ATTACHMENT A UNDERGROUND DRAWINGS

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olytechnic University

Florida Polytechnic Univers 4700 Research Way Lakeland. FL 33805

Consultant:

Seal

Project No.: 723008

Issue Date: 01/31/2023

Drawn By: RAM
Approved By: MJW
Scale:

Scale:

Drawing Title:

HVAC LEGEND AND GENERAL NOTES

Drawing No.:

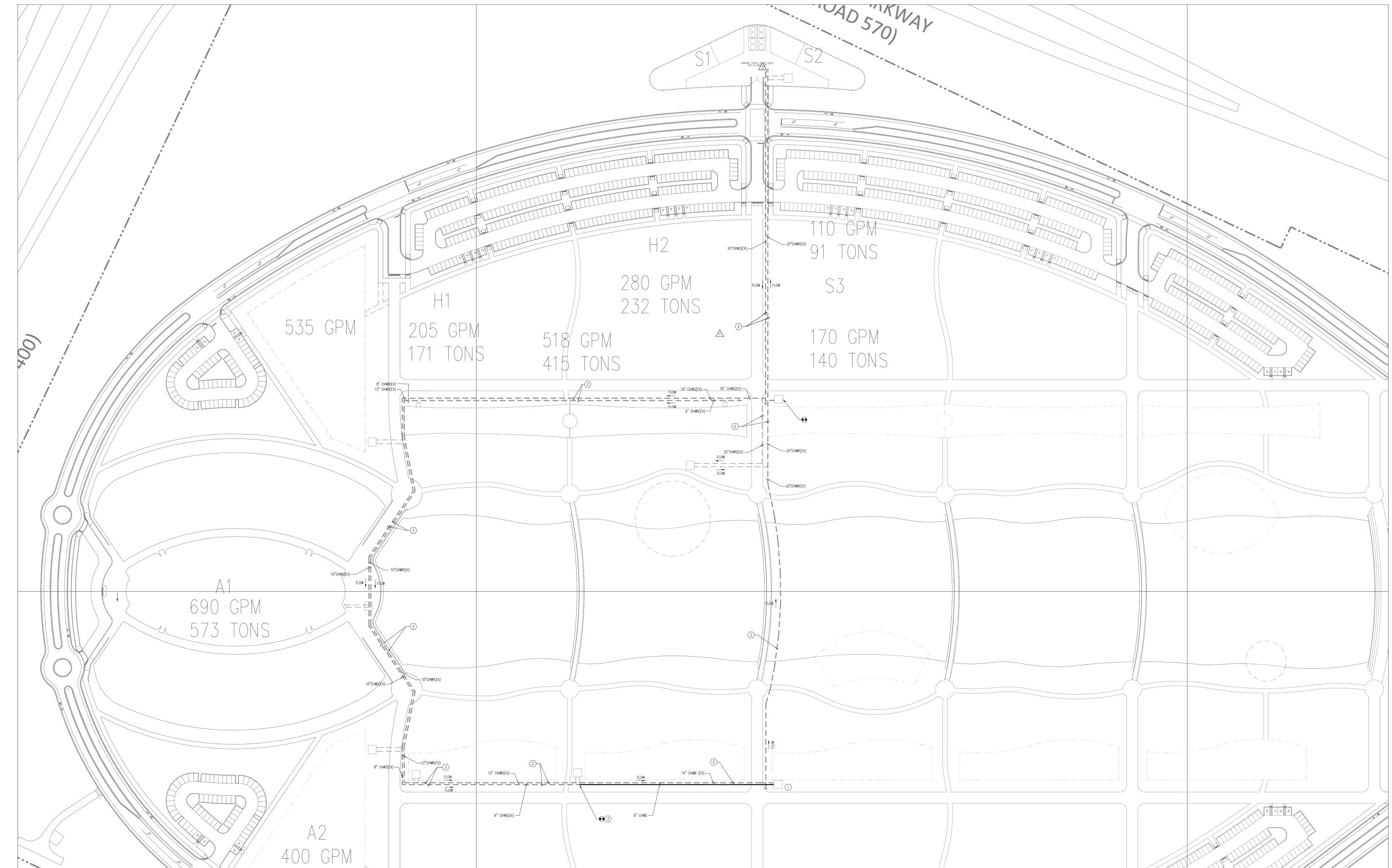
	NG SYMBOL LEGEND	HVAC AB	BREVATIONS	GENERAL NOTES			
SYMBOL DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL DESCRIPTION	SYMBOL DESCRIPTION	
-REVISION REFERENCE 1 DETAIL REFERENCE: TOP - DETAIL#; BOTTOM - DRAWING# SHOWN ON -SHEET NOTE CALLOUT -CWS - CONDENSER WATER SUPPLY -CWR - CONDENSER WATER RETURN -CHILLED WATER SUPPLY -CHILLED WATER SUPPLY -CHILLED WATER RETURN -COD - CONDENSATE -CONDENSATE RETURN -PC - PUMPED CONDENSATE -HOT WATER RETURN -HOT WATER SUPPLY -HIGH PRESSURE STEAM SUPPLY -HIGH PRESSURE STEAM SUPPLY -HIGH PRESSURE STEAM SUPPLY -HIGH PRESSURE STEAM RETURN -MPR - MEDIUM PRESSURE STEAM RETURN -MPR - MEDIUM PRESSURE STEAM RETURN -MPR - MEDIUM PRESSURE STEAM RETURN -REFRIGERANT LIQUID -REFRIGERANT SUCTION		-FLOW DIRECTION -GATE VALVE -BALL VALVE -CALIBRATING BALANCING VALVE -BUTTERFLY VALVE -GAS COCK -UNION -STRAINER -CONTROL VALVE -SOLENOID VALVE -PSI REGCHECK VALVE -FLOW SWITCH -SLOPE DIRECTION (DOWN) -FLEX CONNECTION -O.S.&Y. GATE VALVE -STEAM TRAP -THREE-WAY CONTROL VALVE -THERMOMETER -TWO-WAY CHECK VALVE -RELIEF VALVE -VALVE ON RISER	EQUIP.	- P-TRAP -MANUAL VENT -PRESSURE GAUGE -FLOW METER -WATER METER -INLINE PUMP -INLINE PUMP -CAP -CONNECTION, BOTTOM -CONNECTION, TOP -COUPLING -ELBOW, 90° -ELBOW, 45° -ELBOW, TURNED DOWN -ELBOW, TURNED UP -TEE, OUTLET DOWN -TEE, OUTLET UP -45° PIPE RISE (R) / DROP (D) -PIPE ANCHORS -CONCENTRIC REDUCER -ECCENTRIC REDUCER	AFD — ADJUSTABLE FREQUENCY DRIVE AFF — ABOVE FINISHED FLOOR AFR — ABOVE FINISHED ROOF AHU — AIR HANDLING UNIT AP — ACCESS PANEL BOP — BOTTOM OF PIPE BHP — BRAKE HORSEPOWER BTU — BRITISH THERMAL UNIT h — CENTER LINE ∮ — CFM (CUBIC FEET PER MINUTE) CD — CEILING DIFFUSER CT — COOLING TOWER CV — CONSTANT AIR VOLUME CFM — CUBIC FEET PER MINUTE CU — CONDENSING UNIT DDC — DIRECT DIGITAL CONTROLS DN — DOWN EAT — ENTERING AIR TEMPERATURE ESP — EXTERNAL STATIC PRESSURE EWT — ENTERING WATER TEMPERATURE FCU — FAN COIL UNIT FD — FIRE DAMPER FF — FINAL FILTERS FLA — FULL LOAD AMPS FPM — FEET PER MINUTE GPM — GALLONS PER MINUTE KW — KILOWATT LAT — LEAVING AIR TEMPERATURE LWT — LEAVING WATER TEMPERATURE LD — LINEAR DIFFUSER MBH — THOUSAND BTUS PER HOUR	MCA —MINIMUM CIRCUIT AMPS MOCP —MAXIMUM OVER CURRENT PROTECTION MOD —MOTOR OPERATED CONTROL DAMPER (MOD) NC —NORMALLY CLOSED NO —NORMALLY OPEN NTS —NOT TO SCALE OA —OUTSIDE AIR OAL —OUTSIDE AIR LOUVER PRV —PRESSURE REDUCING VALVE PRS —PRESSURE REDUCING STATION PSI —POUNDS PER SQUARE INCH PSIG —PSI GAUGE PTAC —PACKAGED TERMINAL AIR CONDITIONER PVC —POLYVINYL CHLORIDE PIPE RA —RETURN AIR RHC —REHEAT COIL RHP —ROOFTOP HEAT PUMP RPM —REVOLUTIONS PER MINUTE RS/L —REFRIGERANT SUCTION & LIQUID LINES RTU —ROOFTOP AIR HANDLING UNIT SA —SUPPLY AIR SP —STATIC PRESSURE TSP —TOTAL STATIC PRESSURE UNO —UNLESS NOTED OTHERWISE V/PH —VOLTS/PHASE VAV —VARIABLE AIR VOLUME VFD —VARIABLE FREQUENCY DRIVE ΔP —CHANGE IN TEMPERATURE	 CONNECTION TO EQUIPMENT SHALL BE VERIFIED WITH MANUFACTURER CERTIFIED DRAWINGS. TRANSITIONS TO ALL EQUIPMENT SHALL BE VER AND PROVIDED FOR EQUIPMENT FURNISHED. DIMENSIONS SHALL BE FIELD-VERIFIED AND COORDINATED PRIOR TO PROCUREMENT OR FABRICATION. COORDINATE THE WORK WITH OTHER INVOLVED. FIELD MODIFICATIONS SUCH AS OFFSETS IN PIPING OR DUC (INCLUDING DIVIDED DUCTWORK) NEEDED DUE TO OBSTRUCTIONS OR INTERFERENCES SHALL BE PROVIDED AT NO ADDITIONAL COST. FOR FINVOLVING RENOVATION, COORDINATE NEW WORK WITH EXISTING ELEMI SUCH AS THE BUILDING STRUCTURE AND ARCHITECTURAL FEATURES, SPRINKLER PIPING, LIGHTS, PLUMBING, AND ELECTRICAL CONDUIT. REFER TO TYPICAL DETAILS FOR PIPING AND INSTALLATION OF EQUIP 4. ALL PIPING IS SHOWN SCHEMATICALLY, PROVIDE ALL TRANSITIONS, EFITTINGS, ETC., TO ALLOW SMOOTH FLOWS. INTERRUPTIONS TO EXISTING SERVICES SHALL BE SCHEDULED FOR TIME OF THE OWNER OF THE OWNER'S REPRESENTATIVE AND PROPER COORDINATION WITH OTHER TRADES. PRE-WORK SHALL BE PERFORMED MAKE THE SHUTDOWN PERIOD AS BRIEF AS POSSIBLE. ALL EQUIPMENT, DUCTWORK, ETC., TO BE REMOVED SHALL REMAIN PROFITE OWNER OR DISPOSED OF LEGALLY, AS DIRECTED BY OWNER. WATER PRESSURE DROPS THROUGH COIL CONTROL VALVES SHALL NOT SPSI SLEEYE AND SEAL ALL PIPING PENETRATIONS. PROVIDE MANUAL AIR ALL HIGH POINTS IN CHILLED WATER PIPING. UNLESS OTHERWISE NOTED PIPING LESS THAN 12"Ø SHALL BE SCHED PIPING GREATER THAN 12"Ø SHALL BE STANDARD WEIGHT PIPING.

ATTACHMENT A

UNDERGROUND DRAWINGS

ITB 23-068 CHILLED WATER EX PRJCT

TLC



240 GPM

200 GPM

200 GPM

GENERAL NOTES:

- 1. CONTRACTOR SHALL PROVIDE WARNING TAPE 18" BELOW SURFACE GRADE.
- 2. ANY UTILITY PIPING INDICATED IS FOR INFORMATION AND COORDINATION ONLY.
- 3. REPAIR DAMAGED INSULATION.

DRAWING NOTES:

- 1) PROVIDE ISOLATION VALVE IN VAULT AT THIS LOCATION FOR FUTURE USE
- 2) EXISTING PHASE 1 WORK SHOWN FOR INFORMATION AND COORDINATION ONLY.
- CONNECT NEW CHWS PIPING TO EXISTING PHASE 1 LOOP AND EXTEND TO EXISTING VALVE BOX.



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Consultant:

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Date Description

Project No.: 723008

Issue Date: 01/31/2023

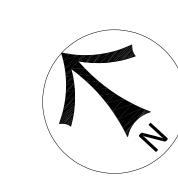
Drawn By: RAM
Approved By: MJW

Scale: 1" = 100'

Drawing Title:

OVERALL MECHANICAL
SITE PLAN

Drawing No.:



- VAULT SCOPE OF WORK:
- CONTRACTOR SHALL EXCAVATE AROUND EXISTING VAULT AND TAKE CARE NOT TO DAMAGE EXISTING PIPE, INSULATION, VALVE, ETC.
- 2. ALL EXCAVATION AROUND PIPING, INSULATION, VALVE ETC. SHALL BE DONE BY HAND.
- 3. VAULT IS TO BE REMOVED AND RESET SO THAT ACCESS LID IS AT GRADE. PROVIDE FOOTER, LIME ROCK, ETC. PER DETAIL 4 ON SHEET M3.0.
- 4. EXISTING 14" AND NEW 6" PIPE SHALL PENETRATE THE VAULT WALL. PROVIDE PENETRATIONS TO ACCOMMODATE PIPING, INSULATION AND SEAL. PENETRATIONS ARE TO BE SEALED PER DETAIL 3 ON SHEET M3.0

DRAWING NOTES:

- EXISTING VAULT SITS ABOVE PIPE AND PIPE IS LOCATED IN THE CENTER OF THE BOX. REPOSITION VALVE BOX TO ACCOMMODATE NEW CHWS PIPE AND VALVES.
- 2 EXISTING VAULT ACCESS IS SITING 2+ FEET ABOVE GRADE. RESET BOX LEVEL SO ACCESS DOOR IS AT SAME ELEVATION AS FINAL GRADE.



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Issue Date: 01/31/2023

Drawn By: RAM Approved By: MJW
Scale: 1" = 100'

Drawing Title:
EXISTING CONDITIONS

M2.0

EXISTING VALVE BOX

EXISTING VALVE BOX



EXISTING VALVE BOX ELEVATION

FLORIDA POLYTECHNIC CHILLED WATER EXPANSION SPECIFICATIONS

1. Chilled-Water Piping: 125 psig at 42 deg F to 56 deg F.

pressure-seal pipe couplings and fittings.

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

Working pressure is equal to the relief pressure plus the static height of the system and pumping head. The only working pressure mandated by authorities having jurisdiction is for

1. Valves. Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.

B. Shop Drawings: Detail, at 1/4 scale, the piping layout, fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and

F. Operation and Maintenance Data: For air control devices, hydronic specialties, and special-duty valves to include in emergency, operation, and maintenance manuals.

1. Installers of Pressure-Sealed Joints: Installers shall be certified by the pressure-seal joint manufacturer as having been trained and qualified to join piping with

D. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the

appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 01.

A. Water-Treatment Chemicals: Furnish enough chemicals for initial system startup and for preventive maintenance for one year from date of Substantial Completion.

A. General: Provide factory pre-insulated underground piping for the underground distribution system. The carrier piping shall be of the following material and connections:

B. Provide with a factory-installed insulation layer of nominal 2 inch thick polyurethane foam insulation complying with the insulating requirements of ASHRAE Standard 90.1,

B. Differential Pressure Meter: For each type of balancing valve and automatic flow control valve, include flowmeter, probes, hoses, flow charts, and carrying case.

A. This Section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:

A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature:

attachments of the same to the building structure. Detail location of anchors, alignment guides, and expansion joints and loops.

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."

1. Division 23 Section "Hydronic Pumps" for pumps, motors, and accessories for hydronic piping.

G. Water Analysis: Submit a copy of the water analysis to illustrate water quality available at Project site.

SECTION 23 2113 - HYDRONIC PIPING

Chilled-water piping.

B. Related Sections include the following:

1.3 PERFORMANCE REQUIREMENTS

A. Product Data: For each type of the following:

Air control devices.

Hydronic specialties.

D. Qualification Data: For Installer.

E. Field quality-control test reports.

C. Welding certificates.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1.6 EXTRA MATERIALS

Material

Connection Type:

a. Welded

2.1 PREFABRICATED UNDERGROUND PIPING

a. Schedule 40 Black Steel

PART 1 - GENERAL

1.2 SUMMARY

makeup water.

1.4 SUBMITTALS

1.1 RELATED DOCUMENTS

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No. Date Description

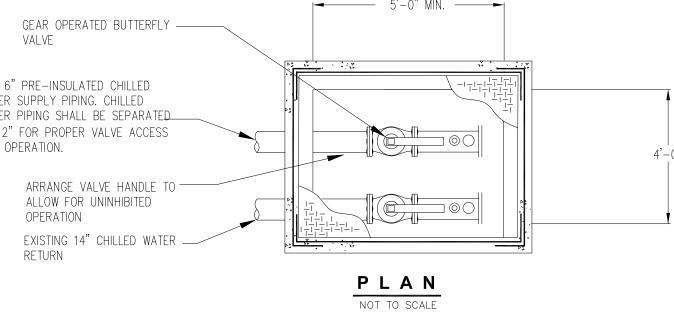
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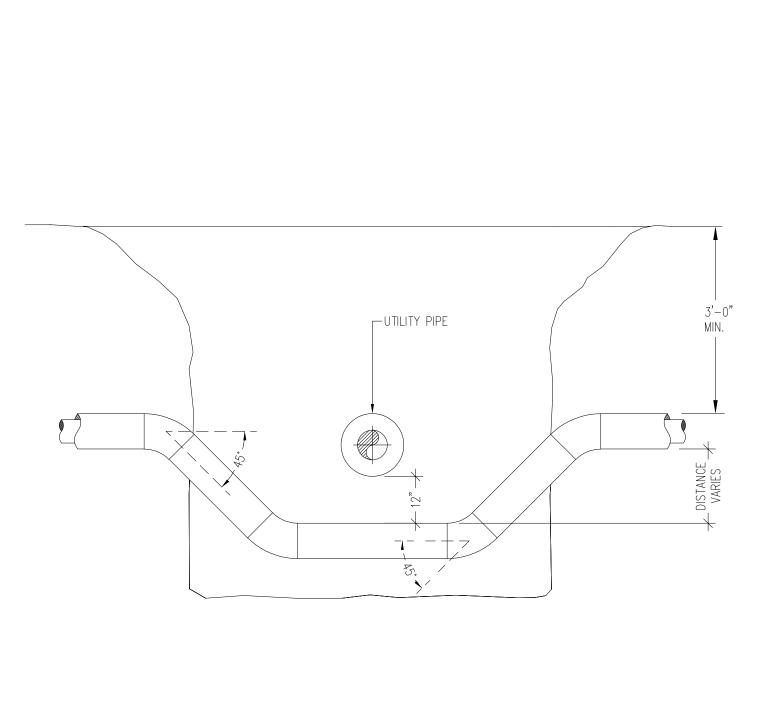
Drawn By: RAM Approved By: MJW

HVAC PIPING SPECIFICATIONS AND DETAILS

UNDERGROUND DRAWINGS WET TAP TYPICAL —

VALVES (TYPICAL) ALLOW FOR ACCESS TO VALVES AND T&P PORTS.





CLEAN —

─UNDISTURBED

← BACKFILL

WELD-TITE

PIPING

BACKFILL

✓ SAND
✓ ■

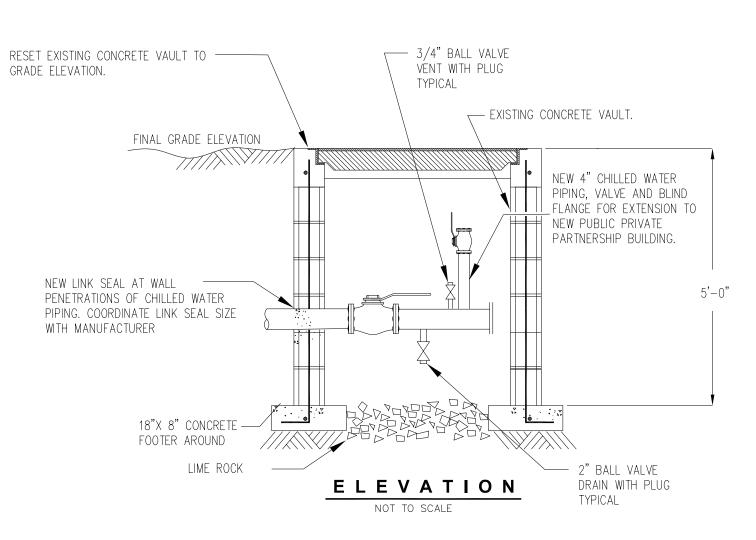
6" MIN. ON 1−1/2"−6"

BEDDING

12" MIN. ON 8"-24"---No Scale PIPE CROSSING DETAIL

5'-0" MIN. ---NEW 6" PRE-INSULATED CHILLED WATER SUPPLY PIPING. CHILLED WATER PIPING SHALL BE SEPARATED. BY 12" FOR PROPER VALVE ACCESS AND OPERATION. ─ 3/4" BALL VALVE RESET EXISTING CONCRETE VAULT TO ————

CHWS&R @ 36" BELOW GRADE MIN. No 55 daystall safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during 1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be 4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum 5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or VENT WITH PLUG GRADE ELEVATION. TYPICAL EXISTING CONCRETE VAULT.



VALVE BOX DETAIL

No Scale

3. Set makeup pressure-reducing valves for required system pressure. 4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type). 5. Set temperature controls so all coils are calling for full flow. 6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values. Verify lubrication of motors and bearings. END OF SECTION 23 2113

B. Perform the following tests on hydronic piping:

Prepare written report of testing.

Inspect pumps for proper rotation.

Open manual valves fully.

C. Perform the following before operating the system:

3. Isolate expansion tanks and determine that hydronic system is full of water.

replacing components and repeat hydrostatic test until there are no leaks.

yield strength or 1.7 times "SE" values in Appendix A in ASME B31.9, "Building Services Piping."

3.4 UNDERGROUND PIPING

C. Water and Sewer Separation: Underground water piping and building sewer shall be separated with undisturbed or compacted earth at least 10 feet horizontally if installed at the same level or lower than the sewer. Where potable water piping is closer than 10 feet to a sewer line, place the bottom of the water pipe at least 18 inches above the top of the sewer or the sewer shall be encased in a concrete envelope as required. D. Identification Tape: Place a color-coded 6 inch wide. 0,004 inch thick polyethylene printed plastic identification tape directly above all underground piping systems at approximately 12 inch below finished grade. Tapes shall be continuously printed with "CAUTION" in large bold letters, and the type of service piping shall be indicated on the second printed line. E. Prefabricated Underground Piping: Adhere strictly to manufacturer's recommendations for installation including sealing of insulation jacketing, anchoring, thrust blocking and expansion. Manufacturer shall include all provisions for system to accommodate all expansion and contraction, including size and location of all thrust blocks, anchors expansion loops and expansion elbows and bends. Provide complete manufacturer's shop drawings and stress calculations. 3.5 PIPE JOINT CONSTRUCTION A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems. B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe. C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly. D. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article. All welds shall be first quality metal, thoroughly fused to the base metal at all points, free of cracks, oxidation, blow holes and nonmetallic inclusions. The welder shall leave his indelible identifying mark on the piping adjacent to each weld. E. Testing of Welded Joints: The Architect may at his own discretion visually spot check welding work anytime. The Architect may also employ an outside testing agency to analyze, using whatever means available, any of the welded joints for imperfections. All welded joints found by inspection or testing to have imperfections shall be repaired as directed by the Architect. 3.7 CHEMICAL TREATMENT A. Perform an analysis of makeup water to determine type and quantities of chemical treatment needed to keep system free of scale, corrosion, and fouling, and to sustain the following water characteristics: 1. pH: 9.0 to 10.5. "P" Alkalinity: 100 to 500 ppm. B. Fill system with fresh water and add liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products from piping. Circulate solution for a minimum of 24 hours, drain, clean strainer screens, and refill with fresh water. C. Add initial chemical treatment and maintain water quality in ranges noted above for the first year of operation. 3.8 FIELD QUALITY CONTROL A. Prepare hydronic piping according to ASME B31.9 and as follows: Leave joints, including welds, un-insulated and exposed for examination during test. 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from 3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens. 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in

2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.

B. Thrust Blocks: Provide properly sized and placed thrust blocks at all fittings in water and fire mains pressure pipe at every change in direction or where required. Thrust blocks shall

bear on and against undisturbed or properly compacted soil. Provide temporary thrust blocking for testing at piping end points and other points as required.

A. Minimum cover for exterior underground piping is three feet over insulation or pipe unless otherwise indicated.

and protected by an outer jacket of PVC, HDPE or fiberglass reinforced composite (FRP) material. C. The insulation jacket joints shall be joined by watertight couplings, and seals shall completely encapsulate the insulation at each end. Fittings shall also be factory pre-insulated and shall comply with the requirements listed above for straight pipe lengths. The piping shall be designed to withstand 150 psig working pressure at 250 degrees F. each field joint shall be fully encapsulated with a 3 mil heat shrunk tape. D. Manufacturers: Thermal Pipe Systems, Inc. Rovanco Piping Systems 3. Perma-Pipe / Ricwil Piping Systems Insultek Ureccon Themacore Energy Task Force

2.2 STEEL PIPE AND FITTINGS A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; type, grade, and wall thickness as indicated in Part 3 "Piping Applications" Article. B. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.

C. Steel Pipe Nipples: ASTM A 733, made of same materials and wall thicknesses as pipe in which they are installed. A. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 VALVES A. Gate, Globe, Check, Ball, and Butterfly Valves: Comply with requirements specified in Division 23 Section "General-Duty Valves for HVAC Piping."

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: Amtrol, Inc. Armstrong Pumps, Inc. 3. Bell & Gossett Domestic Pump; a division of ITT Industries. Taco.

 Body: Bronze. 2. Internal Parts: Nonferrous. 3. Operator: Screwdriver or thumbscrew. Inlet Connection: NPS 1/2. Discharge Connection: NPS 1/8. CWP Rating: 150 psig. 7 Maximum Operating Temperature: 225 deg F.

B. Manual Air Vents:

PART 3 - EXECUTION 3.1 PIPING APPLICATIONS

G. Install piping free of sags and bends.

 A. Chilled-water piping, belowground shall be the following: 1. Service Piping: Schedule 40 steel pipe; 2. It is the contractor options to use either prefabricated fittings or field assemble in strict accordance with the manufacturer's instructions and recommendations. 3.2 VALVE APPLICATIONS

A. Install shutoff-duty valves at each branch connection to supply mains, and at supply connection to each piece of equipment. 3.3 PIPING INSTALLATIONS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on

B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas. C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal. Install piping to permit valve servicing. F. Install piping at indicated slopes.

H. Install fittings for changes in direction and branch connections. I. Install piping to allow application of insulation. J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves. L. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

M. Reduce pipe sizes using eccentric reducer fitting installed with level side up. N. Install valves according to Division 23 Section "General-Duty Valves for HVAC Piping."

O. Identify piping as specified in Division 23 Section "Identification for HVAC Piping and Equipment."

- WALL SLEEVE - LINK SEAL -WATER STOP COLLAR

LINK SEAL THROUGH WALL DETAIL No Scale

No Scale