

AMERICAN
REFRIGERATION
COMPANY

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Ed Burns Arena

422 Summer Street
Arlington, MA

List of Drawings

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- R2.1 Snow Melt Piping
- R3.0 Condenser Water Spec Sheet

Key Plan

General Notes

General Notes

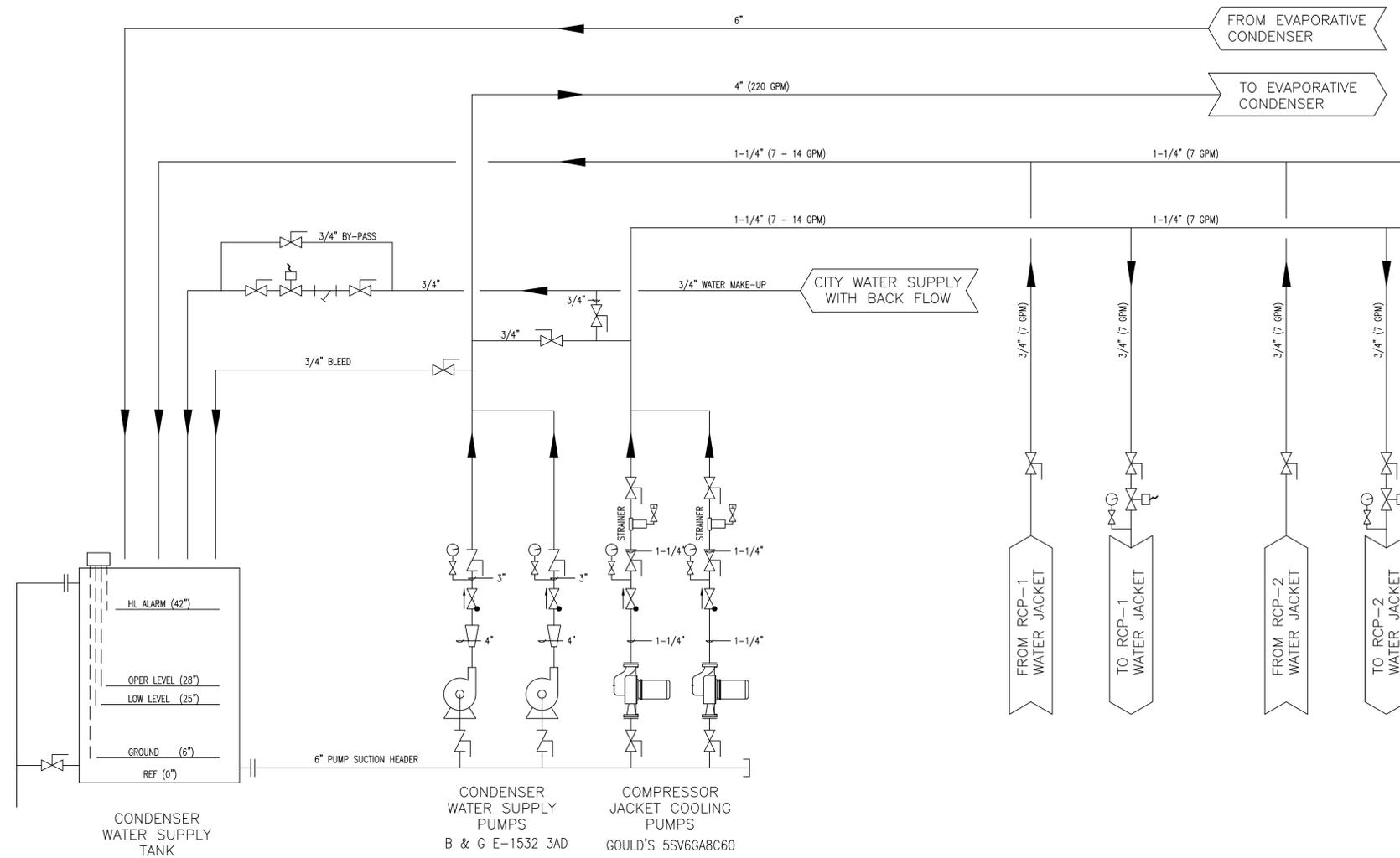
1. This design and specification is the exclusive property of American Refrigeration Company, LLC. It and/or the design therein are not to be copied, sold, transferred or reproduced in any way and is subject to return on demand. The items described may not be built or assembled or its design criteria disclosed to other parties without the written permission of American Refrigeration Company, LLC.
2. All Mechanical Equipment, Piping Design, Materials and Installation shall be in accordance with the following Codes and Standards:
 - a. ASME B31.5 – 2016. Refrigeration Piping and Heat Transfer Components.
 - b. ANSI/ASHRAE Standard 15-2016 Safety Standard for Refrigeration Systems.
 - c. ANSHIAR 2 – 2016 American National Standard for Equipment, Design and Installation of Close Circuit Ammonia Mechanical Refrigerating Systems.
 - d. Applicable Local, State, County, City and Federal Building Codes
 - i. 2015 International Building Code (IBC)
 - ii. 2015 International Mechanical Code (IMC)
 - iii. 2020 National Fire Protection Association, NFPA 70
 - iv. 2020 National Electric Code (NEC)
3. All work to be performed by qualified refrigeration contractor licensed in the state of Massachusetts and having a minimum of 10 years of experience in the design and installation of close circuit ammonia mechanical refrigerating systems.

Piping Material Specification

1. Pipe 1-1/2" in diameter and smaller shall be ASTM A106, grade B, schedule 80, seamless
2. Pipe 2" in diameter through 10" shall be ASTM A53, grade B, schedule 40, ERW or ASTM A106, grade B, schedule 40, seamless.
3. Pipe 12" in diameter and larger shall be ASTM A53, grade B, standard wall, ERW or ASTM A106, grade B, schedule 40, seamless.
4. All piping 2" in diameter and larger shall be welded.
5. All piping 1-1/2" in diameter and smaller may be threaded or welded.
6. All pipe fittings 1-1/2" in diameter and smaller may be 2,000# forged steel threaded fittings per ASTM A105 or 3,000# forged steel socket weld fittings per ASTM A105.
7. All 2" pipe fittings may be 3,000# forged steel socket weld fittings per ASTM A105 or butt weld fittings per ASTM A234.
8. All pipe fittings 2-1/2" in diameter and larger shall be butt weld fittings per ASTM A234.
9. All pipe nipples shall be ASTM A106, grade B, schedule 80 seamless.
10. Water drain and overflow pipe and fitting material shall be type DWV PVC
11. Water piping and fittings 2" diameter and under shall be type L copper
12. All ammonia refrigeration valves shall be Hansen, Refrigeration Specialties or Danfoss.

Installation Notes

1. Provide all materials and equipment and provide all labor to install complete and operable mechanical systems as indicated on these drawings and specifications.
2. All dimensions shown on these drawings are to be field verified prior to fabrication and/or installation.
3. Mechanical Contractor shall be responsible for the coordination of all work performed as indicated on these drawings and specifications and the work of all other sub-contractors associated with this project.
4. Piping system design pressure shall be in accordance with B31.5-2016, Test Pressure shall be no less than 1.5 x Design Pressure.
5. All Pressure Tests shall be completed before any Mechanical Equipment or piping insulation is applied.
6. Glycol Supply/Return Piping and HEX shall have 1-1/2" rigid fiberglass pipe insulation with all service jacket (ASJ) and PVC covering.
7. All insulating materials are to be installed in accordance with manufacturer's recommendations.
8. All miscellaneous steel required to ensure proper installation of piping and equipment shall be furnished and installed by the Mechanical Contractor.
9. All piping and equipment shall be supported per ASME B31.5-206, ANSI/IIAR 2-2016 and/or equipment manufacturer's recommendations.
10. The locations of all items shown on the drawings or called for in these specifications that are not defined by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined by the project site conditions and shall have the approval of the Engineer prior to installation. Do Not Scale The Drawings.
11. Glycol and water piping systems shall have automatic air vents with isolation valves at all high points. All piping shall be pitch to low points. Provide drain valve with hose end and cap at all risers and low points.
12. All required isolation valves in piping systems may not be shown on plans (for clarity) but are required at all branch piping connections and equipment connections.



GENERAL NOTES:

1. ALL WATER PIPING 2" NPS AND OVER SHALL BE SCH40, A53 GRADE B, ERW.
2. ALL STEEL PIPING 2" NPS AND OVER SHALL BE JOINED BY MEANS OF WELDING.
3. ALL DRAIN AND OVERFLOW PIPING SHALL BE SCH40 DWV PVC.
4. ALL WATER PIPING 1-1/2" NPS AND UNDER SHALL BE TYPE L COPPER TUBE AND FITTINGS. COPPER TUBE AND FITTINGS SHALL BE JOINED BY MEANS OF SOLDERING. USE OF VIEGA PRO-PRESS FITTINGS IS ALSO ACCEPTABLE.
5. ALL BALL VALVES SHALL BE APOLLO SERIES 70-100, 2 PIECE BRONZE BODY VALVES (OR EQUAL).
6. ALL BUTTERFLY VALVES SHALL BE APOLLO LUG TYPE BUTTERFLY VALVES (OR EQUAL).
7. ALL PUMP DISCHARGE PIPING SHALL HAVE 3.5" DIA. FACE, 0-60PSI, LIQUID FILLED INDUSTRIAL GRADE PRESSURE GAUGE. PRESSURE GAUGE ISOLATION BALL VALVE SHALL BE 1/2".
8. COMPRESSOR JACKET COOLING PUMPS TO BE FITTED WITH KECKLEY STYLE KT-7 (OR EQUAL) BASKET STRAINER SIZE 1-1/2" WITH 100 MESH SCREEN.

| Rev. | Date | Revision Description | Chk |
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| 1 | 4-9-20 | ORIGINAL ISSUE | |

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**ARLINGTON ICE RINK
REFRIGERATION SYSTEM UPGRADES**
422 SUMMER ST.
ARLINGTON, MA

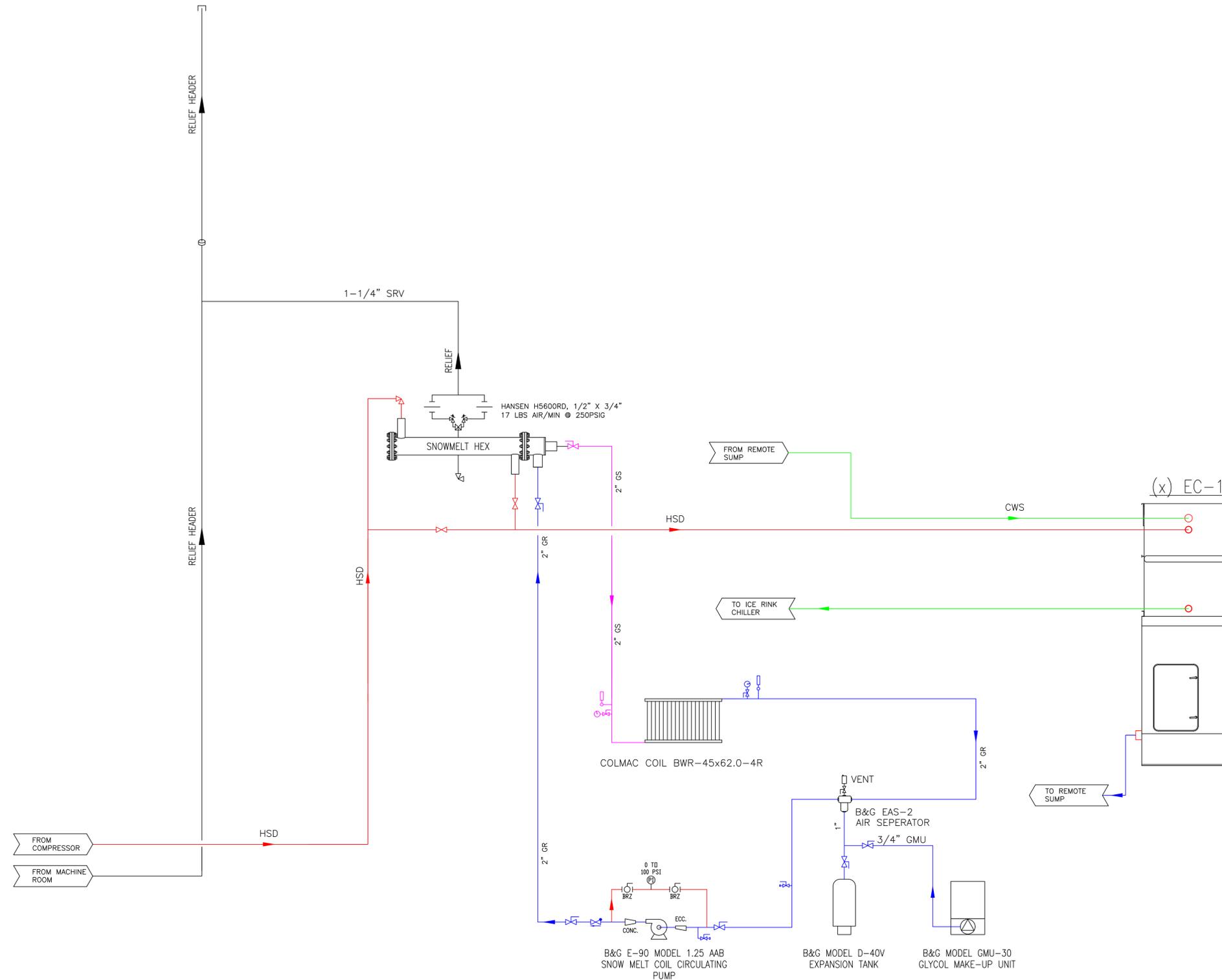
**Arlington Ice Rink
Condenser Water
& Jacket Clg P&ID**

SCALE: NTS
DATE: 04/09/2020
Dr./Det./Chk.: ED

R-1.0
WO - 072609

GENERAL NOTES:

1. SNOW MELT CLOSED LOOP CIRCULATING SYSTEM TO BE FILLED WITH 30% INHIBITED PROPYLENE GLYCOL.
2. SYSTEM VOLUME APPROXIMATELY 120 GALLONS.



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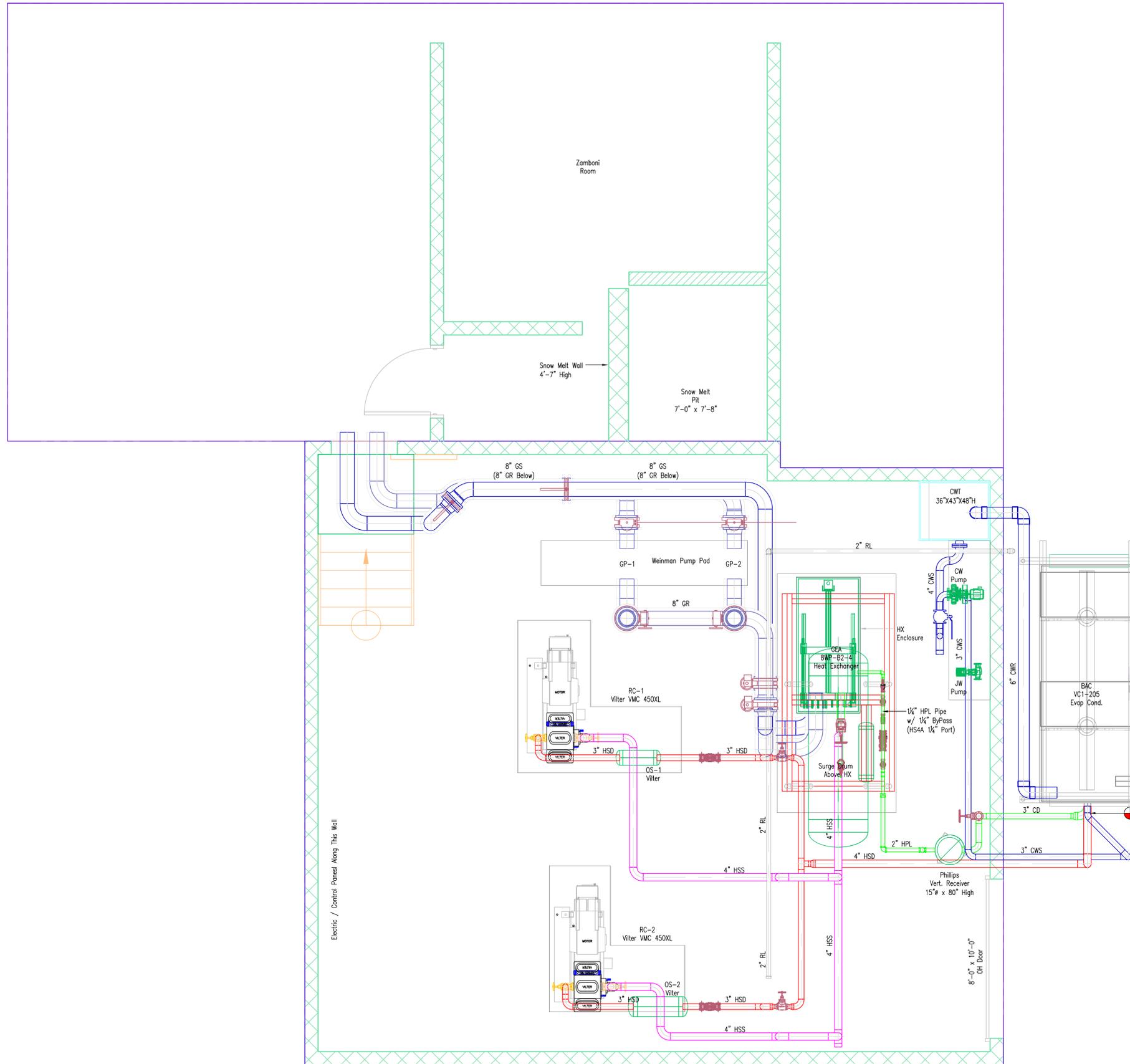
ARLINGTON ICE RINK REFRIGERATION SYSTEM UPGRADES

422 SUMMER ST., ARLINGTON, MA

Arlington Ice Rink SNOW MELT P&ID

SCALE: NTS
 DATE: 5th March 2020
 Dr./Det./Chk.: ED

R1.1
WO - 072609



1 Existing Layout
3/16" = 1'-0"

| Rev. | Date | Revision Description | Chk |
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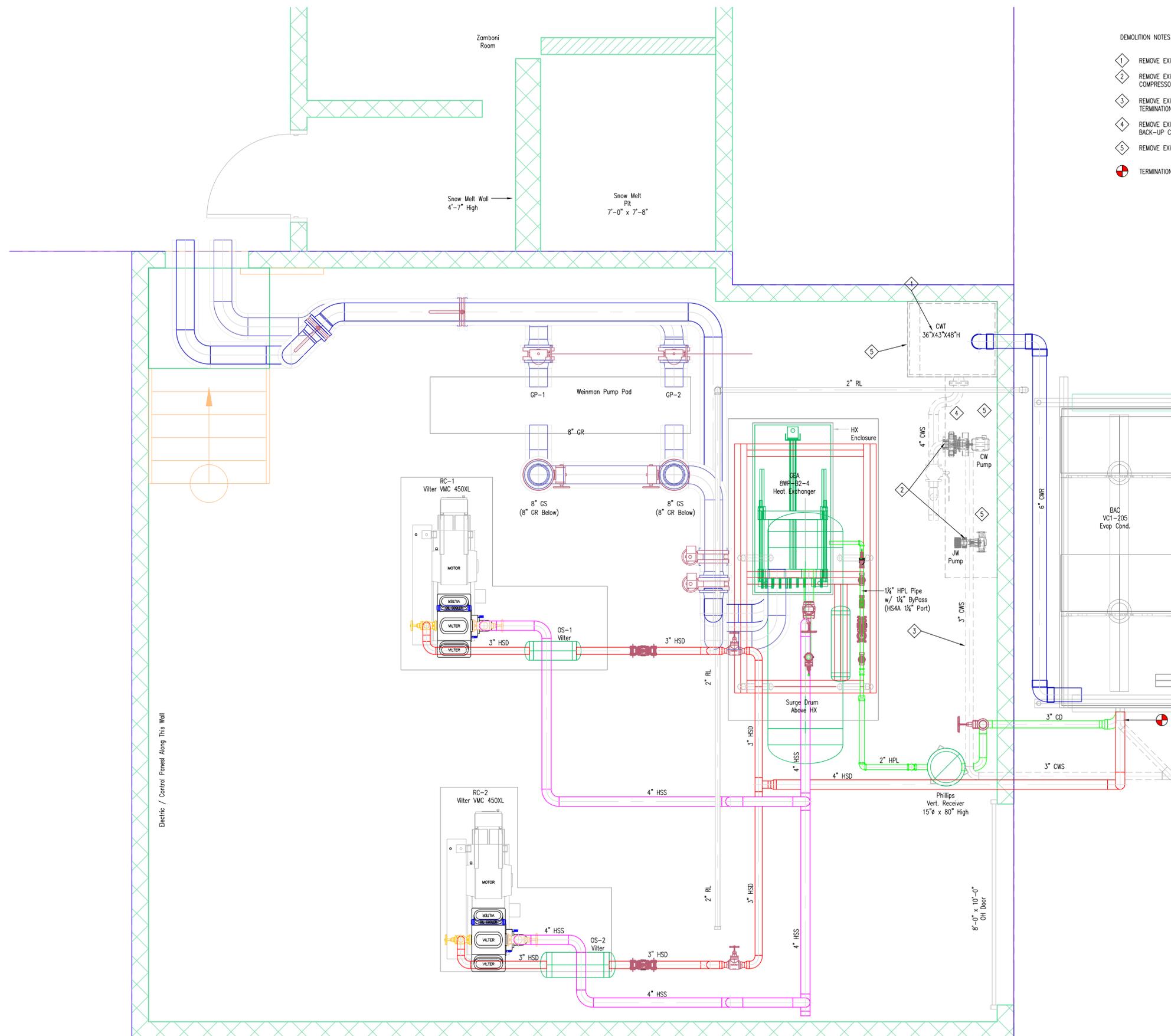
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**Arlington Ice Rink
Refrigeration System Updates**
422 Summer Street
Arlington, MA

**Arlington Ice Rink
Mech Room
Layout**

SCALE: 3/16" = 1'-0"
DATE: 5th March 2020
Dr./Det./Chk.: pk

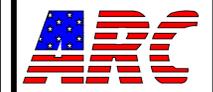
EX1.0
WO-072609



- DEMOLITION NOTES
- 1 REMOVE EXISTING CONDENSER REMOTE WATER SUMP TANK.
 - 2 REMOVE EXISTING CONDENSER WATER SUPPLY AND COMPRESSOR JACKET COOLING WATER PUMPS.
 - 3 REMOVE EXISTING 3" CONDENSER WATER SUPPLY PIPING TO TERMINATION POINT.
 - 4 REMOVE EXISTING CONDENSER SUMP WATER MAKE-UP AND BACK-UP COMPRESSOR JACKET COOLING WATER PIPING.
 - 5 REMOVE EXISTING CONCRETE PADS
- TERMINATION POINT.

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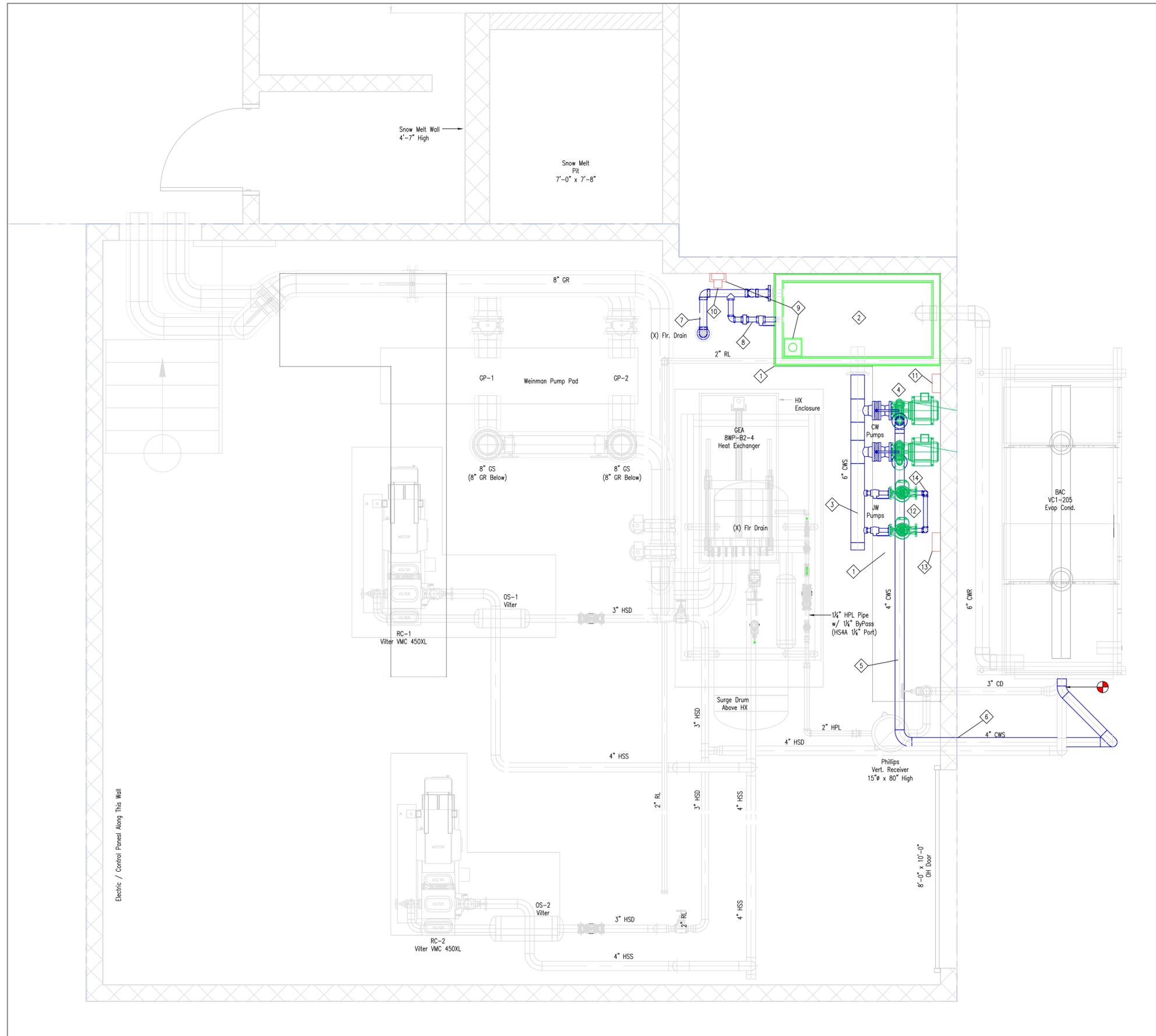
**Arlington Ice Rink
 Refrigeration System Updates**
 422 Summer Street
 Arlington, MA

**Arlington Ice Rink
 Demo Plan**

SCALE: 1/2" = 1'-0"
 DATE: 5th March 2020
 Dr./Det./Chk.: pk

D1.0
WO-072609

1 Demo Plan
 1/2" = 1'-0"



INSTALLATION NOTES:

- 1 POUR NEW 5-1/2" CONCRETE PAD FOR (N) CONDENSER SUMP AND PUMPS. EQUIPMENT PADS TO BE 4,000PSI CONCRETE MINIMUM. REINFORCE CONCRETE PADS WITH #4 BAR PLACED 18" MAX C TO C EACH WAY (UNLESS OTHERWISE NOTED). DOWEL CONCRETE PAD 3" MN INTO FLOOR SLAB WITH #4 BAR 36" C TO C EACH WAY OR MINIMUM OF 6" FROM EACH CORNER.
- 2 PROVIDE AND INSTALL (N) 36"W x 72"L x 48"H CONDENSER WATER SUPPLY TANK. TANK SHALL BE FABRICATED FROM 3/4" NATURAL POLYPROPYLENE WITH (2) 3" x 3" STEEL GIRTH BANDS. GIRTH BANDS SHALL BE ENCAPSULATED WITH 1/2" NATURAL POLYPROPYLENE COVER. ALL FLANGE CONNECTIONS SHALL BE GUSSETED. TANK TO BE FABRICATED PER TANK FABRICATION DETAIL DRAWING R3.0
- 3 INSTALL (N) 6" SCH40 STEEL HEADER FOR PUMP SUCTION.
- 4 PROVIDE AND INSTALL (2) CONDENSER WATER SUPPLY PUMP AND ASSOCIATED PIPING.
 - a. PUMP SHALL BE B & G SERIES e-1532 3AD (OR EQUAL) RATED FOR 220 GPM AT 25FT TDH.
 - b. PUMP TO BE CLOSE COUPLED TO A 3 HP, 480V/3/60 PREMIUM EFFICIENCY ODP MOTOR.
 - c. PUMP SHALL HAVE LINE SIZE LUG TYPE BUTTERFLY ISOLATION VALVE ON SUCTION AND DISCHARGE PIPING.
 - d. EACH PUMP DISCHARGE PIPING TO HAVE APOLLO (OR EQUAL) SOFT SEAT STYLE DUO CHECK VALVE.
- 5 INSTALL (N) 4" CWS PIPING AS SHOWN.
- 6 INSTALL 6" SCH40 PVC SLEEVE AT WALL PENETRATION FOR CWS PIPING. SLEEVE TO BE FLUSH WITH WALL BOTH SIDES AND GROUTED IN PLACE WITH NON-SHRINK CONCRETE GROUT. RUN 4" CWS PIPING THROUGH SLEEVE AND SEAL BOTH ENDS OF SLEEVE TO PIPE WITH PIPE LINX MODEL CSL AS MANUFACTURED BY CALPICO, INC. (OR EQUAL).
- 7 PIPE 3" CONDENSER WATER TANK OVERFLOW CONNECTION TO (X) FLOOR DRAIN AS SHOWN.
- 8 PROVIDE AND INSTALL 2" APOLLO 20-100 SERIES STANDARD PORT THREADED BALL VALVE AT TANK DRAIN AND PIPE VALVE TO 3" OVERFLOW AS SHOWN.
- 9 PROVIDE AND INSTALL (1) INDUSTRIALEVELINE MODEL WFLV-TM-4011-PWP, 110V LIQUID LEVEL CONTROL FITTED WITH VARIABLE SENSITIVITY FEATURE AND MOUNTED IN NEMA4X THERMOPLASTIC CASE AS MANUFACTURED BY LUMENTE CONTROL TECHNOLOGY, INC. LEVEL CONTROL TO BE PROVIDED WITH PHP34EP15T 3" PVC FLANGE PROBE HOLDER WITH (4) SS TEFLON COATED INSERTION PROBES. PROBE LENGTHS ARE AS FOLLOWS:
 - PROBE 1: 6" - (HIGH LEVEL ALARM OUTPUT) WIRED TO AUDIBLE/VISUAL ALARM BEACON
 - PROBE 2: 20" - (OPERATING LEVEL, WATER OFF)
 - PROBE 3: 23" - (LOW LEVEL, WATER ON)
 - PROBE 4: 42" - (GROUND/REFERENCE PROBE)
- 10 120VAC AUDIBLE/VISUAL WARNING BEACON. FEDERAL SIGNAL MODEL SLM600 WITH AMBER POLYCARBONATE LENS.
- 11 PROVIDE SQUARE D MODEL DTU361 SERIES F, 3 POLE DOUBLE THROW 460V/3/60 SAFETY DISCONNECT SWITCH FIELD CONFIGURED TO SWITCH TWO LOADS FROM SINGLE POWER SOURCE. LOAD SIDE TO CONDENSER WATER SUPPLY PUMPS, LINE SIDE WIRED TO EXISTING CONDENSER WATER SUPPLY PUMP MOTOR STARTER.
- 12 PROVIDE AND INSTALL (2) COMPRESSOR JACKET COOLING WATER PUMPS AND ASSOCIATED PIPING.
 - a. PUMP SHALL BE GOULDS MODEL 5SV6GABC60 (OR EQUAL) RATED FOR 14.5 GPM AT 42FT TDH.
 - b. PUMP SHALL HAVE FULL PORT APOLLO (OR EQUAL) ISOLATION BALL VALVES ON SUCTION AND DISCHARGE PIPING
 - c. DISCHARGE PIPING ON EACH PUMP SHALL HAVE APOLLO (OR EQUAL) SOFT SEAT IN-LINE CHECK VALVE.
- 13 PROVIDE SQUARE D MODEL DTU222 SERIES F, 2 POLE DOUBLE THROW, 120VAC SAFETY DISCONNECT SWITCH FIELD CONFIGURED TO SWITCH TWO LOADS FROM SINGLE POWER SOURCE. LOAD SIDE WIRED TO COMPRESSOR JACKET COOLING WATER PUMPS, LINE SIDE WIRED TO EXISTING PUMP MOTOR STARTER.
- 14 RE-PIPE COMPRESSOR JACKET COOLING WATER SUPPLY AND CONDENSER WATER SUPPLY TANK MAKE-UP PER PIPING DIAGRAM ON DRAWING R1.1.

⊕ TIE-IN POINT

1 Proposed New Installation
1/2" = 1'-0"

| Rev. | Date | Description | Chk |
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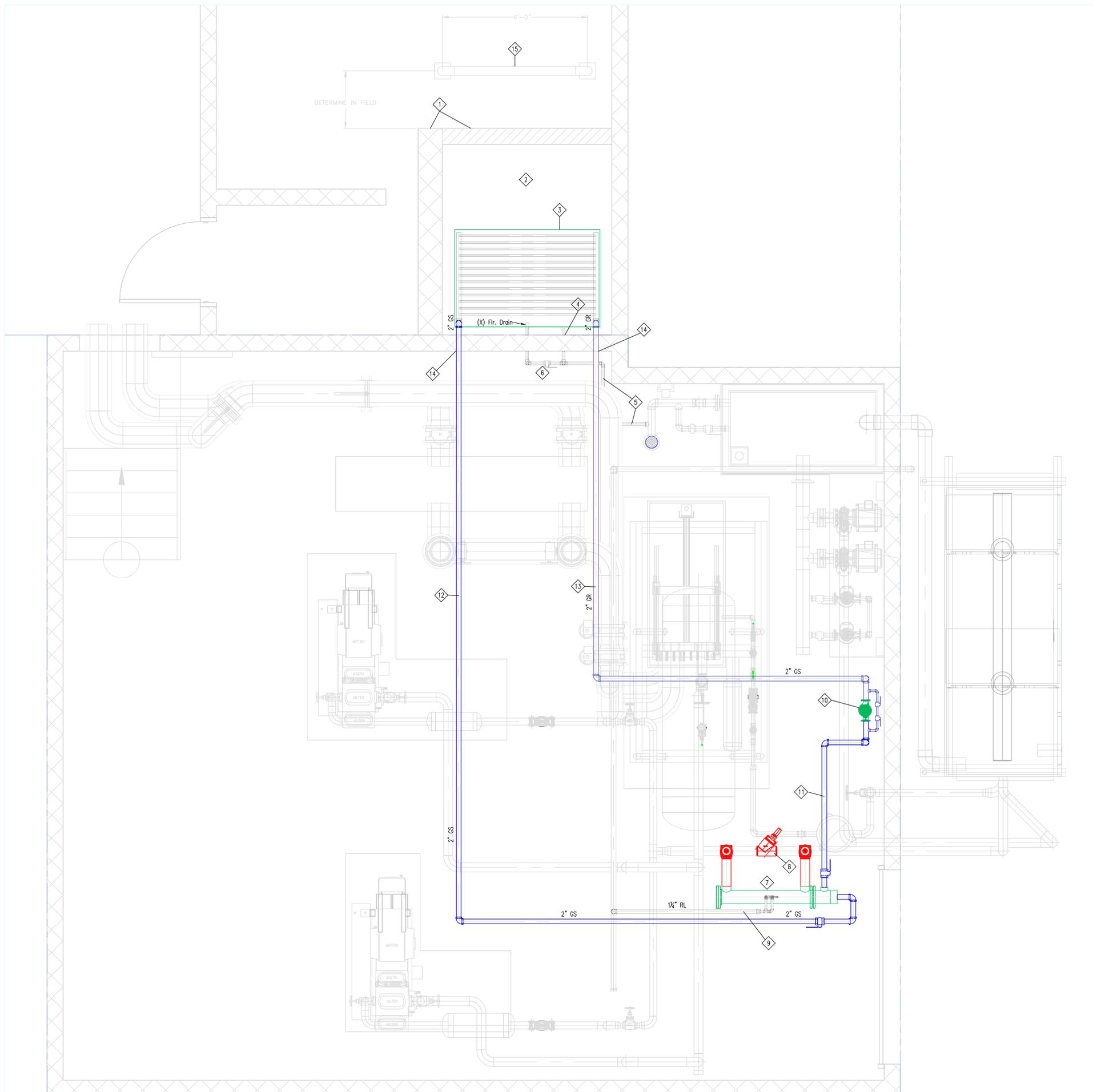
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**Arlington Ice Rink
 Refrigeration System Updates**
 422 Summer Street
 Arlington, MA

**Arlington Ice Rink
 Mech Room
 New Layout**

SCALE: 1/2" = 1'-0"
 DATE: 5th March 2020
 Dr./Det./Chk.: pk

R2.0
WO-072609



INSTALLATION NOTES:

- 1 INFILL FRONT WALL OF EXISTING SNOW MELT PIT TO COMPLETELY ENCLOSE PIT AND BRING WALL HEIGHT TO 40" ABOVE FINISHED FLOOR. MATCH EXISTING CMU CONSTRUCTION AND FILL ALL OPEN CORES WITH #5 BAR AND MORTAR TO STRENGTHEN WALL. TO BE LEFT SMOOTH AND LEVEL.
- 2 AFTER CONCRETE REPAIRS TO SNOW MELT PIT ARE COMPLETE AND 3" OVERFLOW PIPE (SEE NOTE 4) INSTALLED, SEAL FLOOR, WALLS AND TOP OF FRONT WALL OF SNOW MELT PIT WITH DURA-RUBBER LIQUID RUBBER COATING SYSTEM (OR EQUAL). SIDE AND BACK WALL TO BE COATED TO A HEIGHT OF 48" ABOVE FLOOR. DURA-RUBBER LIQUID RUBBER COATING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING;
 - a. PERFORM SERVICE PREPARATION IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTION PRIOR TO APPLYING SERVICE COATING.
 - b. APPLY POLYESTER REINFORCEMENT FABRIC AT ALL INSIDE AND OUTSIDE CORNERS AND SEAMS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTION.
- 3 FURNISH AND INSTALL (1) STAINLESS STEEL SNOW MELT COIL. SNOW MELT COIL DESIGN SPECIFICATIONS ARE AS FOLLOWS;
 - a. 7/8" X .035" STAINLESS 304 TUBES (NO FINS)
 - b. 14 GA 304 STAINLESS STEEL CASING
 - c. OVERALL DIMENSIONS 72"L X 48"W X 12"D (4 ROWS OF COIL DEPTH).
 - d. 70 DEG F PROPYLENE GLYCOL AT 30 GPM
 - e. 62.5 DEG F LEAVING TEMPERATURE AT 6.5PSI PRESSURE DROP THRU COIL
 - f. TOTAL HEATING CAPACITY OF 106,000 BTUH AT DESIGN CONDITIONS
 - g. 2" MPT INLET/OUTLET CONNECTIONS
 - h. INCLUDE TURBULATORS INSIDE TUBES.
 - i. BUILT IN SUPPORT FRAME WITH LEGS TO KEEP COIL 4" OFF BOTTOM OF SNOW MELT PIT.

CONNECT GS/GR PIPING TO SNOW MELT COIL WITH 2" NPS X 12'L G STAINLESS STEEL BRAIDED FLEX HOSE.
- 4 INSTALL 3" SCH40 PVC OVERFLOW PIPE THRU WALL INTO MACHINE ROOM. BOTTOM OF OVERFLOW PIPE TO BE 18" ABOVE SNOW MELT PIT FLOOR. OVERFLOW PIPE TO BE GROUTED WATERTIGHT.
- 5 PIPE 3" SCH40 PVC OVERFLOW INTO MACHINE ROOM AND CONNECT TO CONDENSER WATER SUPPLY TANK OVERFLOW AS SHOWN.
- 6 INSTALL ISOLATION VALVE IN EXISTING 2" SCH40 PC FLOOR DRAIN PIPING. RE--PIPE EXISTING 2" SCH40 PVC FLOOR DRAIN PIPING TO CONNECT TO 3" SCH40 PVC OVERFLOW PIPING AS SHOWN.
- 7 PROVIDE AND INSTALL (1) AMMONIA/20% PROPYLENE GLYCOL DE-SUPERHEATING SHELL AND TUBE HEAT EXCHANGER FOR SNOW MELT COIL HEAT SOURCE. HEAT EXCHANGER DESIGN SPECIFICATIONS ARE AS FOLLOWS;
 - a. 6" DIA. X 60" OAL ALL CARBON STEEL SHELL AND TUBE HEX
 - b. HEX TO BE ASME RATED AT 250PSIG.
 - c. GLYCOL DESIGN FLOW RATE OF 30GPM, 62.5 DEG F INLET/70 DEG F OUTLET, AT 1.73PSIG PRESSURE DROP.
 - d. AMMONIA SIDE DESIGN FLOW RATE OF 2,051 LB/HR AT 200F INLET/105F OUTLET.

HEX TO BE INSULATED WITH 1-1/2" THICK RIGID FIBERGLASS PIPE INSULATION WITH ALL SERVICE JACKET AND PVC COVERING.
- 8 INSTALL 4" AMMONIA ISOLATION VALVE IN HSD LINE BETWEEN HEX INLET/OUTLET CONNECTIONS.
- 9 PROVIDE AND INSTALL HANSEN H5600R DUAL SAFETY RELIEF VALVE ON HEX. PIPE SAFETY RELIEF VALVE OUTLET TO EXISTING 2" SRV MAIN WITH 1-1/4" SCH80 A106B SEAMLESS PIPE.
- 10 PROVIDE AND INSTALL (1) SNOW MELT COIL GLYCOL CIRCULATING PUMP B & G IN-LINE SERIES e-90 MODEL 1.25 AAB, BF (OR EQUAL), 0.5 HP, 1800 RPM, WITH 5.125" IMPELLER, STANDARD SEAL, US MOTORS, TEFC, STANDARD EFFICIENT, 115/208-230/1/60 MOTOR, 30GPM @ 25FT TDH.
- 11 INSTALL 2" SCH40 A53, GRADE B, ERW GLYCOL SUPPLY PIPING FROM SNOW MELT COIL PUMP TO HEX INLET AS SHOWN. ALL GLYCOL SUPPLY/RETURN PIPING TO BE INSULATED WITH 1-1/2" RIGID FIBERGLASS PIPE INSULATION WITH ALL SERVICE JACKET AND PVC COVERING.
- 12 INSTALL 2" SCH40 A53, GRADE B, ERW GLYCOL SUPPLY PIPING FROM HEX OUTLET TO SNOW MELT COIL AS SHOWN. ALL GLYCOL SUPPLY/RETURN PIPING TO BE INSULATED WITH 1-1/2" RIGID FIBERGLASS PIPE INSULATION WITH ALL SERVICE JACKET AND PVC COVERING.
- 13 INSTALL 2" SCH40 A53, GRADE B, ERW GLYCOL RETURN PIPING FROM SNOW MELT COIL TO SNOW MELT COIL PUMP INLET AS SHOWN. ALL GLYCOL SUPPLY/RETURN PIPING TO BE INSULATED WITH 1-1/2" RIGID FIBERGLASS PIPE INSULATION WITH ALL SERVICE JACKET AND PVC COVERING.
- 14 INSTALL 4" NPS SCH40 PVC PIPE SLEEVE FOR 2" GS/GR PIPING TO SNOW MELT COIL. GROUT SLEEVES INTO EXISTING MACHINE ROOM/SNOW MELT PIT WALL WITH NON-SHRINK CONCRETE GROUT. WALL SLEEVES TO BE 6FT ABOVE SNOW MELT PIT FLOOR MINIMUM. SEAL 2" GS/GR PIPING WITH #30 MODEL CSL PIPE LINX.
- 15 INSTALL 6" WIDE X 9" HIGH PIPE RAIL BUMPER GUARD IN FRONT OF SNOW MELT PIT WALL TO PREVENT ZAMBONI FROM DAMAGING WALL WHILE UNLOADING. BUMPER RAIL TO BE FABRICATED FROM 4" NPS WELDED PIPE AND ANCHORED TO FLOOR USING (4) 1/2" HILTI KWIK BOLTS EACH SIDE. HILTI KWIK BOLT TO HAVE MINIMUM OF 3" EMBEDMENT.

| Rev. | Date | Description | Chk |
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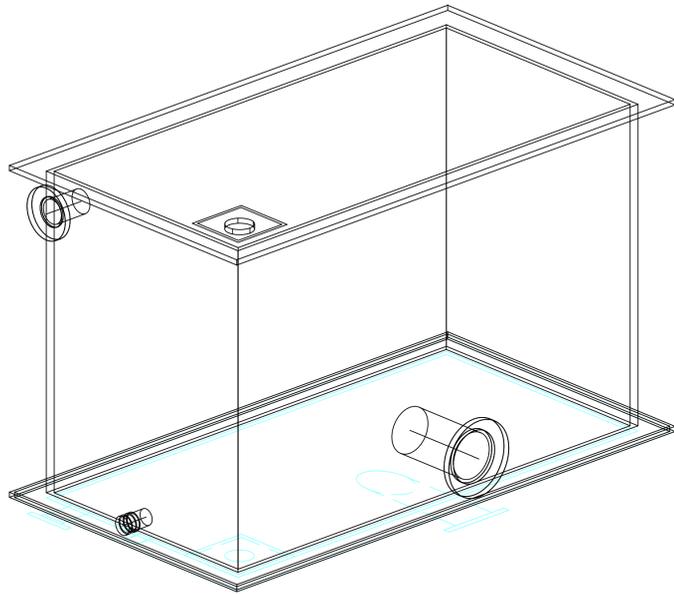
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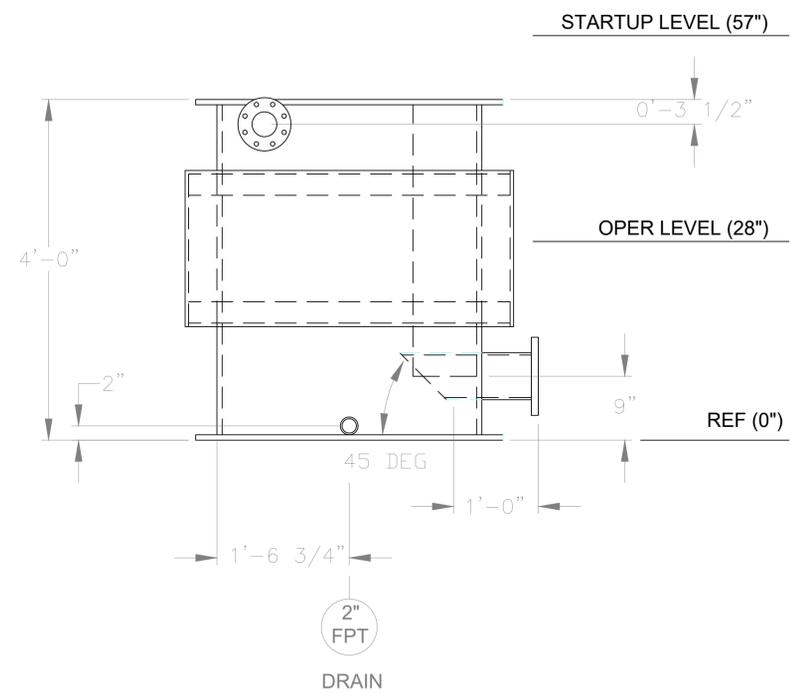
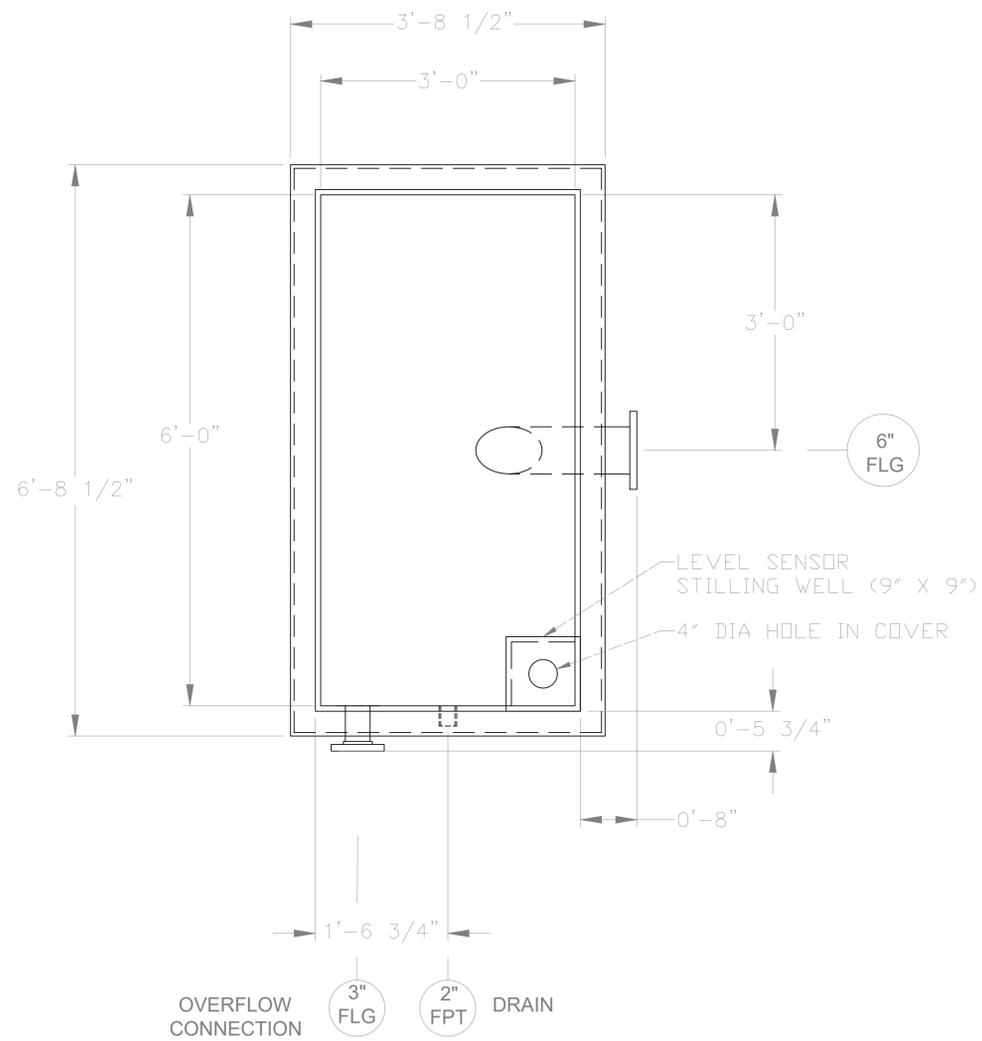
**Arlington Ice Rink
 Snow Melt
 Plan**

SCALE: As Noted
 DATE: 5th March 2020
 Drf./Det./Chk.: pk

R2.1
WO-072609



2 New Condenser Water Tank Alt View
nts



MATERIAL: NATURAL POLYPROPYLENE
 THICKNESS: 3/4"
 VOLUME: 450 GALLONS (NOMINAL)

1 New Condenser Water Tank Spec
nts

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