PHASING PLAN HUSKY

- Construction (Husky) **
  - Phase 0 (Logistics and Prework)
    - **Order and receive all material and equipment required for any phase prior to starting work**
    - **Inventory buildup, outsourcing and managing outage loss of production plan**
    - PRELIMINARY ONLY - Five 3 day outages aligned with plant operations scheduling (possible additional outages with shorter durations and option to lengthen an outage or outages to accomplish more in a phase and reducing # of phases)
    - Walk/Access with lift/Measure/Verify/Coordinate routing of overhead mains and branches. Install overhead mains and branches down to module connection points
  - Phase 1 (Husky area new mains) – no outages
    - Install one mock Machine Connection module for owner/Engineer review and approval
    - Complete module with piping/supports/instruments/valves/insulation/labels/flow arrows
  - Phase 2 (Husky - Prep #1 York chiller for removal) – no outages
    - Install blind flanges on #1 York chiller chilled and cooling water supply and return connections
  - Phase 3 (Husky - Remove #1 York chiller and replace cooling water piping to existing #2 York Chiller) – One 3 day outage
    - Remove #1 York chiller
    - Install Sand Filter
    - Clean York chiller #1 pad
    - Remove and replace cooling water to #2 York chiller
  - Phase 4 (Husky – cooling water piping replacement) - One 3 day outage
    - Install cooling water piping to the new overhead piping mains with connections to old underfloor mains all in mechanical room
    - Install/remove and replace cooling water to air compressors in mechanical room
    - Provide new RO connection tie in to m/u water
  - Phase 5 (Husky - water treatment company source equipment installation at water treatment equipment location) – no outage
    - Install new RO equipment and connect to Husky m/u water
    - Install new water treatment equipment for metering chemical and monitoring
    - Remove old chemical treatment system while swapping over to new chemical treatment system
  - Phase 6 (Husky – Remove and replace chilled water piping) – One 3 day outage
    - Remove and Replace chilled water piping throughout mechanical room and connect to York Chiller #2 and existing chilled water supply/return and new overhead chilled water supply and return
    - Recharge and activate chilled water system **(Note: water treatment company must be engaged in coordinating swap over)**
  - Phase 7 (Husky – cooling and chilled water swap over to new overhead mains) – One 3 day outage
    - Remove all underfloor supplied stub ups to lines 21-26.
    - Replace trench covers with holes or pipe penetrations
    - Install all machine connection modules
    - Obtain owner/engineer approval for machine connection modules for each of all 6 lines **(Note: Owner approval must include an owner designated maintenance and production management representative- see mock approval in Phase 1.)**
    - **Chemically flush each machine internal cooling water, process and chilled water with water treatment vendor before connection to new overhead mains.**
  - Phase 8 (Husky – Test and Balance) – no outages unless required to adjust/modify and TBD
    - Perform complete T&B for flow, pressure and temperatures on chiller/cooling towers/heat exchanger/pumps/blow mold lines 21-26, main piping circuits.
    - Adjust all to scheduled values
  - Phase 9 (Husky – Insulation, pipe painting, Labels, flow indicators, equipment tagging, as built redlines)
  - Phase 10 (Husky – Cleanup, Surface Prep, Painting, and Lighting)
    - Perform deep clean of walls, floors, roof, and all equipment
    - Perform brush and mechanical/chemical surface prep (Altium to provide specs)
    - Paint with primer and finish coats (Altium to provide specs)
    - Prepare and apply floor treatment (Altium to provide specs)
    - Replace lighting

PHASING PLAN WHEEL

- Construction (Wheel) **
  - Phase 0 (Logistics and Prework)
    - **Order and receive all material and equipment required for any phase prior to starting work**
    - **Inventory buildup, outsourcing and managing outage loss of production plan**
    - PRELIMINARY ONLY - Three 3 day outages aligned with plant operations scheduling (possible additional outages with shorter durations and option to lengthen an outage or outages to accomplish more in a phase and reducing # of phases)
    - Walk/Access with lift/Measure/Verify/Coordinate routing of overhead mains and branches. Install overhead mains and branches down to module connection points
  - Phase 1 (Wheel area new mains) – no outages
    - Install one mock Machine Connection module for owner/Engineer review and approval
    - Complete module with piping/supports/instruments/valves/insulation/labels/flow arrows
    - Isolate cooling water supplying three existing air compressors.
    - Remove wiring and remove three air compressors from the wheel apparatus room.
    - Demo #2 and #3 air compressor housekeeping pads.
    - Clean air #1 compressor footprint and surroundings.
    - Modify existing #1 air compressor concrete housekeeping pad to accommodate two new water tanks.
    - Install one new chilled water tank with nozzles and one new cooling water tank with nozzles in wheel apparatus room.
    - Pour five new housekeeping concrete pads for new chilled and cooling water pumps.
    - Install two new chilled water pumps and three new cooling water pumps.
    - Install two VFD's, Two induction motors and 2 flow transmitters.
    - Install new cooling water piping from cooling water pumps to new overhead cooling mains that connect wheel machines and also over to existing Trane chiller for a later (2) phase connection.
    - Install new chilled water piping from new chilled water pumps over to existing Trane chiller for a later (4) phase connection.
    - Provide new RO connection tie in to m/u water
  - Phase 2 (Wheel - Remove cooling tower water tank/prep AEC chiller for removal) – One 3 day outage
    - Valve off, drain and remove existing tank
    - Clean old tank footprint and surroundings and paint area
    - Demo existing cooling water piping and remove AEC chiller.
    - Install new cooling tower return lines to new cooling water tank.
    - Clean AEC chiller pad
    - Install Sand Filter
    - Connect new cooling water piping to existing Trane chiller.
    - Recharge and activate new tank and new cooling water system **(Note: water treatment company must be engaged in coordinating swap over)**
  - Phase 3 (Wheel - water treatment company source equipment installation on removed AEC chiller pad) – no outage
    - Install new RO equipment and connect to wheel m/u water (Husky will have a separate RO system)
    - Install new water treatment equipment for metering chemical and monitoring
    - Remove old chemical treatment system while swapping over to new chemical treatment system
  - Phase 4 (Wheel – Remove and replace chilled water tank and chilled water piping) – One 3 day outage
    - Valve off, drain and remove existing tank
    - Clean old tank footprint and surroundings and paint area
    - Remove and Replace chilled water piping throughout Wheel mechanical room and connect to Trane Chiller and new overhead chilled water supply and return
    - Recharge and activate new tank and chilled water system **(Note: water treatment company must be engaged in coordinating swap over)**
  - Phase 5 (Wheel – cooling and chilled water swap over to new overhead mains) – One 3 day outage
    - Remove all underfloor supplied stub ups to lines 1-11.
    - Replace trench covers with holes or pipe penetrations
    - Install all machine connection modules
    - Obtain owner/engineer approval for machine connection modules for each of all 11 lines **(Note: Owner approval must include an owner designated maintenance and production management representative- see mock approval in Phase 1.)**
    - **Chemically flush each machine internal cooling water and chilled water with water treatment vendor before connection to new overhead mains.**
  - Phase 6 (Wheel – Test and Balance) – no outages unless required to adjust/modify and TBD
    - Perform complete T&B for flow, pressure and temperatures on chiller/cooling towers/pumps/blow mold lines 1-11, main piping circuits.
    - Adjust all to scheduled values
  - Phase 7 (Wheel – Insulation, pipe painting, Labels, flow indicators, equipment tagging, as built redlines)
  - Phase 8 (Wheel – Cleanup, Surface Prep, Painting, and Lighting)
    - Perform deep clean of walls, floors, roof, and all equipment
    - Perform brush and mechanical/chemical surface prep (Altium to provide specs)
    - Paint with primer and finish coats (Altium to provide specs)
    - Prepare and apply floor treatment (Altium to provide specs)
    - Replace lighting

Lenexa KS Cooling Water System

Altium Packaging

11725 W 85th St.
Overland Park, KS 66214

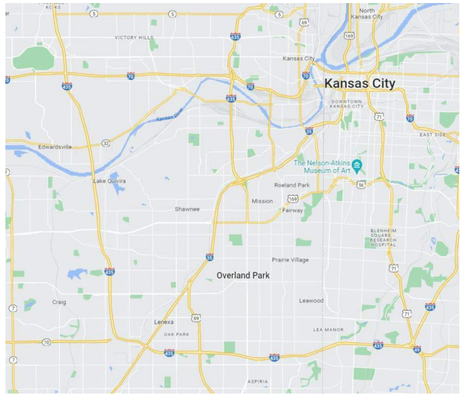
ISSUE FOR BID
02.24.2023

NOTE TO CONTRACTOR

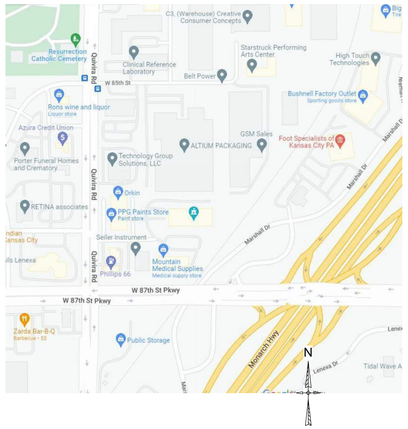
Pipe sizes are not shown on all sheets.
Refer to Process Flow Diagrams for pipe sizing.

GENERAL	
Sheet Number	Sheet Name
G001	COVER SHEET
M001	MECHANICAL LEGEND
M002	SPECIFICATIONS
M003	SPECIFICATIONS
M-100	OVERALL SITE PLAN
M-301	SECTIONS & ISOMETRICS
M-302	SECTIONS & ISOMETRICS
M-501	DETAILS
M-601	SCHEDULES
HUSKY SYSTEM	
HM-100	OVERALL HUSKY SYSTEM - PHASE 1
HM-200	HUSKY SYSTEM MECHANICAL ROOM - PHASE 2
HM-300	HUSKY SYSTEM MECHANICAL ROOM - PHASE 3
HM-301	HUSKY SYSTEM PHASE 3 ISOMETRIC
HM-400	HUSKY SYSTEM MECHANICAL ROOM - PHASE 4
HM-401	HUSKY SYSTEM PHASE 4 ISOMETRIC
HM-500	HUSKY SYSTEM MECHANICAL ROOM - PHASE 5
HM-600	HUSKY SYSTEM MECHANICAL ROOM - PHASE 6
HM-601	HUSKY SYSTEM PHASE 6 ISOMETRIC
HM-700	OVERALL HUSKY SYSTEM - PHASE 7
HPF-800	HUSKY PROCESS FLOW DIAGRAM
WHEEL SYSTEM	
WM-100	OVERALL WHEEL SYSTEM DEMO - PHASE 1
WM-101	OVERALL WHEEL SYSTEM NEW WORK - PHASE 1
WM-102	WHEEL SYSTEM MECHANICAL ROOM - PHASE 1
WM-103	WHEEL SYSTEM PHASE 1 ISOMETRIC
WM-200	WHEEL SYSTEM MECHANICAL ROOM - PHASE 2
WM-201	WHEEL SYSTEM PHASE 2 ISOMETRIC
WM-300	WHEEL SYSTEM MECHANICAL ROOM - PHASE 3
WM-301	WHEEL SYSTEM PHASE 3 ISOMETRIC
WM-400	WHEEL SYSTEM MECHANICAL ROOM - PHASE 4
WM-401	WHEEL SYSTEM PHASE 4 ISOMETRIC
WM-500	OVERALL WHEEL SYSTEM DEMO - PHASE 5
WM-600	OVERALL WHEEL SYSTEM NEW WORK - PHASE 6
WPF-800	WHEEL PROCESS FLOW DIAGRAM

VICINITY MAP



SITE MAP



Altium Packaging

Lenexa KS Cooling Water System
11725 W 85th St.
Overland Park, KS 66214

DESIGNER

CLARKNEXSEN

440 MARTIN LUTHER KING JR BLVD
MACON, GEORGIA 31201
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PROFESSIONAL SEAL

NOT FOR CONSTRUCTION

SUBMITTAL

02.24.2023
ISSUE FOR BID

REVISIONS

SHEET

COVER SHEET

G001

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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LEGEND

GENERAL

#	CONSTRUCTION NOTE IDENTIFICATION (DEMO AND NEW WORK)
	INDICATES EXISTING ITEM
	INDICATES NEW ITEM
	INDICATES ITEM TO BE REMOVED
	REMOVE TO THIS POINT
	CONNECT NEW TO EXISTING
XXXX	ROOM NUMBER IDENTIFICATION
AD	ACCESS DOOR
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
ALUM	ALUMINUM
ARCH	ARCHITECTURAL
DIA	DIAMETER
DWG	DRAWING
EX	EXISTING
EXR	EXISTING TO REMAIN
GA	GAUGE
GALV	GALVANIZED
GFCI	GOVERNMENT FURNISHED, CONTRACTOR INSTALLED
MFG	MANUFACTURER
MISC	MISCELLANEOUS
M/U	MAKE-UP WATER
NIC	NOT IN CONTRACT
RBJ	RUN BETWEEN JOIST
REX	REMOVE EXISTING
RO	REVERSE OSMOSIS SYSTEM
RTJ	RUN THRU JOIST
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED

PIPING SYSTEM ABBREVIATIONS

CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
CWS	CONCENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
D	CONDENSATE DRAIN
PD	PUMPED CONDENSATE DRAIN

VALVES AND ACCESSORIES

	AUTOMATIC AIR VENT W/SHUT OFF PIPE DISCHARGE TO DRAIN
	AUTOMATIC FLOW CONTROL VALVE
	BACKFLOW PREVENTER
	BALL VALVE
	BOTTOM CONNECTION
	BUTTERFLY VALVE
	CAPPED PIPE
	CHECK VALVE
CO	CLEANOUT
	CONCENTRIC REDUCER
	DIRECTION OF FLOW
	ECCENTRIC REDUCER
	FLANGED CONNECTION (THIS NOT A UNION)
	FLEXIBLE CONNECTION
	FLOW METER
	ISOLATION VALVE (BALL VALVE FOR 2" & UNDER; BUTTERFLY FOR 2.5" & LARGER)
	GATE VALVE
	GLOBE VALVE
	MANUAL AIR VENT
	METERED BALANCING VALVE WITH PRESSURE TAPS
	NEEDLE VALVE
PT	PRESSURE/TEMPERATURE TEST PLUG
	PLUG VALVE
W,C,F	PIPE ANCHOR (W=WALL, C=CEILING, F=FLOOR)
	PIPE GUIDE
	PIPE SLEEVE
	PIPE TURNING UP
	PIPE TURNING DOWN
	PITCH DOWN IN DIRECTION OF ARROW
	PRESSURE REDUCING VALVE
	PRESSURE RELIEF VALVE
	PRESSURE GAUGE WITH GAUGE COCK
	SQUARE HEAD COCK
	STEAM TRAP
	STRAINER
	STRAINER WITH BLOW-OFF VALVE
	THREE-WAY CONTROL VALVE COORDINATE WITH CONTROLS
	THERMOMETER
	THERMOSTATIC RADIATOR VALVE
	TOP CONNECTION
	TWO-WAY CONTROL VALVE COORDINATE WITH CONTROLS
	UNION
	VACUUM BREAKER
V-1	VALVE IDENTIFICATION COORDINATE WITH CONTROLS

CONTROLS

AI	ANALOG INPUT (TO PANEL)
AO	ANALOG OUTPUT (OUT OF PANEL)
BI	BINARY INPUT (TO PANEL)
BO	BINARY OUTPUT (OUT OF PANEL)
	2-WAY CONTROL VALVE
HP	HIGH PERFORMANCE 2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
C	COMMON
	CONTROL WIRING (SIGNAL PATH)
EP	POWER WIRING
DP	DIFFERENTIAL PRESSURE SWITCH
DPS	DIFFERENTIAL PRESSURE SENSOR
SD	DUCT SMOKE DETECTOR
VSF	FAN VARIABLE SPEED SWITCH
FMS	FLOW MEASURING STATION
FS	FIRESTAT
FZ	FREEZESTAT
HL	HIGH LIMIT TEMPERATURE SENSOR
H	HUMIDISTAT
H	HUMIDITY SENSOR
M	MOTOR
M	MOTORIZED CONTROL AIR DAMPER
MS	MOTOR STARTER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
S	SWITCH
T	TEMPERATURE SENSOR
T C,H	THERMOSTAT (C-COOLING, H-HEATING) (H&C-HEATING AND COOLING)
TC	TIME CLOCK
V-1	VALVE IDENTIFICATION
CSR	CURRENT SENSING RELAY
	NORMALLY OPEN CONTROLS
	NORMALLY CLOSED CONTROLS
VFD	VARIABLE FREQUENCY DRIVE

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MECHANICAL LEGEND

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SPECIFICATIONS:

1. GENERAL:
   A. SITE SPECIFIC SAFETY TRAINING: CONTRACTOR SHALL PROVIDE 2 HOURS OF SITE-SPECIFIC SAFETY TRAINING ALLOWANCE FOR ANY EMPLOYEE WORKING ON SITE PRIOR TO STARTING WORK.
   B. CONTRACTOR SHALL CONFIRM CERTIFICATION WITH ISNETWORLD.
   C. CONTRACTOR SHALL COORDINATE WITH PLANT REPRESENTATIVE TO PREPARE AND COAT CEILING TO PREVENT INTERFERENCE WITH THIRD-PARTY LIGHTING CONTRACTOR.
   D. MATERIALS CAN BE SUPPLIED TAX EXEMPT.
   E. WHEN REMOVING COOLING WATER PIPING IN TRENCHES, REMOVE AND REINSTALL COMPRESSED AIR PIPING IF REQUIRED FOR ACCESS.
   F. TRENCH STUB UP REPAIRS WILL REQUIRE REMOVAL OF CHECKERED STEEL PLATE AT PENETRATIONS AND REPLACEMENT WITH NEW CHECKERED STEEL TO COVER THE AREA FROM SIDE TO SIDE OF TRENCH COVER. FINAL COVERING SHALL BE AT LEVEL WITH EXISTING CHECKERED STEEL AND SHALL NOT EXTEND ABOVE PLATE ELEVATION AND SHALL NOT CREATE A TRIPPING HAZARD. REINFORCE NEW COVERING AREA AS REQUIRED TO PREVENT SAGGING. PREPARE SURFACE, PRIME AND PAINT ENTIRE COVER FOR ANY TRENCH SECTION REPAIRED.
   G. RECLAIM REFRIGERANT FROM CHILLERS THAT ARE REMOVED AND TURN OVER REFRIGERANT TO ALTIUM.
   H. PIPING SHALL BE TESTED WITH HYDROSTATIC TEST WITH PRESSURE AT 2 TIMES WORKING PRESSURE OF THE SYSTEM. SYSTEM SHALL HOLD PRESSURE FOR A MINIMUM OF 3 HOURS. PIPING SHALL BE FLUSHED AND DEBRIS REMOVED FROM PIPING PRIOR TO CONNECTIONS TO EQUIPMENT. TESTING AND FLUSHING SHALL BE INCLUDED IN BID.
   I. REMOVE AND REINSTALL/REPLACE ELECTRICAL CONNECTIONS TO TANKS OR OTHER INSTRUMENTATION AS REQUIRED TO MAINTAIN EXISTING OPERATIONS ON SYSTEMS AND NEW EQUIPMENT.
   J. CONTRACTOR IS ALLOWED TO USE DESIGNATED ALTIUM RESTROOMS AND BREAK AREAS. COORDINATE USAGE WITH ALTIUM SITE MAINTENANCE MANAGER.
   K. PROVIDE BRANCHES OUT TOP OF MAINS AND PROVIDE BALL VALVE AIR VENTS TO REMOVE AIR WHEN FILLING SYSTEM.
   L. LOCAL/HSE PERMITTING WILL NOT BE A REQUIREMENT.
   M. SURFACE PREP FOR CONCRETE FLOORS, BLOCK WALLS AND ROOF/CEILING STEEL IN MECHANICAL ROOMS SHALL BE IN ACCORDANCE WITH SPCC-SP2 – HAND TOOL CLEANING, SPSS -SP3- POWER TOOL CLEANING, AND SPCC -SP13-SURFACE PREPARATION OF CONCRETE. CONTRACTOR SHALL PROVIDE PRIMING AND COATING RECOMMENDATIONS AND PRICING AS A LINE ITEM ON THE BID FORM.
   N. ALL UNINSULATED PIPING SHALL BE CLEANED, PRIMED AND PAINTED.IN ACCORDANCE WITH AWWA C210-07 LIQUID EPOXY COATING SYSTEMS. COLOR SELECTION MUST BE APPROVED BY OWNER.
   O. PIPE LABELING SHALL BE PROVIDED AT A MAXIMUM SPACING OF 25 FEET AND SHALL BE INSTALLED IN ACCORDANCE WITH ANSI/ASME 13.1 PIPE LABELING REQUIREMENTS.
   P. CAMLOCK FITTINGS ON EXISTING SYSTEM MAY BE REUSED.
   Q. CONTROL VALVES ON AHU-1 AND AHU-2 MAY BE REUSED.

2. PIPING: ALL PIPING SHALL BE SCHEDULE 40 CARBON STEEL. MAINS IN THE PLANT FLOOR SHALL BE GROOVED WITH "VICTAULIC" MECHANICAL COUPLINGS.
   A. STEEL PIPING: ASTM A 53 GRADE B, SCHEDULE 40, ELECTRIC RESISTANCE WELDED OR SEAMLESS.
   B. ALL PIPING IN MECHANICAL ROOMS SHALL BE WELDED IN ACCORDANCE WITH AWWA C206-11, FIELD WELDING OF STEEL WATER PIPING. USE FLANGED CONNECTIONS AT VALVES AND PIPING CONNECTIONS TO EQUIPMENT.
   C. PIPING BRANCHES AND PIPING 2" AND SMALLER SHALL BE THREADED.
   D. FITTINGS: DIAMETERS 2 INCHES AND SMALLER; ANSI/ASME B16.3, MALLABLE IRON, SCREWED AND BANDED. DIAMETERS LARGER THAN 2 INCHES: ASTM A 234/A 234M, ANSI/ASME B16.9. FORGED STEEL WELDED TYPE. ELBOWS: LONG RADIUS TYPE.
   E. JOINTS: DIAMETERS 2 INCHES AND SMALLER: THREADED. DIAMETERS LARGER THAN 2 INCHES: WELDED.
   F. FLANGES: ASTM A 105/A 105M, FORGED CARBON STEEL, WELDING-NECK TYPE, 1/16 INCH RAISED FACE, ANSI/ASME B16.5.
   G. UNIONS: ANSI/ASME B16.39, MALLABLE IRON, GROUND JOINT, SCREWED, BRONZE-TO-BRONZE SEAT.
   H. GROOVED MECHANICAL: EACH GROOVED MECHANICAL JOINT SHALL BE A SYSTEM, INCLUDING COUPLING HOUSING, GASKET, FASTENERS, ALL FURNISHED BY THE SAME MANUFACTURER. JOINT INSTALLATION SHALL BE IN COMPLIANCE WITH JOINT MANUFACTURER'S WRITTEN INSTRUCTIONS. USE FITTING AND COUPLING HOUSES OF MALLEABLE IRON CONFORMING TO ASTM A47/A47M, GRADE 32510; DUCTILE IRON CONFORMING TO ASTM A536, GRADE 65-45-12; OR STEEL CONFORMING ASTM A106/A106M, GRADE B OR ASTM A53/A53M. USE GASKETS OF MOLDED SYNTHETIC RUBBER WITH CENTRAL CAVITY, PRESSURE RESPONSIVE CONFIGURATION AND CONFORMING TO ASTM D2000 GRADE NO. 2CA615A15B44F17Z FOR CIRCULATING MEDIUM UP TO 110 DEGREES C 230 DEGREES F OR GRADE NO. M3BA610A15B44Z FOR CIRCULATING MEDIUM UP TO 93 DEGREES C 200 DEGREES F. GROOVED MECHANICAL CONNECTIONS SHALL CONFORM TO AWWA C606. COUPLING NUTS AND BOLTS SHALL BE STEEL AND SHALL CONFORM TO ASTM A183. PIPE CONNECTIONS AND FITTINGS SHALL BE THE PRODUCT OF THE SAME MANUFACTURER. PROVIDE JOINT INSTALLATION BE IN COMPLIANCE WITH JOINT MANUFACTURER'S WRITTEN INSTRUCTIONS.
   I. INSTALL WITH SUFFICIENT PITCH TO ENSURE ADEQUATE DRAINAGE AND AIR ELIMINATION. INSTALL MANUAL AIR VENTS AT HIGH POINT IN PIPING SYSTEM.
   J. HYDROSTATICALLY TEST EACH SYSTEM AT A PRESSURE OF 150 PERCENT OF THE WORKING PRESSURE OR 125 PSIG, WHICHEVER IS GREATER.
   K. MAINTAIN TEST PRESSURE FOR A MINIMUM OF 2 HOURS AND UNTIL ALL JOINTS ARE EXAMINED FOR LEAKAGE.
   L. PIPING MAY BE TESTED IN SECTIONS AT THE CONTRACTOR'S OPTION. TEST THE ENTIRE SYSTEM.

3. COPPER TUBING
   A. TUBING: ASTM B 88, HARD DRAWN, TYPE L FOR ABOVE AND TYPE K FOR BELOW GROUND.
   B. FITTINGS: ANSI/ASME B16.22, WROUGHT COPPER, SOLDER JOINT TYPE; OR ANSI B16.18 CAST-BRASS SOLDER-JOINT TYPE.
   C. UNIONS AND ADAPTERS: ANSI/ASME B16.22, CAST-BRASS SOLDER-JOINT TYPE.

4. SOLDER: PROVIDE SOLDER IN CONFORMANCE WITH ASTM B 32, GRADE SB5, TIN-ANTIMONY ALLOY. SOLDER FLUX SHALL BE LIQUID OR PASTE FORM, NON-CORROSIVE AND CONFORM TO ASTM B 813.

5. BRAZING FILLER METAL: FILLER METAL SHALL CONFORM TO AWS A5.8/A5.8M, TYPE BAG-5 WITH AWS TYPE 3 FLUX, EXCEPT TYPE BCUP-5 OR BCUP-6 MAY BE USED FOR BRAZING COPPER-TO-COPPER JOINTS.

6. CAMLOCK: 2 – INCH NPT B200-BR, BRASS, COORDINATE VALVE TYPE WITH EXISTING SYSTEM AND PIPING.

7. Y-TYPE STRAINER MANUFACTURERS:
   A. ARMSTRONG.
   B. SPRIAX SARCO
   C. MUELLER.
   D. WATT: LF77S FOR 2" NPT, BRONZE.
   E. UP TO AND INCLUDING 2 - INCHES: CAST BRONZE BODY FOR 175 - PSIG WORKING PRESSURE., THREADED ENDS, Y PATTERN WITH 0.040 INCH PERFORATED STAINLESS STEEL SCREEN WITH NET FREE AREA EQUAL TO AT LEAST 4 TIMES AREA OF PIPE INLET.
   F. OVER 2 – INCHES: CAST BRONZE BODY FOR 175 - PSIG WORKING PRESSURE., FLANGES ENDS, Y PATTERN WITH 0.040 INCH PERFORATED STAINLESS STEEL SCREEN WITH NET FREE AREA EQUAL TO AT LEAST 4 TIMES AREA OF PIPE INLET.

8. AIR VENTING VALVES: MANUALLY-OPERATED GENERAL SERVICE TYPE AIR VENTING VALVES, BRASS OR BRONZE VALVES THAT ARE FURNISHED WITH THREADED PLUGS OR CAPS. AUTOMATIC TYPE AIR VENTING VALVES SHALL BE THE LEVER AND SPRING TYPE WITH BRASS BODIES, 300 SERIES CORROSION-RESISTANT STEEL FLOAT LEVER AND SPRING, LINKAGE AND REMOVABLE SEAT. AIR VENTING VALVES ON WATER COILS SHALL HAVE NOT LESS THAN 1/8 INCH THREADED END CONNECTIONS. AIR VENTING VALVES ON WATER MAINS SHALL HAVE NOT LESS THAN 3/4 INCH THREADED END CONNECTIONS. AIR VENTING VALVES ON ALL OTHER APPLICATIONS SHALL HAVE NOT LESS THAN 1/2 INCH THREADED END CONNECTION.

9. FLEXIBLE PIPE CONNECTORS: PROVIDE FLEXIBLE CONNECTORS OF THE DOUBLE-SPHERICAL RUBBER TYPE. CONNECTORS SHALL BE MADE OF REINFORCED EPDM RUBBER WITH STEEL FLANGES AND ACCESSORIES. PRESSURE AND TEMPERATURE RATING SHALL MATCH THE PIPING SYSTEM. SELECT DOUBLE-SPHERICAL TYPE FOR 2 INCHES LATERAL AND 1 INCH AXIAL MOVEMENT.

10. PIPE HANGERS, INSERTS, AND SUPPORTS: TO MSS SP-58 AND INTERNATIONAL MECHANICAL CODE.

11. DIELECTRIC UNIONS AND FLANGES:
   A. MANUFACTURER: WATTS SERIES 3000.
   B. CONSTRUCTION: SUITABLE FOR THE PRESSURES AND TEMPERATURES OF THE SYSTEMS IN WHICH INSTALLED.
   C. UNION ENDS: THREADED OR SOLDERED TO MATCH ADJACENT PIPING.
   D. FLANGES: WELDING NECK, THREADED, OR SOLDERED TO MATCH ADJACENT PIPING.
   E. METAL PARTS OF DIELECTRIC UNIONS AND FLANGES SEPARATED SUCH THAT ELECTRICAL CURRENT IS BELOW 1 PERCENT OF GALVANIC CURRENT THAT WOULD EXIST WITH METAL-TO-METAL CONTACT.
   F. FACTORY-CERTIFIED TO WITHSTAND A MINIMUM OF 600 VOLTS ON A DRY LINE WITH NO FLASHOVER.
   G. PROVIDE DIELECTRIC WATERWAYS WITH A WATER IMPERVIOUS INSULATION BARRIER CAPABLE OF LIMITING GALVANIC CURRENT TO 1 PERCENT OF SHORT CIRCUIT CURRENT IN A CORRESPONDING BIMETALLIC JOINT. WHEN DRY, INSULATION BARRIER SHALL BE ABLE TO WITHSTAND A 600-VOLT BREAKDOWN TEST. PROVIDE DIELECTRIC WATERWAYS CONSTRUCTED OF GALVANIZED STEEL AND HAVE THREADED END CONNECTIONS TO MATCH CONNECTING PIPING. DIELECTRIC WATERWAYS SHALL BE SUITABLE FOR THE REQUIRED OPERATING PRESSURES AND TEMPERATURES. PROVIDE DIELECTRIC FLANGES WITH THE SAME PRESSURE RATINGS AS STANDARD FLANGES AND PROVIDE COMPLETE ELECTRICAL ISOLATION BETWEEN CONNECTING PIPE AND/OR EQUIPMENT AS DESCRIBED HEREIN FOR DIELECTRIC WATERWAYS.

12. CHECK VALVES:
   A. MANUFACTURERS: WATTS ICV-125 WAFER OR EQUAL.
   B. CHECK VALVE SHALL BE MANUFACTURED OUT OF ASTM A126 CLASS B CAST IRON AND COMPLY WITH API 594. VALVE SHALL BE PRESSURE RATED TO 200PSI FOR SIZES 2" – 12". CHECK VALVE CONSTRUCTED WITH ALUMINUM BRONZE DISC PLATE, EPDM SEAT, 316 STAINLESS STEEL SPRING, AND PTFE BEARINGS. LEAD FREE* CAST IRON WAFER CHECK VALVE SHALL BE CONSTRUCTED USING LEAD FREE* MATERIALS. LEAD FREE ICV-125-2-2-T SHALL COMPLY WITH STATE CODES AND STANDARDS, WHERE APPLICABLE, REQUIRING REDUCED LEAD CONTENT.

13. BUTTERFLY VALVES:
   A. MANUFACTURERS: WATTS DBF-04 WAFER OR EQUAL.
   B. TYPE: MSS SP-67, TYPE 1, TIGHT SHUTOFF, SUITABLE FOR DEAD-END SERVICE.
   C. BODY: LUG-WAFER TYPE, CAST IRON ASTM A 385 OR DUCTILE IRON ASTM A 126, CHROME-PLATED DUCTILE-IRON DISC OR ALUMINUM-BRONZE DISC, STAINLESS STEEL STEM, RESILIENT REPLACEABLE EPDM SEAT, EXTENDED NECK, INFINITE-POSITION LEVER HANDLE WITH MEMORY STOP FOR 2-1/2 INCHES THROUGH 4 INCHES, GEAR OPERATORS FOR 6 INCHES AND LARGER, 150-PSI WORKING PRESSURE.

14. BALL VALVES:
   A. MANUFACTURERS: WATTS LEFBV-3C OR EQUAL.
   B. UP TO AND INCLUDING 2 INCHES: 600-PSIG CWP, TWO-PIECE-BRASS BODIES, REPLACEABLE REINFORCED TEFLON SEAT, CONVENTIONAL PORT, BLOW-PROOF STEM, CHROME=PLATED BRASS BALL, THREADED OR SOLDERED ENDS.

15. CALIBRATED BALANCING VALVES:
   A. MANUFACTURERS:
      a. BELL& GOSSETT, CIRCUIT SETTER.
      b. FLOW DESIGN, ACCUSETTER.
      c. GERAND, BAL VALVE – INDICATOR.
      d. WATTS LFCSM-61-S, 2 – INCH AND SMALLER SIZES, BRONZE.
      e. VICTAULIC FLGD, 6 – FLANGED, DUCTILE IRON.
      f. B & G: CB-6F, 6 – INCH FLANGED, CAST IRON.
   B. BRASS OR BRONZE BODY WITH THREADED ENDS METER CONNECTIONS WITH POSITIVE SHUTOFF CHECK OR NEEDLE VALVE, MEMORY STOP, TAG TO INDICATE GPM AND PRESET POSITION OR DIFFERENTIAL PRESSURE READING. VALVE NOT TO BE USED FOR SHUTOFF OR ISOLATION OF THE SYSTEM COMPONENTS.

16. GATE VALVES: WATTS 408-OSY, 2 – INCH TO 12 - INCH, FLANGED, CAST IRON.

17. HIGH PERFORMANCE ROTARY VALVES:
   A. MANUFACTURE: KELE MAX CAP V SERIES OR EQUAL; VALVE MANUFACTURER SHALL PROVIDE ACTUATOR. ACTUATOR SHALL BE INTEGRALLY MOUNTED TO THE VALVE AT THE FACTORY. THE MANUFACTURER SHALL WARRANT ALL COMPONENTS FOR A PERIOD OF 5 YEARS FROM THE DATE OF PRODUCTION.
   B. VALVE BODY: BODY MATERIAL WCB GRADE CARBON STEEL, ROTARY PLUG STAINLESS STEEL, SHAFT STAINLESS STEEL, SEAT LOW FRICTION GRAPHITE, PACKING TEFLON V-RING, INTEGRAL PRESSURE RECOVERY CHAMBER, WORKING PRESSURE ANSI CLASS 150 BODY 285 PSI AT -20 DEGREES TO 100 DEGREES F.
   C. ACCURACY: THE CONTROL VALVES SHALL ACCURATELY CONTROL THE FLOW FROM 0 TO 100 PERCENT FULL RATED FLOW.
   D. RANGEABILITY: 300:1.
   E. FLOW CHARACTERISTICS: EQUAL PERCENTAGE CHARACTERISTICS.
   F. CLOSE-OFF PRESSURE RATING: 200 PSID.
   G. ASME B16.10ASME B16.10 FACE-TO-FACE DIMENSIONS.
   H. LEAKAGE: ANSI CLASS IV.

18. AUTOMATIC FLOW-CONTROL VALVES
   A. MANUFACTURERS:
      a. GRISWOLD CONTROLS.
      b. AUTOFLOW.
      c. CLAYTON.
   B. TYPE: FACTORY-CALIBRATED, DIRECT-ACTING, AUTOMATIC PRESSURE-COMPENSATING TYPE, DESIGNED TO LIMIT FLOW RATES TO WITHIN PLUS OR MINUS 5-PERCENT ACCURACY, REGARDLESS OF SYSTEM PRESSURE FLUCTUATIONS.
   C. INTERNALS: STAIN-LESS STEEL OR NICKEL-PLATED BRASS, SELF-CLEANING.
   D. OPERATION: USE FULL AVAILABLE DIFFERENTIAL PRESSURE TO ACTUATE WITHOUT HYSTERESIS OR BINDING.
   E. PRESSURE ABSORPTION: 2 TO 32 PSIG RANGE, UNLESS OTHERWISE INDICATED.
   F. ACCESSORIES:
      a. METAL TAG, CHAINED AND STAMPED FOR SYSTEM IDENTIFICATION.
      b. PRESSURE TAPS AND QUICK-DISCONNECT VALVES.
      c. DIFFERENTIAL PRESSURE METER: FURNISH ONE METER TO OWNER'S REPRESENTATIVE. PROVIDE METER, CASE, HOSE, AND ANY ACCESSORIES NECESSARY TO ALLOW MEASUREMENT OF DIFFERENTIAL PRESSURE. PROVIDE METER WITH ACCURACY OF 2 PERCENT OF FULL SCALE.

19. FLOW CONTROL VALVE: CLA-VAL, 40-01, 6 TO 12 – INCH FLANGED, CAST IRON, HYDRAULICALLY OPERATED PILOT CONTROLLED DIAPHRAGM VALVE.

20. CONTROL VALVES: VALVE BODIES SHALL BE DESIGNED FOR 125 PSIG MINIMUM WORKING PRESSURE OR 150 PERCENT OF THE OPERATING PRESSURE, WHICHEVER IS GREATER, UNLESS NOTED OTHERWISE. FACTORY FABRICATED HIGH PERFORMANCE BUTTERFLY VALVES:
   A. VALVE BODY SHALL BE FULL LUGGED CARBON STEEL ANSI CLASS 150 BODY WITH A 316 STAINLESS STEEL DISC WITHOUT A NYLON COATING, RTFE SEAT, AND BE ANSI CLASS 150 FLANGE STANDARDS. BLOWOUT-PROOF SHAFT SHALL BE STAINLESS STEEL. VALVE PACKING SHALL INCLUDE FULLY ADJUSTABLE PACKING FLANGE AND SEPARABLE PACKING GLAND. VALVE BODY SHALL HAVE LONG STEM DESIGN TO ALLOW FOR 2" INSULATION (MINIMUM). VALVE FACE-TO-FACE DIMENSIONS SHALL COMPLY WITH API STD 609 AND MSS SP-68. VALVE ASSEMBLY SHALL BE COMPLETELY ASSEMBLED AND TESTED, READY FOR INSTALLATION. PROVIDE LOW-LEAD CERTIFIED AND NSF/ANSI 61 CERTIFIED VALVE FOR VALVES INSTALLED IN DOMESTIC COLD, DOMESTIC HOT, AND DOMESTIC RECIRCULATING HOT PIPING.
   B. SIZING: LINE SIZE.
   C. FLOW CHARACTERISTICS: MODIFIED EQUAL PERCENTAGE, UNIDIRECTIONAL.
   D. CLOSE-OFF PRESSURE RATING: 150 PSI BUBBLE TIGHT SHUT-OFF.
   E. LEAKAGE: ANSI CLASS IV.
   F. MEDIA TEMPERATURE RANGE: ANSI CLASS 150 LIMITATIONS.
   G. MAX DIFFERENTIAL PRESSURE: 285 PSI AT 100 DEGREES F.

21. ACTUATORS: PROVIDE DIRECT-DRIVE ELECTRIC ACTUATORS FOR ALL CONTROL APPLICATIONS, EXCEPT WHERE INDICATED OTHERWISE.

22. ELECTRIC ACTUATORS: EACH ACTUATOR SHALL DELIVER THE TORQUE REQUIRED FOR CONTINUOUS UNIFORM MOTION AND SHALL HAVE INTERNAL END SWITCHES TO LIMIT THE TRAVEL, OR BE CAPABLE OF WITHSTANDING CONTINUOUS STALLING WITHOUT DAMAGE. ACTUATORS SHALL FUNCTION PROPERLY WITHIN 85 TO 110 PERCENT OF RATED LINE VOLTAGE. PROVIDE ACTUATORS WITH HARDENED STEEL RUNNING SHAFTS AND GEARS OF STEEL OR COPPER ALLOY. FIBER OR REINFORCED NYLON GEARS MAY BE USED FOR TORQUES LESS THAN 16 INCH-POUNDS. PROVIDE TWO-POSITION ACTUATORS OF SINGLE DIRECTION, SPRING RETURN, OR REVERSING TYPE. PROVIDE MODULATING ACTUATORS CAPABLE OF STOPPING AT ANY POINT IN THE CYCLE, AND STARTING IN EITHER DIRECTION FROM ANY POINT. ACTUATORS SHALL BE EQUIPPED WITH A SWITCH FOR REVERSING DIRECTION, AND A BUTTON TO DISENGAGE THE CLUTCH TO ALLOW MANUAL ADJUSTMENTS. PROVIDE THE ACTUATOR WITH A HAND CRANK FOR MANUAL ADJUSTMENTS ON VALVES LARGER THAN 2 INCHES. SPRING RETURN ACTUATORS SHALL BE PROVIDED ON ALL CONTROL DAMPERS AND ALL COIL CONTROL VALVES WITH RETURN POSITION AS INDICATED ON THE DRAWINGS. EACH ACTUATOR SHALL HAVE DISTINCT MARKINGS INDICATING THE FULL-OPEN AND FULL-CLOSED POSITION, AND THE POINTS IN-BETWEEN.

23. PRESSURE GAUGES: WATTS LFDPG -4.5" DIAL SIZES, LEAD FREE BRONZE. PRESSURE GAGE RANGE: (0-150 PSI) UNLESS INDICATED OTHERWISE ON MECHANICAL DETAILS.

24. TEMPERATURE GAUGES: STEM CASED-GLASS CASE SHALL BE POLISHED STAINLESS STEEL OR CAST ALUMINUM, 9 INCHES LONG, WITH CLEAR ACRYLIC LENS, AND NON-MERCURY FILLED GLASS TUBE WITH INDICATING-FLUID COLUMN WATTS LFTA, 3 ½" STEM, LEAD FREE BRONZE. RANGE: CHILLED WATER (0-100 DEGREES F), COOLING TOWER WATER (0-150 DEGREES F), PROCESS WATER (0-150 DEGREES F)

25. INSERTION TURBINE FLOWMETER: PROVIDE DUAL AXIAL TURBINE FLOWMETER WITH ALL INSTALLATION HARDWARE NECESSARY TO ENABLE INSERTION AND REMOVAL OF THE METER WITHOUT SYSTEM SHUTDOWN. ALL PARTS MUST MEET OR EXCEED THE PRESSURE CLASSIFICATION OF THE PIPE SYSTEM IT IS INSTALLED IN. INSERTION TURBINE FLOWMETER ACCURACY MUST BE PLUS OR MINUS 0.5 PERCENT OF RATE AT CALIBRATED VELOCITY., WITHIN PLUS OR MINUS OF RATE OVER A 10:1 TURNDOWN AND WITHIN PLUS OR MINUS 2 PERCENT OF RATE OVER A 50:1 TURNDOWN. REPEATABILITY MUST BE PLUS OR MINUS 0.25 PERCENT OF READING. THE METER FLOW SENSING ELEMENT MUST OPERATE OVER A RANGE SUITABLE FOR THE INSTALLED LOCATION WITH A PRESSURE LOSS LIMITED TO 1 PERCENT OF OPERATING PRESSURE AT MAXIMUM FLOW RATE. THE FLOWMETER MUST INCLUDE EITHER DRY CONTACT PULSE OUTPUTS, 4-20MA, 0-10VDC OR 0-5VDC OUTPUTS. THE TURBINE ROTOR ASSEMBLY MUST BE CONSTRUCTED OF SERIES 300 STAINLESS STEEL AND USE TEFLON SEALS.

26. PIPE INSULATION MATERIAL
   A. FOR INSULATED PIPING MATERIAL AT 10 FEET ABOVE FINISHED FLOOR AND BELOW, PROVIDE FLEXIBLE ELASTOMERIC: ARMAFLEX INSULATION MATERIAL. FOR INSULATED PIPING MATERIAL ABOVE 10 FEET PROVIDE ONE OF THE INDICATED MATERIAL.
   B. CELLULAR GLASS: INORGANIC, INCOMBUSTIBLE, FOAMED OR CELLULATED GLASS WITH ANNEALED, RIGID, HERMETICALLY SEALED CELLS. COMPLY WITH ASTM C552.
   C. FLEXIBLE ELASTOMERIC: ARMAFLEX, CLOSED-CELL OR EXPANDED-RUBBER MATERIALS; SUITABLE FOR MAXIMUM USE TEMPERATURE BETWEEN MINUS 70 DEG F AND 220 DEG F. COMPLY WITH ASTM C534/C534M, TYPE I, FOR TUBULAR MATERIALS, TYPE II FOR SHEET MATERIALS.
   D. MINERAL WOOL, PREFORMED PIPE: MANDREL-WOUND MINERAL WOOL FIBERS BONDED WITH A THERMOSETTING RESIN, UNFACED; SUITABLE FOR MAXIMUM USE TEMPERATURE UP TO 1200 DEG F IN ACCORDANCE WITH ASTM C447. COMPLY WITH ASTM C547.
   E. GLASS-FIBER, PREFORMED PIPE: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN; SUITABLE FOR MAXIMUM USE TEMPERATURE UP TO 850 DEG F IN ACCORDANCE WITH ASTM C411. COMPLY WITH ASTM C547.
   F. INSTALL INSULATION OVER FITTINGS, VALVES, STRAINERS, FLANGES, MECHANICAL COUPLINGS, UNIONS, AND OTHER SPECIALTIES WITH CONTINUOUS THERMAL AND VAPOR-RETARDER INTEGRITY UNLESS OTHERWISE INDICATED.
   G. INSULATE FLANGES, MECHANICAL COUPLINGS, AND UNIONS USING A SECTION OF OVERSIZED PREFORMED PIPE INSULATION TO FIT. OVERLAP ADJOINING PIPE INSULATION BY NOT LESS THAN 2 TIMES THE THICKNESS OF PIPE INSULATION, OR ONE PIPE DIAMETER, WHICHEVER IS THICKER. STENCIL OR LABEL THE OUTSIDE INSULATION JACKET OF EACH UNION WITH THE WORD "UNION".
   H. INSULATE INSTRUMENT CONNECTIONS FOR THERMOMETERS, PRESSURE GAGES, PRESSURE TEMPERATURE TAPS, TEST CONNECTIONS, FLOW METERS, SENSORS, SWITCHES, AND TRANSMITTERS ON INSULATED PIPES. SHAPE INSULATION AT THESE CONNECTIONS BY TAPERING IT TO AND AROUND THE CONNECTION WITH INSULATING CEMENT AND FINISH WITH FINISHING CEMENT, MASTIC, AND FLASHING SEALANT.

Altium Packaging

Lenexa KS Cooling Water System

11725 W 85th St.
Overland Park, KS 66214

DESIGNER

CLARKNEXSEN

440 MARTIN LUTHER KING JR BLVD
MACON, GEORGIA 31201
478·743·8415

PROFESSIONAL SEAL

NOT FOR CONSTRUCTION

SUBMITTAL

02.24.2023

ISSUE FOR BID

REVISIONS

SHEET

SPECIFICATIONS

M002

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

27. INSULATION THICKNESS AND METAL JACKETS:

28. NPS 1 TO 1.5 PIPE SIZE: INSULATION IS THE FOLLOWING:
A. CHILLED WATER SUPPLY AND RETURN:
1. CELLULAR GLASS: 1 INCH THICK.
2. FLEXIBLE ELASTOMERIC: 1 INCH THICK.
3. MINERAL WOOL, PREFORMED PIPE INSULATION: 1 INCH THICK.
4. GLASS-FIBER, PREFORMED PIPE INSULATION: 1 INCH THICK.

29. ABOVE NPS 1-1/2" TO 3": INSULATION IS THE FOLLOWING:
A. CHILLED WATER SUPPLY AND RETURN:
1. CELLULAR GLASS: 1-1/2 INCHES THICK.
2. FLEXIBLE ELASTOMERIC: 1 INCH THICK.
3. MINERAL WOOL, PREFORMED PIPE INSULATION: 1-1/2 INCHES THICK.
4. GLASS-FIBER, PREFORMED PIPE INSULATION: 1-1/2 INCHES THICK.

30. NPS 4 TO NPS 12: INSULATION IS THE FOLLOWING:
A. CHILLED WATER SUPPLY AND RETURN:
1. CELLULAR GLASS: 2 INCHES THICK.
2. FLEXIBLE ELASTOMERIC: 1-1/2 INCHES THICK.
3. MINERAL WOOL, PREFORMED PIPE INSULATION: 2 INCHES THICK.
4. GLASS-FIBER, PREFORMED PIPE INSULATION: 2 INCHES THICK.
B. CONDENSER WATER SUPPLY AND RETURN:
1. INSULATION NOT REQUIRED.
C. PROCESS WATER SUPPLY AND RETURN:
1. INSULATION NOT REQUIRED.

31. MAKEUP WATER PIPING:
A. MINERAL WOOL, PREFORMED PIPE INSULATION: 1 INCH THICK.
B. GLASS-FIBER, PREFORMED PIPE INSULATION: 1 INCH THICK.

32. OUTDOOR INSULATION SCHEDULE:
A. CONDENSER-WATER SUPPLY AND RETURN:
1. CELLULAR GLASS: 2 INCHES THICK

33. PIPING JACKET:
A. FOR INSULATED PIPING AT 10 FEET ABOVE FINISHED FLOOR AND BELOW, PROVIDE ALUMINUM JACKETING WITH STAINLESS STEEL BANDING. FOR PIPING ABOVE 10 FEET PROVIDE PVC JACKETING.
B. PROVIDE A METAL JACKET ON PIPING. ALUMINUM JACKET: ASTM B 209, THICKNESS OF 0.016-INCH SHEET, SMOOTH FINISH, MOIST BARRIER LINER PROVIDE 1 MIL POLYETHYLENE FILM WITH A PROTECTIVE LAYER OF KRAFT PAPER LAMINATED TO INTERIOR SURFACE OF JACKET TO PREVENT CORROSION OF JACKET. JOINTING: LONGITUDINAL PITTSBURG Z-LOCK SLIP JOINTS AND 2-INCH BUTT LAPS. FITTINGS: 0.016-INCHES THICK MINIMUM DIE-SHAPED FITTING COVERS. METAL JACKET BANDS: ½ INCH WIDE; 0.02-INCH-THICK ALUMINUM OR 0.02-INCH-THICK TYPE 304 STAINLESS STEEL.
C. POLYVINYL CHLORIDE (PVC) JACKET AND FITTING COVERS MUST HAVE HIGH IMPACT STRENGTH, ULTRAVIOLET (UV) RESISTANT RATING OR TREATMENT AND MODERATE CHEMICAL RESISTANCE WITH MINIMUM THICKNESS 0.030 INCH.

34. EQUIPMENT INSULATION:

35. INSULATION INSTALLATION ON CHILLED WATER PUMPS:
A. FLEXIBLE ELASTOMERIC: 1 INCH THICK.
B. FABRICATE METAL BOXES LINED WITH INSULATION. FIT BOXES AROUND PUMPS AND COINCIDE BOX JOINTS WITH SPLITS IN PUMP CASINGS. FABRICATE JOINTS WITH OUTWARD BOLTED FLANGES. BOLT FLANGES ON 6-INCH CENTERS, STARTING AT CORNERS. INSTALL 3/8-INCH-DIAMETER FASTENERS WITH WING NUTS. ALTERNATIVELY, SECURE THE BOX SECTIONS TOGETHER USING A FIELD-ADJUSTABLE LATCHING MECHANISM.
C. FABRICATE BOXES FROM GALVANIZED STEEL, AT LEAST 0.040 INCH THICK.
D. FOR BELOW-AMBIENT SERVICES, INSTALL A VAPOR BARRIER AT SEAMS, JOINTS, AND PENETRATIONS. SEAL BETWEEN FLANGES WITH REPLACEABLE GASKET MATERIAL TO FORM A VAPOR BARRIER.

36. INSULATION INSTALLATION ON CHILLED WATER STORAGE TANK:
A. FLEXIBLE ELASTOMERIC THERMAL INSULATION 1 INCH THICK. INSTALL INSULATION OVER ENTIRE SURFACE OF TANKS AND VESSELS. INSTALL ON BOTTOM SURFACE OF TANK.
B. APPLY 100 PERCENT COVERAGE OF ADHESIVE TO SURFACE WITH MANUFACTURER'S RECOMMENDED ADHESIVE.
C. SEAL LONGITUDINAL SEAMS AND END JOINTS.

37. BASE-MOUNTED, CENTRIFUGAL HYDRONIC PUMPS:
A. PUMPS SHALL BE MODEL E-1510 AS MANUFACTURED BY BELL & GOSSETT OR APPROVED EQUAL. PUMPS SHALL MEET TYPES, SIZES, CAPACITIES, AND CHARACTERISTICS AS SCHEDULED ON THE EQUIPMENT SCHEDULE DRAWINGS. PUMP CONNECTIONS SHALL NOT BE DOWNSIZED.
B. COMPONENTS: THE PUMPS SHALL BE LONG COUPLED, BASE MOUNTED, SINGLE STAGE, END SUCTION, VERTICAL SPLIT CASE DESIGN, IN CAST IRON STAINLESS STEEL FITTED, SPECIFICALLY DESIGNED FOR QUIET OPERATION. SUITABLE STANDARD OPERATIONS AT 225°F AND 175 PSIG WORKING PRESSURE OR OPTIONAL OPERATIONS AT UP TO 250°F AND 250 PSIG WORKING PRESSURES. WORKING PRESSURES SHALL NOT BE DE-RATED AT TEMPERATURES UP TO 250F. THE PUMP INTERNALS SHALL BE CAPABLE OF BEING SERVICES WITHOUT DISTURBING PIPING CONNECTIONS, ELECTRICAL MOTOR CONNECTIONS OR PUMP TO MOTOR ALIGNMENT.
C. THE PUMPS SHALL BE COMPOSED OF THREE SEPARABLE COMPONENTS A MOTOR, BEARING ASSEMBLY, AND PUMP END (WET END). THE MOTOR SHAFT SHALL BE CONNECTED TO THE PUMP SHAFT VIA A REPLACEABLE FLEXIBLE COUPLING.
D. A BEARING ASSEMBLY SHALL SUPPORT THE SHAFT VIA TWO HEAVY-DUTY REGREASEABLE BALL BEARINGS. BEARING ASSEMBLY SHALL BE REPLACEABLE WITHOUT DISTURBING THE SYSTEM PIPING AND SHALL HAVE FOOT SUPPORT AT THE COUPLING END. PUMP BEARINGS SHALL BE REGREASEABLE WITHOUT REMOVAL OF THE BEARINGS FROM THE BEARING ASSEMBLY. THERMAL EXPANSION OF THE SHAFT TOWARD THE IMPELLER SHALL BE PREVENTED VIA AN INBOARD THRUST BEARING.
E. THE BEARING ASSEMBLY SHALL HAVE A SOLID SAE1144 STEEL SHAFT. A STAINLESS STEEL SHAFT SLEEVE SHALL BE EMPLOYED TO COMPLETELY COVER THE WETTED AREA UNDER THE SEAL.
F. PUMP SHALL BE EQUIPPED WITH AN INTERNALLY-FLUSHED MECHANICAL SEAL ASSEMBLY INSTALLED IN AN ENLARGED TAPERED SEAL CHAMBER. APPLICATION OF AN INTERNALLY FLUSHED MECHANICAL SEAL SHALL BE ADEQUATE FOR SEAL FLUSHING WITHOUT REQUIRING EXTERNAL FLUSHING LINES. SEAL ASSEMBLY SHALL HAVE BUNA BELLOWS AND SEAT GASKET, STAINLESS STEEL SPRING, AND BE OF A CARBON CERAMIC DESIGN WITH THE CARBON FACE ROTATING AGAINST A STATIONARY CERAMIC FACE.
G. BEARING ASSEMBLY SHAFT SHALL CONNECT TO A STAINLESS STEEL IMPELLER. IMPELLER SHALL BE BOTH HYDRAULICALLY AND DYNAMICALLY BALANCED TO ANSI/HI 9.6.4-2016, BALANCE GRADE G6.3 AND SECURED BY A STAINLESS STEEL LOCKING CAP SCREW OR NUT.
H. PUMP SHOULD BE DESIGNED TO ALLOW FOR TRUE BACK PULL-OUT ALLOWING ACCESS TO THE PUMP'S WORKING COMPONENTS, WITHOUT DISTURBING MOTOR OR PIPING, FOR EASE OF MAINTENANCE.
I. A CENTER DROP-OUT TYPE COUPLING, CAPABLE OF ABSORBING TORSIONAL VIBRATION, SHALL BE EMPLOYED BETWEEN THE PUMP AND MOTOR. PUMPS FOR VARIABLE SPEED APPLICATION SHALL BE PROVIDED WITH A SUITABLE COUPLING SLEEVE. COUPLING SHALL ALLOW FOR REMOVAL OF PUMP'S WETTED END WITHOUT DISTURBING PUMP VOLUTE OR MOVEMENT OF THE PUMP'S MOTOR AND ELECTRICAL CONNECTIONS. ON VARIABLE SPEED APPLICATIONS THE COUPLING SLEEVE SHOULD BE CONSTRUCTED OF A NEOPRENE MATERIAL TO MAXIMIZE PERFORMANCE LIFE.
J. AN ANSI AND OSHA RATED COUPLING GUARD SHALL SHIELD THE COUPLING DURING OPERATION. COUPLING GUARD SHALL BE DUAL RATED ANSI B15.1 AND OSHA 1910.219 COMPLIANT COUPLING GUARD AND CONTAIN VIEWING WINDOWS FOR INSPECTION OF THE COUPLING. NO MORE THAN .25 INCHES OF EITHER ROTATING ASSEMBLY SHALL BE VISIBLE BEYOND THE COUPLING GUARD.
K. PUMP VOLUTE SHALL BE OF A CAST IRON DESIGN FOR HEATING SYSTEMS WITH INTEGRALLY CAST PEDESTAL VOLUTE SUPPORT, RATED FOR 175 PSIG WITH INTEGRAL CAST IRON FLANGES DRILLED FOR 125# ANSI COMPANION FLANGES. (OPTIONAL 250 PSIG WORKING PRESSURES ARE AVAILABLE AND ARE 250# FLANGE DRILLED.) VOLUTE SHALL INCLUDE GAUGE PORTS AT NOZZLES, AND VENT AND DRAIN PORTS.
L. MOTORS SHALL MEET SCHEDULED HORSEPOWER, SPEED, VOLTAGE, AND ENCLOSURE DESIGN. PUMP AND MOTORS SHALL BE FACTORY ALIGNED, AND SHALL BE REALIGNED AFTER INSTALLATION BY THE MANUFACTURER'S REPRESENTATIVE. MOTORS SHALL BE NON-OVERLOADING AT ANY POINT ON THE PUMP CURVE AND SHALL MEET NEMA SPECIFICATIONS AND CONFORM TO STANDARDS OUTLINED IN EISA 2007.
M. BASE PLATE SHALL BE OF STRUCTURAL STEEL OR FABRICATED STEEL CHANNEL CONFIGURATION FULLY ENCLOSED AT SIDES AND ENDS, WITH SECURELY WELDED CROSS MEMBERS AND FULLY OPEN GROUTING AREA (FOR FIELD GROUTING). THE MINIMUM BASE PLATE STIFFNESS SHALL CONFORM TO ANSI/HI 1.3.8.2.1-2019 FOR GROUTED HORIZONTAL BASEPLATE DESIGN STANDARDS.
N. PUMP SHALL BE OF A MAINTAINABLE DESIGN AND, FOR EASE OF MAINTENANCE, SHOULD USE MACHINE FIT PARTS AND NOT PRESS FIT COMPONENTS.
O. THE PUMP(S) VIBRATION LIMITS SHALL CONFORM TO HYDRAULIC INSTITUTE ANSI/HI 9.6.4-2016 FOR RECOMMENDED ACCEPTABLE UNFILTERED FIELD VIBRATION LIMITS (AS MEASURED PER ANSI/HI 9.6.4-2016 FIGURE 9.6.4.2.3.1) FOR PUMPS WITH ROLLING CONTACT BEARINGS.
P. EACH PUMP SHALL BE HYDROSTATICALLY TESTED 1.5 TIMES THE MAXIMUM RATED WORKING PRESSURE AND NAME-PLATED BEFORE SHIPMENT.
Q. PUMP SHALL CONFORM TO ANSI/HI 9.6.3.1-2012 STANDARD FOR PREFERRED OPERATING REGION (POR) UNLESS OTHERWISE APPROVED BY THE ENGINEER.

38. COOLING TOWER AND CHILLED WATER STORAGE TANKS
A. MANUFACTURERS:
a. JOHN WOOD COMPANY.
b. NILES STEEL TANK.
c. RECO TANKS.
d. STEEL-PRO INCORPORATED ROCKLAND
e. OR EQUAL.
B. FURNISH AND INSTALL 81" L X 56-1/2" W X 96" H, 1,850 GALLONS CAPACITY STEEL TANK WITH 24" X 24" TOP OF TANK MANWAY AND TANK LIFTING LUGS SIMILAR IN CONSTRUCTION TO EXISTING TANKS. PROVIDE PIPING CONNECTIONS AND ACCESSORIES SIMILAR TO THE EXISTING TANKS. PROVIDE AN INTERNAL OVERFLOW PIPE, TANK FILL SIGHT GLASS, 1 – ½" MAKEUP WATER FILL PIPING CONNECTION, 2" TOP OF TANK VENT, 2" DRAIN LINE, AND 6" BOTTOM SIDE PUMP WATER OUTLETS, COORDINATE LOCATION WITH NEW PUMP LOCATIONS. FOR THE COOLING TOWER WATER TANK PROVIDE TWO 8" TOP OF TANK WATER INLETS THROUGH THE TOP COVER. FOR CHILLED WATER TANK PROVIDE A 6" TOP SIDE OF TANK INLET. THE UNIT SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE ASME BOILER AND PRESSURE VESSEL CODE SECTION VIII, DIVISION 1 WITH A STAMPED MAWP OF 125 PSI AND A MAXIMUM DESIGN TEMPERATURE OF 650°F. FOR THE CHILLED WATER TANK PROVIDE FIELD INSTALLED FOAM INSULATION, R-16 – MINIMUM. PROVIDE LEGS TO CHILLED WATER TANK TO ALLOW FOR BOTTOM OF TANK INSULATION. SUBMITTAL SHOP DRAWING TO OWNER FOR ENGINEER APPROVAL.

39. SAND FILTER:
A. MANUFACTURER: THE SAND FILTER SYSTEM SHALL BE MANUFACTURED BY LAKOS FILTRATION SOLUTIONS IN FRESNO, CALIFORNIA USA. SPECIFIC MODEL DESIGNATION: STS-48-310
B. FILTER TANK
a. ALL STS FILTER TANKS ARE MADE FROM 304-L STAINLESS STEEL. MINIMUM WALL AND DOME THICKNESS FOR THE TANK IS 14 GAUGE. GROOVED PIPE CONNECTIONS ARE PROVIDED AT THE INLET AND OUTLET. A TOP INSPECTION PORT IS PROVIDED WITH AN EPOXY-COATED CAST IRON BOLT-ON COVER. A LOWER CLEAN-OUT PORT IS PROVIDED WITH A PLASTIC (PVC) THREADED PLUG.
b. STS FILTERS UTILIZE A BED OF SAND & GRAVEL AS A BARRIER TYPE OF FILTRATION. FILTRATION PERFORMANCE IS PREDICTABLY UP TO 95% OF 10 MICRONS AND LARGER AS STANDARD. OPTIONAL FINER SILICA SAND MEDIA IS AVAILABLE FOR FILTRATION PERFORMANCE OF 90% OF 5 MICRONS AND LARGER.
c. MAXIMUM SYSTEM PRESSURE IS 100 PSI FOR TANK 36" AND SMALLER AND 80 PSI FOR 48" TANKS.
d. OUTLET & BACKWASH CONNECTIONS SHALL BE GROOVED COUPLINGS SIZE: 3 -INCH.
e. PUMP INLET CONNECTION SHALL BE THREADED OR FLANGED SIZE:3 – INCH.
C. BACKWASH & SOLIDS HANDLING
a. THE EVACUATION (BACKWASH) OF SOLIDS THAT ACCUMULATE ON THE SAND BED IN THE TANK SHALL BE ACCOMPLISHED AUTOMATICALLY, EMPLOYING ELECTRICALLY ACTUATED BUTTERFLY VALVES USING A TIMER CLOCK TO CONTROL THE FREQUENCY AND DURATION OF THE BACKWASH. THE STANDARD TIMER SETTING (FACTORY) IS TO BACKWASH THE SYSTEM FOR 3 MINUTES EVERY 24 HOURS.
b. THE SYSTEM SHALL BE EQUIPPED WITH A PRESSURE DIFFERENTIAL SWITCH THAT SENSES DIFFERENTIAL PRESSURE IN THE TANK. DIFFERENTIAL PRESSURE INCREASES AS SOLIDS BUILD UP ON TOP OF THE SAND BED. ONCE THE DIFFERENTIAL PRESSURE REACHES A CERTAIN POINT (10 PSI), THE SWITCH WILL SEND A SIGNAL TO START A BACKWASH CYCLE.
c. A MANUAL PUSH BUTTON IS PROVIDED ON THE FRONT OF THE CONTROL PANEL SO THAT A BACKWASH CYCLE CAN BE INITIATED AT ANYTIME IF NECESSARY.
d. THE BACKWASH WATER SHALL BE PIPED OUT TO A DRAIN OR TANK THAT IS ADEQUATELY SIZED TO ACCEPT THE QUANTITY OF WATER. THE AMOUNT OF WATER BEING BACKWASHED (PURGED) FROM THE SYSTEM IS BASED ON THE FILTRATION SURFACE AREA, FLOW RATE, NUMBER OF TANKS, AND BACKWASH TIME DURATION.
e. WATER SHALL BE USED BY REVERSING THE FLOW BACK THRU THE UNDERDRAIN TO AGITATE THE TOP LAYER OF THE SAND BED FOR REMOVAL OF SOLIDS. THE WATER THEN PUSHES THE SOLIDS OUT OF THE TANK THRU THE BACKWASH PIPING, THUS "CLEANING" THE SAND BED AND PREPARING IT FOR ANOTHER FILTERING CYCLE.
D. UNDERDRAIN ASSEMBLY: STAINLESS STEEL WEDGE WIRE ELEMENTS EACH WITH V-SHAPED SLOTS FOR IMPROVED BACKWASH PERFORMANCE.
E. PUMP:
a. END-SUCTION, SINGLE STAGE; TEFC MOTOR; CAST IRON HOUSING; IRON OR BRONZE IMPELLER; BRONZE SHAFT SLEEVE; BUNA-N MECHANICAL SHAFT SEAL; FLOODED SUCTION REQUIRED. ALL STS SYSTEMS ARE SUPPLIED WITH A CAST IRON PUMP STRAINER WITH A STAINLESS STEEL PERFORATED BASKET.
b. A HIGH HEAD PUMP OPTION IS AVAILABLE FOR BASIN SWEEPING APPLICATIONS.
c. A MANUAL PUSH BUTTON IS PROVIDED ON THE FRONT OF THE CONTROL PANEL SO THAT A BACKWASH CYCLE CAN BE INITIATED AT ANYTIME IF NECESSARY
d. THE BACKWASH WATER SHALL BE PIPED OUT TO A DRAIN OR TANK THAT IS ADEQUATELY SIZED TO ACCEPT THE QUANTITY OF WATER. THE AMOUNT OF WATER BEING BACKWASHED (PURGED) FROM THE SYSTEM IS BASED ON THE FILTRATION SURFACE AREA, FLOW RATE, NUMBER OF TANKS, AND BACKWASH TIME DURATION.
e. WATER SHALL BE USED BY REVERSING THE FLOW BACK THRU THE UNDERDRAIN TO AGITATE THE TOP LAYER OF THE SAND BED FOR REMOVAL OF SOLIDS. THE WATER THEN PUSHES THE SOLIDS OUT OF THE TANK THRU THE BACKWASH PIPING, THUS "CLEANING" THE SAND BED AND PREPARING IT FOR ANOTHER FILTERING CYCLE.
F. UNDERDRAIN ASSEMBLY: STAINLESS STEEL WEDGE WIRE ELEMENTS EACH WITH V-SHAPED SLOTS FOR IMPROVED BACKWASH PERFORMANCE.
G. PUMP
a. END-SUCTION, SINGLE STAGE; TEFC MOTOR; CAST IRON HOUSING; IRON OR BRONZE IMPELLER; BRONZE SHAFT SLEEVE; BUNA-N MECHANICAL SHAFT SEAL; FLOODED SUCTION REQUIRED. ALL STS SYSTEMS ARE SUPPLIED WITH A CAST IRON PUMP STRAINER WITH A STAINLESS STEEL PERFORATED BASKET.
b. A HIGH HEAD PUMP OPTION IS AVAILABLE FOR BASIN SWEEPING APPLICATIONS.
H. STRAINER:
a. PROVIDED WITH SYSTEM TO PROTECT SYSTEM PUMP FROM DAMAGE OR FOULING BY LARGER SOLIDS OR DEBRIS.
b. CAST-IRON HOUSING; MANUAL-CLEANING; 1/8-INCH MINIMUM MESH RATING; STAINLESS STEEL BASKET.
I. PIPING: GALVANIZED PIPE WITH GROOVED COUPLING.
J. ELECTRICAL CONTROL: STARTER WITH OVERLOAD MODULE; HOA SELECTOR SWITCH; NEMA-4X ENCLOSURE; RE-SET/DISCONNECT/TRIP SWITCH, 120 VOLT, SINGLE PHASE CONTROL VOLTAGE; UL LISTED PANEL.
K. BACKWASH VALVES: ELECTRICALLY-ACTUATED VALVES. SINGLE TANK SYSTEMS USE A SINGLE ACTUATOR WITH LINKAGE ARMS TO CONTROL TWO BUTTERFLY VALVES (OUTLET AND BACKWASH). MULTIPLE TANK SYSTEMS USE MULTIPLE ACTUATORS TO CONTROL BUTTERFLY VALVES (OUTLET AND BACKWASH).
L. SKID PLATE: STAINLESS STEEL, 3/16-INCH MINIMUM THICKNESS ON SINGLE TANK SYSTEMS; EPOXY-COATED STRUCTURAL STEEL FRAMEWORK ON MULTIPLE TANK SYSTEMS.

40. VARIABLE FREQUENCY DRIVES (VFD)
PROVIDE VARIABLE FREQUENCY DRIVE WHERE INDICATED. THE VFD SHALL INCLUDE THE FOLLOWING MINIMUM FUNCTIONS, FEATURES AND RATINGS. MANUFACTURER: ABB.
A. INPUT CIRCUIT BREAKER PER UL 489 WITH REQUIRED SYMMETRICAL INTERRUPTING CAPACITY AND DOOR INTERLOCKED EXTERNAL OPERATOR.
B. A CONVERTER STAGE PER UL 508C SHALL CHANGE FIXED VOLTAGE, FIXED FREQUENCY, AC LINE POWER TO A FIXED DC VOLTAGE. THE CONVERTER SHALL UTILIZE A FULL WAVE BRIDGE DESIGN INCORPORATING DIODE RECTIFIERS. SILICON CONTROLLED RECTIFIERS (SCR) ARE NOT ACCEPTABLE. THE CONVERTER SHALL BE INSENSITIVE TO THREE PHASE ROTATION OF THE AC LINE AND SHALL NOT CAUSE DISPLACEMENT POWER FACTOR OF LESS THAN .95 LAGGING UNDER ANY SPEED AND LOAD CONDITION.
C. AN INVERTER STAGE SHALL CHANGE FIXED DC VOLTAGE TO VARIABLE FREQUENCY, VARIABLE VOLTAGE, AC FOR APPLICATION TO A STANDARD NEMA DESIGN B SQUIRREL CAGE MOTOR. THE INVERTER SHALL BE SWITCHED IN A MANNER TO PRODUCE A SINE CODED PULSE WIDTH MODULATED (PWM) OUTPUT WAVEFORM.
D. THE VFD SHALL BE CAPABLE OF SUPPLYING 120 PERCENT OF RATED FULL LOAD CURRENT FOR ONE MINUTE AT MAXIMUM AMBIENT TEMPERATURE.
E. THE VFD SHALL BE DESIGNED TO OPERATE FROM CIRCUIT VOLTAGE, + OR - 10 PERCENT, THREE PHASE, 60 HZ SUPPLY, AND CONTROL MOTORS WITH A CORRESPONDING VOLTAGE RATING.
F. THE CONTROLLER EFFICIENCY AT ANY SPEED SHALL NOT BE LESS THAN 96 PERCENT.
G. THE CONTROLLERS SHALL BE CAPABLE OF BEING RESTARTED INTO A MOTOR COASTING IN THE FORWARD DIRECTION WITHOUT TRIPPING.
H. SOLID STATE MOTOR OVERLOAD PROTECTION SHALL BE INCLUDED SUCH THAT CURRENT EXCEEDING AN ADJUSTABLE THRESHOLD SHALL ACTIVATE A 60 SECOND TIMING CIRCUIT. SHOULD CURRENT REMAIN ABOVE THE THRESHOLD CONTINUOUSLY FOR THE TIMING PERIOD, THE CONTROLLER WILL AUTOMATICALLY SHUT DOWN.
I. THE VFD SHALL BE FACTORY SET FOR MANUAL RESTART AFTER THE FIRST PROTECTIVE CIRCUIT TRIP FOR MALFUNCTION (OVERCURRENT, UNDERVOLTAGE, OVERVOLTAGE OR OVERTEMPERATURE) OR AN INTERRUPTION OF POWER. THE VFD SHALL BE CAPABLE OF BEING SET FOR AUTOMATIC RESTART AFTER A SELECTED TIME DELAY. IF THE DRIVE FAULTS AGAIN WITHIN A SPECIFIED TIME PERIOD (ADJUSTABLE 0-60 SECONDS), A MANUAL RESTART WILL BE REQUIRED.
J. THE VFD SHALL INCLUDE EXTERNAL FAULT RESET CAPABILITY. ALL THE NECESSARY LOGIC TO ACCEPT AN EXTERNAL FAULT RESET CONTACT SHALL BE INCLUDED.
K. PROVIDE CRITICAL SPEED LOCKOUT CIRCUITRY TO PREVENT OPERATING AT FREQUENCIES WITH CRITICAL HARMONICS THAT CAUSE RESONANT VIBRATIONS. THE VFD SHALL HAVE A MINIMUM OF THREE USER SELECTABLE BANDWIDTHS.
L. PROVIDE THE FOLLOWING OPERATOR CONTROL AND MONITORING DEVICES MOUNTED ON THE FRONT PANEL OF THE VFD:
1. MANUAL SPEED POTENTIOMETER.
2. HAND-OFF-AUTO (HOA) SWITCH.
3. POWER ON LIGHT.
4. DRIVE RUN POWER LIGHT.
5. LOCAL DISPLAY.
M. PROVIDE PROPERLY SIZED NEMA RATED BY-PASS AND ISOLATION CONTACTORS TO ENABLE OPERATION OF MOTOR IN THE EVENT OF VFD FAILURE. MECHANICAL AND ELECTRICAL INTERLOCKS SHALL BE INSTALLED BETWEEN THE BY-PASS AND ISOLATION CONTACTORS. PROVIDE A SELECTOR SWITCH AND TRANSFER DELAY TIMER.

41. AIR SEPARATOR: BELL & GOSSETT CENTRIFUGAL TYPE AIR SEPARATOR. THE UNIT SHALL HAVE FLANGED INLET AND OUTLET CONNECTIONS TANGENTIAL TO THE VESSEL SHELL. THE UNIT SHALL HAVE THE CAPABILITY TO DIRECT ACCUMULATED AIR TO AN AIR VENT (AIR ELIMINATION SYSTEM) VIA AN NPT VENT CONNECTION AT TOP OF UNIT. A BLOWDOWN CONNECTION SHALL BE PROVIDED TO FACILITATE ROUTINE CLEANING. SPECIFY B&G MODEL MBV-1 ROLAIRTROL ACCESSORY WITH APPROPRIATE FITTINGS FOR MANUAL BLOWDOWN. THE AIR SEPARATOR SHALL BE DESIGNED, CONSTRUCTED AND STAMPED FOR 125 PSIG @ 350°F IN ACCORDANCE WITH SECTION VIII, DIVISION I OF THE ASME BOILER AND PRESSURE VESSEL CODE, AND REGISTERED WITH THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS. THE AIR SEPARATOR SHALL BE PAINTED WITH ONE SHOP COAT OF LIGHT GRAY AIR DRY ENAMEL.

42. EXPANSION TANK: BELL & GOSSETT, SERIES "D" EXPANSION TANKS ARE ASME RATED PRECHARGED DIAPHRAGM-TYPE PRESSURE VESSELS. THE SERIES "D" TANK IS DESIGNED TO ABSORB THE EXPANSION FORCES OF HEATING/COOLING SYSTEM WATER WHILE MAINTAINING PROPER SYSTEM PRESSURIZATION UNDER VARYING OPERATING CONDITIONS. THE HEAVY DUTY DIAPHRAGM SEPARATES SYSTEM WATER FROM THE TANK AIR CHARGE THEREBY ELIMINATING WATERLOGGING PROBLEMS. ALL SERIES "D" EXPANSION TANKS INCLUDE AN INTEGRATED BLADDER INTEGRITY MONITOR AND ARE AVAILABLE WITH SIGHT GLASS AND/OR SEISMIC RESTRAINTS. SYSTEM CONNECTION: FORGED STEEL SHELL: CARBON STEEL DIAPHRAGM: HEAVY DUTY BUTYL RUBBER DESIGNED AND CONSTRUCTED PER ASME SECTION VIII, DIVISION 1, 175 PSI DESIGN PRESSURE, 240°F DEGREES F DESIGN TEMPERATURE.

43. TEST AND BALANCE: A TESTING, ADJUSTING, AND BALANCING AGENCY CERTIFIED BY AABC OR NEBB SHALL BALANCE THE HYDRONIC SYSTEMS AND EQUIPMENT TO DESIGN CONDITIONS. PROVIDE A SUMMARY SYSTEM REPORT THAT DOCUMENTS WATER BALANCE CONDITIONS.

SCHEDULE
1. HUSKY OPERATES 7 DAYS PER WEEK WITH 3 SHIFTS. WHEEL OPERATES 5 DAYS PER WEEK FOR 3 SHIFTS. WHEEL IS NOT IN OPERATION ON WEEKENDS. OUTAGES FOR WHEEL SHALL BE OVER WEEKENDS SO THAT SATURDAYS AND SUNDAYS CAN BE INCLUDED FOR OUTAGE DOWN TIME.
2. CONTRACTOR IS ALLOWED TO USE DESIGNATED ALTIUM RESTROOMS AND BREAK AREAS. COORDINATE USAGE WITH ALTIUM SITE MAINTENANCE MANAGER.

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SHEET
SPECIFICATIONS

M003

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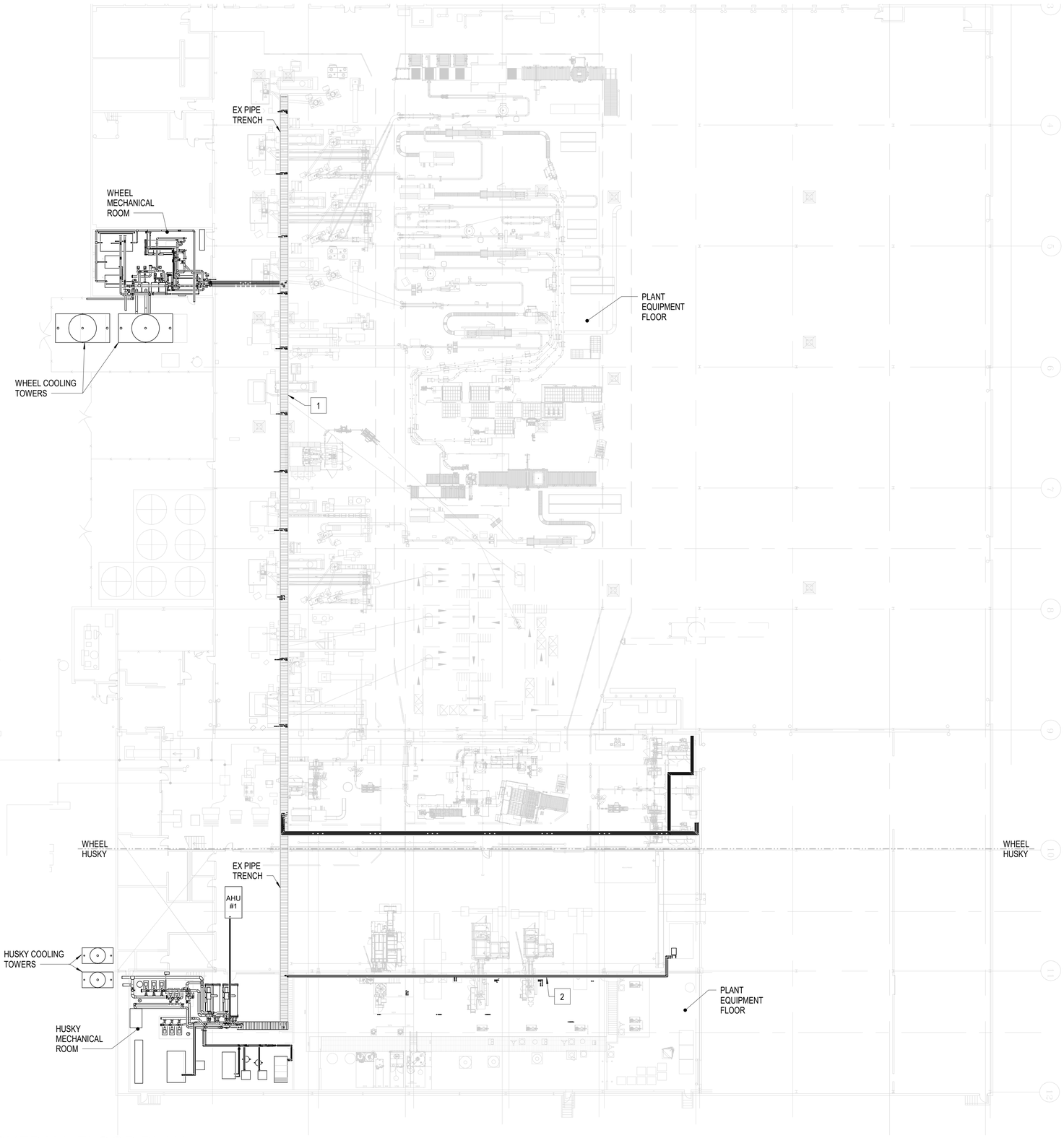
REVIEW: RWC

CN 10136



OVERALL FLOOR PLAN

3/64" = 1'-0"

GENERAL NOTES

A. DRAWINGS AND DIMENSIONS ARE BASED ON FIELD SURVEY. CONTRACTOR SHOULD EXPECT TO MAKE SOME FIELD ALTERATIONS TO THE PIPE ROUTING SHOWN.
B. DIMENSIONS ARE FOR REFERENCE ONLY.
C. ALL PIPE ROUTING IS TO BE VERIFIED BY THE CONTRACTOR. ANY DEVIATIONS FROM THE ROUTING PROVIDED WILL REQUIRE OWNER AND ENGINEER APPROVAL.
D. WHEN DEMOLISHING EXISTING CHILLED WATER, COOLING TOWER WATER, AND PROCESS WATER PIPING CAREFULLY REMOVE AND PROTECT ALL FLOW SWITCHES AND OTHER CONTROL DEVICES FOR REUSE. INSPECT DEVICES, IF DEVICES ARE DAMAGED NOTIFY OWNER FOR DIRECTION. REUSE AND INSTALL CONTROL DEVICE INTO NEW PIPING SYSTEM. CONNECT DEVICE INTO EXISTING CONTROL SYSTEMS.
E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 REFER TO MW SHEET FOR WORK IN THIS AREA.
2 REFER TO HM SHEET FOR WORK IN THIS AREA.

GRAPHIC SCALE(S)

3/64" = 1' - 0" 0 5' 10' 20' 40' 80'

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OVERALL SITE PLAN

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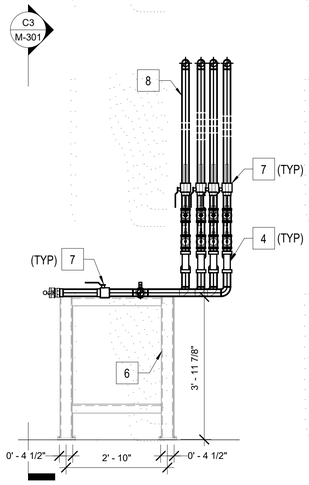
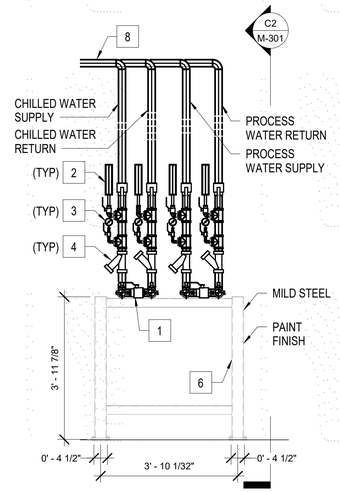
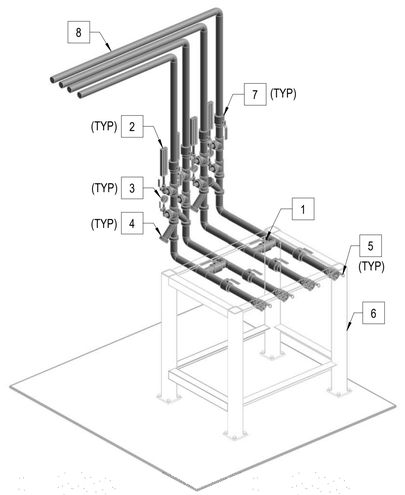


C2 HUSKY MACHINE MODULE - SECTION
1/2" = 1'-0"



C3 HUSKY MACHINE MODULE - SECTION
1/2" = 1'-0"



A3 HUSKY MACHINE MODULE
NO SCALE

GENERAL NOTES

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E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 CALIBRATED BALANCING VALVE.
2 THERMOMETER.
3 PRESSURE GAUGE.
4 Y-STRAINER.
5 CAMLOCK FITTING.
6 PROVIDE PIPING SUPPORT FRAMING.
7 ISOLATION VALVE.
8 SEE SHEET HPF-800 FOR PIPING SIZES.

GRAPHIC SCALE(S)

1/2" = 1' - 0" 0 6" 1' 2' 3' 4' 5'

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REVIEW: RWC

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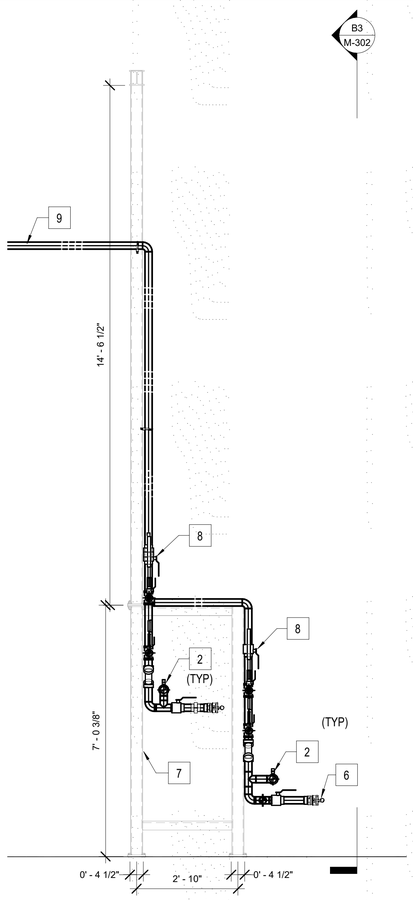
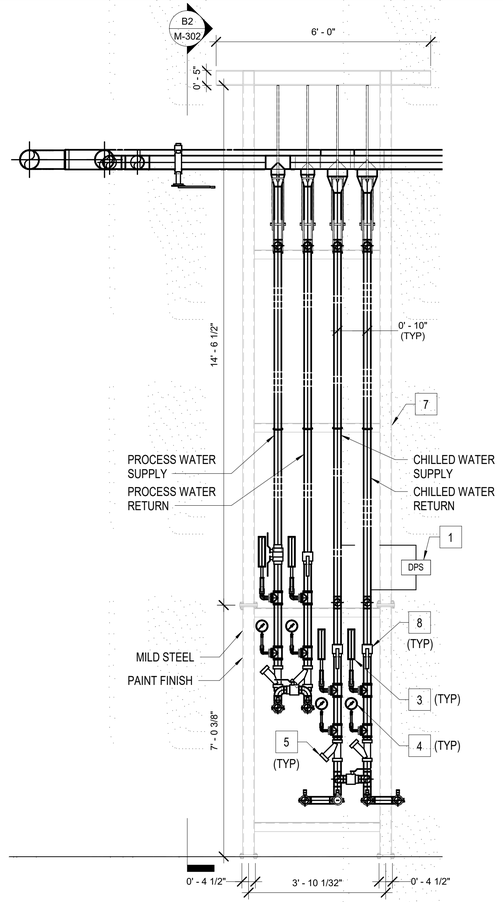
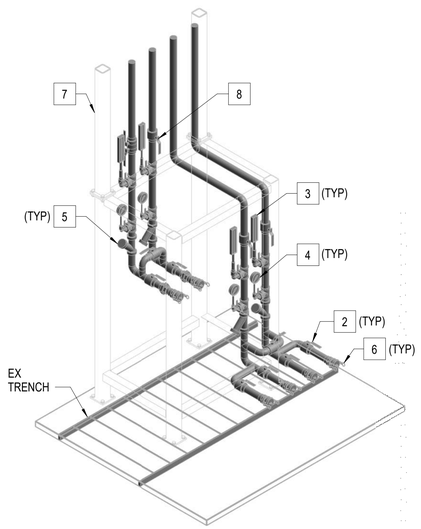


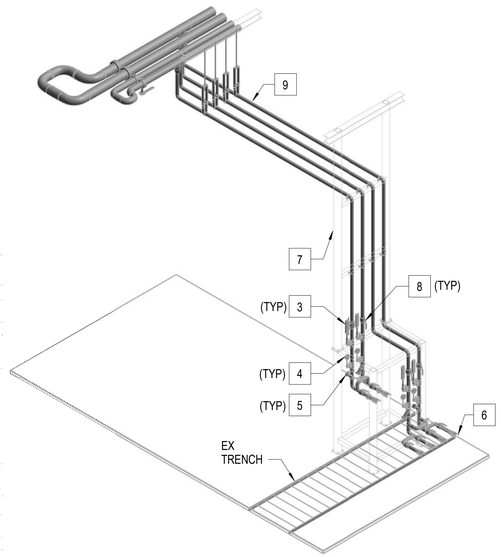
B2 WHEEL MACHINE MODULE - SECTION
1/2" = 1'-0"



B3 WHEEL MACHINE MODULE - SECTION
1/2" = 1'-0"



A2 WHEEL MACHINE MODULE - A
NO SCALE



A3 WHEEL MACHINE MODULE - B
NO SCALE

GENERAL NOTES

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C. ALL PIPE ROUTING IS TO BE VERIFIED BY THE CONTRACTOR. ANY DEVIATIONS FROM THE ROUTING PROVIDED WILL REQUIRE OWNER AND ENGINEER APPROVAL.
D. WHEN DEMOLISHING EXISTING CHILLED WATER, COOLING TOWER WATER, AND PROCESS WATER PIPING CAREFULLY REMOVE AND PROTECT ALL FLOW SWITCHES AND OTHER CONTROL DEVICES FOR REUSE. INSPECT DEVICES, IF DEVICES ARE DAMAGED NOTIFY OWNER FOR DIRECTION. REUSE AND INSTALL CONTROL DEVICE INTO NEW PIPING SYSTEM. CONNECT DEVICE INTO EXISTING CONTROL SYSTEMS.
E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 INSTALL CHILLED WATER DPS. DIRECT WIRE SENSOR TO PUMPS (P-1 AND P-2) VARIABLE SPEED CONTROLLER IN WHEEL MECHANICAL ROOM. PROVIDE ONE SENSOR, LOCATE SENSOR ON LINE 11 PIPING SYSTEM ONLY.
2 CALIBRATED BALANCING VALVE.
3 THERMOMETER.
4 PRESSURE GAUGE.
5 Y-STRAINER.
6 CAMLOCK FITTING.
7 PROVIDE PIPING SUPPORT FRAMING.
8 ISOLATION VALVE.
9 SEE SHEET WPF-800 FOR PIPING SIZES.

GRAPHIC SCALE(S)

1/2" = 1' - 0" 0 6" 1' 2' 3' 4' 5'

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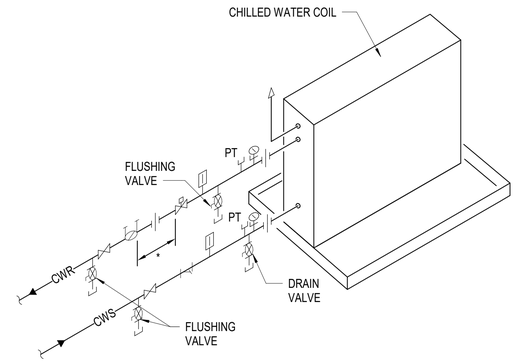
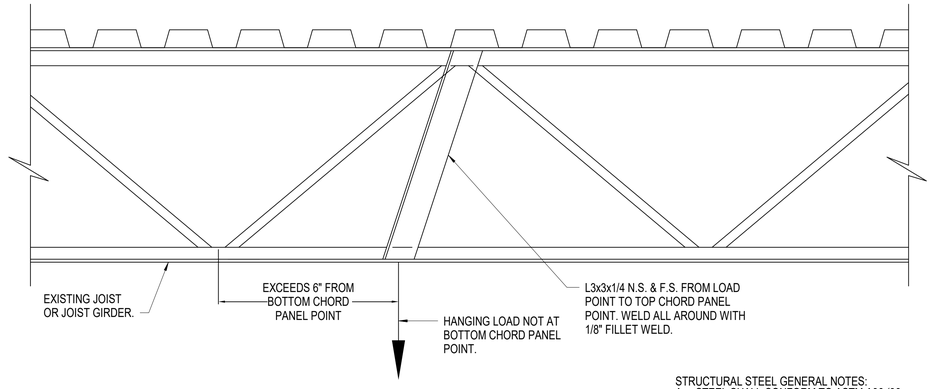


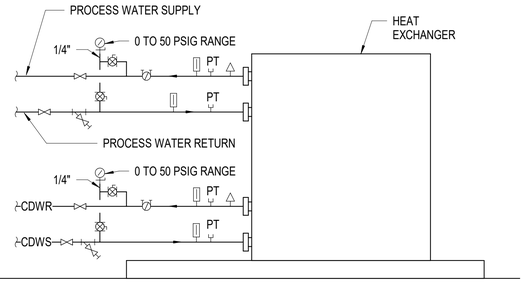
NOTE:
THE METERED BALANCING VALVE SHALL BE INSTALLED BY THE CONTRACTOR IN CONFORMANCE WITH VALVE MANUFACTURER'S RECOMMENDED SPACING UP/DOWNSTREAM FROM PIPE CHANGES IN DIRECTION AND/OR OTHER VALVES/COMPONENTS IN THE PIPING.

AHU-1 & AHU-2
C2 WATER COIL 2-WAY VALVE PIPING DETAIL
NO SCALE



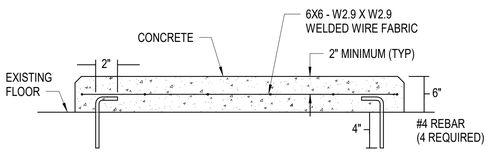
STRUCTURAL STEEL GENERAL NOTES:
A. STEEL SHALL CONFORM TO ASTM A36 (36 KSI YIELD STRENGTH), EXCEPTIONS NOTED.
B. ELECTRODES FOR WELDING CARBON STEEL TO CARBON STEEL SHALL CONFORM TO E70-XX.

C3 TYPICAL JOIST/JOIST GIRDER REINFORCEMENT DETAIL
NO SCALE

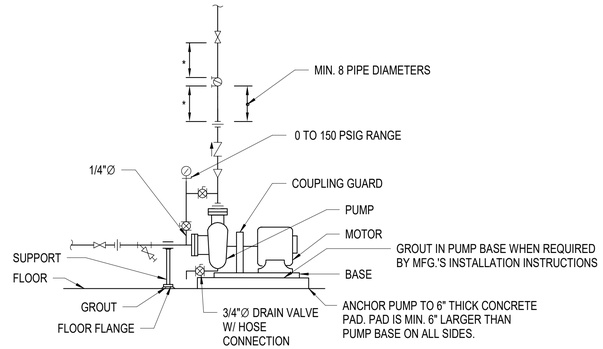


B1 PLATE AND FRAME HEAT EXCHANGER DETAIL
NO SCALE

NOTE: SLAB DIMENSIONS SHALL EXCEED EQUIPMENT DIMENSIONS BY 6" ON ALL SIDES.

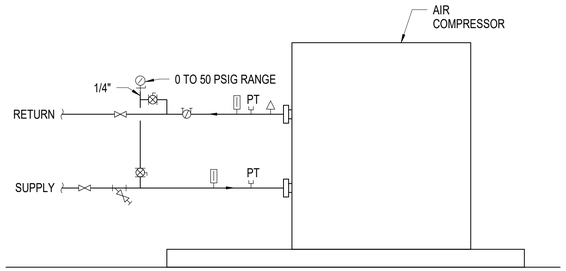


B3 CONCRETE SUPPORT PAD DETAIL
NO SCALE

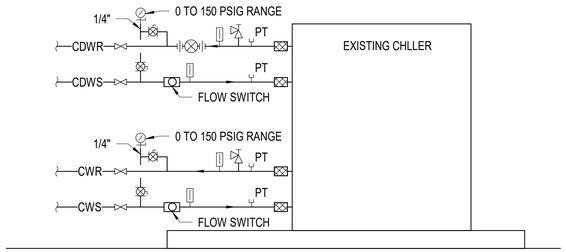


* STRAIGHT LENGTHS OF UNOBSTRUCTED PIPE WITHOUT INLINE APPURTENANCES SHALL BE INSTALLED UP/DOWNSTREAM OF METERED BALANCING VALVE PER MFG.'S INSTALLATION INSTRUCTIONS

B4 BASE MOUNTED CENTRIFUGAL PUMP
NO SCALE

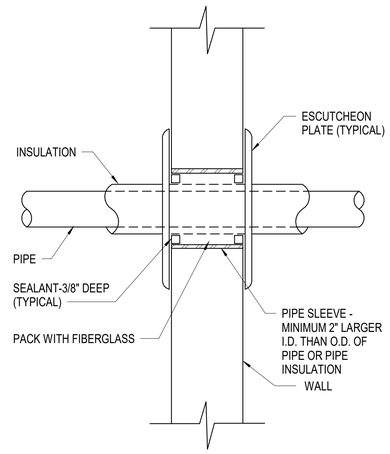


A1 TYPICAL AIR COMPRESSOR PIPING DETAIL
NO SCALE



THOROUGHLY FLUSH ALL PIPING TO UNIT BEFORE MAKING THE FINAL PIPING CONNECTIONS TO THE UNIT.

A3 WATER COOLED CHILLER DETAIL
NO SCALE



A4 ABOVE GRADE PIPE PENETRATION DETAIL
NO SCALE

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EXISTING PUMP SCHEDULE

MARK	LOCATION	SERVICE	GPM	FT HD	MAX RPM	MAX HP	NOTES
CTP-1	HUSKY MECH RM	TOWER WATER	1250	70	1750	30	
CTP-2	HUSKY MECH RM	TOWER WATER	1250	70	1750	30	
CTP-3	HUSKY MECH RM	TOWER WATER	1250	70	1750	30	
PC-1	HUSKY MECH RM	PROCESS WATER	1000	175	3500	60	
PC-2	HUSKY MECH RM	PROCESS WATER	1000	175	3500	60	
CWP-1	HUSKY MECH RM	PROCESS WATER	1350	220	1750	125	
CWP-2	HUSKY MECH RM	CHILLED WATER	1350	220	1750	125	
CWP-3	HUSKY MECH RM	CHILLED WATER	1350	220	1750	125	

NOTES:

EXISTING COOLING TOWER SCHEDULE

MARK	LOCATION	GPM	WATER TEMP (°F)		WB	MAX FAN HP	NOTES
			ENT.	LVG.			
CT-1	OUTDOOR WHEEL MECH RM	1250	95.0	85.0	78	20	1
CT-2	OUTDOOR WHEEL MECH RM	918	95.0	85.0	78	20	2
CT-1	OUTDOOR HUSKY MECH RM	1250	95.0	85.0	78	20	3
CT-2	OUTDOOR HUSTY MECH RM	1250	95.0	85.0	78	20	3

NOTES:

1. MARLEY MODEL NO.: 10155180, ONE CELL.
2. MARLEY MODEL NO.: P15HG-1, ONE CELL.
3. MARLEY MODEL NO.: NC8407PAN1BGF, 2 CELL.

EXISTING WATER COOLED CHILLER SCHEDULE

MARK	LOCATION	TONS (MIN)	EVAPORATOR					CONDENSER				REFRIGERANT TYPE	NOTES
			ENTERING WATER (DEG F)	LEAVING WATER (°F)	MAX GPM	MIN GPM	MAX P.D. (FT WG)	ENTERING WATER (°F)	LEAVING WATER (°F)	GPM	MAX P.D. (FT WG)		
C-1	WHEEL MECH RM	143	45.0	38.0	540	390	38.4	95	85	480	20.7	R134A	1
C-2	HUSKY MECH RM	250	46.4	42.0	1350	1350	16.1	95	85	750	10.1	R22	2

NOTES:

1. TRANE MODEL NO. RTWD 160F.
2. YORK MODEL NO. YSDCCBS2-CJES.

EXISTING HEAT EXCHANGER SCHEDULE

MARK	LOCATION	TYPE	COLD WATER TEMP (°F)		HOT WATER TEMP (°F)		COLD FLOWRATE (LB/HR)	HOT FLOWRATE (LB/HR)	COLD PD (PSIG)	HOT PD (PSIG)	NOTES
			ENT.	LVG. DB	ENT.	LVG.					
HX-1	HUSKY MECH RM	PLATE & FRAME	85	100	105	90	500564	497870.0	9.1	8.9	1

NOTES: 1. MANUFACTURER APV AMERICAS MODEL NO.: A085 MGS-10.

SAND FILTER SCHEDULE

MARK	LOCATION	GPM	FILTRATION SURFACE AREA (SF)	PIPE - FPT		HP	SAND REQUIREMENT (LBS)	GRAVEL REQUIREMENT (LBS)	POWER			NOTES
				INLET (IN.)	OUTLET (IN.)				VOLTAGE	PHASE/HZ	FLA	
SF-1	HUSKY MECH RM	250	12.6	3.0	3.0	5	1300	560	460	3/60	7.6	1
SF-2	WHEEL MECH RM	215	12.6	3.0	3.0	5	1300	560	460	3/60	7.6	1

NOTES:

1. BASIS OF DESIGN: LAKOS MODEL: STS-48-310.

PUMP SCHEDULE

MARK	LOCATION	SERVICE	TYPE	GPM MIN	GPM MAX	FT HD	MAX RPM	MAX HP	NOTES
P-1	WHEEL MECH RM	CHILLER WATER	BASE MOUNTED END SUCTION	390	540	301	1725	75	1, 2, 3
P-2	WHEEL MECH RM	CHILLED WATER	BASE MOUNTED END SUCTION	390	540	301	1662	75	1, 2, 3
P-3	WHEEL MECH RM	TOWER WATER	BASE MOUNTED END SUCTION	1084	1084	185	3600	75	1, 2, 4
P-4	WHEEL MECH RM	TOWER WATER	BASE MOUNTED END SUCTION	1084	1084	185	3600	75	1, 2, 4
P-5	WHEEL MECH RM	TOWER WATER	BASE MOUNTED END SUCTION	1084	1084	185	3600	75	1, 2, 4

NOTES:

1. BASIS OF DESIGN: PUMP P-1 & 2: B&G SERIES E-1510 MODEL NO.: 2.5BB; PUMP P-3, 4, & 5: B&G SERIES: E-1510, MODEL NO. 4BD.
2. ELECTRICAL: 480/60/3 (V/PH/HZ).
3. PROVIDE A VARIABLE SPEED DRIVE WITH PUMP. PUMP P-1 & 2 NPSHR = 28.7 FT. PUMP P-2 SHALL BE A BACK-UP PUMP.
4. CONSTANT SPEED MOTOR. PUMP P-3, 4 & 5 NPSHR = 23.2 FT. P-5 SHALL BE A BACK-UP PUMP.

AIR CONTROL SCHEDULE

SERVICE	AIR SEPARATOR				EXPANSION TANK				
	MARK	GPM	MAX PD (FT WG)	SIZE (IN.)	MARK	TANK VOL (GAL)	ACCEPTANCE VOLUME (GAL)	TYPE	SIZE (IN.)
PROCESS WATER	AS-1	1000.0	1	8.0	ET-1	45.0	36.0	BLADDER	3/4
CHILLED WATER	AS-2	1350.0	0.7	10	ET-2	60.0	48.0	BLADDER	3/4

NOTES:

1. BELL & GOSSETT AIR SEPARATOR MODEL - ROLAIRTROL. EXPANSION...

Altium Packaging

Lenexa KS Cooling Water System

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DESIGNER

CLARKNEXSEN

440 MARTIN LUTHER KING JR BLVD
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478·743·8415

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SUBMITTAL

02.24.2023

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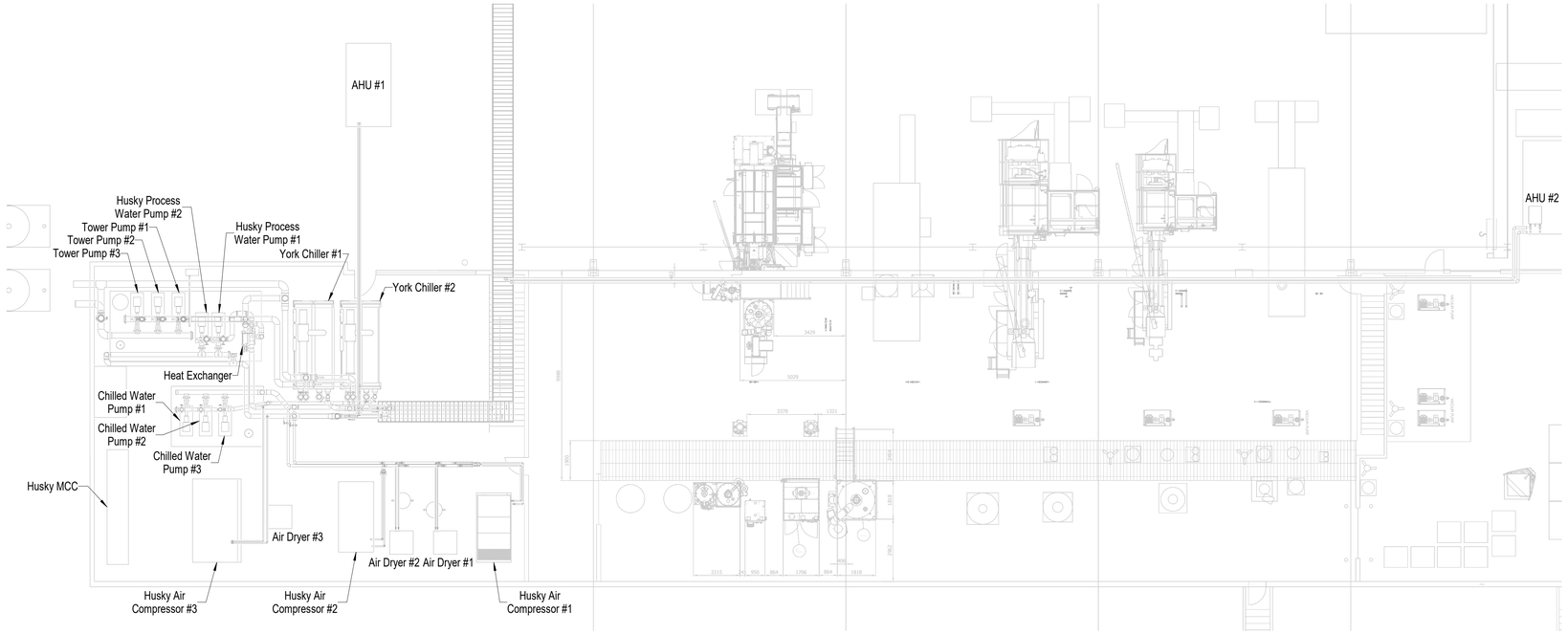
SHEET

SCHEDULES

M-601

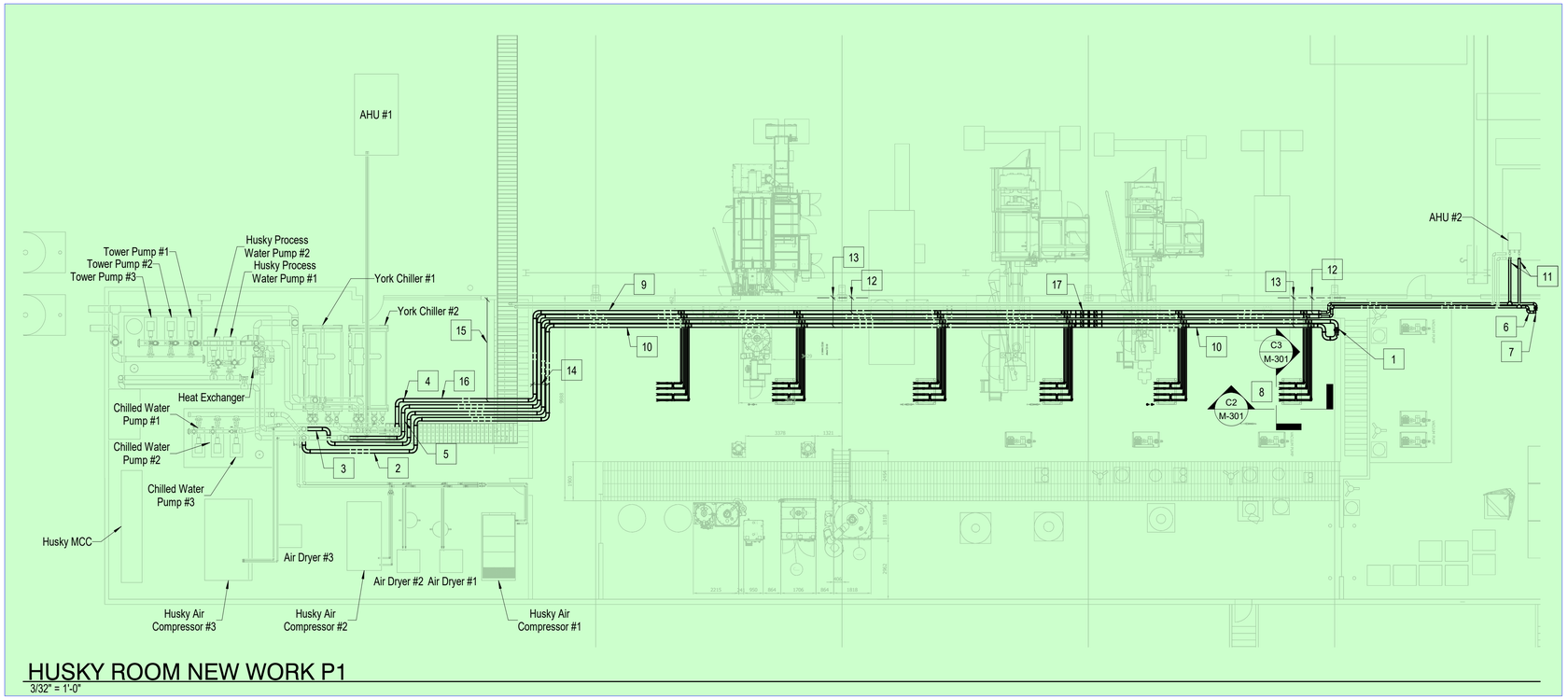
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



HUSKY ROOM DEMO P1

3/32" = 1'-0"



HUSKY ROOM NEW WORK P1

3/32" = 1'-0"

GENERAL NOTES

A. DRAWINGS AND DIMENSIONS ARE BASED ON FIELD SURVEY. CONTRACTOR SHOULD EXPECT TO MAKE SOME FIELD ALTERATIONS TO THE PIPE ROUTING SHOWN.
B. DIMENSIONS ARE FOR REFERENCE ONLY.
C. ALL PIPE ROUTING IS TO BE VERIFIED BY THE CONTRACTOR. ANY DEVIATIONS FROM THE ROUTING PROVIDED WILL REQUIRE OWNER AND ENGINEER APPROVAL.
D. WHEN DEMOLISHING EXISTING CHILLED WATER, COOLING TOWER WATER, AND PROCESS WATER PIPING CAREFULLY REMOVE AND PROTECT ALL FLOW SWITCHES AND OTHER CONTROL DEVICES FOR REUSE. INSPECT DEVICES, IF DEVICES ARE DAMAGED NOTIFY OWNER FOR DIRECTION. REUSE AND INSTALL CONTROL DEVICE INTO NEW PIPING SYSTEM. CONNECT DEVICE INTO EXISTING CONTROL SYSTEMS.
E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 PROCESS WATER RECIRCULATION LINE AT END OF MAIN BALANCING VALVE.
2 PROCESS WATER RETURN FROM HUSKY.
3 PROCESS WATER SUPPLY TO HUSKY.
4 CHIILLED WATER SUPPLY TO HUSKY.
5 CHILLED WATER RETURN FROM HUSKY.
6 CHILLED WATER RECIRCULATION LINE AT END OF MAIN.
7 PROVIDE A BALANCING VALVE AT THE END OF THE CHILLED WATER MAIN.
8 INSTALL ONE MOCK MACHINE CONNECTION MODULE FOR OWNER/ENGINEER REVIEW AND APPROVAL. REFER TO SECTION PLANS.
9 COMPLETE MODULE WITH PIPING, SUPPORTS, INSTRUMENTS, VALVES, INSULATION, LABELS, AND FLOW ARROWS.
10 CENTERLINE OF PIPING SHALL BE LOCATED 11'-10" AFF.
11 CHILLED WATER PIPING TO AHU-2. ROUTE PIPING TO UNIT AND PREPARE PIPING FOR FUTURE CONNECTION. CONNECT PIPING TO UNIT IN PHASE 6.
12 ROUTE PIPING 2'-4" FROM CENTERLINE OF STRUCTURAL COLUMN.
13 ROUTE PIPING 4'-6" FROM CENTERLINE OF STRUCTURAL COLUMN.
14 ROUTE PIPING 2'-5" FROM WALL.
15 ROUTE PIPING 16'-1" FROM WALL.
16 CENTERLINE OF PIPING SHALL BE LOCATED 23'-6" AFF.
17 DROP PIPING. ROUTE UNDER FIRE PROTECTION MAIN. CENTERLINE OF PIPING SHALL BE LOCATED 9'-9" AFF.

GRAPHIC SCALE(S)

3/32" = 1' - 0" 0 5' 10' 20' 40'

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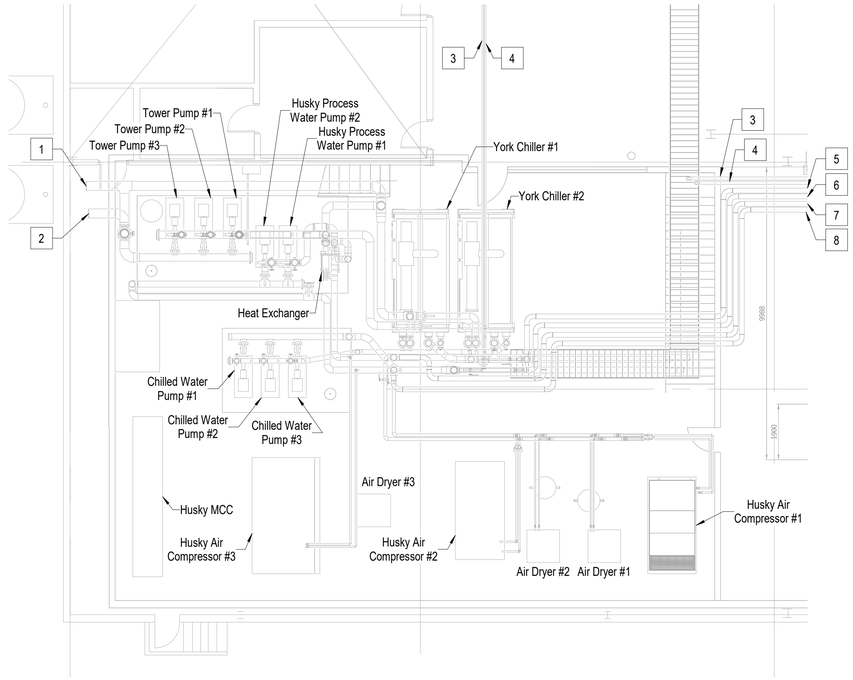
OVERALL HUSKY SYSTEM - PHASE 1

HM-100

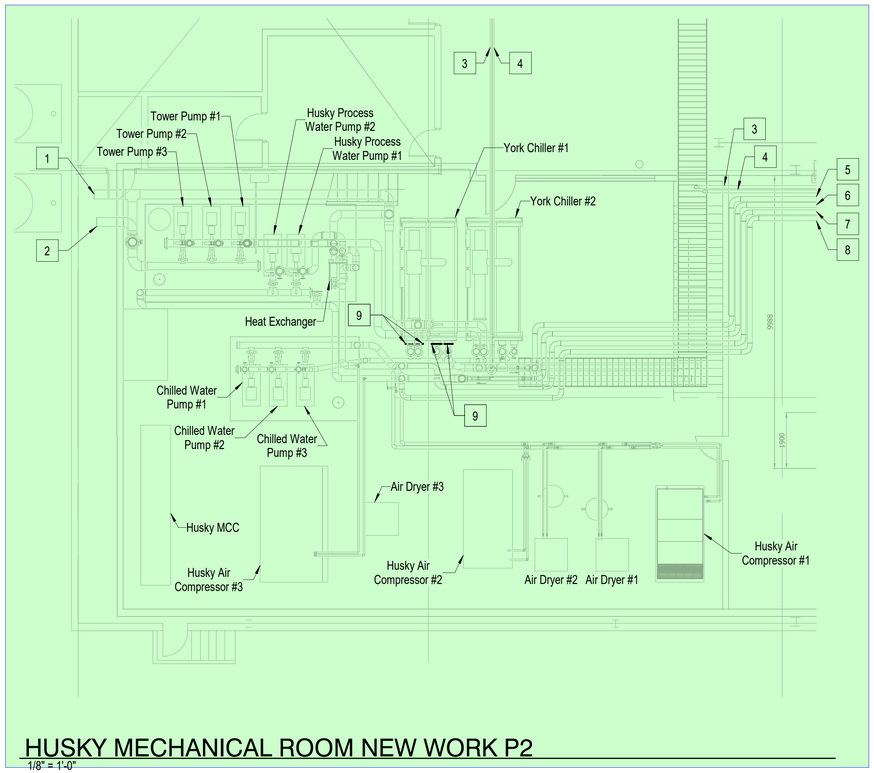
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



HUSKY MECHANICAL ROOM DEMO P2

1/8" = 1'-0"



HUSKY MECHANICAL ROOM NEW WORK P2

1/8" = 1'-0"

GENERAL NOTES

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E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

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2 COOLING TOWER RETURN.
3 CHILLED WATER RETURN FROM AHU.
4 CHILLED WATER SUPPLY TO AHU.
5 CHIILLED WATER SUPPLY TO HUSKY.
6 CHILLED WATER RETURN FROM HUSKY.
7 PROCESS WATER SUPPLY TO HUSKY.
8 PROCESS WATER RETURN FROM HUSKY.
9 DISCONNECT YORK CHILLER NO. 1 FROM PLANT PIPING SYSTEM. INSTALL BLIND FLANGES ON CHILLER (YORK NO. 1) CHILLED AND COOLING WATER SUPPLY AND RETURN CONNECTIONS.

GRAPHIC SCALE(S)

1/8" = 1' - 0" 0 5' 10' 15' 30'

Altium Packaging

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HUSKY SYSTEM MECHANICAL ROOM - PHASE 2

HM-200

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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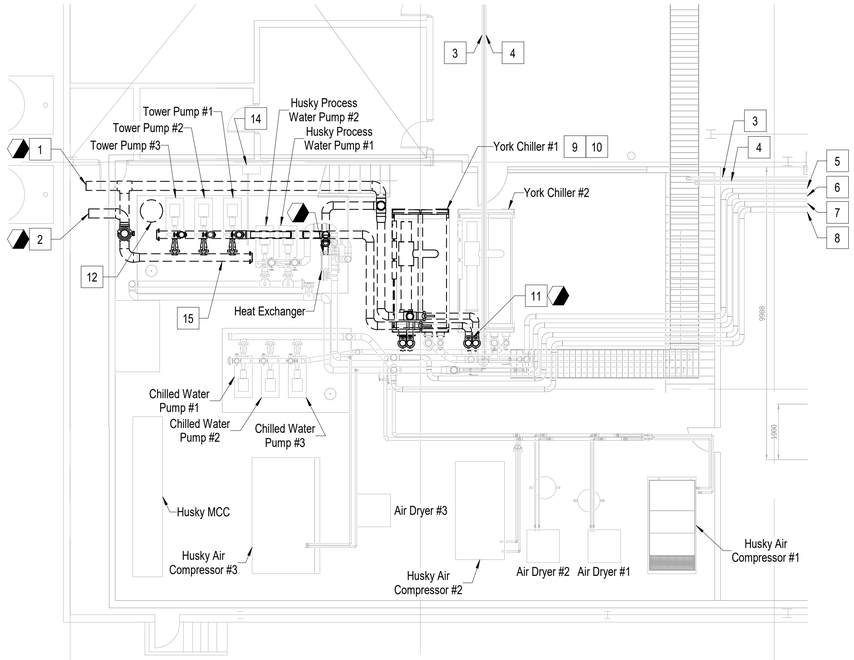
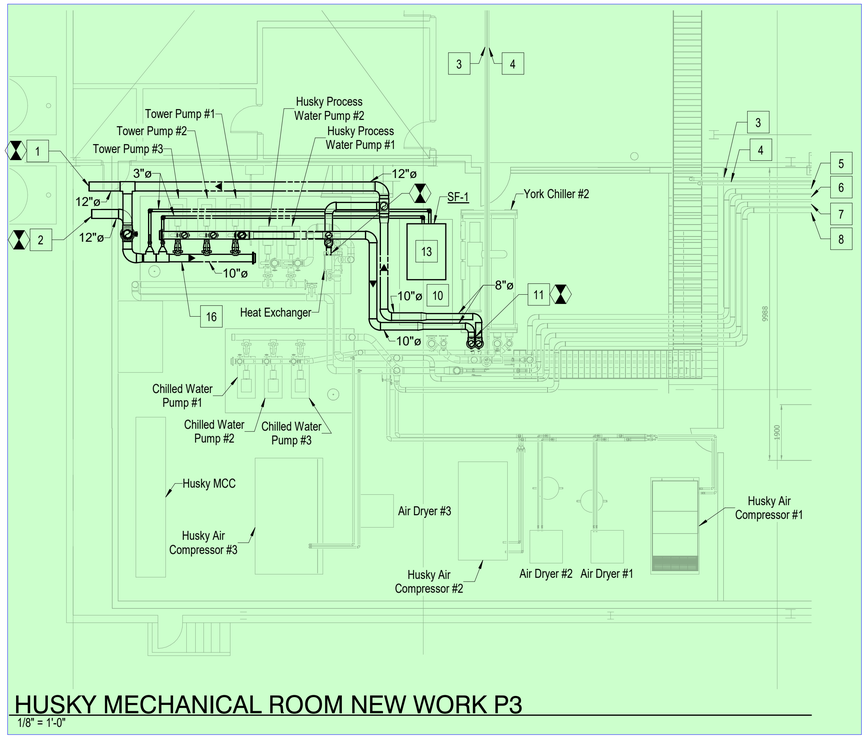


HUSKY MECHANICAL ROOM DEMO P3

1/8" = 1'-0"



HUSKY MECHANICAL ROOM NEW WORK P3

1/8" = 1'-0"

GENERAL NOTES

A. DRAWINGS AND DIMENSIONS ARE BASED ON FIELD SURVEY. CONTRACTOR SHOULD EXPECT TO MAKE SOME FIELD ALTERATIONS TO THE PIPE ROUTING SHOWN.
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E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

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2 COOLING TOWER RETURN.
3 CHILLED WATER RETURN FROM AHU.
4 CHILLED WATER SUPPLY TO AHU.
5 CHIILLED WATER SUPPLY TO HUSKY.
6 CHILLED WATER RETURN FROM HUSKY.
7 PROCESS WATER SUPPLY TO HUSKY.
8 PROCESS WATER RETURN FROM HUSKY.
9 REMOVE YORK CHILLER NO. 1.
10 CLEAN YORK CHILLER NO. 1 HOUSEKEEPING PAD.
11 REMOVE AND REPLACE COOLING WATER PIPING TO YORK CHILLER NO. 2.
12 REMOVE EXISTING COOLING TOWER SAND FILTER, ASSOCIATED FILTER PUMP AND CONTROLS. MAINTAIN INLET, OUTLET AND BACKWASH PIPING FOR REUSE PIPING ROUTING FOR NEW FILTER. COORDINATE WITH NEW CONDENSER WATER PIPING INSTALLATION.
13 PROVIDE NEW SAND FILTER SYSTEM. BASIC OF DESIGN LAKOS MODEL NO. STS-48-310. INSTALL PER MANUFACTURERS INSTRUCTIONS. EXTEND INLET, OUTLET, AND BACKWASH PIPING TO COOLING TOWER PIPING MAIN AND CONNECT TO EXISTING.
14 EXISTING MAKEUP WATER SYSTEM.
15 MAINTAIN EXISTING 1-1/4" MAKEUP WATER PIPING TO PROCESS WATER PIPING SYSTEM. DISCONNECT PIPING FROM PROCESS WATER PIPING AND PREPARE PIPING FOR FUTURE CONNECTION.
16 CONNECT 1-1/4" MAKEUP WATER PIPING TO COOLING TOWER PIPING SYSTEM.

GRAPHIC SCALE(S)

1/8" = 1' - 0" 0 5' 10' 15' 30'

Altium Packaging

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DESIGNER

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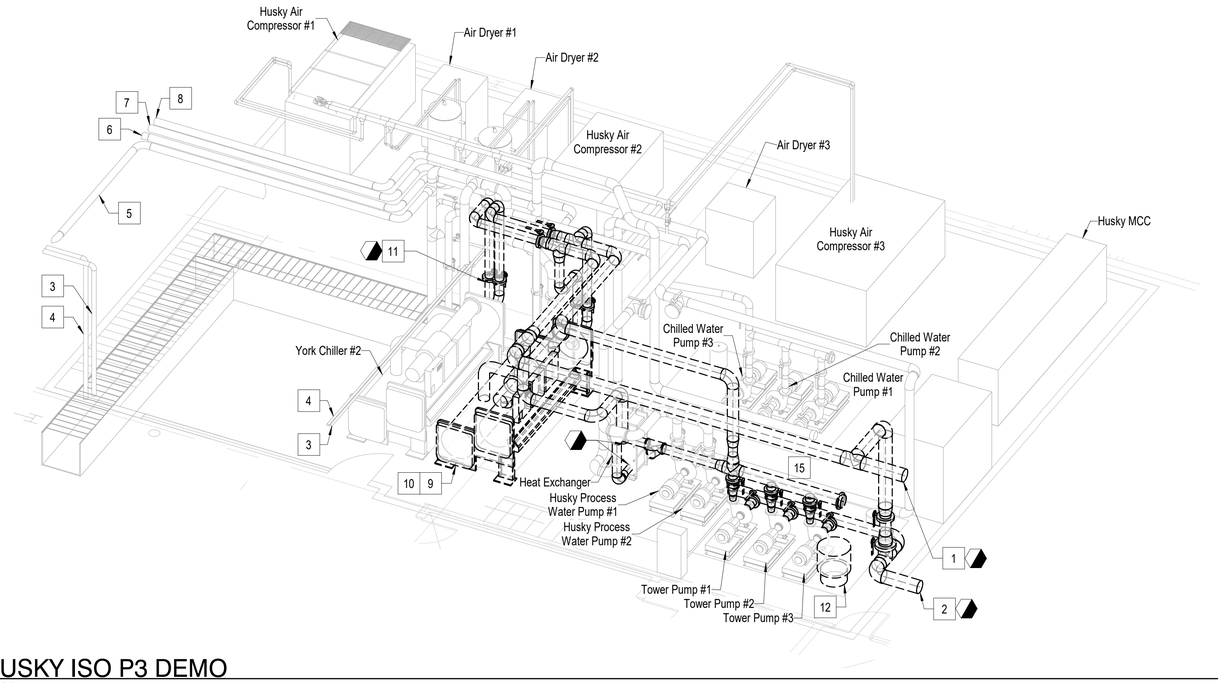
HUSKY SYSTEM MECHANICAL ROOM - PHASE 3

HM-300

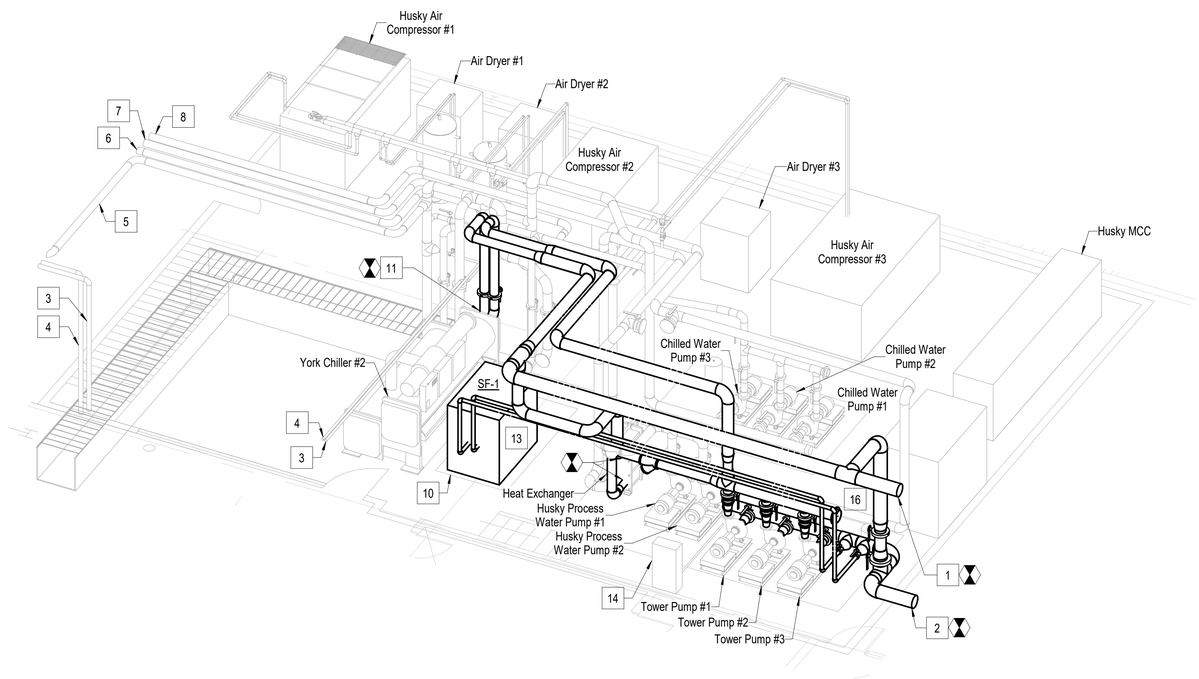
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



HUSKY ISO P3 DEMO

NO SCALE



HUSKY ISO P3 NEW WORK

NO SCALE

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13 PROVIDE NEW SAND FILTER SYSTEM. BASIC OF DESIGN LAKOS MODEL NO. STS-48-310. INSTALL PER MANUFACTURERS INSTRUCTIONS. EXTEND INLET, OUTLET, AND BACKWASH PIPING TO COOLING TOWER PIPING MAIN AND CONNECT TO EXISTING.
14 EXISTING MAKEUP WATER SYSTEM.
15 MAINTAIN EXISTING 1-1/4" MAKEUP WATER PIPING TO PROCESS WATER PIPING SYSTEM. DISCONNECT PIPING FROM PROCESS WATER PIPING AND PREPARE PIPING FOR FUTURE CONNECTION.
16 CONNECT 1-1/4" MAKEUP WATER PIPING TO COOLING TOWER PIPING SYSTEM.

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DESIGNER

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HUSKY SYSTEM PHASE 3 ISOMETRIC

HM-301

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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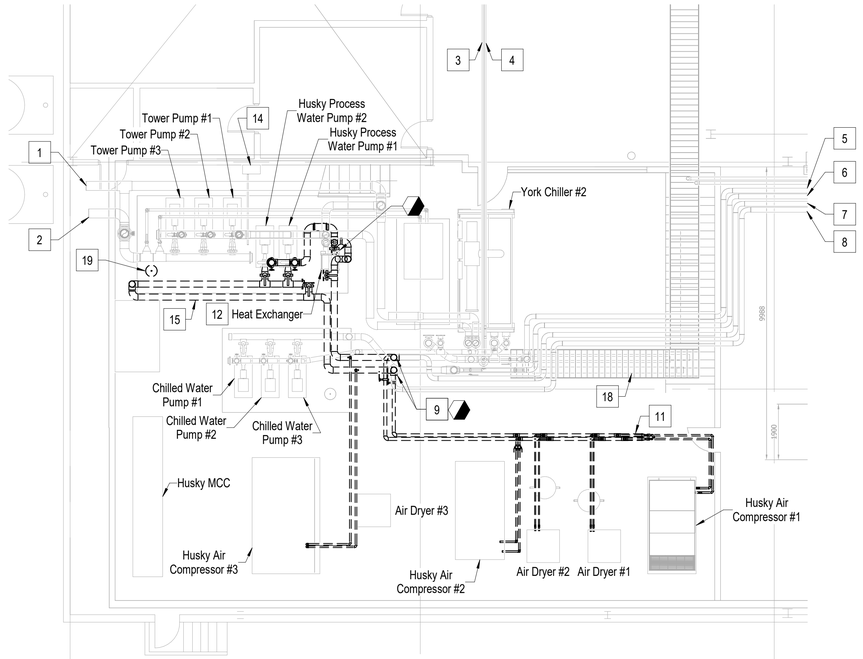
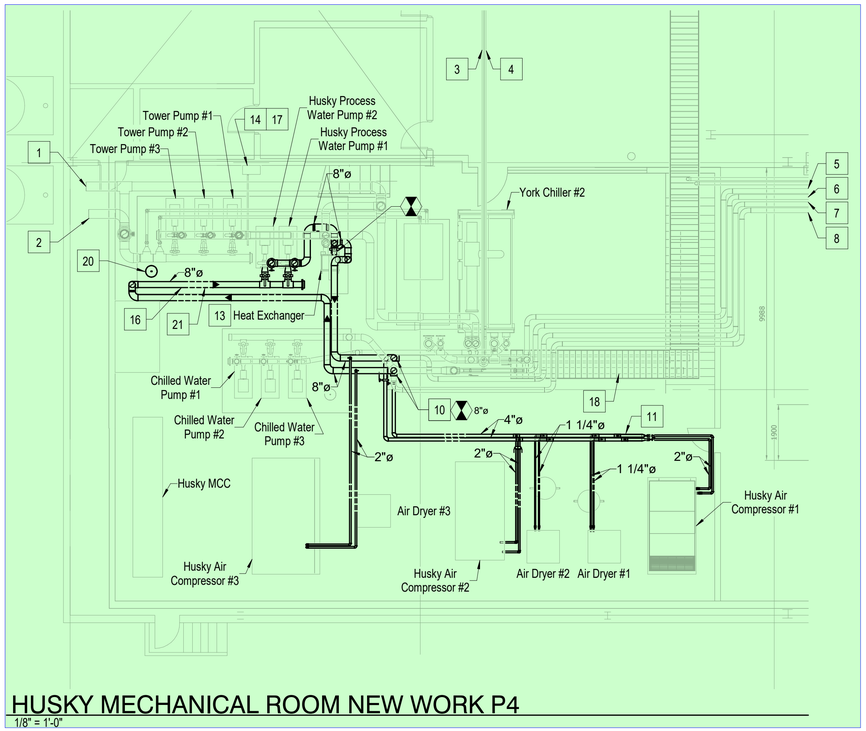


HUSKY MECHANICAL ROOM DEMO P4

1/8" = 1'-0"



HUSKY MECHANICAL ROOM NEW WORK P4

1/8" = 1'-0"

GENERAL NOTES

A. DRAWINGS AND DIMENSIONS ARE BASED ON FIELD SURVEY. CONTRACTOR SHOULD EXPECT TO MAKE SOME FIELD ALTERATIONS TO THE PIPE ROUTING SHOWN.
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D. WHEN DEMOLISHING EXISTING CHILLED WATER, COOLING TOWER WATER, AND PROCESS WATER PIPING CAREFULLY REMOVE AND PROTECT ALL FLOW SWITCHES AND OTHER CONTROL DEVICES FOR REUSE. INSPECT DEVICES, IF DEVICES ARE DAMAGED NOTIFY OWNER FOR DIRECTION. REUSE AND INSTALL CONTROL DEVICE INTO NEW PIPING SYSTEM. CONNECT DEVICE INTO EXISTING CONTROL SYSTEMS.
E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

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4 CHILLED WATER SUPPLY TO AHU.
5 CHIILLED WATER SUPPLY TO HUSKY.
6 CHILLED WATER RETURN FROM HUSKY.
7 PROCESS WATER SUPPLY TO HUSKY.
8 PROCESS WATER RETURN FROM HUSKY.
9 DEMO PIPING TO EXISTING PROCESS WATER MAINS.
10 TIE INTO NEW PROCESS WATER MAINS.
11 REMOVE AND REPLACE COOLING WATER PIPING TO AIR COMPRESSORS IN MECHANICAL ROOM.
12 REMOVE PROCESS PIPING UP TO EXISTING HEAT EXCHANGER. HEAT EXCHANGER TO REMAIN.
13 INSTALL PROCESS PIPING AND CONNECT PIPING TO EXISTING HEAT EXCHANGER.
14 EXISTING MAKEUP WATER SYSTEM.
15 MAINTAIN EXISTING 1-1/4" MAKEUP WATER PIPING TO PROCESS WATER PIPING SYSTEM. DISCONNECT PIPING FROM PROCESS WATER PIPING AND PREPARE PIPING FOR FUTURE CONNECTION.
16 CONNECT 1-1/4" MAKEUP WATER PIPING TO PROCESS WATER PIPING SYSTEM.
17 PROVIDE NEW RO CONNECTION, TIE INTO MAKEUP WATER SERVICE COORDINATE PIPING SIZE WITH RO EQUIPMENT REQUIREMENTS.
18 EXISTING PIPING MAINS IN TRENCH.
19 REMOVE EXISTING EXPANSION TANK.
20 EXPANSION TANK 45 TOTAL, 36 ACCEPTABE VOLUME.
21 8" AIR SEPARATOR.

GRAPHIC SCALE(S)

1/8" = 1' - 0" 0 5' 10' 15' 30'

Altium Packaging

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DESIGNER

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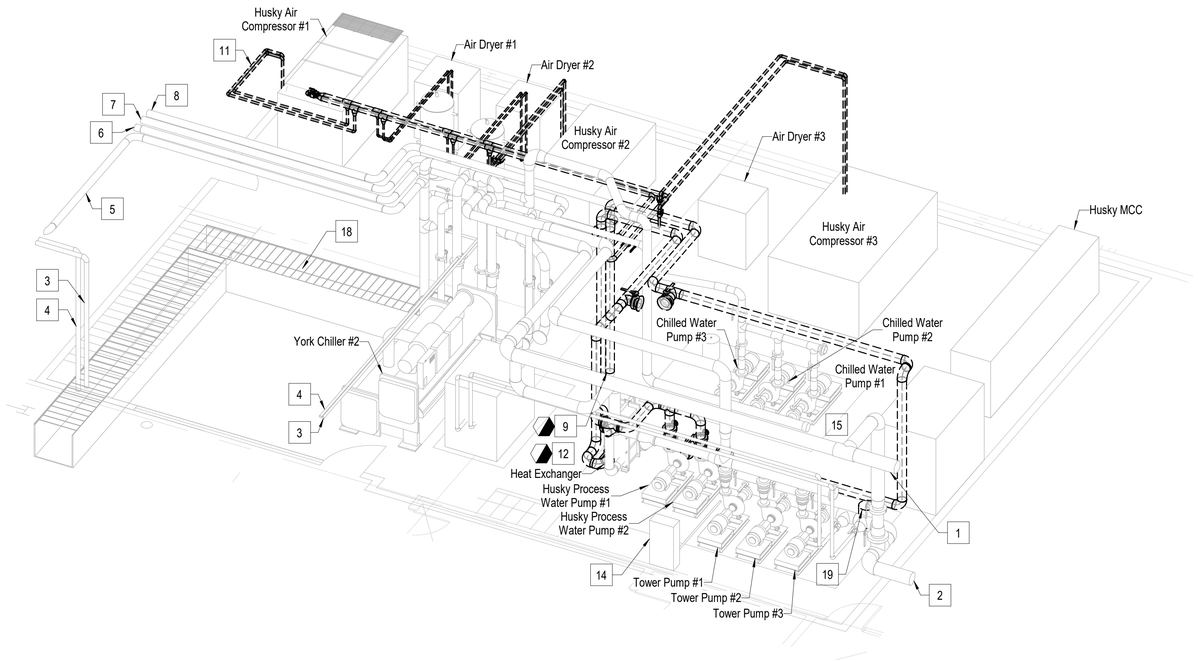
HUSKY SYSTEM MECHANICAL ROOM - PHASE 4

HM-400

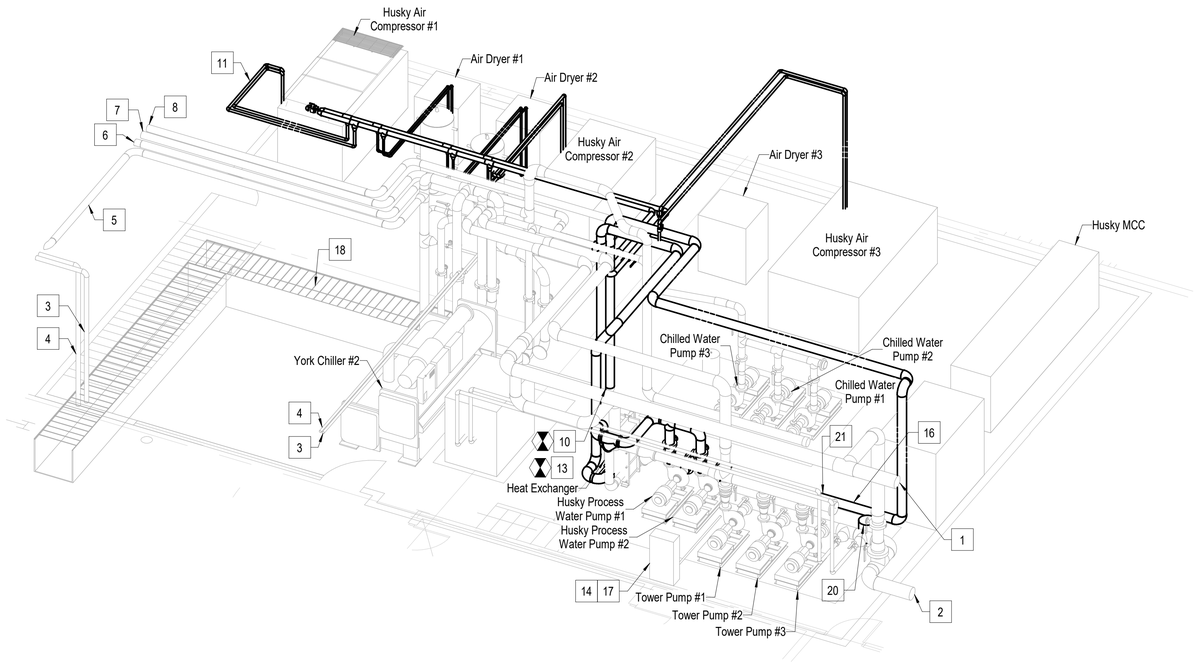
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



HUSKY ISO P4 DEMO

NO SCALE



HUSKY ISO P4 NEW WORK

NO SCALE

GENERAL NOTES

A. DRAWINGS AND DIMENSIONS ARE BASED ON FIELD SURVEY. CONTRACTOR SHOULD EXPECT TO MAKE SOME FIELD ALTERATIONS TO THE PIPE ROUTING SHOWN.
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C. ALL PIPE ROUTING IS TO BE VERIFIED BY THE CONTRACTOR. ANY DEVIATIONS FROM THE ROUTING PROVIDED WILL REQUIRE OWNER AND ENGINEER APPROVAL.
D. WHEN DEMOLISHING EXISTING CHILLED WATER, COOLING TOWER WATER, AND PROCESS WATER PIPING CAREFULLY REMOVE AND PROTECT ALL FLOW SWITCHES AND OTHER CONTROL DEVICES FOR REUSE. INSPECT DEVICES, IF DEVICES ARE DAMAGED NOTIFY OWNER FOR DIRECTION. REUSE AND INSTALL CONTROL DEVICE INTO NEW PIPING SYSTEM. CONNECT DEVICE INTO EXISTING CONTROL SYSTEMS.
E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 COOLING TOWER SUPPLY.
2 COOLING TOWER RETURN.
3 CHILLED WATER RETURN FROM AHU.
4 CHILLED WATER SUPPLY TO AHU.
5 CHIILLED WATER SUPPLY TO HUSKY.
6 CHILLED WATER RETURN FROM HUSKY.
7 PROCESS WATER SUPPLY TO HUSKY.
8 PROCESS WATER RETURN FROM HUSKY.
9 DEMO PIPING TO EXISTING PROCESS WATER MAINS.
10 TIE INTO NEW PROCESS WATER MAINS.
11 REMOVE AND REPLACE COOLING WATER PIPING TO AIR COMPRESSORS IN MECHANICAL ROOM.
12 REMOVE PROCESS PIPING UP TO EXISTING HEAT EXCHANGER. HEAT EXCHANGER TO REMAIN.
13 INSTALL PROCESS PIPING AND CONNECT PIPING TO EXISTING HEAT EXCHANGER.
14 EXISTING MAKEUP WATER SYSTEM.
15 MAINTAIN EXISTING 1-1/4" MAKEUP WATER PIPING TO PROCESS WATER PIPING SYSTEM. DISCONNECT PIPING FROM PROCESS WATER PIPING AND PREPARE PIPING FOR FUTURE CONNECTION.
16 CONNECT 1-1/4" MAKEUP WATER PIPING TO PROCESS WATER PIPING SYSTEM.
17 PROVIDE NEW RO CONNECTION, TIE INTO MAKEUP WATER SERVICE COORDINATE PIPING SIZE WITH RO EQUIPMENT REQUIREMENTS.
18 EXISTING PIPING MAINS IN TRENCH.
19 REMOVE EXISTING EXPANSION TANK.
20 EXPANSION TANK 45 TOTAL, 36 ACCEPTABE VOLUME.
21 8" AIR SEPARATOR.

Altium Packaging

Lenexa KS Cooling Water System

11725 W 85th St.
Overland Park, KS 66214

DESIGNER

CLARKNEXSEN
440 MARTIN LUTHER KING JR BLVD
MACON, GEORGIA 31201
478·743·8415

PROFESSIONAL SEAL

NOT FOR CONSTRUCTION

SUBMITTAL

02.24.2023

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REVISIONS

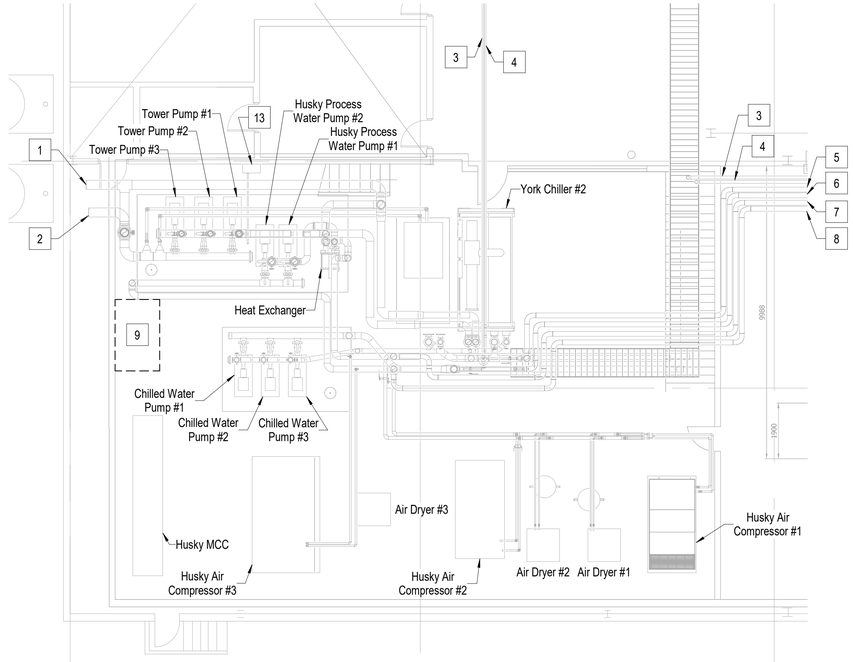
SHEET

HUSKY SYSTEM PHASE 4 ISOMETRIC

HM-401

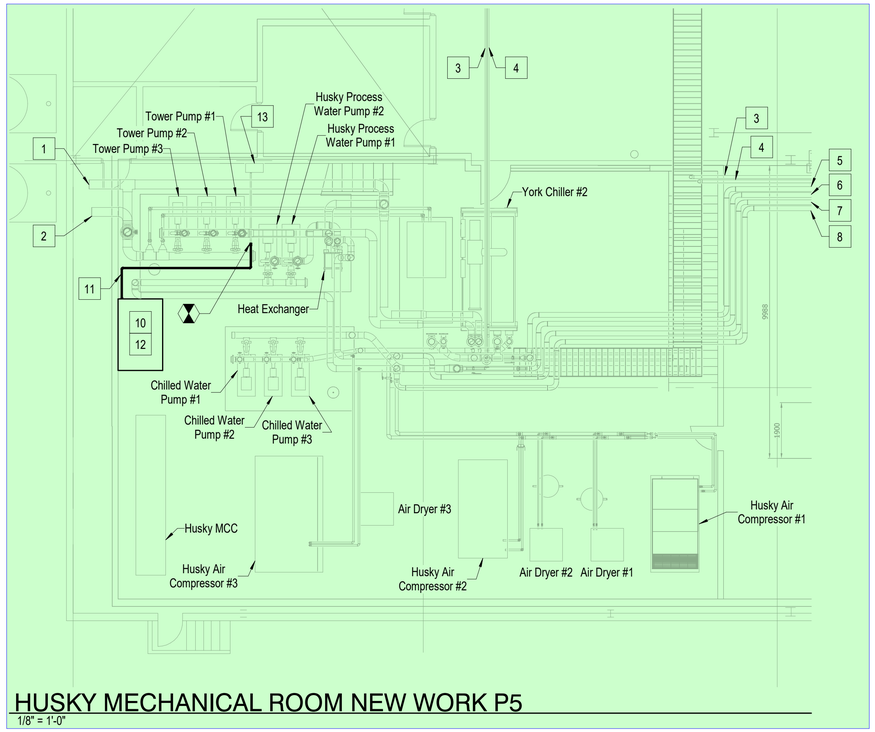
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



HUSKY MECHANICAL ROOM DEMO P5

1/8" = 1'-0"



HUSKY MECHANICAL ROOM NEW WORK P5

1/8" = 1'-0"

GENERAL NOTES

A. DRAWINGS AND DIMENSIONS ARE BASED ON FIELD SURVEY. CONTRACTOR SHOULD EXPECT TO MAKE SOME FIELD ALTERATIONS TO THE PIPE ROUTING SHOWN.
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6 CHILLED WATER RETURN FROM HUSKY.
7 PROCESS WATER SUPPLY TO HUSKY.
8 PROCESS WATER RETURN FROM HUSKY.
9 REMOVE OLD CHEMICAL TREATMENT SYSTEM WHILE SWAPPING OVER TO NEW CHEMICAL TREATMENT SYSTEM.
10 PROVIDE NEW CHEMICAL TREATMENT SYSTEM.
11 PROVIDE RO EQUIPMENT AND CONNECT TO HUSKY MAKE-UP WATER PIPING.
12 NEW CHEMICAL TREATMENT SYSTEM SHALL HAVE METERING AND MONITORING OF CHEMICALS.
13 EXISTING MAKEUP WATER SYSTEM.

GRAPHIC SCALE(S)

1/8" = 1' - 0" 0 5' 10' 15' 30'

Altium Packaging

Lenexa KS Cooling Water System

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Overland Park, KS 66214

DESIGNER

CLARKNEXSEN
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478·743·8415

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SHEET

HUSKY SYSTEM MECHANICAL ROOM - PHASE 5

HM-500

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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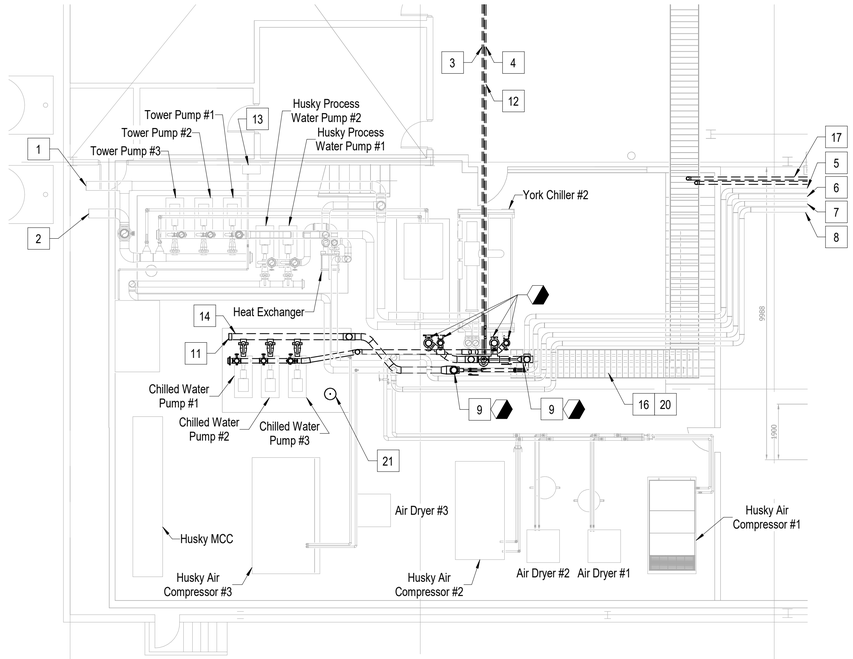
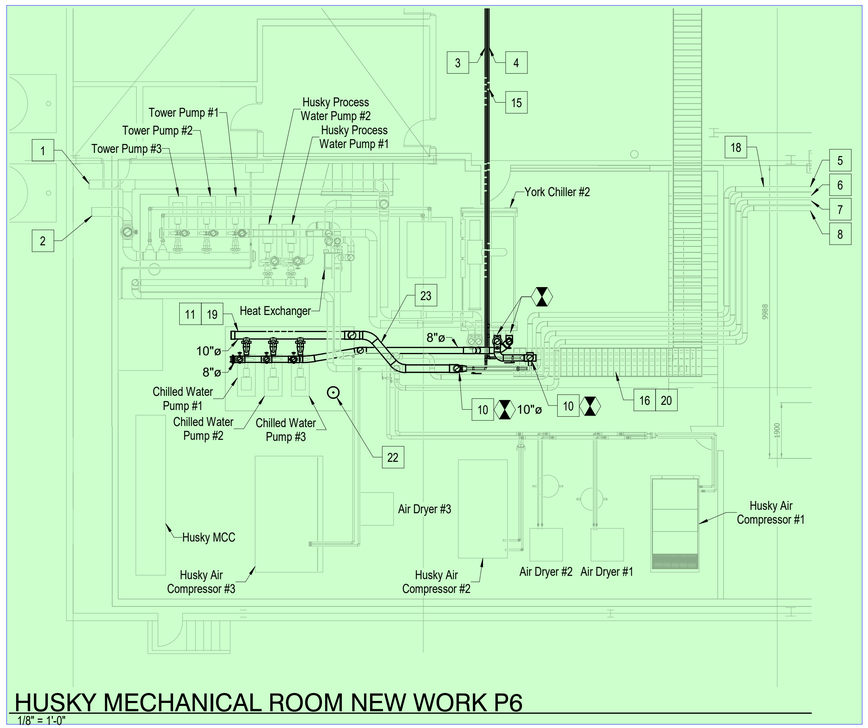


HUSKY MECHANICAL ROOM DEMO P6

1/8" = 1'-0"



HUSKY MECHANICAL ROOM NEW WORK P6

1/8" = 1'-0"

GENERAL NOTES

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8 PROCESS WATER RETURN FROM HUSKY.
9 DEMO PIPING TO EXISTING CHILLED WATER MAINS.
10 TIE INTO NEW CHILLED WATER MAINS.
11 REMOVE AND REPLACE CHILLED WATER PIPING. RECHARGE AND ACTIVATE CHILLED WATER SYSTEM. WATER TREATMENT COMPANY SHALL BE ENGAGED IN COORDINATING THE PIPING UPGRADE.
12 DEMO PIPING UP TO AHU-1. REFER TO SHEET HM-100 FOR PIPE ROUTE.
13 EXISTING MAKEUP WATER SYSTEM.
14 MAINTAIN EXISTING 1-1/4" MAKEUP WATER PIPING TO PROCESS WATER PIPING SYSTEM. DISCONNECT PIPING FROM PROCESS WATER PIPING AND PREPARE PIPING FOR FUTURE CONNECTION.
15 INSTALL PIPING UP TO AHU-1. REFER TO SHEET HM-100 FOR PIPE ROUTE.
16 DURING PHASE 7: REMOVE ALL UNDERFLOOR PIPING AND STUB UPS TO LINES 21-26. REPLACE TRENCH COVER WITH HOLES OR PIPE PENETRATIONS.
17 DEMO PIPING TO AHU-2. REFER TO SHEET HM-100 FOR PIEP ROUTE.
18 INSTALL PIPING CONNECTION TO AHU-2 AT END OF PIPING MAIN.
19 MAINTAIN EXISTING 1-1/4" MAKEUP WATER PIPING TO CHILLED WATER PIPING SYSTEM. DISCONNECT PIPING FROM CHILLED WATER PIPING AND PREPARE PIPING FOR FUTURE CONNECTION.
20 EXISTING PIPING MAINS IN TRENCH.
21 REMOVE EXISTING EXPANSION TANK.
22 EXPANSION TANK 60 TOTAL, 48 ACCEPTABE VOLUME.
23 10" AIR SEPARATOR.

GRAPHIC SCALE(S)

1/8" = 1' - 0" 0 5' 10' 15' 30'

Altium Packaging

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DESIGNER

CLARKNEXSEN
440 MARTIN LUTHER KING JR BLVD
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SUBMITTAL

02.24.2023

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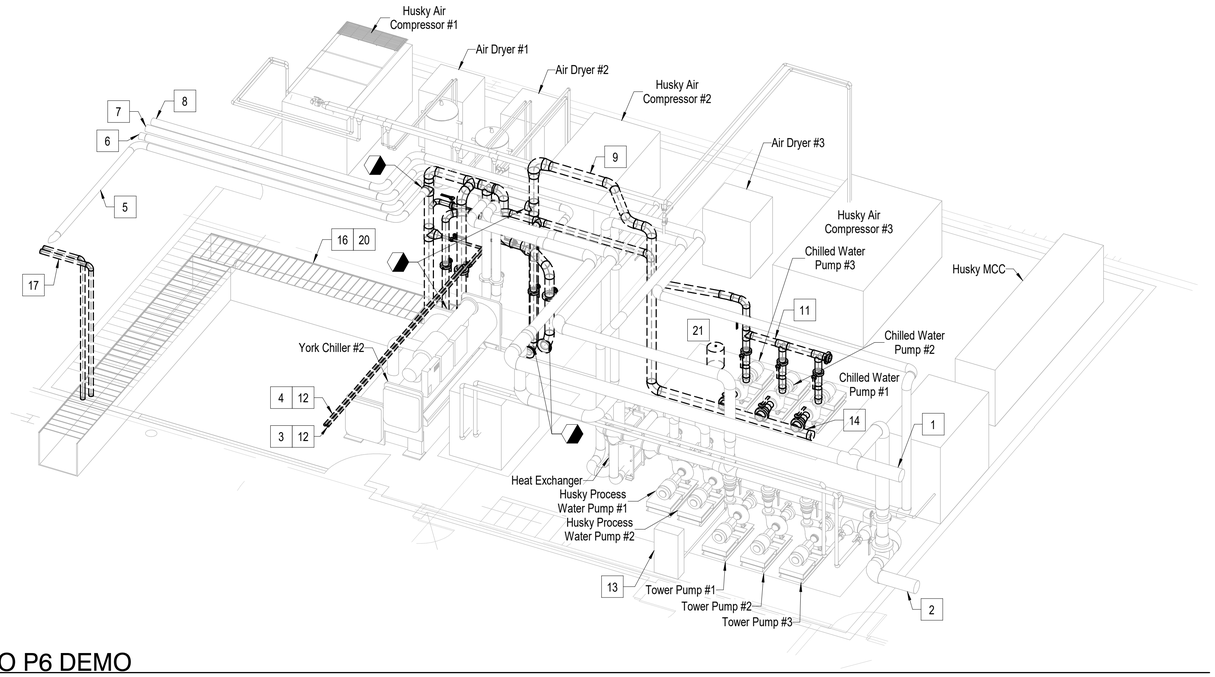
SHEET

HUSKY SYSTEM MECHANICAL ROOM - PHASE 6

HM-600

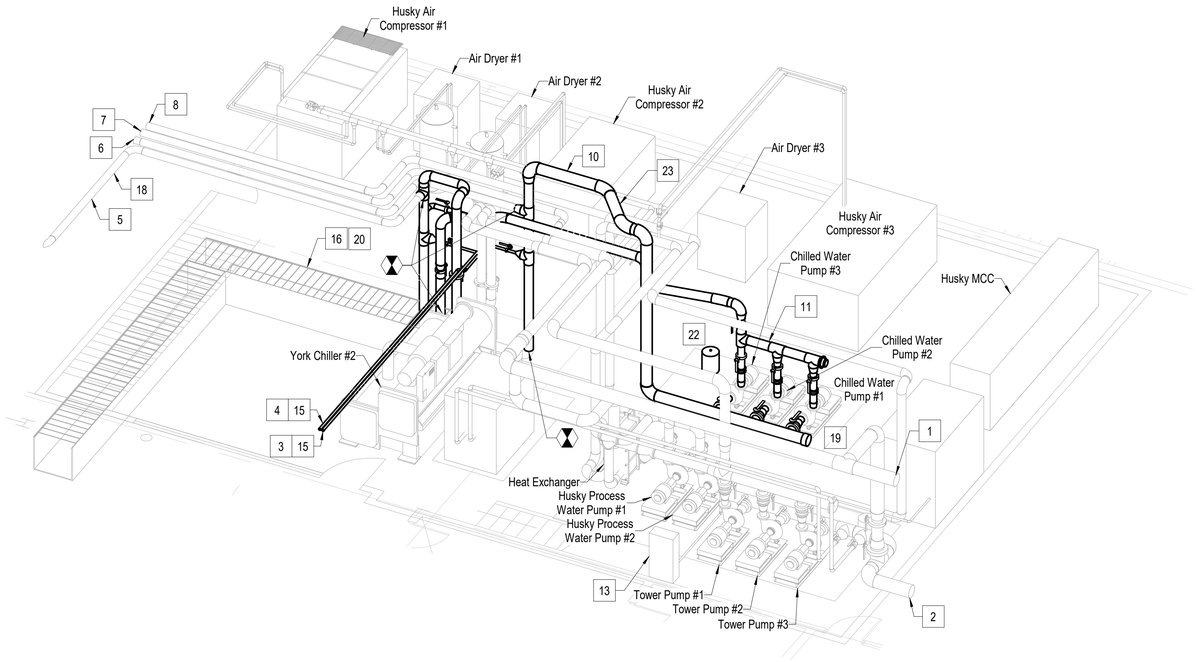
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



HUSKY ISO P6 DEMO

NO SCALE



HUSKY ISO P6 NEW WORK

NO SCALE

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18 INSTALL PIPING CONNECTION TO AHU-2 AT END OF PIPING MAIN.
19 CONNECT 1-1/4" MAKEUP WATER PIPING TO CHILLED WATER PIPING SYSTEM.
20 EXISTING PIPING MAINS IN TRENCH.
21 REMOVE EXISTING EXPANSION TANK.
22 EXPANSION TANK 60 TOTAL, 48 ACCEPTABE VOLUME.
23 10" AIR SEPARATOR.

Altium Packaging

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DESIGNER

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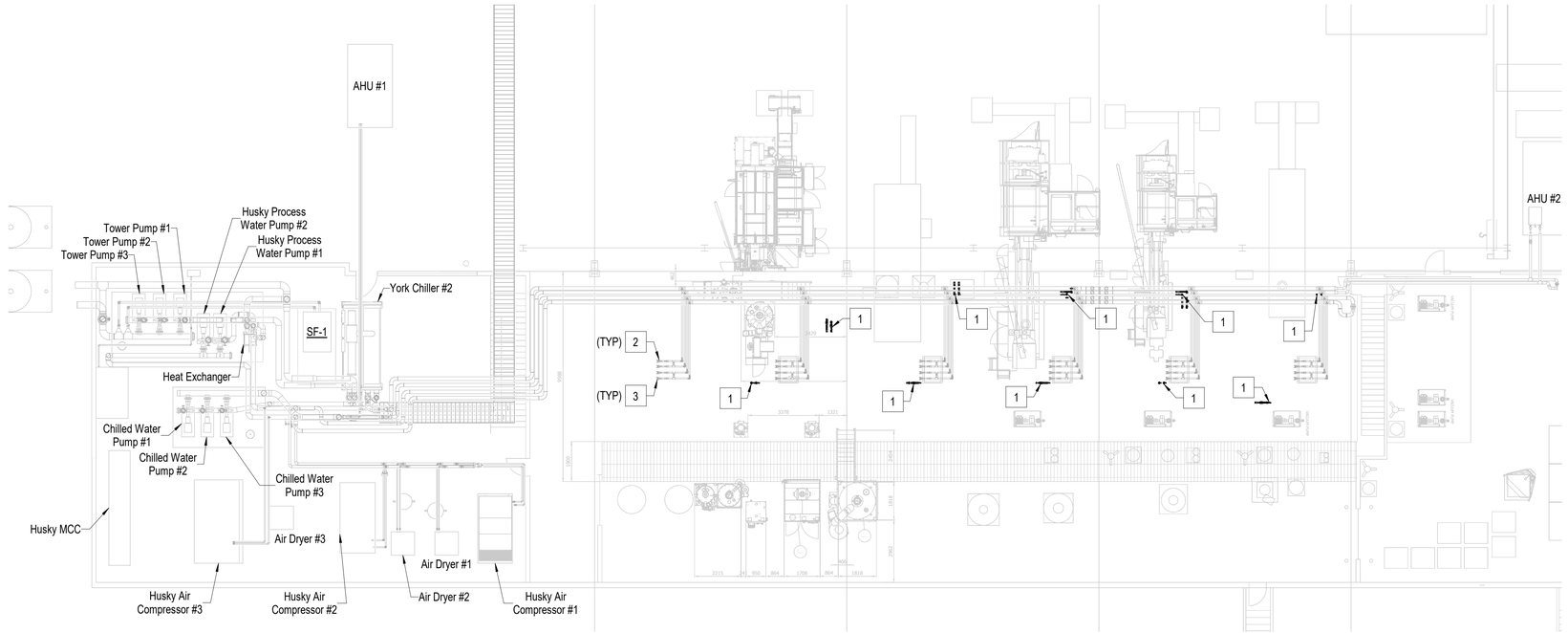
SHEET

HUSKY SYSTEM PHASE 6 ISOMETRIC

HM-601

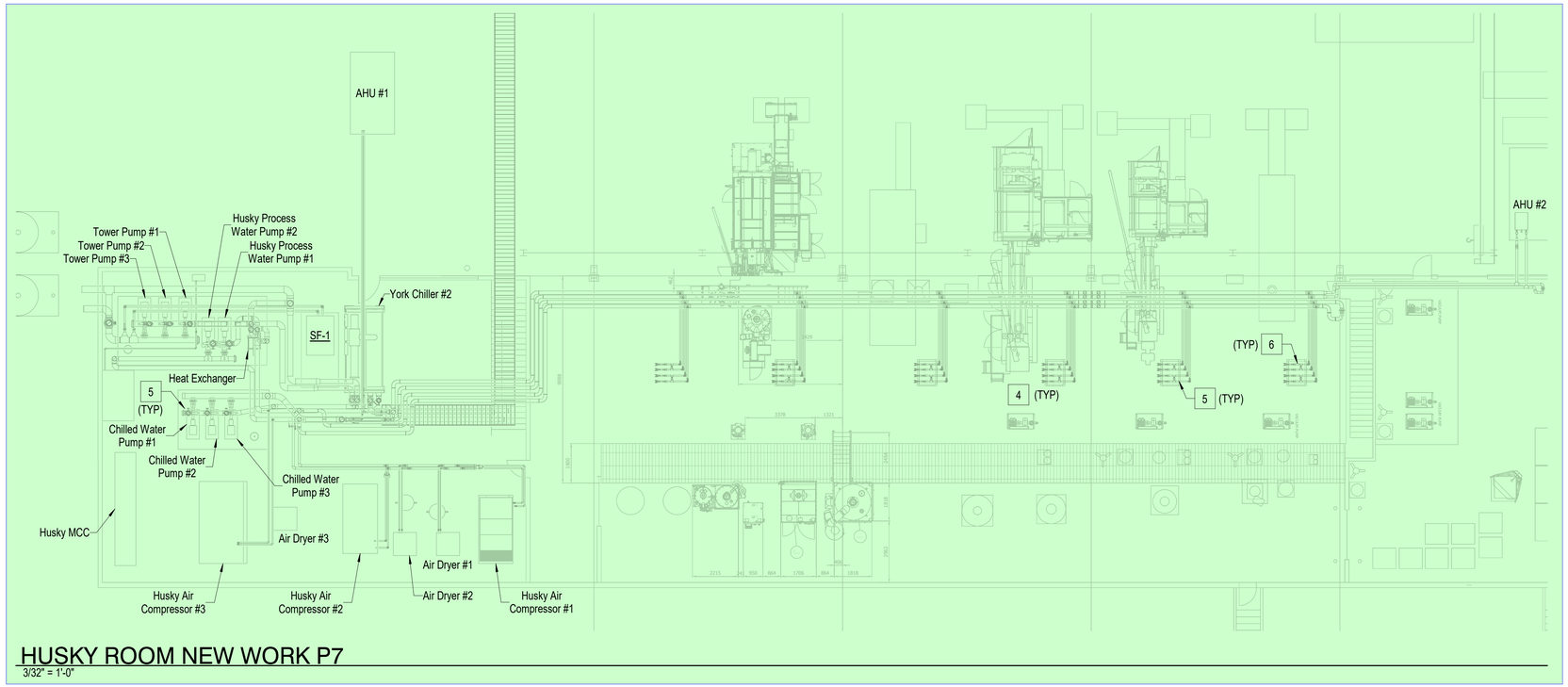
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



HUSKY ROOM DEMO P7

3/32" = 1'-0"



HUSKY ROOM NEW WORK P7

3/32" = 1'-0"

GENERAL NOTES

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E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 DURING PHASE 7: REMOVE ALL UNDERFLOOR PIPING AND STUB UPS TO LINES 21-26. REPLACE TRENCH COVER WITH HOLES OR PIPE PENETRATIONS.
2 INSTALL ALL MACHINE CONNECTION MODULES.
3 OBTAIN OWNER/ENGINEER APPROVAL FOR MACHINE CONNECTION MODULES FOR EACH OF ALL 6 LINES. OWNER APPROVAL MUST INCLUDE AND OWNER DESIGNATED MAINTENANCE AND PRODUCTION MANAGEMENT REPRESENTATIVE. SEE MOCK APPROVAL IN PHASE 1.
4 CHEMICALLY FLUSH EACH MACHINE INTERNAL COOLING WATER, PROCESS AND CHILLED WATER WITH WATER TREATMENT VENDOR BEFORE CONNECTION TO NEW OVERHEAD MAINS.
5 PHASE 8 WORK: PERFORM COMPLETE T&B FOR FLOW, PRESSURE, AND TEMPERATURE ON CHILLER/COOLING TOWER/PUMPS/HEAT EXCHANGER BLOW MOLD LINES 21 THRU 26 AND MAIN PIPING CIRCUITS.
6 REFER TO SHEET G001 FOR ADDITIONAL PHASE WORK.

GRAPHIC SCALE(S)

3/32" = 1' - 0" 0 5' 10' 20' 40'

Altium Packaging

Lenexa KS Cooling Water System

11725 W 85th St.
Overland Park, KS 66214

DESIGNER

CLARKNEXSEN
440 MARTIN LUTHER KING JR BLVD
MACON, GEORGIA 31201
478·743·8415

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OVERALL HUSKY SYSTEM - PHASE 7

HM-700

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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GENERAL NOTES

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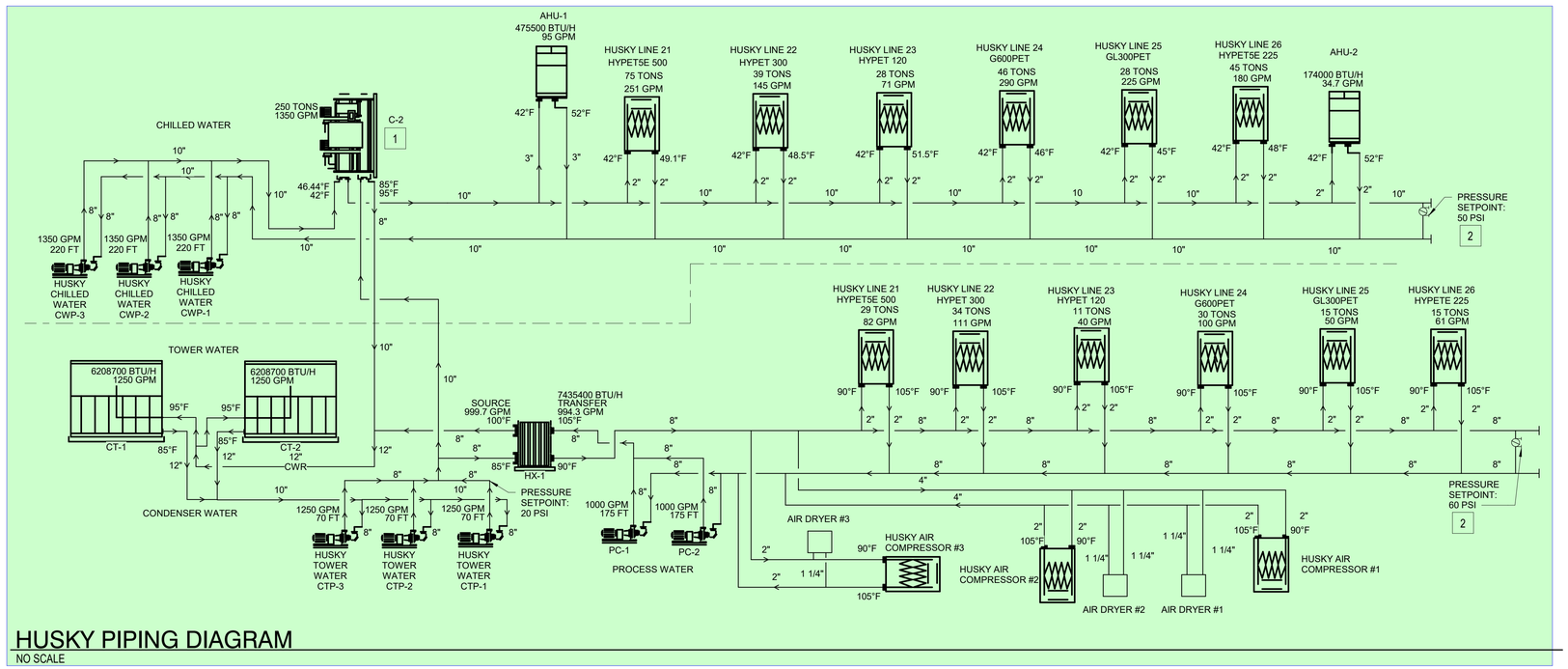
KEYNOTES

1 CHILLER SUPPLY CHILLED WATER SETPOINT SHALL BE 42 DEGREES F.
2 WHEN TAB THE SYSTEM, ADJUST SYSTEM PRESSURE SETPOINT TO LOWEST PRESSURE TO MAINTAIN RELIABLE DESIGN FLOW RATES THRU EQUIPMENT.



HUSKY PIPING DIAGRAM

NO SCALE

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Altium Packaging

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0	06/20/22	UPDATED PIPING SIZE

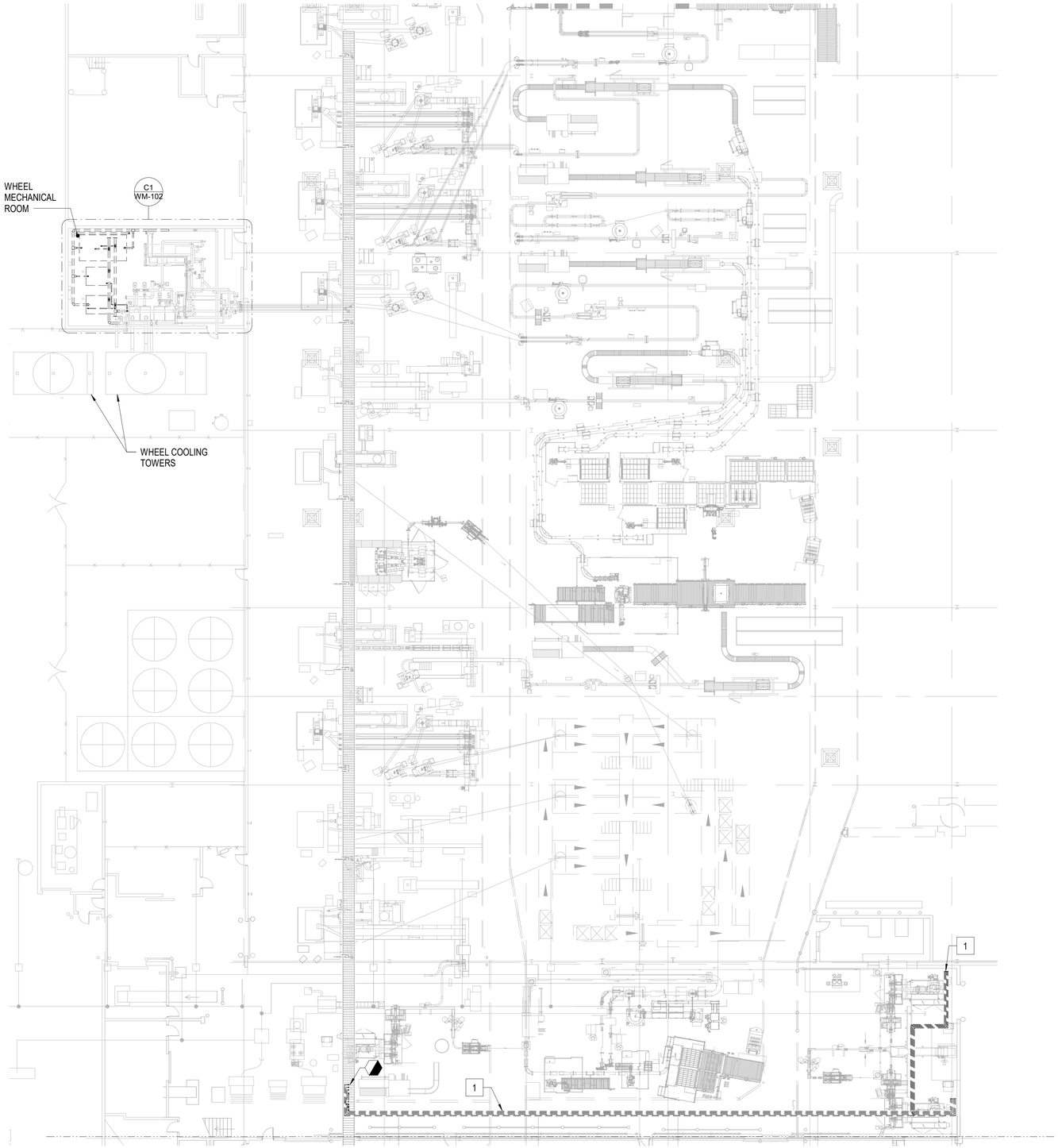
SHEET

HUSKY PROCESS FLOW DIAGRAM

HPF-800

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



WHEEL ROOM DEMO P1

1/16" = 1'-0"

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KEYNOTES

1 CHILLED WATER SUPPLY AND RETURN PIPING TO BE DEMOLISHED.

GRAPHIC SCALE(S)

1/16" = 1' - 0" 0 5' 10' 20' 30' 60'

Altium Packaging

Lenexa KS Cooling Water System

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SUBMITTAL

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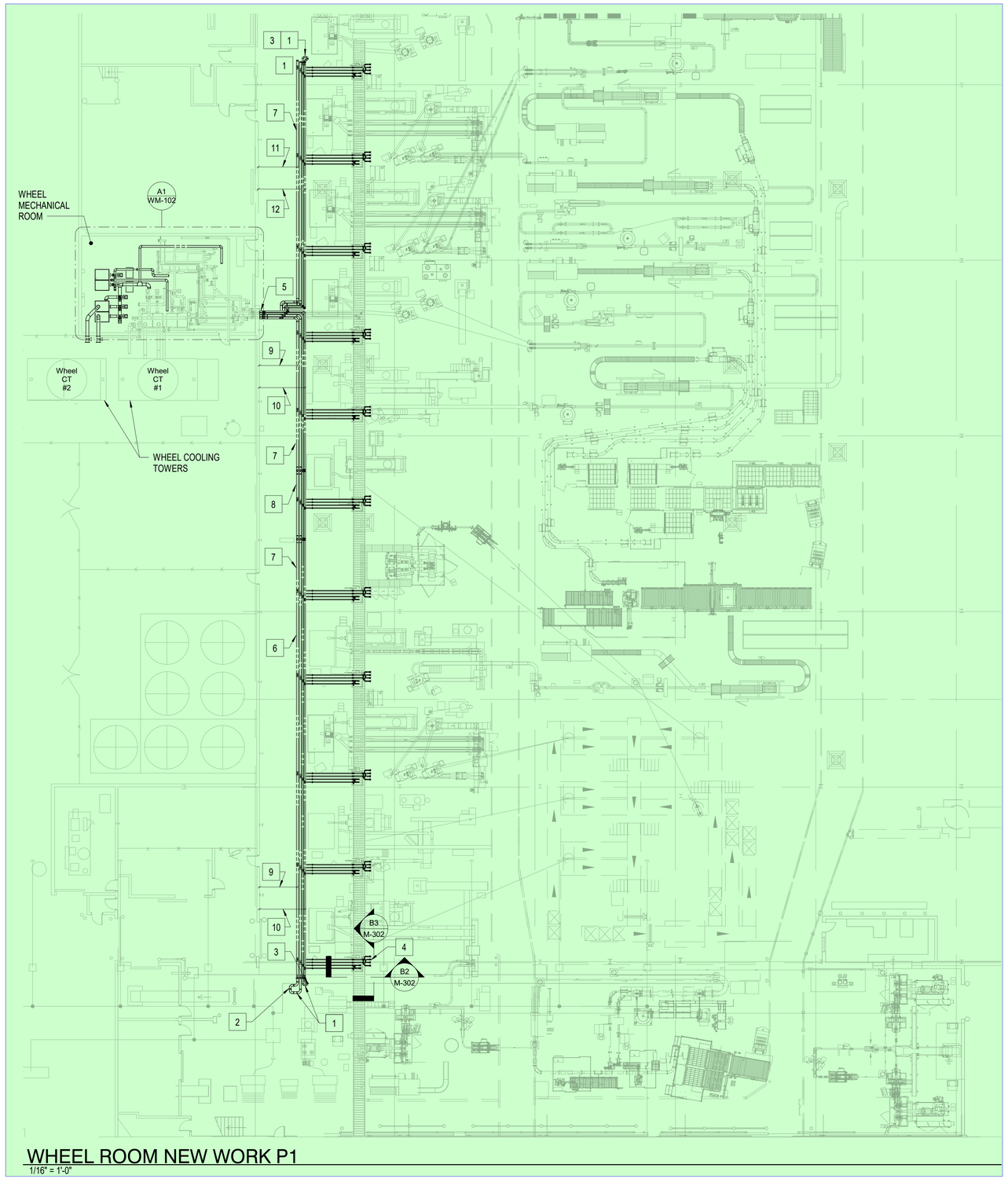
SHEET

OVERALL WHEEL SYSTEM DEMO - PHASE 1

WM-100

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



WHEEL ROOM NEW WORK P1

1/16" = 1'-0"

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KEYNOTES

1 CHILLED AND PROCESS WATER RECIRCULATION LINES AT END OF MAINS.
2 PROVIDE A BALANCING VALVE AND HIGH PERFORMANCE CONTROL VALVE AT END OF THE CHILLED WATER MAIN.
3 PROVIDE A BALANCING VALVE AT END OF THE PROCESS WATER MAIN.
4 INSTALL ONE MOCK MACHINE CONNECTION MODULE FOR OWNER/ENGINEER REVIEW AND APPROVAL.
5 ROUTE NEW PIPING TO WALL AND PREPARE PIPING FOR FUTURE CONNECTION. ALLOW SPACE FOR FUTURE WALL PENETRATION.
6 COMPLETE MODULE WITH PIPING, SUPPORTS, INSTRUMENTS, VALVES, INSULATION, LABELS, AND FLOW ARROWS.
7 CENTERLINE OF PIPING SHALL BE LOCATED 19'-6" AFF.
8 ROUTE PIPING DIRECTLY BELOW STRUCTURAL PLATFORM, TIGHT TO STRUCTURE. CENTERLINE OF PIPING SHALL BE 16'-9" AFF.
9 ROUTE PIPING 10'-10" FROM WALL.
10 ROUTE PIPING 12'-11" FROM WALL.
11 ROUTE PIPING 11'-2" FROM WALL.
12 ROUTE PIPING 13'-3" FROM WALL.

GRAPHIC SCALE(S)

1/16" = 1' - 0" 0 5' 10' 20' 30' 60'

Altium Packaging

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DESIGNER

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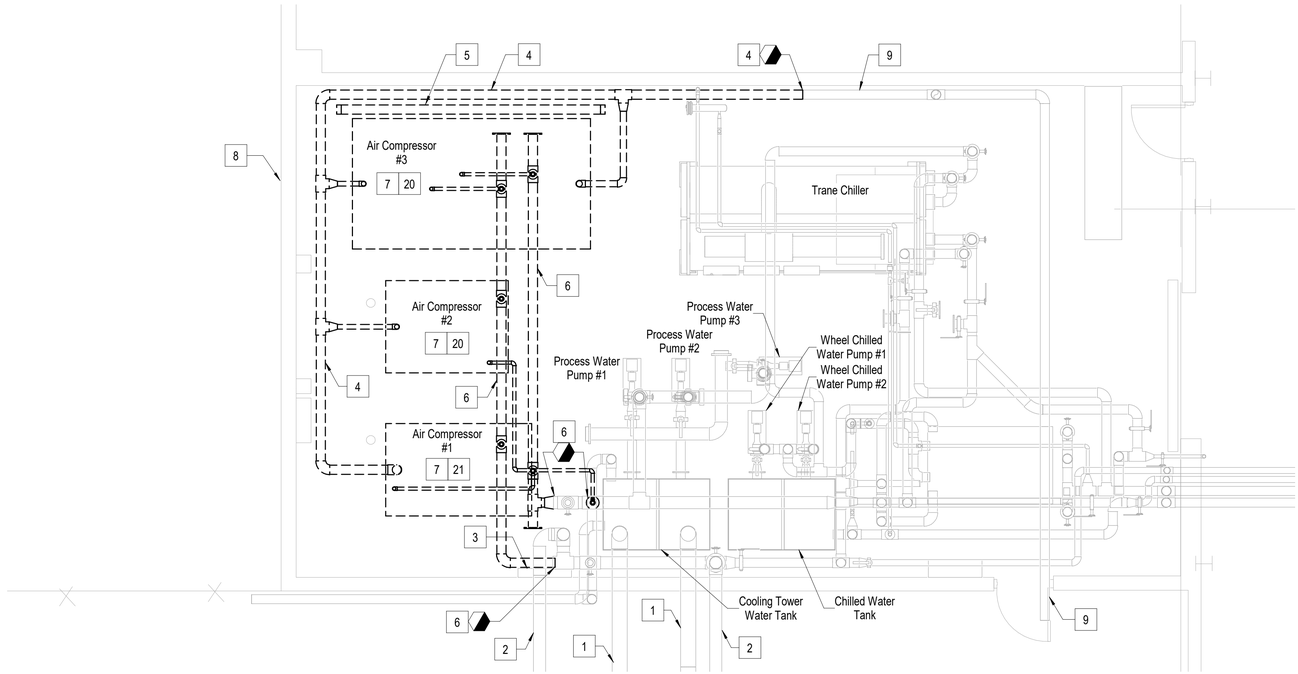
OVERALL WHEEL SYSTEM NEW WORK - PHASE 1

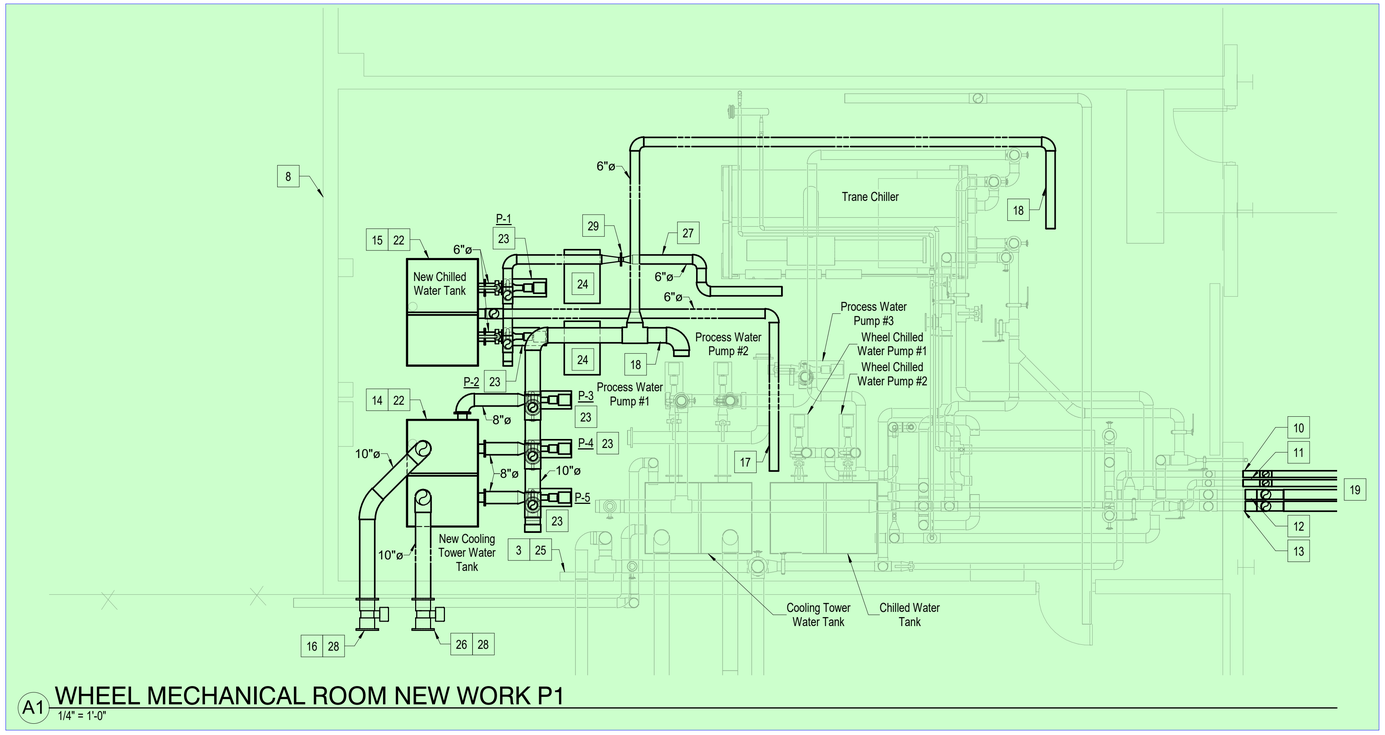
WM-101

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



C1 WHEEL MECHANICAL ROOM DEMO P1
1/4" = 1'-0"



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B. DIMENSIONS ARE FOR REFERENCE ONLY.
C. ALL PIPE ROUTING IS TO BE VERIFIED BY THE CONTRACTOR. ANY DEVIATIONS FROM THE ROUTING PROVIDED WILL REQUIRE OWNER AND ENGINEER APPROVAL.
D. WHEN DEMOLISHING EXISTING CHILLED WATER, COOLING TOWER WATER, AND PROCESS WATER PIPING CAREFULLY REMOVE AND PROTECT ALL FLOW SWITCHES AND OTHER CONTROL DEVICES FOR REUSE. INSPECT DEVICES, IF DEVICES ARE DAMAGED NOTIFY OWNER FOR DIRECTION. REUSE AND INSTALL CONTROL DEVICE INTO NEW PIPING SYSTEM. CONNECT DEVICE INTO EXISTING CONTROL SYSTEMS.
E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 COOLING TOWER SUPPLY.
2 COOLING TOWER RETURN.
3 EXISTING MAKEUP PIPING AND METERS TO REMAIN.
4 REMOVE EXISTING COMPRESSED AIR PIPING TO POINTS INDICATED.
5 REMOVE EXISTING 6" ABANDONED PIPING HEADER.
6 REMOVE EXISTING COOLING TOWER CONDENSER WATER PIPING.
7 REMOVE EXISTING AIR COMPRESSOR AND ASSOCIATED COOLING TOWER WATER PIPING BACK TO PIPE MAIN. CAP BRANCH LINES.
8 EXISTING SNOW ROLL-UP DOOR IN THIS AREA.
9 COMPRESSED AIR PIPING TO REMAIN.
10 PROCESS WATER RETURN FROM WHEELS.
11 PROCESS WATER SUPPLY TO WHEELS.
12 CHILLED WATER SUPPLY TO WHEELS.
13 CHILLED WATER RETURN FROM WHEELS.
14 NEW COOLING WATER TANK.
15 NEW CHILLED WATER TANK.
16 ROUTE CONDENSER WATER PIPING TO EXISTING TOWER NO. 2 SUPPLY WATER PIPING. CAP FOR FUTURE CONNECTION. MAINTAIN A PIPING SLOPE BACK TO TANK.
17 ROUTE CHILLED WATER RETURN PIPING TO EXISTING PIPING MAIN. CAP FOR FUTURE CONNECTION.
18 ROUTE CONDENSER WATER SUPPLY PIPING TO EXISTING PIPING MAIN. CAP FOR FUTURE CONNECTION.
19 SEE SHEET WM-101 FOR CONTINUATION.
20 DEMO #2 AND #3 AIR COMPRESSOR HOUSEKEEPING PADS.
21 CLEAN AIR #1 COMPRESSOR FOOTPRINT AND SURROUNDINGS.
22 MODIFY EXISTING AIR COMPRESSOR CONCRETE HOUSEKEEPING PAD TO ACCOMMODATE NEW WATER TANKS. EXISTING PAD HEIGHT IS APPROXIMATELY 11 INCHES HIGH.
23 PROVIDE CONCRETE HOUSEKEEPING PAD.
24 INSTALL VFD, INDUCTION MOTORS AND FLOW TRANSMITTERS.
25 PROVIDE NEW RO CONNECTION INTO MAKEUP WATER LINE.
26 ROUTE CONDENSER WATER PIPING TO EXISTING TOWER NO. 1 SUPPLY WATER PIPING. CAP FOR FUTURE CONNECTION. MAINTAIN A PIPING SLOPE BACK TO TANK.
27 ROUTE CHILLED WATER SUPPLY PIPING TO EXISTING PIPING MAIN. CAP FOR FURTURE CONNECTION.
28 INSTALL ISOLATION CONTROL VALVE. MATCH EXISTING PIPING VALVE LOCATIONS AT OUTER WALL.
29 CHILLED WATER FLOW METER, FM-1.

GRAPHIC SCALE(S)

1/4" = 1' - 0" 0 1' 5' 10' 15'

Altium Packaging

Lenexa KS Cooling Water System
11725 W 85th St.
Overland Park, KS 66214

DESIGNER
CLARKNEXSEN
440 MARTIN LUTHER KING JR BLVD
MACON, GEORGIA 31201
478·743·8415

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NOT FOR CONSTRUCTION

SUBMITTAL
02.24.2023
ISSUE FOR BID

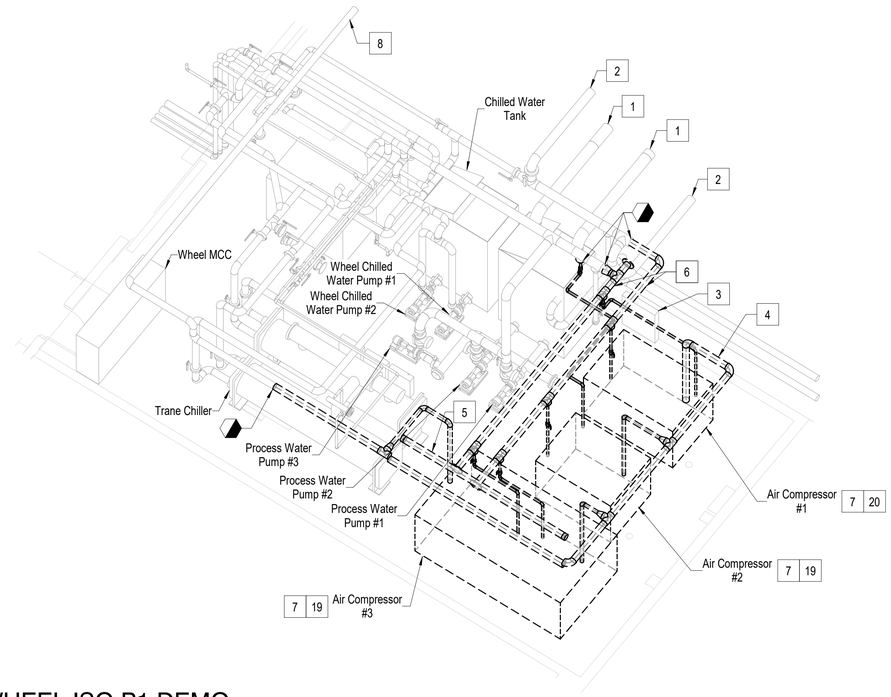
REVISIONS

SHEET
WHEEL SYSTEM MECHANICAL ROOM - PHASE 1

WM-102

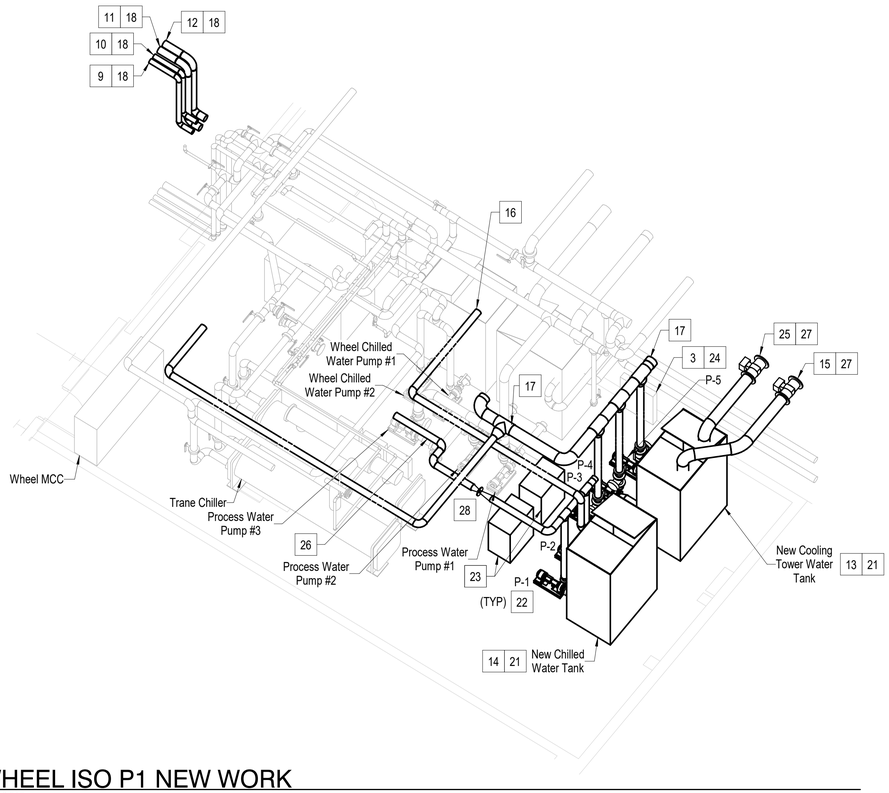
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



WHEEL ISO P1 DEMO

NO SCALE



WHEEL ISO P1 NEW WORK

NO SCALE

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E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 COOLING TOWER SUPPLY.
2 COOLING TOWER RETURN.
3 EXISTING MAKEUP PIPING AND METERS TO REMAIN.
4 REMOVE EXISTING COMPRESSED AIR PIPING TO POINTS INDICATED.
5 REMOVE EXISTING 6" ABANDONED PIPING HEADER.
6 REMOVE EXISTING COOLING TOWER CONDENSER WATER PIPING.
7 REMOVE EXISTING AIR COMPRESSOR AND ASSOCIATED COOLING TOWER WATER PIPING BACK TO PIPE MAIN. CAP BRANCH LINES.
8 COMPRESSED AIR PIPING TO REMAIN.
9 PROCESS WATER RETURN FROM WHEELS.
10 PROCESS WATER SUPPLY TO WHEELS.
11 CHILLED WATER SUPPLY TO WHEELS.
12 CHILLED WATER RETURN FROM WHEELS.
13 NEW COOLING WATER TANK.
14 NEW CHILLED WATER TANK.
15 ROUTE CONDENSER WATER PIPING TO EXISTING TOWER NO. 2 SUPPLY WATER PIPING. CAP FOR FUTURE CONNECTION. MAINTAIN A PIPING SLOPE BACK TO TANK.
16 ROUTE CHILLED WATER RETURN PIPING TO EXISTING PIPING MAIN. CAP FOR FUTURE CONNECTION.
17 ROUTE CONDENSER WATER SUPPLY PIPING TO EXISTING PIPING MAIN. CAP FOR FUTURE CONNECTION.
18 SEE SHEET WM-101 FOR CONTINUATION.
19 DEMO #2 AND #3 AIR COMPRESSOR HOUSEKEEPING PADS.
20 CLEAN AIR #1 COMPRESSOR FOOTPRINT AND SURROUNDINGS.
21 MODIFY EXISTING AIR COMPRESSOR CONCRETE HOUSEKEEPING PAD TO ACCOMMODATE NEW WATER TANKS. EXISTING PAD HEIGHT IS APPROXIMATELY 11 INCHES HIGH.
22 PROVIDE CONCRETE HOUSEKEEPING PAD.
23 INSTALL VFD, INDUCTION MOTORS AND FLOW TRANSMITTERS.
24 PROVIDE NEW RO CONNECTION INTO MAKEUP WATER LINE.
25 ROUTE CONDENSER WATER PIPING TO EXISTING TOWER NO. 1 SUPPLY WATER PIPING. CAP FOR FUTURE CONNECTION. MAINTAIN A PIPING SLOPE BACK TO TANK.
26 ROUTE CHILLED WATER SUPPLY PIPING TO EXISTING PIPING MAIN. CAP FOR FURTURE CONNECTION.
27 INSTALL ISOLATION CONTROL VALVE. MATCH EXISTING PIPING VALVE LOCATIONS AT OUTER WALL.
28 CHILLED WATER FLOW METER, FM-1.

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478·743·8415

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02.24.2023

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REVISIONS

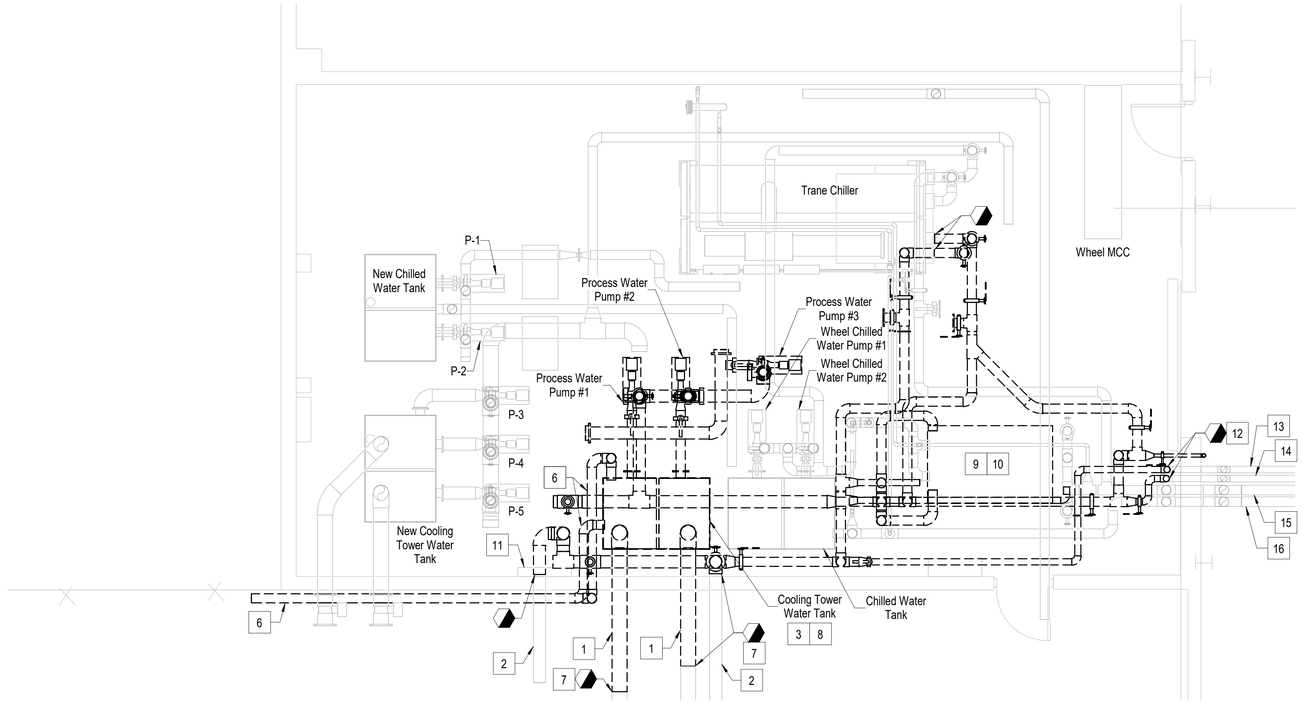
SHEET

WHEEL SYSTEM PHASE 1 ISOMETRIC

WM-103

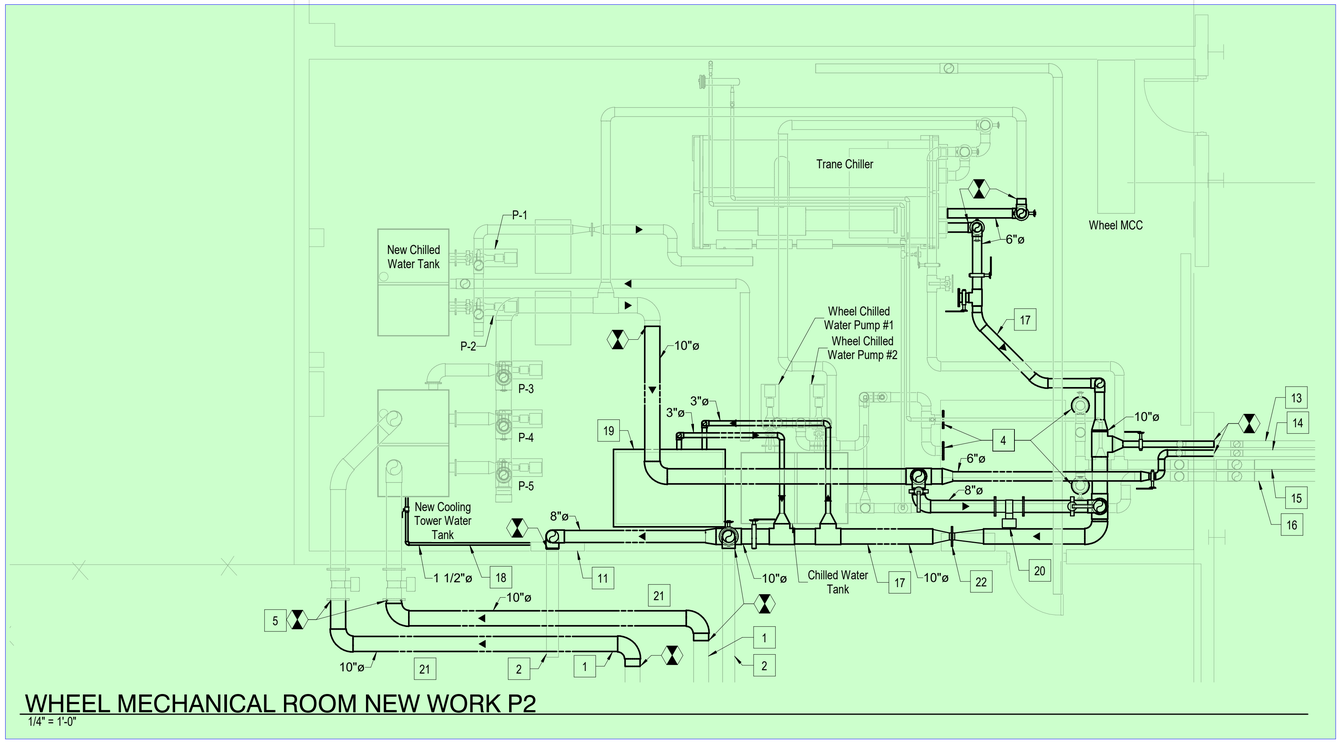
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



WHEEL MECHANICAL ROOM DEMO P2

1/4" = 1'-0"



WHEEL MECHANICAL ROOM NEW WORK P2

1/4" = 1'-0"

GENERAL NOTES

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E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 COOLING TOWER SUPPLY.
2 COOLING TOWER RETURN.
3 COOLING WATER TANK TO BE REMOVED. VALVE OFF, DRAIN, AND REMOVE TANK.
4 BLIND FLANGES SHALL BE INSTALLED.
5 CONNECT COOLING TOWER PIPING TO EXISTING PIPING. PROVIDE PIPING SUPPORT STANCHONS FROM GRADE OR SUPPORT PIPING FROM COOLING TOWER STRUCTURAL STEEL FRAMING.
6 REMOVE EXISTING PVC BACKUP COOLING TOWER PIPING. PATCH HOLE IN WALL, MATCH WITH SIMILAR BUILDING MATERIAL.
7 REMOVE EXISTING COOLING TOWER PIPING. PREPARE FOR NEW CONNECTION.
8 CLEAN OLD TANK FOOTPRINT AND SURROUNDINGS AND PAINT AREA.
9 DEMO AND REMOVE AEC CHILLER.
10 CLEAN AEC CHILLER PAD.
11 EXISTING MAKEUP PIPING AND METERS TO REMAIN.
12 DEMO PIPING TO EXISTING COOLING TOWER MAINS. STUB AND CAP PIPING AT FLOOR LEVEL.
13 PROCESS WATER RETURN FROM WHEELS.
14 PROCESS WATER SUPPLY TO WHEELS.
15 CHILLED WATER SUPPLY TO WHEELS.
16 CHILLED WATER RETURN FROM WHEELS.
17 INSTALL NEW COOLING TOWER PIPING.
18 CONNECT MAKEUP WATER LINE TO NEW TANK. RECHARGE AND ACTIVATE NEW TANK AND NEW COOLING WATER SYSTEM.
19 NEW SAND FILTER.
20 8" BYPASS PIPING WITH 2-WAY CONTROL VALVE. HP-2.
21 HEAT TRACE PIPING, INSULATE PIPING AND PROVIDE PIPING METAL JACKET.
22 COOLING TOWER WATER FLOW METER, FM-2.

GRAPHIC SCALE(S)

1/4" = 1' - 0" 0 1' 5' 10' 15'

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SHEET

WHEEL SYSTEM MECHANICAL ROOM - PHASE 2

WM-200

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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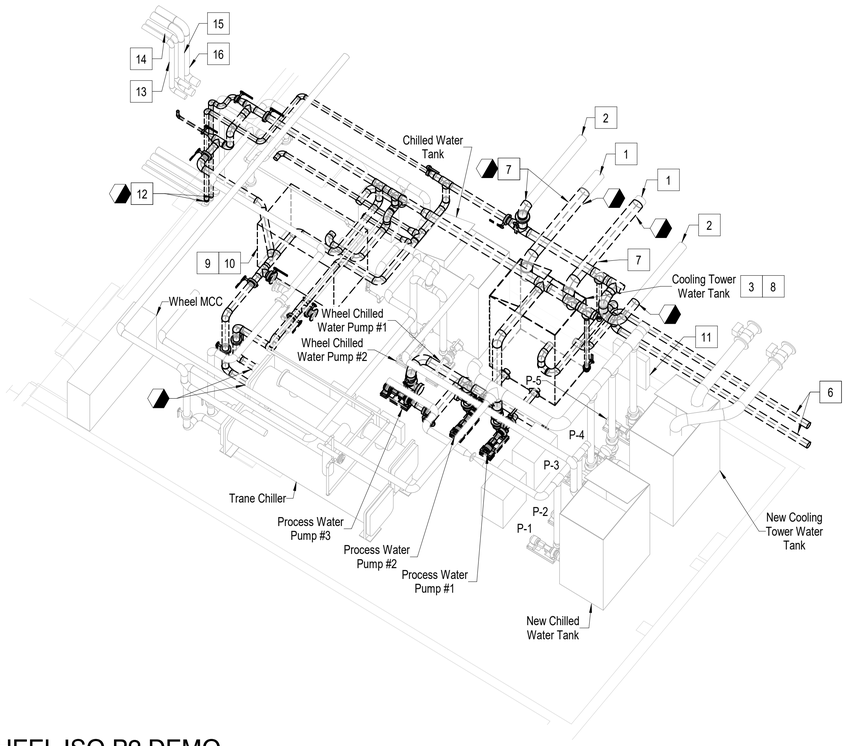
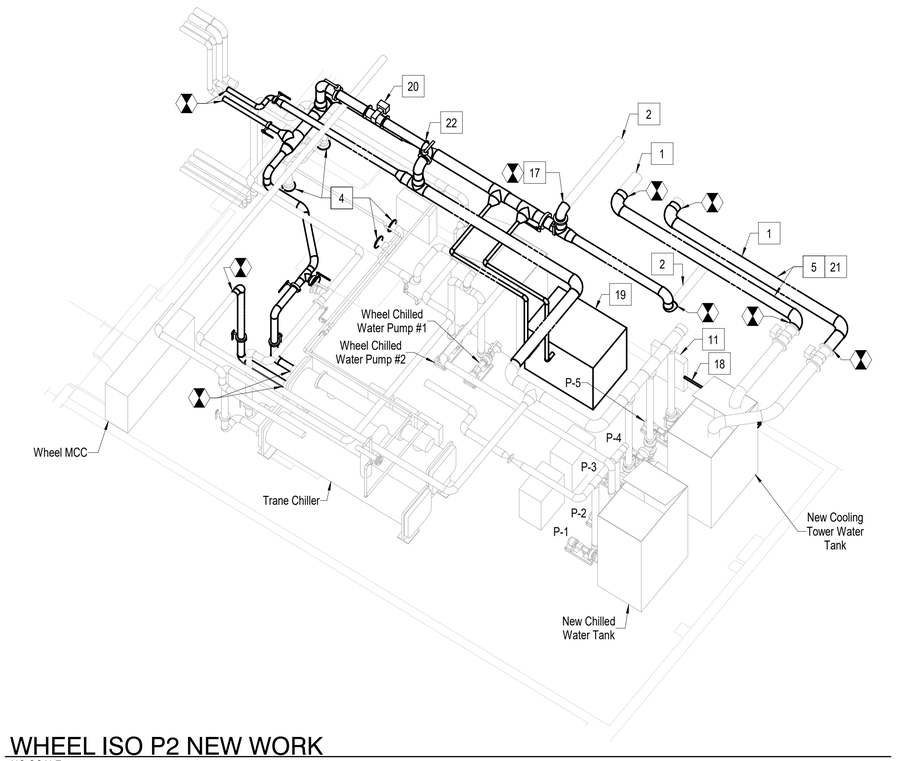


WHEEL ISO P2 DEMO

NO SCALE



WHEEL ISO P2 NEW WORK

NO SCALE

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10 CLEAN AEC CHILLER PAD.
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12 DEMO PIPING TO EXISTING COOLING TOWER MAINS. STUB AND CAP PIPING AT FLOOR LEVEL.
13 PROCESS WATER RETURN FROM WHEELS.
14 PROCESS WATER SUPPLY TO WHEELS.
15 CHILLED WATER SUPPLY TO WHEELS.
16 CHILLED WATER RETURN FROM WHEELS.
17 INSTALL NEW COOLING TOWER PIPING.
18 CONNECT MAKEUP WATER LINE TO NEW TANK. RECHARGE AND ACTIVATE NEW TANK AND NEW COOLING WATER SYSTEM.
19 NEW SAND FILTER.
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22 COOLING TOWER WATER FLOW METER, FM-2.

Altium Packaging

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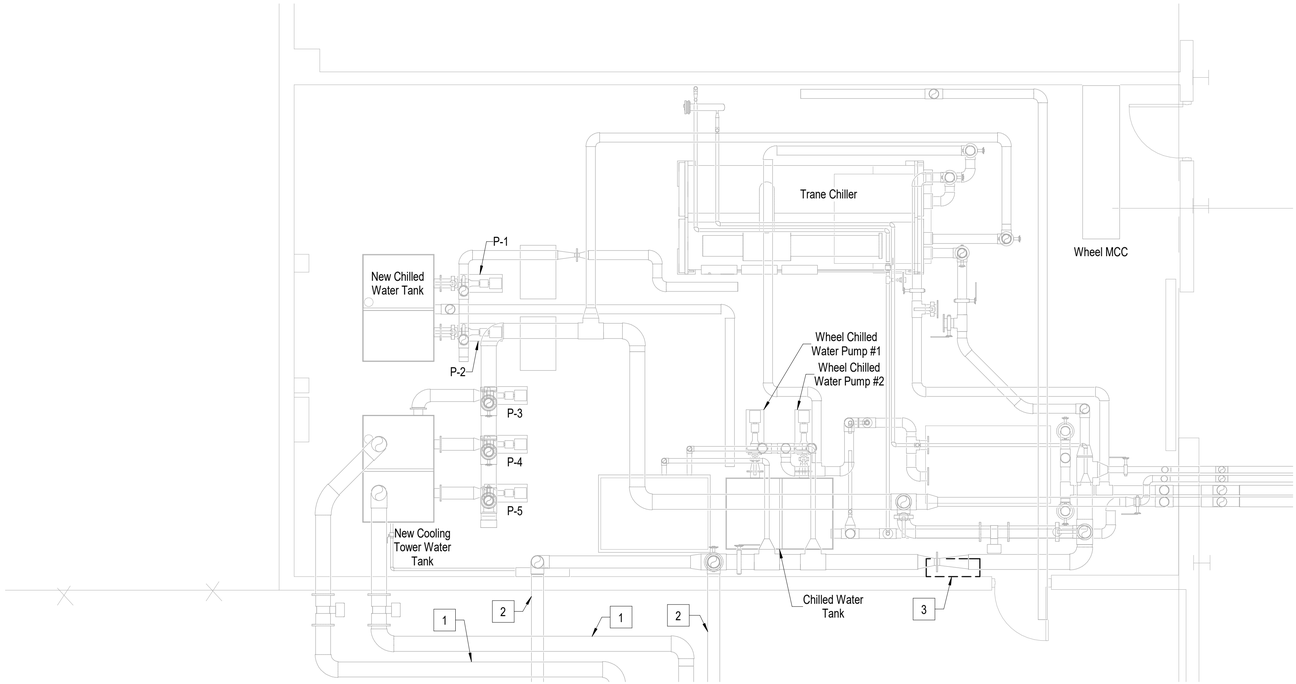
SHEET

WHEEL SYSTEM PHASE 2 ISOMETRIC

WM-201

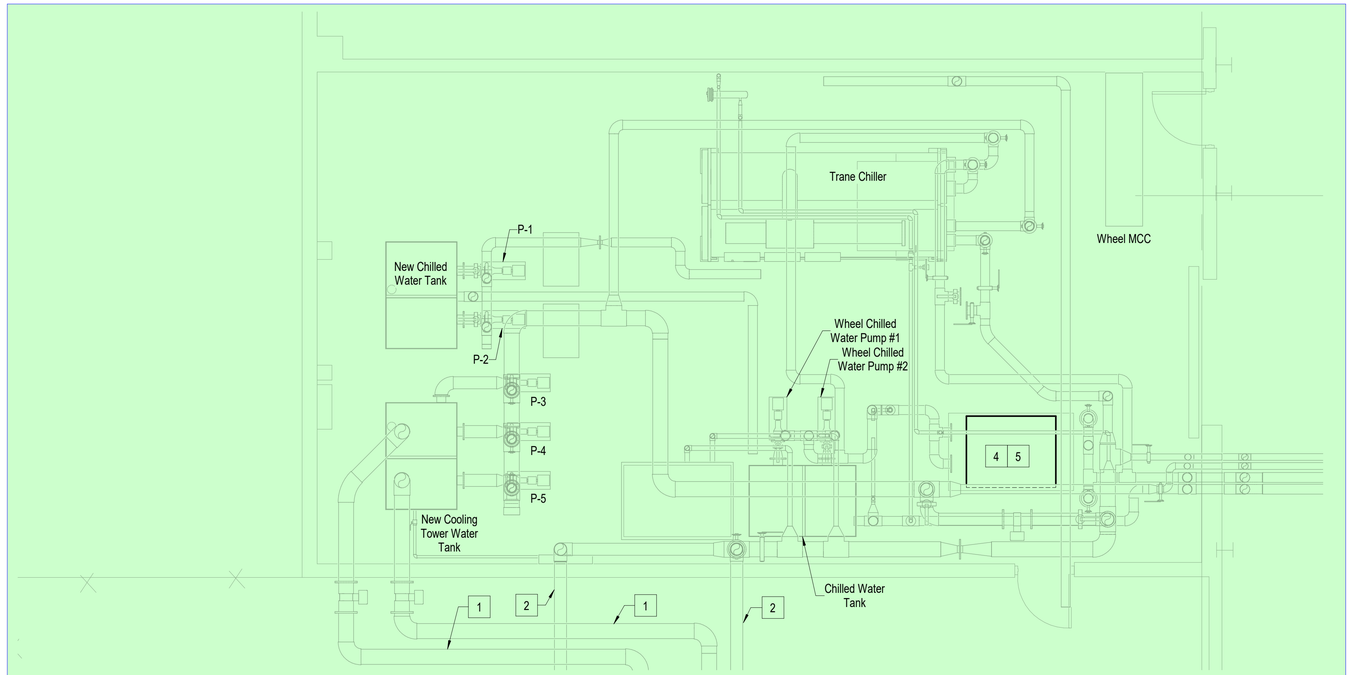
DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136



WHEEL MECHANICAL ROOM DEMO P3

1/4" = 1'-0"



WHEEL MECHANICAL ROOM NEW WORK P3

1/4" = 1'-0"

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KEYNOTES

1 COOLING TOWER SUPPLY.
2 COOLING TOWER RETURN.
3 REMOVE OLD CHEMICAL TREATMENT SYSTEM WHILE SWAPPING OVER TO NEW CHEMICAL TREATMENT SYSTEM.
4 INSTALL NEW RO EQUIPMENT AND CONNECT TO WHEEL MAKEUP WATER.
5 INSTALL NEW WATER TREATMENT EQUIPMENT FOR METERING CHEMICAL AND MONITORING.

GRAPHIC SCALE(S)

1/4" = 1' - 0" 0 1' 5' 10' 15'

Altium Packaging

Lenexa KS Cooling Water System

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Overland Park, KS 66214

DESIGNER

CLARKNEXSEN

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MACON, GEORGIA 31201
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SHEET

WHEEL SYSTEM MECHANICAL ROOM - PHASE 3

WM-300

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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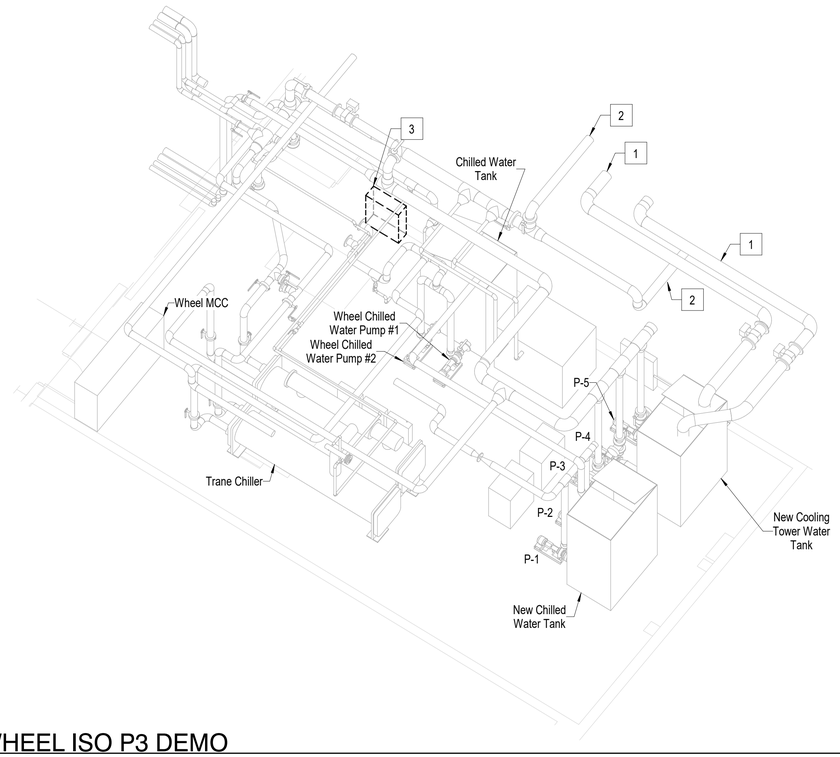
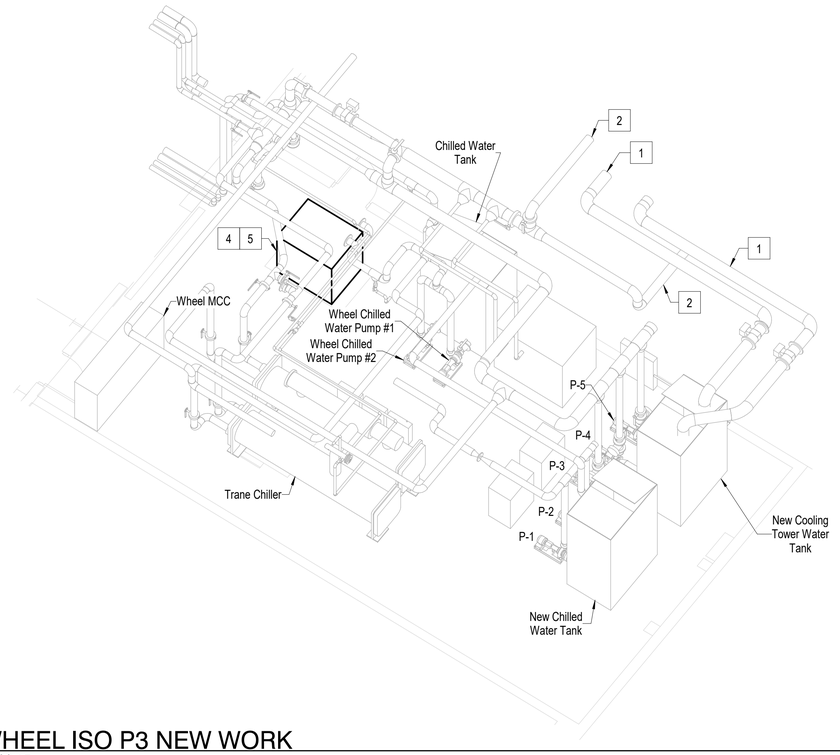


WHEEL ISO P3 DEMO

NO SCALE



WHEEL ISO P3 NEW WORK

NO SCALE

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SHEET

WHEEL SYSTEM PHASE 3 ISOMETRIC

WM-301

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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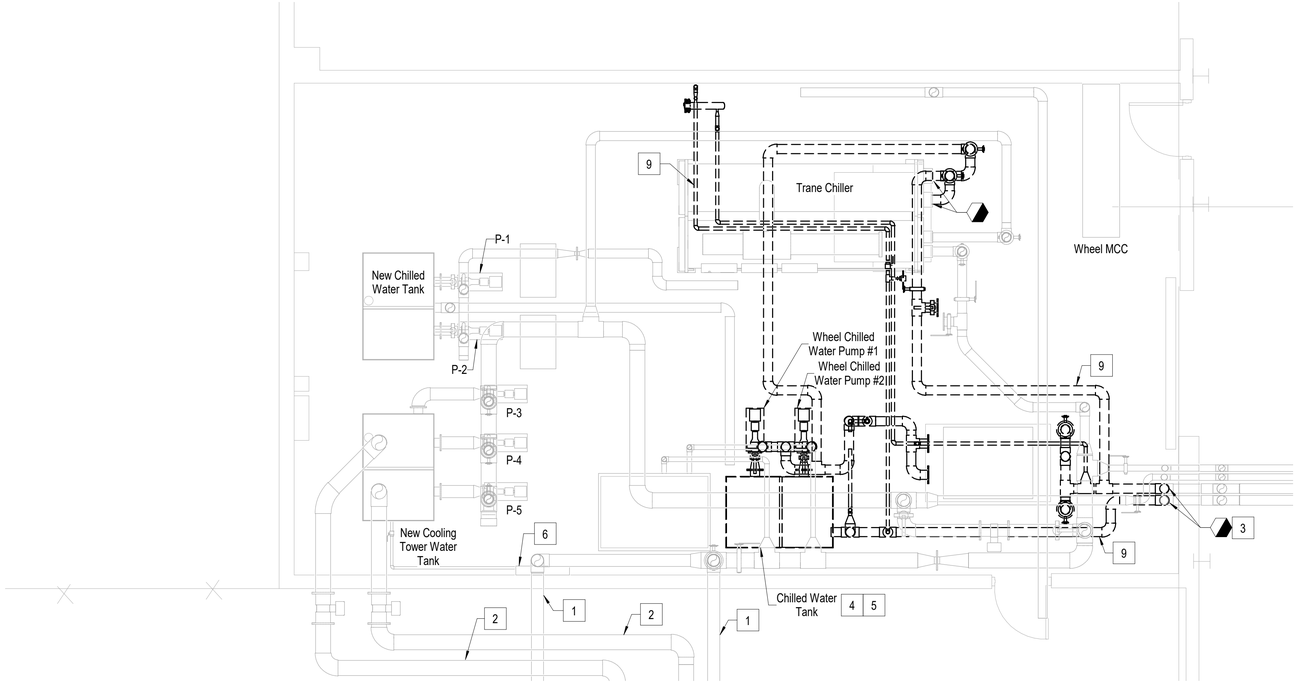
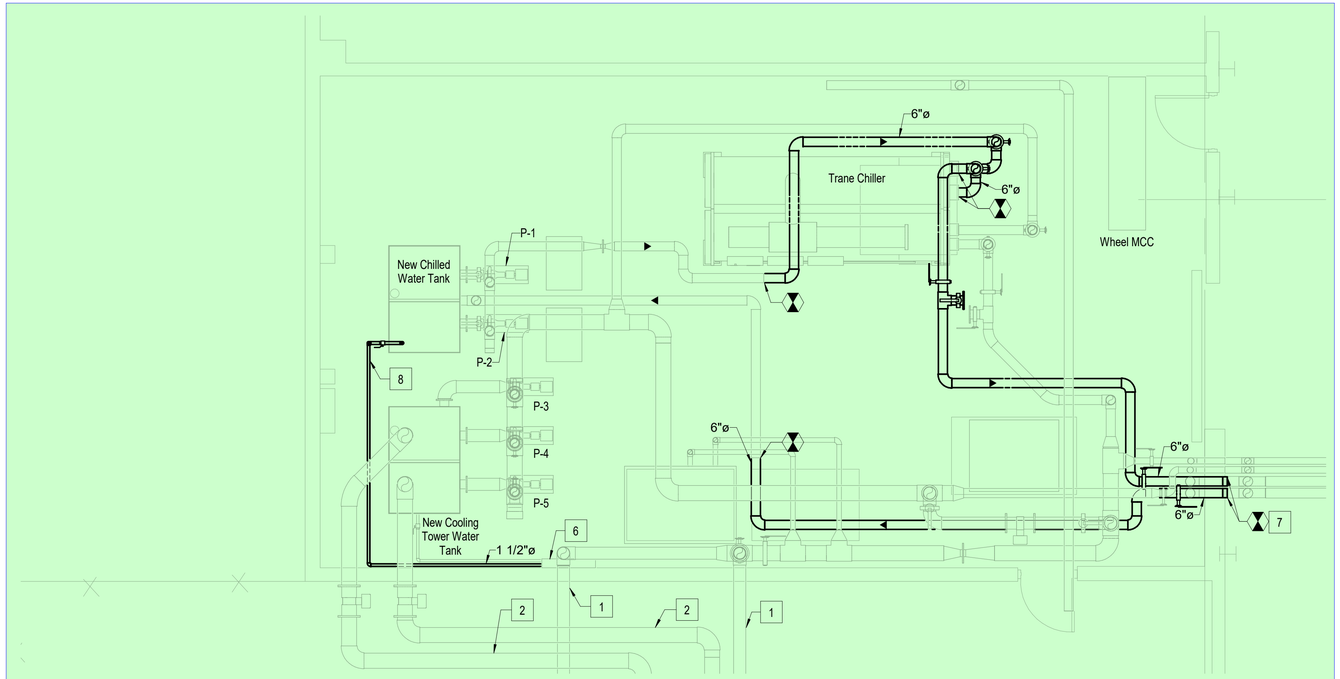


WHEEL MECHANICAL ROOM DEMO P4

1/4" = 1'-0"



WHEEL MECHANICAL ROOM NEW WORK P4

1/4" = 1'-0"

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KEYNOTES

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2 COOLING TOWER SUPPLY.
3 DEMO PIPING TO EXISTING CHILLED WATER MAINS. STUB AND CAP PIPING AT FLOOR LEVEL.
4 CHILLED WATER TANK TO BE REMOVED. VALVE OFF, DRAIN AND REMOVE EXISTING TANK.
5 CLEAN OLD TANK FOOTPRINT AND SURROUNDINGS AND PAINT AREA.
6 EXISTING MAKEUP PIPING AND METERS TO REMAIN.
7 TIE INTO NEW CHILLED WATER MAINS.
8 CONNECT MAKEUP WATER LINE TO NEW TANK WITH SHUTOFF VALVE, RECHARGE AND ACTIVATE NEW TANK AND NEW COOLING WATER SYSTEM.
9 REMOVE EXISTING CHILLED WATER PIPING.

GRAPHIC SCALE(S)

1/4" = 1' - 0" 0 1' 5' 10' 15'

Altium Packaging

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DESIGNER

CLARKNEXSEN

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PROFESSIONAL SEAL

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SHEET

WHEEL SYSTEM MECHANICAL ROOM - PHASE 4

WM-400

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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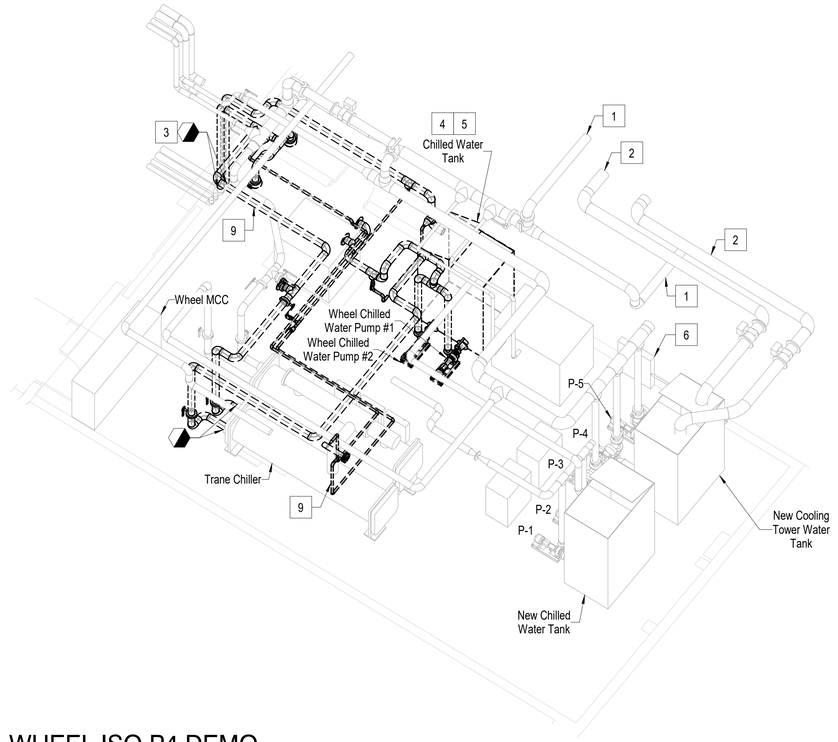
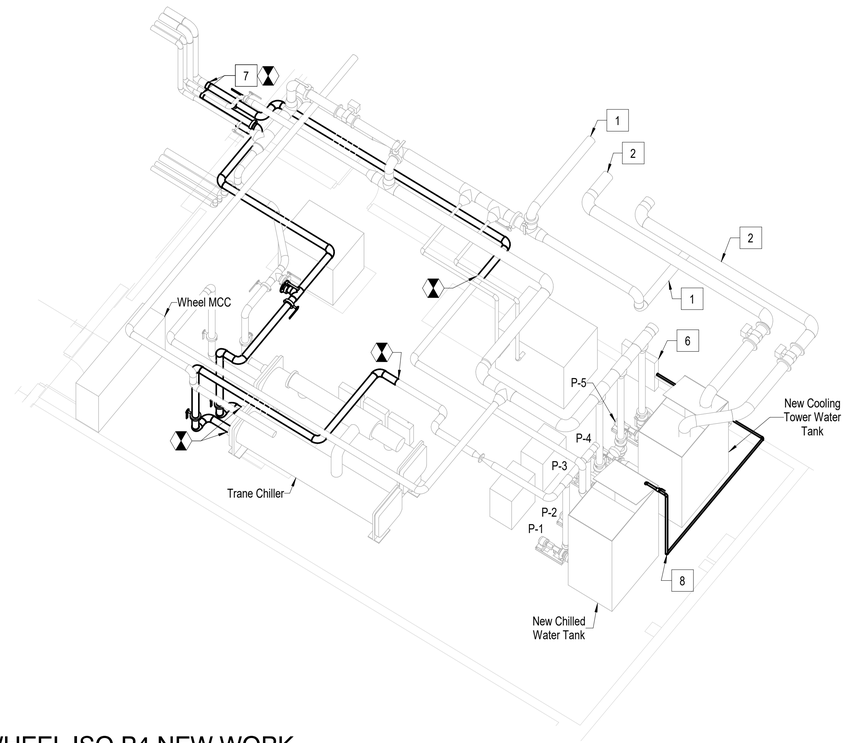


WHEEL ISO P4 DEMO

NO SCALE



WHEEL ISO P4 NEW WORK

NO SCALE

GENERAL NOTES

A. DRAWINGS AND DIMENSIONS ARE BASED ON FIELD SURVEY. CONTRACTOR SHOULD EXPECT TO MAKE SOME FIELD ALTERATIONS TO THE PIPE ROUTING SHOWN.
B. DIMENSIONS ARE FOR REFERENCE ONLY.
C. ALL PIPE ROUTING IS TO BE VERIFIED BY THE CONTRACTOR. ANY DEVIATIONS FROM THE ROUTING PROVIDED WILL REQUIRE OWNER AND ENGINEER APPROVAL.
D. WHEN DEMOLISHING EXISTING CHILLED WATER, COOLING TOWER WATER, AND PROCESS WATER PIPING CAREFULLY REMOVE AND PROTECT ALL FLOW SWITCHES AND OTHER CONTROL DEVICES FOR REUSE. INSPECT DEVICES, IF DEVICES ARE DAMAGED NOTIFY OWNER FOR DIRECTION. REUSE AND INSTALL CONTROL DEVICE INTO NEW PIPING SYSTEM. CONNECT DEVICE INTO EXISTING CONTROL SYSTEMS.
E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 COOLING TOWER RETURN.
2 COOLING TOWER SUPPLY.
3 DEMO PIPING TO EXISTING CHILLED WATER MAINS. STUB AND CAP PIPING AT FLOOR LEVEL.
4 CHILLED WATER TANK TO BE REMOVED.
5 CLEAN OLD TANK FOOTPRINT AND SURROUNDINGS AND PAINT AREA.
6 EXISTING MAKEUP PIPING AND METERS TO REMAIN.
7 TIE INTO NEW CHILLED WATER MAINS.
8 CONNECT MAKEUP WATER LINE TO NEW TANK. RECHARGE AND ACTIVATE NEW TANK AND NEW COOLING WATER SYSTEM.
9 REMOVE EXISTING CHILLED WATER PIPING.

Altium Packaging

Lenexa KS Cooling Water System

11725 W 85th St.
Overland Park, KS 66214

DESIGNER

CLARKNEXSEN
440 MARTIN LUTHER KING JR BLVD
MACON, GEORGIA 31201
478·743·8415

PROFESSIONAL SEAL

NOT FOR CONSTRUCTION

SUBMITTAL

02.24.2023
ISSUE FOR BID

REVISIONS

SHEET

WHEEL SYSTEM PHASE 4 ISOMETRIC

WM-401

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

CN 10136

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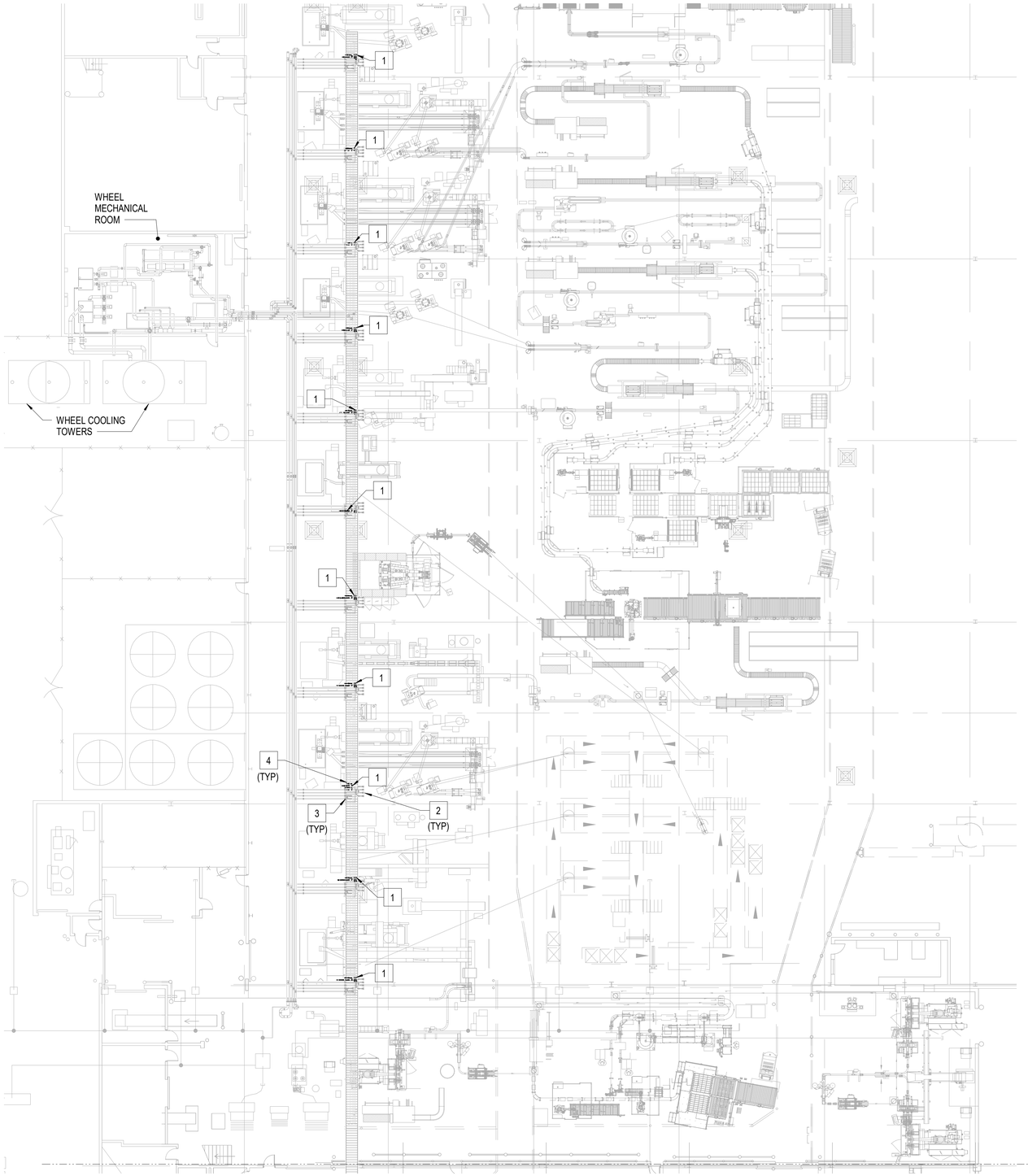

WHEEL ROOM DEMO P5
1/16" = 1'-0"

GENERAL NOTES

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E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 REMOVE ALL UNDERFLOOR PIPING AND STUB UPS. REPLACE TRENCH COVER WITH HOLES OR PIPE PENETRATIONS.
2 INSTALL ALL MACHINE CONNECTION MODULES.
3 OBTAIN OWNER/ENGINEER APPROVAL FOR MACHINE CONNECTION MODULES FOR EACH OF ALL 11 LINES. OWNER APPROVAL MUST INCLUDE AN OWNER DESIGNATED MAINTENANCE PRODUCTION MANAGEMENT REPRESENTATIVE. SEE MOCK APPROVAL IN PHASE 1.
4 CHEMICALLY FLUSH EACH MACHINE INTERNAL COOLING WATER AND CHILLED WATER WITH WATER TREATMENT VENDOR BEFORE CONNECTION TO NEW OVERHEAD MAINS.

GRAPHIC SCALE(S)

1/16" = 1' - 0" 0 5' 10' 20' 30' 60'

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OVERALL WHEEL SYSTEM DEMO - PHASE 5

WM-500

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

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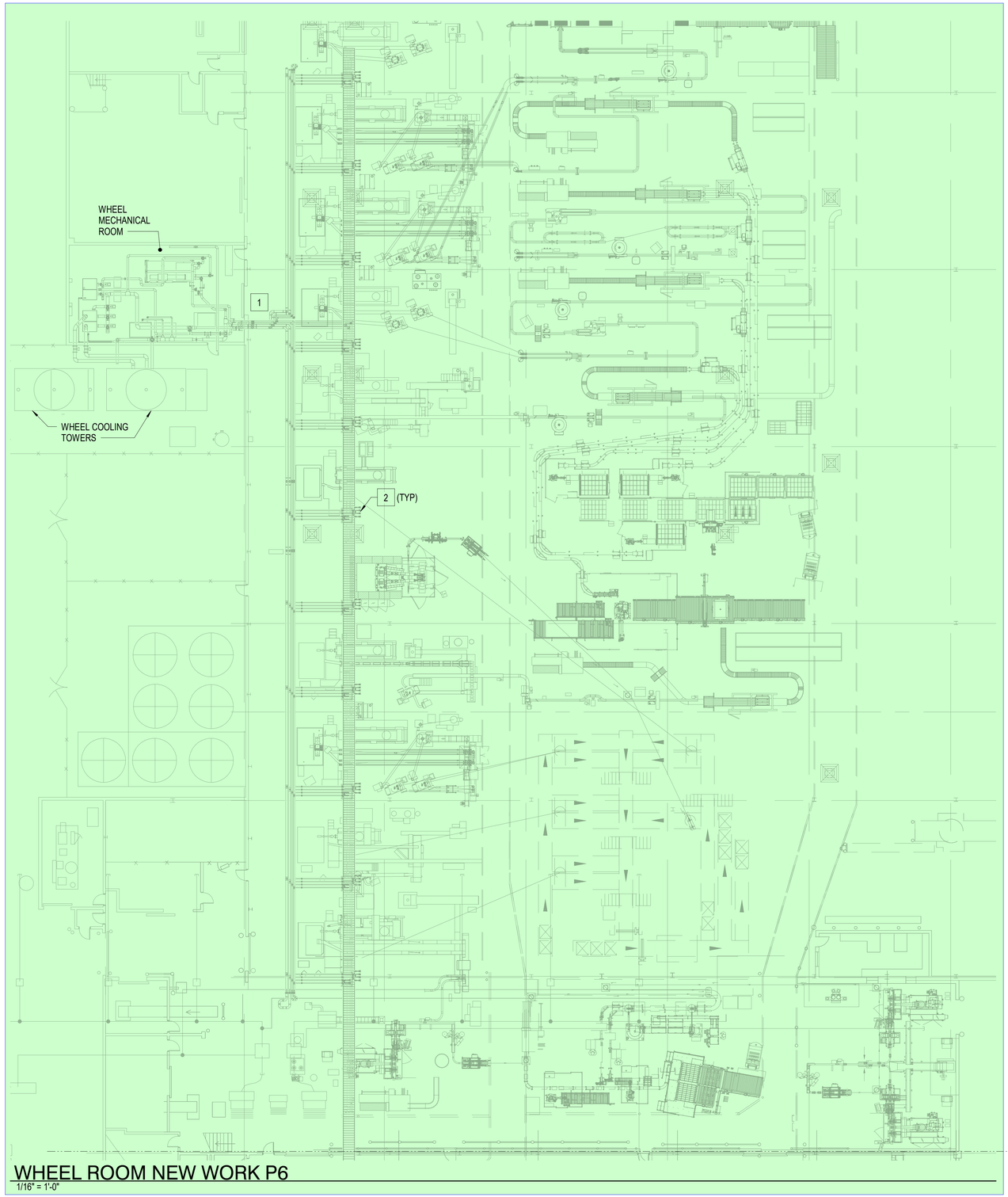

WHEEL ROOM NEW WORK P6

1/16" = 1'-0"

GENERAL NOTES

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C. ALL PIPE ROUTING IS TO BE VERIFIED BY THE CONTRACTOR. ANY DEVIATIONS FROM THE ROUTING PROVIDED WILL REQUIRE OWNER AND ENGINEER APPROVAL.
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E. PIPE SIZES ARE NOT SHOWN ON ALL SHEETS. REFER TO PROCESS FLOW DIAGRAMS FOR PIPE SIZING.

KEYNOTES

1 PERFORM COMPLETE T&B FOR FLOW, PRESSURE, AND TEMPERATURE ON CHILLER/COOLING TOWER/PUMPS/BLOW MOLD LINES 1 THRU 11 AND MAIN PIPING CIRCUITS.
2 REFER TO SHEET G001 FOR ADDITIONAL PHASE WORK.

GRAPHIC SCALE(S)

1/16" = 1' - 0" 0 5' 10' 20' 30' 60'

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OVERALL WHEEL SYSTEM NEW WORK - PHASE 6

WM-600

DESIGN: SB/BV
DRAWN: JAO
REVIEW: RWC

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SYSTEM SEQUENCE OF OPERATIONS

1. WHEEL SYSTEM CHILLED WATER PUMP (P-1 AND P-2) CONTROL:

   ENERGIZE THE LEAD PUMP WHENEVER THE FACILITY EQUIPMENT REQUIRES COOLING. MONITOR PUMP STATUS THRU THE VARIABLE SPEED DRIVE. IF LEAD PUMP FAILS, ALARM TO SYSTEM AND START LAG PUMP. MONITOR CHILLED WATER DIFFERENTIAL PRESSURE, IN THE REMOTE END OF THE PIPING DISTRIBUTION SYSTEM (LOCATION INDICATED) BY DIFFERENTIAL PRESSURE SENSOR (DPS-1). THE PRESSURE SENSOR SHALL BE DIRECT WIRED AND CONNECTED TO THE PUMP SPEED CONTROLLER LOCATED IN THE MECHANICAL ROOM. MODULATE PUMP SPEED THROUGH THE PUMP VARIABLE SPEED CONTROLLER AS REQUIRED TO MAINTAIN SETPOINT (DPS-1). PERIODICALLY EVERY 7 DAYS, CHANGE THE ROLES OF LEAD AND LAG PUMPS.

2. WHEEL SYSTEM MINIMUM CHILLED WATER FLOWRATE:

   CHILLED WATER SYSTEM SHALL HAVE TWO FLOWRATE SETPOINT OPTIONS:

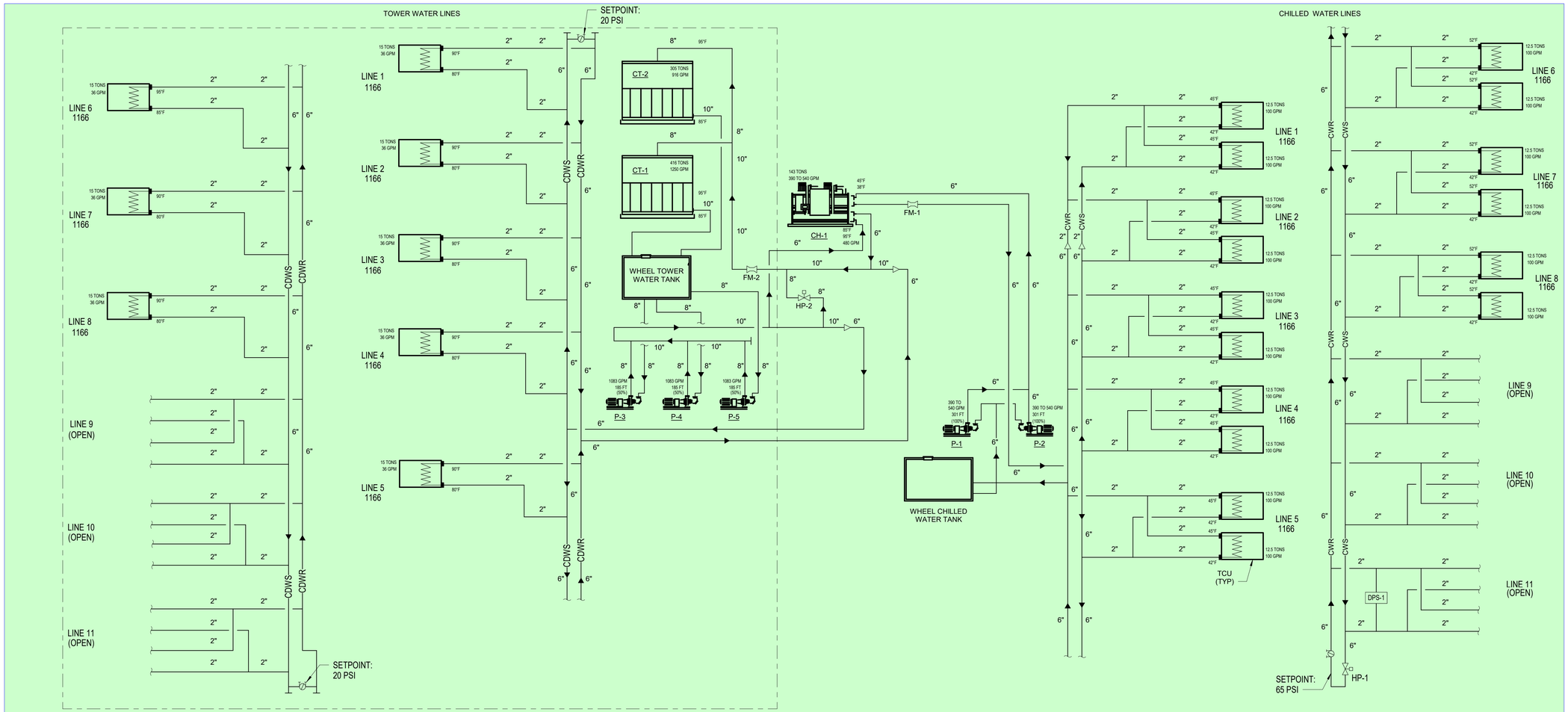
   A. OPTION A (NORMAL FLOWRATE OPERATION): 400 GPM SETPOINT.
   B. OPTION B (HIGH FLOWRATE OPERATION): 530 GPM SETPOINT.

   PLANT OPERATOR SHALL BE ABLE TO SELECT BETWEEN OPTION A AND B.

   - MONITOR CHILLED WATER FLOWRATE WITH FLOW METER (FM1). MODULATE BYPASS VALVE (HS-1) TO MAINTAIN THE MINIMUM FLOWRATE SETPOINT. WHEN SYSTEM IS NOT IN OPERATION AND DURING STSTEM START BYPASS VALVE (HS-2) SHALL FAIL TO THE OPEN POSITION.
   - FOR OPTION A: WHEN CHILLED WATER FLOWRATE DROPS BELOW 400 GPM MODULATE BYPASS VALVE (HS-1) OPEN TO MAINTAIN A MINIMUM FLOWRATE OF 400 GPM. WHEN THE FLOWRATE INCREASES ABOVE 450 GPM MODULATE BYPASS VALVE (HS-1) CLOSED TO MAINTAIN A MINIMUM FLOWRATE OF 400 GPM.
   - FOR OPTION B: WHEN CHILLED WATER FLOWRATE DROPS BELOW 470 GPM MODULATE BYPASS VALVE (HS-1) OPEN TO MAINTAIN A MINIMUM FLOWRATE OF 530 GPM. WHEN THE FLOWRATE INCREASES ABOVE 530 GPM MODULATE BYPASS VALVE (HS-1) CLOSED TO MAINTAIN A MINIMUM FLOWRATE OF 530 GPM.

3. WHEEL SYSTEM COOLING TOWER WATER BYPASS WATER CONTROL:

   MONITOR COOLING TOWER WATER FLOWRATE WITH FLOW METER (FM2). THE WATER FLOWRATE SETPOINT IS 2,060 GPM. WHEN COOLING TOWER FLOWRATE DROPS BELOW 1,950 GPM MODULATE BYPASS VALVE (HS-2) OPEN TO MAINTAIN A MINIMUM FLOWRATE OF 2,060 GPM. WHEN THE FLOWRATE INCREASES ABOVE 2,165 GPM MODULATE BYPASS VALVE (HS-2) CLOSED TO MAINTAIN A MINIMUM FLOWRATE OF 2,060 GPM. WHEN SYSTEM IS NOT IN OPERATION AND DURING STSTEM START BYPASS VALVE (HS-2) SHALL FAIL TO THE OPEN POSITION.



WHEEL PIPING DIAGRAM

NO SCALE

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0	06/20/22	UPDATED PIPING SIZE

SHEET

WHEEL PROCESS FLOW DIAGRAM

WPF-800

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DRAWN: JAO
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