SOUTH DAKOTA SCIENCE AND TECHNOLOGY AUTHORITY
RFP 2023-14
WWTP RBC Replacement
Amendment #3

SDSTA amends the subject RFP to include the following Addendum #3 from Banner Associates, Inc. and to extend the proposal due date to May 19, 2023, at 5pm. It is hereby understood that all other provisions will not be otherwise changed nor affected.

This Amendment is effective May 12, 2023.

Banner Associates, Inc.
409 22nd Avenue South
Brookings, SD 57006
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

ADDENDUM | No. 3

PROJECT	Sanford Underground Research Facility WWTP
PROPOSAL SUBMISSION DATE	2:00 PM Mountain Time Zone May 19, 2023
PROPOSAL SUBMISSION LOCATION	Sanford Underground Research Facility 630 East Summit Street Lead, SD 57754
ISSUE DATE	May 12, 2023

SCOPE OF THIS ADDENDUM

The following becomes a part of the original project specifications and design drawings, taking precedence over the items that may conflict. The person submitting a proposal shall note receipt and make acknowledgment of the Addendum on his/her proposal form, incorporating its provision in his/her proposal.

PROJECT SPECIFICATIONS

The following additions, changes and clarifications have been made to the Project Specifications.

Clarification

This contract includes developing a process control system for the process improvements as shown in the plans and specifications. System shall include RTU-2 with the PLC listed under 46 6900-2.5Q 5b. The PLC shall be provided with an ethernet port for ethernet/IP communication with the existing SCADA system. With the exception of some conduit and ethernet wiring as noted in Specification Section 46 6900-2.5T, the Owner shall be responsible for integrating and connecting the new system into the existing plant SCADA, including any requirements needed to communicate between the new Ethernet/IP Protocol and the existing PLCs shown in the table below. The integrator shall be available for verification and troubleshooting during the integration process.

PLC Name	Make	Model	Configured Communication Protocols
WWTP Main Controller	GE	Fanuc 90-30	GE-SRTP, CCM Master, CCM Slave
WWTP Yardney Sand Filter	GE	Fanuc 90-30	GE-SRTP, RS-232, SNP
WWTP Baker Sand Filter	GE	Fanuc 90-30	GE-SRTP
WWTP Soda Ash	GE	Fanuc 90-30	GE-SRTP, RS-485, SNP
Surface Reservoir	Horner	XL6e HEXL1E2BJ	CsCAN, EGD
Grizzly Gulch	GE	Fanuc 90-30	GE-SRTP

See Mechanical and Electrical Addendum Attachment

DRAWINGS

The following additions, changes and clarifications have been made to the Drawings.

See Mechanical and Electrical Addendum Attachment

NOTE

Addendums are available on the SURF website at http://sanfordlab.org/contractors-and-vendors/contract-opportunities by clicking on **Request for Proposal (RFP) 2023-14 WWTP RBC Replacement** link.

Project Manual and Drawing inquiries regarding the work should be directed to:

CONTACT PERSON(S)

Banner Associates, Inc.	Tel 1-605-692-6342 | Toll Free 1-855-323-6342	
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Dave Lorang	Architect	davel@bannerassociates.com
Dennis Rebelein	Controls	dennisr@bannerassociates.com
Subconsultants		
Kelli Osterloo	Electrical Engineer	rikalalm@teamtsp.com
Lance Rikala	Mechanical Engineer	osterlooka@teamtsp.com

Kathryn Schmit, P.E. #7754

ATTACHMENT

Mechanical and Electrical Addendum
May 11, 2023

Addendum

600 Kansas City St
Rapid City, SD 57701
(605) 343-6102
www.teamtsp.com

Issued:	May 11, 2023
Bids Due:	May 19, 2023
Project Name:	Sanford Underground Research Facility WWTP
TSP Project No:	03211470

The following changes or modifications are to be incorporated into and become a part of the Contract Documents. The Bidder shall note receipt and make acknowledgement of this Addendum on the Bid Proposal, incorporating these provisions in the bid.

SPECIFICATION MANUAL:	
ITEM NO 1:	Section 23 34 23, HVAC Power Ventilators: Revised specifications for housing and fan wheel construction materials. Refer to attached revised spec.

DRAWINGS:	
ITEM NO 1:	Drawing 4E-100, Blower Building Electrical Plan: Change panelboard BB-HN1 to a 250A panelboard, revise riser diagram and associated keynotes to indicate 250A in lieu of 400A.
ITEM NO 2:	Drawing 4E-101, Blower Building Electrical Schedules: Change panelboard BB-HN1 to a 250A MLO panelboard.
ITEM NO 3:	Drawing 5E-100, Garage-Shop Electrical Plan: Revise Keynote 1 as follows: "Modify existing switchgear to feed new 250A panelboard at Blower Building. Existing switchgear is General Electric AKD-8 and 8000 Line Control Center. Provide a new 250A breaker in a spare 18" vertical space. Existing loads currently in the 'off' position may be assumed as spare spaces. Coordinate with Owner to shift existing remaining loads and buckets within the gear to make space for an 18" vertical space for the 250A breaker. Provide blank cover on any remaining space."
ITEM NO 4:	Drawing E-501, Grounding Detail: Change "Boiler" to "Blower"
ITEM NO 5:	Drawing 4M-601, Mechanical Schedules, Louver Schedule: Modified equipment notes for L-2. Refer to attached revised 4M-601.

ATTACHMENTS:

- Specification Sections 23 34 23
- Drawings 4E-100, 4E-101, 5E-100, E-501, 4M-601

END OF ADDENDUM

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
14807
LANCE M.
RIKALA
SOUTH DAKOTA

DATE: 05/11/2023

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
13400
KELLI A.
OSTERLOO
SOUTH DAKOTA

DATE: 05/11/2023

SECTION 23 3423
HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. In-line centrifugal fans.

1.3 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base fan-performance ratings on 5200 ft.

B. Operating Limits: Classify according to AMCA 99.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:

1. Certified fan performance curves with system operating conditions indicated.

2. Certified fan sound-power ratings.

3. Motor ratings and electrical characteristics, plus motor and electrical accessories.

4. Material thickness and finishes, including color charts.

5. Dampers, including housings, linkages, and operators.

6. Fan speed controllers.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

2. Wiring Diagrams: For power, signal, and control wiring.

C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.

C. UL Standards: Power ventilators shall comply with UL 705.

1.7 COORDINATION

A. Coordinate size and location of structural-steel support members.

PART 2 - PRODUCTS

2.1 IN-LINE CENTRIFUGAL FANS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carnes Company.
2. Greenheck Fan Corporation.
3. Loren Cook Company.
4. Twin City Fan.

B. ~~Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting~~. Housing: 18 gauge galvanized steel with integral duct collars. Fasteners shall be of corrosion resistant construction. Access doors shall be proved on three sides, sealed with closed cell neoprene gasket.

C. Direct-Drive Units: Motor mounted in airstream; factory wired to disconnect switch located on outside of fan housing**.**

D. Fan Wheels: ~~Aluminum, airfoil blades welded to aluminum hub.~~ Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including cast aluminum hub. Wheel shall be balanced in accordance with AMCA Standard 204-05.

E. Accessories:

1. Companion Flanges: For inlet and outlet duct connections.
2. Disconnect switch.

3. Vibration isolators.

F. Capacities and Characteristics: See schedule on drawings.

2.2 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.

B. Enclosure Type: Totally enclosed, fan cooled.

C. Motor shall be an electronically commutated motor rated for continuous duty and furnished either with internally mounted potentiometer speed controller or with leads for connection to 0-10 VDC internal controller.

2.3 SOURCE QUALITY CONTROL

A. Certify sound-power level ratings according to AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

B. Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Support suspended units from structure using threaded steel rods and spring hangers with vertical-limit stops having a static deflection of .5 inch (25 mm) .

C. Install units with clearances for service and maintenance.

D. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

3.2 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Duct Accessories."

B. Install ducts adjacent to power ventilators to allow service and maintenance.

C. Ground equipment according to Division 26 Section "Grounding and Bonding."

D. Connect wiring according to Division 26 Section "Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Verify that shipping, blocking, and bracing are removed.

2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.

3. Verify that cleaning and adjusting are complete.

4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system.

5. Adjust damper linkages for proper damper operation.

6. Verify lubrication for bearings and other moving parts.

7. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.

8. Disable automatic temperature-control operators, energize motor, and adjust fan to indicated rpm, and measure and record motor voltage and amperage.

9. Shut unit down and reconnect automatic temperature-control operators.

10. Remove and replace malfunctioning units and retest as specified above.

C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing procedures.

C. Lubricate bearings.

END OF SECTION 23 3423

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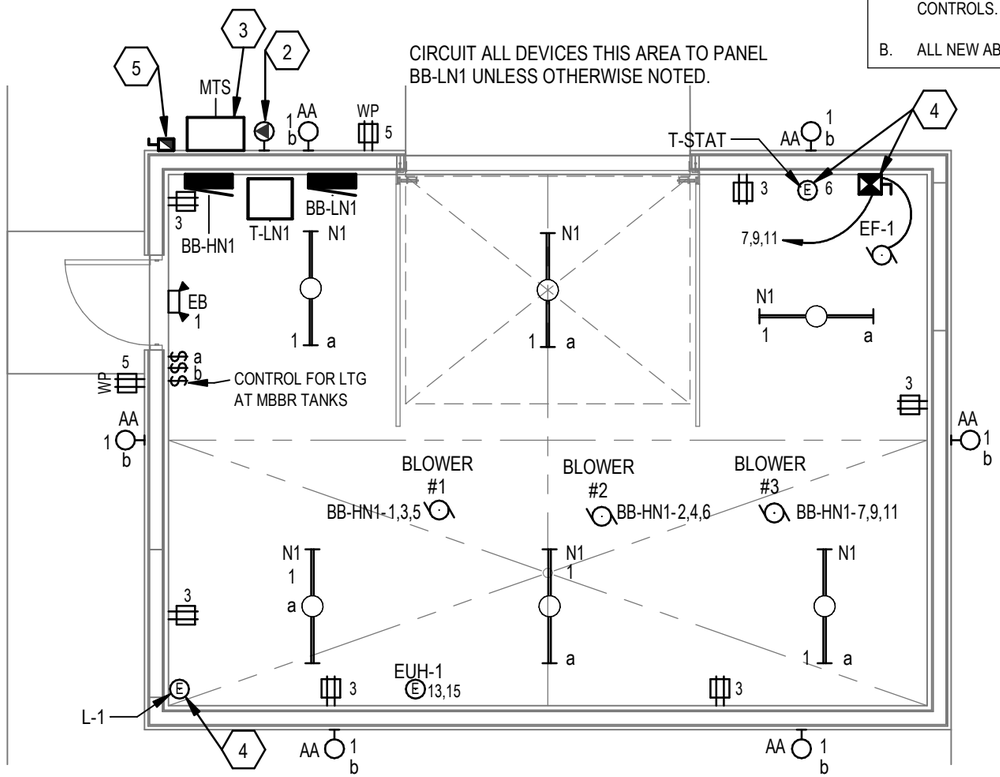
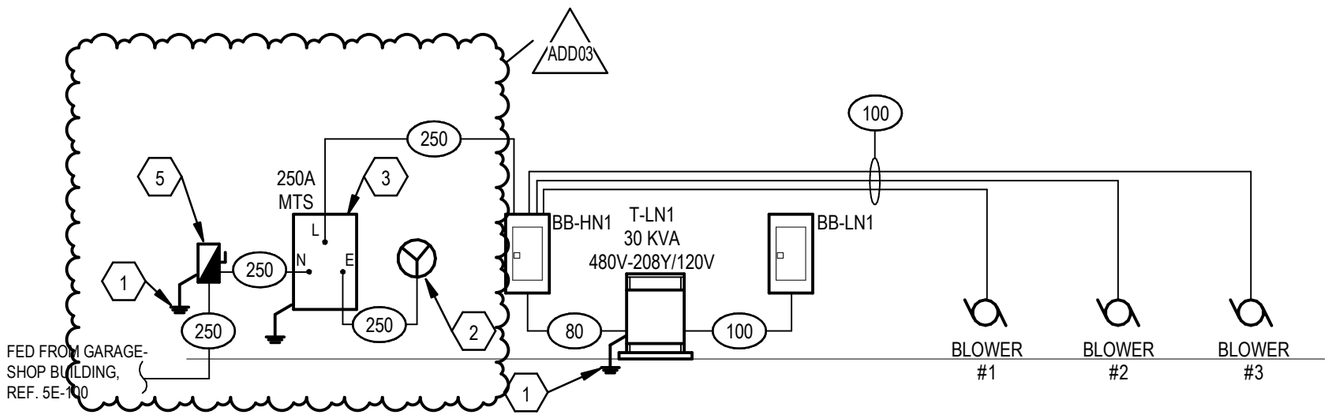


2 BLOWER BUILDING ELECTRICAL PLAN

SCALE: 3/16" = 1'-0"

NORTH



1 BLOWER BUILDING RISER DIAGRAM

SCALE: NOT TO SCALE

SHEET GENERAL NOTES:

A. REFERENCE I&C DRAWINGS ON Y-SERIES DRAWINGS FOR ALL RACEWAYS AND WIRING REQUIRED FOR LOW VOLTAGE INSTRUMENTATION AND CONTROLS.

B. ALL NEW ABOVE GROUND RACEWAYS TO BE GRC, MINIMUM 3/4" SIZE.

KEY NOTES:

1. GROUND PER NEC AND DETAIL 1/E-501.
2. PROVIDE PIN AND SLEEVE RECEPTACLE FOR PORTABLE GENERATOR CONNECTION: 250A, 480V, 3-PHASE, 3-WIRE CONNECTION. PORTABLE GENERATOR BY OWNER. CONFIRM RECEPTACLE CONFIGURATION WITH OWNER. ADD03
3. PROVIDE 250A MANUAL TRANSFER SWITCH IN NEMA 3R ENCLOSURE. ADD03
4. PROVIDE COMBINATION MOTOR STARTER/DISCONNECT WITH A 20A, 120V COIL, IN NEMA 1 ENCLOSURE, FOR EF-1. PROVIDE 120V CIRCUIT TO LINE VOLTAGE THERMOSTAT AND MOTORIZED DAMPER (THERMOSTAT AND DAMPER PROVIDED BY MC, REFERENCE SHEET 4M-101 FOR LOCATION). WIRE THERMOSTAT AND DAMPER THROUGH STARTER SO THAT WHEN THERMOSTAT CALLS FOR COOLING, FAN TO TURN ON AND DAMPER TO OPEN.
5. PROVIDE A 250A DISCONNECT SWITCH IN NEMA 3R ENCLOSURE, WITH 250A FUSE. ADD03

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PROJECT / SHEET TITLE:
SANFORD UNDERGROUND RESEARCH FACILITY WWTP
BLOWER BUILDING ELECTRICAL PLAN
LEAD, SOUTH DAKOTA

REV	DATE	DESCRIPTION
ADD03	05/11/2023	ADDENDUM 03

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
13400
KELLI A.
OSTERLOO
SOUTH DAKOTA

DATE: 03/13/2023

TSP

JOB No.:	03211470
DATE:	March, 2023
ENG / ARCH:	DLB
DESIGNER:	KAO
TECHNICIAN:	

SHEET No. :
4E-100

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NEW PANELBOARD: BB-HN1

LOCATION: BLOWER BUILDING
MOUNTING: SURFACE TYPE 1
MAIN DEVICE: 250 A MLO
BUS AMPS: 250 AMPS

VOLTAGE: 480 V. 3 ø 3 W.
A.I.C. RATING: 22,000 AMPS SYMMETRICAL
SPECIAL: SURGE PROTECTIVE DEVICE

ADD03

N	LOAD DESCRIPTION	RATING	P	CKT	A		B		C		CKT	P	RATING	LOAD DESCRIPTION	N
1	BLOWER #1	100 A	3	1	14.4	14.4					2	3	100 A	BLOWER #2	1
				3			14.4	14.4			4				
				5					14.4	14.4	6				
1	BLOWER #3	100 A	3	7	14.4	3.4					8	3	80 A	T-LN1	
				9			14.4	4.3			10				
				11					14.4	1.0	12				
	SPACE	--	1	13	--	--					14	1	--	SPACE	
	SPACE	--	1	15			--	--			16	1	--	SPACE	
	SPACE	--	1	17					--	--	18	1	--	SPACE	
	SPACE	--	1	19	--	--					20	1	--	SPACE	
	SPACE	--	1	21			--	--			22	1	--	SPACE	
	SPACE	--	1	23					--	--	24	1	--	SPACE	
	SPACE	--	1	25	--	--					26	1	--	SPACE	
	SPACE	--	1	27			--	--			28	1	--	SPACE	
	SPACE	--	1	29					--	--	30	1	--	SPACE	
		TOTAL LOAD:			47 kVA		47 kVA		44 kVA						
		TOTAL AMPS:			170 A		173 A		160 A						

LOAD CLASSIFICATION	CONNECTED	DEMAND	ESTIMATED	PANEL TOTALS	
REC	1800 VA	100.00%	1800 VA		
LTG	630 VA	125.00%	788 VA	**CONNECTED LOAD:**	138410 VA
SPEC	5352 VA	100.00%	5352 VA	**ESTIMATED DEMAND:**	149366 VA
MTR	130696 VA	108.27%	141504 VA	**CONNECTED CURRENT:**	166 A
				EST. DEMAND CURRENT:	180 A

NOTES (N):

1. CIRCUIT BREAKER SIZE IS BASED ON 40 HP BLOWER MOTOR. CONFIRM BREAKER SIZE WITH BLOWER HORSEPOWER PRIOR TO ORDER.

NEW PANELBOARD: BB-LN1

LOCATION: BLOWER BUILDING
MOUNTING: SURFACE TYPE 1
MAIN DEVICE: 100 A MCB
BUS AMPS: 100 AMPS

VOLTAGE: 208Y/120 V. 3 ø 4 W.
A.I.C. RATING: 10,000 AMPS SYMMETRICAL
SPECIAL:

ADD02

N	LOAD DESCRIPTION	RATING	P	CKT	A		B		C		CKT	P	RATING	LOAD DESCRIPTION	N
	BLWR BLDG LTG	20 A	1	1	0.4	0.3					2	1	20 A	MBBR LTG	
	INT. CONV. RCPT	20 A	1	3			1.1	0.4			4	1	20 A	MBBR RCPT	
	EXT. RCPT	20 A	1	5					0.4	0.4	6	1	20 A	T-STAT & LOUVER	
	EF-1	20 A	3	7	0.3	0.0					8	1	20 A	SPARE	
				9			0.3	0.0			10	1	20 A	SPARE	
				11					0.3	0.0	12	1	20 A	SPARE	
	EUH-1	35 A	2	13	2.5	0.0					14	1	20 A	SPARE	
				15			2.5	0.0			16	1	20 A	SPARE	
	SPARE	20 A	1	17					0.0	0.0	18	1	20 A	SPARE	
	SPARE	20 A	1	19	0.0	0.0					20	1	20 A	SPARE	
	SPARE	20 A	1	21			0.0	0.0			22	1	20 A	SPARE	
	SPARE	20 A	1	23					0.0	0.0	24	1	20 A	SPARE	
	SPARE	20 A	1	25	0.0	0.0					26	1	20 A	SPARE	
	SPACE	--	1	27			--	--			28	1	--	SPACE	
	SPACE	--	1	29					--	--	30	1	--	SPACE	
	SPACE	--	1	31	--	--					32	1	--	SPACE	
	SPACE	--	1	33			--	--			34	1	--	SPACE	
	SPACE	--	1	35					--	--	36	1	--	SPACE	
	SPACE	--	1	37	--	--					38	1	--	SPACE	
	SPACE	--	1	39			--	--			40	1	--	SPACE	
	SPACE	--	1	41					--	--	42	1	--	SPACE	
		TOTAL LOAD:			3 kVA		4 kVA		1 kVA						
		TOTAL AMPS:			32 A		38 A		9 A						

LOAD CLASSIFICATION	CONNECTED	DEMAND	ESTIMATED	PANEL TOTALS	
REC	1800 VA	100.00%	1800 VA		
LTG	630 VA	125.00%	788 VA	**CONNECTED LOAD:**	8730 VA
SPEC	5352 VA	100.00%	5352 VA	**ESTIMATED DEMAND:**	9131 VA
MTR	1000 VA	125.00%	1250 VA	**CONNECTED CURRENT:**	24 A
				EST. DEMAND CURRENT:	25 A

NOTES (N):

LIGHTING FIXTURE SCHEDULE - BLOWER BUILDING

TYPE	MANUFACTURER	CATALOG SERIES	DESCRIPTION	VOLTAGE	MOUNTING	LAMP	WATTAGE	EQUIVALENTS
AA	LITHONIA	WDGE2 LED P3 30K 80CRI T4M MVOLT SRM DDBXD	EXTERIOR LED WALLPACK MOUNTED AT 10'-0" AFG, 3200 LUMENS	120 V	EXTERIOR WALL	LED	18 W	OR EQUAL
EB	LITHONIA	ELM4L	BATTERY BACK-UP EMERGENCY LIGHT	120 V	WALL	LED	4 W	OR EQUAL
N1	LITHONIA	FEX L48 6000LM FPFL MD MVOLT GZ10 40K 80CRI	HEAVY DUTY, INDUSTRIAL, ENCLOSED AND GASKETED STRIP LIGHT	120 V	CHAIN HUNG	LED	40 W	OR EQUAL

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13400
KELLI A. OSTERLOO
SOUTH DAKOTA

DATE: 03/13/2023

TSP

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PROJECT / SHEET TITLE:
SANFORD UNDERGROUND RESEARCH FACILITY WWTP
BLOWER BUILDING ELECTRICAL SCHEDULES
LEAD, SOUTH DAKOTA

REV.	DATE	DESCRIPTION
ADD03	05/11/2023	ADDENDUM 03

JOB No.: 03211470
DATE: March, 2023
ENG / ARCH: DLB
DESIGNER: KAO
TECHNICIAN:

SHEET No. :
4E-101

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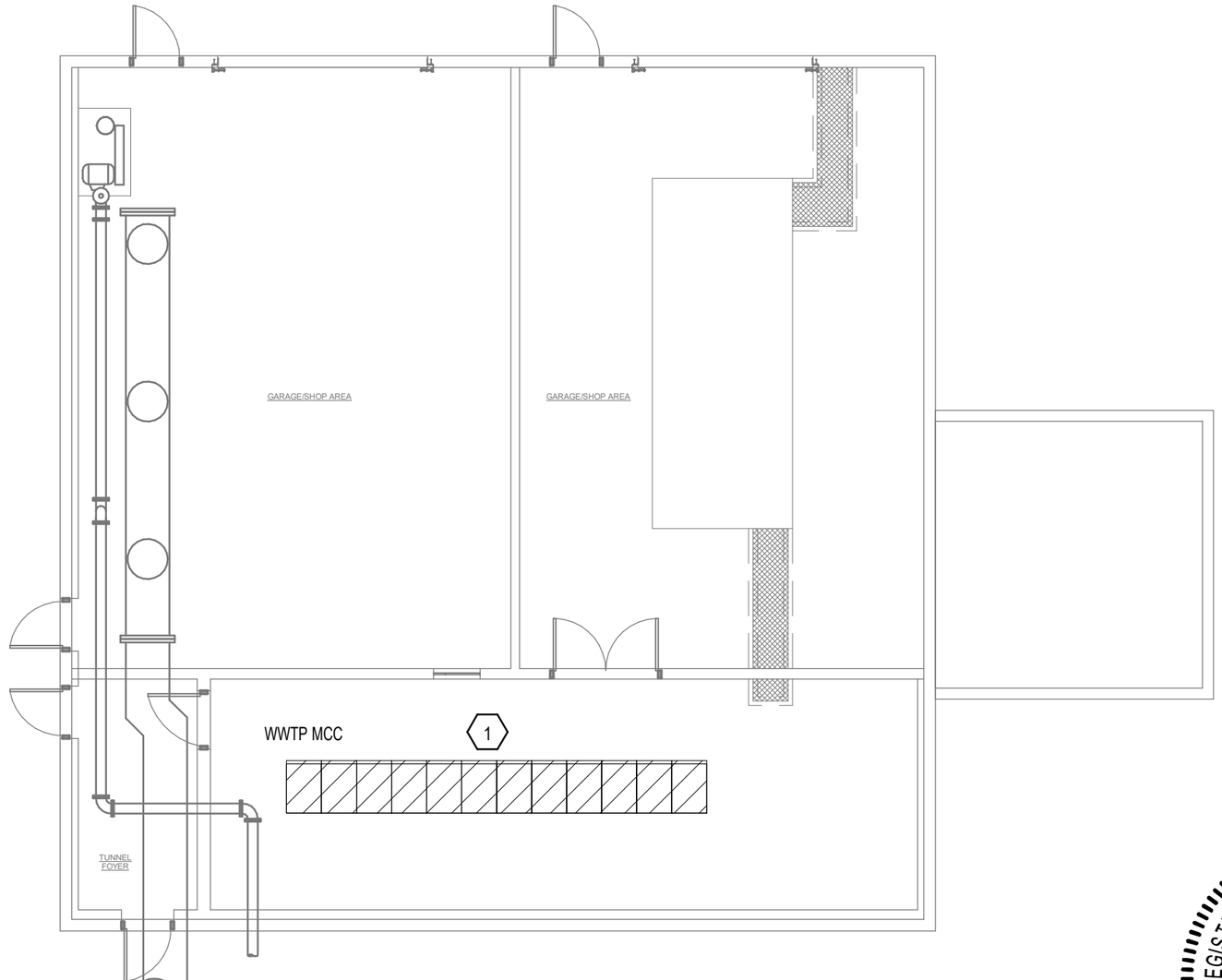
ADD03

KEY NOTES:

1. MODIFY EXISTING SWITCHGEAR TO FEED NEW 250A PANELBOARD AT BLOWER BUILDING. EXISTING SWITCHGEAR IS GENERAL ELECTRIC AKD-8 AND 8000 LINE CONTROL CENTER. PROVIDE A NEW 250A BREAKER IN A SPARE 18" VERTICAL SPACE. EXISTING LOADS CURRENTLY IN THE 'OFF' POSITION MAY BE ASSUMED AS SPARE SPACES. COORDINATE WITH OWNER TO SHIFT EXISTING REMAINING LOADS AND BUCKETS WITHIN THE GEAR TO MAKE SPACE FOR AN 18" VERTICAL SPACE FOR THE 250A BREAKER. PROVIDE BLANK COVER ON ANY REMAINING SPACE.



GARAGE-SHOP ELECTRICAL PLAN

SCALE: 1/8" = 1'-0"

NORTH

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
13400
KELLI A.
OSTERLOO
SOUTH DAKOTA

DATE: 03/13/2023

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PROJECT / SHEET TITLE:
SANFORD UNDERGROUND RESEARCH FACILITY WWTP
GARAGE-SHOP ELECTRICAL PLAN
LEAD, SOUTH DAKOTA

REV	DATE	DESCRIPTION
A		
B		
C		

JOB No.:	03211470
DATE:	March, 2023
ENG / ARCH:	DLB
DESIGNER:	KAO
TECHNICIAN:	

SHEET No. :
5E-100

TSP

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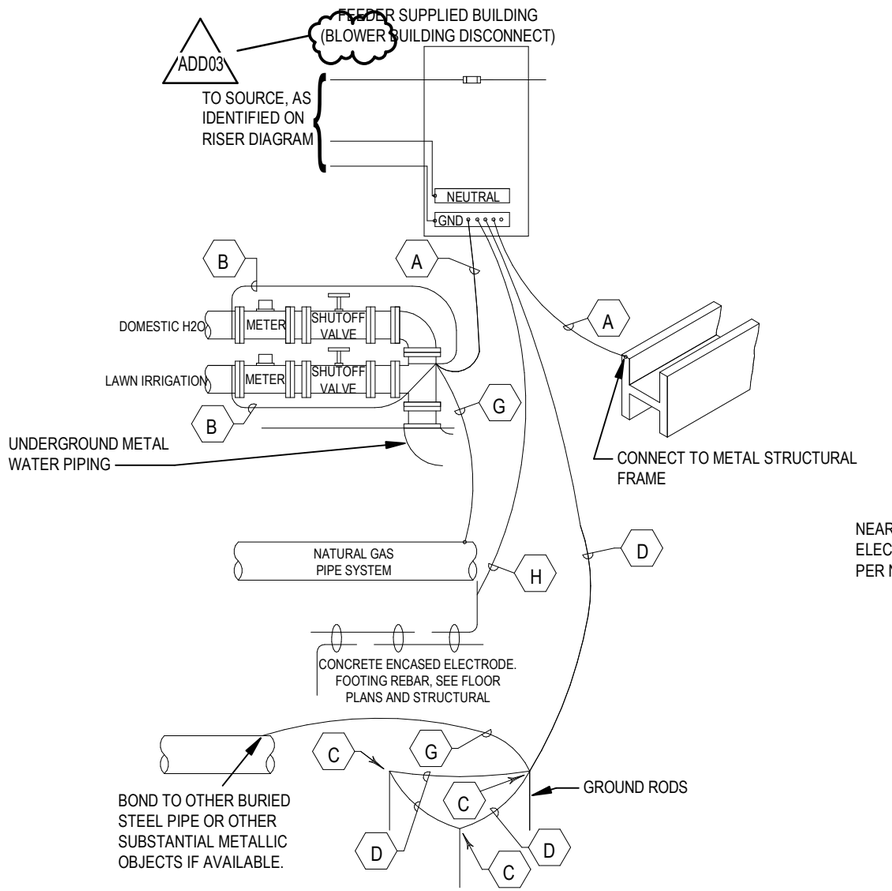

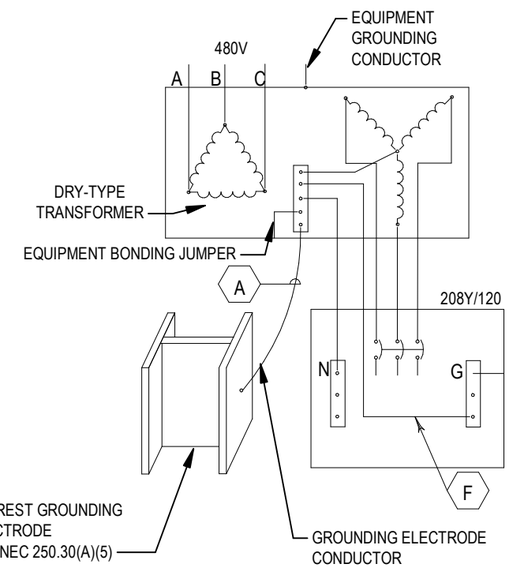

KEYNOTES

A. GROUNDING ELECTRODE CONDUCTOR TO GROUNDING ELECTRODE, AS SHOWN. SIZE PER NEC TABLE 250.66.

B. BOND WATER SYSTEMS AROUND ALL VALVES AND METERS PER NEC.

C. CONNECT GROUNDING ELECTRODE CONDUCTOR TO GROUND ROD WITH GROUND CONNECTOR.

D. GROUNDING ELECTRODE CONDUCTOR TO GROUNDING ELECTRODE, AS SHOWN. #6 AWG BARE COPPER CONDUCTOR.

E. #3/0 AWG BARE COPPER BONDING CONDUCTOR.

F. SYSTEM BONDING JUMPER SHALL NOT BE SMALLER THAN THE SIZES SHOWN IN NEC TABLE 250.66. WHERE THE SUPPLY CONDUCTORS ARE LARGER THAN 1100KCMIL COPPER, THE BONDING JUMPER SHALL HAVE AN AREA THAT IS NOT LESS THAN 12 1/2 PERCENT OF THE AREA OF THE LARGEST PHASE CONDUCTOR.

G. BOND METAL WATER PIPING AND OTHER METAL PIPING SYSTEMS WITH BONDING JUMPER SIZED PER NEC.

H. GROUND ELECTRODE CONDUCTOR TO GROUNDING ELECTRODE, AS SHOWN. #4 AWG COPPER CONDUCTOR.

1 GROUNDING DETAIL
SCALE: NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
13400
KELLI A.
OSTERLOO
SOUTH DAKOTA

DATE: 03/13/2023

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PROJECT / SHEET TITLE:
SANFORD UNDERGROUND RESEARCH FACILITY WWTP
GROUNDING DETAIL
LEAD, SOUTH DAKOTA

REV.	DATE	DESCRIPTION
ADD03	05/11/2023	ADDENDUM 03

JOB No.:	03211470
DATE:	March, 2023
ENG / ARCH:	DLB
DESIGNER:	KAO
TECHNICIAN:	

SHEET No.:
E-501

ELECTRIC UNIT HEATER SCHEDULE 1/2

EQUIPMENT REQUIREMENTS								
UNIT NO.	MANUFACTURER	MODEL NO.	AIRFLOW	AIRSIDE HEATING CAP.	EQUIPMENT NOTES	VOLT/PH	MIN CKT AMP	MOCP
EUH-1	QMARK	MUH05-81	350 CFM	5.0 kW	ALL	208/1	30	35

ELECTRIC UNIT HEATER SCHEDULE 2/2

	ELECTRICAL REQUIREMENTS										
		CONTROLLER							DISCONNECT		
UNIT NO.	WIRE SIZE / CONDUIT	TYPE	SIZE	LOCATION	CTL DEVICE	AUX	BY	CONTROL BY	TYPE	BY	ELECTRICAL NOTES
EUH-1	SEE CIRCUIT SCHEDULE	-	-	-	-	-	-	INTEGRAL	INTEGRAL	DIV. 22/23	-

MECH NOTES:
1. SELECTION BASED ON EAT = 40°F AND ΔT = 45°F.
2. PROVIDE INTEGRAL THERMOSTAT, WALL MOUNTED HANGING BRACKET, AND MFG DISCONNECT.

LOUVER SCHEDULE

UNIT NO.	MANUFACTURER	MODEL NO.	AIRFLOW	MAX APD	HEIGHT	WIDTH	FREE AREA	FREE AREA VELOCITY	FRAME STYLE	MATERIAL DESCRIPTION	EQUIPMENT NOTES
L-1	RUSKIN	ELF375DX	2000 CFM	0.02 in-wg	36"	48"	6.0 SF	329 FPM	STANDARD	ALUMINUM	ALL
L-2	RUSKIN	ELF375DX	2000 CFM	0.04 in-wg	28"	48"	4.7 SF	423 FPM	STANDARD	ALUMINUM	1,2

ADD03

MECH NOTES:
1. ARCHITECT TO SELECT COLOR FROM MFG LIST OF STANDARD COLORS.
2. PROVIDE WITH ALUMINUM BIRD SCREEN.
3. PROVIDE 120/1 MOTORIZED DAMPER (BASIS OF DESIGN IS POTTORFF CD-41); PROVIDE W/ 2-POSITION EXTERNALLY MOUNTED ACTUATOR, END SWITCH, AND CLEAR HOUSING ENCLOSURE.

EXHAUST FAN & POWER ROOF VENT SCHEDULE 1/2

EQUIPMENT REQUIREMENTS													
UNIT NO.	MANUFACTURER	MODEL NO.	TYPE	AIRFLOW	ESP	MOTOR RPM	BRAKE POWER	POWER	SONES	UNIT WEIGHT	EQUIPMENT NOTES	VOLT/PH	MIN CKT AMP
EF-1	LOREN COOK	195 SQND-HP VF	SQUARE CENTRIFUGAL INLINE BLOWER	2000 CFM	0.75 in-wg	1725	0.47 hp	1.00 hp	9	155 lb	ALL	208/3	5.8

EXHAUST FAN & POWER ROOF VENT SCHEDULE 2/2

	ELECTRICAL REQUIREMENTS										
		CONTROLLER							DISCONNECT		
UNIT NO.	WIRE SIZE / CONDUIT	TYPE	SIZE	LOCATION	CTL DEVICE	AUX	BY	CONTROL BY	TYPE	BY	ELECTRICAL NOTES
EF-1	SEE CIRCUIT SCHEDULE	COMB.	00	WALL MOUNT	T-STAT	E1	DIV. 26	DIV. 26	COMB.	DIV. 26	E1

MECH NOTES:
1. SELECTIONS BASED ON 5,200 FT ELEVATION AND 70°F AIRSTREAM.
2. PROVIDE WITH CEILING MOUNTED VIBRATION ISOLATORS.
3. PROVIDE W/ MFG DISCONNECT.
4. PROVIDE W/ INTERNALLY ADJUSTABLE EC MOTOR AND CONTROL COVER.
5. M.C. TO PROVIDE LINE VOLTAGE REVERSE ACTING THERMOSTAT.

ELEC NOTES:
E1. PROVIDE COMBINATION STARTER/DISCONNECT TO CONTROL FAN AND MOTORIZED DAMPER VIA LINE VOLTAGE THERMOSTAT. T-STAT BY MC.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
14807
LANCE M.
RIKALA
SOUTH DAKOTA

DATE: 03/13/23

TSP

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PROJECT / SHEET TITLE:
SANFORD UNDERGROUND RESEARCH FACILITY WWTP
MECHANICAL SCHEDULES
LEAD, SOUTH DAKOTA

REV.	DATE	DESCRIPTION
ADD03	05/11/2023	ADDENDUM 03

JOB No.:	03211470
DATE:	March, 2023
ENG / ARCH:	LMR
DESIGNER:	ADK
TECHNICIAN:	

SHEET No. :
4M-601