Engineering Technologies Inc

ADDENDUM

DATE ISSUED	04.09.2026	ADDENDUM #	1
ENGINEER	Engineering Technologies, Inc. 1101 North 13th Street Omaha, NE 68102	PROJECT	Wayne State College Cooling Tower Replacement
		ETI PROJECT #	2025-134

The Architect issues this Addendum to all known bidders before receipt of proposals. Bidder shall acknowledge the receipt of this addendum on their proposal sheet and all information contained herein shall become a part of the contract documents.

ADDENDUM:

SPECIFICATIONS – MECHANICAL

1. Section 236514 – INDUCED-DRAFT COOLING TOWERS
   A. Remove section 2.03 OPEN-CIRCUIT, INDUCED-DRAFT, CROSSFLOW COOLING TOWERS in it's entirety.

DRAWINGS – MECHANICAL

1. Sheet M3.1 – Mechanical Schedules
   A. Revise Cooling Tower Schedule note #4 to read "Standard color" in lieu of "Custom color".
   B. Removed Cooling Tower Schedule note #12 in it's entirety.

END OF ADDENDUM

LINCOLN: 825 M Street, Suite 200, Lincoln, NE 68508 P 402.476.1273
OMAHA: 1101 N.13th Street, Omaha, NE 68102 P 402.330.2772

6. Cooling tower shall have hardware to enable FMS to remotely monitor and display the following:
    a. Operational status of each motor.
    b. Cooling tower leaving-fluid temperature.
    c. Fan vibration alarm.
    d. Collection basin high- and low-water-level alarms.

L. Personnel Access Components:
1. Doors: Large enough for personnel to access cooling tower internal components from both cooling tower end walls. Doors shall be operable from both sides of the door.
2. External Ladders with Safety Cages: Aluminum, galvanized- or stainless-steel, fixed ladders with ladder extensions to access external platforms and top of cooling tower from adjacent grade without the need for portable ladders. Comply with 29 CFR 1910.27.
3. External Platforms with Handrails: Aluminum, FRP, or galvanized-steel bar grating at cooling tower access doors when cooling towers are elevated and not accessible from grade.
4. Handrail: Aluminum, galvanized steel, or stainless steel complete with kneerail and toeboard, around top of cooling tower. Comply with 29 CFR 1910.23.
5. Internal Platforms: Aluminum, FRP, or galvanized-steel bar grating.
    a. Spanning the collection basin from one end of cooling tower to the other and positioned to form a path between the access doors. Platform shall be elevated so that all parts are above the high water level of the collection basin.
    b. Elevated internal platforms with handrails accessible from fixed vertical ladders to access the fan drive assembly when out of reach from collection basin platform.

M. Capacities and Characteristics: as indicated in the Documents.

~~2.03 OPEN-CIRCUIT, INDUCED-DRAFT, CROSSFLOW COOLING TOWERS.~~

~~A. Description: Open-circuit, induced-draft, cross-flow cooling tower that is factory fabricated and factory assembled using manufacturer's standard design and construction according to published product information and these specifications.~~

~~B. Structure and Casing:~~
~~1. Casing Material: Stainless steel, Type 304.~~
~~2. Frame Material: Stainless steel, Type 304.~~
~~3. Materials provided for framework, casings and equipment supports shall be compatible. Structural supports shall be provided in accordance with the recommendations of the manufacturer of the tower unless otherwise indicated.~~
~~4. Joints and Seams: Sealed watertight.~~
~~5. Welded Connections: Continuous and watertight.~~

~~C. Collection Basin:~~
~~1. Material: Stainless steel, Type 304.~~
~~2. Strainer: Removable stainless-steel strainer with openings smaller than nozzle orifices.~~
~~3. Overflow and drain connections.~~
~~4. Makeup water connection.~~
~~5. Outlet Connection: ASME B16.5, Class 150 flange.~~
~~6. Basin Sweeper Distribution Piping and Nozzles:~~
~~a. Pipe Material: PVC~~
~~b. Nozzle Material: Plastic.~~
~~c. Configure piping and nozzles to minimize sediment from collecting in the collection basin.~~

~~D. Water Level Controller and Makeup Water Valve:~~
~~1. Mechanically Operated, Collection Basin Water-Level Control: Manufacturer's standard adjustable, mechanical float assembly and valve.~~

~~E. Electric Basin Heater:~~

1. Stainless Steel Electric Immersion Heaters: Installed in a threaded coupling on the side of the collection basin.
2. Heater Control Panel: Mounted on the side of each cooling tower cell.
3. Enclosure: NEMA 250, Type 3R.
4. Magnetic contactors controlled by a temperature sensor/controller to maintain collection basin water temperature set point. Water level probe shall monitor cooling tower water level and de-energize the heater when the water reaches low level set point.
5. Control circuit transformer with primary and secondary side fuses.
6. Terminal blocks with numbered and color-coded wiring to match wiring diagram.
7. Single-point, field-power connection to a fused disconnect switch and heater branch circuiting complying with NFPA 70.
8. Factory Wiring Method: Metal raceway for factory-installed wiring outside of enclosures, except make connections to each electric basin heater with liquidtight conduit.

F. Gravity Water Distribution Basin: Nonpressurized design with head of water level in basin adequate to overcome non-clogging metering or orifice type nozzle losses and designed to evenly distribute water over fill throughout the flow range indicated.
1. Material: Stainless steel, Type 304.
2. Location: Over each bank of fill with easily replaceable plastic spray nozzles mounted in bottom of basin.
3. Inlet Connection: ASME B16.5, Class 150 flange.
4. Joints and Seams: Sealed watertight.
5. Partitioning Dams: Same material as basin to distribute water over the fill to minimize icing while operating throughout the flow range indicated.
6. Removable Panels: Same material as basin to completely cover top of basin. Secure panels to basin with removable corrosion-resistant hardware.
7. Valves: As indicated on drawings arranged to balance or shut off flow to each gravity distribution basin.

G. Fill:
1. Materials: PVC, resistant to rot, decay, and biological attack; with maximum flame-spread index of 25 according to ASTM E 84.
2. Minimum Thickness: 15 mils (0.4 mm) before forming.
3. Fabrication: Fill type sheets fabricated, formed, and bonded together after forming into removable assemblies that are factory installed by manufacturer.
4. Fill Material Operating Temperature: Suitable for entering-water temperatures up through 120 deg F (49 deg C).

H. Drift Eliminator:
1. Material: FRP or PVC; with maximum flame-spread index of 5 according to ASTM E 84.
2. UV Treatment: Inhibitors to protect against damage caused by UV radiation.
3. Configuration: Multipass, designed and tested to reduce water carryover to achieve performance indicated.
4. Maximum drift rate: .005% of the design water flow rate.
5. Location: Separate from fill.

I. Air Intake Louvers:
1. Material: PVC.
2. UV Treatment: Inhibitors to protect against damage caused by UV radiation.
3. Louver Blades: Arranged to uniformly direct air into cooling tower, to minimize air resistance, and to prevent water from splashing out of tower during all modes of operation including operation with fans off.

J. Axial Fan: Balanced at the factory after assembly.
1. Blade Material: Aluminum.
2. Hub Material: Aluminum.

3. Protective Enclosure: Removable, galvanized-steel, wire-mesh screens complying with OSHA regulations.
4. Fan Shaft Bearings: Self-aligning ball or roller bearings with moisture-proof seals and premium, moisture-resistant grease suitable for temperatures between minus 20 and plus 300 deg F (minus 29 and plus 149 deg C). Bearings designed for an L-10 life of 40,000 hours.
5. Bearings Grease Fittings: Extended lubrication lines to an easily accessible location.
6. Fan shall be fully reversible for de-icing tower.

K. Gear Drive: Right angle, reduced speed, and designed for cooling tower applications according to CTI STD 111. Motor and gear drive shall be aligned before shipment.
1. Gear Drive and Coupling Service Factor: 2.0 based on motor nameplate horsepower.
2. Housing: Cast iron, with epoxy or polyurethane finish, beveled high-strength steel gears continuously bathed in oil, and with lubrication to other internal parts at all operating speeds.
3. Mounting: Directly mounted to fan hub and connected to motor so motor shaft is in horizontal position.
4. Operation: Able to operate both forward and in reverse.
5. Drive Shaft Material: Corrosion resistant or stainless steel, and fitted with flexible couplings on both ends. Provide exposed shaft and couplings with guards according to OSHA regulations.
6. Extend oil fill, drain, and vent to outside of cooling tower casing using galvanized-steel piping. Provide installation with oil-level sight glass.
7. Gear drive shall be fully reversible for de-icing tower.

L. Fan Motor:
1. Motor Enclosure: Totally enclosed fan cooled (TEFC).
2. Energy Efficiency: Comply with ASHRAE/IESNA 90.1.
3. Service Factor: 1.15.
4. Insulation: Class F.
5. Variable-Speed Motors: Inverter-duty rated per NEMA MG-1, Section IV, "Performance Standard Applying to All Machines," Part 31, "Definite-Purpose, Inverter-Fed, Polyphase Motors."
6. Motor Base: Adjustable, or other suitable provision for adjusting belt tension.
7. Fan motor shall be fully reversible for de-icing tower.

M. Fan Discharge Stack: Material shall match casing, manufacturer's standard design.
1. Stack Extension: Fabricated to extend above fan deck unless otherwise indicated.
2. Stack Termination: Wire-mesh, galvanized-steel screens; complying with OSHA regulations.

N. Vibration Switch: For each fan drive.
1. Enclosure: NEMA 250, Type 4.
2. Vibration Detection: Sensor with a field-adjustable, acceleration-sensitivity set point in a range of 0 to 1 g and frequency range of 0 to 3000 cycles per minute. Cooling tower manufacturer shall recommend switch set point for proper operation and protection.
3. Provide switch with manual-reset button for field connection to a FMS and hardwired connection to fan motor electrical circuit.
4. Switch shall, on sensing excessive vibration, signal an alarm through the FMS and shut down the fan.

O. Control Package: Factory installed and wired, and functionally tested at factory before shipment.
1. Collection basin level controller complying with requirements above.
2. Basin heaters with temperature control and low-water-level safety switch for each cell, complying with requirements above.

3. Vibration switch for each fan, complying with requirements in "Vibration Switch" Paragraph.
4. Single-point, field-power connection to a fused disconnect switch for each cooling tower cell.
    a. Branch power circuit to each motor and electric basin heater and to controls with a disconnect switch.
    b. NEMA-rated motor controller, hand-off-auto switch, and overcurrent protection for each motor. Provide variable frequency controller with manual bypass and line reactors for each variable-speed motor indicated.
5. Factory-installed wiring outside of enclosures shall be in metal raceway, except make connections to each motor and electric basin heater with liquid tight conduit.
6. Cooling tower shall have hardware to enable FMS to remotely monitor and display the following:
    a. Operational status of each motor.
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PART 3 EXECUTION

3.01 EXAMINATION

A. Before cooling tower installation, examine roughing-in for tower support, anchor-bolt sizes and locations, piping, and electrical connections to verify actual locations, sizes, and other conditions affecting tower performance, maintenance, and operation.
    1. Cooling tower locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide the services of the manufacturer's field representative to supervise rigging, hoisting, and installation, allowing for minimum of one 8-hour day per tower.

C. Install tower on structural steel beams as instructed by manufacturer.

D. Install tower on vibration isolators. See Section 230548.

E. Maintain manufacturer's recommended clearances for service and maintenance.

COOLING TOWER SCHEDULE

NOTES:
1. HIGH DENSITY POLYETHYLENE (HDPE), SEAMLESS DOUBLE WALL SHELL AND BASIN.
2. BOTTOM OUTLET CONNECTION. BASIN SHALL SLOPE AT MINIMUM 3% TO OUTLET.
3. OPERATING INLET PRESSURE BETWEEN 1.5-4.0 PSI.
4. STANDARD COLOR WITH UV INHIBITORS.
5. EACH FAN VARIABLE FREQUENCY DRIVE WITH BYPASS TO BE REUSED.
6. VFD RATED MOTORS WITH VFD FOR EACH CELL. ONE VFD SHALL CONTROL BOTH FANS FOR EACH CELL.
7. BALL FLOAT MAKEUP VALVE FOR 10 GPM AT 5 PSIG INLET PRESSURE.
8. SCCR RATING SHALL MEET OR EXCEED PANEL AIC RATING.
9. VIBRATION CUTOUT SWITCH
10. PROVIDE ACCESS PLATFORM WITH SAFETY HANDRAIL. PROVIDE LADDER WITH CAGE AND SAFETY GATE.
11. NOISE DATA PER SPEC SUBMITTAL
12. NOT USED.

MARK	NOMINAL TONS	FAN TYPE	CELLS	GPM	DRIVE	STATIC LIFT (PSI)	EWT (°F)	LWT (°F)	DESIGN WB TEMP (°F)	BASIN HEATER (PER CELL)			MOTOR DATA (PER CELL)				DIMENSIONS L X W X H (IN)	OPERATING WEIGHT (LBS.)	MANUFACTURER AND MODEL	NOTES
										NO.	KW	VOLTS / PH	NO.	HP	RPM	VOLTS / PH				
CT-1	1900	AXIAL	4	4800	DIRECT	4.65	95	85	80	3	6	480/3	2	15	900	480/3	412 X 256 X 211	59,040	DELTA TMX-415312	ALL

PUMP SCHEDULE

NOTES:
1. NAMEPLATE HORSEPOWER SHALL BE NON-OVERLOADING ON THE PUMP CURVE.
2. SCCR SHALL MEET OR EXCEED PANEL KAIC RATING.
3. SPLIT-COUPLED, INLINE PUMP WITH STANCHIONS. COORDINATE STANCHION HEIGHT WITH PIPE CONNECTIONS.
4. STAINLESS STEEL SHAFT AND IMPELLER.
5. VFD WITH BYPASS.
6. NPSHR = 10.9 FT. HD. AT DESIGN CRITERIA LISTED BELOW.

MARK	LOCATION	SYSTEM SERVED	TYPE	FLUID	GPM	TDH (FT. HD.)	% EFF.	ELECTRICAL					MOUNTING	WEIGHT (LBS.)	MANUFACTURER AND MODEL	NOTES
								DISCONNECT	CONTROLLER	MOTOR HP	MOTOR RPM	VOLT / PH				
TWP-1	ENERGY PLANT	CONDENSER WATER	VERTICAL INLINE	WATER	2400	100	85.1	VFD	VFD	75	1800	480/3	STANCHION	2250	BELL & GOSSETT E60SC 10X10X13.5	ALL
TWP-2	ENERGY PLANT	CONDENSER WATER	VERTICAL INLINE	WATER	2400	100	85.1	VFD	VFD	75	1800	480/3	STANCHION	2250	BELL & GOSSETT E60SC 10X10X13.5	ALL

SIDESTREAM GRIT SEPARATOR SCHEDULE

NOTES:
1. PROVIDE FACTORY-FABRICATED SIDESTREAM GRIT SEPARATOR SKID, COMPLETE WITH PUMP, SEPARATOR, SKID FRAME, VALVES, STRAINER, PRESSURE GAUGES, AND CONTROLS.
2. PROVIDE DRY ELECTRICAL CONTACTS FOR SEPARATOR AND LOGIC CONTROLLER FOR ENABLE/DISABLE, BLOWDOWN, AND ALARM. CONNECT TO BAS.
3. PROVIDE MOTORIZED BALL VALVE FOR AUTOMATED PURGING.
4. CONTROL PANEL WITH HOA START, 480 TO 120 VOLT CONTROL TRANSFORMER, DISCONNECT SWITCH, SINGLE-POINT CONNECTION.
5. RATED AT 125 PSIG AT 135°F.
6. STAINLESS STEEL STRAINER VERTICAL STRAINER WITH REMOVABLE FILTER LID. PROVIDE WITH 30 MESH SCREEN. CLEAN PRESSURE DROP OF <1 PSIG AT 400 GPM.
7. 4" FLANGED INLET/OUTLET CONNECTIONS.

MARK	TYPE	SERVES	GPM	TDH (FT. HD.)	MOTOR DATA				INLET/OUTLET SIZE (IN.)	DIMENSIONS L X W X H (IN.)	WEIGHT (LBS)	MANUFACTURER AND MODEL	NOTES
					HP	VOLTS/PH	RPM	FLA					
GS-1	SIDESTREAM	CONDENSER WATER	425	55.1	7.5	480/3	1750		4" / 4"	37-7/16 X 31 X 43-5/16	436	MILLER LEAMAN MLS-4C	ALL

DIRT SEPARATOR SCHEDULE

NOTES:
1. ASME RATED.
2. 150 PSI MAX WORKING PRESSURE.
3. REMOVABLE LOWER HEAD.
4. FLANGED CONNECTIONS.
5. PROVIDE BALL VALVE FOR MANUAL BLOWDOWN.

MARK	SERVES	LOCATION	TYPE	MIN. FLOW (GPM)	MAX. P.D. (FT. HD.)	INLET (IN.)	OUTLET (IN.)	WEIGHT	MANUFACTURER	MODEL	NOTES
DS-1	WATERSIDE ECONOMIZER HX	ENERGY PLANT	HIGH VELOCITY COALESCING	2400	10	10	10	1649	SPIROTHERM	THN1000FA	ALL

VARIABLE FREQUENCY CONTROLLER SCHEDULE

MARK	SERVES	LOCATION	MOUNTING TYPE	ENCLOSURE	DISCONNECT TYPE	BYPASS	REDUNDANT VFD	VOLTS	PHASE	H.P.	MANUFACTURER	REFERENCE SPECIFICATIONS	NOTES
CT-1.1 VFD	CT-1	CHILLER ROOM 102	WALL	NEMA-1	INTEGRAL CIRCUIT BREAKER	NONE	NO	480	3	2@15	ABB	230934	VFD TO PANEL. ONE FAN VFD PER CELL. COORDINATE UPSTREAM BREAKER SIZE WITH VFD PROVIDED.
CT-1.2 VFD	CT-1	CHILLER ROOM 102	WALL	NEMA-1	INTEGRAL CIRCUIT BREAKER	NONE	NO	480	3	2@15	ABB	230934	VFD TO PANEL. ONE FAN VFD PER CELL. COORDINATE UPSTREAM BREAKER SIZE WITH VFD PROVIDED.
CT-1.3 VFD	CT-1	CHILLER ROOM 102	WALL	NEMA-1	INTEGRAL CIRCUIT BREAKER	NONE	NO	480	3	2@15	ABB	230934	VFD TO PANEL. ONE FAN VFD PER CELL. COORDINATE UPSTREAM BREAKER SIZE WITH VFD PROVIDED.
CT-1.4 VFD	CT-1	CHILLER ROOM 102	WALL	NEMA-1	INTEGRAL CIRCUIT BREAKER	NONE	NO	480	3	2@15	ABB	230934	VFD TO PANEL. ONE FAN VFD PER CELL. COORDINATE UPSTREAM BREAKER SIZE WITH VFD PROVIDED.

eti Engineering Technologies Inc
MECHANICAL & ELECTRICAL BUILDING SOLUTIONS
1101 N. 13TH ST., OMAHA, NE 68102
P 402.330.2772 F 402.330.2630
WWW.ETI-ENGINEERS.COM

TD2 engineering & surveying
Thompson, Dreessen & Dorner, Inc.
10836 Old Mill Rd
Omaha, NE 68154
402.330.8860 www.td2co.com
TD2 JOB# 2310-107 NE CA-0199

WAYNE STATE COLLEGE COOLING TOWER REPLACEMENT

WAYNE STATE COLLEGE
400 LINDAHL DR.
WAYNE, NE

ISSUE FOR CONSTRUCTION

PROFESSIONAL MECHANICAL ENGINEER
WYATT W. WIRGES
E-17919
4/3/26
STATE OF NEBRASKA
CA-0176

REV. #	DESCRIPTION	DATE
1	ADDENDUM #1	04.09.2026

PROJECT NUMBER:	2025-134
ISSUE DATE:	04/03/2026
DRAWN BY:	MJB
CHECKED BY:	WWW

SHEET NAME
MECHANICAL SCHEDULES

SHEET NUMBER
M3.1