Town of Simsbury

933 HOPMEADOW STREET SIMSBURY, CONNECTICUT 06070

Engineering Department

DATE: **August 21, 2020**

RE: **BID NO. 20-06**
Simsbury Farms Ice Rink Refrigeration Condensing Unit Replacement and Controls Upgrade
Simsbury, Connecticut

This **Addendum No. 2** includes clarification, revisions and additions to the documents. Modifications are hereby made to the Project Documents dated August 2020, for the above-referenced project.

REVISIONS

1. REVISIONS PERTAINING TO ADDENDUM #2 HAVE BEEN MADE TO THE FOLLOWING DRAWINGS:

    1) M1.01 – CONDENSING UNIT REPLACEMENT MECHANICAL SPECIFICATIONS

2. PRE-BID QUESTION RESPONSES:

    1) M1.01 VARIABLE FREQUENCY DRIVES - no specifications are listed, please provide info
        - VFD specification is missing due to a CAD issue. Refer to revised drawing M1.01 - Condensing Unit Replacement Mechanical Specifications, Section 2.4.
    2) I-beam steel structural supports for new condensing unit, size of I-beam not listed, please provide info.
        - Structural support design, replacing existing supports (except for concrete pillars) shall be provided by successful Evaporative Condenser manufacturer. Refer to revised drawing M1.01 – Condensing Unit Replacement Mechanical Specifications, Section 2.3H.
    3) Is condenser water treatment system existing to remain and be reused as is?
        - Yes, the existing condenser water treatment system is to remain as is.
    4) Please clarify scope for testing and balancing.
        - The scope of TAB applies to the condenser water loop (WP-1/2), including the new evaporative condenser.
    5) The drawings indicate VFD brine pump control. Do you want this control cost included in the base quote or broken out as a line item option?
        - Brine pump control should be included in the base quote.

6) Are there 1 or 2 condenser fans? Condenser schedule shows a single fan but electrical diagram also lists a pony fan motor. Please clarify if pony exist and control requirements.
    - There is one condenser fan. The main fan motor is controlled by the VFD and the pony motor is for a backup and will run if the main motor fails.
7) Do you want the condenser VFD fan control included in the base quote or broken out as a line item option?
    - Condenser VFD fan control should be included in the base quote.
8) The drawings reference an infrared temperature sensor. Please confirm if this is required and if so, should it be included in the base quote or as a line item option?
    - All sensors identified on the drawings should be included in the base quote.
9) Drawings show 2 exhaust fans (EF1 and EF2) but note section list only a single exhaust fan. Please advise on correct exhaust fan count and whether one is a continuous run fan?
    - There are two fans: EF-1 for emergency (NH3 leak) operation and EF-2 for mechanical room ventilation. Fan control separation will be coordinated during shop drawing approval process.
10) Drawing notes list 3 leak detectors. Do you want these included in the base quote or broken out as a line item option?
    - The three leak detector sensors should be included in the base quote.
11) Are lighting control outputs required or are they intended to be quoted as an option?
    - Lighting control outputs should be quoted as an option.
12) Do you want the PC software included in the base quote or broken out as a line item option?
    - The PC software should be included in the base quote.
13) Do you want PC hardware included as an optional line item quote or will the facility be providing its own PC hardware?
    - The PC hardware should be included in the base quote.
14) Who is providing the Motor Control Panel for this project or is there an existing panel being reused?
    - There is no Motor Control Panel for this project. The fans are fed from the existing Chiller Control Panel.
15) Do you want any onsite training time included in the controls quote and if so, how many days?
    - As stated on drawing M1.02 – Ice Rink Controls Specification, Section 1.19, eight hours of instruction is to be provided to owner's personnel.
16) Completion date of October 30th based on a September 11th contract execution is extremely tight especially if new Motor Control Panel and condenser are being installed. Please confirm these dates are accurate?
    - The date included in the bid documents is correct for the completion of the project. The preparation for winter season requires an early start for the season. We intend on expediting the contract execution earlier that September 11, 2020 to allow additional lead time for equipment purchasing and project completion.

THIS ENDS ADDENDUM NO. 2.

SIMSBURY FARMS ICE RINK REFRIGERATION CONDENSING UNIT REPLACEMENT MECHANICAL SPECIFICATION

PART 1 - GENERAL

1.1 GENERAL

A. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS OF LOCAL AND STATE AGENCIES AND UTILITY COMPANIES. THIS CONTRACTOR SHALL BEAR THE COST OF ALL FEES, PERMITS, LICENSES AND TAXES AND ANY UTILITY COMPANY CHARGES IN CONNECTION WITH THE WORK. ALL EQUIPMENT INSTALLED SHALL BE UL LISTED.

B. PRIME CONTRACTOR SHALL BE THE MECHANICAL CONTRACTOR WHO SHALL ARRANGE AND BE RESPONSIBLE FOR ALL WORK IN CONTRACT DOCUMENTS INCLUDING ANY SUBCONTRACTED WORK.

1.2 SCOPE

A. PROVIDE MODIFICATIONS TO THE EXISTING HVAC SYSTEM AND ALL OTHER EQUIPMENT AS SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED, INCLUDING BUT NOT LIMITED TO:

1. SYSTEM SHALL BE COMPLETE IN ALL RESPECTS, TESTED, ACCEPTED AND READY TO OPERATE.
2. DEMOLITION OF EXISTING EVAPCO EVAPORATIVE CONDENSING UNIT, AS WELL AS PIPING AND ACCESSORIES ASSOCIATED WITH EVAPORATIVE CONDENSER EXTERIOR TO THE BUILDING.
3. DEMOLITION OF METAL STRUCTURAL SUPPORT BENEATH EVAPORATIVE CONDENSER, AND ON TOP OF CONCRETE PILLARS.
4. FURNISH AND INSTALL NEW METAL STRUCTURAL SUPPORT ON TOP OF EXISTING CONCRETE PILLARS.
5. FURNISH AND INSTALL NEW EVAPORATIVE CONDENSER, ALONG WITH REQUIRED WATER AND NH3 PIPING EXTERIOR TO BUILDING, CONNECTING TO EXISTING PIPING INTERIOR TO BUILDING.

1.3 SUBMITTALS

A. SUBMIT THREE (3) COPIES OF MANUFACTURER'S DRAWINGS OF THE FOLLOWING TO THE ENGINEER FOR APPROVAL:

1. EVAPORATIVE CONDENSER, STRUCTURAL SUPPORT, PIPING AND INSULATION.

1.4 GUARANTEE

A. MATERIALS, EQUIPMENT AND WORKMANSHIP SHALL HAVE STANDARD WARRANTY AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP. ANY FAILURE DUE TO DEFECTIVE OR IMPROPER MATERIAL, EQUIPMENT, WORKMANSHIP OR DESIGN SHALL BE MADE GOOD, FORTHWITH, BY AND AT THE EXPENSE OF THE CONTRACTOR, INCLUDING ANY DAMAGE DONE TO AREAS, MATERIALS AND OTHER SYSTEMS RESULTING FROM THIS FAILURE. GUARANTEE PERIOD SHALL EXTEND FOR ONE YEAR FROM THE DATE OF ACCEPTANCE.

1.5 DEFINITION

A. AS USED ON CONTRACT DOCUMENTS, THE TERM "TO PROVIDE" SHALL MEAN "TO FURNISH, INSTALL AND CONNECT COMPLETELY IN THE SPECIFIED OR APPROVED MANNER THE ITEM OR MATERIAL DESCRIBED."

1.6 OPERATING AND MAINTENANCE INSTRUCTIONS

A. UPON COMPLETION OF THE PROJECT, THE HVAC CONTRACTOR SHALL FULLY INSTRUCT THE OWNER IN THE OPERATION, ADJUSTMENT AND MAINTENANCE OF ALL EQUIPMENT AND SYSTEMS FURNISHED.

B. THE HVAC CONTRACTOR SHALL PROVIDE THE OWNER WITH THREE (3) SETS OF COMPLETE MAINTENANCE AND OPERATING INSTRUCTIONS, AND TECHNICAL DATA, IN BOOKLET FORM, OF ALL EQUIPMENT AND DEVICES FURNISHED IN THE CONTRACT.

1.7 CONTRACTOR'S INSPECTION

A. CONTRACT DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW EVERY REQUIRED FITTINGS, ETC. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE EXISTING SITE CONDITIONS, PRIOR TO SUBMITTING A BID, AND SHALL INCLUDE ALL EQUIPMENT AND ACCESSORIES NECESSARY FOR COMPLETE AND OPERATIONAL SYSTEMS.

B. THE HVAC CONTRACTOR SHALL EXAMINE THE DRAWINGS AND SPECIFICATIONS ALONG WITH THOSE OF OTHER TRADES TO DETERMINE THE EXTENT OF WORK. THE HVAC CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE PROJECT AND LOCAL CONDITIONS BEFORE SUBMITTING A BID. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. IF SO DIRECTED BY THE ENGINEER, THE HVAC CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT TO ENSURE PROPER INSTALLATION OF WORK. THE CONTRACTOR SHALL COORDINATE LOCATIONS OF EQUIPMENT WITH ALL TRADES BEFORE STARTING CONSTRUCTION. ANY MODIFICATIONS TO THE EQUIPMENT LAYOUT REQUIRED FOR INSTALLATION SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.

1.8 ARRANGEMENT OF WORK

A. WORK SHALL BE COORDINATED BETWEEN TRADES TO PREVENT UNNECESSARY INTERFERENCE. WORK SHALL PRESENT A NEAT COORDINATED APPEARANCE. INSTALL WORK AS NECESSARY TO PROVIDE MAXIMUM POSSIBLE HEADROOM, ADEQUATE CLEARANCE AND READY ACCESS FOR INSPECTION, OPERATION, SAFE MAINTENANCE AND REPAIR, AND CODE CONFORMANCE. WHERE SPACE APPEARS INADEQUATE, CONSULT THE OWNER BEFORE PROCEEDING WITH INSTALLATION.

1.9 INSURANCE

A. FURNISH INSURANCE CERTIFICATES REQUIRED BY THE OWNER.

1.10 PERMITS, LAWS, ORDINANCES, CODES AND STANDARDS

A. OBTAIN AND PAY FOR PERMITS, INSPECTIONS, LICENSES AND CERTIFICATES REQUIRED. WORK OF THIS CONTRACT SHALL MEET CURRENT ACCEPTED EDITIONS OF THE STATE BUILDING CODE, STATE FIRE SAFETY CODE AND OTHER LAWS, RULES AND REGULATIONS OF LOCAL, STATE AND FEDERAL AUTHORITIES INCLUDING, BUT NOT LIMITED TO: NATIONAL FIRE PROTECTION ASSOCIATION #13; NATIONAL FIRE PROTECTION ASSOCIATION #90A; NATIONAL FIRE PROTECTION ASSOCIATION #90B; NATIONAL FIRE PROTECTION ASSOCIATION #99; INTERNATIONAL PLUMBING CODE; INTERNATIONAL MECHANICAL CODE; NATIONAL FIRE PROTECTION ASSOCIATION #70 (NATIONAL ELECTRICAL CODE); AND LOCAL UTILITY COMPANY REQUIREMENTS. PAY UTILITY COMPANY BACKCHARGES. EQUIPMENT, MATERIALS AND COMPONENTS LISTED UL PRODUCT DIRECTORIES, SHALL BEAR UL LABELS.

1.11 WORK BY OTHERS

A. THE HVAC CONTRACTOR SHALL INSTALL ALL MOTORS PROVIDED UNDER THE HVAC CONTRACT READY FOR WIRING BY THE ELECTRICAL CONTRACTOR AND SHALL FURNISH AND DELIVER TO THE ELECTRICAL CONTRACTOR WIRING DIAGRAMS FOR ALL MOTOR STARTERS FOR INSTALLATION AND WIRING. THE HVAC CONTRACTOR SHALL FURNISH MOTOR STARTERS, RELAYS AND ALL TEMPERATURE CONTROL EQUIPMENT TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION AND WIRING. THE GENERAL CONTRACTOR SHALL PERFORM ALL EXCAVATION, BACKFILL, CHASES, OPENINGS, CUTTING, PATCHING AND FINISH WORK.

1.12 FIELD MEASUREMENTS

A. THE HVAC CONTRACTOR SHALL VERIFY IN THE FIELD ALL MEASUREMENTS NECESSARY FOR THE WORK.

1.13 WORKMANSHIP

A. EQUIPMENT AND MATERIALS SHALL BE NEW, OF FIRST QUALITY, SELECTED AND ARRANGED TO FIT PROPERLY INTO SPACES INDICATED. INSTALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

1.14 COORDINATION WITH OWNER

A. ALL WORK SHALL BE SCHEDULED WITH THE OWNER. INTERRUPTIONS IN THE OWNER'S ACCESS TO THE SITE SHALL BE SUBJECT TO OWNER LIMITATIONS OF DATE AND DURATION.

1.15 OPERATION OF SERVICES AND UTILITIES

A. SHUTDOWN OF EXISTING SERVICES AND UTILITIES SHALL, WITHOUT EXCEPTION, BE COORDINATED WITH THE PROPER UTILITY AND WITH THE OWNER AS TO DATE, TIME OF DAY, AND DURATION BEFORE ANY SERVICE IS INTERRUPTED. NOTIFY THE OWNER OF ESTIMATED DURATION OF SHUTDOWN PERIOD AT LEAST TEN DAYS IN ADVANCE OF PROPOSED SHUTDOWN.

1.16 PROTECTION

A. CLOSE OPEN ENDS OF WORK WITH TEMPORARY COVERS OR PLUGS DURING CONSTRUCTION TO PREVENT ENTRY OF OBSTRUCTING MATERIAL OR DAMAGING WATER. PROTECT EXISTING PROPERTY, EQUIPMENT AND FINISHES FROM DAMAGE. REPAIR, TO ORIGINAL CONDITION, EXISTING PROPERTY THAT HAS BEEN DAMAGED DURING EXECUTION OF THE WORK.

1.17 CLEANING

A. WORK SITE MUST BE KEPT CLEAN. RUBBISH, DEBRIS AND LEFTOVER OR EXCESS MATERIALS SHALL BE REMOVED DAILY.

1.18 LUBRICATION

A. NO EQUIPMENT SHALL BE OPERATED FOR TEMPORARY SERVICE OR TESTING WITHOUT PROPER LUBRICATION. ITEMS REQUIRING LUBRICATION SHALL BE LEFT FRESHLY AND FULLY LUBRICATED AT TIME OF SUBSTANTIAL COMPLETION. FURNISH OWNER WITH ONE (1) COMPLETE NEW SET OF ANY SPECIAL LUBRICATION DEVICES REQUIRED FOR SERVICING, E.G., GREASE GUNS, FITTINGS AND ADAPTERS.

1.19 PAINTING

A. MECHANICAL AND ELECTRICAL EQUIPMENT AND MATERIALS SHALL HAVE PRIME COAT AND STANDARD MANUFACTURER'S FINISH. PAINTING OF FINISHED SURFACES (EXCLUDING CEILINGS) SHALL BE ONE COAT PRIMER AND TWO COATS VINYL BASE SEMI-GLOSS PAINT. PAINTING OF CEILING SHALL BE ONE COAT PRIMER AND TWO COATS FLAT WHITE PAINT. PRIMER SHALL BE OMITTED ON REPAINTING OF EXISTING SURFACES.

1.20 CUTTING AND PATCHING

A. AREAS DISTURBED BY NEW CONSTRUCTION OR DEMOLITION SHALL BE PATCHED AND REPAIRED TO MATCH EXISTING CONDITIONS. PATCH PAINTING OF CEILINGS SHALL INCLUDE PAINTING OF ENTIRE CEILING OF ROOM INVOLVED. PATCH PAINTING OF OTHER SURFACES SHALL BE TO NEAREST CUT-OFF POINT.

1.21 WATERPROOFING

A. PROVIDE NECESSARY SLEEVES, CAULKING AND FLASHING REQUIRED TO MAKE OPENINGS WATERPROOF.

1.22 FIREPROOFING

A. AT CLOSING OF EACH WORKING DAY, PROVIDE TEMPORARY FIRESTOPPING IN EVERY OPENING CUT BETWEEN FLOORS AND THROUGH FIRE-RATED PARTITIONS. PERMANENT FIRESTOPS SHALL BE PROVIDED AROUND SLEEVES AND AT OTHER PERMANENT OPENINGS THROUGH FIRE-RATED PARTITIONS AND FLOORS, AS REQUIRED. MATERIALS USED FOR FIRE STOPPING SHALL BE CLASS A "NONCOMBUSTIBLE" WITH FIRESTOPPING CAPABILITIES EQUAL TO THAT OF ADJACENT CONSTRUCTION.

1.23 BASES AND SUPPORTS

A. PROVIDE NECESSARY SUPPORTS, PADS, BASES AND PIERS REQUIRED. EQUIPMENT SHALL BE SECURELY ATTACHED TO STRUCTURE IN ACCEPTABLE MANNER. ATTACHMENTS SHALL BE OF STRONG AND DURABLE NATURE, AS DETERMINED BY THE OWNER.

1.24 TESTS

A. PERFORM TESTS REQUIRED BY THE OWNER, LEGAL AUTHORITIES AND AGENCIES. EACH PIECE OF EQUIPMENT, INCLUDING MOTORS AND CONTROLS, SHALL BE OPERATED CONTINUOUSLY FOR MINIMUM ONE-HOUR TEST. CORRECT ALL DEFECTS APPEARING DURING TESTS, AND REPEAT TESTS UNTIL NO DEFECTS ARE DISCLOSED. FINAL TESTS SHALL BE MADE IN THE OWNER'S PRESENCE.

1.25 INSTRUCTION TRAINING

A. COMPETENT TECHNICIANS SHALL PROVIDE FOUR (4) HOURS OF INSTRUCTION TO OWNER'S PERSONNEL. INSTRUCTIONS SHALL INCLUDE, BUT ARE NOT LIMITED TO, FOLLOWING:

1. FAMILIARIZATION WITH HVAC CONTROL SYSTEM, HARDWARE AND OPERATION PROCEDURES.
2. FAMILIARIZATION WITH MANAGEMENT SYSTEM HARDWARE.
3. USE OF MANAGEMENT SYSTEM.
4. MODIFICATIONS OF SOFTWARE PACKAGES.
5. TROUBLE-SHOOTING AND SERVICE PROCEDURES.

PART 2 - PRODUCTS

2.1 MATERIALS AND METHODS

A. PIPING:

1. EVAPORATIVE CONDENSER CONDENSATE DRAIN PIPING SHALL BE TYPE "M" COPPER WITH WROUGHT COPPER PRESSURE FITTINGS AND 95/5 SOLDER. USE 45 DEGREE LATERAL TYPE FITTINGS AND LONG SWEEP ELBOWS. NO TEES OR SHORT RADIUS ELBOWS WILL BE ALLOWED.
2. EVAPORATIVE CONDENSING WATER SUPPLY AND RETURN PIPING SHALL BE SCH. 40 PVC. CONTRACTOR TO MATCH EXISTING PIPING SYSTEM.
3. NH3 PIPING SHALL BE SCH. 40 WELDED STEEL. CONTRACTOR TO MATCH EXISTING PIPING SYSTEM.
4. WATER SYSTEM PIPING SHALL BE RUN PITCHED. TAKE-OFFS SHALL BE MADE FROM THE BOTTOM OF THE MAIN OR AT 45 DEGREES FROM THE BOTTOM OF THE MAIN. PROVIDE DRAIN VALVES AT ALL LOW POINTS; MANUAL AIR VENTS AT ALL HIGH POINTS. USE ECCENTRIC REDUCERS ON HORIZONTAL LINES, FLUSH TO TOP OF THE PIPE.
5. PROVIDE UNIONS AND SHUT-OFF VALVES AT ALL EQUIPMENT, COILS, ETC.
6. ALL PIPING SHALL BE SUPPORTED IN A MANNER TO PREVENT VIBRATION OR SAGGING. IN NO CASE SHALL THE HANGER SPACING EXCEED THE DISTANCES LISTED IN THE CURRENT ACCEPTED EDITION OF THE INTERNATIONAL MECHANICAL CODE.

B. VALVES:

1. GATE (3" AND LARGER): NIBCO #F-617-0, STOCKHAM #G-623.
2. CHECK (FOR BASE-MOUNTED PUMP DISCHARGE): MILWAUKEE #1400, NIBCO #W-960, STOCKHAM #WG-970.
3. CHECK (2-1/2" AND LARGER): NIBCO #F91 8, HAMMOND #IR1124.
4. BALL VALVES: APOLLO #70-100, JAMESBURY #A11TT.
5. BUTTERFLY: STOCKHAM #LD-711, KEYSTONE #AR-2.
6. BALANCING: ARMSTRONG CBV OR BELL & GOSSETT "CIRCUIT SETTER".

2.2 MOTOR REQUIREMENTS FOR MECHANICAL EQUIPMENT

A. MOTORS USED WITH VARIABLE FREQUENCY CONTROLLERS: RATINGS, CHARACTERISTICS, AND FEATURES COORDINATED WITH AND APPROVED BY CONTROLLER MANUFACTURER.

1. WINDINGS: COPPER MAGNET WIRE WITH MOISTURE-RESISTANT INSULATION VARNISH, DESIGNED AND TESTED TO RESIST TRANSIENT SPIKES, HIGH FREQUENCIES, AND SHORT TIME RISE PULSES PRODUCED BY PULSE-WIDTH MODULATED INVERTERS.
2. ENERGY- AND PREMIUM-EFFICIENT MOTORS: CLASS B TEMPERATURE RISE; CLASS F INSULATION.
3. INVERTER-DUTY MOTORS: CLASS F TEMPERATURE RISE; CLASS H INSULATION.
4. THERMAL PROTECTION: COMPLY WITH NEMA MG 1 REQUIREMENTS FOR THERMALLY PROTECTED MOTORS.
5. MOTORS SHALL HAVE A SHAFT GROUNDING BRUSH TO PREVENT BEARING FAILURE FROM PRESENCE OF VOLTAGE ON THE SHAFT.

2.3 EVAPORATIVE CONDENSERS

A. MANUFACTURERS

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE EVAPORATIVE CONDENSERS MANUFACTURED BY ONE OF THE FOLLOWING:
   a. EVAPCO MODEL LRC-201
   b. APPROVED SUBSTITUTE

B. THERMAL PERFORMANCE

1. EACH UNIT SHALL BE CAPABLE OF 1,563.00 (MBH) AT 90.0° F CONDENSING AND A DESIGN WET BULB OF 76.0° F.

C. IBC COMPLIANCE

1. THE UNIT STRUCTURE SHALL BE DESIGNED, ANALYZED, AND CONSTRUCTED IN ACCORDANCE WITH THE LATEST EDITION OF INTERNATIONAL BUILDING CODE (IBC) FOR: IP = 1.0, SDS = 0.67, P = 288PSF.

D. COMPONENTS

1. DESCRIPTION: FACTORY ASSEMBLED AND TESTED, FORCED DRAFT COUNTER FLOW EVAPORATIVE CONDENSER.
2. MATERIALS OF CONSTRUCTION:
   a. ALL PANELS INCLUDING THE FAN SNOUTS, HOUSINGS AND SUPPORTS SHALL BE CONSTRUCTED OF HEAVY GAUGE MILL HOT-DIP GALVANIZED STEEL. ALL GALVANIZED STEEL SHALL BE COATED WITH A MINIMUM OF 2.35 OUNCES OF ZINC PER SQUARE FOOT OF AREA (G-235 HOT-DIP GALVANIZED STEEL DESIGNATION). DURING FABRICATION, ALL GALVANIZED STEEL PANEL EDGES SHALL BE COATED WITH A 95% PURE ZINC-RICH COMPOUND.
3. FAN(S):
   a. FANS SHALL BE FORWARD CURVED CENTRIFUGAL OF HOT DIPPED GALVANIZED CONSTRUCTION. THE FANS SHALL BE FACTORY INSTALLED, AND STATICALLY AND DYNAMICALLY BALANCED FOR VIBRATION FREE OPERATION.
4. FAN HOUSING
   a. THE COMPLETE DRIVE SYSTEM, INCLUDING THE ELECTRIC MOTOR, BELTS, BEARINGS, FAN, AND DRIVES SHALL BE COMPLETELY ENCLOSED IN A PROTECTIVE HOUSING WHICH COVERS THE DRIVE SYSTEM AND PROVIDES SOUND REDUCTION.
5. DRIFT ELIMINATORS
   a. DRIFT ELIMINATORS SHALL BE CONSTRUCTED ENTIRELY OF POLYVINYL CHLORIDE (PVC) IN EASILY HANDLED SECTIONS. DESIGN SHALL INCORPORATE THREE CHANGES IN AIR DIRECTION AND LIMIT THE WATER CARRYOVER TO A MAXIMUM OF 0.001% OF THE RECIRCULATING WATER RATE. DRIFT ELIMINATORS SHALL BE SELF-EXTINGUISHING, HAVE A FLAME SPREAD OF LESS THAN 25 UNDER ASTM E84, AND SHALL BE RESISTANT TO ROT, DECAY AND BIOLOGICAL ATTACK.
6. WATER DISTRIBUTION SYSTEM
   a. SPRAY NOZZLES SHALL BE PRECISION MOLDED ABS WITH LARGE ORIFICE THREADED INTO BRANCH PIPING WITH INTERNAL SLUDGE RING TO ELIMINATE CLOGGING. SPRAY HEADER AND BRANCHES SHALL BE SCHEDULE 40 POLYVINYL CHLORIDE (PVC) FOR CORROSION RESISTANCE.
7. HEAT TRANSFER MEDIA
   a. HEAT TRANSFER COIL SHALL BE ELLIPTICAL TUBES OF PRIME SURFACE STEEL, ENCASED IN STEEL FRAMEWORK WITH ENTIRE ASSEMBLY HOT-DIP GALVANIZED AFTER FABRICATION. THE COIL ASSEMBLY SHALL BE DESIGNED WITH SLOPING TUBES FOR LIQUID DRAINAGE. COIL SHALL HAVE DESIGN PRESSURE OF 300 PSI AND SHALL BE IN COMPLIANCE WITH ASME/ANSI B31.5, REFRIGERATION PIPING AND HEAT TRANSFER COMPONENTS. THE COIL ASSEMBLY SHALL BE STRENGTH TESTED IN ACCORDANCE WITH ASME/ANSI B31.5 AND SUBSEQUENTLY LEAK TESTED USING AIR UNDER WATER.
   b. THE HEAT TRANSFER COIL SHALL BE EVACUATED AND CHARGED WITH LOW PRESSURE NITROGEN PRIOR TO SHIPMENT.
8. AIR INLET SCREENS
   a. PROTECTIVE SCREENS SHALL BE PROVIDED OVER AIR INLET.

E. MOTORS AND DRIVES

1. GENERAL REQUIREMENTS FOR MOTORS ARE SPECIFIED IN DIVISION 23 SECTION "MOTORS".
2. FAN MOTOR
   a. FAN MOTOR(S) SHALL BE TOTALLY ENCLOSED, BALL BEARING TYPE ELECTRIC MOTOR(S) SUITABLE FOR MOIST AIR SERVICE. MOTOR(S) ARE PREMIUM EFFICIENT, CLASS F INSULATED, 1.15 SERVICE FACTOR DESIGN. INVERTER RATED PER NEMA MG1 PART 31.4.4.2 AND SUITABLE FOR VARIABLE TORQUE APPLICATIONS AND CONSTANT TORQUE SPEED RANGE WITH PROPERLY SIZED AND ADJUSTED VARIABLE FREQUENCY DRIVES.
3. PONY MOTOR
   a. DRIVE SYSTEM SHALL INCLUDE AN ADDITIONAL MOTOR SIZED FOR APPROXIMATELY 25% OF THE MAIN FAN MOTOR POWER.
4. FAN DRIVE
   a. THE FAN DRIVE SHALL BE V-BELT TYPE WITH QD TAPERED BUSHINGS DESIGNED FOR 150% OF THE MOTOR NAMEPLATE POWER. THE BELT MATERIAL SHALL BE NEOPRENE REINFORCED WITH POLYESTER CORD AND SPECIFICALLY DESIGNED FOR EVAPORATIVE EQUIPMENT SERVICE. BELT ADJUSTMENT SHALL BE ACCOMPLISHED FROM THE EXTERIOR OF THE UNIT.
5. FAN SHAFT
   a. FAN SHAFT SHALL BE SOLID, GROUND AND POLISHED STEEL. EXPOSED SURFACE SHALL BE COATED WITH RUST PREVENTATIVE.
6. FAN SHAFT BEARINGS
   a. FAN SHAFT BEARINGS SHALL BE HEAVY-DUTY, SELF-ALIGNING BALL TYPE BEARINGS WITH EXTENDED LUBRICATION LINES TO GREASE FITTINGS LOCATED ON ACCESS DOOR FRAME. BEARINGS SHALL BE DESIGNED FOR A MINIMUM L-10 LIFE OF 100,000 HOURS.

F. MAINTENANCE ACCESS

1. FAN SECTION
   a. FAN SCREENS SHALL BE REMOVABLE FOR FAN MOTOR AND DRIVE ACCESS AT GRADE.
2. BASIN SECTION
   a. CIRCULAR ACCESS DOOR SHALL BE LOCATED ABOVE THE BASIN TO ALLOW FOR EASY ACCESS TO PAN INTERIOR

G. ACCESSORIES

1. PIPING CONNECTIONS
   a. UNIT SHALL INCLUDE AN OVERSIZED OUTLET CONNECTION FOR REMOTE SUMP OPERATION. SUCTION HOOD AND STRAINER ASSEMBLY AS WELL AS MAKE-UP, OVERFLOW AND DRAIN CONNECTIONS SHALL BE OMITTED.

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H. SUPPORTS

1. SUCCESSFUL BIDDING MANUFACTURER SHALL PROVIDE FULL DESIGN OF THE EVAPORATIVE CONDENSER SUPPORT. EXCEPT FOR THE CONCRETE PILLARS, ALL EXISTING SUPPORT SHALL NOT BE RE-USED AND SHALL BE DEMOLISHED.
2. NEW SUPPORT DESIGN AND CALCULATIONS, INCLUDING SUPPORT AND UNIT ANCHORING SHALL BE SUBMITTED WITH A STRUCTURAL P.E. AFFIDAVIT FOR ARCHITECT / ENGINEER REVIEW.
3. STRUCTURAL DESIGN SHALL FOLLOW MANUFACTURER RECOMMENDED SUPPORT CONFIGURATIONS AND EQUIPMENT WEIGHTS.
4. CONSTRUCTION OF THE APPROVED EVAPORATIVE CONDENSER SUPPORT BY DIVISION 23.

2.4 VARIABLE FREQUENCY DRIVES

A. VFDS SHALL BE FURNISHED AND INSTALLED UNDER THIS SECTION. POWER CIRCUITING FOR VFDS SHALL BE DONE AS PART OF WORK OF DIVISION 26, ELECTRICAL WORK; CONTROL WIRING SHALL BE DONE AS PART OF DIVISION 23.

B. VFD SHALL BE UL OR ETL LISTED, ADJUSTABLE FREQUENCY MOTOR DRIVE, FOR USE POWERING NEMA DESIGN B ALTERNATING CURRENT INDUCTIO MOTOR; BY ABB, YASKAWA, GRAHAM, EATON, OR ALLEN BRADLEY.

C. VFD SHALL BE MOUNTED WITH ALL ACCESSORIES INCLUDING BUT NOT LIMITED TO TRANSFORMERS, FILTERS, LINE REACTORS, ETC. IN SINGLE WALL MOUNTED OR FREE STANDING ENCLOSURE AS REQUIRED. ACCESSORIES SHALL BE FACTORY WIRED SO ONLY INPUT AND OUTPUT FEEDER AND CONTROL WIRING IS REQUIRED IN THE FIELD.

D. VFD SHALL HAVE DIGITAL CONTROL LOGIC AND THE FOLLOWING MINIMUM FEATURES AND ACCESSORIES:

1. INPUT: VOLTAGE AND PHASES INDICATED ON DRAWINGS, +/- 10%.
2. OUTPUT: FROM 0 VAC TO RATED INPUT VOLTAGE; THREE-PHASE, UNLESS OTHERWISE SPECIFIED; FROM 6 HZ TO 60 HZ FREQUENCY.
3. 115 VAC POWER SUPPLY TO OPERATE THE CONTROL COMPONENTS.
4. AMBIENT TEMPERATURE REQUIREMENTS: 0 TO 104°F OPERATING CONDITIONS, -4 TO 140°F STORAGE.
5. AMBIENT HUMIDITY REQUIREMENTS: 0 TO 95% RH, NON-CONDENSING.

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6. SHORT CIRCUIT PROTECTION INCLUDING INSTANTANEOUS OVER-CURRENT PROTECTION, GROUND FAULT PROTECTION AND CURRENT LIMITING INPUT FUSES. J PROTECTION DEVICES SHALL BE SELECTED TO SAFELY INTERRUPT THE AVAILABLE FAULT CURRENT OF THE VFD INPUT FEEDER.
7. AUTOMATIC RESTART, AFTER A TRIP CONDITION; WITH SHUTDOWN AFTER FIVE FAILED ATTEMPTS AT RESTART. AUTOMATIC RESTART SHALL BE CAPABLE OF BEING ACTIVATED OR DEACTIVATED BY BUILDING OPERATING PERSONNEL.
8. SPEED COMMAND SIGNAL SOURCE: 4-20 MA DC, ISOLATED; OR 0-10 VDC, CAPABLE OF BEING GROUNDED.
9. PRE-WIRED HAND-OFF-AUTO SWITCH, SPEED POTENTIOMETER AND MANUAL FUSED DISCONNECT, FUSED SWITCH OR CIRCUIT BREAKER (RATED FOR 65,000 AIC RMS SYMMETRICAL FAULT CURRENT).
10. DIAGNOSTIC PANEL, INDICATING: POWER ON, ZERO SPEED, ENABLED, OVER-CURRENT, OVER-VOLTAGE, UNDER-VOLTAGE, CURRENT LIMIT, OVER-TEMPERATURE, OUTPUT FREQUENCY (IN PERCENT, AND CURRENT DRAW (IN AMPERES).
11. SAFE SHUTDOWN, IN THE EVENT OF MOMENTARY OR SUSTAINED POWER LOSS. INTERRUPTION OF INPUT OR OUTPUT POWER SHALL NOT DAMAGE VFD.
12. OUTPUT CONTACTS TO INDICATE "VFD RUNNING".
13. OUTPUT CONTACTS TO INDICATE "FAULT TRIP".
14. START-STOP BY EXTERNAL DRY CONTACT, EXTERNAL 120 VAC SIGNAL AND SWITCHING ON-OFF OF LINE VOLTAGE.
15. REVERSING SWITCH WITH PROTECTION, FOR REVERSING HIGH-MASS PROPELLER FAN.
16. FILTER SHALL BE DAMPENED, LOW PASS OUTPUT FILTER CONSISTING OF A GAPPED, THREE PHASE, IRON CORE INDUCTOR, AC-RATED, POLYPROPYLENE CAPACITORS, AND WIRE-WOUND RESISTORS.
17. THE VFD SHALL HAVE AN RS-485 PORT AS STANDARD. THE STANDARD PROTOCOLS SHALL BE JOHNSON CONTROLS N2 BUS, SIEMENS FL, MODBUS RTU. OPTIONAL PROTOCOLS SHALL BE BACNET (MSTP) AND LON WORKS.

PART 3 - EXECUTION

3.1 FIRE STOPS

A. ALL PENETRATIONS THROUGH FIRE RATED WALLS, CEILINGS OR FLOORS IN WHICH PIPES OR DUCTS PASS SHALL BE SEALED WITH A UL APPROVED FIRE-STOP FITTING CLASSIFIED FOR AN HOURLY RATING EQUAL TO THE RATING OF THE WALL, CEILING OR FLOOR.

3.2 REMOVAL, RELOCATION AND/OR ABANDONMENT

A. ALL ITEMS NOTED FOR REMOVAL SHALL BE DISCONNECTED AND TURNED OVER TO THE OWNER OR DISPOSED OF BY THE CONTRACTOR IF THE OWNER SO REQUESTS.

3.3 PIPE PRESSURE TESTING

A. PIPING SYSTEMS SHALL BE PRESSURE TESTED AS INDICATED BELOW FOR EACH SYSTEM. ALL PIPING SHALL BE TESTED BEFORE IT IS COVERED, CONCEALED OR MADE OTHERWISE INACCESSIBLE.

B. LEAKS FOUND DURING PRESSURE TESTS SHALL BE CORRECTED BY REMAKING THE JOINT, TIGHTENING OR OTHER SUITABLE METHOD. THE CONTRACTOR SHALL NOT ADD ANY "STOP-LEAK" TYPE COMPOUNDS TO THE PIPING SYSTEM.

C. ANY SYSTEM REQUIRING LEAK REPAIR SHALL BE RETESTED IN THE SAME MANNER AS THE ORIGINAL TEST.

3.4 CLEANING AND FLUSHING STEAM AND CONDENSATE SYSTEMS

A. ALL PIPING SYSTEMS SHALL BE THOROUGHLY CLEANED BEFORE PLACING IN OPERATION TO RID THE SYSTEM OF DIRT, PIPING COMPOUND, MILL SCALE, OIL AND ANY AND ALL OTHER MATERIAL FOREIGN TO THE WATER BEING CIRCULATED. THIS APPLIES EQUALLY AND ESPECIALLY TO SYSTEMS WHERE PHASES OR PORTIONS OF THE SYSTEMS ARE OPERATED DURING CONSTRUCTION.

3.5 BALANCING AIR AND WATER SYSTEMS

A. THIS CONTRACT IS FOR ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED FOR THE AIR AND WATER SYSTEMS.

B. UPON COMPLETION OF ALL TESTS AND BALANCING OPERATIONS, THE CONTRACTOR SHALL SUBMIT THREE (3) COPIES OF THE CERTIFIED BALANCING REPORT TO THE GENERAL CONTRACTOR. THIS REPORT SHALL INCLUDE ALL DATA FOR EACH OF THE AIR AND WATER SYSTEMS.

C. BALANCING OF SYSTEMS SHALL BE FOLLOWED UP AFTER BUILDING IS OCCUPIED; ANY REBALANCING SHALL BE DONE AS REQUIRED TO MEET OCCUPANT'S REQUIREMENTS WITHOUT EXTRA CHARGE.

3.6 START UP AND ADJUSTMENT

A. STARTUP OF EQUIPMENT SHALL BE PERFORMED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. STARTUP AND ADJUSTMENT SHALL INCLUDE SERVICES REQUIRED TO CHECK OUT, TEST AND BALANCE DEVICES TO ENSURE PROPER SEQUENCING OF OPERATION, PRIOR TO INSTRUCTION OF THE OWNER'S MAINTENANCE PERSONNEL.

B. PRIOR TO STARTUP, EQUIPMENT SHALL BE CHECKED FOR PHYSICAL DAMAGE, LOOSE CONNECTIONS, LOOSE PARTS, LEAKS AND OTHER DEFECTS AND DEFECTS SHALL BE CORRECTED.

C. FURNISH STARTUP/ADJUSTMENT SERVICES BY MANUFACTURER, FOR FOLLOWING EQUIPMENT. MANUFACTURER SHALL BE RESPONSIBLE FOR SUPERVISING AND INSPECTING EQUIPMENT INSTALLATION AND FOR EQUIPMENT START UP AND ADJUSTMENT.

1. CONDENSER WATER TREATMENT SYSTEM. MANUFACTURER SHALL FURNISH WRITTEN REPORT AND BASIC WATER TEST KIT UPON COMPLETION OF START-UP/ADJUSTMENT PROCEDURE.

END OF SECTION

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PROJECT NAME:

TOWN OF SIMSBURY
ICE RINK REFRIGERATION
CONDENSING UNIT REPLACEMENT AND
CONTROLS UPGRADE
100 OLD FARMS ROAD
SIMSBURY, CT, 06070

KEYPLAN

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REVISIONS

REV. NO.	DATE	DESCRIPTION
1	08/21/20	ADDENDUM #2

DRAWING TITLE:

CONDENSING UNIT REPLACEMENT MECHANICAL SPECIFICATIONS

DATE: 05-20-2020
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CHECKED BY: RSM
SCALE: AS NOTED
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