIME THERE IS A POWER FAILURE, THE BACK-UP NATURAL GAS GENERATOR WILL BE ENERGIZED. THIS BACK-UP GENERATOR WILL IN TURN POWER THE LEAD PUMP OF SFP-1A OR 1B.
 - ENERGIZE MOTORIZED VALVE MV#1 SO THAT THE RETURN FLOW OF FLUID FROM THE COLLECTORS IS DIVERTED TO THE EMERGENCY HEAT DUMP HEAT EXCHANGER HX-1, AND ENERGIZE MV#2, MV#3 AND MV #4 SO THE FLOW OF MUNICIPAL WATER IS DIRECTED TO THE OTHER SIDE OF THE HX-1 AND THEN TO THE RAINWATER CISTERN. THIS CONDITION WILL CONTINUE UNTIL T_m (THE TEMPERATURE IN THE BOTTOM OF TANK ST-2) DROPS BELOW 230 DEGREES (ADJUSTABLE) AND T_c IS 15 DEGREES (ADJUSTABLE) BELOW THE MAXIMUM STAGNATION TEMPERATURE.
 - LEAD PUMP CONTROL
 - SOLAR TANK, ST-2 AND ASSOCIATED PUMP USAGE.
 - IF $T_m > T_m$ BY 3F ENERGIZE THE LEAD PUMP OF SP-1A OR SP-1B.
 - IF $T_m < T_m$ BY 2F DE-ENERGIZE SP-1A OR SP-1B AND ENERGIZE BOILER SYSTEM.
 - ENERGIZE THE LEAD PUMP OF SP-1A OR SP-1B.
 - IF $T_m > T_m$ BY 3F DE-ENERGIZE BOILER SYSTEM AND TO THE COOLING TOWER CT-2. SIMULTANEOUSLY, THE LEAD PUMP SHALL DE-ENERGIZE AND THE LEAD AND LAG PUMP'S VFD'S SHALL MODULATE IN UNISON TO CONTROL THE HOT WATER PIPING DIFFERENTIAL PRESSURE SETPOINT. IF THE LEAD PUMP CANNOT MAINTAIN THE DIFFERENTIAL SETPOINT, THE LEAD PUMP SHALL DE-ENERGIZE AND THE LEAD AND LAG PUMP'S VFD'S SHALL MODULATE IN UNISON TO CONTROL THE PIPING DIFFERENTIAL PRESSURE SETPOINT, (ADJUSTABLE).
 - IF THE SPEED OF THE PUMPS IN UNISON FALLS BELOW 75% (ADJUSTABLE) THE LAG PUMP SHALL BE DE-ENERGIZED AND THE LEAD PUMP ONLY SHALL RUN. THE ADEQUACY OF THE SINGLE PUMP SHALL BE VERIFIED AS DESCRIBED ABOVE.
 - THE LEAD PUMP SHALL BE ALTERNATED WEEKLY.
 - IF ANY PUMP FAILS, THE PUMP SHALL BE DE-ENERGIZED AN ALARM GENERATED AND THE OTHER PUMP ENERGIZED TO CONTROL THE PIPING PRESSURE.
 - IF BOTH PUMPS FAIL, BOTH PUMPS SHALL BE DE-ENERGIZED
 - ALARMS
 - HIGH PRESSURE DEVIATION FROM SETPOINT
 - LOW PRESSURE DEVIATION FROM SETPOINT
 - HIGH TEMPERATURE DEVIATION FROM SETPOINT
 - LOW TEMPERATURE DEVIATION FROM SETPOINT
 - PUMP FAILURE (VFD ALARM)
 - EMERGENCY HIGH WATER TEMPERATURE

- HEATING AND COOLING WATER SYSTEM**
- ENERGIZE THE HOT WATER SYSTEM WHEN THE AIR HANDLING UNIT IS ENERGIZED IN THE UNOCCUPIED LOW LIMIT MODE OR WARM UP MODE, OR IF THE OUTSIDE AIR TEMPERATURE IS BELOW 40F (ADJUSTABLE).
 - ENERGIZE THE HOT WATER SYSTEM IF ONE OF THE AIR HANDLING UNITS ARE IN THE OCCUPIED MODE AND 5 (ADJUSTABLE) VAV TERMINALS ARE AT MINIMUM AIR VOLUME.
 - PUMP CONTROL
 - SOLAR TANK, ST-2 AND ASSOCIATED PUMP USAGE.
 - IF $T_m > T_m$ BY 3F ENERGIZE THE LEAD PUMP OF SP-1A OR SP-1B.
 - IF $T_m < T_m$ BY 2F DE-ENERGIZE SP-1A OR SP-1B AND ENERGIZE BOILER SYSTEM.
 - ENERGIZE THE LEAD PUMP OF SP-1A OR SP-1B.
 - IF $T_m > T_m$ BY 3F DE-ENERGIZE BOILER SYSTEM AND TO THE COOLING TOWER CT-2. SIMULTANEOUSLY, THE LEAD PUMP SHALL DE-ENERGIZE AND THE LEAD AND LAG PUMP'S VFD'S SHALL MODULATE IN UNISON TO CONTROL THE HOT WATER PIPING DIFFERENTIAL PRESSURE SETPOINT. IF THE LEAD PUMP CANNOT MAINTAIN THE DIFFERENTIAL SETPOINT, THE LEAD PUMP SHALL DE-ENERGIZE AND THE LEAD AND LAG PUMP'S VFD'S SHALL MODULATE IN UNISON TO CONTROL THE PIPING DIFFERENTIAL PRESSURE SETPOINT, (ADJUSTABLE).
 - IF THE SPEED OF THE PUMPS IN UNISON FALLS BELOW 75% (ADJUSTABLE) THE LAG PUMP SHALL BE DE-ENERGIZED AND THE LEAD PUMP ONLY SHALL RUN. THE ADEQUACY OF THE SINGLE PUMP SHALL BE VERIFIED AS DESCRIBED ABOVE.
 - THE LEAD PUMP SHALL BE ALTERNATED WEEKLY.
 - IF ANY PUMP FAILS, THE PUMP SHALL BE DE-ENERGIZED AN ALARM GENERATED AND THE OTHER PUMP ENERGIZED TO CONTROL THE PIPING PRESSURE.
 - IF BOTH PUMPS FAIL, BOTH PUMPS SHALL BE DE-ENERGIZED
 - ALARMS
 - HIGH PRESSURE DEVIATION FROM SETPOINT
 - LOW PRESSURE DEVIATION FROM SETPOINT
 - HIGH TEMPERATURE DEVIATION FROM SETPOINT
 - LOW TEMPERATURE DEVIATION FROM SETPOINT
 - PUMP FAILURE (VFD ALARM)
 - EMERGENCY HIGH WATER TEMPERATURE

- PRE-HEAT VALVE (GLYCOL)**
- REHEAT VALVE: MODULATE THE PREHEAT VALVE TO PROVIDE A MINIMUM PREHEAT COIL DISCHARGE SETPOINT. (40F - ADJUSTABLE)
 - SAFETIES
 - FREEZE/STAY - WHEN THE TEMPERATURE SENSED BY THE LOWEST ONE FOOT SEGMENT OF THE FREEZE/STAY ELEMENT IS LESS THAN 35F (ADJUSTABLE), THE FREEZE/STAY SHALL TRIP. THE BAS SHALL ALARM AND THE AIR HANDLING UNIT SHALL RETURN TO THE UNOCCUPIED MODE UNTIL THE ALARM IS RESET. THE FREEZE/STAY SHALL HAVE TWO CONTACTS. ONE CONTACT SHALL BE HARD WIRE TO DE-ENERGIZE THE AIR HANDLER AND ONE SHALL INFORM THE BAS. THE HOT WATER AND CHILLED WATER PUMPS SHALL BE DE-ENERGIZED, THE HEAT EXCHANGER SHALL BE ENERGIZED, THE CHILLED WATER AND HOT WATER VALVES SHALL OPEN UNTIL THE FREEZE/STAY IS RESET
 - SMOKE ALARM
 - SMOKE DETECTOR - WHEN THE SMOKE DETECTORS SENSE THE PRESENCE OF PRODUCTS OF COMBUSTION OR ANY OTHER ELEMENTS OF FIRE, THE SMOKE DETECTOR SHALL ENTER THE ALARM MODE. THE FIRE ALARM SYSTEM AND BAS SHALL BE INFORMED. A HARD WIRE INTERLOCK, THROUGH A SMOKE DETECTOR AUXILIARY CONTACT, SHALL RETURN THE AIR HANDLING UNIT TO THE UNOCCUPIED MODE, AND INFORM THE BAS, UNTIL THE ALARM IS MANUALLY RESET.
 - ALARMS
 - TEMPERATURE - +/- 5F DEVIATION FROM SETPOINT
 - HUMIDITY - INTERNAL MALFUNCTION
 - STATIC PRESSURE - +/- 0.5" FROM SETPOINT
 - DELAY - ALL ALARMS SHALL HAVE A TIME DELAY TO ALLOW FOR UNIT STABILIZATION AND TO REDUCE UNNECESSARY DELAY FUNCTION SHALL BE INDICATED IN THE CONTROL SUBMITTAL.
 - HIGH FILTER STATIC PRESSURE DROP
 - ELECTROSTATIC FILTER ELECTRICAL FAILURE.

- ECONOMIZER**
- WHEN THE RETURN AIR ENTHALPY IS HIGHER THAN THE OUTSIDE AIR ENTHALPY AND THE UNIT IS IN MORNING COOL DOWN OR OCCUPIED MODE, THE ECONOMIZER SHALL BE ENABLED.
 - THE ECONOMIZER SETPOINT SHALL EQUAL THE DISCHARGE TEMPERATURE MINUS 2F.
 - THE OUTSIDE AND RELIEF DAMPERS SHALL MODULATE OPEN AND THE RETURN DAMPER SHALL MODULATE CLOSED AS THE MIXED AIR TEMPERATURE RISES ABOVE SETPOINT. THE POWER FAILURE SHALL OCCUR IN A FALL IN MIXED AIR TEMPERATURE.
 - THE RETURN DAMPER SHALL BE AT LEAST 25% (ADJUSTABLE) CLOSED BEFORE THE RELIEF DAMPER CAN OPEN.
 - AFTER THE ECONOMIZER IS DELIVERING 100% OUTSIDE AIR, MODULATE THE CHILLED WATER VALVE IF REQUIRED TO PROVIDE AIR TO THE PRIMARY INLET OF THE VAV TERMINALS AT THE CALCULATED DISCHARGE SETPOINT.
 - CHILLED WATER VALVE
 - THE CHILLED WATER VALVE SHALL BE MODULATED OPEN ON 10.15 IN DISCHARGE TEMPERATURE ABOVE SETPOINT AND SHALL BE MODULATED CLOSED ON A FALL IN DISCHARGE TEMPERATURE BELOW SETPOINT.
 - THE DISCHARGE TEMPERATURE SETPOINT SHALL BE RESET BETWEEN 54F AND 60F. THE SETPOINT AT THE BEGINNING OF EACH DAY SHALL BE 56F. THE SETPOINT SHALL RESET DOWNWARD BY 0.5F (ADJUSTABLE) EVERY 10 MINUTES (ADJUSTABLE) AS LONG AS LESS THAN 5 (ADJUSTABLE) TERMINALS SERVED ARE AT MINIMUM AIR VOLUME. IF MORE

- SUPPLY FAN**
- THE SUPPLY FAN SPEED SHALL INCREASE AS THE STATIC PRESSURE FALLS BELOW THE DUCT STATIC PRESSURE SETPOINT.
 - THE SUPPLY FAN SPEED SHALL DECREASE AS THE STATIC PRESSURE RISES ABOVE THE DUCT STATIC PRESSURE SETPOINT.
 - SUPPLY FAN STATIC PRESSURE CALCULATION.
 - DETERMINE THE STATIC PRESSURE SETPOINT BY THE TEST AND BALANCE PROCESS AT THE LOWEST VALUE THAT CAN DELIVER THE DESIGN AIR FLOWS TO ALL TERMINALS.
 - THE BAS SHALL POLL THE DAMPER POSITION

- THE BAS SCHEDULING SHALL INDEX THE AIR HANDLER FOR OCCUPIED OPERATION.**
- VENTILATION CFM
 - OPEN THE OUTSIDE AIR DAMPER TO DELIVER AT LEAST THE VENTILATION CFM. SEE AHU SCHEDULE. MODULATE THE RETURN DAMPER TOWARD THE CLOSED POSITION IF THE OUTSIDE AIR DAMPER IS FULLY OPEN AND THE MINIMUM VENTILATION SETPOINT CANNOT BE REACHED. RESET THE MINIMUM CFM SETPOINT FROM THE MINIMUM VENTILATION CFM TO THE MAXIMUM VENTILATION CFM AS THE CO2 RISES FROM 1100 PPM (ADJUSTABLE) TO 1300 PPM (ADJUSTABLE). SEE THE AHU SCHEDULE FOR CFM VALUES.
 - THE CO2 CONTROL VARIABLE IS THE AVERAGE ON THE FLOOR MOUNTED SENSORS.
 - OPERATE THE SUPPLY FAN UNDER STATIC PRESSURE CONTROL.
 - RELIEF FAN SHALL MAINTAIN 0.10" STATIC PRESSURE.
 - INDEX THE AIR HANDLER TO OCCUPIED MODE WHEN ALL SINGLE INLET VAV TERMINALS REACH SETPOINT, OR IF THE BUILDING BECOMES OCCUPIED.
 - SUPPLY FAN
 - THE SUPPLY FAN SPEED SHALL INCREASE AS THE STATIC PRESSURE FALLS BELOW THE DUCT STATIC PRESSURE SETPOINT.
 - THE SUPPLY FAN SPEED SHALL DECREASE AS THE STATIC PRESSURE RISES ABOVE THE DUCT STATIC PRESSURE SETPOINT.
 - SUPPLY FAN STATIC PRESSURE CALCULATION.
 - DETERMINE THE STATIC PRESSURE SETPOINT BY THE TEST AND BALANCE PROCESS AT THE LOWEST VALUE THAT CAN DELIVER THE DESIGN AIR FLOWS TO ALL TERMINALS.
 - THE BAS SHALL POLL THE DAMPER POSITION

- VAV AIR HANDLING UNIT**
- THE AIR HANDLING UNIT SHALL HAVE THE FOLLOWING MODES OF OPERATION:
- UNOCCUPIED HIGH TEMPERATURE LIMIT, UNOCCUPIED LOW TEMPERATURE LIMIT, UNOCCUPIED HIGH HUMIDITY LIMIT, MORNING COOL DOWN, MORNING WARM UP, OCCUPIED
 - UNOCCUPIED AIR HANDLING UNIT COMPONENTS SHALL ASSUME THE FOLLOWING STATES:
 - SUPPLY FAN OFF
 - RELIEF FAN OFF
 - OUTSIDE AIR DAMPER CLOSED
 - RELIEF CLOSED
 - RETURN AIR DAMPER OPEN
 - PREHEAT VALVE OPEN IF THE OUTSIDE AIR TEMP. IS BELOW 40F. PREHEAT VALVE CLOSED OTHERWISE.
 - CHILLED WATER VALVE CLOSED
 - ALL ASSOCIATED EXHAUST FANS SHALL BE OFF
 - UNOCCUPIED HIGH TEMPERATURE LIMIT
 - WHEN AT LEAST 5 (ADJUSTABLE) TERMINALS ARE INDEXED TO THE UNOCCUPIED HIGH LIMIT MODE, THE AIR HANDLING UNIT SHALL BE ENERGIZED IN THE UNOCCUPIED HIGH LIMIT MODE
 - THE OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL REMAIN CLOSED. THE RETURN DAMPER SHALL REMAIN OPEN.
 - THE PREHEAT VALVE SHALL CLOSE OR REMAIN CLOSED.
 - THE CHILLED WATER VALVE SHALL MODULATE TO PROVIDE AIR TO THE PRIMARY INLET AT THE DISCHARGE SETPOINT.
 - THE SUPPLY FAN SHALL OPERATE UNDER STATIC PRESSURE CONTROL.
 - RELIEF FAN SHALL MAINTAIN 0.10" STATIC PRESSURE
 - ALL ASSOCIATED EXHAUST FANS SHALL BE OFF.
 - MORNING COOL DOWN
 - THE BAS OPTIMAL START SOFTWARE SHALL CALCULATE A START TIME FOR THE SYSTEM. IF THE MAJORITY OF THE VAV TERMINALS (SINGLE INLET AND FAN POWERED) ARE IN THE COOLING MODE, THE AIR HANDLER SHALL ENTER THE MORNING COOL DOWN MODE
 - THE OUTSIDE AND RELIEF AIR DAMPERS REMAIN CLOSED. THE RETURN DAMPER REMAINS OPEN.
 - THE PREHEAT VALVE REMAINS CLOSED.
 - MODULATE THE CHILLED WATER VALVE TO PROVIDE AIR TO THE PRIMARY INLET AT THE CALCULATED DISCHARGE SETPOINT.
 - THE SUPPLY FAN SHALL OPERATE UNDER STATIC PRESSURE CONTROL.
 - RELIEF FAN SHALL MAINTAIN 0.10" STATIC PRESSURE.
 - WHEN ALL VAV TERMINALS REACH SETPOINT, OR IF THE BUILDING BECOMES OCCUPIED, THE AIR HANDLER SHALL ENTER THE OCCUPIED MODE.
 - MORNING WARM UP
 - THE BAS OPTIMAL START SOFTWARE SHALL CALCULATE A START

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1	Bid Set	4/08/10
NO.	SUBMISSION	DATE

CHECKED BY: **WLA**

DRAWN BY: **DKF**

PROJECT NUMBER: **208064.00**

SHEET NAME: **SCHEMATICS**

SHEET NUMBER: **M0.11**

FIREWALL LEGEND

1 HR	-----
3 HR	-----



**INNOVATIVE
DESIGN**

850 W. MORGAN STREET
RALEIGH, NORTH CAROLINA 27603
919-832-6303
919-832-3339 FAX

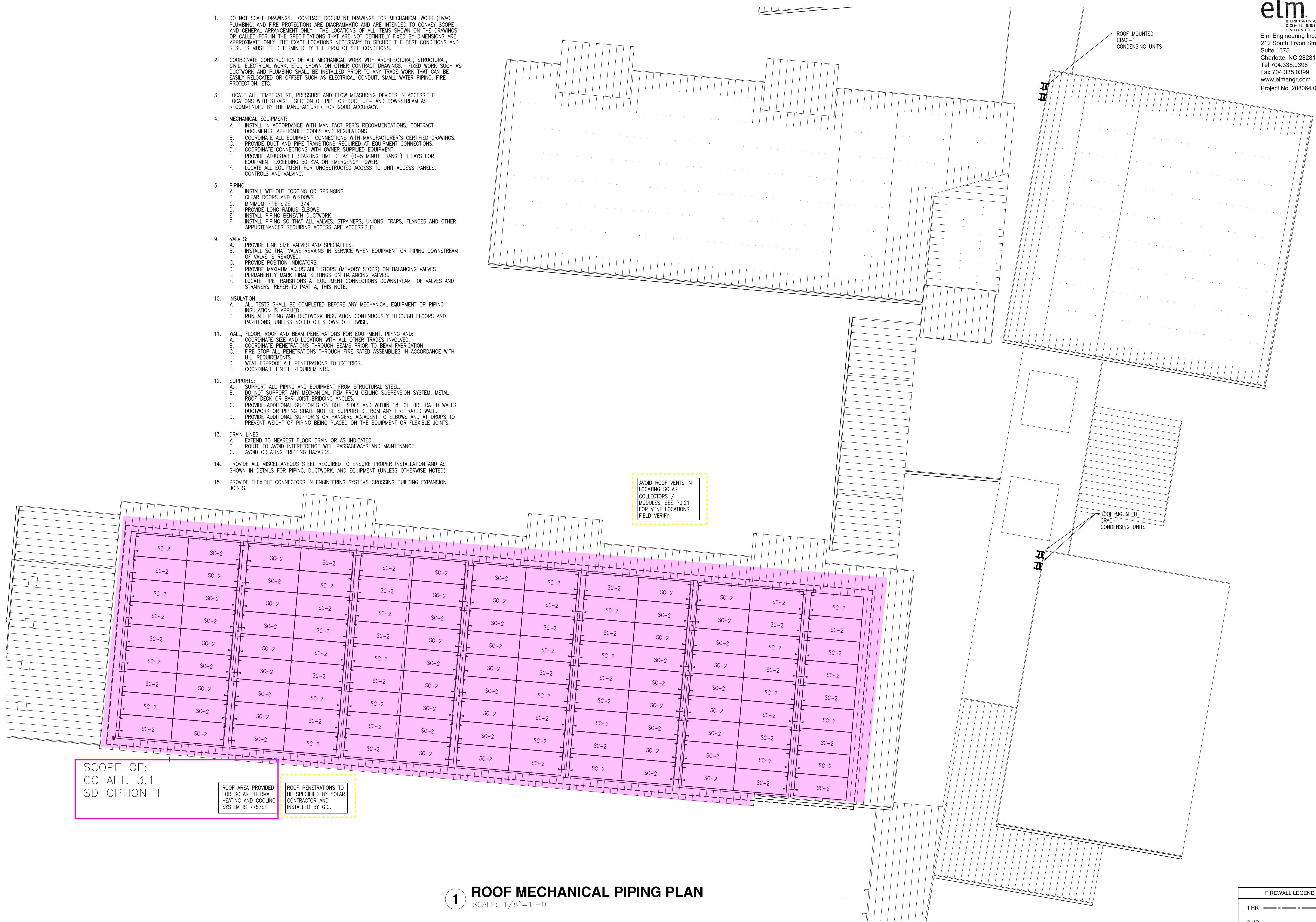
SEAL:

SEAL:



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Freedlander Dr. Clyde, NC 28721

1. DO NOT SCALE DRAWINGS. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS.
2. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DRAWINGS. FIXED WORK SUCH AS DUCTWORK AND PLUMBING SHALL BE INSTALLED PRIOR TO ANY TRADE WORK THAT CAN BE EASILY RELOCATED OR OFFSET SUCH AS ELECTRICAL CONDUIT, SMALL WATER PIPING, FIRE PROTECTION, ETC.
3. LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
4. MECHANICAL EQUIPMENT:
 - A. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, APPLICABLE CODES AND REGULATIONS.
 - B. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS.
 - C. PROVIDE DUCT AND PIPE TRANSITIONS REQUIRED AT EQUIPMENT CONNECTIONS.
 - D. COORDINATE CONNECTIONS WITH OWNER SUPPLIED EQUIPMENT.
 - E. PROVIDE ADJUSTABLE STARTING TIME DELAY (0-5 MINUTE RANGE) RELAYS FOR EQUIPMENT EXCEEDING 50 KVA ON EMERGENCY POWER.
 - F. LOCATE ALL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS AND VALVING.
5. PIPING:
 - A. INSTALL WITHOUT FORCING OR SPRINGING.
 - B. CLEAR DOORS AND WINDOWS.
 - C. MINIMUM PIPE SIZE - 3/4"
 - D. PROVIDE LONG RADIUS ELBOWS.
 - E. INSTALL PIPING BENEATH DUCTWORK.
 - F. INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.
9. VALVES:
 - A. PROVIDE LINE SIZE VALVES AND SPECIALTIES.
 - B. INSTALL SO THAT VALVE REMAINS IN SERVICE WHEN EQUIPMENT OR PIPING DOWNSTREAM OF VALVE IS REMOVED.
 - C. PROVIDE POSITION INDICATORS.
 - D. PROVIDE MAXIMUM ADJUSTABLE STOPS (MEMORY STOPS) ON BALANCING VALVES.
 - E. PERMANENTLY MARK FINAL SETTINGS ON BALANCING VALVES.
 - F. LOCATE PIPE TRANSITIONS AT EQUIPMENT CONNECTIONS DOWNSTREAM OF VALVES AND STRAINERS. REFER TO PART A, THIS NOTE.
10. INSULATION:
 - A. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
 - B. RUN ALL PIPING AND DUCTWORK INSULATION CONTINUOUSLY THROUGH FLOORS AND PARTITIONS, UNLESS NOTED OR SHOWN OTHERWISE.
11. WALL, FLOOR, ROOF AND BEAM PENETRATIONS FOR EQUIPMENT, PIPING AND:
 - A. COORDINATE SIZE AND LOCATION WITH ALL OTHER TRADES INVOLVED.
 - B. COORDINATE PENETRATIONS THROUGH BEAMS PRIOR TO BEAM FABRICATION.
 - C. FIRE STOP ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES IN ACCORDANCE WITH U.L. REQUIREMENTS.
 - D. WEATHERPROOF ALL PENETRATIONS TO EXTERIOR.
 - E. COORDINATE LINTEL REQUIREMENTS.
12. SUPPORTS:
 - A. SUPPORT ALL PIPING AND EQUIPMENT FROM STRUCTURAL STEEL.
 - B. DO NOT SUPPORT ANY MECHANICAL ITEM FROM CEILING SUSPENSION SYSTEM, METAL ROOF DECK OR BAR JOIST BRIDGING ANGLES.
 - C. PROVIDE ADDITIONAL SUPPORTS ON BOTH SIDES AND WITHIN 18" OF FIRE RATED WALLS. DUCTWORK OR PIPING SHALL NOT BE SUPPORTED FROM ANY FIRE RATED WALL.
 - D. PROVIDE ADDITIONAL SUPPORTS OR HANGERS ADJACENT TO ELBOWS AND AT DROPS TO PREVENT WEIGHT OF PIPING BEING PLACED ON THE EQUIPMENT OR FLEXIBLE JOINTS.
13. DRAIN LINES:
 - A. EXTEND TO NEAREST FLOOR DRAIN OR AS INDICATED.
 - B. ROUTE TO AVOID INTERFERENCE WITH PASSAGEWAYS AND MAINTENANCE.
 - C. AVOID CREATING TRIPPING HAZARDS.
14. PROVIDE ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED).
15. PROVIDE FLEXIBLE CONNECTORS IN ENGINEERING SYSTEMS CROSSING BUILDING EXPANSION JOINTS.



SCOPE OF:
GC ALT. 3.1
SD OPTION 1

ROOF AREA PROVIDED FOR SOLAR THERMAL HEATING AND COOLING SYSTEM IS 7757SF.

ROOF PENETRATIONS TO BE SPECIFIED BY SOLAR CONTRACTOR AND INSTALLED BY G.C.

AVOID ROOF VENTS IN LOCATING SOLAR COLLECTORS / MODULES. SEE P0.21 FOR VENT LOCATIONS. FIELD VERIFY.

1 ROOF MECHANICAL PIPING PLAN
SCALE: 1/8"=1'-0"

FIREWALL LEGEND	
1 HR	-----
3 HR	-----

1	Bid Set	4/08/10
NO.	SUBMISSION	DATE
CHECKED BY:		WLA
DRAWN BY:		WLA
PROJECT NUMBER:		208064.00
SHEET NAME:		ROOF MECHANICAL PIPING PLAN
SHEET NUMBER:		M4.01

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- LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
- MECHANICAL EQUIPMENT:
 - INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, APPLICABLE CODES AND REGULATIONS.
 - COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS.
 - PROVIDE DUCT AND PIPE TRANSITIONS REQUIRED AT EQUIPMENT CONNECTIONS.
 - COORDINATE CONNECTIONS WITH OWNER SUPPLIED EQUIPMENT.
 - PROVIDE ADJUSTABLE STARTING TIME DELAY (0-5 MINUTE RANGE) RELAYS FOR EQUIPMENT EXCEEDING 50 KW ON EMERGENCY POWER.
 - LOCATE ALL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS AND VALVING.
- PIPING:
 - INSTALL WITHOUT FORCING OR SPRINGING.
 - CLEAR DOORS AND WINDOWS.
 - MINIMUM PIPE SIZE - 3/4"
 - PROVIDE LONG RADIUS ELBOWS.
 - INSTALL PIPING BENEATH DUCTWORK.
 - INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.
- VALVES:
 - PROVIDE LINE SIZE VALVES AND SPECIALTIES.
 - INSTALL SO THAT VALVE REMAINS IN SERVICE WHEN EQUIPMENT OR PIPING DOWNSTREAM OF VALVE IS REMOVED.
 - PROVIDE POSITION INDICATORS.
 - PROVIDE MAXIMUM ADJUSTABLE STOPS (MEMORY STOPS) ON BALANCING VALVES.
 - PERMANENTLY MARK FINAL SETTINGS ON BALANCING VALVES.
 - LOCATE PIPE TRANSITIONS AT EQUIPMENT CONNECTIONS DOWNSTREAM OF VALVES AND STRAINERS. REFER TO PART A, THIS NOTE.
- INSULATION:
 - ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
 - RUN ALL PIPING AND DUCTWORK INSULATION CONTINUOUSLY THROUGH FLOORS AND PARTITIONS, UNLESS NOTED OR SHOWN OTHERWISE.
- WALL, FLOOR, ROOF AND BEAM PENETRATIONS FOR EQUIPMENT, PIPING AND:
 - COORDINATE SIZE AND LOCATION WITH ALL OTHER TRADES INVOLVED.
 - COORDINATE PENETRATIONS THROUGH BEAMS PRIOR TO BEAM FABRICATION.
 - FIRE STOP ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES IN ACCORDANCE WITH U.L. REQUIREMENTS.
 - WEATHERPROOF ALL PENETRATIONS TO EXTERIOR.
 - COORDINATE LINTEL REQUIREMENTS.
- SUPPORTS:
 - SUPPORT ALL PIPING AND EQUIPMENT FROM STRUCTURAL STEEL.
 - DO NOT SUPPORT ANY MECHANICAL ITEM FROM CEILING SUSPENSION SYSTEM, METAL ROOF DECK OR BAR JOIST BRIDGING ANGLES.
 - PROVIDE ADDITIONAL SUPPORTS ON BOTH SIDES AND WITHIN 18" OF FIRE RATED WALLS. DUCTWORK OR PIPING SHALL NOT BE SUPPORTED FROM ANY FIRE RATED WALL.
 - PROVIDE ADDITIONAL SUPPORTS OR HANGERS ADJACENT TO ELBOWS AND AT DROPS TO PREVENT WEIGHT OF PIPING BEING PLACED ON THE EQUIPMENT OR FLEXIBLE JOINTS.
- DRAIN LINES:
 - EXTEND TO NEAREST FLOOR DRAIN OR AS INDICATED.
 - ROUTE TO AVOID INTERFERENCE WITH PASSAGEWAYS AND MAINTENANCE.
 - AVOID CREATING TRIPPING HAZARDS.
- PROVIDE ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED).
- PROVIDE FLEXIBLE CONNECTORS IN ENGINEERING SYSTEMS CROSSING BUILDING EXPANSION JOINTS.

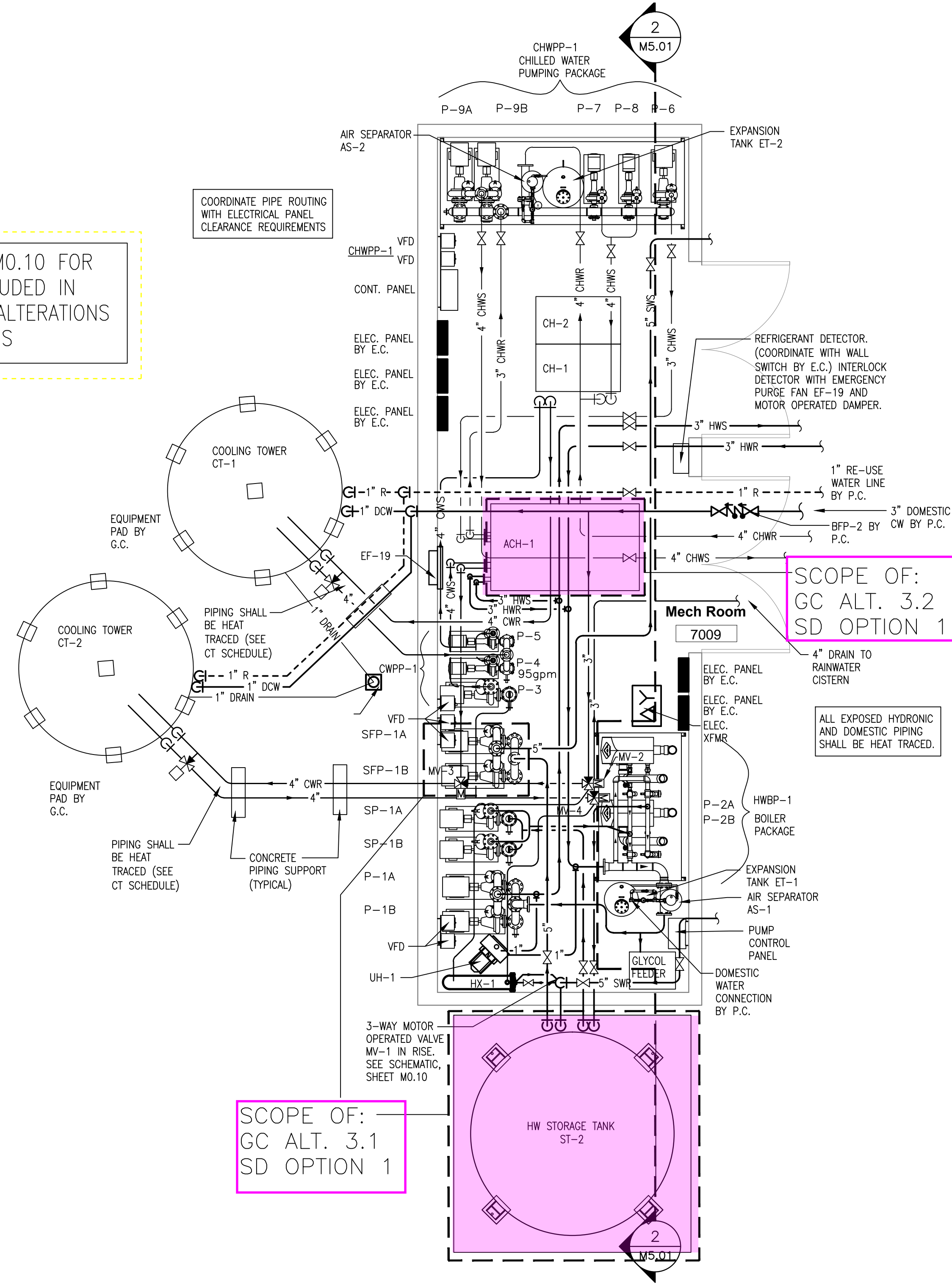
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SUSTAINABILITY
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ENGINEERING

Elm Engineering Inc.
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Project No. 208064.00

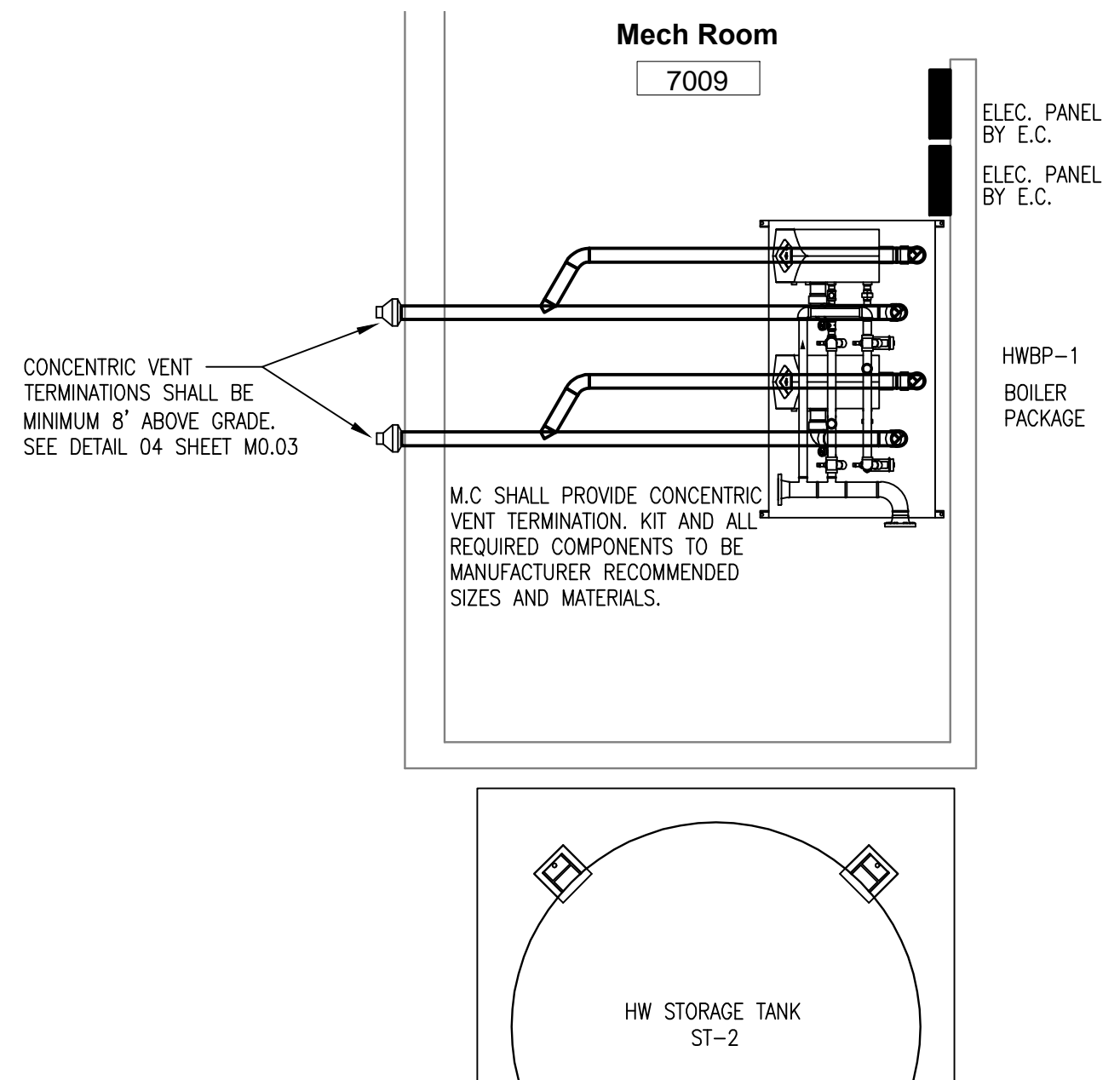
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DESIGN**

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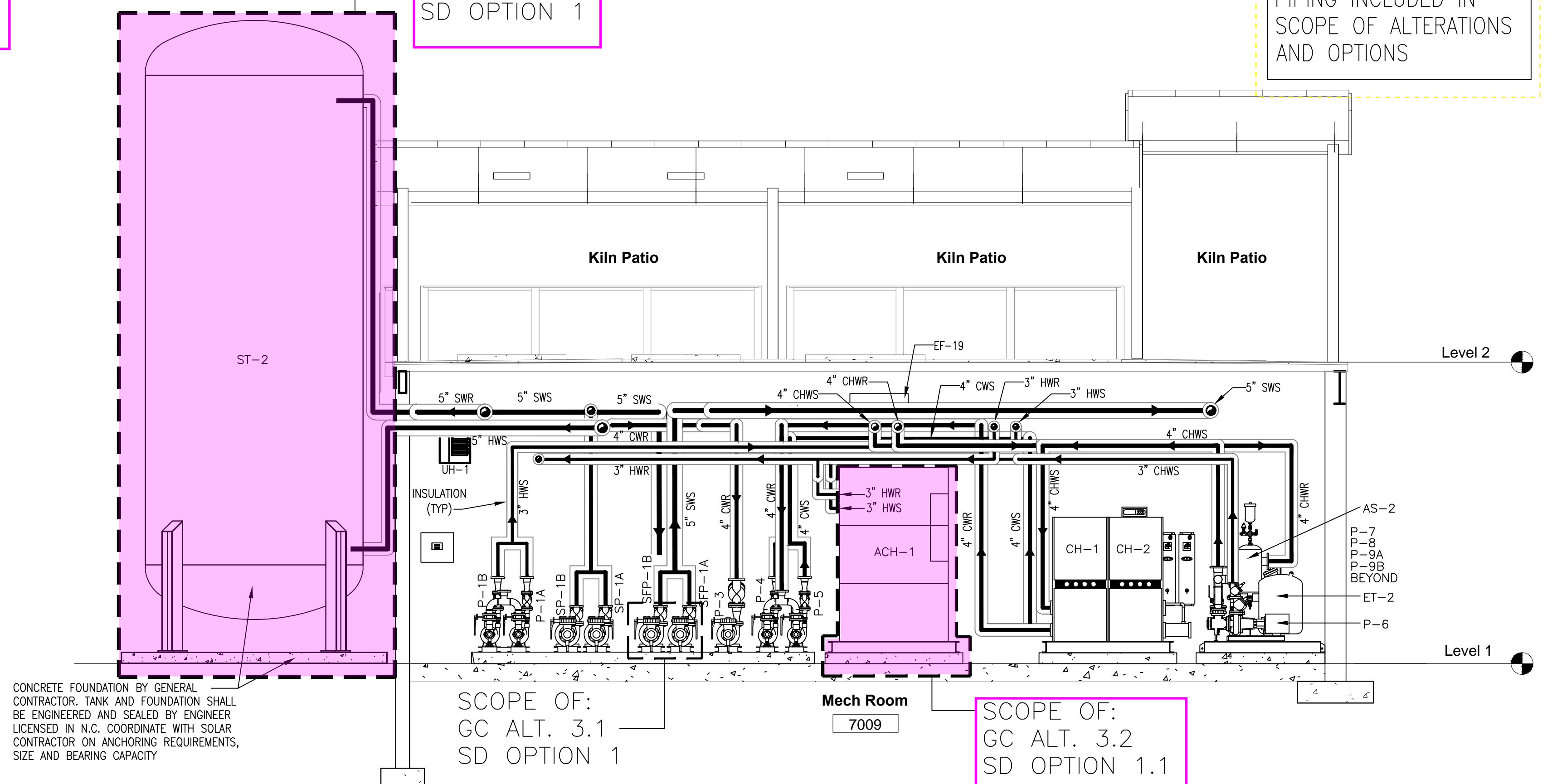
REFER TO M0.10 FOR
PIPING INCLUDED IN
SCOPE OF ALTERATIONS
AND OPTIONS



1 ENLARGED MECH ROOM 7009 PIPING PLAN
SCALE: 1/4"=1'-0"



3 PARTIAL ENLARGED MECH ROOM 7009 PLAN
SCALE: 1/4"=1'-0"



2 MECH ROOM 7009 SECTION
SCALE: 1/4"=1'-0"

SCOPE OF:
GC ALT. 3.1
SD OPTION 1

SCOPE OF:
GC ALT. 3.2
SD OPTION 1

SCOPE OF:
GC ALT. 3.1
SD OPTION 1

REFER TO M0.10 FOR
PIPING INCLUDED IN
SCOPE OF ALTERATIONS
AND OPTIONS

SCOPE OF:
GC ALT. 3.2
SD OPTION 1.1

FIREWALL LEGEND

1 HR	-----
3 HR	-----

SEAL:

SEAL:

HAYWOOD
COMMUNITY COLLEGE

Solar Development Package
Creative Arts Building
Haywood Community College
Freedlander Dr. Clyde, NC 28721

1	Bid Set	4/08/10
NO.	SUBMISSION	DATE
CHECKED BY:	WLA	
DRAWN BY:	DKF	
PROJECT NUMBER:	208064.00	

SHEET NAME:
**ENLARGED PLANS
& SECTIONS**

SHEET NUMBER:
M5.01

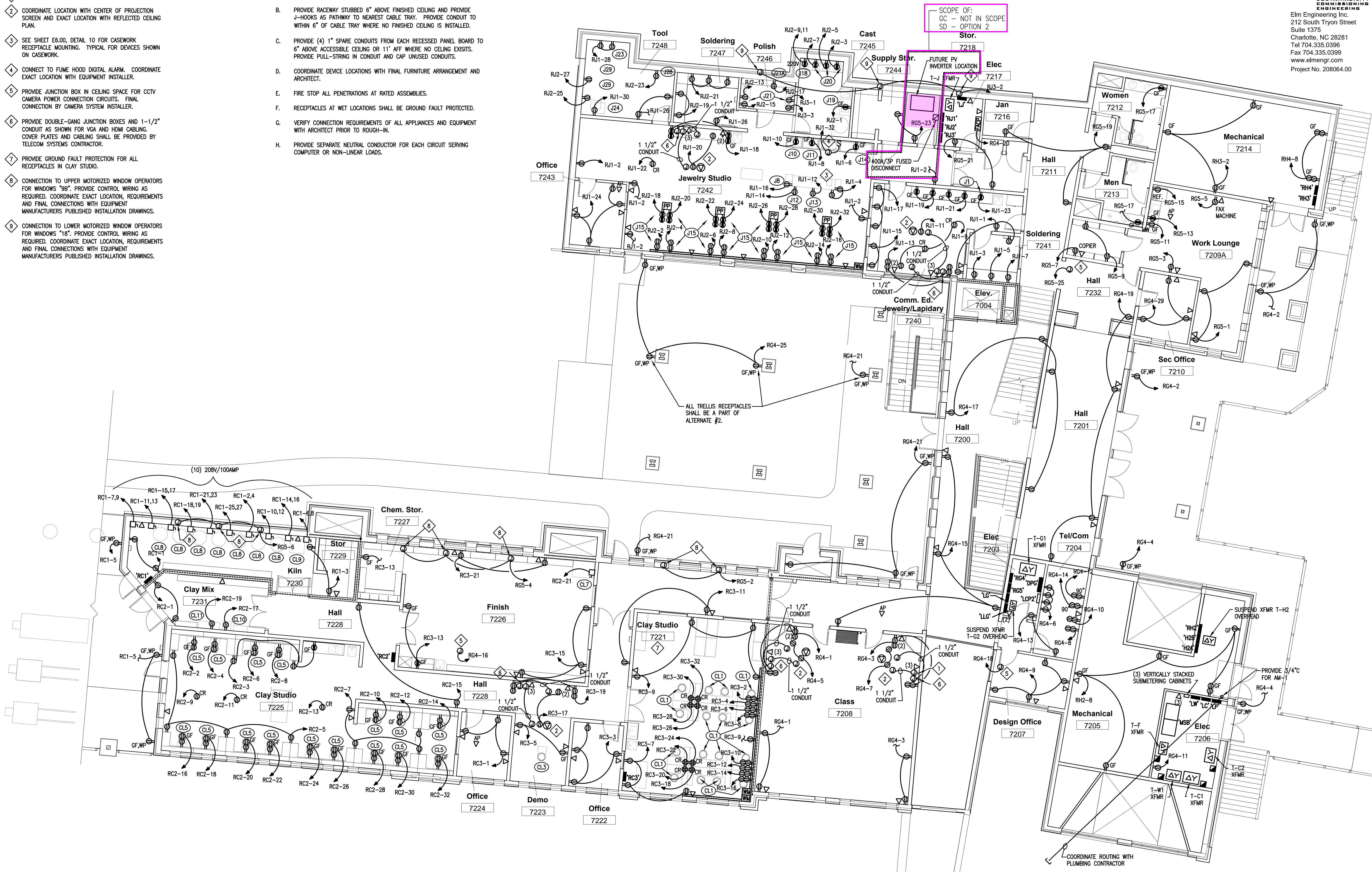
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KEYED NOTES:

- 1 CAT6, USB HUB AND DOCUMENT CAMERA LOCATION.
- 2 COORDINATE LOCATION WITH CENTER OF PROJECTION SCREEN AND EXACT LOCATION WITH REFLECTED CEILING PLAN.
- 3 SEE SHEET E6.00, DETAIL 10 FOR CASEWORK RECEPTACLE MOUNTING. TYPICAL FOR DEVICES SHOWN ON CASEWORK.
- 4 CONNECT TO FUME HOOD DIGITAL ALARM. COORDINATE EXACT LOCATION WITH EQUIPMENT INSTALLER.
- 5 PROVIDE JUNCTION BOX IN CEILING SPACE FOR CCTV CAMERA POWER CONNECTION CIRCUITS. FINAL CONNECTION BY CAMERA SYSTEM INSTALLER.
- 6 PROVIDE DOUBLE-GANG JUNCTION BOXES AND 1-1/2" CONDUIT AS SHOWN FOR VGA AND HDMI CABLING. COVER PLATES AND CABLING SHALL BE PROVIDED BY TELECOM SYSTEMS CONTRACTOR.
- 7 PROVIDE GROUND FAULT PROTECTION FOR ALL RECEPTACLES IN CLAY STUDIO.
- 8 CONNECTION TO UPPER MOTORIZED WINDOW OPERATORS FOR WINDOWS "9B". PROVIDE CONTROL WIRING AS REQUIRED. COORDINATE EXACT LOCATION, REQUIREMENTS AND FINAL CONNECTIONS WITH EQUIPMENT MANUFACTURERS PUBLISHED INSTALLATION DRAWINGS.
- 9 CONNECTION TO LOWER MOTORIZED WINDOW OPERATORS FOR WINDOWS "18". PROVIDE CONTROL WIRING AS REQUIRED. COORDINATE EXACT LOCATION, REQUIREMENTS AND FINAL CONNECTIONS WITH EQUIPMENT MANUFACTURERS PUBLISHED INSTALLATION DRAWINGS.

GENERAL NOTES:

- A. SEE E0.03 FOR EQUIPMENT CONNECTION SCHEDULE.
- B. PROVIDE RACEWAY STUBBED 6" ABOVE FINISHED CEILING AND PROVIDE J-HOOKS AS PATHWAY TO NEAREST CABLE TRAY. PROVIDE CONDUIT TO WITHIN 6" OF CABLE TRAY WHERE NO FINISHED CEILING IS INSTALLED.
- C. PROVIDE (4) 1" SPARE CONDUITS FROM EACH RECESSED PANEL BOARD TO 6" ABOVE ACCESSIBLE CEILING OR 11" AFF WHERE NO CEILING EXISTS. PROVIDE PULL-STRING IN CONDUIT AND CAP UNUSED CONDUITS.
- D. COORDINATE DEVICE LOCATIONS WITH FINAL FURNITURE ARRANGEMENT AND ARCHITECT.
- E. FIRE STOP ALL PENETRATIONS AT RATED ASSEMBLIES.
- F. RECEPTACLES AT WET LOCATIONS SHALL BE GROUND FAULT PROTECTED.
- G. VERIFY CONNECTION REQUIREMENTS OF ALL APPLIANCES AND EQUIPMENT WITH ARCHITECT PRIOR TO ROUGH-IN.
- H. PROVIDE SEPARATE NEUTRAL CONDUCTOR FOR EACH CIRCUIT SERVING COMPUTER OR NON-LINEAR LOADS.



1 SECOND FLOOR POWER PLAN
SCALE: 1/8"=1'-0"

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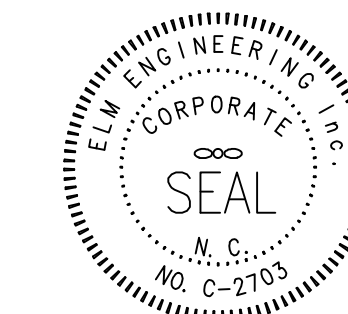
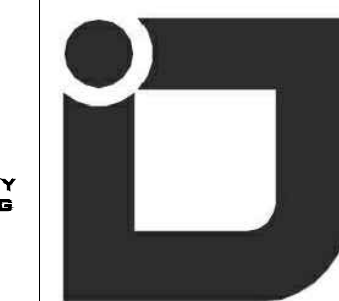
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1	Bid Set	4/08/10
NO.	SUBMISSION	DATE
CHECKED BY:		RJM
DRAWN BY:		SB
PROJECT NUMBER:		208064.00
SHEET NAME:		SECOND FLOOR POWER PLAN
SHEET NUMBER:		E2.02



SEAL:

SEAL:



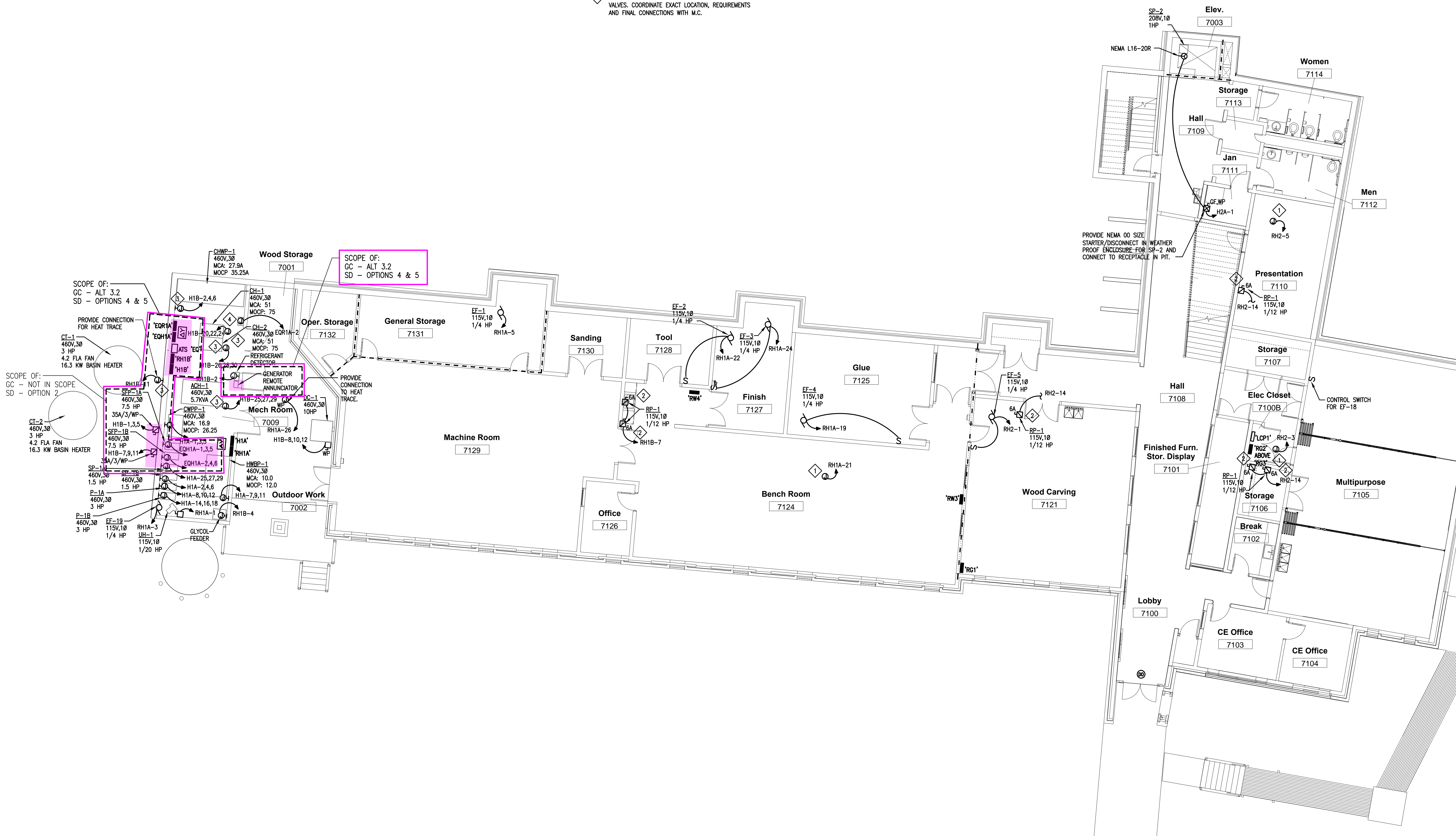
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Freedlander Dr. Clyde, NC 28721

KEYED NOTES:

- 1 PROVIDE CIRCUIT ABOVE ACCESSIBLE CEILING FOR MC CONNECTION TO VAV CONTROLS.
- 2 LOCATE DISCONNECT FOR RADIANT FLOOR PUMP ADJACENT TO PUMP.
- 3 PROVIDE JUNCTION BOX FOR MC TO CONNECT TO MECHANICAL CONTRACTOR PROVIDED DISCONNECT OR STARTER.
- 4 CONNECTION TO CONTROL PANEL FOR MOTOR OPERATED VALVES. COORDINATE EXACT LOCATION, REQUIREMENTS AND FINAL CONNECTIONS WITH M.C.

GENERAL NOTES:

- A. COORDINATE EXACT LOCATION AND CONNECTION REQUIREMENTS FOR HVAC AND PLUMBING EQUIPMENT WITH MECHANICAL AND PLUMBING CONTRACTORS PRIOR TO ROUGH-IN.
- B. ALL EXHAUST AND VENTILATION FANS ARE PROVIDED WITH DISCONNECTS SWITCHES. PROVIDE CONNECTION TO FAN DISCONNECT SWITCH ONLY.



1 FIRST FLOOR HVAC-ELECTRICAL PLAN

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

1	Bid Set	4/08/10
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CHECKED BY: **MCR**

DRAWN BY: **SB**

PROJECT NUMBER:
208064.00

SHEET NAME:
**FIRST FLOOR
HVAC-ELECTRICAL
PLAN**

SHEET NUMBER:
E4.01