ADDENDUM NO. 1

PROJECT NAME: **ELLIOTT BUILDING INFRASTRUCTURE UPGRADEUNL**
PROJECT NUMBER: **J001P049**
BID INVITATION NUMBER: **2058-13-7200**

CONSULTANT: Alvine and Associates, Inc.
ADDRESS: 1102 Douglas Street, Omaha, NE 68102

DATE OF ISSUANCE: 20 February 2013
DATE OF BID OPENING: 26 February 2013 at 2:30 PM CST

The bid documents dated 25 January 2013 for the above referenced project are amended by this addendum.

NOTICE: This Addendum is issued to all interested prospective bidders as an amendment to the project manual or other parts of the bidding (contract) documents for the above named project. Reference to this Addendum must be included in the Bid proposal. The information contained herein shall be fully incorporated into the contract documents as though originally included therein.

QUESTIONS AND MODIFICATIONS TO THE PROJECT MANUAL:

MODIFICATIONS:

SECTION 00 01 10 – TABLE OF CONTENTS

1. Page 00 01 10-3 and 00 01 10-4: Replace DIVISION 2 through DIVISION 9 TABLE OF CONTENTS with attached TABLE OF CONTENTS DIVISION 2 through DIVISION 9.

SECTION 01 23 00 - ALTERNATES

1. Clarification: Alternate #1 applies to both the first floor and second floor in the 2-story building.

SECTION 23 09 13 – INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

1. The following manufacturers have been approved as equals:
   a. Air Monitor
   b. Ruskin

SECTION 23 09 13.53 – VARIABLE-FREQUENCY MOTOR CONTROLLERS FOR HVAC

1. The following manufacturer has been approved as equals:
   a. Emerson

SECTION 23 09 23 – DIRECT DIGITAL CONTROL SYSTEM FOR HVAC

1. Clarification: All control wiring shall be installed in conduit. For conduit specification see Specification Section 26 27 17 – EQUIPMENT WIRING.

SECTION 23 09 63 – LABORATORY CONTROLS

1. The following manufacturer has been approved as equals:
   a. Laboratory Control Valves – Critical Room Control

2. Clarification: All laboratory controls, components, and wiring shall be furnished and installed by lab supplier. Also start-up shall be included.

SECTION 23 21 13 – HYDRONIC PIPING

1. The following manufacturers have been approved as equals:
   a. Automatic Flow Controls Valves – Pro Hydronic Specialties
   b. Triple Duty Valves – Patterson

SECTION 23 21 14 – HYDRONIC SPECIALTIES

1. The following manufacturers have been approved as equals:
   a. Expansion Tanks – Patterson
   b. Suction Diffusers – Patterson
   c. Glycol Feed System – General Treatment Products
   d. Automatic Flow Control Valves – Pro Hydronic Specialties

SECTION 23 31 00 – HVAC DUCTS AND CASINGS

1. The following manufacturers have been approved as equals:
   a. Spiral Pipe of Texas
   b. LaPine Metal Products
   c. Lewis and Lambert

SECTION 23 34 23 – HVAC POWER VENTILATORS

1. The following manufacturer has been approved as equals:
   a. Plastic Air

SECTION 23 52 16 – CONDENSING BOILERS

1. The following manufacturer has been approved as equals:
   a. Laars

SECTION 23 64 23 – SCROLL WATER CHILLERS

1. Page 4, Paragraph 2.3.B.2H. Delete in its entirety.

SECTION 23 73 13 – MODULAR CENTRAL-STATION AIR-HANDLING UNITS

1. The following manufacturers have been approved as equals.
   a. Carrier
   b. Dunham Bush
   c. York

2. Page 23 73 13-4, Article 2.5, Paragraph J: Delete in its entirety

3. Page 23 73 13-8, Article 3.3, Paragraphs D, E, F, and G: Delete in their entirety.

SECTION 23 82 16 – AIR COILS

1. The following manufacturer has been approved as equals.
   1. York

QUESTIONS AND MODIFICATIONS TO THE DRAWINGS:

MODIFICATIONS:

SHEET A010: AREA A FIRST FLOOR PLAN – ARCHITECTURAL DEMOLITION:

1. Room 130 LAB: Existing casework and counter top located south of existing fume hoods to remain per Plan Keyed Demolition Note 21. Existing casework and countertop located under existing fume hoods shall be removed.

SHEET A011: AREA B FIRST FLOOR PLAN - ARCHITECTURAL DEMOLITION:

1. Room 147A ELECTRICAL: Remove existing wall chase at northeast room corner along with existing fire extinguisher cabinet recessed in chase from CORRIDOR E. Salvage for re-installation.

SHEET A100: AREA A FIRST FLOOR PLAN: ROOM 130 LAB:

1. Delete Plan Keyed Note No. 28.

SHEET A101: AREA B FIRST FLOOR PLAN:

1. ROOM 147A ELECTRICAL: Patch floor and walls to match existing at northeast room corner.
2. CORRIDOR F: Construct new wall enclosure with WALL TYPE A construction at northwest corner of CORRIDOR F, located just north of the existing door to CORRIDOR G. The wall enclosure will house relocated fire extinguisher cabinet (relocated from CORRIDOR E). Patch to match existing at adjacent CORRIDOR E and F walls.

SHEET A 203: AREA C SECOND FLOOR PLAN – REFLECTED CEILING PLAN:

1. ROOM 207 OFFICE: See Sheet M103: AREA C SECOND FLOOR PLAN – HVAC for supply diffusers and return air grille to be located at new suspended acoustical tile ceiling.

SHEET M202 – “AREA C” FIRST FLOOR PLAN – PIPING

1. Add a sump pump and associated sump pit and plumbing piping for the existing elevator pit. See attached Sketch Sheet MS-1 for location of pump, pit, and discharge piping.

SHEET M405 – MECHANICAL DETAILS

1. Add an elevator sump pump detail. See attached Sketch Sheet MS-2 for detail.

SHEET M502 – MECHANICAL SCHEDULES

1. Add Sump Pump (SP-1) to pump schedule. See attached Sketch Sheet MS-3 for schedule.

2. Modify fan type on Air Handling Unit Schedule to be a Direct Drive Plenum style. See attached Sketch Sheet MS-4 for revised schedule.

SHEET E011 - AREA 'B' FIRST FLOOR PLAN- ELECTRICAL DEMOLITION

1. See Sketch Sheet ES-1 for modified 147A Enlarged Plan1/E011.

SHEET E012 - AREA 'C' FIRST FLOOR PLAN - ELECTRICAL DEMOLITION

1. Computer Lab 109A: The four lighting fixtures at the east end of the room shall be labeled 'RP'.

SHEET E100 - AREA 'A' FIRST FLOOR PLAN - LIGHTING

1. Delete the western exterior lighting fixture Type '16' outside of Corridor N and add Type '15'.

SHEET E101 - AREA 'B' FIRST FLOOR PLAN - LIGHTING

1. In Vestibule 136B, delete lighting fixture Type 'R' and add Type '2'.

2. In Reception Area 136A, delete two Type 'R' lighting fixtures and add two Type '2'.

3. In Storage Rooms 139A and 146A, the occupancy sensor shall be a Type '5'. In Office 144, the occupancy sensor shall be Type '1'.

SHEET E102 - AREA 'C' FIRST FLOOR PLAN - LIGHTING

1. In Office 104, the occupancy sensor shall be a Type '1'.

2. Provide line voltage connection to occupancy sensor in Office 101, Office 102, Office 108A, and Office 106AC.

3. In the elevator pit, provide two Type '22' wall-mounted lighting fixtures, switch and branch circuit wiring to load center 'ELEV'.

SHEET E103 - AREA 'C' SECOND FLOOR PLAN - LIGHTING

1. Occupancy sensor in Sim. Lab 206A shall be Type '1'.

2. Occupancy sensor in Storage 201A shall be Type '1'.

3. Provide line voltage connection to occupancy sensor in Office 222, Office 226, Office 223, and Office 226A.

5. Provide additional wiring to a Type '17' lighting fixture near the stairwell.

6. Classroom 200: Provide an emergency lighting relay and one Type '1' lighting fixture and connect to the Corridor unswitched emergency lighting circuit.

SHEET E202 - AREA 'C' FIRST FLOOR PLAN - POWER

1. Provide an additional load center 'ELEV' in the Elevator Equipment Room 105D and two GFCI receptacles in the elevator pit, with two 20A branch circuits to load center 'ELEV'.

SHEET E207 - ENLARGED POWER PLANS

1. Enlarged Plan 1/E207 - See Sketch Sheet ES-2 for revised layout of electrical equipment in Electrical Room 147A.

SHEET E301 - AREA 'B' FIRST FLOOR PLAN - FIRE ALARM/ SPECIAL SYSTEMS

1. Provide an additional fire alarm manual pull station in Corridor 132.2.

SHEET E400 - ELECTRICAL RISER DIAGRAM - DEMOLITION

1. Remove Flag Note 1 from existing Panel 6.

2. Remove the two existing 60A disconnects for the autoclaves. Remove the wiring between the disconnects and panel; the wiring between the disconnects and autoclaves shall remain. Provide junction boxes where the existing disconnects were located. See Sketch Sheets ES-1 and ES-2.

3. Remove the existing 4" housekeeping metal channel under the existing switchboard.

4. The secondary electrical conductors in the existing padmount transformer shall be disconnected by Nebraska Public Power District (NPPD).

SHEET E401 - ELECTRICAL RISER DIAGRAM - NEW

1. The power company serving the building is Nebraska Public Power District (NPPD). The power company representative is Chuck V. (308) 630-5475.

2. The final connection of secondary conductors in the existing padmount transformer is by NPPD.

3. Raise the existing 75 kVA transformer 'XP' to be a minimum of 6'-6" from the bottom of the transformer to finished floor.

4. Provide a 225A, 3-pole, enclosed breaker on the side of transformer 'XP'. The feeder between the transformer and the enclosed breaker shall be Type '30T'. The feeder between the enclosed breaker and Panel 'P' shall be Type '28'.

5. Remove Flag Note 1 from Panel 'N6'.

6. Provide wireways above and below Panel 'N6' to intercept existing branch circuit conduits. Provide new wiring between Panel 'N6' and existing branch circuits stubbed into new wireways.

7. Provide 4" housekeeping metal channels on four sides under the Main Switchboard 'MS'.

SHEET E500 - ELECTRICAL PANEL SCHEDULES

1. Lighting Panel Schedule, Panel 'P': Delete 225A main breaker and add 225A main lugs only.

2. Lighting Panel Schedule, Panel 'NIA': Delete three 20/1 breakers and add one 60/3 breaker.

3. Switchboard Panel Schedule: The maximum length of the switchboard shall be 76".

SHEET E501 - ELECTRICAL SCHEDULES

1. Feeder Schedule: Add feeder Type '26'. Feeder Type '26' shall be 4# 3/0, 1# 6 ground in 2 ½" conduit.

2. Equipment Connection Schedule: The disconnect described in Note 6 shall be a NEMA 3R type.

3. Lighting Fixture Schedule: Add Type '22', and should be Fail-Safe, Catalog #FSSD226UNVEBT2, with 2-26 quad lamps.

4. Lighting Fixture Schedule:
   a. The following lighting fixture manufacturers are acceptable if equal to the specified lighting fixture manufacturer and are subject to a final shop drawing review:

Type	Manufacturer
1	Columbia
2	Columbia
3	Dual-Lite
4	Dual-Lite
5	Dual-Lite
6	Columbia
7	Columbia
8	Columbia
10	Columbia
11	Columbia
12	Dual-Lite
13	Prescolite
14	Columbia
15	Dual-Lite
16	Prescolite
18	Columbia
19	Columbia
21	Columbia
P	Columbia

SHEET E600- ELECTRICAL DETAILS

1. Generator Connection Detail 4/E600: Provide a total of three 120V, 20A branch circuits for generator accessories. 6#10, #10 gnd in 1" conduit. Provide three 20/1 breakers in Panel 'L'. Route circuits to Panel 'L'.

SHEET E601- ELECTRICAL DETAIL

1. Elevator Connection Detail 1/E601:
   a. In Elevator Equipment Room 105D, provide a 120/208V, 3-phase, 4-wire, 100A, surface-mounted load center with eight 20/1 breakers. Provide a 60A feeder to Panel 'NIA', 4#6, #10 gnd in 1" conduit.
   b. Remove existing junction box, small transformer, two switch and fustats, and associated wiring.
   c. Remove existing receptacle.
   d. Connect existing lighting circuit to load center 'ELEV'.
   e. Provide a 30a, 1-pole, non-fused disconnect for the cab lighting circuit and connect circuit to load center 'ELEV'.
   f. See Item 5ED1-3 for pit lighting.
   g. See Item 7ED1-1 for pit receptacles.
   h. In the Elevator Equipment Room, provide a GFCI receptacle and connect to load center 'ELEV'.

GENERAL COMMENTS

1. See attached meeting minutes with attendance roster that was completed on February 12, 2013.

END OF ADDENDUM NO. *1*

Meeting Minutes

1102 Douglas on the Mall, Omaha, Nebraska 68102 (402) 346-7007

February 12, 2013 | University of Nebraska Elliott Building Mechanical/Electrical Infrastructure Upgrades | Alvine No. 2012 2883

Attendees: See attached List

Discussion:

1. The generator is being pre purchased. The lead time on the generator is nine weeks. The University is going to postpone purchasing the generator until bids are received.

2. This project will be handled through Submittal Exchange and the cost will be picked up by the University.

3. Steve Ford talked about the scope of work as well as the phasing and the alternates to the project.

4. Bob Foust discussed the electrical scope of the project.

5. Dan Drain talked about the architectural scope of the project.

6. Joe Goodwater stated that he will provide the contractors with the asbestos abatement report.

7. Lead times of equipment, such as air handling units, chillers, electrical gear, and lights were discussed. All of the equipment specified is not specialized, so leads times should not be a concern. However, it was stated that the successful contractor will need to get the shop drawing process started ASAP to avoid any delays to the project due to lead times.

8. A detailed schedule from the successful contractor will need to be provided shortly after the pre-construction meeting.

9. There is no Davis Bacon on this project.

10. This project is sales tax exempt.

11. On February 15th and February22nd there will be access to the building for contractors to walk through the facility. These walk-throughs will need to be coordinated with Bob O-Neill.

12. It was clarified that all power outages require a 72-hour advance notice.

Please submit comments, additions, or corrections to these meeting minutes in writing within five days of issuance. If no comments are received within this period, this memo will be assumed accurate and filed as part of the permanent record for this project.

Submitted by: Steve Ford

SEF/mkm

University of Nebraska Lincoln

Meeting Attendance

FACILITIES PLANNING & CONSTRUCTION

Purpose: Pre Bid Meeting

Project Name: Elliot Bldg Infrastructure Upgrade **Project No.** 3001049

Date: 2/12/13 **Time:** 10:30 A. **Location:** PREC Elliot Board Room

Name	Organization	Phone	Fax	E-Mail
Bob Foust	Alvine Eng	402 477-6161		rfoust@alvine.com
DANIEL DRAIN	MILLER & ASSOC.	308.234-6456		ddrain@miller-engineers.com
STEVE FORD	ALVINE ENG.	402 477-6161		SFORD@ALVINE.COM
Bob O'Neill	UN Scottsbluff	308 631-9405		roneill@unl.edu
Karen Schultz	PREC	308-632-1259		Kschultz2@unl.edu
Stewart Rusch	Rusch's Gen Cont	308-632-2228	308-632-2856	ruschs@nebmail.com
Kirk Rusch	" "	"	"	Ruschs@nebmail.com
Jay D Goff	Bamford Inc	308-430-2372		jaygoff44@bamford.com
Tim Laeger	Laeger Const.	816-550-8357		laegergroup@aol.com
Aroony Sarnirand	Nebraska Safety and Fire	1-800-504-7833		nebsafe@nebsafe.com
Andy Yocom	Nebraska Safety & Fire	1-800-504-7833		nebsafe@nebsafe.com

1901 Y Street / Lincoln, NE 68588-0605
(402) 472-3131 / FAX (402) 472-5908

University of Nebraska Lincoln

Meeting Attendance

FACILITIES PLANNING & CONSTRUCTION

Purpose: Pre B.I Meeting

Project Name: Elliot Bldg Infrastructure Upgrade **Project No.** J001P049

Date: 2/12/13 **Time:** 10:30 A. **Location:** RREC Elliot Board Room

Name	Organization	Phone	Fax	E-Mail
Joe Goodwater	UNL FPC	402 450-6028	402 472-5908	jgoodwater1@unl.edu
Adam Petersen	Sampson Construction	402-434-5450	402-434-5466	adam.petersen@sampson-construction.com
BRANDON FLANAGAN	High Pointe Electric	307-534-5513	307-534-2089	highpointeelectric@yahoo.com
JOSH IMEL	FCI CONSTRUCTORS	307-778-3085	307-778-3659	jimel@fcicl.com
Stephen Shaw	Anderson & Shaw	308-632-2574	308 632-7405	ainsconstruction@allowphone.com
Taylor Propp	Paul Reed Construction	308 635-2213	308 635-0182	taylorp@paulreedconstruction.com
Lon Asselin	Snell Services	308-436-7372	436-2043	Snellboy@allophone.com
Scott Patterson	Snell Services	308-436-7572	" 2043	snellboy@allophone.com
Jarod Wilson	Rapid Fire Protection	605-348-7342	605-348-0108	jarodw@rapidfireinc.com
Joe [illegible]	LIGHTHOUSE ELECTRIC	308-220-3532	308-220-3532	LHECLLC@GMAIL.COM
Susan Wilhelm	UNMC-CON	308-632-0472	308-632-0475	swilhel@unmc.edu
Kelly McDonald	UNMC CON	402-559-4350	"	Kelly.McDonald@unmc.edu

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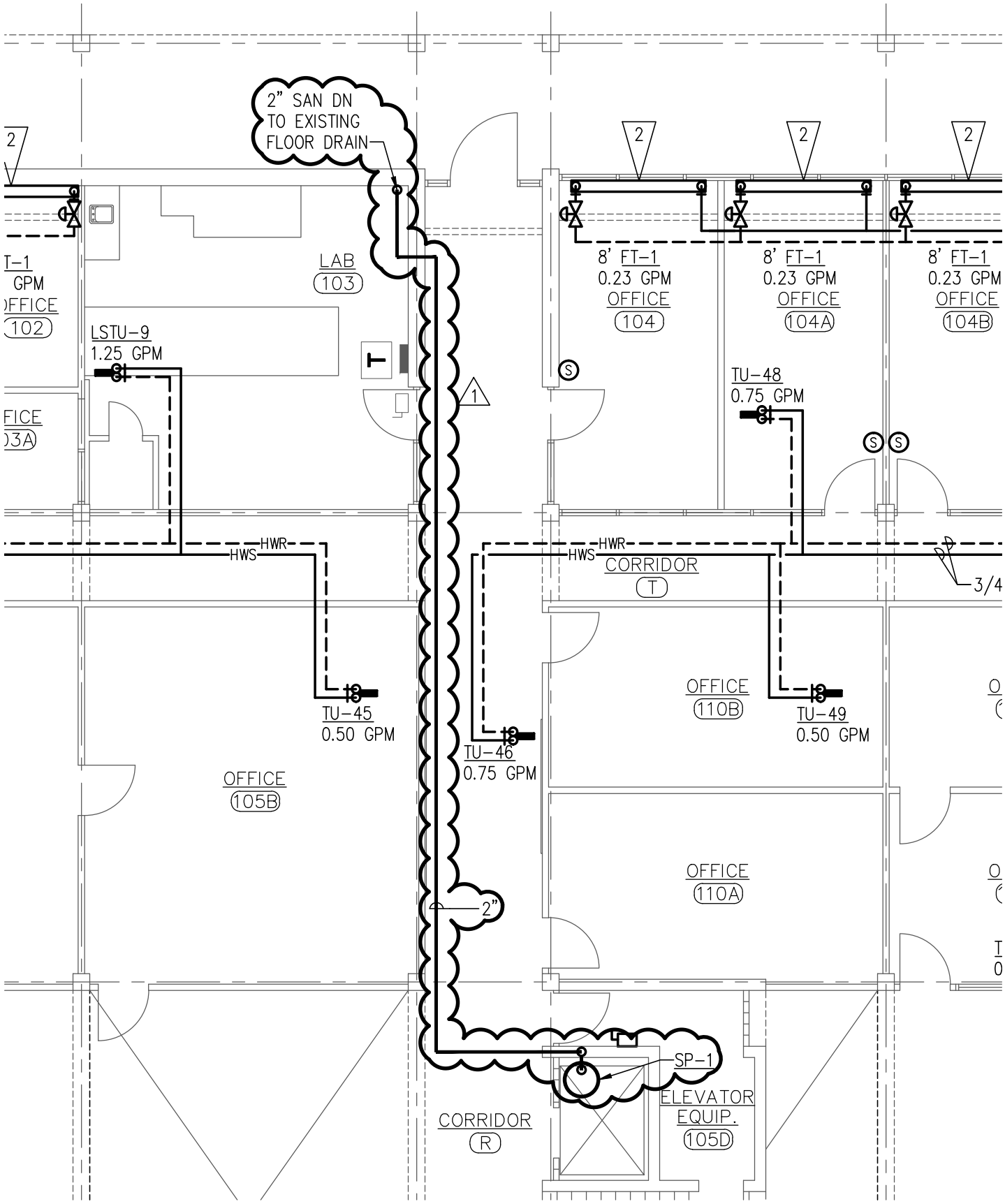
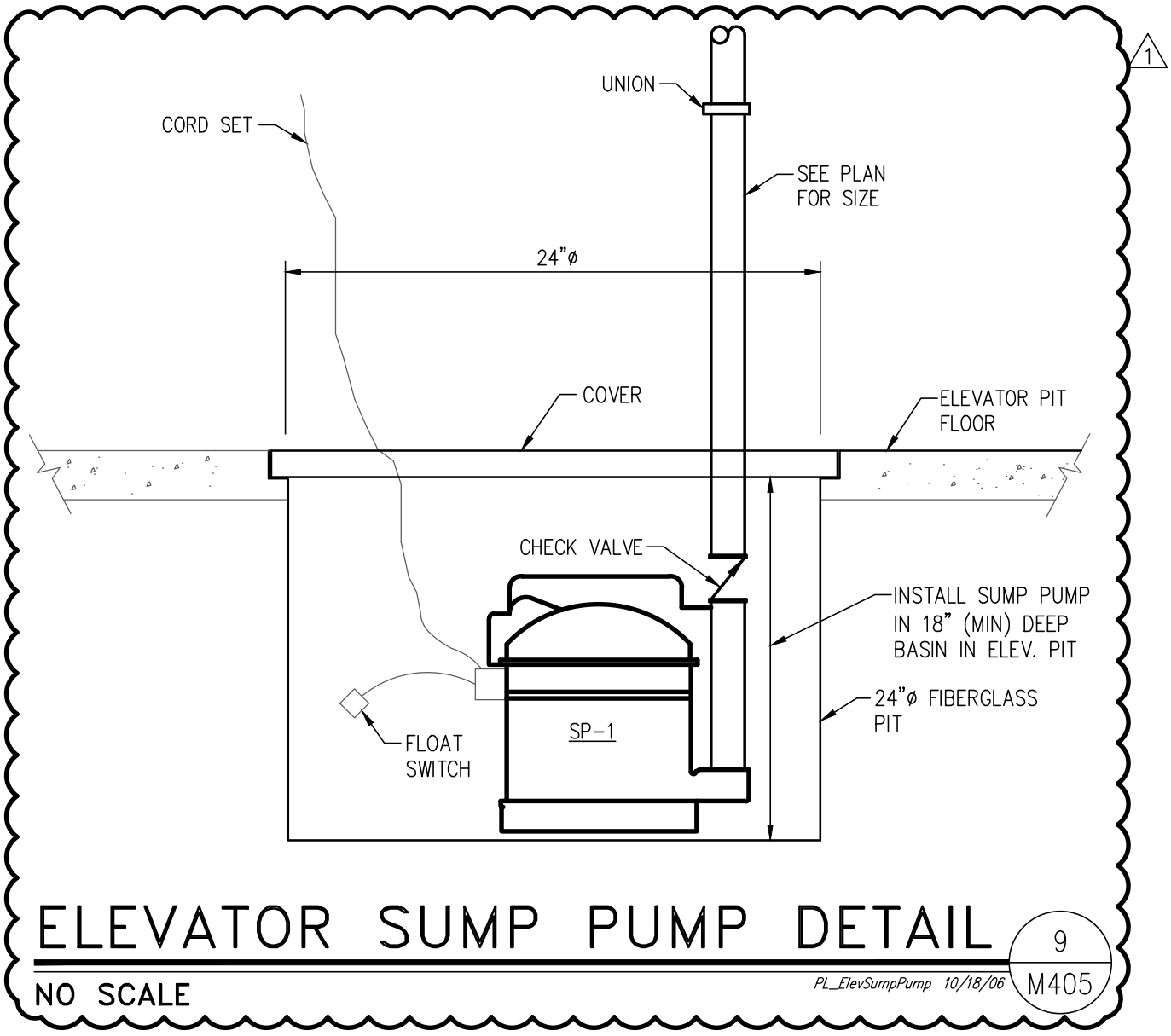


Alvine Engineering

UNIVERSITY OF NEBRASKA ELLIOTT BUILDING INFRASTRUCTURE UPGRADE

PROJECT NO.	DATE	DRAWING REFERENCED: M202	SKETCH
20122883	02/20/13	ADDENDUM NO.: 1	MS-1



ELEVATOR SUMP PUMP DETAIL

9
M405

NO SCALE

PL_ElevSumpPump 10/18/06

Alvine Engineering

UNIVERSITY OF NEBRASKA ELLIOTT BUILDING INFRASTRUCTURE UPGRADE

PROJECT NO.	DATE	DRAWING REFERENCED: M405	SKETCH
20122883	02/20/13	ADDENDUM NO.: 1	MS-2

Pump 12-11-06

PUMP SCHEDULE

MARK		CWP-1	CWP-2	HWP-1	HWP-2	SP-1
SERVES		CHILLED WATER	CHILLED WATER	HOT WATER	HOT WATER	ELEVATOR PIT
LOCATION		SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	ELEVATOR PIT
TYPE		BASE MOUNTED	BASE MOUNTED	BASE MOUNTED	BASE MOUNTED	SUBMERSIBLE
FLOW (GPM)		325	325	200	200	50
TOTAL HEAD (FEET)		130	130	70	70	24
MIN. EFFICIENCY		68	68	70	70	–
FLUID		GLYCOL	GLYCOL	GLYCOL	GLYCOL	WATER
MOTOR DATA	HP	20	20	7.5	7.5	3/4
	RPM	1760	1760	1760	1760	1750
	VOLTS	460	460	460	460	115
	PHASE	3	3	3	3	1
SUCTION SIZE (IN)		4	4	3	3	–
DISCHARGE SIZE (IN)		3	3	2.5	2.5	2
MANUFACTURER		TACO	TACO	TACO	TACO	WEIL
MODEL NUMBER		FI3013	FI3013	FI2509C	FI2509C	1413F
REMARKS		(1)(2)(3)	(1)(2)(3)	(1)(2)(3)	(1)(2)(3)	(4)

1

REMARKS:

(1.) INVERTOR RATED MOTOR.

(2.) END SUCTION PUMP.

(3.) 30% PROPYLENE GLYCOL.

(4.) PROVIDE WITH 24"ø x 36" DEEP FIBERGLASS PIT, MICRO SWITCH LEVEL CONTROL AND A 6-FT PLUG AND CORD SET. 1

Alvine Engineering

UNIVERSITY OF NEBRASKA ELLIOTT BUILDING
INFRASTRUCTURE UPGRADE

PROJECT NO.	DATE	DRAWING REFERENCED: M502	SKETCH
20122883	02/20/13	ADDENDUM NO.: 1	MS-3

AirHandlingUnit 11-9-06

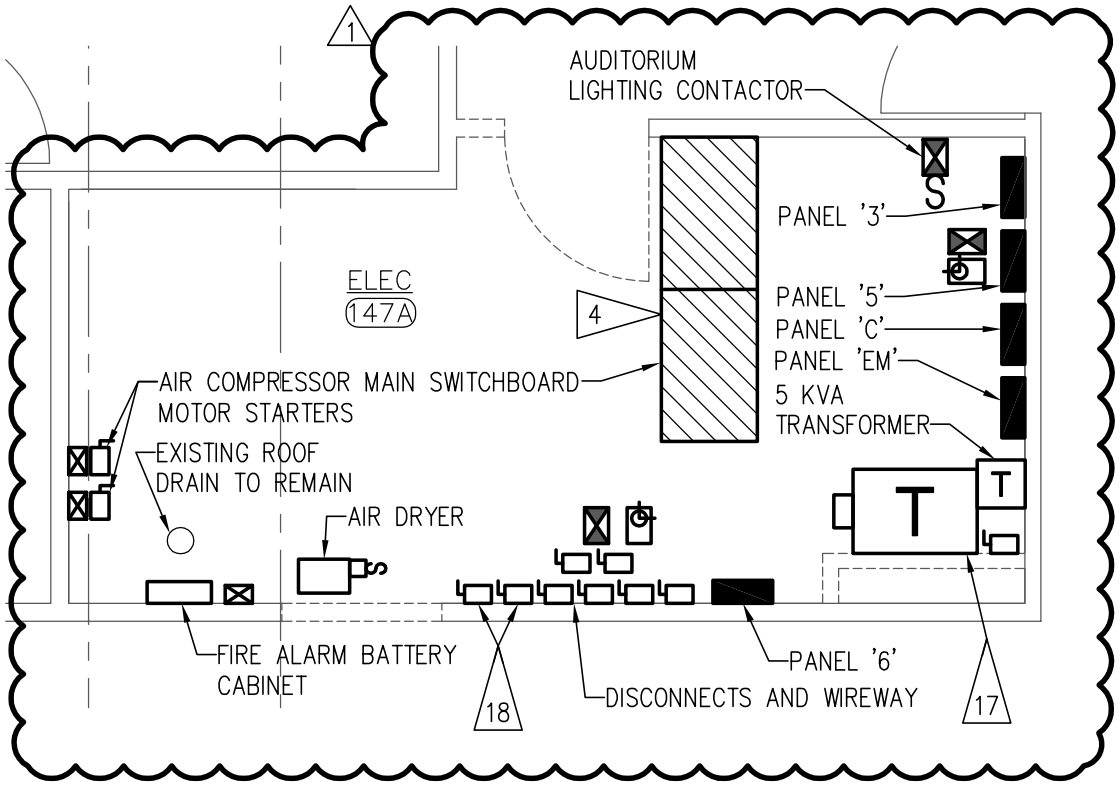
AIR HANDLING UNIT SCHEDULE

	MARK	AHU-1	AHU-2	AHU-3	AHU-4	AHU-5
GENERAL DATA	SERVES	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS
	LOCATION	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS
	TOTAL AIRFLOW (CFM)	18000	5535	4800	5700	7100
	MAXIMUM OUTSIDE AIRFLOW	18000	5535	4800	5700	7100
	MINIMUM OUTSIDE AIRFLOW	1800	600	500	1200	700
	DIMENSIONS (LxWxH)(IN)	176x113x71	147x67x45	147x67x45	142x72x45	141x72x53
	MAXIMUM WEIGHT (LBS)	5800	2000	2000	2500	2500
	CONFIGURATION	DRAW THRU	DRAW THRU	DRAW THRU	DRAW THRU	DRAW THRU
	MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE
	MODEL NUMBER	40	12	12	14	17
	REMARKS	(1) (7)	(2) (7)	(3) (7)	(4) (7)	(5) (7)
SUPPLY FAN DATA	1 FAN TYPE	DIRECT DRIVE PLENUM	DIRECT DRIVE PLENUM	DIRECT DRIVE PLENUM	DIRECT DRIVE PLENUM	DIRECT DRIVE PLENUM
	EXTERNAL SP (IN. W.C.)	2.5	1.0	1.0	1.0	1.0
	TOTAL SP (IN. W.C.)	3.9	2.7	2.4	2.7	2.7
	RPM	1400	2100	1874	1871	1900
	BHP	8.18	4.0	2.9	3.8	5.1
SUPPLY FAN MOTOR DATA	HP	10 (6)	5	5	5	5
	RPM	1200	1800	1800	1800	1800
	VOLTS	460	460	460	460	460
	PHASE	3	3	3	3	3
FILTER DATA	MERV NO.	8	8	8	8	8
	TYPE	PLEATED	PLEATED	PLEATED	PLEATED	PLEATED
	THICKNESS	2"	2"	2"	2"	2"

Alvine Engineering

UNIVERSITY OF NEBRASKA ELLIOTT BUILDING INFRASTRUCTURE UPGRADE

PROJECT NO.	DATE	DRAWING REFERENCED: M502	SKETCH
20122883	02/20/13	ADDENDUM NO.: 1	MS-4



17 RELOCATE EXISTING 75KVA TRANSFORMER 'TP'. REMOVE SUPPORT METAL AND WIRING.

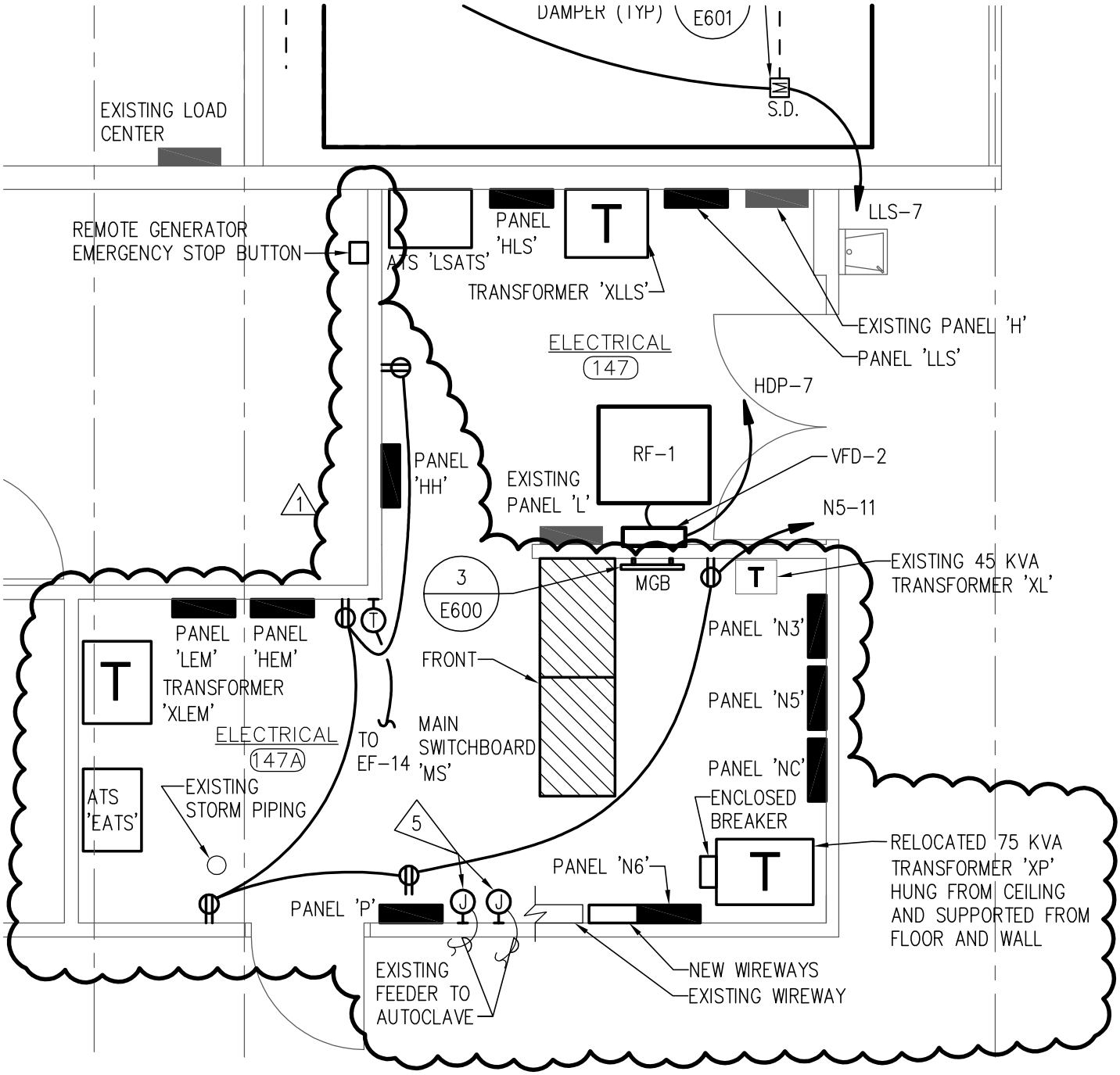
18 REMOVE 60AMP AUTOCLAVE DISCONNECT AND WIRING FROM DISCONNECT TO SOURCE. WIRING FROM DISCONNECT TO LOAD TO REMAIN.

1

Alvine Engineering

UNIVERSITY OF NEBRASKA
ELLIOT BUILDING INFRASTRUCTURE UPGRADE

PROJECT NO.	DATE	DRAWING REFERENCED: E011	SKETCH
20122883	2/20/13	ADDENDUM NO.: 1	ES-1



5/1 PROVIDE 3-BOXES FOR EXISTING AUTOCLAVE CIRCUITS. SEE SHEET E401 FOR WIRING FROM J-BOXES TO PANEL.

Alvine Engineering

UNIVERSITY OF NEBRASKA
ELLIOT BUILDING INFRASTRUCTURE UPGRADE

PROJECT NO.	DATE	DRAWING REFERENCED: E207	SKETCH
20122883	2/20/13	ADDENDUM NO.: 1	ES-2

SECTION 26 32 13

ENGINE GENERATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Packaged engine generator set. The emergency generator will be furnished by the University of Nebraska. The emergency generator will be installed and wired by the electrical contractor.

B. Exhaust silencer and fittings.

C. Battery and charger.

D. Weatherproof enclosure.

1.2 REFERENCE STANDARDS

A. NECA/EGSA 404 - Recommended Practice for Installing Generator Sets; National Electrical Contractors Association.

B. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association.

D. NFPA 70 - National Electrical Code; National Fire Protection Association.

E. NFPA 110 - Standard for Emergency and Standby Power Systems; National Fire Protection Association.

1.3 SUBMITTALS

A. Shop Drawings: Indicate electrical characteristics and connection requirements. Show plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, electrical diagrams including schematic and interconnection diagrams.

B. Product Data: Provide data showing dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, battery, battery rack, battery charger, exhaust silencer, vibration isolators, day tank, and remote radiator.

C. Manufacturer's Field Reports: Indicate procedures and findings.

D. Operation Data: Include instructions for normal operation.

E. Maintenance Data: Include instructions for routine maintenance requirements, service manuals for engine and day tank, oil sampling and analysis for engine wear, and emergency maintenance procedures.

F. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
   1. Extra Filter Elements: Two of each type, including fuel, oil and air.
   2. Provide two of each indicator lamp used.
   3. Provide two of each fuse size and type used.

1.4 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Furnish products listed and classified by testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept unit on site on skids. Inspect for damage.

B. Protect equipment from dirt and moisture by securely wrapping in heavy plastic.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Caterpillar Inc : www.caterpillar.com.

B. Cummins Engine Company : www.cumminspower.com.

C. Kohler Power Systems: www.kohlerpower.com

2.2 PACKAGED ENGINE GENERATOR SYSTEM

A. Description: NFPA 110, engine generator system to provide source of power for Level 1 applications .

B. System Capacity: At an elevation of 3,000 feet above sea level, standby rating using engine-mounted radiator.

C. Ambient Temperature: Minus 20 to 105 deg F.

2.3 ENGINE

A. Type: Water-cooled inline or V-type, four stroke cycle, electric ignition internal combustion engine.

B. Fuel System: Natural gas.

C. Engine Fuel System Components for Natural Gas Engine:
   1. Solenoid Valve: Powered from the starting batteries, controlled by the genset control panel.
   2. Secondary gas regulator.
   3. Demand Safety Regulator: Shuts down the engine if incoming fuel pressure is above the acceptable range.
   4. Flexible connector: Minimum length of 6 inches, located between genset piping and fuel supply piping.
   5. Carburetor.

D. Engine speed: 1800 rpm.

E. Governor: Isochronous type to maintain engine speed within 0.5 percent, steady state, and 5 percent, no load to full load, with recovery to steady state within 2 seconds following sudden load changes. .

F. Safety Devices: Engine shutdown on high water temperature, low oil pressure, overspeed, and engine overcrank. Limits as selected by manufacturer.

G. Engine Starting: DC starting system with positive engagement, number and voltage of starter motors in accordance with manufacturer's instructions. Include remote starting control circuit, with MANUAL-OFF-REMOTE selector switch on engine-generator control panel.

H. Engine Jacket Heater: Thermal circulation type water heater with integral thermostatic control, sized to maintain engine jacket water at 90 degrees F, and suitable for operation on 120 volts AC.

I. Radiator: Radiator using glycol coolant, with blower type fan, sized to maintain safe engine temperature in ambient temperature of 110 degrees F. Radiator air flow restriction 0.5 inches of water maximum.

J. Engine Accessories: Fuel filter, lube oil filter, intake air filter, lube oil cooler, gear-driven water pump. Include fuel pressure gage, water temperature gage, and lube oil pressure gage on engine/generator control panel.

K. Mounting: Provide unit with suitable spring-type vibration isolators and mount on structural steel base.

2.4 GENERATOR

A. Generator: NEMA MG 1, three phase, four pole, revolving field, reconnectable brushless synchronous generator.

B. Exciter: Brushless, permanent magnet type.

C. Rating: 100 kW, 125 kVA, at 0.8 power factor, 480Y-277 volts, 60 Hz at 1800 rpm.

D. Insulation Class: F.

E. Temperature Rise: 105 degrees C Continuous.

F. Enclosure: NEMA MG 1, open drip proof.

G. Voltage Regulation: Include generator-mounted volts per hertz exciter-regulator to match engine and generator characteristics, with voltage regulation plus or minus 1 percent from no load to full load. Include manual controls to adjust voltage droop, voltage level (plus or minus 5 percent) and voltage gain.

H. Voltage Regulator: Solid-state type, separate from exciter.
1. Three-phase sensing.
2. Protects against overvoltage and overexcitation.
3. Insensitive to load-induced waveshape distortion caused by non-linear loads.
4. Include manual controls to adjust voltage droop, voltage level (plus or minus 5 percent) and voltage gain.

2.5 ACCESSORIES

A. Exhaust Silencer: Critical type silencer, with muffler companion flanges and flexible stainless steel exhaust fitting, sized in accordance with engine manufacturer's instructions, configured as indicated on plans.

B. Batteries: Heavy duty, diesel starting type lead-acid storage batteries, 170 ampere-hours minimum capacity. Match battery voltage to starting system. Include necessary cables and clamps.

C. Battery Heater: Thermostatically controlled heater to maintain batteries at manufacturer's recommended temperature based on ambient temperatures listed in Packaged Engine Generator System Paragraph.

D. Battery Tray: Treated for electrolyte resistance, constructed to contain spillage.

E. Battery Charger: Current limiting type designed to float at 2.17 volts per cell and equalize at 2.33 volts per cell. Include overload protection, full wave rectifier, DC voltmeter and ammeter, and 120 volts AC fused input. Provide wall-mounted enclosure to meet NEMA 250, Type 1 requirements. At equipment supplier's option, battery charger may be included in an automatic transfer switch.

F. Line Circuit Breakers: Molded case, electronic trip circuit breakers on generator output with integral thermal and instantaneous magnetic trip in each pole, sized in accordance with NFPA 70; UL listed. Include battery-voltage operated shunt trip, connected to open circuit breaker on engine failure. Unit mount in enclosure to meet NEMA 250, Type 1 requirements. Size of the two output breakers shall both be 100 amp 3 pole.

G. Engine-Generator Control Panel: NEMA 250, Type 1 generator mounted control panel enclosure with engine and generator controls and indicators. Include provision for padlock and the following equipment and features:
1. Frequency Meter: 45-65 Hz. range.
2. AC Output Voltmeter: 2 percent accuracy, with phase selector switch.
3. AC Output Ammeter: 2 percent accuracy, with phase selector switch.
4. Output voltage adjustment.
5. Push-to-test indicator lamps, one each for low oil pressure, high water temperature, overspeed, and overcrank.
6. Engine start/stop selector switch.
7. Engine running time meter.
8. Oil pressure gage.
9. Water temperature gage.
10. Auxiliary Relay: 3PDT, operates when engine runs, with contact terminals prewired to terminal strip.
11. Additional visual indicators and alarms as required by NFPA 110.
12. Remote Alarm Contacts: Pre-wire SPDT contacts to terminal strip for remote alarm functions required by NFPA 110.

H. Remote Annunciator Panel: Surface mounted panel with brushed stainless steel. Provide alarm horn, and indicators and alarms as follows:
1. High battery voltage (alarm).
2. Low battery voltage (alarm).
3. System ready.
4. Anticipatory-high water temperature.
5. Anticipatory-low oil pressure.
6. Low coolant temperature.
7. Switch in off position (alarm).
8. Overcrank (alarm).
9. Emergency stop (alarm).
10. High water temperature (alarm).
11. Overspeed (alarm).
12. Low oil pressure (alarm).
13. Line power available.
14. Generator power available.
15. Lamp test and horn silence switch.

I. Oil Heater: Non-condensing type; 120 volt AC. Include only if use will not void equipment warranty.

J. Weather-Protective Enclosure: Reinforced steel housing allowing access to control panel and service points, with lockable doors and panels. Include fixed louvers, battery rack, and silencer.
   1. Silencer Location: Within the enclosure.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install securely, in a neat and workmanlike manner, as specified in NECA/EGSA 404.

C. Install to provide access for periodic maintenance without removing connections or accessories.

D. Provide coolant sufficient for entire cooling system.

3.2 FIELD QUALITY CONTROL

A. Load Bank Test: Use resistive load bank furnished by equipment supplier, KW rating to match genset rating.
   1. Perform block loading as follows:
      a. 50% Load: 1 hour.
      b. 75% Load: 1.5 hours.
      c. 100% Load: 1.5 hours.

B. Record in 20 minute intervals during test:
   1. Kilowatts.
   2. Amperes.
   3. Voltage.
   4. Coolant temperature.
   5. Frequency.
   6. Oil pressure.

C. Test alarm and shutdown circuits by simulating conditions.

D. Coordinate tests with tests for transfer switches and run them concurrently.

3.3 MANUFACTURER'S FIELD SERVICES

A. Provide the services of manufacturer's representative to prepare and start system.

B. The supplier and the electrical contractor have joint responsibility for testing. The supplier shall provide fuel and engine fluids required for start-up and testing .

3.4 ADJUSTING

A. Adjust generator output voltage and engine speed.

3.5 CLEANING

A. Clean engine and generator surfaces. Replace oil and fuel filters.

3.6 CLOSEOUT ACTIVITIES

A. Demonstrate operation to Owner's operating personnel:

B. Describe loads connected to emergency system and restrictions for future load additions.

3.7 MAINTENANCE

A. Provide service and maintenance of engine generator for one year from Date of Substantial Completion.

END OF SECTION

SECTION 26 36 00

TRANSFER SWITCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Automatic Transfer Switches (two required).The automatic transfer switches will be furnished by the University of Nebraska. The automatic transfer switches will be installed and wired by the electrical contractor.

1.2 REFERENCE STANDARDS

A. NEMA ICS 10 - Industrial Control and Systems: AC Transfer Switch Equipment; National Electrical Manufacturers Association.

B. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.3 SUBMITTALS

A. Product Data: Provide catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.

B. Operation Data: Instructions for operating equipment under emergency conditions .

C. Maintenance Data: Routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.4 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. ASCO Power Technologies, LP : www.asco.com.

B. Caterpillar Inc.

C. Cummins Power Generation

D. GE Zenith Controls

E. Kohler Power Systems

F. Russelectric : www.russelectric.com.

2.2 AUTOMATIC TRANSFER SWITCH

A. Description: NEMA ICS 10, automatic transfer switch .

B. Configuration: Electrically operated, mechanically held transfer switch.

C. The automatic transfer switches shall both be 480 volt 100 amp 3 pole with solid neutral and ground lugs. A total of two automatic transfer switches are required.

D. Withstand Current Rating: 42,000 rms symmetrical amperes, when used with molded case circuit breaker.

2.3 COMPONENTS

A. Indicating Lights: Mount in cover of enclosure to indicate NORMAL SOURCE AVAILABLE, ALTERNATE SOURCE AVAILABLE, and SWITCH POSITION.

B. Test Switch: Mount in cover of enclosure to simulate failure of normal source.

C. Transfer Switch Auxiliary Contacts: 1 normally open; 1 normally closed for each switch position, not wired, for customer use.

D. Normal Source Monitor: Monitor each phase of normal source voltage; pickup at 85 percent of nominal value, adjustable.

E. Alternate Source Monitor: Monitor alternate source voltage and frequency; inhibit transfer when voltage is below 85 percent or frequency varies more than 5 percent from rated nominal value, adjustable.

F. In-Phase Monitor: Inhibit transfer until source and load are within 15 electrical degrees, adjustable. In-phase monitor may be replaced by programmed neutral switch position at the supplier's option.

G. Programmed Neutral Switch Position: Transfer load to a neutral position, disconnected from sources with a delay before continuing transfer, 0 to 60 seconds, adjustable; set at 0.5 seconds. Programmed neutral switch position may be replaced by in-phase monitor at the supplier's option.

H. Engine Exercise Timer: Solid state programmable timer starts engine, transfers load to generator, retransfers load to normal source and shuts down engine; selector switch allows exercising generator with or without load transfer.

I. Ammeter: Mount in cover of enclosure. Provide three phase selector switch. Locate CTs to sense current in load conductors.

J. Manual Operating Handle: Allows unloaded operation of switch.

K. Enclosure: ICS 10, Type 1, finished with manufacturer's standard finish.

2.4 AUTOMATIC SEQUENCE OF OPERATION

A. Initiate Time Delay to Start Alternate Source Engine Generator: Upon initiation by normal source monitor.

B. Time Delay To Start Alternate Source Engine Generator: 0 to 15 seconds, adjustable.

C. Initiate Transfer Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.

D. Time Delay Before Transfer to Alternate Power Source: 0 to 120 seconds, adjustable.

E. Initiate Retransfer Load to Normal Source: Upon permission by normal source monitor.

F. Time Delay Before Transfer to Normal Power: 0 to 30 minutes, adjustable; set for 10 minutes; bypass time delay in event of alternate source failure.

G. Time Delay Before Engine Shut Down: 0 to 30 minutes, adjustable, of unloaded operation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surface is suitable for transfer switch installation.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Identify transfer switches in accordance with Section 26 05 53.

3.3 FIELD QUALITY CONTROL

A. Provide the services of the manufacturer's technical representative to check out transfer switch connections and operation and place in service.

B. Train Owner's maintenance personnel on procedures and schedules for operating and maintaining equipment. Provide two hours of instruction.

C. Coordinate training with engine generator training.

3.4 CLEANING

A. Clean electrical parts to remove conductive and harmful materials.

B. Remove dirt and debris from enclosure.

C. Clean finishes and touch up damage.

3.5 CLOSEOUT ACTIVITIES

A. Demonstrate operation of transfer switch in bypass, normal, and emergency modes.

3.6 MAINTENANCE

A. Provide service and maintenance of transfer switches for one year from Date of Substantial Completion.

END OF SECTION