

PIPE INSULATION THICKNESS TABLE								
FLUID TEMPERATURE RANGE (°F)	CONDUCTIVITY RANGE (IN BTU-INCH PER HOUR SQUARE FOOT PER °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (IN INCHES)					
			< 1	1 TO < 1.5	1.5 TO < 4.5	4 TO < 8	8 AND LARGER	
			INSULATION THICKNESS REQUIRED (IN INCHES)					
SPACE HEATING, HOT WATER SYSTEMS (STEAM, STEAM CONDENSATE AND HOT WATER) AND SERVICE WATER HEATING SYSTEMS								
ABOVE 350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0	
251-350	0.29-0.31	200	3.0	4.0	4.5	4.5	4.5	
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0	
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0	
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5	
SPACE COOLING SYSTEMS (CHILLED WATER, REFRIGERANT AND BRINE)								
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0	
BELOW 40	0.20-0.26	50	1.0	1.5	1.5	1.5	1.5	
FROM TABLE 120.3-A 2019 CEC								

CAL GREEN FIXTURE CONNECTION TABLE							
DESCRIPTION	MIN. BRANCH SIZE				TRAP	MAX. GPM	COMMENTS
	W	V	CW	HW			
WATER CLOSET	3"	2"	1/2"	NA	3"		1
KITCHEN/LAUNDRY SINK	2"	1-1/2"	1/2"	1/2"	1-1/2"	1.8 @ 60 PSI	
TUB/SHOWER COMBO	2"	1-1/2"	3/4"	3/4"	1-1/2"	1.8 @ 60 PSI	2 4
BATH TUB ONLY	2"	1-1/2"	3/4"	3/4"	1-1/2"		
LAVATORY	1-1/2"	1-1/2"	1/2"	1/2"	1-1/2"	1.2 @ 60 PSI	
CLOTHES WASHER	2"	1-1/2"	3/4"	3/4"	2"		
SHOWER	2"	1-1/2"	3/4"	3/4"	2"	1.8 @ 80 PSI	2 4

NOTES:

1. Dual-Flush or equal to or less than 1.28 gallon per flush
2. Individual control valves of the pressure balance or thermostatic mixing valve type shall be provided.
3. Plumbing fixtures shall meet the standard referenced in CGBSC Table 4.303.3
4. When a shower is served by more than one showerhead, the combined flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower to be in operation at a time. (Note: hand-held shower is to be considered a showerhead)

ELECTRIC WATER HEATERS									
MARK	LOCATION	GAL CAP	ELECT		RECOVERY AT 90°F RISE	MCA	LBS FULL	MANUFACTURER AND MODEL	COMMENTS
			KW	V/PH					
<u>HPWH-1</u>	ROOF TOP	---	---	---	---	101.5	1340	TRANSOM HBV210-WSDNFN1	1
<u>FWH-1</u>	UTILITY	175	24	240/1	110	100	2153	RHEEM E175A-24-G	
<u>FWH-2</u>	UTILITY	175	24	240/1	110	100	2153	RHEEM E175A-24-G	

NOTES:

1. SPLIT HEAT PUMP WATER HEATER, PIPE HOT WATER FROM OUTSIDE HEAT PUMP TO STORAGE TANK LOCATED IN MECHANICAL ROOM PER SCHEMATIC ON P6.1

STORAGE TANKS									
MARK	LOCATION	GAL CAP	ELECT		RECOVERY AT 90° RISE	DIMENSIONS D ₁ X H ₁ (INCHES)	LBS FULL	MANUFACTURER AND MODEL	COMMENTS
			KW	V/PH					
ST-1	UTILITY	310	—	—	—	40" X 86"	3355	ELBI NTA-36-078	1
ST-2	UTILITY	310	—	—	—	40" X 86"	3355	ELBI NTA-36-078	2

NOTES:

1. SOLAR THERMAL HOT WATER STORAGE
2. HEAT PUMP WATER HEATER HOT WATER STORAGE

PLUMBING ABBREVIATIONS

ARCH — ARCHITECT	LAV — LAVATORY
AFS — AUTOMATIC FIRE SPRINKLERS	LBS — POUNDS
BTU/H — BRITISH THERMAL UNITS PER HOUR	LRA — LOCKED ROTOR AMPS
CD — CONDENSATE DRAIN	MAX — MAXIMUM
CIRC — CIRCULATION	MPG — MEDIUM PRESSURE GAS
CLG — CEILING	MFR — MANUFACTURER
CONC — CONCRETE	MIN — MINIMUM
CONT — CONTINUATION	(N) — NEW
COORD — COORDINATION	NC — NORMALLY CLOSED
COTG — CLEAN-OUT TO GRADE	NIC — NOT IN CONTRACT
CW — COLD WATER	NO — NORMALLY OPEN
Ø — DIAMETER	POC — POINT OF CONNECTION
DF — DRINKING FOUNTAIN	PSI — POUNDS PER SQUARE INCH
DN — DOWN	REQS — REQUIREMENTS
DWG — DRAWINGS	RM — ROOM
(E) — EXISTING	RPM — REVOLUTIONS PER MINUTE
ELECT — ELECTRICAL	SH — SHOWER
°F — DEGREES FAHRENHEIT	STM — STEAM
FCW — FILTERED COLD WATER	STRUCT — STRUCTURAL
FLA — FULL LOAD AMPS	\$ SW — SWITCH
FLEX — FLEXIBLE	SS — SANITARY SEWER
FPM — FEET PER MINUTE	TYP — TYPICAL
FS — FLOOR SINK	UL — UNDERWRITERS LABORATORY
FTF — FLUE THRU ROOF	UON — UNLESS OTHERWISE NOTED
G — GAS	V — VENT
GALV — GALVANIZED	VTR — VENT THRU ROOF
GPM — GALLONS PER MINUTE	W — WASTE
HB — HOSE BIBB	W/ — WITH
HP — HORSE POWER	WC — WATER CLOSET
HPG — HIGH PRESSURE GAS	WT — WEIGHT
HW — HOT WATER	
HWR — HOT WATER RETURN	
KBTUH — 1000 BTU/H	

SYMBOLS		
SYMBOL	ABBREVIATION	IDENTIFICATION
		MANIFOLD
	WCO	WALL C.O.
	GCO/FCO	GRADE C.O./FLOOR C.O.
	GC	GAS COCK
		PRESSURE/TEMPERATURE PLUG
	BV	BALL VALVE
	CHVA	CHECK VALVE
	OS&Y	OUTSIDE SCREW & YOKE GATE VALVE
	BV/SOV	BALANCING/SHUT-OFF VALVE
	GV	GATE VALVE
	T&PRV	TEMP & PRESS RELIEF VALVE
	WHA	WATER HAMMER ARRESTOR
		SOLENOID VALVE
	DCBP	DOUBLE CHECK BACKFLOW PREVENTER
		UNION
		PRESSURE GAUGE
		CENTRIFUGAL WATER PUMP
	FC	FLEXIBLE CONNECTION
		HYDROSTATIC RELIEF VALVE
	RPBP	REDUCE PRESS BACKFLOW PREVENTER
	HB	HOSE BIB
	MH	MANHOLE
		THERMOMETER
	P.O.C.	POINT OF CONNECTION
		CENTERLINE
	GPR	GAS REDUCING VALVE

PLUMBING SPECIFICATIONS

A. General Conditions

1. All work shall be in conformance with the 2019 CPC, NFPA and all applicable codes, local jurisdictional amendments and agencies.
2. Work Included:
 - A. Domestic hot and cold water systems.
 - B. Fuel gas piping.
 - C. Installation of all new plumbing fixtures.
 - D. Complete waste and vent piping system.
3. It shall be the contractors responsibility to visit the project site and acquaint himself with all existing conditions, as well as ascertain the extent of the work involved. By submitting a bid, the contractor shall be deemed to have made such an examination, to have accepted such conditions and to have made all necessary allowances in preparing his proposal.
4. A structural member weakened or impaired by cutting, notching, or otherwise shall be reinforced, repaired, or replaced so as to be left in a safe structural condition in accordance with the requirements of the building code.
5. All work and materials shall comply with governing codes, safety orders and regulations.
6. Plumbing contractor shall deliver to the architect a written one year guarantee on all workmanship, equipment and materials; repair or replace any such defective items during this period.
7. Provide Hanger and supports per table 313.1 2019 CPC

Horizontal	Vertical	
Cast Iron	18" of joint	Each Floor max 15'
Copper Pipe	< 1- 1/2" - 6" > 10'	Each Floor max 10'
PVC and ABS	all max 4'	Base, each floor, mid story guideline
Pex	< 1' at 32' > 4'	Base, each floor, mid story guideline
Steel for gas ½" - 6" - ¾" at 1'-8" > 10'	Same	

B. Utilities and Site Work:

1. Prior to commencing work, plumbing contractor shall consult representatives of local utilities concerning locations and availability of utilities. Plumbing contractor shall be responsible for any damage to existing utility lines.
2. Plumbing contractor shall reroute any existing utility lines in conflict with new construction.
3. Plumbing contractor shall confirm locations and elevations of all existing new and rerouted mains and meters on job record drawings.
4. Piping in the ground shall be laid on a firm bed for its entire length.
5. Backfilling trenches with piping shall be made with clean earth, no stones, boulders, cinder fill, frozen earth, construction debris, or other materials that will damage or cause corrosion.

C. Drain, Waste and Vent:

1. All waste piping below 1st floor shall be schedule 40 ABS.
2. All waste piping serving 2nd floor fixtures shall be no-hub cast-iron. (Note: p-trap and trap-arm shall be cast-iron. Note: transitions from ABS to no-hub piping for upstairs baths shall be beneath floor at 1st floor and transitions back to ABS shall be above 2nd floor plate line.)
3. All vent piping shall be schedule 40 ABS or schedule 40 PVC DWV.
4. Vents shall be combined to minimize roof penetration where possible. Confirm roof penetration locations with architect prior to installing. Submit shop drawings to architect for roof penetration approval.
5. Cleanouts shall be installed at upper terminals of all horizontal waste runs as per CPC.
6. Plumber shall provide waste for softener location.
7. Domestic dishwashing machines shall discharge indirectly through an air gap fitting in accordance with section 807.4 into a waste receptor, a wye branch fitting on the tailpiece of a kitchen sink, or dishwashing food waste grinder.
8. Cleanouts are required at drainage piping upper terminal; each branch line over 5 feet from main, no greater than 100 feet in developed length from each cleanout; Over 135 degrees in horizontal change of direction.
9. Sinks and urinals shall require cleanouts.
10. Cleanout clearances in front shall be <2' - 12 inches. <2'- 18 inches. Cleanouts shall extend to finished floor or outside the building.
11. No clothes washer standpipe shall extend more than 30 inches or no less than 18 inches above its trap. The trap shall be roughed in not less than 6 inches nor greater than 18 inches above the floor.
12. Condensate waste from air conditioning coils discharges by direct connection to a lav or approved bathtub overflow, the connection shall be located in the area controlled by the same person controlling the air conditioning space. Submit shop drawings to architect for condensate route and termination location approval.
13. No domestic dishwashing machine shall be direct connected to the drainage system or a food waste disposer without the use of an approved dishwasher air gap fitting on the discharge side of the dishwashing machine. Listed air gaps shall be installed with the flood level marking at or above the flood level of the sink or drain board whichever is higher.

PLUMBING SPECIFICATIONS

D. Water Supply Piping:

1. All underground water supply piping shall be schedule 40 PVC. Provide tracer wire at all underground utilities.
2. Water service line to dwelling shall be buried at a minimum depth of 18 inches. Where service enters building, service shall have a stop (ball valve), waste (drain cock), and pressure regulating valve if necessary.
3. Plastic and copper piping penetrating framing members within 1 inch of the exposed framing shall be protected by a steel nail plated not less than 18 gauge in thickness. Extend nail plate 1 1/2 inches beyond the outside diameter of the pipe
4. Plumber shall provide water treatment loop.
5. All water supply piping within building shall be approved PEX.
6. Hot and cold supplies to all tubs shall be 3/4" minimum.
7. The maximum hot water temperature of discharging from the bathtub and whirlpool bathtub filler shall be limited to 120 degrees F by a device that is in accordance with ASSE 1070 or CSA B 125.3. Water heater thermostats do not comply.
8. Discharge from a relief valve into a water heater pan shall be prohibited.
9. Plastic water supply piping, underground outside a building, shall have a blue insulated copper tracer wire installed adjacent to the piping. The tracer wire shall terminate above grade and be not less than 18 awg.
10. Pex piping shall not be installed within the first 18 inches of piping connected to a water heater. Water heater flexes shall not be greater than 24 inches.
11. Where water pressure exceeds 80 Psi an approved type pressure regulator shall be installed. An approved expansion shall be installed in the cold water distribution piping downstream of each regulator.
12. All piping in hot water system shall be insulated per CPC insulation schedule.
13. All copper tubing shall be isolated from framing members with polyethylene isolators or 1/4" felt.
14. Water supply to refrigerators shall be 1/2" PEX.
15. Stub out height for water closet supplies to be coordinated with baseboard detail; confirm with architect before installation.
16. No (2) fixtures shall be served with 1/2" supply piping.
17. Water supply system mains and branches shall be properly sized to deliver adequate water pressure and volume as per the CPC, and to minimize friction generated noise; no 1/2" ID piping shall be installed in walls or ceilings adjacent to living or sleeping areas; piping shall be sized so that flow velocities do not exceed 6'/second.
18. All building water systems in which quick acting valves are installed shall be provided with water hammer arrestors per 609.10. Arrestors shall be installed as close as possible to these valve types.
19. Automatic fire sprinkler demand has not been included in sizing of the site main domestic water supply. Coord WFS contractor for upsizing requirements for combination feed from single meters.

E. Gas Piping:

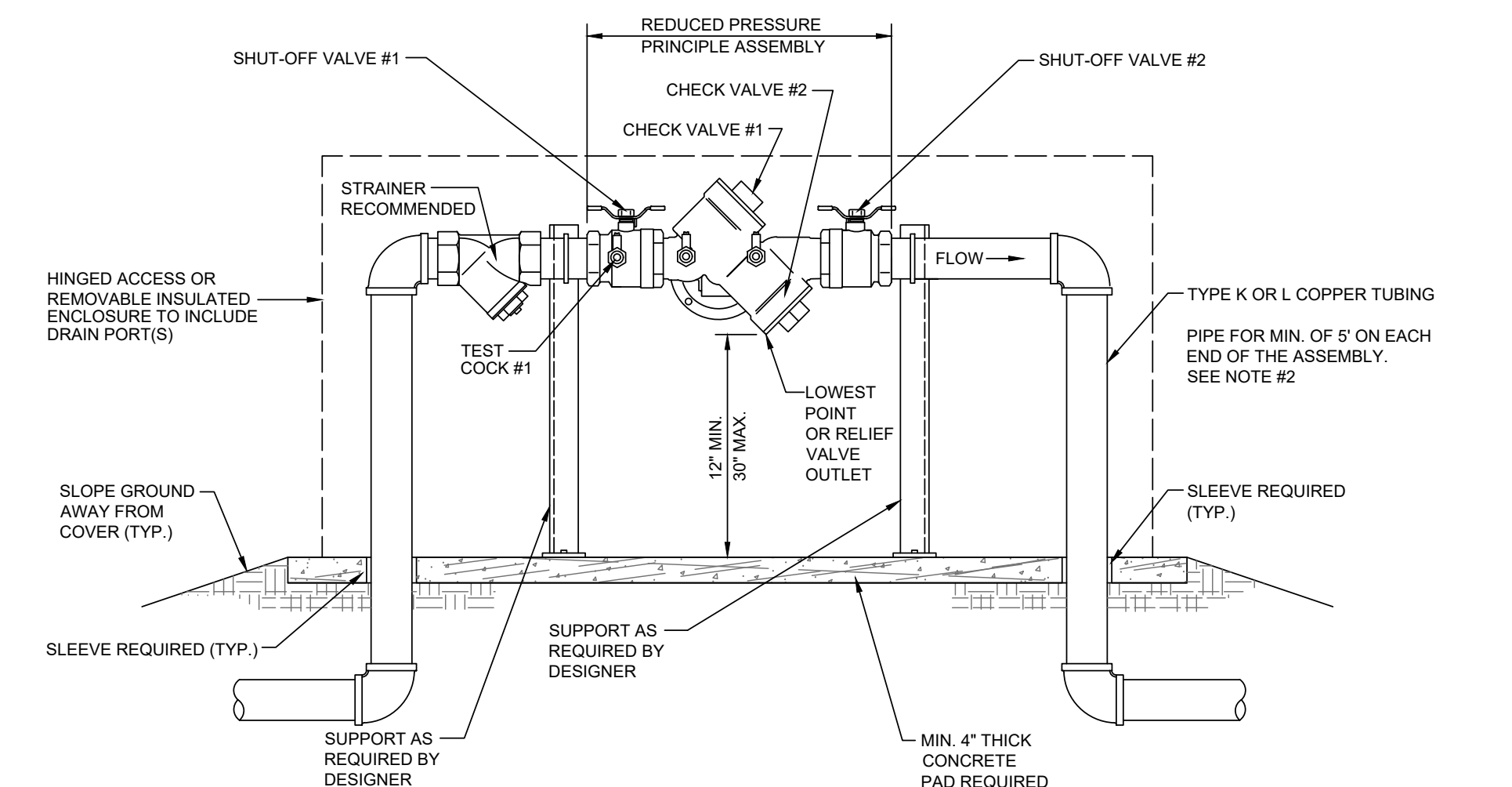
1. Underground natural gas piping from meter shall be run in polyethylene pipe with tracer wire.
2. Gas piping within house shall be run in black iron pipe with galvanized fittings.
3. Threaded joints shall be made up with teflon paste, rector seal #1, teflon tape or other approved joint compound material (Note: no pipe dope shall be applied to female threads).
4. All gas piping shall be fully reamed as per CPC.
5. Exterior piping shall be protected by approved, machine applied protective coating. Field wrapping shall be limited to sections at joints and shall provide equivalent protection to the machine applied coating.

F. Tub, Shower and Pan Installation:

1. Plumbing contractor shall receive written specification for tile & float thickness for tubs and showers; rough-in valve accordingly.
2. Shower drains shall be Frank Pattern #20SD.
3. Roman tub shall be set in mortabase with 15# paper beneath mortar with 6 mil visqueen between mortar and tub.


G. Trim:

1. Plumbing contractor shall be responsible for protection of all finished work by other trades; plumbers working on finished floors shall use clean quilted drops.
2. Hot and cold water subouts beneath sinks shall have brass T's and separate stops when supplies are to be run to dishwasher, refrigerator or other accessory.
3. Recirc system shall be properly balanced with Nibco globe valves; circulation return shall have a check valve installed in the line, before its connection back to the hot water source.
4. Water heaters: indirect by radiant heating contractor
5. Plumbing contractor shall thoroughly flush all water supply lines.



1 DOUBLE BACK FLOW PREVENTION DEVICE

REVISIONS:	BY:
1 11/14/22	MEG



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CHECKED:	
CHECKED:	
FILE NAME:	
SHEET:	PO. 1
SHEET OF SHEETS	

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MONTEREY ENERGY GROUP, INC.

PLUMBING SPECIFICATIONS

PART ONE - GENERAL

- A. **Contract Documents:** The Contract Documents (CDs) consist of a full set of Drawings and These Specifications. Contractor's bid shall include all requirements of all Drawings and all Specifications. Contractor shall coordinate necessary adjustments in the work of various trades to provide a complete project. Contractor shall visit site. No change in cost will be considered for failure to review and coordinate.
- B. **Complete Working Installation:** The intent of the Contract Documents is to produce a complete project. Provide connection to all equipment requiring service from systems installed in this Section. Where labor or material is needed for satisfactory operation, required by the equipment manufacturer or accepted as good practice, provide at no change in Contract cost.
- C. **Utilities and Site Work:** Prior to commencing work, plumbing contractor shall consult representatives of local utilities concerning locations and availability of utilities. Plumbing contractor shall be responsible for any damage to existing utility lines. Plumbing contractor shall reroute any existing utility lines in conflict with new construction. Plumbing contractor shall confirm locations and elevations of all existing new and rerouted mains and meters on job record drawings.

Scope Includes:

- D. **Plumbing:** Furnishing and installing complete plumbing and piping systems.
- E. **Contractor Furnished Items:** Contractor shall rough-in, install and connect items including:
1. Water Closets
 2. Sinks
 3. Lavatories
 4. Dishwashers
 5. Showers
 6. Tubs
 7. Hose Bibs
 8. Floor Drains
 9. Floor Sinks
 10. Clothes Washers

- F. **Coordination:** Coordinate with all other trades on requirements for proper connections to equipment, devices and systems.
- G. **Repair Damages:** Repair any damage to equipment, building or site, which is caused by work. Repair damage caused by pipe leaks or breaks, malfunctions of equipment provided or installed.
- H. **Reference:** Refer to other Drawings and Specifications for related work.

Coordination

- A. **Review and Site Visit Report:** Contractor shall review the entire set of CDs, Drawings and Specifications, and become familiar with related work of other trades. Contractor shall visit site and issue a written "Site Visit Report".
- B. **Owner Coordination:** Public will be using portions of the premises during construction. Schedule the Work to allow public's procedures to continue. Limit construction noise close to sensitive areas or during quiet periods.
- C. **Experience:** Contractor is assumed to be experienced in this work. After award of contract, no additional costs will be considered for payment for work that must be altered due to conflicts with other trades; claims of ignorance of the intent of the CDs will not be allowed.
- D. **Insurance:** Contractor shall possess proper insurance in accordance with the General Specifications.
- E. **Inspections:** Contractor shall coordinate the exact times of required inspections. Inspection schedule shall include rough-in, pre-final, final and others if required by the building inspector. Construction shall be complete and ready at time of inspection.
- F. **Safety:** Contractor shall conduct safety meetings and provide safety training to all company personal on site. Design team construction support services do not imply review or approval of Contractor's safety procedures.
- G. **Shop Drawings:** Coordinate with the General Contractor and the work of other trades on Shop Drawing submittals.
- H. **Record Drawings and Record Set:** Coordinate with the General Contractor and the work of other trades on production of Record Drawings and the final Record Set and submittal of same. Give to design team for review prior to incorporating comments into "Record Set". As-Built are to be kept current and available for review in conjunction with each application for payment.
- I. **Submittals:**
1. Equipment details shall be submitted for coordination with other trades and for review and approval by the Owner and designated representatives prior to purchase. Provide submittals organized in electronic format. Submittal data shall be provided in a timely manner to allow sufficient review time without delaying construction. Submittals shall contain descriptive materials such as catalog cuts, diagrams, performance curves and charts published by the manufacturer; model numbers alone will not be acceptable. All literature shall clearly indicate the specified model number, dimensions, weights, arrangement, rating and characteristics of the proposed equipment. All motor driven equipment shall include start-up procedures and tests recommended by the equipment manufacturer. Contractor testing procedures may be considered as an alternative. All powered electrical equipment shall include electrical ratings and wiring information. All items requiring architectural approval, such as air outlets, shall include photographs of equipment. Shop drawings shall be submitted for each piece of purchased equipment and materials including pipes, valves, and fittings.
 2. Submission Requirements:
 - 1) Initial submittal:
 - a. Submit electronic format of product data.
 - b. Make any corrections or change in submittals as required.
 - c. Resubmit for review until no exceptions are taken.
 - 2) Final approval: Once submission is accepted, Contactor shall print two bound sets of submittals for make photocopies for coordination with other trades, as required by the General Contractor. Photocopies will be submitted for record and coordination.

Substitutions

- A. **Substitutions:** No substitute material or equipment may be installed without the written consent of the Architect and Engineer. The Contractor shall pay all additional costs incurred by any substitution, whether costs are architectural, structural, electrical, plumbing or mechanical.
- B. **Shop Drawings:** Provide Shop Drawings and detailed descriptions for any equipment fabricated specifically for this project. Provide Shop Drawings of any suggested changes to designed piping layouts. Shop Drawings shall be 24-inch by 36-inch, minimum. Quality of drawings shall be equal to Contract Documents. Provide copies of a portfolio with a description of fixtures and trim. Provide a complete materials list.

Building Codes

- A. **Conformance:** Work shall comply with requirements of building inspectors and all local, state and federal codes including 2019 CPC, CMC, CBC, CEC, CRC, CFC, NFPA, T-24 Energy Code and California Green Building Standards Code. Work shall also conform to SMACNA and OSHA standards. Installation of equipment and materials shall comply with manufacturer's installation instructions and industry standards.
- B. **Conflicts:** Nothing in the Specifications or Drawings shall be construed as permitting a departure from any applicable code, ordinance or regulation. If any conflicts exist between CDs and Codes, Codes shall govern. Where CDs require superior quality, better construction methods or greater capacity than Codes, CDs shall govern. Minor changes required by Codes shall be included in Contractor's bid.

PART TWO - MATERIALS

Soil, Waste, Drain, Vent Systems

- A. **General:** Pipe and fittings shall be the product of a single manufacturer and shall conform to Table 604.1 of the 2019 CPC.
- B. **Soil, Waste and Drain Piping Above Grade:** Soil, waste, drain piping above grade shall be service weight hubless cast iron per CISPI 301 with neoprene sleeves and stainless steel clamps with a stainless steel shield which shall completely cover the neoprene. All cast iron piping shall have a standard rust inhibiting coating. Schedule 40 ABS may be used, when approved by the local authority, below slab and in locations where sound transmission in not an issue. Contractor shall obtain approval of all ABS locations from the architect/owner prior to installation.
- C. **Vent Piping Above Grade:** Vent piping above grade shall be ABS-DWV schedule 40, ASTM d-2661, IAPMO approved.

Potable Water Piping System

- A. **General:** Pipe and fittings shall be the product of a single manufacturer and shall conform to Table 701.1 of the 2019 CPC.
- B. **Copper Piping:** Hard copper water tube, conforming to ASTM 888 (Type "K" underground, Type "L" above ground) with wrought copper fittings.
- C. **PEX Piping:** Non Barrier PEX water tube, conforming to ASTM F 876 and F 877 with fittings per ASTM F1960 Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) Tubing
- D. **Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Piping:** Rigid PVC and CPVC piping shall be Schedule 40, Schedule 80 or Schedule 120 pressure piping as specified and as described in ASTM D-1785. PVC piping shall be Type I, Grade I compound Cell classification 12454-B per ASTM D-1784. SDR Pressure Rated PVC Piping shall be as described in ASTM D-2241. Plastic piping below grade shall be CPVC material.
- E. **Valves:** All valves shall be the product of a single manufacturer such as Milwaukee, NIBCO, Stockham, or Crane; 125-psig steam service rated and 200 psig air and water rated.
1. **Gate Valves:** Milwaukee 1152 screwed, rising stem, union bonnet, bronze valve with integral tapered seats.
 2. **Ball Valves:** Milwaukee 8A100 standard port, screwed, bronze valve.
 3. **Check Valves:** Milwaukee 509T screwed, bronze, swing check valve. Provide non-slam check on pumped equipment or quick closing fixtures.
- F. **Unions:** Mueller C-107, in copper piping systems. Stockham Figure 694, galvanized malleable iron, brass seat, in steel piping systems. Crane dielectric unions where copper connects to steel piping systems.
- G. **Thermometers:** Thermometers shall be H.O. Terrice Company with separable wells, straight or angle mounted, installed to be easily read from floor. Temperature range 30 to 180 degrees Fahrenheit for domestic hot water, 30 to 240 for heating water, 0 to 100 for chilled water, all with 2 degree divisions.
- H. **Pressure gauges:** Pressure gauges shall be H.O. Terrice, grade 2a, bourdon tube spring type with 4.5-inch dials and calibrating screws. Provide anderson-greenwood type h-5 with Teflon packing shutoff needle valves and Terrice 872 pressure snubbers. Install where easily read from floor and only after systems are cleaned. Select pressure range to position indicator at half way point during normal operation.
- I. **Shock Absorbers:** Provide on cold water lines at quick closing valves such as flush valves, solenoid valves, etc. Sized and located in accordance with Plumbing and Drainage Institute Manual WH 201. Provide access panels at locations where shock absorbers are not accessible. See applicable paragraph for types. Locations to be submitted to and approved by Architect
- J. **Insulation:**
1. **Insulation shall:**
 - A. Be of one manufacturer – Commercial Spaces, Certainteed, Owens Corning, Manville, Knauf, or equal. Residential Spaces Nomaco Thermocel, Armaflex or equal.
 2. Meet minimum thickness requirements of Ch. of Title 24
 3. Meet mold, humidity, and erosion resistance requirements of CMC Standard 6-1
 4. Have flame spread not more than 25 and smoke density of not more than 50 when tested as a composite installation per CBC.
 2. **Exposed insulation:** Insulation exposed to weather shall be protected by a smooth or corrugated aluminum jacket or colored plastic jacket approved for outdoor installation, minimum 0.016 inch thick, secured 3" on center, overlapped at joints and sealed watertight.

Gas Piping Systems

1. Below Grade: PE-2406, polyethylene piping conforming with ASTM D 2513, with socket type fittings conforming with ASTM D 2683. Installation shall include tracer wire and transition riser.
2. Above Grade, 2" size and Under 2" in Size: Schedule 40 black steel pipe and black malleable iron fittings.
3. Above Floor, 2-1/2" Size and Over: Schedule 40 black steel pipe and standard weight fittings
4. Exposed pipe and fittings shall be galvanized.
- Pipe Hangers, Supports and Seismic Restraints**
- General:** Hangers and supports shall be the product of a single manufacturer. Provide additional supports where necessary at sufficiently close intervals to prevent sagging and to keep it in alignment and at maximum 24-inches from each fitting and change of direction. Anchor vertical risers with hooks, brackets or clamps to make them rigid. Show location of pipe hangers, supports and seismic restraints on shop drawings. Stainless steel fasteners are recommended.
- A. Provide seismic restraints to meet the more stringent requirements of the CBC or the local building code.
- B. Restraints shall not short-circuit vibration isolation systems under normal operation.
- C. Design and provide restraints to prevent permanent displacement in any direction caused by lateral motion, overturning, or uplift of Plumbing equipment, and piping. Restraints shall meet requirements of the CBC.
- D. Published specifications standards, tests or recommended methods of trade, industry or governmental organizations apply to work in this section:
1. "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems"
 - a. Published by SMACNA and PPIC
 - b. Approved by the State of California
 2. CBC – 2019 California Building Code
 3. CPC – 2019 California Plumbing Code
 4. CRC – 2019 California Residential Code

E. Manufacturers:

1. Hangers: Any manufacturer who can verify compliance with the CBC standards
 2. Strut - Channel Framing: Any manufacturer who can verify compliance with the CBC standards
 3. Anchors:
 - a. Poured in place: Any manufacturer within the CBC standards
 - b. Drill In: Any manufacturer within the CBC standards
- F. Anchors, Inserts and Fasteners:
1. General:
 - a. Capable of safely accepting indicated external forces without failure
 - b. Maintain equipment, piping and ducts in a captive position
 2. All anchors and inserts shall be installed according to the CBC standards

Pipe Sizes to Equipment

- A. **General:** Pipe sizes indicated, including required valves and fittings, shall be carried full size to the equipment served. Any changes in size to match equipment connection shall be made within 1-foot of equipment. All temperature control valves with sizes smaller that connected lines shall have reduction made immediately adjacent to the valves.

Clean-Outs

- A. **General:** Provide Zurn, Wade or Jay R. Smith clean-outs where indicated and required by Code. Same size as main with a maximum size of 4-inches.
1. **Floor Clean-Outs (FCO):** Zurn ZN1400-2 round top floor clean-out with nickel-bronze head.
 2. **Wall Clean-Outs (WCO):** Zurn ZN1460-8 clean-out, cast brass counter-sunk plug, stainless steel access cover plate secured to plug with counter-sunk screw. For No-Hub piping, Zurn ZN1440-1.
 3. **Grade Clean-Outs (GCO):** In unfinished areas, use Zurn ZN1420-25 cast iron clean-out, fitted with brass counter-sunk plug. For No-Hub piping, ZN1440.
 4. **Clean-Outs (CO):** For grass or planted areas, Zurn 1449 located in concrete box with cover.

Unions

- A. **General:** Provide unions at each soldered or threaded connection to equipment, tanks and valves; on one threaded connection to each manually operated threaded valve and cock and on one threaded connection to each check valve; at both threaded connections to threaded or soldered automatic valves. Provide where required by service whether indicated or not.

Traps

- A. **General:** Provide traps on all fixtures connected to soil systems, except for fixtures having integral traps. Arrange so discharge form any fixture will not pass through more than one trap before reaching sewer. All traps shall have seal of not less than 2-inches and not more than 4-inches.
- B. **Exposed Pipe:** Exposed traps shall be 17-gauge chromium plated cast brass.
- C. **Cast Iron Traps:** Traps installed in connection with cast iron piping shall be same quality and grade as pipe.

Trap Primers

- A. **General:** Provide trap primers on all drains with infrequent usage and as follows:

1. **Water Closets:** When connecting to water closets, provide Sloan F72-A primer complete with fitting and accessories.
2. **Trap Primer Valve:** Automatic trap primer valve shall be Precision Plumbing Products Primer Valve No.1 non-adjusting, for a maximum of two drains.

Hose Bibbs

- A. **General:** Provide all hose bibbs or hydrants with vacuum breakers. All hose bibbs shall have removable metallic handles and lock-shield.

Drains

- A. **General:** Provide Zurn, Wade, or Jay R. Smith drains of sizes indicated. Coordinate installation methods with surfaces where installed. Provide any sleeves, seals, gaskets, rings or other appurtanences required for a complete installation. Drains inside caulked or threaded outlet as required. Provide clamping collars for drains in areas except slab on grade. Provide trap primers where required by Code.
- B. **Floor Drain:** Zurn ZN415-B-6 cast iron floor drain, 2-piece body with double drainage flange, reversible flashing collar, weep-holes, bottom outlet, and adjustable polished nickaloy 6-inch diameter round strainer, Z419-B-6 polished chrome for showers.
- C. **Floor Sinks:** Shall be complete with cast iron with acid-resisting porcelain enameled interior, double drainage flange, internal dome, half grate, nickel-bronze frame and trap priming connection. Set top of floor sink to be flush with finished floor. Unless otherwise noted all floor sinks shall be a minimum of 8-1/2" square x 61/4" deep, with 1/2 grate.

Fixtures

- A. **General:** See fixture schedule on Architectural Drawings. Coordinate with Architectural Drawings for fixtures requiring connection. Verify fixtures are properly set and level prior to connection.

PART THREE - METHODS

Excavation and Backfilling

- A. **General:** Perform all necessary excavation and backfilling required for installation of mechanical and plumbing work. Any work damaged during excavation and backfilling shall be repaired at the Contractor's expense. Engage underground utility locating service prior to excavations.
- B. **Verify Conditions:** Examine the site to determine the character of the materials to be encountered and existing conditions affecting the Work. Excavation shall be unclassified and shall include the removal of all buried obstructions within the area to be excavated.
- C. **Reshching:** Trenching for underground pipe shall be to the required depths. Maintain excavations free of water while installing pipe and until completion of backfill operation.
- D. **Tamping:** Tamp bottom of trenches to uniform grade and excavate bell holes where necessary to insure that pipe rests for entire length on solid ground. Should rock be encountered, excavate to 6-inches below bottom of pipe and fill with well tamped and compacted 0.5-inch to 1.5-inch broken stone or gravel-sand before laying pipe.
- E. **Backfill:** After pipe has been installed, tested, inspected and approved, backfill excavations with clean earth from excavation or with imported sandy soil in layers not exceeding 8-inches. Moisten and machine tamp and restore ground or paving to original condition. Backfill shall be compacted to a density of 90-percent as determined by laboratory test procedure in ASTM D1557.
- F. **Owner Tests:** During progress of Work, Owner may have compaction tests made under direction of testing laboratory for air compacted fill. If found not to meet Specifications, Contractor shall excavate and re-compact fill at no additional cost to Owner.
- G. **Grading:** After backfilling, grade all trenches to level of surrounding sub-grade. All excess soil shall be removed from site and disposed of in accordance with local Codes.

Pipe Installation

- A. **General:** Install piping approximately as indicated, direct as possible without unnecessary offsets or fittings, parallel with building lines. Locate valves for accessibility. If a location indicated on Drawings for an item requiring access is blocked by an obstacle, point out location to Architect prior to installing item for direction on new location.
- B. **Layout:** Maintain maximum headroom under piping. Contractor to coordinate line locations with beams, windows, columns, etc, to provide maximum clearance. From Drawings, ascertain heights of suspended ceilings and size of pipe shafts, in which piping is concealed, and location and size of structural members in and adjacent to pipe shafts. Coordinate piping installation with ductwork, lighting and equipment. If sufficient space above ceilings or in soffits, shafts and chases is not available, obtain clarification from Architect prior to beginning work.
- C. **Slope:** Horizontal piping shall slope uniformly without sags or humps to provide for complete drainage of systems and elimination of air. Low points in closed systems shall have drain valves accessibly located. Drainage piping shall slope as required by Code or as indicated.
- D. **Cleaning Piping:** Clean all piping prior to assembly. Maintain in clean condition during construction, temporarily capping or plugging ends of pipe when not being worked on.
- E. **Sizes:** Water piping is sized at maximum 8-feet per second velocity for cold water piping and 5-feet per second velocity in hot water piping. Do not reduce pipe sizes shown on Drawings.
- F. **Cutting:** Cut pipe accurately to measurements established on site and work into place without springing or undue forcing and out of the way of openings, ductwork and equipment. Ream ends of pipe and tubing to original bore before connection. Support pipe during cutting. Do not cut plastic piping with tools that generate heat.
- G. **Expansion:** Install piping to allow for expansion and contraction with damage to pipe, supports or building. Provide expansion loops or other devices where required even if not shown on Drawings. Provide swing joints or run-outs to equipment with swing connections or expansion loops to eliminate stress on equipment connections.
- H. **Cutting Structure:** Cutting of structural elements to facilitate pipe installation is strictly prohibited without the written permission of the Structural Engineer.
- I. **Concealed Pipe:** Run piping concealed, except as otherwise noted, with vertical pipe plumb and horizontal pipe installed to maintain uniform slope.
- J. **Anchored Pipe:** All exposed pipe and trim at fixtures shall be chrome-plated.
- K. **Protection:** Protect all piping located in sensitive areas such as over switchboards, electrical machinery or equipment against condensation.
- L. **Prohibited Locations:** Do not install piping in locations prohibited by Code or by Specification Section 15050 Mechanical General.
- M. **Isolate:** Isolate water piping from hangers, walls, structure, etc. with 0.25-inch thick felt pad or Acousto-Plumb Systems. Alleviate noise transmission when water is flowing.
- N. **Joints:** Make all joints in accordance with manufacturer's recommendations and local Codes.
 1. **Cast Iron:** Joints in cast iron piping with neoprene compound applied to male threads only.
 2. **Threaded Joints:** Make screw joints with approved pipe joint compound applied to male threads only. Threaded joints shall not be made in Schedule 40 PVC piping.
 3. **Copper:** Solder joints in copper tubing with lead free soft solder and flux. All joints to be cleaned bright before soldering. Wipe excess solder from joints while molten.
 4. **PVC Joints:** Joints in PVC piping systems shall be solvent weld compatible with the type of materials being handled. Plastic to plastic, plastic to metal, vitacaulic and flanged fittings shall be made in accordance with the manufacturer's recommendations.
- O. **Connections:** Piping at tanks, converters, generators, pumps, etc shall be supported independently so pipe weight is not supported by equipment. Provide shut off valves, balancing valves, unions, flanges as required by service in supply and return to each item of equipment. Installation shall allow for proper service, balance, testing, maintenance and removal of equipment and associated apparatus. Provide temporary connections, valves, over-sized flushing connections, pipe extensions, etc. as required to test and balance systems.

- P. **Drains:** Drain piping from pump glands, relief valves, etc. Shall spill over open-sight drains, floor drains, floor sinks or other acceptable locations which shall be readily observable. Terminate drainpipe with plain unthreaded pipe with minimum 1-inch air gap.
- Q. **Unions:** Provide screwed unions or flanges in locations required for disconnecting all equipment, traps, by-passes, tanks, etc.
- R. **Flashing:** Coordinate with flashing methods detailed on Architectural Drawings for a uniform appearance. Flash roof vent piping through roof with 24-gauge or heavier galvanized flashing. Make watertight with black fibrous mastic. Extend flashing into roofing felts minimum 12-inches from pipes.
- S. **Anchorage:** equipment and piping shall be accurately set and leveled, anchored to structure as indicated and according to CCR Title 24, CBC and SMACNA "Guidelines For Seismic Restraint Of Plumbing Systems And Mechanical Systems". Supplemental supports to span structural elements shall be provided. Shop drawings shall be approved by the design team prior to installation. Items requiring vibration isolation shall have Mason SSLFH isolators.
- T. **Pipe Penetrations:**
- General:** All concrete penetrations shall be coordinated with contractor. Verify all sleeves and penetrations are in correct locations after installation of rebar and prior to placement of concrete.
1. **Sleeves:** Pipe runs in masonry and concrete floors shall be sleeved for protection. Use standard sleeves or black steel piping at least one size larger than piping run. Chase or sleeve all pipes rising in footings and where running concealed through walls. Caulk space between pipes and sleeves in exterior walls and concrete slabs with graphite packing and waterproof plastic compound.
 2. **Fire Barrier Penetrations:** Provide full copy of UL listed fire resistive detail where piping passes through rated barriers. Fire resistive penetration detail shall be coordinated with listing of fire resistive assembly where pipe passes.
 3. **Slabs:** Coordinate water proofing seals where pipes pass through slabs with waterproofing consultant/contractor.
 4. **Foundation Walls:** Pipes penetrating below grade foundation walls shall be protect with Linkseal Systems.
5. **Escutcheons:** Place escutcheon, stamped with 16-gauge steel and chromium plated, on pipes passing through sleeves in walls, floors or ceilings where exposed to view in finished areas. Grout in all other pipes.
6. **Concrete:** All concrete penetrations shall be coordinated with contractor.

Soil, Waste, Drain And Vent Pipe Installation

- A. **General:** Run piping in approximate location shown on the Drawings, graded one unit in forty-eight (1/4-inch per foot) in buildings. Lay sewers in straight lines at a uniform grade of one unit in forty-eight (1/4-inch per foot) or as noted on Drawings. 1/8" slope on pipe sizes 4" - 8" shall be permitted with approval from the authority having jurisdiction. Roof vent locations shall be coordinated with solar panel installation vendor prior to placement. Roof penetrations shall not interfere with solar panels or associated assemblies.
- B. **Plug Ends:** Keep stopper in mouth of pipe when pipe work is not in progress.
- C. **Connection Schedule:** Contractor shall coordinate with Owner on preferred schedule of system shutdown. Prior to starting any new pipe replacement work, run new waste piping adjacent to existing piping and make connections during off hours so as to maintain service to buildings.
- D. **Vents:** Extend vents through roof. Vents may be combined in accordance with the CPC. Combination of cross-section of all venting within each building shall equal waste pipe size cross-section leaving that building.
- E. **Traps:** All drains shall be properly trapped and vented and supplied with water where required by Code. Give special attention to drains located in areas that are pitched for drainage so that uniform slope will be obtained.
- F. **Clean-Outs:** Cleanouts shall be installed per CPC 707.0 and Table 707.1, every 100-feet of horizontal runs. Make-up clean-out plugs with graphite and oil to facilitate easy removal. Take necessary precautions to protect clean-outs during construction. Replace damaged clean-outs.

Clean Up

- A. **General:** Daily clear construction debris and trash from work areas and dispose of off site. Sweep building floors weekly. Clean all portions of site to the satisfaction of Owner and Architect. See individual Specification Sections for additional requirements.
- B. **Site:** Layout construction tools, work areas, materials and supplies to promote a clean and safe project site. Clean tools and sweep work areas daily.
- C. **Pipe Cleaning:** Flush thoroughly and submit documentation that all water distribution systems have been properly cleaned.
- D. **Strainers:** Remove strainer screens and flush clean before replacing.
- E. **Equipment:** Wipe down equipment, removing dust, grease, marks from shipping or installation. Coordinate any repair, refurbish or touch-up painting required.
- F. **Safety:** Contractor shall protect trenches with 3/4" plywood or similar if trench is not to be backfilled during same work shift.

Final Inspection

- A. **Final Inspection:** Furnish Architect with all certificates of final inspection and approval from inspection authorities. Coordinate with design team and building inspectors on inspection schedule. Domestic water piping shall be chlorinated and tested by 3" party agency prior to building occupancy.

Limited Field Visits

- A. **Site Visits:** Engineer's responsibility is limited to normal construction support services only. Engineer will provide office consultation and, upon approval, will visit site at rough-in, pre-final and final stages only. Contractor shall pay all costs for additional site visits required to re-inspect incomplete work or due to poor coordination or supervision by the Contractor.

Field Instructions


- A. **Field Instructions:** At project completion, provide services of engineer to instruct Owner's maintenance personnel in operation and maintenance of each system. Cover all items in the bound instruction books. Instruction service shall be of sufficient length with enough detail to insure safe and efficient operation. Provide operation and maintenance manual for all equipment and systems to Owner prior to training. Use sign-in sheet at Owner training and include this with closeout documents.

Guarantee

- A. **Guarantee:** Plumbing Contractor shall guarantee the following:
1. Sub-contractor will replace or repair any defect in equipment, materials, and/or installation within the warranty period, which shall be on year from substantial completion.
 2. That all equipment and material will produce the results specified.
 3. The Plumbing Contractor shall furnish written guarantee to replace all defective work and materials furnished under this Section, at no cost to the Owner, for this one (1) year period.

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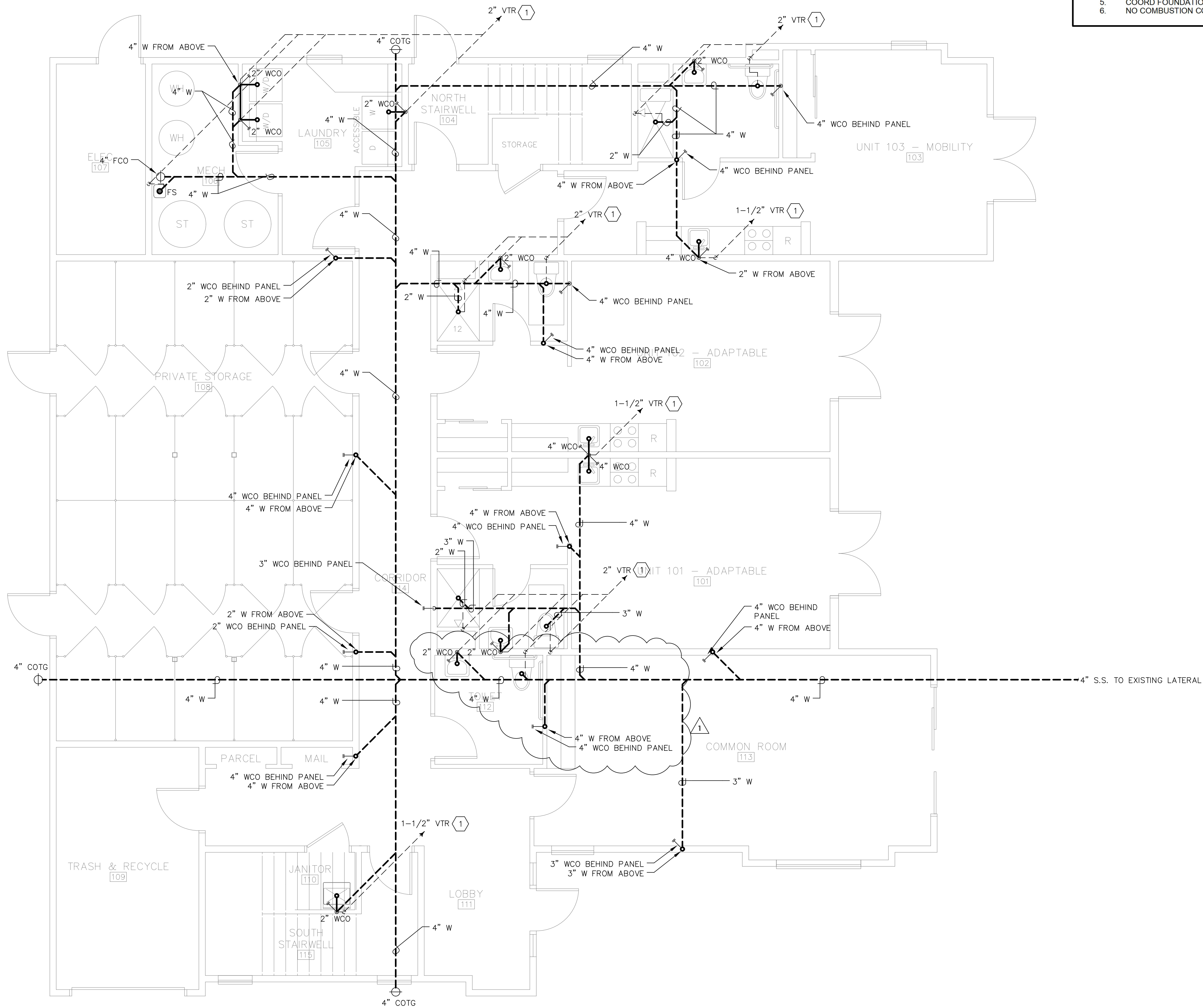


AFFORDABLE HOUSING
PROJECT

PLUMBING
SPECIFICATIONS

415 NATURAL BRIDGES DRIVE
SANTA CRUZ, CA

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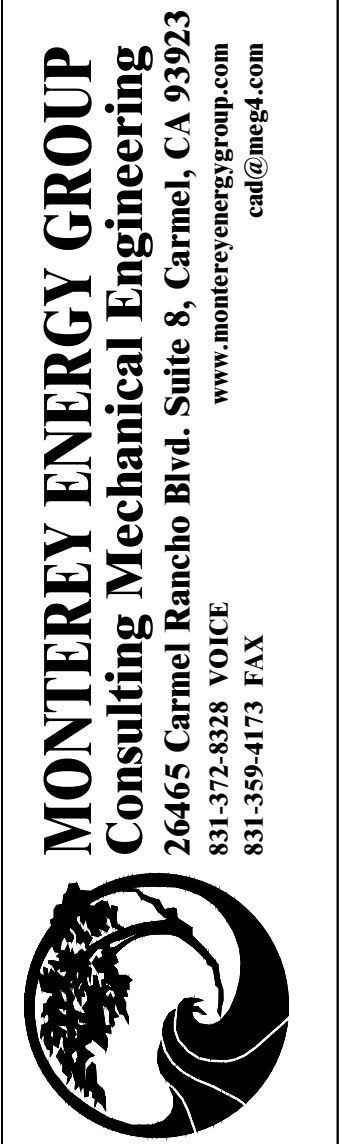
1 1ST FLOOR WASTE & VENT PLAN
SCALE: 1/4" = 1'-0"

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

SHEET NOTES

1. NOTE: GROUP ALL VENTS WHERE PRACTICAL TO MINIMIZE PENETRATIONS THROUGH ROOF.
PENETRATIONS SHALL NOT INTERFERE WITH SOLAR PANELS OR ASSOCIATED COMPONENTS.
PLUMBING CONTRACTOR SHALL OBTAIN APPROVAL FROM ARCHITECT FOR ALL VENT
TERMINATION
2. PROVIDE APPROVED AIR GAP FITTING ON THE DISCHARGE SIDE OF THE DISHWASHING MACHINE
WHEN DIRECTLY CONNECTED TO A DRAINAGE SYSTEM OR FOOD DISPOSER.
3. PROVIDE TRAP PRIMERS AT ALL FLOOR DRAINS & FLOOR SINKS.
4. COORD ALL PIPING LAYOUTS W/DRIFT SYSTEM AND ALL TRADES.
5. COORD FOUNDATION PENETRATIONS.
6. NO COMBUSTION CONDENSATE SHALL DRAIN INTO A CAST IRON PIPE.

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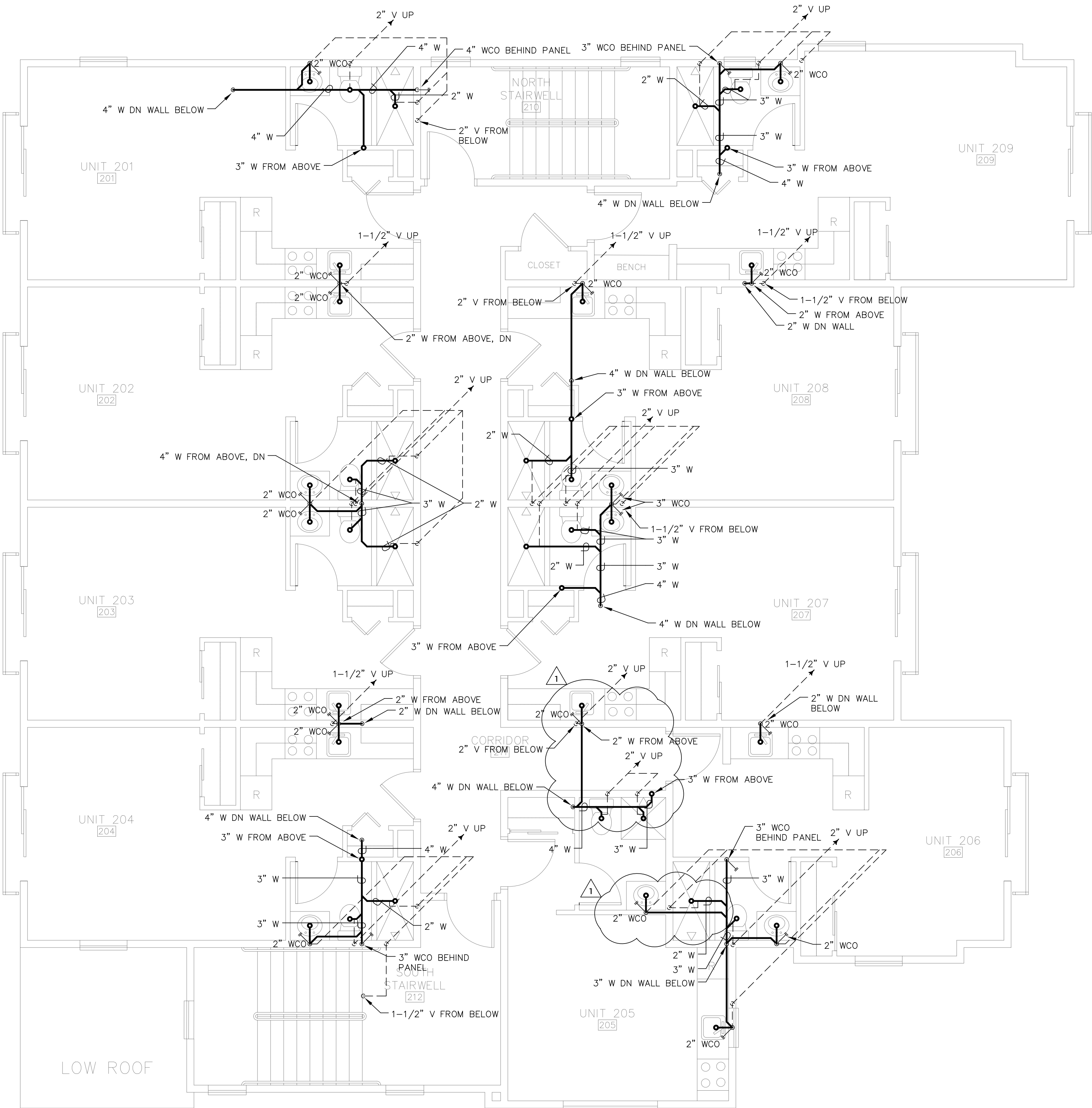
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1 2ND FLOOR WASTE & VENT PLAN
SCALE: 1/4" = 1'-0"



SHEET NOTES

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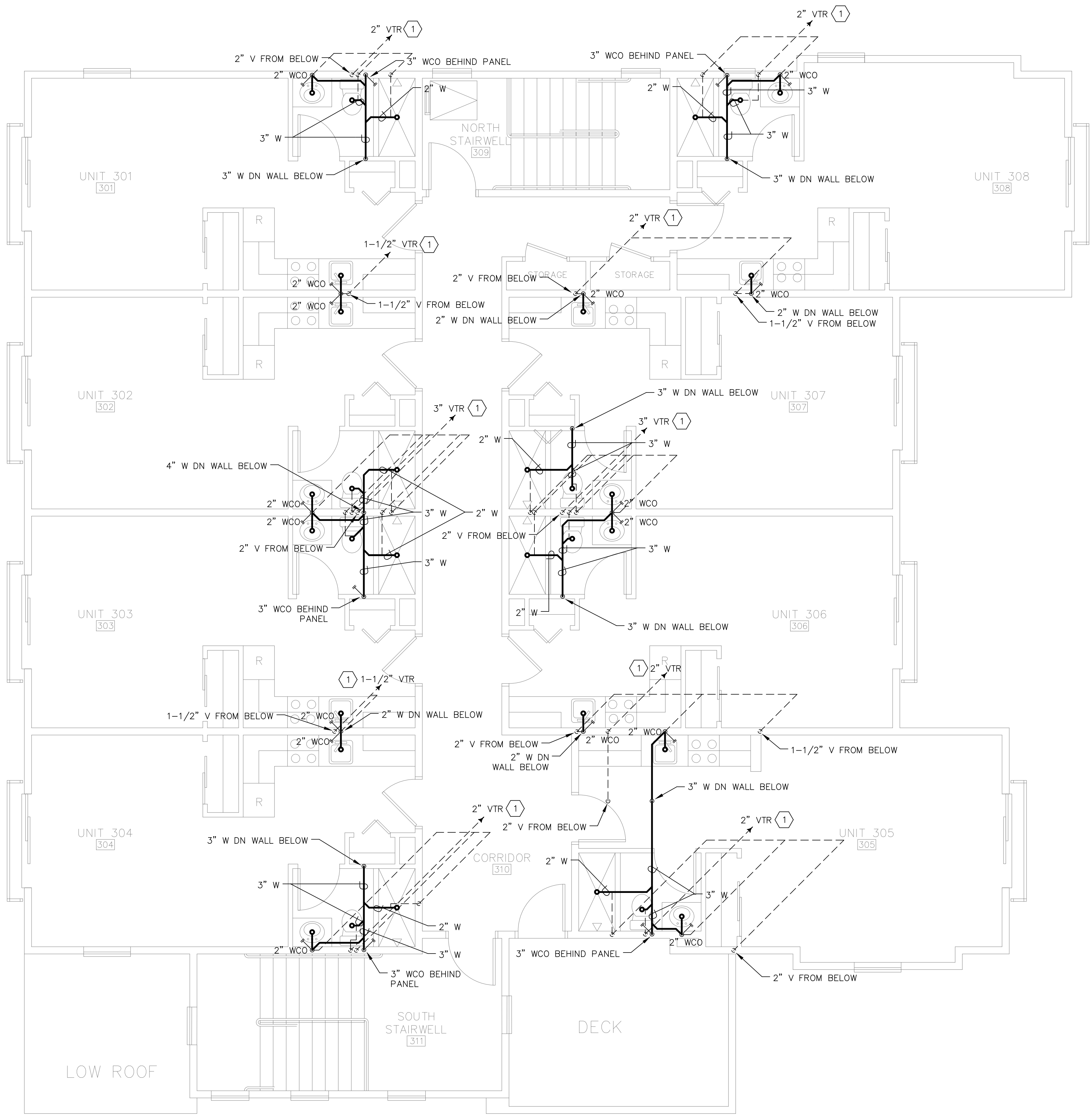
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2ND FLOOR WASTE & VENT PLAN
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1 3RD FLOOR WASTE & VENT PLAN
SCALE: 1/4" = 1'-0"

- SHEET NOTES
1.

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2.

PROVIDE APPROVED AIR GAP FITTING ON THE DISCHARGE SIDE OF THE DISHWASHING MACHINE WHEN DIRECTLY CONNECTED TO A DRAINAGE SYSTEM OR FOOD DISPOSER.
3.

PROVIDE TRAP PRIMERS AT ALL FLOOR DRAINS & FLOOR SINKS.
4.

COORD ALL PIPING LAYOUTS W/DUCT SYSTEM AND ALL TRADES.
5.

COORD FOUNDATION PENETRATIONS.
6.

NO COMBUSTION CONDENSATE SHALL DRAIN INTO A CAST IRON PIPE.

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REGISTERED PROFESSIONAL ENGINEER

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MECHANICAL

STATE OF CALIFORNIA

No. M31607

EXP. MAR 31, 2023

AFFORDABLE HOUSING PROJECT

415 NATURAL BRIDGES DRIVE

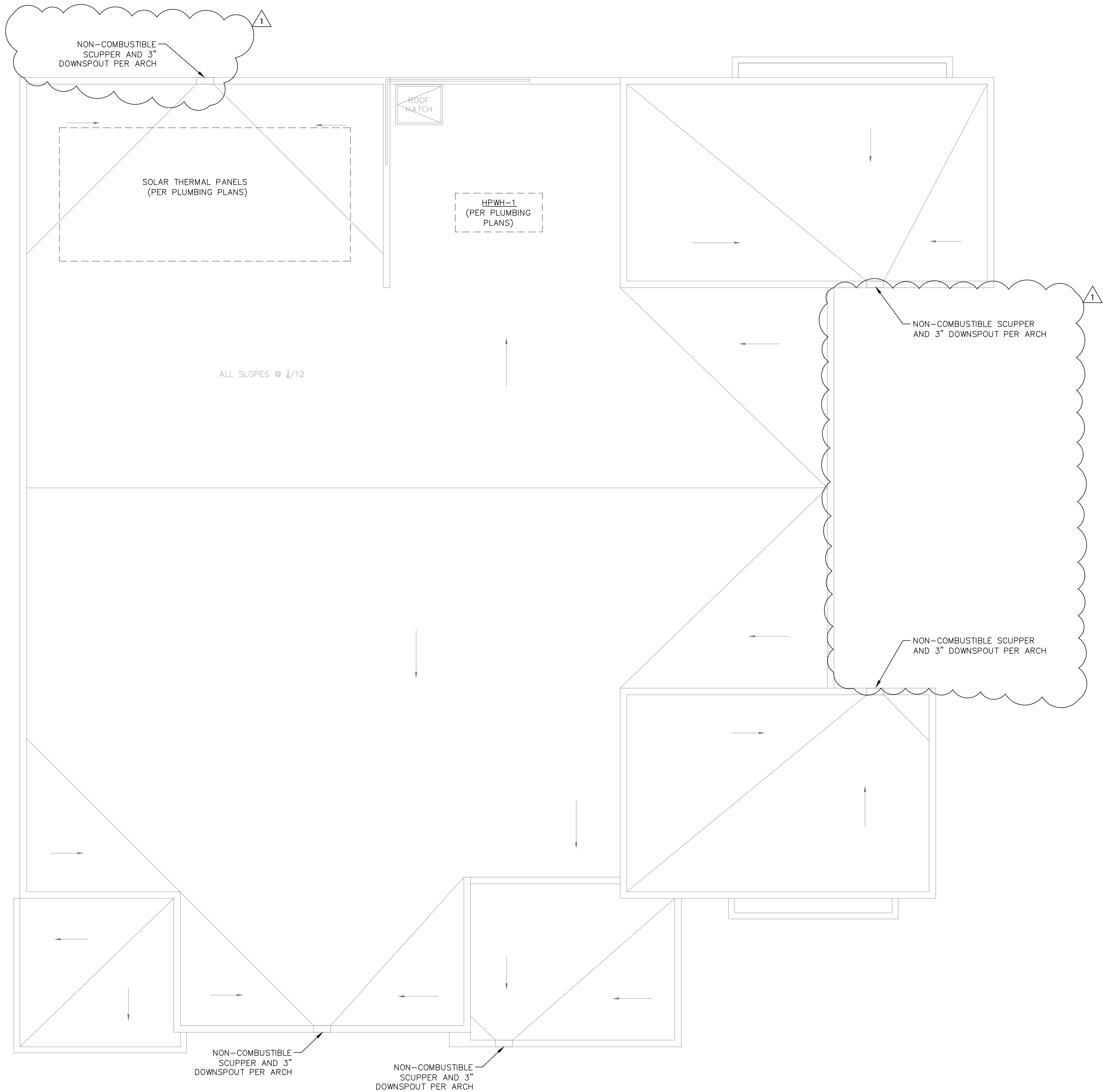
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3RD FLOOR PLAN

WASTE & VENT PLAN

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1 ROOFTOP WASTE & VENT PLAN
SCALE: 1/4" = 1'-0"



SHEET NOTES

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- PROVIDE TRAP PRIMERS AT ALL FLOOR DRAINS & FLOOR SINKS.
- COORD ALL PIPING LAYOUTS W/DUCT SYSTEM AND ALL TRADES.
- COORD FOUNDATION PENETRATIONS.
- NO COMBUSTION CONDENSATE SHALL DRAIN INTO A CAST IRON PIPE.

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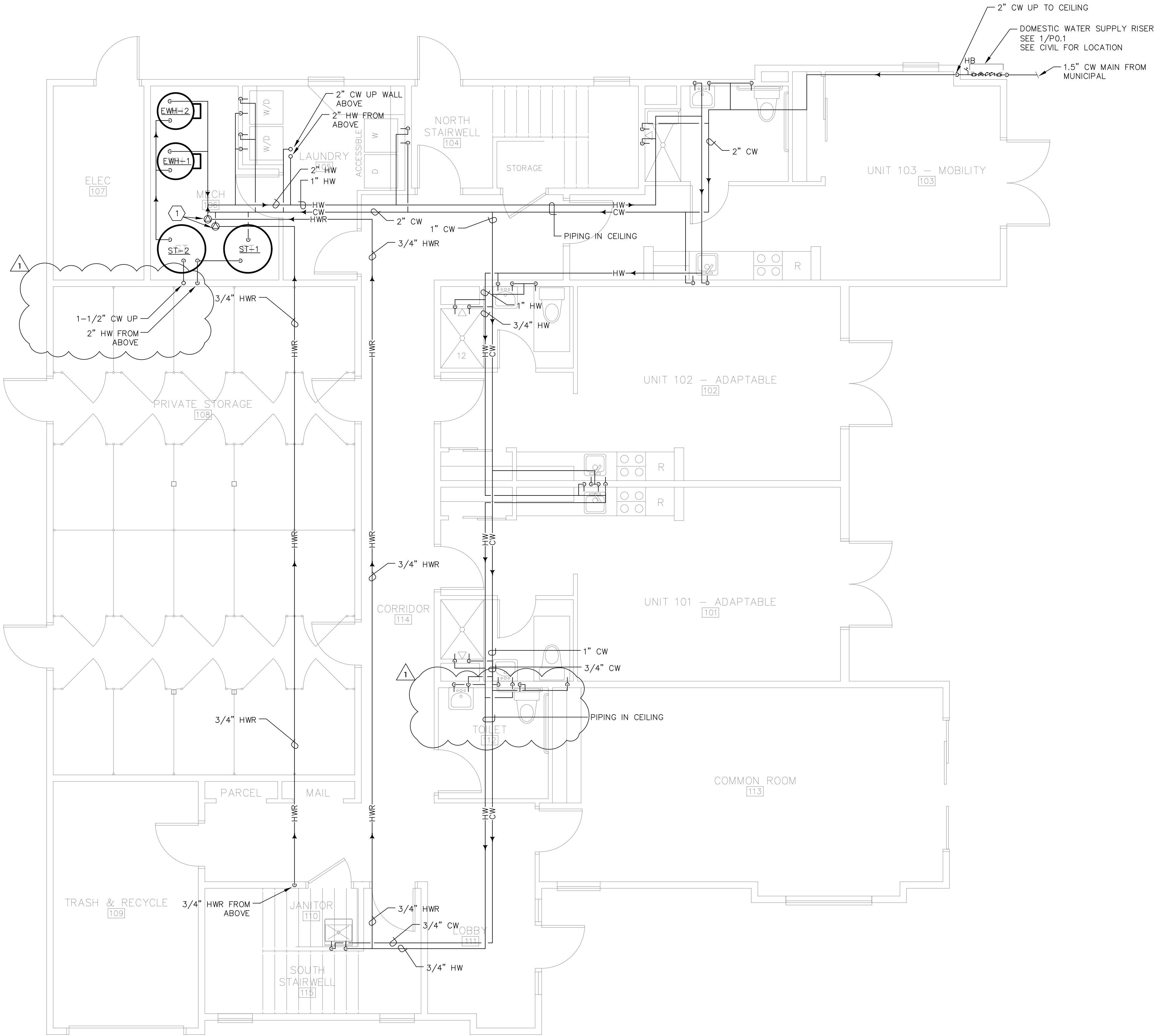
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1 1ST FLOOR DOMESTIC WATER PLAN
SCALE: 1/4" = 1'-0"



SHEET NOTES

1. PROVIDE TACO GENIE ON COMMAND MODEL 0011-CF-USK DHW RECIRCULATION SYSTEM. SYSTEM SHALL BE EQUIPPED WITH WIRED MOTION SENSOR KIT 554-4 AT EA. BATHROOM AND WIRED INDIVIDUAL STARTER BUTTON 554-3 AT KITCHEN SINK.
2. PROVIDE TRAP PRIMERS AT ALL FLOOR DRAINS & FLOOR SINKS.
3. COORD ALL PIPING LAYOUTS W/DUCT SYSTEM AND ALL TRADES
4. NOTE: ALL HOT AND COLD WATER PIPING BELOW SLAB SHALL BE TYPE K SOFT COPPER OR APPROVED PEX. NO JOINTS SHALL BE PERMITTED BELOW SLAB. INSULATE WITH APPROVED BELOW SLAB INSULATION. ALL BELOW GRADE PIPING SHALL BE TYPE K SOFT COPPER IN CRUSH-PROOF SLEEVES.
5. NOTE: ALL GAS PIPING BELOW SLAB OR IN CONCEALED SPACES SHALL BE APPROVED FLEX TYPE APPROVED FOR APPLICATION, TRAC PIPE OR EQUAL. NO JOINTS SHALL BE PERMITTED BELOW SLAB.
6. PROVIDE PROTECTIVE BOLLARD OR ELEVATE EQUIP ABOVE PATH OF VEHICLE PER CPC 507.13.1 AND CMC 307.1
7. PROVIDE 100 SQ. IN. NET FREE AREA FOR DRYER EXHAUST MAKEUP / COMBUSTION AIR PATH BY LOUVERED DOOR OR TRANSFER GRILL.
8. SITE MAIN & METER SIZE TO BE DETERMINED BASED ON COMBINED DOMESTIC DEMAND AND IRRIGATION DEMAND. DOMESTIC DEMAND = 65 GPM @ 46 TO 60 PSI @ 250 FT COLUMN. SYSTEM ASSUMES SEPARATE FIRE SPRINKLER SYSTEM. COORDINATE WITH ALL TRADES.
9. PROVIDE ISOLATION/SHUT-OFF VALVES FOR HOT AND COLD WATER SUPPLY LINES TO EACH UNIT IN ACCESSIBLE LOCATION IN BATHROOM.

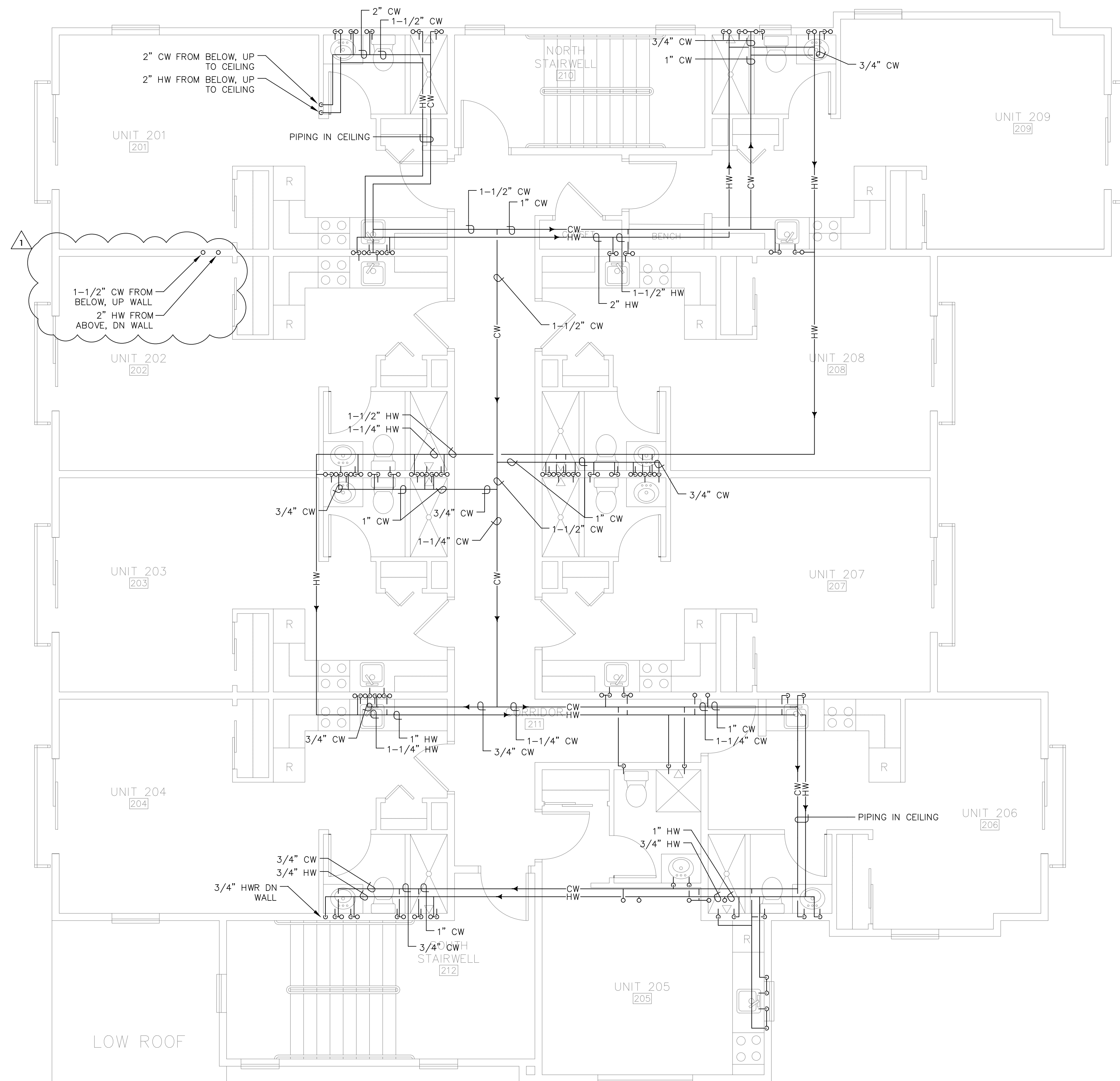
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1ST FLOOR DOMESTIC WATER & GAS PLAN
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1 2ND FLOOR DOMESTIC WATER PLAN


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

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

SHEET NOTES

1. PROVIDE TACO GENIE ON COMMAND MODEL 0011-CF-USK DSHWR RECIRCULATION SYSTEM. SYSTEM SHALL BE EQUIPED WITH WRED MOTION SENSOR KIT 554-4 AT EA. BATHROOM AND WRED INDIVIDUAL STARTER BUTTON 554-3 AT KITCHEN SINK.
2. PROVIDE TRAP PRIMERS AT ALL FLOOR DRAINS & FLOOR SINKS.
3. COORD ALL PIPING LAYOUTS W/DRUT SYSTEM AND ALL TRADES
4. NOTE: ALL HOT AND COLD WATER PIPING BELOW SLAB SHALL BE TYPE K SOFT COPPER OR APPROVED PEX. NO JOINTS SHALL BE PERMITTED BELOW SLAB. INSULATE WITH APPROVED BELOW SLAB INSULATION. ALL BELOW GRADE PIPING SHALL BE TYPE K SOFT COPPER IN CRUSH-PROOF SLEEVES.
5. NOTE: ALL GAS PIPING BELOW SLAB OR IN CONCEALED SPACES SHALL BE APPROVED FLEX TYPE APPROVED FOR APPLICATION, TRAC PIPE OR EQUAL. NO JOINTS SHALL BE PERMITTED BELOW SLAB.
6. PROVIDE PROTECTIVE BOLLARD OR ELEVATE EQUIP ABOVE PATH OF VEHICLE PER CPC 507.13.1 AND CMC 307.1
7. PROVIDE 100 SQ. IN. NET FREE AREA FOR DRYER EXHAUST MAKEUP / COMBUSTION AIR PATH BY LOUVERED DOOR OR TRANSFER GRILL.
8. SITE MAIN & METER SIZE TO BE DETERMINED BASED ON COMBINED DOMESTIC DEMAND AND IRRIGATION DEMAND. DOMESTIC DEMAND = 65 GPM @ 46 TO 60 PSI @ 250 FT COLUMN. SYSTEM ASSUMES SEPARATE FIRE SPRINKLER SYSTEM. COORDINATE WITH ALL TRADES.
9. PROVIDE ISOLATION/SHUT-OFF VALVES FOR HOT AND COLD WATER SUPPLY LINES TO EACH UNIT IN ACCESSIBLE LOCATION IN BATHROOM.

REVISIONS:	BY:
1 11/14/22	MEG



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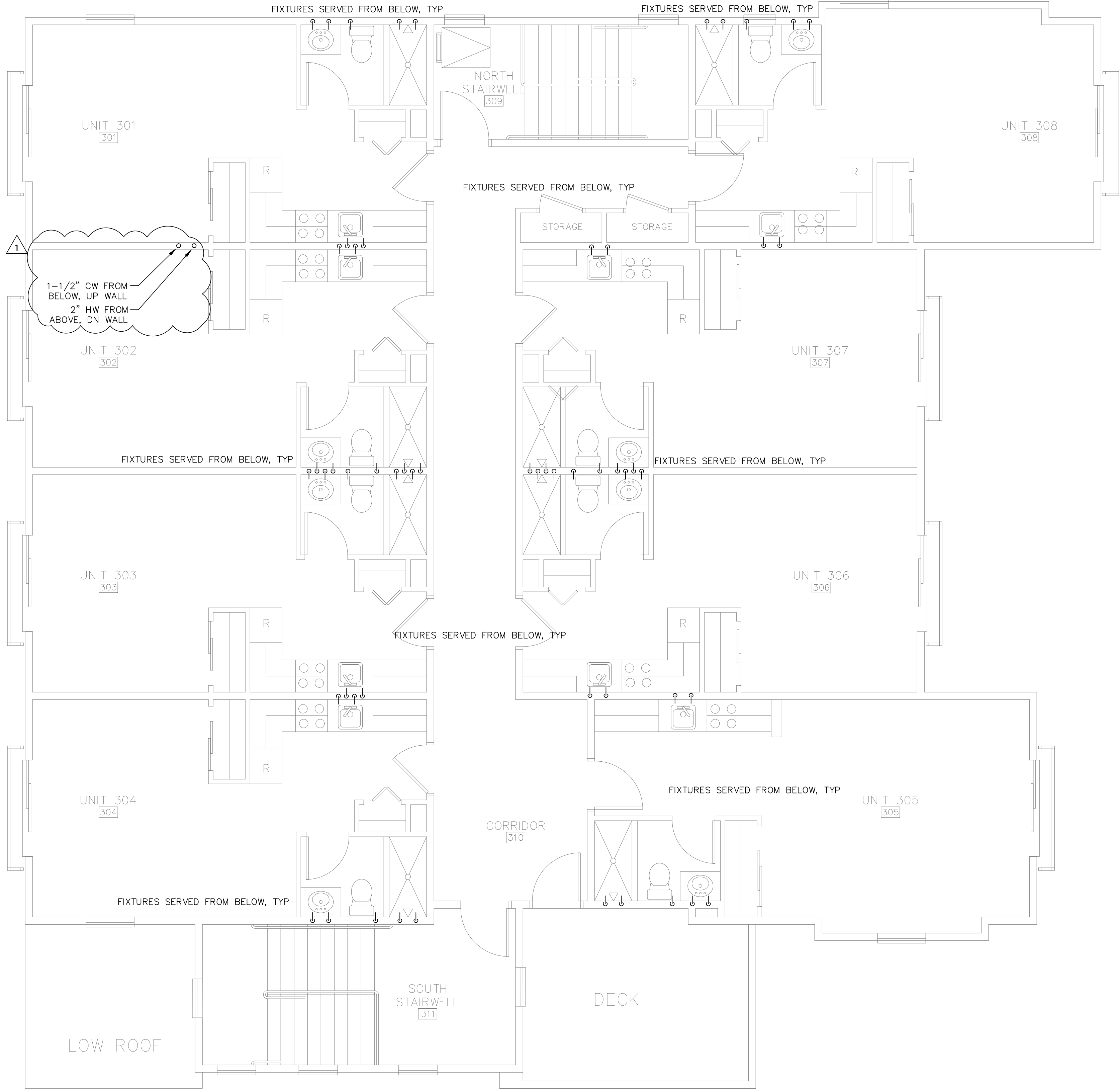


**AFFORDABLE HOUSING
PROJECT**
415 NATURAL BRIDGES DRIVE
SANTA CRUZ, CA

2ND FLOOR DOMESTIC WATER & GAS PLAN

DATE:	11/14/22
SCALE:	AS NOTED
DRAWN:	MEG
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FILE NAME:	
SHEET:	P2.6
SHEET OF SHEETS	

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1 3RD FLOOR DOMESTIC WATER PLAN
SCALE: 1/4" = 1'-0"

- ### SHEET NOTES
1. PROVIDE TACO GENIE ON COMMAND MODEL 0011-CF-USK DHW RECIRCULATION SYSTEM. SYSTEM SHALL BE EQUIPPED WITH WIRED MOTION SENSOR KIT 554-4 AT EA. BATHROOM AND WIRED INDIVIDUAL STARTER BUTTON 554-3 AT KITCHEN SINK.
 2. PROVIDE TRAP PRIMERS AT ALL FLOOR DRAINS & FLOOR SINKS.
 3. COORD ALL PIPING LAYOUTS W/DUCT SYSTEM AND ALL TRADES
 4. NOTE: ALL HOT AND COLD WATER PIPING BELOW SLAB SHALL BE TYPE K SOFT COPPER OR APPROVED PEX. NO JOINTS SHALL BE PERMITTED BELOW SLAB. INSULATE WITH APPROVED BELOW SLAB INSULATION. ALL BELOW GRADE PIPING SHALL BE TYPE K SOFT COPPER IN CRUSH-PROOF SLEEVES.
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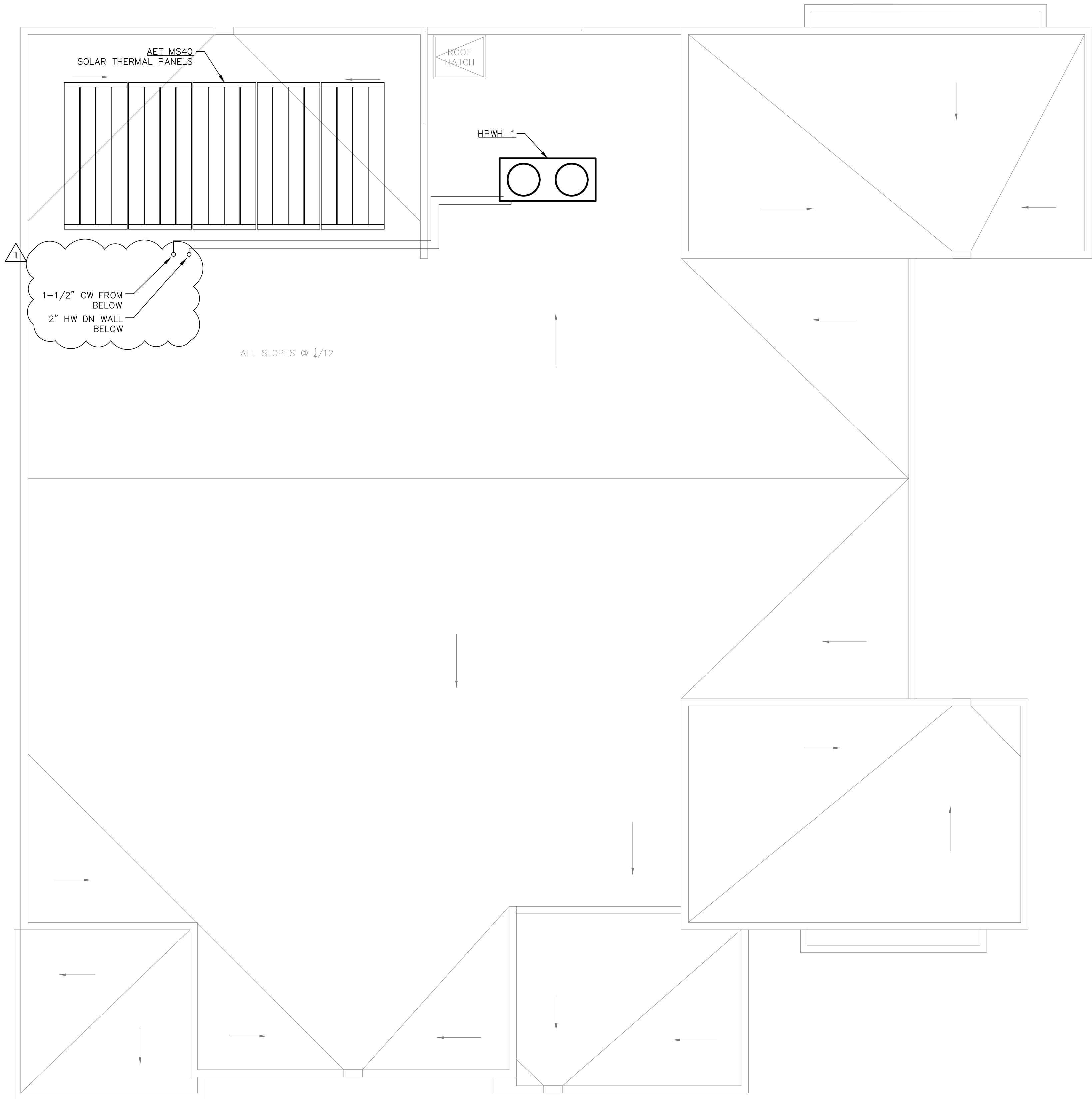
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
No. M31607
EXP. MAR 31, 2023
MECHANICAL

AFFORDABLE HOUSING PROJECT
415 NATURAL BRIDGES DRIVE
SANTA CRUZ, CA

3RD FLOOR DOMESTIC WATER & GAS PLAN

DATE:	11/14/22
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1 ROOFTOP DOMESTIC WATER PLAN
SCALE: 1/4" = 1'-0"



SHEET NOTES

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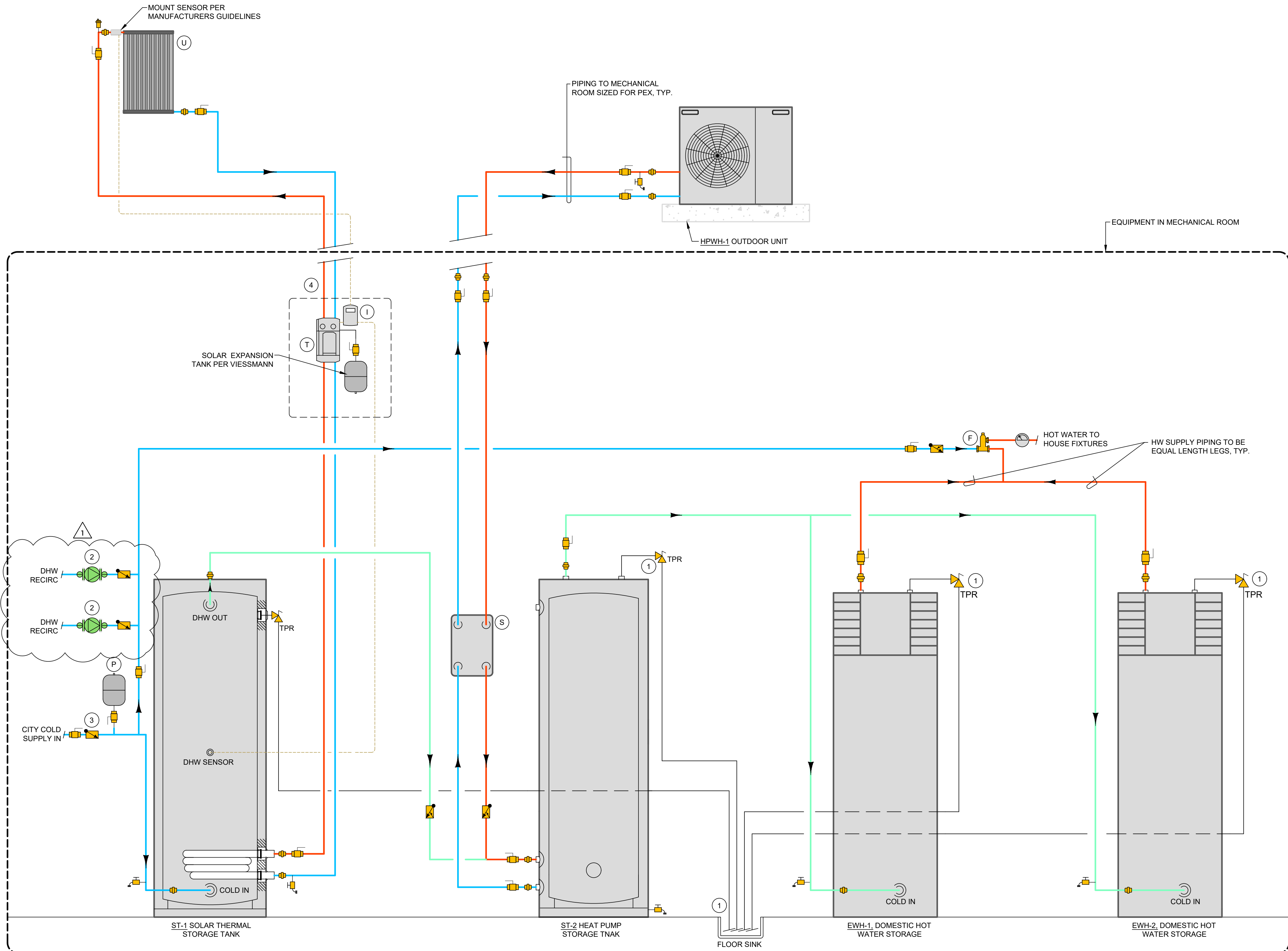
AFFORDABLE HOUSING PROJECT
415 NATURAL BRIDGES DRIVE
SANTA CRUZ, CA

ROOFTOP DOMESTIC WATER & GAS PLAN
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SHEET: P2.8
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LEGEND

	PUMP W/INTEGRAL FLOW CHECK		THERMOSTATIC MIXING VALVE		HOSE BIB/DRAIN/PURGE VALVE
	PUMP W/ISOLATION FLANGES		AIR VENT		CHECK VALVE - SPRING
	BALL VALVE		STRAINER		BACKFLOW PREVENTER
	TEMPERATURE GAUGE		UNION		PRESSURE RELIEF VALVE
	TEMPERATURE/PRESSURE GAUGE		EXPANSION TANK		TEMPERATURE PRESSURE RELIEF VALVE



1 ALL ELECTRIC DHW PIPING SCHEMATIC

NOT TO SCALE

ELECTRIC WATER HEATING DEVICES

MARK	KBTUH IN OUT	FAN V/PH AMPS	GAS CON.	HW/ CW CON.	WT LBS	AFUE	MANUFACTURER AND MODEL	NOTES
HPWH-1	SEE ELECTRIC WATER HEATERS SCHEDULE ON SHEET P0.1							B1-B2
EWH-1	SEE ELECTRIC WATER HEATERS SCHEDULE ON SHEET P0.1							B1-B2
EWH-2	SEE ELECTRIC WATER HEATERS SCHEDULE ON SHEET P0.1							B1-B2

STORAGE TANK

MARK	GAL CAP	KBTUH IN	RECOV. AT 90° F RISE	LBS FULL	DIM. HT. X DIA.	MANUF. MODEL	
ST-1	310	-	-	TBD	TBD	ELBI TBD	
ST-2	310	-	-	3355	86"x40"	ELBI NTA-36-078	

SYSTEM COMPONENTS

MARK	COMPONENT	MANUF.	MODEL	NOTES
(F)	MIXING VALVE	ESBE	VTA 3/4"	C1
(G)	TEMP/PRESSURE GAUGE	MILJOCO	PB300804	
(H)	TEMPERATURE GAUGE	MILJOCO	B259951-2W	
(P)	DHW EXPANSION TANK	ELBI	DXT-18	C2
(R)	STRAINER	-	-	
(S)	FLAT PLATE HEAT EXCHANGER	SWEP	TBD	
(T)	PUMPING STATION	VISSMANN	DN 25	
(U)	SOLAR THERMAL PANEL	TBD	-	
(V)	SOLAR CONTROLLER	VISSMANN	SCU345	

SYSTEM COMPONENTS NOTES

- C1. ANTI-SCALD THERMOSTATIC MIXING VALVE SET TO 115° SHALL BE USED. MOUNT MIXING VALVE NO HIGHER THAN 8" ABOVE HOT WATER OUTLET.
- C2. VERIFY EXPANSION TANK SIZE PER PLUMBING DESIGN. DHW EXPANSION TANK SHALL BE SIZED FOR 9.5 ACCEPTANCE GALLONS AT 140 GALLONS OF SYSTEM VOLUME (INCLUDING TANK), 150° MAX TEMPERATURE AND MAX 20FT SYSTEM PIPING ABOVE INLET TO TANK. SEE MANUFACTURER'S GUIDELINES FOR SIZING DIFFERENT THAN THESE PARAMETERS.

NOTES

GENERAL

1. THIS DRAWING IS CONCEPTUAL AND DIAGRAMMATIC AND DOES NOT CONSTITUTE A COMPLETE PLAN. INSTALLER TO SUPPLY AND INSTALL ALL MATERIALS SHOWN ON THIS PLAN AND ALL OTHERS NEEDED TO COMPLETE THIS HYDRONIC SYSTEM. ALSO, PROVIDE ANY INCIDENTAL WORK NOT SHOWN OR SPECIFIED, WHICH CAN BE REASONABLE INFERRED AS BELONGING TO THE WORK NECESSARY TO PROVIDE THE COMPLETE SYSTEM.
2. ONLY QUALIFIED PLUMBING OR HEATING TECHNICIAN SHALL INSTALL THE HEATING SYSTEM.
3. REFER TO ALL MANUFACTURES GUIDELINES PERTAINING TO THE INSTALLATION, PROTECTION AND MAINTENANCE OF THE HOT WATER SOURCE.

SUBSTITUTIONS

7. INSTALLER SHALL OBTAIN AUTHORIZATION FROM THE OWNER AND DESIGN TEAM FOR "OR EQUAL" SUBSTITUTIONS ON HEATING SYSTEM COMPONENTS. CONTRACTOR SHALL PROVIDE SUBMITTAL ON PROPOSED SUBSTITUTIONS. CLEARLY IDENTIFY MODEL AND OPTIONS.
- APPROVED MANUFACTURER SUBSTITUTION:
- PUMPS - GRUNDFOS, WILO, TACO
- EXPANSION TANKS - AMTROL, ELBI, FLEXCON
- COMPONENTS (VALVES, ETC.) - CALEFFI, WATTS

AIR FOR COMBUSTION AND GAS LINES

8. SYSTEM IS SEALED COMBUSTION DIRECT VENT. SEE MANUFACTURERS VENTING SHEET FOR VENTING REQUIREMENTS.
9. ALL ROUTING OF GAS LINE PIPING SHALL BE BASED ON THE CHAPTER 12 OF THE 2019 CALIFORNIA PLUMBING CODE AND CHAPTER 13 OF THE 2019 CALIFORNIA MECHANICAL CODE. PIPING SHALL BE NEW, STANDARD WEIGHT WROUGHT IRON OR STEEL (EXTERIOR-ONLY GALVANIZED OR BLACK), WITH MALLEABLE IRON FITTINGS. APPROVED PE (POLY-ETHYLENE) PIPE MAY BE USED IN EXTERIOR BURIED PIPING SYSTEMS.

KEY NOTES

- (1) PROVIDE TEMPERATURE & PRESSURE RELIEF WITH DIRECT PIPING TO APPROVED LOCATION.
- (2) RECIRCULATION PUMP WITH DEMAND PER T-24 REQUIREMENTS. TACO GENIE SYSTEM OR EQUAL. COORDINATE WITH PLUMBING CONTRACTOR AND SIZE BASED ON PLUMBING DESIGN.
- (3) PROVIDE DOUBLE BACKFLOW PREVENTION DEVICE PER P2.5.
- (4) ARMACELL VT/SOLARFLEX INSULATION.

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ALL ELECTRIC DHW PIPING SCHEMATIC

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