State of Utah

GARY R. HERBERT
Governor

GREGORY S. BELL
Lieutenant Governor

Department of Administrative Services
KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management
DAVID G. BUXTON
Director

FINAL ADDENDUM

Date: September 29, 2010

To: Contractors

From: Tim Parkinson

Reference: Matheson Courthouse HVAC Variable Frequency Drive Replacement
Administrative Office of the Courts – Salt Lake City, Utah

Project No. 09042150

Subject: **Final Addendum**

Pages	Addendum	1 page
	Revised Schedule	1 page
	Revised Bid Form	2 pages
	Engineers Addendum	14 pages
	Total	18 pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

1.1 SCHEDULE CHANGES – There are schedule changes for this project.
The bid date is October 6, 2010 at 2:30 PM
Sublists are due October 7, 2010 by 2:30 PM

1.2 GENERAL – Revised Bid Form – One Additive Alternate was added.
Electrical Engineering & Lighting Design, Final Addenda, please see attached sheets.

Utah!
Where ideas connect

REVISED - PROJECT SCHEDULE
PER FINAL ADDENDUM – Dated September 29, 2010

PROJECT NAME: MATHESON COURTHOUSE HVAC VARIABLE REQUENCY DRIVE REPLACEMENT – ADMINISTRATIVE OFFICE OF THE COURTS SALT LAKE CITY, UTAH
DFCM PROJECT NO. 09042150

Event	Day	Date	Time	Place
Bidding Documents Available	Wednesday	August 11, 2010	2:00 PM	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site *
Last Day to submit qualifications and background check information	Wednesday	August 18, 2010	10:00 AM	DFCM 4110 State Office Bldg SLC, UT Attn: Tim Parkinson e-mail: tparkins@utah.gov
Approved Contractors List Post	Monday	August 23, 2010	10:00 AM	DFCM Web Site*
Mandatory Pre-bid Site Meeting	Tuesday	August 24, 2010	9:00 AM	Matheson Courthouse West Entrance Rotunda 450 South State St. Salt Lake City, Utah
Last Day to Submit Questions	Thursday	August 26, 2010	10:00 AM	Tim Parkinson – DFCM E-mail: tparkins@utah.gov Fax 801-538-3267
Addendum Deadline (exception for bid delays)	Tuesday	August 31, 2010	4:00 PM	DFCM web site *
Prime Contractors Turn In Bid and Bid Bond	**Wednesday**	**October 6, 2010**	**2:30 PM**	DFCM 4110 State Office Bldg SLC, UT
Sub-contractor List Due	**Thursday**	**October 7, 2010**	**2:30 PM**	DFCM 4110 State Office Bldg SLC, UT Fax 801-538-3677
Substantial Completion Date		November 19, 2010		

***DFCM's web site address is http://dfcm.utah.gov**

REVISED BID FORM

NAME OF BIDDER _____ DATE _____

The undersigned, responsive to the "Notice to Contractors" and in accordance with the "Instructions to Bidders", in compliance with your invitation for bids for the **Matheson Courthouse HVAC Variable Frequency Drive Replacement – Administrative Office of the Courts – Salt Lake City, Utah – DFCM Project No. 09042150** and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:
BASE BID:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

ADDITIVE ALTERNATE #1: VFD #4 Full Replacement

_____DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

We guarantee that the Work will be Substantially Complete by November 19, 2010, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **$200.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____._____

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in the Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract

.

The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within the time set forth.

Type of Organization:

_____
(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

_____

Respectfully submitted,

_____
Name of Bidder

ADDRESS:

_____

_____

_____
Authorized Signature

Electrical
Engineering &
Lighting
Design

1220 South
300 West
Salt Lake City, UT
84101

Phone:
(801) 486-2222

Fax:
(801) 474-3353

Final Electrical Addendum

Project Name: Matheson Courthouse VFD Upgrade
Date: September 29, 2010

The following modification, clarifications, and/or corrections shall become part of the original bid documents.

1. **Replace the attached drawings and specification with the previous drawings and specification posted.**

SECTION 262923 – VARIABLE FREQUENCY DRIVES

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. This Section includes solid-state, PWM, VFD's for speed control of three-phase, squirrel-cage induction motors.

1.3 DEFINITIONS

A. BMS: Building management system

B. IGBT: Integrated gate bipolar transistor

C. LAN: Local area network.

D. PID: Control action, proportional plus integral plus derivative.

E. PWM: Pulse-width modulated.

F. VFD: Variable frequency drive.

1.4 SUBMITTALS

A. Product Data: For each type of VFD. Include dimensions, mounting arrangements, location for conduit entries, shipping and operating weights, and manufacturer's technical data on features, performance, electrical ratings, characteristics, and finishes.

B. Shop Drawings: For each VFD

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:

    a. Each installed unit's type and details
    b. Nameplate legends
    c. Short-circuit current rating of integrated unit.

d. Listed and labeled for series rating of overcurrent protective devices in combination controllers by an NRTL acceptable to authorities having jurisdiction.
e. Features, characteristics, ratings, and factory settings of each motor control center unit.

2. Wiring Diagrams: Power, signal, and control wiring for VFDs. Provide schematic wiring diagram for each type of VFD.

C. Coordination Drawings: Floor plans, drawn to scale, showing dimensioned layout, required working clearances, and required area above and around VFDs where pipe and ducts are prohibited. Show VFD layout and relationships between electrical components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate the field measurements.

D. Manufacturer Seismic Qualification Certification: Submit certification that VFDs, accessories, and components will withstand seismic forces defined in Division 16 Section "Electrical Supports and Seismic Restraints." Include the following:

1. Basis for Certification: indicate whether withstand certification is based on actual test of assembled components or on calculation.
   a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Qualifications: For manufacturer and testing agency.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For VFDs, all installed devices, and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. Routine maintenance requirements for VFDs and all installed components.
2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

H. Load-Current and List of Settings of Adjustable Overload Relays: compile after motors have been installed and arrange to demonstrate that dip switch settings for motor running overload protection suit actual motor to be protected.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance and repairs.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

   1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

C. Source Limitations: Obtain VFDs of a single type through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with NFPA 70

F. Product Selection for Restricted Space: Drawings indicate maximum dimensions for VFDs, minimum clearances between VFDs, and adjacent surfaces and other items. Comply with indicated maximum dimensions and clearances.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver VFDs in shipping splits of lengths that can be moved past obstructions in delivery path as indicated.

B. Store VFDs indoors in clean, dry space with uniform temperature to prevent condensation. Protect VFDs from exposure to dirt, fumes, water, corrosive substances, and physical damage.

C. If stored in areas subject to weather, cover VFDs to protect them from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers; install electric heating of sufficient wattage to prevent condensation.

1.7 PROJECT CONDITIONS

A. Environmental limitations : Rate equipment for continuous operation, capable of driving full load without derating, under the following conditions, unless otherwise indicated:

1. Ambient Temperature: 0 to 100 deg F.
2. Humidity: Less than 90 percent (noncondensing).
3. Altitude: 4500 feet.

B. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements.

1. Notify Owner no fewer than three days in advance of proposed interruption of electrical service.
2. Indicate method of providing temporary electrical service.
3. Do not proceed with interruption of electrical service without Owner's written permission

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for VFDs, including clearances between VFDs, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.8 COORDINATION

A. Coordinate layout and installation of VFDs with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

C. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 7 Section "Roof Accessories."

D. Coordinate features of VFDs, installed units, and accessory devices with pilot devices and control circuits to which they connect.

E. Coordinate features, accessories, and functions of each VFD and each installed unity with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.

F. Coordinate current (AMP) draw on the actual motor's HP/Nameplate.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Spare Fuses: Furnish one spare for every one installed, but no fewer than one set of three of each type and rating.
2. Indication Lights: Two of each type installed.

1.10 WARRANTYS

A. Manufacturer's standard form in which manufacturer agrees to repair or replace units that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of substantial completion (Parts and Labor).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Mitsubishi by Energy management.
2. Yaskawa by Long and Associates

2.2 VARIABLE FREQUENCY DRIVES

A. The VFD shall be supplied as a complete, pre-integrated, stand-alone package produced by a single manufacturer regularly engaged in the production and who maintains full system support responsibility. The VFD system manufacturer shall integrate all components and equipment required to meet these specification features and functions as a single UL labeled system. Vendors providing equipment requiring field integration of separate components shall not be acceptable. Pre-integrated equipment shall include but not be limited to incoming protective equipment, line filters, inverter unit, control circuitry, operator interfaces, bypass arrangement and accessories and auxiliary items required to meet the highest standards for the type of service specified herein.

B. Application

1. Provide VFD units, which are applicable to variable torque fan loads. The entire system unit shall be capable of 110% overload for one minute in the rated environment.

2. Provide equipment that is rated for continuous operation at 4500 feet above sea level in an operating temperature range of 0-40 degrees C.
3. Provide Units constructed in an enclosure system rated for indoor environments

C. Protection

1. Provide short circuit protection by means of an externally operated, door interlocked circuit breaker or motor circuit protector (MCP). Provide provisions for the handle to be locked off to meet NEC requirements.
2. Provide VFD operated motor overload protection by means of programmable, speed sensitive, electronic overload circuits with instantaneous trip, inverse time trip and current limit functions. In the bypass mode, provide motor overload relay set to protect the motor and capable of starting across line.
3. The VFD's shall have built in SPD's (Surge Protective Devices).

D. Construction

a. Provide NEMA 1 configuration enclosure for each indoor VFD system. The enclosure shall be either wall mounted or free standing, as required with force ventilation, and filtered intake. Mount all components in a single enclosure including, but not limited to, the VFD unit, contractors, door interlocked circuit breaker, bypass/isolating equipment, harmonic filter units, line reactors, and/or other items listed on the specifications or on the drawings. Indoor enclosures shall be NEMA 1 force filter ventilated with an intake air filter to create a positive internal pressure. The air filter must be accessible from the enclosure front and easily changed without shutting down the system. Include door mounted keypad parameter unit (full graphic keypad). The VFD system enclosure shall include a main door-interlocked, pad-lockable disconnecting means. All components including specified bypass contactors, reactors and harmonic filter units etc. shall be isolated behind this single interlocked door disconnect means.

2. The VFD enclosure shall fit in the available space. It shall be the same dimension as the Existing Units being replaced. Field verify prior to bid.

3. Provide a "machine tool" type control transformer with primary and secondary fusing. All control power shall be 120 volt. Operator Devices: Provide door mounted, industrial type, oil tight operator devices for the following required functions:

a. Hand/Off/Auto switch

b. VFD/Bypass switch

c. Power on light, 100,000 hour LED

d. VFD run light, 100,000 hour LED

e. Bypass run light, 100,000 hour LED

f. VFD fault light, 100,000 hour LED

g. External fault light, 100,000 hour LED

4. Programming/Monitoring Keypad: Provide a door mounted, keypad with the following required functions:

   a. The keypad/display shall be a 24-Key enhanced version with a user friendly alphanumeric-numeric entry method full numeric keypad and graphic display. The keypad/display shall have the capability to retain programming parameter values independent of the VFD. HELP functionality shall include the following:
   b. Monitoring of data: Running frequency, motor current, output voltage, set frequency, running speed (RPM), dc bus voltage, over-current load %, peak output current, peak dc bus voltage, input & output used (kW), input and output signal state (ON or OFF).
   c. Stores/displays last eight (8) alarm faults and data at time of fault. The data shall include output frequency, output current, output voltage and VFD operation time and fault occurrence.
   d. Trouble shooting hints shall reference alarm definitions in plain English and point to applicable parameter settings.
   e. Display of installed options and software version shall be available

5. Customer Terminations: Provide customer termination points for the following:

   a. Safeties interlock

   b. Remote start/stop

   c. Remote VFD fault annunciation

   d. Remote motor run annunciation

   e. Remote speed signal input (0-10vdc or 4-20mA)

6. Bypass: Provide VFD system with a manual bypass contactor arrangement for transfer to the feeder line to operate at constant speed. The contactors shall be electrically and mechanically interlocked with an adjustable motor overload relay.

7. Isolation: Provide a VFD isolation switch or contractor to allow maintenance on the VFD while operating in the bypass mode (Three contactor bypass).

8. Harmonic Mitigation: Provide integrated harmonic distortion mitigating devices designed for the specific VFD to guarantee harmonic distortion limits required herein. VFD system integrated AC reactors, transformers, passive or active harmonic filters or other required devices shall be housed in the single filter ventilated VFD system enclosure isolated by the door interlocked disconnect as a complete UL assembly. Non pre-integrated configurations requiring separate enclosures and components, field mounting, wiring, circuit protection or tuning

shall not be permitted. VFD systems shall meet the following THD limits compared to bypass operation:

a. 7.5HP and Larger – VFD systems 7.5HP and larger shall include harmonic mitigation to prevent current harmonic distortion (ITHD) from increasing by more than 12%, (and 3% voltage distortion) as measured at the VFD system input terminals.
b. Motors less than 7.5 HP: AC Line reactor and DC Choke.

9. Include phase monitor integrated protection in both VFD and bypass.

10. The VFD's shall be able to communicate with TAC Inet Protocol.
11. Provide individual disconnecting overload protection for each motor on drives with multiple motors. Each individual motor overload disconnect shall include provisions for padlock lock-out.

E. Start-up Services

1. The supplier of the VFD system shall provide field start-up service by and authorized factory trained service representative. The factory representative shall be trained in the maintenance and troubleshooting of the equipment as specified herein. Start-up service shall include system check-out, start-up and system run, and harmonic testing including the following.

a. Verify that the system voltage is within the manufacturer's specification tolerances.

b. Verify that the motor rotation is correct in all modes of operation.

c. Verify operator devices, programming and monitoring functions to be fully operational.

d. Measure and record system input and output voltage and current at 100% speed. Tune the output voltage to correspond to the motor nameplate data.

e. Make all parameter adjustments to tune and optimize the VFD system to the application. Record all configuration values as part of the start-up report.

f. Conduct harmonic tests as identified below.

g. Program each VFD to automatically restart after a momentary power bump, and after an extended power outage.

F. Harmonic Distortion Report
1. After the installation is complete, measure harmonic voltage and current distortion of each VFD system at its highest operating speed. Submit text and

graphical data showing voltage and current waveforms in compliance with the harmonic limits specified herein. Submit voltage and current THD as well as individual harmonic spectrum analysis data (At the VFD Terminals).

2. The supplier is to measure the Harmonic Distortion 11 months after installation and submit a report indicating that the VFD's are meeting this specification. Replace any units that are not in compliant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, surfaces, and substrates to receive VFDs for compliance with requirements, installation tolerances, and other conditions affecting performance.

B. Examine roughing-in for conduit systems to verify actual locations of conduit connections before VFD installation.

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

3.2 APPLICATIONS

A. Select features of each VFD to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; and duty cycle of motor, controller, and load.

B. Select horsepower rating of controllers to suit motor controlled.

3.3 INSTALLATION

A. Anchor each VFD assembly to steel-channel sills arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and grout sills flush with mounting surface.

B. Install VFD's on concrete bases, or unistrut mounts as necessary.

C. Comply with mounting and anchoring requirements specified in Division 16 Section "Electrical Supports and Seismic Restraints."

D. Controller Fuses: Install fuses in each fusible switch. Comply with requirements in Division 16 Section "Fuses."

3.4 IDENTIFICATION

A. Identify VFDs, components, and control wiring according to Division 16 Section "Electrical Identification."

B. Operating Instructions: Frame printed operating instructions for VFDs, including control sequences and emergency procedures. Fabricate frame of finished metal, and cover instructions with clear acrylic plastic. Mount on front of VFD units.

3.5 CONTROL WIRING INSTALLATION

A. Install wiring between VFDs and remote devices according to Division 16 Section "Conductors and cables."

B. Bundle, train, and support wiring in enclosures.

C. Connect hand-off-automatic switch and other automatic-control devices where applicable.

1. Connect selector switches to bypass only manual- and automatic-control devices that have no safety functions when switch is in hand position.
2. Connect selector switches with control circuit in both hand and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.6 CONNECTIONS

A. Conduit installation requirements are specified in other Division 16 Sections. Drawings indicate general arrangement of conduit, fittings, and specialties.

B. Ground equipment according to Division 16 "Grounding and Bonding."

3.7 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each enclosed controller element, bus, component, connecting supply, feeder, and control circuit
2. Test continuity of each circuit.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to perform the following:

1. Inspect controllers, wiring, components, connections, and equipment installation. Test and adjust controllers, components, and equipment.
2. Assist in field testing of equipment including pretesting and adjusting of solid state controllers

3. Report results in writing

C. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

D. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports.

E. Perform the following field tests and inspections and prepare test reports:

1. Perform each electrical test and visual and mechanical inspection, except optional tests, stated in NETA ATS. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.8 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges.

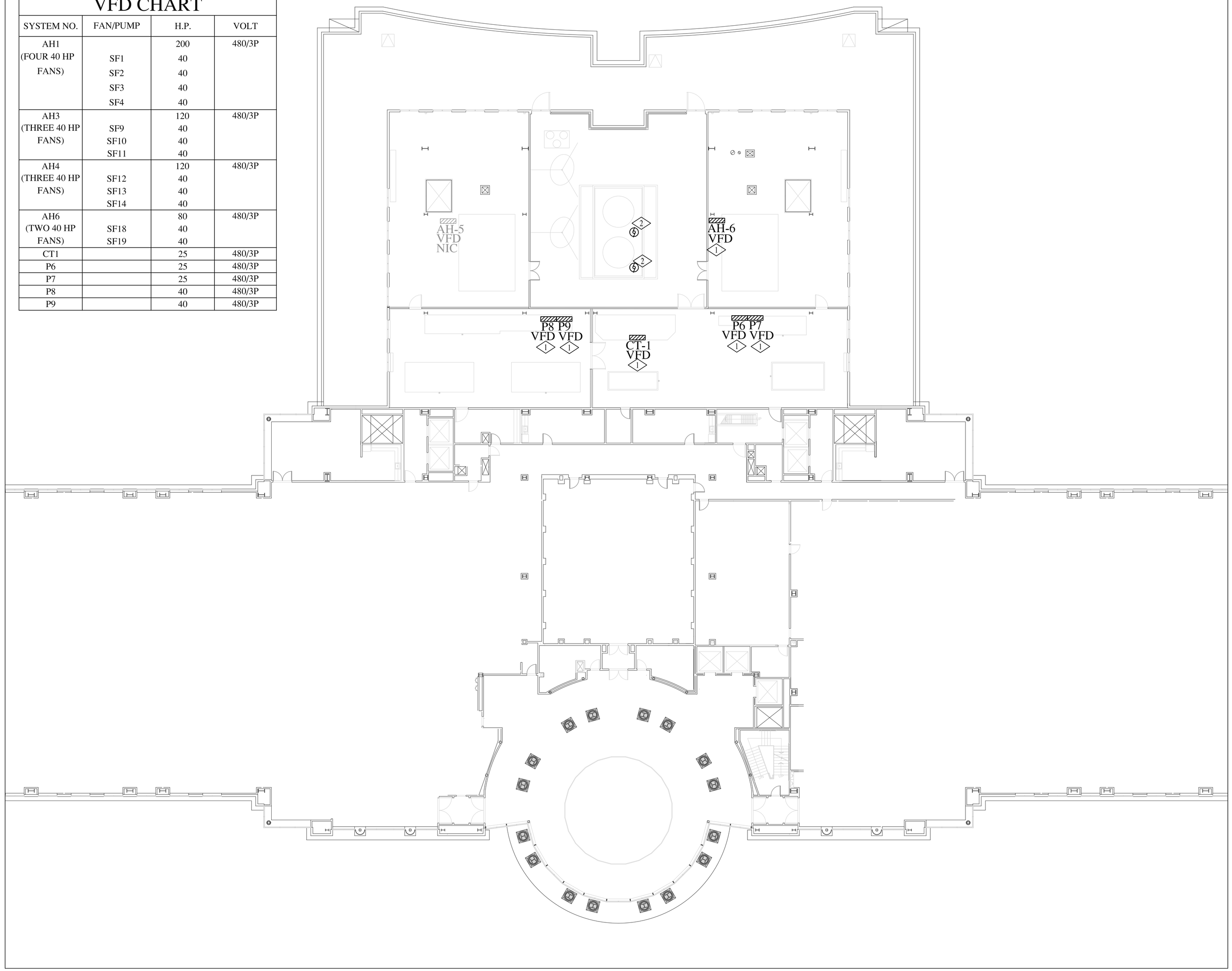
3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain variable frequency controllers. Refer to Division 1 Section "Demonstration and Training:

END OF SECTION 26 05 00

VFD CHART

SYSTEM NO.	FAN/PUMP	H.P.	VOLT
AH1 (FOUR 40 HP FANS)		200	480/3P
	SF1	40	
	SF2	40	
	SF3	40	
	SF4	40	
AH3 (THREE 40 HP FANS)		120	480/3P
	SF9	40	
	SF10	40	
	SF11	40	
AH4 (THREE 40 HP FANS)		120	480/3P
	SF12	40	
	SF13	40	
	SF14	40	
AH6 (TWO 40 HP FANS)		80	480/3P
	SF18	40	
	SF19	40	
CT1		25	480/3P
P6		25	480/3P
P7		25	480/3P
P8		40	480/3P
P9		40	480/3P



REFERENCE NOTES: POWER

1. REPLACE EXISTING VFD'S AND ASSOCIATED FILTERS, CONTACTORS, ENCLOSURE, ETC. WITH A NEW ONE. THE NEW ENCLOSURE SHALL FIT IN THE AVAILABLE SPACE. INSURE THE FEEDER/LOAD CONDUCTORS CAN REACH THE TERMINATION POINTS OF THE NEW VFD TO ELIMINATE THE NEED OF CONDUCTORS SPLICING. DO NOT SPLICE THE FEEDER/L0AD CONDUCTORS. REPLACE THE EXISTING CONDUCTORS IF NECESSARY. PROVIDE ADDITIONAL SUPPORT AND SEISMIC BRACING AS NECESSARY. FIELD VERIFY PRIOR TO BID. PROGRAM THE VFD'S AS PER OWNER'S REQUIREMENT. INTEGRATE THE NEW EQUIPMENT TO THE EXISTING CONTROL SYSTEM. PROVIDE ADDITIONAL CONDUITS, CONDUCTORS, CONTROL CABLES, CONTROL TRANSFORMER, ETC. FOR A COMPLETE WORKING INSTALLATION. THE VFD'S SHALL BE REPLACED ONE AT A TIME SO THAT ONLY ONE MECHANICAL UNIT IS DOWN AT A TIME. COORDINATE THE DOWN TIME WITH THE OWNER A WEEK IN ADVANCE.

2. REPLACE EXISTING 25 HP, 480 VOLT, THREE PHASE COOLING TOWER MOTORS WITH NEW ONES. THESE MOTORS ARE LOCATED ON TOP OF THE COOLING TOWERS. THE NEW MOTORS SHALL:
   A. HAVE PREMIUM EFFICIENCY
   B. BE INVERTER DUTY RATED, PER NEMA MG1 PARTS 30 AND 31 (MOTORES ARE TO BE RATED FOR VFD AND STARTER).
   C. BE COMPATIBLE WITH THE EXISTING SETUP.
   D. HAVE 1.25 SERVICE FACTOR
   E. HAVE GASKETED JBOX TO FRAME AND COVER
   F. BE RATED FOR OUTDOOR INSTALLATION
   G. HAVE OVERSIZED BEARING

   MAKE FINAL ELECTRICAL/MECHANICAL CONNECTION TO THE UNITS FOR A COMPLETE WORKING INSTALLATION. STORE THE EXISTING MOTORS ON TOP OF COOLING TOWER. COORDINATE WITH THE OWNER FOR EXACT LOCATION.PROVIDE 5 YEARS WARRANTY ON THE NEW MOTORS (PARTS AND LABOR).

NORTH

PARTIAL 5TH FLOOR - POWER PLAN

SCALE 1/16"=1'-0"

ELECTRICAL ENGINEERING LIGHTING DESIGN
1220 S. 300 W. P: (801) 486-2222
SLC, UT 84101 F: (801) 474-3353
www.ee-ld.com

LICENSED PROFESSIONAL ENGINEER NO. 334543-2202 MANSOUR ASHNAFI STATE OF UTAH

MATHESON COURT HOUSE
450 SOUTH STATE STREET
SALT LAKE CITY, UT, 84114

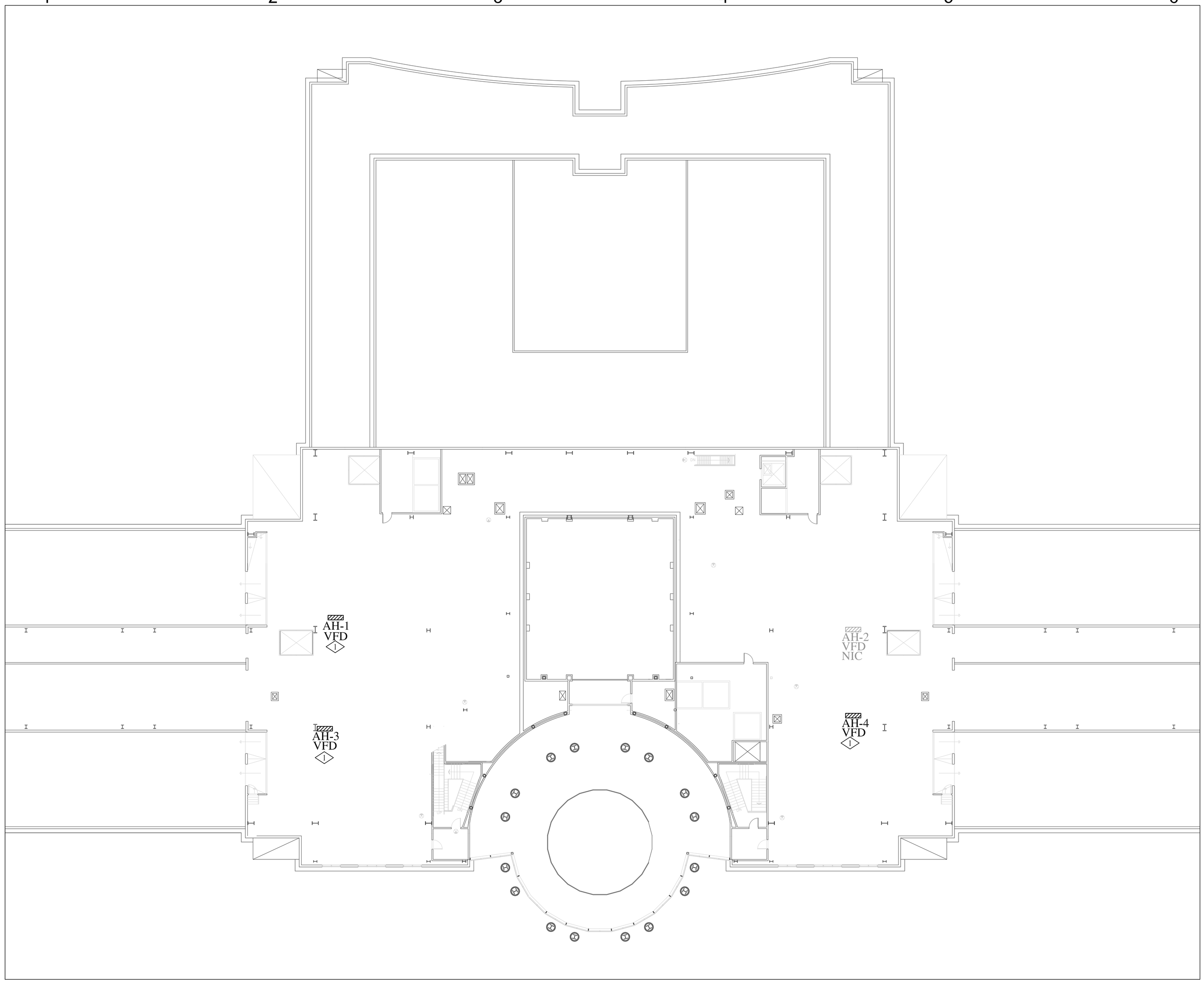
REV #	DATE	DESCRIPTION

JOB #: 345
DATE: 9-28-2010
DRAWN:
CHECKED:

TITLE:
PARTIAL 5TH FLOOR - POWER PLAN

SHEET:
EP-501

Drawing Scale/Plot Scale:
Date Printed:



NORTH

PARTIAL 6TH FLOOR - POWER PLAN

SCALE 1/16"=1'-0"

REFERENCE NOTES: POWER

1. REPLACE EXISTING VFD'S AND ASSOCIATED FILTERS, CONTACTORS, ENCLOSURE, ETC. WITH A NEW ONE. THE NEW ENCLOSURE SHALL FIT IN THE AVAILABLE SPACE. INSURE THE FEEDER/LOAD CONDUCTORS CAN REACH THE TERMINATION POINTS OF THE NEW VFD TO ELIMINATE THE NEED OF CONDUCTORS SPLICING. DO NOT SPLICE THE FEEDER/L0AD CONDUCTORS. REPLACE THE EXISTING CONDUCTORS IF NECESSARY. PROVIDE ADDITIONAL SUPPORT AND SEISMIC BRACING AS NECESSARY. FIELD VERIFY PRIOR TO BID. PROGRAM THE VFD'S AS PER OWNER'S REQUIREMENT. INTEGRATE THE NEW EQUIPMENT TO THE EXISTING CONTROL SYSTEM. PROVIDE ADDITIONAL CONDUITS, CONDUCTORS, CONTROL CABLES, CONTROL TRANSFORMER, ETC. FOR A COMPLETE WORKING INSTALLATION. THE VFD'S SHALL BE REPLACED ONE AT A TIME SO THAT ONLY ONE MECHANICAL UNIT IS DOWN AT A TIME. COORDINATE THE DOWN TIME WITH THE OWNER A WEEK IN ADVANCE.

ALTERNATE BIDS

ALTERNATE BID #1:ALL WORK ASSOCIATED WITH THE NEW VFD FOR THE AH-4.

ELECTRICAL ENGINEERING LIGHTING DESIGN
1220 S. 300 W. SLC, UT 84101
P: (801) 486-2222
F: (801) 474-3353
www.ee-ld.com

LICENSED PROFESSIONAL ENGINEER
NO. 334543-2202
MANSOUR AGHIASI
STATE OF UTAH

MATHESON COURT HOUSE
450 SOUTH STATE STREET
SALT LAKE CITY, UT, 84114

REV #	DATE	DESCRIPTION

JOB #: 345
DATE: 9-28-2010
DRAWN:
CHECKED:

TITLE:
PARTIAL 6TH FLOOR - POWER PLAN

SHEET:
EP-601

Drawing Scale/Plot Scale:
Date Printed: