

TMV-1:

ARMSTRONG,
RADA40R THERMOSTATIC MIXING VALVE OPERATING PRESSURES
(OR EQUAL)

MAXIMUM: 150 PSI
MINIMUM: 10 PSI

MAXIMUM PRESSURE DROP: 20 PSI
MAXIMUM FLOW RATE: 58 GPM (75F₄)
FLOW COEFFICIENT (Cv) 16

SP1-SP5:

AET INC.
AE-32 (OR EQUAL)
LENGTH: 8.1 FT
WIDTH: 3.94 FT
VOLUMETRIC CAPACITY: 1.3 GALLONS
WEIGHT (EMPTY): 113.0 POUNDS
FLOW RATE: 1.2 GPM
TEST PRESSURES: 160 PSIG
ENERGY OUT PUT: 33,500 BTU/DAY AT 95°F TESTED PER AS HRAE 93-1986

EST1:

RHEEM WATER HEATERS. (OR EQUAL)
SALARAIDE 120 GALLON TOP CONNECT ELECTRIC
STORAGE WATER HEATER
MODEL NUMBER 81VR120TC-1
ELEMENT WATTAGE UPPER: 4.5KW; 240 VAC 1ϕ
HEIGHT: 62"; DIAMETER 26 1/2" WEIGHT: 336 LBS

DTC 1:

GOLDLINE GL-30 DIFFERENTIAL TEMPERATURE CONTROL
INPUT POWER 120VAC/24VAC
DIFFERENT 8 TO 24° F; ACCURACY +/-1° F
(OR EQUAL)

TEA 1:

AMTROL THERM-X-TROL ST-12-C EXPANSION TANK
(OR EQUAL)

CP 1 AND CP 2:

BELL & GOSSETT NBF-36
TYPE: IN-LINE
INLET/OUTLET FLANGE(N): 1"
CAPACITY: 10 GPM; HEAD: 20'; INPUT POWER: 270 W 115/1/60 VAC; RPM: 3300
WET ROTOR, LEAD FREE BRONZE BODY,UL LISTED THERMALLY PROTECTED
(OR EQUAL)

CP 3:

TACO 005-F2 CARTRIDGE CIRCULATOR
INLET/OUTLET FLANGE(N): 1" OR 1.25"
INPUT POWER: 115 VAC/1ϕ HP 1/35 RPM: 3250
(OR EQUAL)

FI 1:

LETRO LDF357B LETRO-FLOW2S FLOW METER
(OR EQUAL)

HV 1:

THOMLINSON QUADFLOW BYPASS H VALVE
MODEL: THOMLINSON-C-125

PI 1:

OTHER-P570K-100LM PRESSURE GAUGE
(OR EQUAL)

S1 & S2:

TEMPERATURE SENSORS 10K Ω THERMISTOR
SENSOR @ 77F

CKV 1-3:

NIBCO S-480 IN-LINE CHECK VALVE
(OR EQUAL)

AV 1:

MAIDOMIST AIR VENT NO.71
(OR EQUAL)

PRV 1-3:

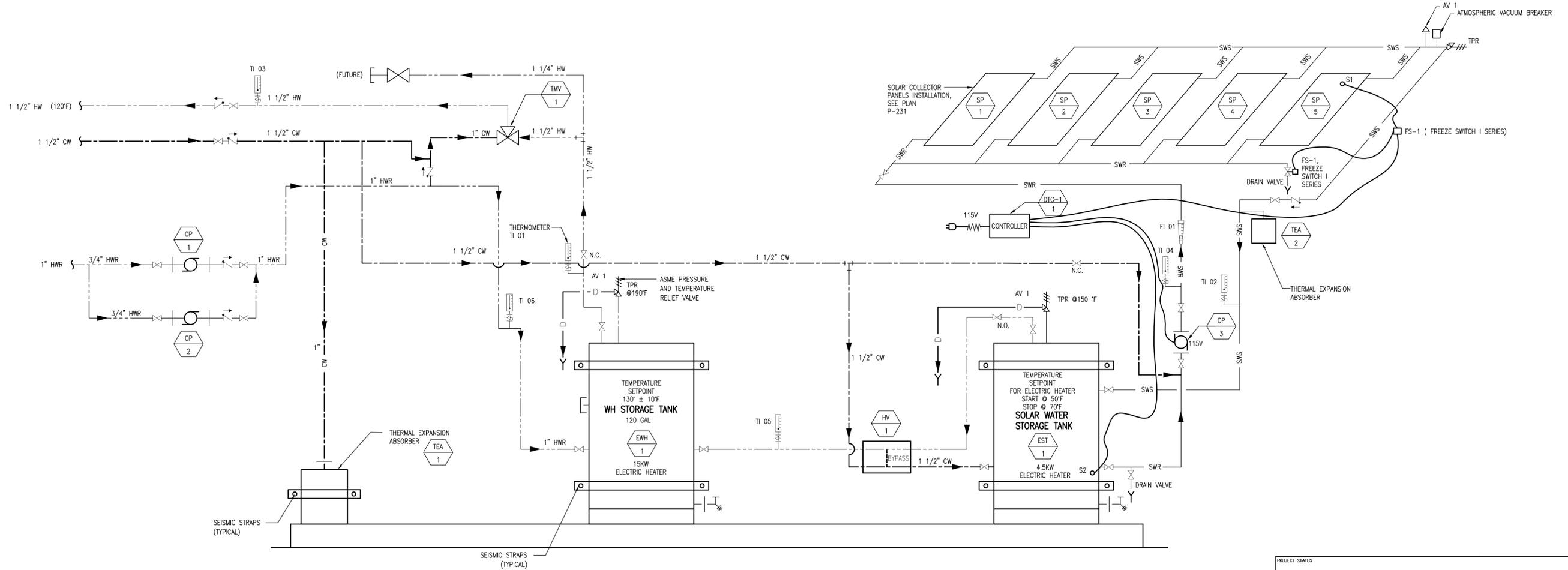
WATTS-100 X 14 T/P PRESSURE RELIEF VALVE @ 212°F, 150 PSI
(OR EQUAL)

EWH1:

AO SMITH 120 GALLON ELECTRIC WATER HEATER
ELEMENT UPPER: 15KW; 208 VAC; 3ϕ; 41.6 AMS
HEIGHT 62 1/4"; DIAMETER 29 1/2"; WEIGHT 390 LBS
(OR EQUAL)

TEA 2:

AMTROL THERM-X-TROL ST-12-C EXPANSION TANK
(OR EQUAL)



SEQUENCE OF OPERATION FOR SOLAR COLLECTOR SYSTEM:

- DIFFERENTIAL TEMPERATURE CONTROL (DTC-1) STARTS CIRCULATOR (CP-3) WHEN CONTROLLER DETECTS USEFUL SOLAR HEAT AVAILABLE AT SENSOR (S1) ATTACHED TO SOLAR PANEL (SP-5). USEFUL SOLAR HEAT IS AVAILABLE WHEN TEMPERATURE IN THE SOLAR PANEL IS 7°F HIGHER THAN TEMPERATURE OF THE WATER AT THE BOTTOM OF SOLAR WATER STORAGE TANK (EST-1) MEASURED BY A SENSOR (S2) AT THAT LOCATION.
- CONTROLLER (DTC-1) STOPS PUMP (CP-3) WHEN IT SENSES USEFUL SOLAR HEAT IS NO LONGER AVAILABLE. THERE IS NO USEFUL HEAT TO COLLECT WHEN THE TEMPERATURE AT THE BOTTOM OF SOLAR STORAGE TANK REACHES ABOUT THE SAME TEMPERATURE AS SOLAR PANEL. WHEN THERE IS NOT A SIGNIFICANT TEMPERATURE DIFFERENCE (DIFFERENTIAL) BETWEEN THE SOLAR PANEL AND THE SOLAR WATER STORAGE TANK. THE CONTROLLER STARTS THE PUMPS AGAIN WHEN USEFUL HEAT IS AVAILABLE.
- ON-OFF CYCLE OF THE PUMP CONTINUES THROUGHOUT THE DAY MAXIMIZING AVAILABILITY OF SOLAR HEATED WATER. AT NIGHT THE SOLAR SYSTEM STAYS OFF. THE SYSTEM ACTIVATES THE HEATING CYCLE AGAIN THE NEXT DAY WHEN CONTROLLER SENSES DIRECT OR INDIRECT SOLAR LIGHT HEATING THE SOLAR PANEL.
- 4.5 KW ELECTRIC HEATER IN SOLAR WATER STORAGE TANK IS ENERGIZED AT 50°F AND DE-ENERGIZED AT 70°F TO KEEP SOLAR WATER AT MINIMUM TEMPERATURE.
- WHEN CONTROLLER SENSES TEMPERATURE AT SENSOR ATTACHED TO SOLAR PANEL (SP-5) IS BELOW 35°F, INCTIVATE FREEZE SWITCH (FS-1) TO OPEN DRAIN VALVE.
- 15KW ELECTRIC WATER HEATER (EWH-1) MAINTAIN LEAVING HOT WATER TEMPERATURE BETWEEN 120°F AND 140°F INTEGRAL.

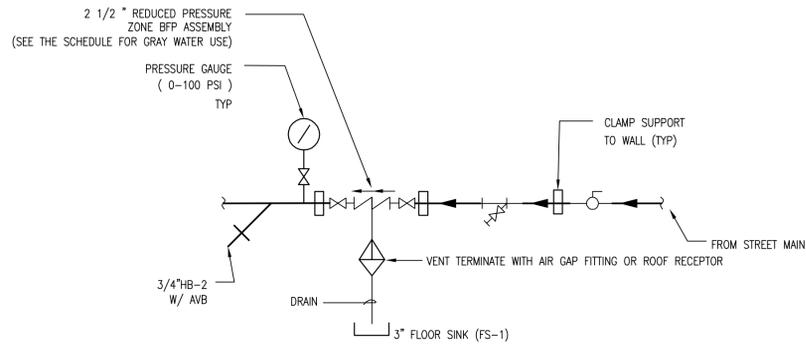
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DRAWN	J XIANG		
DESIGNED	J XIANG		
CHECKED	S PAINTER		
PROGRAM	J GRANT		
REQUESTOR	R SCHULER		
SCALE			
SAFETY			
SUPERVISOR	S FRANKEL		
SIZE	D	CAGE CODE	25307
SCALE		INDEX	A232-0800-
		SHEET	P401
		REV	

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N232 COLLABORATIVE SUPPORT FACILITY
PLUMBING

OPEN LOOP SOLAR HOT WATER HEATING SYSTEM DIAGRAM

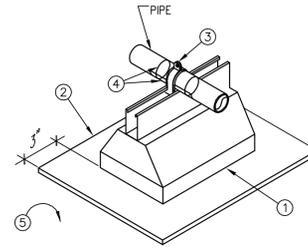
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 DATE: Apr 30, 2009 4:36:21 pm
 Xrefs: "RBR-SHORT"



BACKFLOW PREVENTER SCHEDULE		
PRV SIZE	GPM	SET PRESSURE
2 1/2"	150	46 - 56 PSI
2"(GRAY WATER)	150	46 - 56 PSI

1 | BACKFLOW PREVENTER STATION

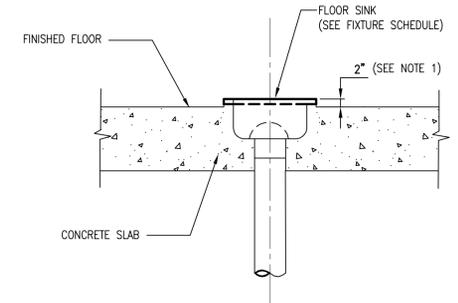
P403 REF. P301 SCALE: NONE



- DETAIL NOTES:**
- SUPPORT BASE WITH INTEGRAL FRAMING CHANNEL: BASE IS 100% RECYCLED RUBBER. INSTALL SOLAR WATER PIPE WITH 1/2" THICK INSULATION AND THE BOTTOM OF INSULATION IS MINIMUM 1-1/2" ABOVE FINISHED ROOF. FOR MULTIPLE PIPES, ADJUST BASE LENGTH AS REQUIRED.
 - ROOF PROTECTION PAD: EXTEND PAD 3" MINIMUM BEYOND ALL EDGES OF SUPPORT BASE. SET BASE ON PAD WITHOUT MASTIC. SEE ARCHITECTURAL DWGS FOR PAD SPECIFICATIONS.
 - PIPE GUIDE: B-LINE #B2417, OR EQUAL, WITH 3/8" MINIMUM RADIAL CLEARANCE.
 - PROVIDE INSULATION INSERT AND PIPE SHIELD AT SUPPORT FOR INSULATED PIPING.
 - ROOFING: SEE ARCHITECTURAL DWGS. FOR ROOF AND INSULATION TYPE.

2 | PIPE SUPPORT ON ROOF

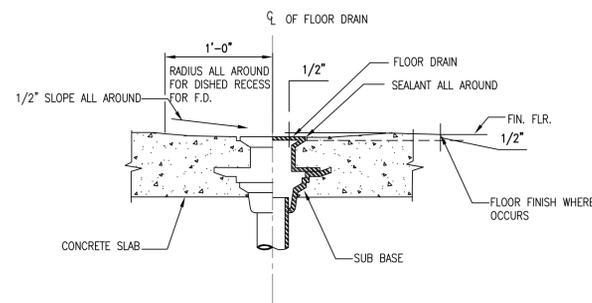
P403 REF. P231 SCALE: NONE



- NOTES:**
- THE TOP OF FS-01 IS 2" ABOVE FF. IN MECHANICAL ROOM 116 IN SOLAR WATER ROOM 104. 1/2" BELOW FF. WITH 1/2" SLOPE ALL AROUND, NO SLOPE UNDER SOLAR AND ELECTRIC HOT WATER STORAGE TANKS.

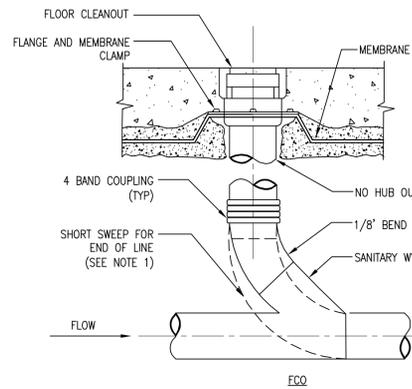
3 | FLOOR SINK (FS-01) DETAIL

P403 REF. P211, P212 AND P301 SCALE: NONE



4 | FLOOR DRAIN

P403 REF. SCALE: NONE



- NOTES:**
- FOR CLEANOUT LOCATED AT THE END OF RUN, REPLACE WYE AND 1/8" BEND WITH A SHORT SWEEP ELBOW.

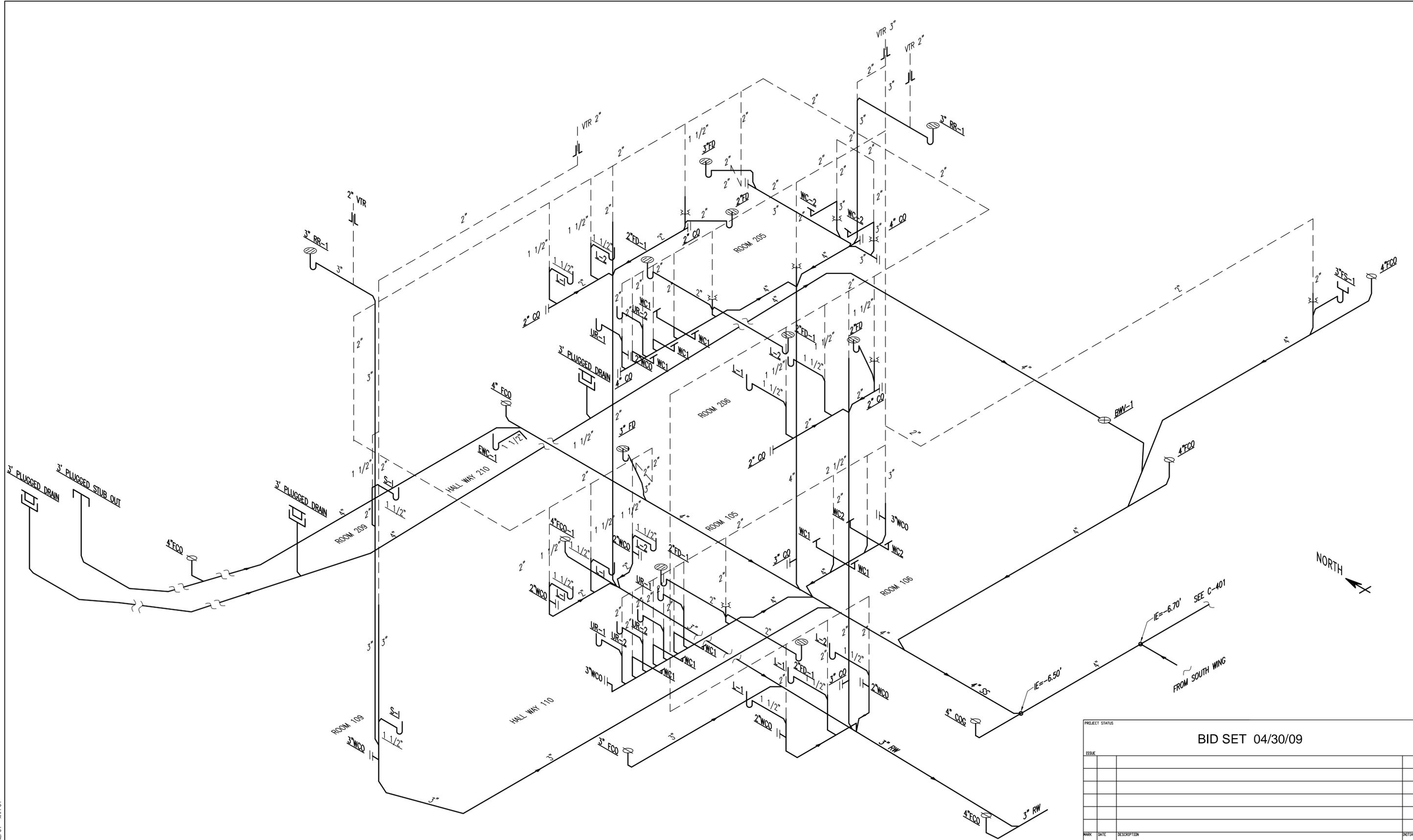
5 | FLOOR CLEANOUT

P403 REF. SCALE: NONE

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ISSUE			
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DRAWN	C. WONG	DATE	
DESIGNED	J. XIANG	DATE	
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PROGRAM	J. GRANT	DATE	
REQUESTOR	R. SCHULER	DATE	
PLUM		DATE	
SAFETY		DATE	
SUPERVISOR	S. FRANKEL	DATE	
SIZE	D	CAGE CODE	25307
SCALE	1/16" = 1'-0"	INDEX	A232-0800-
			P403
			REV
			SHEET
			OF

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N232 COLLABORATIVE SUPPORT FACILITY
PLUMBING
DETAILS



1 | PLUMBING SANITARY DRAINAGE AND RW DIAGRAM

P502 REF. P301 SCALE: NONE

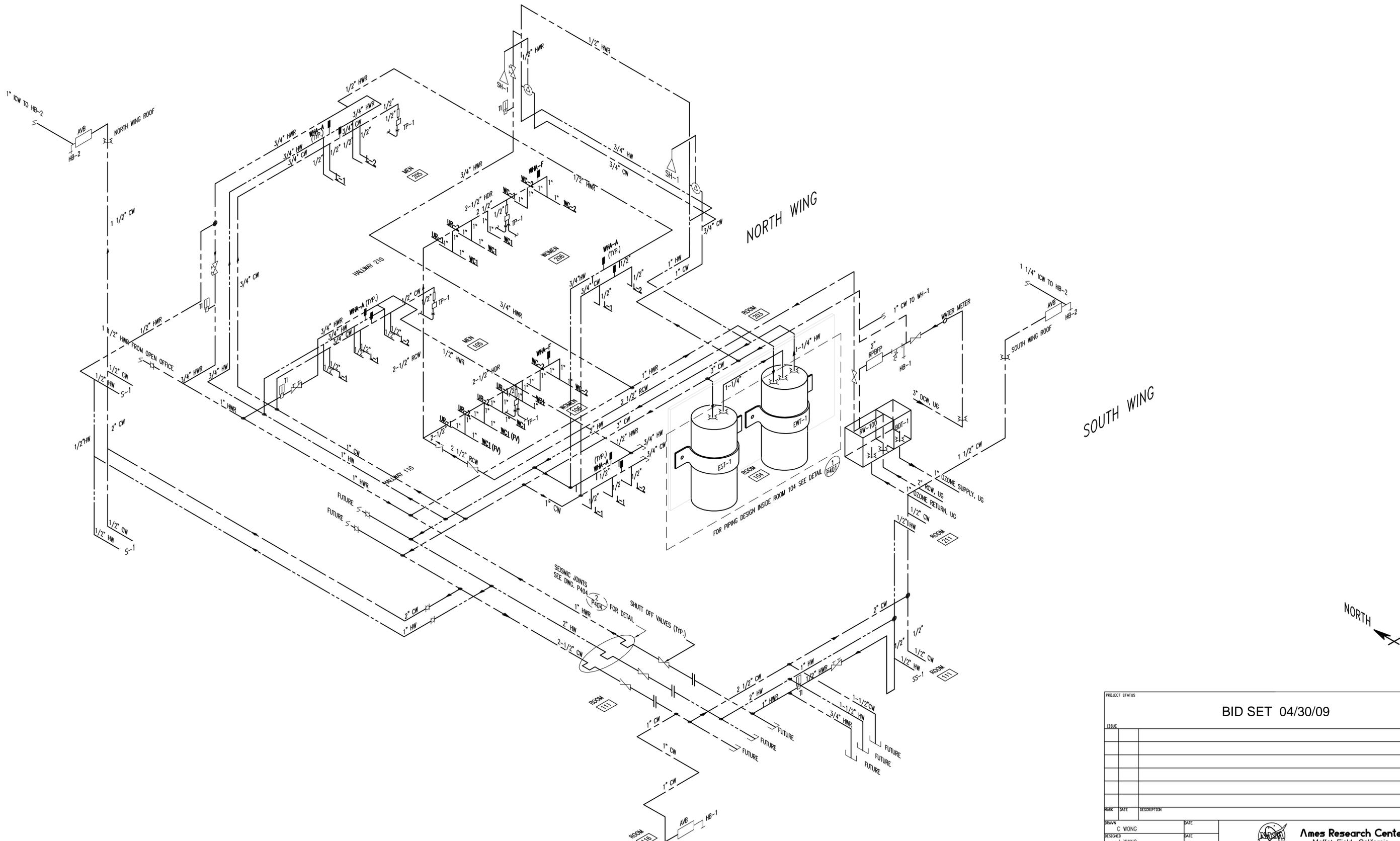
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ISSUE			
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CHECKED	S PAINTER	DATE	
PROGRAM	J GRANT	DATE	
REQUESTOR	R SCHULER	DATE	
PLANNED		DATE	
SAFETY		DATE	
SUPERVISOR	S FRANKEL	DATE	
SIZE	D	CAGE CODE	25307
SCALE		INDEX	A232-0800-
		SHEET	P502
		OF	



N232 COLLABORATIVE SUPPORT FACILITY

PLUMBING CALCULATIONS AND ISOMETRIC DIAGRAM

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 DATE: Apr 30, 2009 4:12:52 PM
 Xrefs: "MBR-SHORT" "P211" "AFF01" "MCPENUP01" "AFF01"



PARTIAL COLD, RECYCLE COLD AND
HOT WATER PLUMBING DIAGRAM

1
P503 REF. P301 SCALE: NONE

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 DATE: Apr 30, 2009 4:44:21 PM
 Xrefs: "MERR-SHORT" "P211" "AFF01" "MERR-P01" "AFF01"

PROJECT STATUS		BID SET 04/30/09	
ISSUE			
MARK	DATE	DESCRIPTION	INITIAL
DRAWN	C. WONG	DATE	
REVISION	J. XIANG	DATE	
CHECKED	S. PAINTER	DATE	
PROGRAM	J. GRANT	DATE	
REQUESTOR	R. SCHULER	DATE	
PLAID		DATE	
SAFETY		DATE	
SUPERVISOR	S. FRANKEL	DATE	
SIZE	D	CAGE CODE	25307
SCALE		INDEX	A232-0800-
		SHEET	P503
		OF	



N232 COLLABORATIVE SUPPORT FACILITY

WATER SUPPLY
ISOMETRIC DIAGRAM

PLUMBING FIXTURE SCHEDULE

SYMBOL	FIXTURE	DESCRIPTION	PIPE ROUGH-IN CONN (IN)					NOTES
			S	O	R	W	HW	
WC-1	WATER CLOSET	AMERICAN STANDARD AFWALL 2256 WALL MOUNT FLUSH VALVE TOILET W/EXPOSED, BATTERY POWERED SENSOR ACTIVATED, "SILDAN CROWN OPTIMA SMOOTH" MODEL 111-1.2 FLUSHMETER VALVE. LOW CONSUMPTION FLUSH (1.6 GPF/6.0 LPF-MAX); SEAT: OLSONITE 10C HEAVY DUTY WHITE SOLID PLASTIC OPEN FRONT SEAT FOR ELONGATED BOWL.	4	INT	2	1	-	
WC-2	WATER CLOSET-ADA	SAME AS WC-1 EXCEPT MOUNTED AT HEIGHT REQUIRED FOR ADA COMPLIANCE	4	INT	2	1	-	
UR-1	URINAL	ZURN ECOVANTAGE (HEU) Z5798 SERIES, WALL MOUNT, VITREOUS CHINA, WASHOUT FLUSHING ACTION. PRESSURE COMPENSATING INTERNAL FLOW REGULATOR, TOP SPUD, VANDAL RESISTANT, W/EXPOSED, SENSOR OPERATED DIAPHRAGM. "SLOAN OPTIMA WEUS 1000.1301-0.1301-ES-S" (0.13 GPF/0.5 LPF) FLUSHMETER VALVE.	2	INT	1 1/2	3/4	-	
UR-2	URINAL-ADA	SAME AS UR-01 EXCEPT MOUNTED AT HEIGHT REQUIRED FOR ADA COMPLIANCE	2	INT	1 1/2	3/4	-	
L-1	LAVATORY	AMERICAN STANDARD OVALYN II # 0496.011, VITREOUS CHINA, REAR OVERFLOW, UNDER COUNTER LAVATORY WITH SOAP DISPENSER, METAL GRID DRAIN, COMPLETE WITH "TECHNICAL CONCEPT" AUTO FAUCET WITH SST CAPRI IN POLISHED CHROME SINGLE HOLE MOUNT 500651 W/ THERMOSTATIC MIXING VALVE-ITC #490071 MULTIPLE 6PK AC POWER ADAPTER PER RR. P-TRAP, ANGLE STOP.	2	1 1/2	1 1/2	1/2	1/2	
L-2	LAVATORY-ADA	AMERICAN STANDARD OVALYN II # 0496.011, VITREOUS CHINA, REAR OVERFLOW, UNDER COUNTER LAVATORY WITH SOAP DISPENSER, METAL GRID DRAIN, COMPLETE WITH "TECHNICAL CONCEPT" AUTO FAUCET WITH SST CAPRI IN POLISHED CHROME SINGLE HOLE MOUNT 500651 W/ THERMOSTATIC MIXING VALVE-ITC #490071 MULTIPLE 6PK AC POWER ADAPTER PER RR. P-TRAP, ANGLE STOP.	2	1 1/2	1 1/2	1/2	1/2	
SH-1	SHOWER	"ZURN" TEMP-GARD Z7000-HW-1.5, HAND/WALL SHOWER UNIT, WITH SWYVEL CONNECTION, 60" FLEXIBLE METAL HOSE, 24" MOUNTING BAR, NON ADJUSTABLE SPRAY PATTERN, WITH 1.5 GPM PRESSURE COMPENSATING FLOWRATE REGULATOR.						
EWD-1	ELECTRIC WATER DISPENSER	"INNOWAVE" UVF3 WATER DISPENSER. COLD WATER TEMP: 37°F - 54°F; HOT WATER TEMP: 158°F -203°F ELECTRICAL SUPPLY: 120V/60HZ; 7.2AMPS					1/4	
MS-1	MOP SINK	FLORESTONE MODELS 95/96 NEO ANGLE DROP FRONT FLOOR MOUNT, RECTANGULAR, TERRAZO	3	3	2	1/2	1/2	
FD-1	FLOOR DRAIN	J R SMITH #2005 FLOOR DRAIN, WITH TYPE A STRAINER, POLISHED CHROME TOP WITH TRAP PRIMER CONNECTION.						SEE PLANS
FD-2	FLOOR DRAIN	ZURN 415 BODY ASSEMBLY WITH "ZURN" 400 TYPE D ROUND STRAINER W/ REMOVABLE COVER (PLUGGED) W/ CHAIN & EXTENSION (FOR VISIBILITY WHEN FLOODING) (NOT TRAP)	3		2			WITH AIR-TIGHT GASKET
FS-1	FLOOR SINK	ZURN Z1901 SANI-FLOOR RECEPTOR 12"X12"X8" DEEP, LOOSE SET FULL GRATE WITH 1/2" SQUARE OPENINGS AND ANIT-SPLASH STAINLESS STEEL INTERIOR DOME STRAINER.	3					SEE PLANS
TP-1	TRAP PRIMER	PPP INC PRIME RITE #PR-500.	-	-	-	1/2	-	
S-1	KITCHEN SINK	ELKAY MODEL BILGR2115L SINGLE BOWL SINK SELF-RIMMING, 18 GAUGE, 304 SS, SINK, COMPLETE WITH CHROME PLATED SUPPLIES AND ANGLE STOPS, CHROME PLATED 17 GAUGE P-TRAP, JUST #JGN-4 GOOSENECK FAUCET AND J35-SSF GRID DRAIN.						WITH GARBAGE DISPOSAL
RD-1	ROOF DRAIN	J R SMITH #1010 CAST-IRON BODY ROOF DRAIN WITH FLASHING CLAMP, UNDER DECK CLAMP, SUMP RECEIVER, & POLYETHYLENE DOME.						SEE PLANS
OD-1	OVERFLOW DRAIN	J R SMITH #1080 2" HIGH WATER DAM, UNDER DECK CLAMP, SUMP RECEIVER, & POLYETHYLENE DOME.						SEE PLANS
WH-1	WALL HYDRANT	WATTS #HY42.					3/4	
BFP-1	BACKFLOW PREVENTER	WATTS #919, REDUCED PRESSURE ZONE.						SEE PLANS
RR-1	ROOF RECEPTOR	J R SMITH #3960, ROOF SUMP RECEIVER, UNDER DECK CLAMP.						SEE PLANS
WHA-1	WATER HAMMER ARRESTER	WATTS SERIES 15, ALL STAINLESS STEEL WATER HAMMER ARRESTOR. PROVIDE WITH ACCESS PANEL.						SEE SCHEDULE
HB-1	HOSE BIBB - INDOOR	WATTS #SCB.					3/4	
HB-2	HOSE BIBB - OUTDOOR	ACORN MODEL B131					3/4	WITH VACUUM BREAKER

NOTES:

SOLAR HEATER SCHEDULE

ITEM NO.	MANUFACTURER MODEL	LOCATION	TYPE	SERVICE	WATER CONNECTION	WEIGHT (LBS)	REMARKS
EST 1	RHEEM SALARAIDE TOP CONNECT ELECTRIC 81VR120TC-1	RM 104	ELECTRIC HEATER	DOMESTIC HOT WATER	ALL TOP CONNECT	336 (EMPTY)	4.5 KW ELECTRIC AUX HEATER, 208V 1P

CIRCULATING PUMP SCHEDULE

UNIT	MANUFACTURER MODEL	TYPE	INLET / OUTLET FLANGE (IN)	GPM	HEAD (FT)	MOTOR			REMARKS
						WATTS	V/PHASE/HZ	RPM	
CF 1&2	BELL & GOSSETT NBF-36	IN-LINE	1	10	20	270	115/1/60	3300	WET ROTOR, LEAD FREE BRONZE BODY, UL LISTED THERMALLY PROTECTED
CF 3	TACO 005-F2	CARTRIDGE CIRCULATOR	1.25	18	10	21.3	115/1/60	3300	WET ROTOR, LEAD FREE BRONZE BODY, UL LISTED THERMALLY PROTECTED

GRAYWATER RECLAMATION SYSTEM

SYMBOL NO.	MANUFACTURERS MODEL	LOCATION	CAPACITY		MOTOR			ELECTRICAL		WORKING PRESSURE (PSI)	REMARKS	
			GPM	HEAD	HP	BHP	RPM	PH	VOLT/ I			HZ
RW 100	WATER CONTROL CORPORATION RW-100 SERIES	RM 104	110	20 FT	3	-	3500	3	480V 8 AMPS	60	MAX. 40	CORROSION-RESISTANT CONSTRUCTION
BDT 1	WATER CONTROL CORPORATION BLADDER TANK	RM 104	N/A				N/A				N/A	26" L X 26" W X 55" H
CLT 1	WATER CONTROL CORPORATION CLEAN TANK	ENCLOSURE	N/A				N/A				N/A	48" D X 73" H
DYT 1	WATER CONTROL CORPORATION DIRTY TANK	ENCLOSURE	N/A		1.5	-	2500	3	208V 8 AMPS	60	N/A	36" D X 79" H
ACF 1	WATER CONTROL CORPORATION FILTERS ARRAY	ENCLOSURE	N/A				N/A	1	115V 15 AMPS	60	N/A	28" L X 28" W X 48" H

THERMAL EXPANSION ABSORBER

SYMBOL NO.	MANUFACTURERS (BASIS OF DESIGN)	LOCATION	MAXIMUM TEMPERATURE (°F)	TANK VOLUME (GAL)	MAXIMUM WORKING PRESSURE (P.S.I.)	REMARKS
TEA 1	AMTROL THERM-X-TROL ST-12-C	RM 104	160° F	6.4	125	
TEA 2	AMTROL THERM-X-TROL ST-12-C	RM 104	160° F	6.4	125	

HOT WATER STORAGE TANK

ITEM NO.	MANUFACTURER MODEL	LOCATION	SERVICE	STORAGE CAPACITY (GAL.)	DIMENSIONS DIA X HEIGHT	WEIGHT LBS	REMARKS
EWH 1	AO SMITH DRE-120-15	RM 104	DOMESTIC HOT WATER	120	29.50" X 62.25"	390 LB (EMPTY)	15 KW 3P 208V 41.6 AMPS

TEMPERATURE MIXING VALVE

UNIT	MANUFACTURER MODEL	LOCATION	INLET	OUTLET	REMARKS
TMV 1	ARMSTRONG RADA 40R	RM 104	1"	1.25"	Cv 16

WATER HAMMER ARRESTERS

SYMBOL NO.	FIXTURE UNIT RATING	NIPPLE SIZE (INCHES)
WHA-A	1 - 11	3/4
WHA-B	12 - 32	1
WHA-C	33 - 60	1
WHA-D	61 - 113	1
WHA-E	114 - 154	1
WHA-F	155 - 330	1

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PLUMBING
EQUIPMENT SCHEDULES