



UNIVERSITY  
OF KENTUCKY

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# Purchasing Division

Request for Proposal

UK-2341-23

Proposal Due Date – 4/27/2023

MDS Passenger Elevator Modernization



# UNIVERSITY OF KENTUCKY

## Purchasing Division

### REQUEST FOR PROPOSAL (RFP)

**ATTENTION: This is not an order. Read all instructions, terms and conditions carefully.**

<b>PROPOSAL NO.:</b>	<b>UK-2341-23</b>	<b>RETURN ORIGINAL COPY OF PROPOSAL TO:</b>
<b>Issue Date:</b>	<b>04/04/2023</b>	<b>UNIVERSITY OF KENTUCKY</b>
<b>Title:</b>	<b>MDS Passenger Elevator Modernization</b>	<b>PURCHASING DIVISION</b>
<b>Purchasing Officer:</b>	<b>Ken Scott</b>	<b>411 S LIMESTONE</b>
<b>Phone/Email:</b>	<b>859.257.9102/Kenneth.Scott@uky.edu</b>	<b>ROOM 322 PETERSON SERVICE BLDG.</b>
		<b>LEXINGTON, KY 40506-0005</b>

**IMPORTANT: PROPOSALS MUST BE RECEIVED BY: 4/27/2023 3 P.M. LEXINGTON, KY TIME.**

NOTICE OF REQUIREMENTS

1. The University's General Terms and Conditions and Instructions to Bidders, viewable at [www.uky.edu/Purchasing/terms.htm](http://www.uky.edu/Purchasing/terms.htm), apply to this RFP. When the RFP includes construction services, the University's General Conditions for Construction and Instructions to Bidders, viewable at [www.uky.edu/Purchasing/ccphome.htm](http://www.uky.edu/Purchasing/ccphome.htm), apply to the RFP.
2. Contracts resulting from this RFP must be governed by and in accordance with the laws of the Commonwealth of Kentucky.
3. Any agreement or collusion among offerors or prospective offerors, which restrains, tends to restrain, or is reasonably calculated to restrain competition by agreement to bid at a fixed price or to refrain from offering, or otherwise, is prohibited.
4. Any person who violates any provisions of KRS 45A.325 shall be guilty of a felony and shall be punished by a fine of not less than five thousand dollars nor more than ten thousand dollars, or be imprisoned not less than one year nor more than five years, or both such fine and imprisonment. Any firm, corporation, or association who violates any of the provisions of KRS 45A.325 shall, upon conviction, be fined not less than ten thousand dollars or more than twenty thousand dollars.

AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION AND NON-CONFLICT OF INTEREST

I hereby swear (or affirm) under the penalty for false swearing as provided by KRS 523.040:

1. That I am the offeror (if the offeror is an individual), a partner, (if the offeror is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the offeror is a corporation);
2. That the attached proposal has been arrived at by the offeror independently and has been submitted without collusion with, and without any agreement, understanding or planned common course of action with, any other Contractor of materials, supplies, equipment or services described in the RFP, designed to limit independent bidding or competition;
3. That the contents of the proposal have not been communicated by the offeror or its employees or agents to any person not an employee or agent of the offeror or its surety on any bond furnished with the proposal and will not be communicated to any such person prior to the official closing of the RFP;
4. That the offeror is legally entitled to enter into contracts with the University of Kentucky and is not in violation of any prohibited conflict of interest, including, but not limited to, those prohibited by the provisions of KRS 45A.330 to .340, and 164.390;
5. That the offeror, and its affiliates, are duly registered with the Kentucky Department of Revenue to collect and remit the sale and use tax imposed by Chapter 139 to the extent required by Kentucky law and will remain registered for the duration of any contract award;
6. That I have fully informed myself regarding the accuracy of the statement made above.

SWORN STATEMENT OF COMPLIANCE WITH CAMPAIGN FINANCE LAWS

In accordance with KRS 45A.110 (2), the undersigned hereby swears under penalty of perjury that he/she has not knowingly violated any provision of the campaign finance laws of the Commonwealth of Kentucky and that the award of a contract to a bidder will not violate any provision of the campaign finance laws of the Commonwealth of Kentucky.

CONTRACTOR REPORT OF PRIOR VIOLATIONS OF KRS CHAPTERS 136, 139, 141, 337, 338, 341 & 342

The contractor by signing and submitting a proposal agrees as required by 45A.485 to submit final determinations of any violations of the provisions of KRS Chapters 136, 139, 141, 337, 338, 341 and 342 that have occurred in the previous five (5) years prior to the award of a contract and agrees to remain in continuous compliance with the provisions of the statutes during the duration of any contract that may be established. Final determinations of violations of these statutes must be provided to the University by the successful contractor prior to the award of a contract.

CERTIFICATION OF NON-SEGREGATED FACILITIES

The contractor, by submitting a proposal, certifies that he/she is in compliance with the Code of Federal Regulations, No. 41 CFR 60-1.8(b) that prohibits the maintaining of segregated facilities.

**SIGNATURE REQUIRED:** This proposal cannot be considered valid unless signed and dated by an authorized agent of the offeror. Type or print the signatory's name, title, address, phone number and fax number in the spaces provided. Offers signed by an agent are to be accompanied by evidence of his/her authority unless such evidence has been previously furnished to the issuing office.

<b>DELIVERY TIME:</b>	<b>NAME OF COMPANY:</b>	<b>DUNS #</b>
<b>PROPOSAL FIRM THROUGH:</b>	<b>ADDRESS:</b>	<b>Phone/Fax:</b>
<b>PAYMENT TERMS:</b>	<b>CITY, STATE &amp; ZIP CODE:</b>	<b>E-MAIL:</b>
<b>SHIPPING TERMS: F. O. B. DESTINATION PREPAID AND ALLOWED</b>	<b>TYPED OR PRINTED NAME:</b>	<b>WEB ADDRESS:</b>
<b>FEDERAL EMPLOYER ID NO.:</b>	<b>SIGNATURE:</b>	<b>DATE:</b>





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-  Attachment A General Conditions
-  Attachment B Special Conditions
-  Attachment C Drawings
-  Attachment D Specifications

## 1.0 DEFINITIONS

The term "addenda" means written or graphic instructions issued by the University of Kentucky prior to the receipt of proposals that modify or interpret the RFP documents by additions, deletions, clarifications and/or corrections.

The term "competitive negotiations" means the method authorized in the Kentucky Revised Statutes, Chapter 45A.085.

The terms "offer" or "proposal" mean the offeror's/offers' response to this RFP.

The term "offeror" means the entity or contractor group submitting the proposal.

The term "contractor" means the entity receiving a contract award.

The term "purchasing agency" means the University of Kentucky, Purchasing Division, Room 322 Peterson Service Building, Lexington, KY 40506-0005.

The term "purchasing official" means the University of Kentucky's appointed contracting representative.

The term "responsible offeror" means a person, company or corporation that has the capability in all respects to perform fully the contract requirements and the integrity and reliability that will assure good faith performance. In determining whether an offeror is responsible, the University may evaluate various factors including (but not limited to): financial resources; experience; organization; technical qualifications; available resources; record of performance; integrity; judgment; ability to perform successfully under the terms and conditions of the contract; adversarial relationship between the offeror and the University that is so serious and compelling that it may negatively impact the work performed under this RFP; or any other cause determined to be so serious and compelling as to affect the responsibility of the offeror.

The term "solicitation" means RFP.

The term "University" means University of Kentucky.

## 2.0 GENERAL OVERVIEW

### 2.1 Intent and Scope

Project scope includes the complete modernization of the 2 existing hydraulic passenger elevators at the Multidisciplinary Science Building (MDS) at 725 Rose Street in Lexington, KY. The intent is to provide a comprehensive turnkey proposal that furnishes the owner with a 100% code compliant modernized elevator system. References to work by others or other trade sections is not excluded in this work but is intended to help identify work that may be needed that is not directly elevator related. It is up to the contractor to survey the site and determine the nature and quantity of work necessary to furnish a code compliant installation.

More detailed scope descriptions can be found within the elevator specification sections (142000S02 Hydraulic and Traction Elevators and 142123.13 Hydraulic Elevator Modernization), related specification sections, and drawings.

### 2.2 Background Information

Current passenger elevators in the Multidisciplinary Science Building (MDS) at 725 Rose Street need modernization. These units are original to the building, constructed in 1983, and currently only one of two are operating on a shared controller. New construction in the building as well as assumed increase in number of students and faculty visiting the building are driving the need for upgrades of controllers, interior finishes, equipment, and the elevator room itself.

### 2.3 University Information

Since his arrival, President Eli Capilouto has set forth an ambitious agenda to extend and enhance our role as Kentucky's land-grant and flagship research university. By focusing on infrastructure growth and improvement; creating opportunities for innovative teaching, learning, and academic excellence; fostering a robust research and creative scholarship enterprise; providing life-saving subspecialty care; empowering communities through service and outreach; and encouraging a transparent and shared dialogue about institutional priorities; the University of Kentucky will ensure a new century of promise for the people we impact.

Founded in 1865 as a land-grant institution adjacent to downtown Lexington, UK is nestled in the scenic heart of the beautiful Bluegrass Region of Kentucky. From its early beginnings, with only 190 students and 10 professors, UK's campus now covers more than 918 acres and is home to more than 30,000 students and approximately 14,500 employees, including more than 2,300 full-time faculty. UK is one of a small number of universities in the United States that has programs in agriculture, engineering, a full complement of health colleges including medicine and pharmacy, law and fine arts on a single campus, leading to groundbreaking discoveries and unique interdisciplinary collaboration. The state's flagship university consists of 17 academic and professional colleges where students can choose from more than 200 majors and degree programs at the undergraduate and graduate levels. The colleges are Agriculture, Food and Environment; Arts and Sciences; Business and Economics; Communication and Information; Dentistry; Design; Education; Engineering; Fine Arts; Graduate School; Health Sciences; Law; Medicine; Nursing; Pharmacy; Public Health; and Social Work. These colleges are supported by a modern research library system.

Research at the University of Kentucky is a dynamic enterprise encompassing both traditional scholarship and emerging technologies, and UK's research faculty, staff and students are establishing UK as one of the nation's most prolific public research universities. UK's research enterprise attracted \$285 million in research grants and contracts from out-of-state sources, which generated a \$580 million impact on the Kentucky economy. Included in this portfolio is \$153 million in federal awards from the National Institutes of Health, non-NIH grants from the Department Health and Human Services, the National Science Foundation, Department of Energy, Department of Agriculture and NASA, among others. The National Science Foundation ranks UK's research enterprise 44th among public institutions.

With more than 50 research centers and institutes, UK researchers are discovering new knowledge, providing a rich training ground for current students and the next generation of researchers, and advancing the economic growth of the Commonwealth of Kentucky. Several centers excel in the services offered to the public. The Gluck Equine Research Center is one of only three facilities of its kind in the world, conducting research in equine diseases.

The Center for Applied Energy Research is pursuing groundbreaking discovery across the energy disciplines. CAER staff are pioneering new ways to sustainably utilize Kentucky natural resources through carbon-capture algae technology, biomass/coal to liquid products and the opening of UK's first LEED-certified research lab to support the development of Kentucky's growing alternative energy industry. Among the brightest examples of UK's investment in transformative research is the Markey Cancer Center. As a center of excellence and distinction at UK, Markey's robust research and clinical enterprise is the cornerstone of our commitment to Kentucky – fundamental to our success in uplifting lives through our endeavors and improving the general health and welfare of our state – burdened by the nation's highest rate of cancer deaths per 100,000 people. In 2013, Markey earned the prestigious National Cancer Institute-designation (NCI) – one of 68 nationally and the only one in Kentucky.

The University of Kentucky was awarded a \$20 million Clinical Translational Sciences Award (CTSA) from the National Institutes of Health (NIH). As one of only 60 institutions with this research distinction, UK was awarded the CTSA for its potential in moving research and discovery in the lab into practical field and community applications. The CTSA and NCI are part of a trifecta of federal research grants that includes an Alzheimer's Disease Center. UK is one of only 22 universities in the country to hold all three premier grants from NIH.

Established in 1957, the medical center at UK is one of the nation's finest academic medical centers and includes the University's clinical enterprise, UK HealthCare. The 569-bed UK Albert B. Chandler Hospital and Kentucky Children's Hospital, along with 256 beds at UK Good Samaritan Hospital, are supported by a growing faculty and staff providing the most advanced subspecialty care for the most critically injured and ill patients throughout the Commonwealth and beyond. Over the last several years, the number of patients served by the medical enterprise has increased from roughly 19,000 discharges to more than 36,000 discharges in 2014.

UK Chandler Hospital includes the only Level 1 Trauma Center for both adult and pediatric patients in Central and Eastern Kentucky. In addition, UK HealthCare recently opened one of the country's largest robotic hybrid operating rooms and the first of its kind in the region. While our new patient care pavilion is the leading healthcare facility for advanced medical procedures in the region, our talented physicians consult with and travel to our network of affiliate hospitals so Kentucky citizens can receive the best health care available close to their home and never need to leave the Bluegrass for complex subspecialty care.



King's Daughters Medical Center based in Ashland Kentucky officially became part of the University of Kentucky. King's Daughters Medical Center serves a 16-county region across Kentucky, Ohio, and West Virginia. Its health system is comprised of two acute-care hospitals totaling 465 licensed beds, more than 50 ambulatory centers and practice locations, a long-term care facility, medical transport company, and six urgent care centers.

UK's agenda remains committed to accelerating the University's movement toward academic excellence in all areas and gain worldwide recognition for its outstanding academic programs, its commitment to students, its investment in pioneering research and discovery, its success in building a diverse community and its engagement with the larger society. It is all part of the University's fulfillment of our promise to Kentucky to position our state as a leader in American prosperity.

## **SUSTAINABILITY**

Sustainability is an institution-wide priority for the University of Kentucky. We strive to ensure that all activities are ecologically sound, socially just, and economically viable, and that they will continue to be so for future generations. This commitment also prioritizes the integration of these principles in curricula, research, athletics, health care, creative works, and outreach. This principled approach to operational practices and intellectual pursuits is intended to prepare students and empower the campus community to support sustainable development in the Commonwealth and beyond. The UK Sustainability Strategic Plan guides these efforts (<https://www.uky.edu/sustainability/sustainability-strategic-plan>).

### **2.4 Supplier Diversity and Procurement**

The University of Kentucky is committed to serve as an advocate for diverse businesses in their efforts to conduct business. Diverse Business Enterprises (DBE) consist of minority, women, disabled, veteran and disabled veteran owned business firms that are at least fifty-one percent owned and operated by an individual(s) of the aforementioned categories. Also included in this category are disabled business enterprises and non-profit work centers for the blind and severely disabled.

The University is committed to increasing the amount of goods and services acquired from businesses owned and controlled by diverse persons to 10% of all procurement expenditures. The University expects its suppliers to support and assist in this effort.

Among the University's goals for DBE participation in procurement are:

- To ensure the absence of barriers that reduce the participation of diverse suppliers
- Educate vendors on "how to" do business with the University
- Support diverse vendors seeking to do business with the University in the areas of goods, services, construction, and other areas of procurement
- Encourage participation of qualified diverse vendors by directing them to agencies that can benefit from their product or service
- Provide resources for diverse vendors
- Sponsor events to assist diverse vendors in becoming active, responsible, and responsive participants in the University's purchasing opportunities

For additional information regarding how diverse suppliers may participate in this Request for Proposal, submit any questions to the Purchasing Officer as indicated in Section 3.2 by the Deadline for Written Questions date.

**3.0 PROPOSAL REQUIREMENTS**

**3.1 Key Event Dates**

Pre-Proposal Conference (Optional)	04/12/2023 @1:00 P.M. Lexington, KY Time
Deadline for Written Questions	1:00 P.M. 04/17/2023 Lexington, KY Time
RFP Proposals Due	3:00 P.M. 04/17/2023 Lexington, KY Time

**3.2 Communication Offeror**

To ensure that RFP documentation and subsequent information (modifications, clarifications, addenda, Written Questions and Answers, etc.) are directed to the appropriate persons within the offeror’s firm, each offeror who intends to participate in this RFP is to provide the following information to the purchasing officer. Prompt, thorough compliance is in the best interest of the offeror. Failure to comply may result in incomplete or delayed communication of addenda or other vital information. Contact information is the responsibility of the offeror. Without the prompt information, any communication shortfall shall reside with the offeror.

- Name of primary contact
- Mailing address of primary contact
- Telephone number of primary contact
- Fax number of primary contact
- E-mail address of primary contact
- Additional contact persons with same information provided as primary contact

This information shall be transmitted via fax or e-mail to:

Ken Scott  
 Purchasing Division  
 University of Kentucky  
 322 Peterson Service Building  
 Lexington, KY 40506-0005  
 Phone: (859) 257-9102  
 Fax: (859) 257-1951  
 E-mail: [Kenneth.Scott@uky.edu](mailto:Kenneth.Scott@uky.edu)

All communication with the University regarding this RFP shall only be directed to the purchasing officer listed above.

### **3.3 Pre-Proposal Conference**

A pre-proposal conference will be held in Lexington, Kentucky on 3/31/23 at 1p.m. in the first floor elevator lobby in the Multidisciplinary Science Building at 725 Rose Street on the University of Kentucky campus to allow prospective contractors an opportunity to ask questions and clarify the University's expectations. This conference provides offerors an opportunity for oral questions.

The following items should be noted in reference to the pre-proposal conference:

- Attendance at the pre-proposal conference is optional. At this conference, the scope of services will be discussed in detail and copies of prior year financial reports will be distributed.
- Offerors are encouraged to submit written questions after the conference by the date listed in Section 3.1.

The University will prepare written responses to all questions submitted and make them available to all offerors. The questions and answers will be made part of the RFP and may become part of the contract with the successful contractor. Answers given orally at the conference are not binding.

### **3.4 Offeror Presentations**

All offerors whose proposals are judged acceptable for award may be required to make a presentation to the evaluation committee.

### **3.5 Preparation of Offers**

The offeror is expected to follow all specifications, terms, conditions and instructions in this RFP.

The offeror will furnish all information required by this solicitation.

Proposals should be prepared simply and economically, providing a description of the offeror's capabilities to satisfy the requirements of the solicitation. Emphasis should be on completeness and clarity of content. All documentation submitted with the proposal should be bound in the single volume except as otherwise specified.

An electronic version of the RFP, in .PDF format only, is available through the University of Kentucky Purchasing Division website at: <https://purchasing.uky.edu/bid-and-proposal-opportunities>.

### **3.6 Proposed Deviations from the RFP**

The stated requirements appearing elsewhere in this RFP shall become a part of the terms and conditions of any resulting contract. Any deviations therefrom must be specifically defined in accordance with the transmittal letter, Section 4.3 (d). If accepted by the University, the deviations shall become part of the contract, but such deviations must not be in conflict with the basic nature of this RFP.

Note: Offerors shall not submit their standard terms and conditions as exceptions to the University's General Terms and Conditions. Each exception to the University's General Terms and Conditions shall be individually addressed.

### **3.7 Proposal Submission and Deadline**

Offeror must provide the following materials prior to 3 p.m. (Lexington, KY time) on the date specified in Section 3.1 and addressed to the purchasing officer listed in Section 3.2:

- **Technical Proposal:** One (1) copy on an electronic storage device (USB) (1 copy per storage device) each clearly marked with the proposal number and name, firm name and what is included (Technical Proposal) and two (2) printed copies in a single package, separate from the Financial Proposal.
- **Financial Proposal:** One (1) copy on an electronic storage device (USB) (1 copy per storage device) each clearly marked with the proposal number and name, firm name and what is included (Financial Proposal) and two (2) printed copies in a single package, separate from the Technical Proposal.

**Note: Proposals received after the closing date and time will not be considered. In addition, proposals received via fax or e-mail are not acceptable.**

**The University of Kentucky accepts deliveries of RFPs Monday through Friday from 8 a.m. to 5 p.m. Lexington, KY time. However, RFPs must be received by 3 p.m. Lexington, KY time on the date specified on the RFP in order to be considered.**

Proposals shall be enclosed in sealed envelopes to the above referenced address and shall show on the face of the envelope: the closing time and date specified, the solicitation number and the name and address of the offeror. The technical proposal shall be submitted in a sealed envelope and the financial proposal shall be submitted in a sealed envelope under separate cover. Both sealed envelopes shall have identical information on the cover, with the addition that one will state "Technical Information," and the other, "Financial Proposal."

Note: In accordance with the Kentucky Revised Statute 45A.085, there will be no public opening.

### **3.8 Modification or Withdrawal of Offer**

An offer and/or modification of offer received at the office designated in the solicitation after the exact hour and date specified for receipt will not be considered.

An offer may be modified or withdrawn by written notice before the exact hour and date specified for receipt of offers. An offer also may be withdrawn in person by an offeror or an authorized representative, provided the identity of the person is made known and the person signs a receipt for the offer, but only if the withdrawal is made prior to the exact hour and date set for receipt of offers.

### **3.9 Acceptance or Rejection and Award of Proposal**

The University reserves the right to accept or reject any or all proposals (or parts of proposals), to waive any informalities or technicalities, to clarify any ambiguities in proposals and (unless otherwise specified) to accept any item in the proposal. In case of error in extension or prices or other errors in calculation, the unit price shall govern. Further, the University reserves the right to make a single award, split awards, multiple awards or no award, whichever is in the best interest of the University.

### **3.10 Rejection**

Grounds for the rejection of proposals include (but shall not be limited to):

- Failure of a proposal to conform to the essential requirements of the RFP.
- Imposition of conditions that would significantly modify the terms and conditions of the solicitation or limit the offeror's liability to the University on the contract awarded on the basis of such solicitation.
- Failure of the offeror to sign the University RFP. This includes the Authentication of Proposal and Statement of Non-Collusion and Non-Conflict of Interest statements.
- Receipt of proposal after the closing date and time specified in the RFP.

### **3.11 Addenda**

Any addenda or instructions issued by the purchasing agency prior to the time for receiving proposals shall become a part of this RFP. Such addenda shall be acknowledged in the proposal. No instructions or changes shall be binding unless documented by a proper and duly issued addendum.

### **3.12 Disclosure of Offeror's Response**

The RFP specifies the format, required information and general content of proposals submitted in response to this RFP. The purchasing agency will not disclose any portions of the proposals prior to contract award to anyone outside the Purchasing Division, the University's administrative staff, representatives of the state or federal government (if required) and the members of the committee evaluating the proposals. After a contract is awarded in whole or in part, the University shall have the right to duplicate, use or disclose all proposal data submitted by offerors in response to this RFP as a matter of public record.

Any submitted proposal shall remain valid six (6) months after the proposal due date.

The University shall have the right to use all system ideas, or adaptations of those ideas, contained in any proposal received in response to this RFP. Selection or rejection of the proposal will not affect this right.

**3.13 Restrictions on Communications with University Staff**

From the issue date of this RFP until a contractor is selected and a contract award is made, offerors are not allowed to communicate about the subject of the RFP with any University administrator, faculty, staff or members of the board of trustees except: the purchasing office representative, any University purchasing official representing the University administration, others authorized in writing by the purchasing office and University representatives during offeror presentations. If violation of this provision occurs, the University reserves the right to reject the offeror's proposal.

**3.14 Cost of Preparing Proposal**

Costs for developing the proposals and any subsequent activities prior to contract award are solely the responsibility of the offerors. The University will provide no reimbursement for such costs.

**3.15 Disposition of Proposals**

All proposals become the property of the University. The successful proposal will be incorporated into the resulting contract by reference.

**3.16 Alternate Proposals**

Offerors may submit alternate proposals. If more than one proposal is submitted, all must be complete (separate) and comply with the instructions set forth within this document. Each proposal will be evaluated on its own merits.

**3.17 Questions**

All questions should be submitted by either fax or e-mail to the purchasing officer listed in Section 3.2 no later than the date listed in Section 3.1.

**3.18 Section Titles in the RFP**

Section titles used herein are for the purpose of facilitating ease of reference only and shall not be construed to infer the construction of contractual language.

**3.19 No Contingent Fees**

No person or selling agency shall be employed or retained or given anything of monetary value to solicit or secure this contract, except bona fide employees of the offeror or bona fide established commercial or selling agencies maintained by the offeror for the purpose of securing business. For breach or violation of this provision, the University shall have the right to reject the proposal, annul the contract without liability, or, at its discretion, deduct from the contract price or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee or other benefit.

### **3.20 Proposal Addenda and Rules for Withdrawal**

Prior to the date specified for receipt of offers, a submitted proposal may be withdrawn by submitting a written request for its withdrawal to the University purchasing office, signed by the offeror. Unless requested by the University, the University will not accept revisions or alterations to proposals after the proposal due date.

### **3.21 Requirement To Perform Vendor Onboarding and Registration**

As a condition of award, and for any renewals performed during the life of the contract, successful Contractor agrees to register their company with PaymentWorks, Inc., the University's vendor onboarding application. Registration information will be provided by the Purchasing Division as part of the award process. During the vendor registration process, successful Contractor agrees to provide any applicable information pertaining to diversity demographics for their company. Further, should any company or diversity information change during the life of the contract, successful Contractor agrees to update this information in PaymentWorks as applicable.

## **4.0 PROPOSAL FORMAT AND CONTENT**

### **4.1 Proposal Information and Criteria**

The following list specifies the items to be addressed in the proposal. Offerors should read it carefully and address it completely and, in the order, listed to facilitate the University's review of the proposal.

Proposals shall be organized into the sections identified below. The content of each section is detailed in the following pages. It is strongly suggested that offerors use the same numbers for the following content that are used in the RFP.

- Signed Authentication of Proposal and Statement of Non-Collusion and Non-Conflict of Interest Form
- Transmittal Letter
- Executive Summary and Proposal Overview
- Criteria 1 - Offeror Qualifications
- Criteria 2 - Services Defined
- Criteria 3 - Financial Proposal
- Criteria 4 - Evidence of Successful Performance and Implementation Schedule
- Criteria 5 - Other Additional Information

#### **4.2 Signed Authentication of Proposal and Statements of Non-Collusion and Non-Conflict of Interest Form**

The Offeror will sign and return the proposal cover sheet and print or type their name, firm, address, telephone number and date. The person signing the offer must initial erasures or other changes. An offer signed by an agent is to be accompanied by evidence of their authority unless such evidence has been previously furnished to the purchasing agency. The signer shall further certify that the proposal is made without collusion with any other person, persons, company or parties submitting a proposal; that it is in all respects fair and in good faith without collusion or fraud; and that the signer is authorized to bind the principal offeror.

#### **4.3 Transmittal Letter**

The Transmittal Letter accompanying the RFP shall be in the form of a standard business letter and shall be signed by an individual authorized to legally bind the offeror. It shall include:

- A statement referencing all addenda and written questions, the answers and any clarifications to this RFP issued by the University and received by the offeror (If no addenda have been received, a statement to that effect should be included.).
- A statement that the offeror's proposal shall remain valid for six (6) months after the closing date of the receipt of the proposals.
- A statement that the offeror will accept financial responsibility for all travel expenses incurred for oral presentations (if required) and candidate interviews.
- A statement that summarizes any deviations or exceptions to the RFP requirements and includes a detailed justification for the deviation or exception.
- A statement that identifies the confidential information as described in Section 6.23.



#### **4.4 Executive Summary and Proposal Overview**

The Executive Summary and Proposal Overview shall condense and highlight the contents of the technical proposal in such a way as to provide the evaluation committee with a broad understanding of the entire proposal.

As part of the Executive Summary and Proposal Overview, Offeror shall submit with their response a summarized profile describing the demographic nature of their company or organization:

1. When was your organization established and/or incorporated?
2. Indicate whether your organization is classified as local, regional, national, or international.
3. Describe the size of your company in terms of number of employees, gross sales, etc.
4. Is your company certified as small business, minority-owned, women-owned, veteran-owned, disabled-owned, or similar classification?
5. Include other demographic information that you feel may be applicable to the Request for Proposal submission.
6. Offeror shall describe in detail their company's commitment to diversity, equity, and inclusion. Information shall be provided as to the number of diverse individuals that the vendor employees as well as a description of vendors efforts to do business with Diverse Business Enterprises as they conduct their own business. In addition, please indicate the diversity nature of your company as well as ownership race/ethnicity.

Check One Only	<b>Diverse Business Description (If Diverse Business, determine the classification that is the best description)</b>	<b>Internal Code</b>
	Minority Owned (only)	10
	Veteran Owned and Small Business	100
	Minority and Woman and Small Business	110
	Minority and Woman and Veteran-Owned Business	120
	Minority and Veteran and Small Business	130
	Woman and Veteran and Small Business	140
	Minority and Woman and Veteran-Owned Small Business	150
	Woman Owned (only)	20
	Small Business (only)	30
	Veteran Owned (only)	40
	Minority and Woman Owned	50
	Minority and Small Business	60
	Minority and Veteran-Owned	70
	Woman Owned and Small Business	80
	Woman and Veteran-Owned	90
	Diversity not indicated	999

<b>Race/Ethnicity</b>	<b>Check One</b>
Asian	
Black/African American	
Hispanic or Latino	
Native American	
Native Hawaiian/Pacific Islander	
White	
Other	

**4.5 Criteria 1 - Offeror Qualifications**

The purpose of the Offeror Qualifications section is to determine the ability of the offeror to respond to this RFP. Offerors must describe and offer evidence of their ability to meet each of the qualifications listed below.

Our supply chains and business partnerships are an important aspect of this work. In your proposal, please (A) provide your company’s mission and vision relative to sustainability, and (B) how your company, through services, products, and partnerships, will help the University of Kentucky advance specific elements of the Sustainability Strategic Plan.

**4.6 Criteria 2 – Services Defined**

1. Provide a brief narrative explaining how your company will accomplish the services described in this RFP, including number and type of staff (engineering, project management, etc.). In the narrative, please describe each phase of the work, (design, equipment selection, installation, training and after warranty service).
2. Identify the major equipment/materials that will be used in the performance of the scope of work defined in this RFP. Provide product information on the equipment that is being proposed.
3. Include the sizes of required elevator shafts, pits, and machine/controller rooms, and a written confirmation that the proposed equipment will work properly with the shaft, pit, and machine/controller room sizes indicated on contract documents.

**4.7 Criteria 3 – Financial Proposal**

The Financial Summary Form shall contain the complete financial offer made to the University using the format contained in Section 8.0. All financial information must be submitted in a sealed envelope under separate cover.

**4.8 Criteria 4 – Evidence of Successful Performance and Implementation Schedule**

Provide a statement that the Offeror has the resources available to assure meeting the requirements described in this RFP and to meet the schedule included in the documents. Include manpower schedule and manhour totals.

**4.9 Criteria 5 – Other Additional Information**

Please provide any additional information that the offeror feels should be considered when evaluating their proposal.

## 5.0 EVALUATION CRITERIA PROCESS

A committee of University officials appointed by the Chief Procurement Officer will evaluate proposals and make a recommendation to the Chief Procurement Officer. The evaluation will be based upon the information provided in the proposal, additional information requested by the University for clarification, information obtained from references and independent sources and oral presentations (if requested).

The evaluation of responsive proposals shall then be completed by an evaluation team, which will determine the ranking of proposals. Proposals will be evaluated strictly in accordance with the requirements set forth in this solicitation, including any addenda that are issued. The University will award the contract to the responsible offeror whose proposal is determined to be the most advantageous to the University, taking into consideration the evaluation factors set forth in this RFP.

The evaluation of proposals will include consideration of responses to the list of criteria in Section 4.0. Offerors must specifically address all criteria in their response. Any deviations or exceptions to the specifications or requirements must be described and justified in a transmittal letter. Failure to list such exceptions or deviations in the transmittal letter may be considered sufficient reason to reject the proposal.

The relative importance of the criteria is defined below:

### **Primary Criteria**

- Offeror Qualifications
- Services Defined
- Financial Proposal
- Evidence of Successful Performance and Implementation

### **Secondary Criteria**

- Other Additional Services

The University will evaluate proposals as submitted and may not notify offerors of deficiencies in their responses.

Proposals must contain responses to each of the criteria, listed in Section 4 even if the offeror's response cannot satisfy those criteria. A proposal may be rejected if it is conditional or incomplete in the judgment of the University.

## **6.0 SPECIAL CONDITIONS**

### **6.1 Contract Term**

The contract resulting from this RFP shall be effective 4/18/23 through 12/31/23 and is renewable for up to 1 additional one-year renewal periods. The total contract period will not exceed 2 years. Annual renewal shall be contingent upon the University's satisfaction with the services performed.

### **6.2 Effective Date**

The effective date of the contract shall be the date upon which the parties execute it and all appropriate approvals, including that of the Commonwealth of Kentucky Government Contracts Review Committee, have been received.

### **6.3 Competitive Negotiation**

It is the intent of the RFP to enter into competitive negotiation as authorized by KRS 45A.085.

The University will review all proposals properly submitted. However, the University reserves the right to request necessary modifications, reject all proposals, reject any proposal that does not meet mandatory requirement(s) or cancel this RFP, according to the best interests of the University.

Offeror(s) selected to participate in negotiations may be given an opportunity to submit a Best and Final Offer to the purchasing agency. All information-received prior to the cut-off time will be considered part of the offeror's Best and Final Offer.

The University also reserves the right to waive minor technicalities or irregularities in proposals providing such action is in the best interest of the University. Such waiver shall in no way modify the RFP requirements or excuse the offeror from full compliance with the RFP specifications and other contract requirements if the offeror is awarded the contract.

### **6.4 Appearance Before Committee**

Any, all or no offerors may be requested to appear before the evaluation committee to explain their proposal and/or to respond to questions from the committee concerning the proposal. Offerors are prohibited from electronically recording these meetings. The committee reserves the right to request additional information.

### **6.5 Additions, Deletions or Contract Changes**

The University reserves the right to add, delete, or change related items or services to the contract established from this RFP. No modification or change of any provision in the resulting contract shall be made unless such modification is mutually agreed to in writing by the contractor and the Chief Procurement Officer and incorporated as a written modification to the contract. Memoranda of understanding and correspondence shall not be interpreted as a modification to the contract.

**6.6 Contractor Cooperation in Related Efforts**

The University reserves the right to undertake or award other contracts for additional or related work to other entities. The contractor shall fully cooperate with such other contractors and University employees and carefully fit its work to such additional work. The contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor or by University employees. This clause shall be included in the contracts of all contractors with whom this contractor will be required to cooperate. The University shall equitably enforce this clause to all contractors to prevent the imposition of unreasonable burdens on any contractor.

**6.7 Entire Agreement**

The RFP shall be incorporated into any resulting contract. The resulting contract, including the RFP and those portions of the offeror's response accepted by the University, shall be the entire agreement between the parties.

**6.8 Governing Law**

The contractor shall conform to and observe all laws, ordinances, rules and regulations of the United States of America, Commonwealth of Kentucky and all other local governments, public authorities, boards or offices relating to the property or the improvements upon same (or the use thereof) and will not permit the same to be used for any illegal or immoral purposes, business or occupation. The resulting contract shall be governed by Kentucky law and any claim relating to this contract shall only be brought in the Franklin Circuit Court in accordance with KRS 45A.245.

**6.9 Kentucky's Personal Information Security and Breach Investigation Procedures and Practices Act**

To the extent Company receives Personal Information as defined by and in accordance with Kentucky's Personal Information Security and Breach Investigation Procedures and Practices Act, KRS 61.931, 61.932 and 61.933 (the "Act"), Company shall secure and protect the Personal Information by, without limitation: (i) complying with all requirements applicable to non-affiliated third parties set forth in the Act; (ii) utilizing security and breach investigation procedures that are appropriate to the nature of the Personal Information disclosed, at least as stringent as University's and reasonably designed to protect the Personal Information from unauthorized access, use, modification, disclosure, manipulation, or destruction; (iii) notifying University of a security breach relating to Personal Information in the possession of Company or its agents or subcontractors within seventy-two (72) hours of discovery of an actual or suspected breach unless the exception set forth in KRS 61.932(2)(b)2 applies and Company abides by the requirements set forth in that exception; (iv) cooperating with University in complying with the response, mitigation, correction, investigation, and notification requirements of the Act, (v) paying all costs of notification, investigation and mitigation in the event of a security breach of Personal Information suffered by Company; and (vi) at University's discretion and direction, handling all administrative functions associated with notification, investigation and mitigation.

## **6.10 Termination for Convenience**

The University of Kentucky, Purchasing Division, reserves the right to terminate the resulting contract without cause with a thirty (30) day written notice. Upon receipt by the contractor of a "notice of termination," the contractor shall discontinue all services with respect to the applicable contract. The cost of any agreed upon services provided by the contractor will be calculated at the agreed upon rate prior to a "notice of termination" and a fixed fee contract will be pro-rated (as appropriate).

## **6.11 Termination for Non-Performance**

### Default

The University may terminate the resulting contract for non-performance, as determined by the University, for such causes as:

- Failing to provide satisfactory quality of service, including, failure to maintain adequate personnel, whether arising from labor disputes, or otherwise any substantial change in ownership or proprietorship of the Contractor, which in the opinion of the University is not in its best interest, or failure to comply with the terms of this contract;
- Failing to keep or perform, within the time period set forth herein, or violation of, any of the covenants, conditions, provisions or agreements herein contained;
- Adjudicating as a voluntarily bankrupt, making a transfer in fraud of its creditors, filing a petition under any section from time to time, or under any similar law or statute of the United States or any state thereof, or if an order for relief shall be entered against the Contractor in any proceeding filed by or against contractor thereunder. In the event of any such involuntary bankruptcy proceeding being instituted against the Contractor, the fact of such an involuntary petition being filed shall not be considered an event of default until sixty (60) days after filing of said petition in order that Contractor might during that sixty (60) day period have the opportunity to seek dismissal of the involuntary petition or otherwise cure said potential default; or
- Making a general assignment for the benefit of its creditors, or taking the benefit of any insolvency act, or if a permanent receiver or trustee in bankruptcy shall be appointed for the Contractor.

### Demand for Assurances

In the event the University has reason to believe Contractor will be unable to perform under the Contract, it may make a demand for reasonable assurances that Contractor will be able to timely perform all obligations under the Contract. If Contractor is unable to provide such adequate assurances, then such failure shall be an event of default and grounds for termination of the Contract.

### Notification

The University will provide ten (10) calendar days written notice of default. Unless arrangements are made to correct the non-performance issues to the University's satisfaction within ten (10) calendar days, the University may terminate the contract by giving forty-five (45) days notice, by registered or certified mail, of its intent to cancel this contract.

### **6.12 Funding Out**

The University may terminate this contract if funds are not appropriated or are not otherwise available for the purpose of making payments without incurring any obligation for payment after the date of termination, regardless of the terms of the contract. The University shall provide the contractor thirty (30) calendar days' written notice of termination under this provision.

### **6.13 Prime Contractor Responsibility**

Any contracts that may result from the RFP shall specify that the contractor(s) is/are solely responsible for fulfillment of the contract with the University.

### **6.14 Assignment and Subcontracting**

The Contractor(s) may not assign or delegate its rights and obligations under any contract in whole or in part without the prior written consent of the University. Any attempted assignment or subcontracting shall be void.

### **6.15 Permits, Licenses, Taxes**

The contractor shall procure all necessary permits and licenses and abide by all applicable laws, regulations and ordinances of all federal, state and local governments in which work under this contract is performed.

The contractor must furnish certification of authority to conduct business in the Commonwealth of Kentucky as a condition of contract award. Such registration is obtained from the Secretary of State, who will also provide the certification thereof. However, the contractor need not be registered as a prerequisite for responding to the RFP.

The contractor shall pay any sales, use, personal property and other tax arising out of this contract and the transaction contemplated hereby. Any other taxes levied upon this contract, the transaction or the equipment or services delivered pursuant hereto shall be the responsibility of the contractor.

The contractor will be required to accept liability for payment of all payroll taxes or deductions required by local and federal law including (but not limited to) old age pension, social security or annuities.



**6.16 Attorneys' Fees**

In the event that either party deems it necessary to take legal action to enforce any provision of the contract and in the event that the University prevails, the contractor agrees to pay all expenses of such action including attorneys' fees and costs at all stages of litigation.

**6.17 Royalties, Patents, Copyrights and Trademarks**

The Contractor shall pay all applicable royalties and license fees. If a particular process, products or device is specified in the contract documents and it is known to be subject to patent rights or copyrights, the existence of such rights shall be disclosed in the contract documents and the Contractor is responsible for payment of all associated royalties. To the fullest extent permitted by law the Contractor shall indemnify, hold the University harmless, and defend all suits, claims, losses, damages or liability resulting from any infringement of patent, copyright, and trademark rights resulting from the incorporation in the Work or device specified in the Contract Documents.

Unless provided otherwise in the contract, the Contractor shall not use the University's name nor any of its trademarks or copyrights, although it may state that it has a Contract with the University.

**6.18 Indemnification**

The contractor shall indemnify, hold and save harmless the University, its affiliates and subsidiaries and their officers, agents and employees from losses, claims, suits, actions, expenses, damages, costs (including court costs and attorneys' fees of the University's attorneys), all liability of any nature or kind arising out of or relating to the Contractor's response to this RFP or its performance or failure to perform under the contract awarded from this RFP. This clause shall survive termination for as long as necessary to protect the University.

**6.19 Insurance**

The successful Contractor shall procure and maintain, at its expense, the following minimum insurance coverages insuring all services, work activities and contractual obligations undertaken in this contract. These insurance policies must be with insurers acceptable to the University.

**COVERAGES**

Workers' Compensation  
Employer's Liability  
Commercial General Liability including operations/completed operations, products and contractual liability (including defense and investigation costs), and this contract  
Business Automobile Liability covering owned, leased, or non-owned autos

**LIMITS**

Statutory Requirements (Kentucky)  
\$500,000/\$500,000/\$500,000  
\$3,000,000 each occurrence  
(BI & PD combined) \$2,000,000 Products and Completed Operations Aggregate  
\$1,000,000 each occurrence  
(BI & PD combined)

The successful contractor agrees to furnish Certificates of Insurance for the above described coverages and limits to the University of Kentucky, Purchasing Division. The University, its trustees and employees must be added as additional insured on the Commercial General Liability policy with regard to the scope of this solicitation. Any deductibles or self-insured retention in the above-described policies must be paid and are the sole responsibility of the contractor. Coverage is to be primary and non-contributory with other coverage (if any) purchased by the University. All of these required policies must include a Waiver of Subrogation (except Workers' Compensation) in favor of the University, its trustees and employees.

#### **6.20 Method of Award**

It is the intent of the University to award a contract to the qualified offeror whose offer, conforming to the conditions and requirements of the RFP, is determined to be the most advantageous to the University, cost and other factors considered.

Notwithstanding the above, this RFP does not commit the University to award a contract from this solicitation. The University reserves the right to reject any or all offers and to waive formalities and minor irregularities in the proposal received.

#### **6.21 Reciprocal Preference**

In accordance with KRS 45A.494, a resident offeror of the Commonwealth of Kentucky shall be given a preference against a nonresident offeror. In evaluating proposals, the University will apply a reciprocal preference against an offeror submitting a proposal from a state that grants residency preference equal to the preference given by the state of the nonresident offeror. Residency and non-residency shall be defined in accordance with KRS 45A.494(2) and 45A.494(3), respectively. Any offeror claiming Kentucky residency status shall submit with its proposal a notarized affidavit affirming that it meets the criteria as set forth in the above reference statute.

#### **6.22 Reports and Auditing (NOT USED)**

#### **6.23 Confidentiality**

The University recognizes an offeror's possible interest in preserving selected information and data included in the proposal; however, the University must treat such information and data as required by the Kentucky Open Records Act, KRS 61.870, et seq.

Information areas which normally might be considered proprietary, and therefore confidential, shall be limited to individual personnel data, customer references, formulae and company financial audits which, if disclosed, would permit an unfair advantage to competitors. If a proposal contains information in these areas and the offeror declares them to be proprietary in nature and not available for public disclosure, the offeror shall declare in the Transmittal Letter the inclusion of proprietary information and shall noticeably label as confidential or proprietary each sheet containing such information. Proposals containing information declared by the offeror to be proprietary or confidential, either wholly or in part, outside the areas listed above may be deemed non-responsive and may be rejected.

The University's General Counsel shall review each offeror's information claimed to be confidential and, in consultation with the offeror (if needed), make a final determination as to whether or not the confidential or proprietary nature of the information or data complies with the Kentucky Open Records Act.

#### **6.24 Conflict of Interest**

This Request for Proposal and resulting Contract are subject to provisions of the Kentucky Revised Statutes regarding conflict of interest and the University of Kentucky's Ethical Principles and Code of Conduct ([www.uky.edu/Legal/ethicscode.htm](http://www.uky.edu/Legal/ethicscode.htm)). When submitting and signing a proposal, an offeror is certifying that no actual, apparent or potential conflict of interest exists between the interests of the University and the interests of the offeror. A conflict of interest (whether contractual, financial, organizational or otherwise) exists when any individual, contractor or subcontractor has a direct or indirect interest because of a financial or pecuniary interest, gift or other activities or relationships with other persons (including business, familial or household relationships) and is thus unable to render or is impeded from rendering impartial assistance or advice, has impaired objectivity in performing the proposed work or has an unfair competitive advantage.

Questions concerning this section or interpretation of this section should be directed to the University purchasing officer identified in this RFP.

#### **6.25 Personal Service Contract Policies (NOT USED)**

#### **6.26 Copyright Ownership and Title to Designs and Copy**

The contractor and University intend this RFP to result in a contract for services, and both consider the products and results of the services to be rendered by the contractor hereunder to be a work made for hire. The contractor acknowledges and agrees that the work and all rights therein, including (without limitation) copyright, belongs to and shall be the sole and exclusive property of the University. For any work that is not considered a work made for hire under applicable law, title and copyright ownership shall be assigned to the University.

Title to all dies, type, cuts, artwork, negatives, positives, color separations, progressive proofs, plates, copy and any other requirement not stated herein required for completion of the finished product for use in connection with any University job shall be the property of and owned by the University. Such items shall be returned to the appropriate department upon completion and/or delivery of work unless otherwise authorized by the University. In the event that time of return is not specified, the contractor shall return all such items to the appropriate University department within one week of delivery.

**6.27 University Brand Standards**

The contractor must adhere to all University of Kentucky Brand Standards. University Brand Standards are maintained by the University Public Relations Office (UKPR) and can be viewed at <http://www.uky.edu/prmarketing/brand-standards>. Non-adherence to the standards can have a penalty up to and including contract cancellation. Only the UKPR Director or designee can approve exceptions to the University standards.

Graphics standards for the UK HealthCare areas are governed by UK HealthCare Clinical Enterprise Graphic Standards, found at: <https://ukhealthcare.uky.edu/staff/brand-strategy>.

Contractor warrants that its products or services provided hereunder will be in compliance with all applicable Federal disabilities laws and regulations, including without limitation the accessibility requirements of Section 255 of the Federal Telecommunications Act of 1996 (47 U.S.C. § 255) and Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794d), and its implementing regulations set forth at Title 36, Code of Federal Regulations, Part 1194. For purposes of clarity, updated regulations under Section 508 standards now incorporate WCAG 2.0, and for purposes of this agreement WCAG 2.0 Level AA compliance is expressly included. Contractor agrees to promptly respond to, resolve and remediate any complaint regarding accessibility of products or services in a timely manner and provide an updated version to University at no cost. If deficiencies are identified, University reserves the right to request from Contractor, a timeline by which accessibility standards will be incorporated into the products or services provided by Contractor and shall provide such a timeline within a commercially reasonable duration of time. Failure to comply with these requirements shall constitute a material breach of this Agreement and shall be grounds for termination of this Agreement.

Where any customized web services are provided, Contractor represents that it has reviewed the University's Web Policy and all products or services will comply with its published standards.

Contractor will provide University with a current Voluntary Product Accessibility Template (VPAT) for any deliverable(s). If none is available, Vendor will provide sufficient information to reasonably assure the University that the products or services are fully compliant with current requirements.

**6.28 Printing Statutes (NOT USED)****6.29 Requirement for Contract Administration Fee (NOT USED)**

### 6.30 **Payment Terms**

The University adheres to a strategic approach regarding payables management based on risk minimization, processing costs, and industry best practices. As such, suppliers and individuals doing business with the University will be paid based on the following protocol:

1. The University utilizes Payment Plus (e-payables) as its primary default form of payment. By enrolling in Payment Plus, suppliers can receive payments immediately (all invoices will be paid immediately upon confirmation of goods receipt and invoice). The process is electronic and the supplier receives real-time payment notices. Additional information regarding Payment Plus (and enrollment form) can be found at: <https://www.uky.edu/ufs/payment-plus-supplier-enrollment-form>.
2. Payments by check. Payment terms for check payments are Net-30.
3. Individuals receiving payments from the University that require ACH direct payments will only be processed under special circumstances as approved by the Controller's office. Payment terms for ACH are Net-40.

## 7.0 **SCOPE OF SERVICES**

### 7.1 **Detailed Services Defined**

#### **A. Contract Documents**

##### **Sheet List:**

A2.0	COMPOSITE BASEMENT DEMOLITION PLAN
M0.0	MECHANICAL LEGEND
M1.0	BASEMENT - MECHANICAL DEMOLITION / NEW WORK
E0.0	ELECTRICAL LEGEND
E0.1	ELECTRICAL NOTES
E1.0	BASEMENT - LIGHTING - DEMOLITION
E2.0	BASEMENT - POWER/SYSTEMS DEMOLITION
E3.0	BASEMENT - LIGHTING - NEW WORK
E4.0	BASEMENT - POWER - NEW WORK
E6.0	EXISTING ONE-LINE DIAGRAM
E6.1	NEW WORK ONE-LINE DIAGRAM

##### **Specification Index:**

#### **DIVISION 0 – BIDDING REQUIREMENTS (UNIVERSITY OF KENTUCKY)**

000000S01	Introduction and Preface
002113B01	Instructions to Bidders
004100B01	Form of Proposal
004539B01	DBE Participation Goals
005000B01	Contract Agreement Form

005000B02	Affidavit
005000B03	Determination of Responsibility, CPMD
005000B04	Memorandum to Bid File
00611313	Performance Bond GC
00611316	Payment Bond GC
06120B01	Bid Bond GC
007100B02	Punch List Responsibility
007100S02	Consultant Contract Responsibilities
007200B00	General Conditions, GC

#### **DIVISION 0 – PROCUREMENT AND CONTRACTING REQUIREMENTS (ARCHITECT OF RECORD)**

000001	Architect's Seal
000002	Project Directory
000100	Instruction to Bidders
002000	Information Available to Bidders

#### **DIVISION 1 - GENERAL REQUIREMENTS (UNIVERSITY OF KENTUCKY)**

010000S01	Special Conditions - General Contractor
010000S02	Tree Protection Standards
013529S01	Health, Safety, and Emergency Response Procedures - Fire Response Procedures
014000S06	Quality Requirements Post Occupancy Roof Fall Protection
014100S02	American Disability Act Accessibility Guidelines (ADAAG)
014500S01	Quality Control: Plumbing Inspection and Water Sample Report
014500S02	Quality Control: Electrical Inspection
014500S03	Quality Control: Air Systems Testing, Adjusting and Balancing
015600S01	Temporary Barriers and Enclosures - Temporary Partitions
015626S01	Temporary Fencing - Performance Standard for Construction Site Fencing
017413S01	Progress Cleaning- Mechanical Piping Construction Cleaning
017800S01	Closeout Submittals
017900S01	Demonstration and Training

#### **DIVISION 1 - GENERAL REQUIREMENTS (ARCHITECT OF RECORD)**

01 01 00	Summary of Work
01 01 90	Contract Considerations
01 03 90	Coordination and Meetings
01 30 00	Submittals
01 40 00	Quality Control
01 41 10	Structural Special Inspections
01 60 00	Material and Equipment
01 65 00	Starting of Systems
01 72 00	Interim Life Safety Measures (ILSM)
01 73 40	Indoor Air Quality Control

#### **DIVISION 2 – EXISTING CONDITIONS**

02 41 19	Selective Demolition
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**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**

07 84 00 Firestopping

**DIVISION 14 – CONVEYING SYSTEMS**

142000S01 Elevators – Telephone (University of Kentucky)  
142000S02 Hydraulic and Traction Elevator (University of Kentucky)  
142000S02 Hydraulic and Traction Elevators - Appendix 1 (University of Kentucky)  
14 21 23.13 Hydraulic Elevator Modernization

**DIVISION 20 – MECHANICAL**

20 01 00 General Provisions  
20 02 00 Scope of the Mechanical Work  
20 03 00 Shop Drawings, Descriptive Literature, Maintenance Manuals, Parts Lists, Special  
Keys and Tools  
20 04 00 Demolition and Salvage  
20 05 00 Coordination Among Trades, Connection of Equipment  
20 11 00 Sleeving, Cutting, Patching and Repairing  
20 13 00 Pipe, Pipe Fittings, and Pipe Support  
20 21 10 Access to Valves, Equipment, Filters, Etc.  
20 22 00 Insulation  
20 23 00 Thermometers and Others, Monitoring Instruments  
20 24 00 Identifications, Tags, Charts, Etc.  
20 25 00 Hangers, Clamps, Attachments, Etc.  
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**DIVISION 21 – FIRE PROTECTION**

21 01 00 Fire Protection System

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23 02 00 HVAC Equipment  
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**DIVISION 25 - BUILDING AUTOMATION SYSTEMS**

25 01 00 Motor Starters and Other Electrical Requirements for Mechanical Equipment  
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**DIVISION 26 – ELECTRICAL**

26 05 01 General Provisions  
26 05 02 Scope of the Electrical Work  
26 05 03 Shop Drawings, Literature, Manuals, Parts Lists, and Special Tools  
26 05 04 Sleeving, Cutting, Patching and Repairing  
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26 05 08	Coordination Among Trades, Systems Interfacing and Connection of Equipment Furnished by Others
26 05 19	Conductors, Identifications, Splicing Devices and Connectors
26 05 26	Grounding and Bonding for Electrical Systems
26 05 31	Cabinets, Outlet Boxes and Pull Boxes
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27 06 10	Voice/Data System

#### **DIVISION 28 – ELECTRICAL SAFETY AND SECURITY**

28 31 00	Fire Alarm System
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### **B. Schedule of Construction**

This project is occurring within an active academic facility. The Contractor shall coordinate all construction activities with the University of Kentucky. Each Contractor is to submit a proposed logistics plan and schedule for the work as part of the initial proposal. Both elevators are to be modernized simultaneously in order to efficiently complete the work.

The project is to be completed by August 11, 2023 – prior to the beginning of the University of Kentucky Fall 2023 Semester.

### **7.2 Optional Services**

Not Applicable



## **8.0 FINANCIAL OFFER SUMMARY**

Offerors are to provide a fixed price for the services offered.

### **8.1 Mandatory Services (Section 7.1)**

Please complete and attach Section 7.1 to provide support for your firm fixed price bid covering the scope of services defined in 7.1.

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**GENERAL CONDITIONS OF THE CONTRACT  
FOR CONSTRUCTION BY A GENERAL CONTRACTOR  
University of Kentucky  
Capital Construction Division**

These General Conditions are binding upon the General Contractor and all Sub-contractors as each are subject to the provisions contained herein.

**ARTICLE 1 - DEFINITIONS**

1.1 Wherever used in these General Conditions or in other Contract Documents, the following terms have the meaning indicated which are applicable to both the singular and plural thereof:

1.1.1 ARCHITECTS SUPPLEMENTAL INSTRUCTIONS (ASI) - The term "ASI" means a written order issued by the Consultant that clarifies or interprets the Contract Documents, that orders minor changes in the Work, that does not require an adjustment in either cost or time, and that does not require a Change Order

1.1.2 BUSINESS DAY – The term "Business Day" means a Calendar Day that is not a Saturday, Sunday or legal holiday in Fayette County, Kentucky.

1.1.3 CALENDAR DAY - The term "Calendar Day" means a day of twenty-four hours measured from midnight to the next midnight.

1.1.4 CHANGE ORDER - The term "Change Order" means a written order to the General Contractor, signed by the Owner and issued after the execution of the Contract, directing a change in the Work or an adjustment in the Contract Amount or the Contract Time. A Change Order may be an agreed change by the General Contractor and the Owner or it may be a unilateral change by the Owner.

1.1.5 CONSULTANT - The term "Consultant" means the person and/or entity, whether singular or plural, either Architect, Engineer or other Consultant, who is or are identified as such in the Contract Documents.

1.1.6 CONTRACT - The term "Contract" means the Contract between Owner and General Contractor and consists of all Contract Documents as defined in Article 1.1.8 of these General Conditions.

1.1.7 CONTRACT AMOUNT - The term "Contract Amount" means the sum stated in the Agreement which represents the total amount payable by the Owner to the General Contractor for the performance of the Work under the Contract Documents, plus or minus adjustments as provided for in the Contract Documents or by approved Change Orders.

1.1.8 CONTRACT DOCUMENTS - The "Contract Documents" include the Agreement of Contract between the Owner and the General Contractor (the "Agreement"); the General Conditions; the Special Conditions; the General Contractor's Form of Proposal; the General Contractor's Bonds; the Specifications, Drawings and Addenda for the construction of the Project; and any Change Orders issued after execution of this Contract. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Owner and any Sub-contractor, or any person or entity other than the General Contractor. Documents not included or expressly contemplated in this Article do not, and shall not, form any part of the Contract for Construction. Without limiting the generality of the foregoing, shop drawings and other submittals from the General Contractor or its

Sub-contractors and suppliers do not constitute a part of the Contract Documents. Except as otherwise provided, where these Contract Documents obligate the General Contractor to certain responsibilities or require the General Contractor to perform certain actions, the General Contractor may require these same responsibilities and/or actions of one or more Sub-contractors. However, assignment of such responsibilities or actions to one or more Sub-contractors shall not be construed to relieve the General Contractor of its obligation to the University under this contract.

1.1.9 CONTRACT TIME - The term "Contract Time", unless otherwise provided, means the specified number of consecutive Calendar Days following the stipulated commencement of the Work as stated in the Work Order, plus or minus adjustments as provided for by approved Change Orders, within which the General Contractor shall complete the Work required by the Contract and shall achieve certification of substantial and final completion.

1.1.10 GENERAL CONTRACTOR or (GC) - The term "General Contractor" or "GC" means the person or entity who will or has entered into a contract with the Owner that assumes the risk for construction of the Project as the general contractor, and who will provide consultation and collaboration regarding the construction during and after design of the Project. The GC shall execute and hold all construction Sub-contracts and Purchase Orders for the Project.

1.1.11 KRS REFERENCES - Reference to "KRS" means the "Kentucky Revised Statutes" adopted by the Commonwealth of Kentucky, including all laws that may have been revised, amended, supplemented or new laws enacted.

1.1.12 OWNER - The term "Owner" means the University of Kentucky, a statutory body corporate existing pursuant to Sections 164.100 et seq. of the Kentucky Revised Statutes.

1.1.13 PROJECT - The term "Project" means the total construction of the Work performed under the Contract Documents, which may be the whole or a part, and which may include construction by the Owner or by separate contracts.

1.1.14 PROJECT MANAGER - The term "Project Manager", when used alone, means the Owner's representative responsible for administration and management of the Project. The Owner's Project Manager during construction shall be the designated University of Kentucky Capital Projects Management Project Manager that is in charge of the Project. The term "General Contractor's Project Manager" or "GC Project Manager" means the individual employed by the General Contractor who is assigned to the Project to provide overall management during both the design and construction phases of the Project, and who has total responsibility for the successful completion of the Project

1.1.15 PROVIDE - The term "Provide," as used throughout the specifications, shall mean furnish, install and pay for.

1.1.16 SHOP DRAWINGS - The term "Shop Drawings" means drawings, diagrams, schedules, and other data specially prepared for the Work by the General Contractor or any Sub-contractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

1.1.17 SUBSTANTIAL COMPLETION - The term "Substantial Completion" is the point at which, as certified in writing by the Owner, a project is at the level of completion, in strict compliance with the contract, where (a) necessary approval by public regulatory authorities (and by other authorities having jurisdiction or as identified in Article 11.2, as necessary) has been given; (b) the Owner has received all required warranties and documentation, and (c) the Owner may enjoy beneficial use or

occupancy and may use, operate, and maintain the project in all respects, for its intended purpose. Partial use or occupancy shall not necessarily result in the project being deemed substantially complete and shall not be evidence of Substantial Completion. In order for the Owner to enjoy beneficial use or occupancy and use, operate, and maintain the project in all respects, for its intended purpose, the stage or progress of the Work or a designated portion thereof shall be sufficiently complete, accessible, operable and usable, and all parts, systems and site Work shall be 100% complete, cleaned and available for the Owner's full use without interruption in accordance with the Contract Documents, including but not limited to the provisions of Article 28 of these General Conditions. The Work will not be considered acceptable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and approvals provided to the Owner, designated instruction of the Owner's personnel in the operation of systems has been completed, and all final finishes within the Contract Documents are in place. In general, the only remaining Work shall be minor in nature so that the Owner and/or the Owner's tenants could occupy the Project on that date and the completion of the Work by the General Contractor would not materially interfere or hamper the Owner's or the Owner's tenants' normal business operations. As a further condition of Substantial Completion acceptance, the General Contractor shall certify in writing that all remaining Work, the same being solely of a "punch list" nature, will be completed within thirty (30) consecutive Calendar Days following the date of Substantial Completion.

1.1.17.1 The parties agree that "substantial completion" as defined in Article No. 2 of the Agreement and Article 1 of the General Conditions, as extended by approved Change Order(s) pursuant to Article 18.1 of the General Conditions, shall be the "date of completion specified in the contract" for purposes of KRS. 45A.250(2).

1.1.18 SUB-CONTRACTOR - The term "Sub-contractor" means the person, company, corporation, joint venture or other legal entity with whom the General Contractor has executed a Contract for a portion of the Work.

1.1.19 WORK - The term "Work" means the scope of construction and services required by the Contract Documents and all approved Change Orders, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the General Contractor to perform and complete the General Contractor's obligations under the Contract in an expeditious, orderly and workmanlike manner. The Work may constitute the whole or a part of the Project.

1.1.20 WORK ORDER - The term "Work Order" means a written notice by the Owner to the General Contractor authorizing the General Contractor to commence Work under the Contract and establishing the beginning date from which the time for Substantial and Final Completion shall be established.

1.1.21 UNIT PRICE - The term "Unit Price" means the amount per unit of measurement for materials or services as described in the bid documents.

## **ARTICLE 2 - CONSULTANT**

2.1 The Consultant will be the Owner's representative during construction and until the Work is complete. The Consultant will advise and consult with the Owner. The Owner's instructions to the General Contractor may be forwarded through the Consultant.

2.2 The Consultant will regularly, but no less frequently than monthly, visit the site to become familiar with the progress of the Work, the quality of the Work being provided and to determine if the

Work is proceeding in accordance with the Contract Documents. On the basis of these on-site inspections, the Consultant will inform the Owner of the progress of the Work, will advise the Owner of any defects and deficiencies observed in the Work and, when appropriate, will certify to the Owner that the Work in place equals or exceeds the amount requested by the General Contractor on all applications for progress payments.

2.2.1 If applicable for the Work, the Consultant will verify to the Owner that the General Contractor is performing erosion prevention and sediment control inspections as required by the Kentucky Division of Water Construction General Permit (KYR10) at least once every 7 days and shall include the findings in the site visit reports.

2.3 The Consultant will be the interpreter of the requirements of the drawings and specifications and any changes made to the drawings and specifications.

2.4 Claims, disputes, and other matters in question that arise relating to the execution or the progress of the Work shall be referred in writing to the Consultant by the General Contractor. The Consultant will provide a response in accordance with and subject to the provisions of Article 38 of these General Conditions

2.5 The Consultant will have the authority to reject Work which does not conform to the Contract Documents or to the required level of quality and performance.

2.6 The Consultant will review and approve, or take other appropriate action upon receipt of the General Contractor's submittals such as Shop Drawings, product data, and samples. The review of submittals will be for general conformance with the design concept of the work, and for compliance with the information provided by the Contract Documents. Such review will not relieve the General Contractor of any responsibility for errors or omissions in submittals, and will in no way constitute a waiver of or change to the requirements of the Contract Documents.

2.6.1 The Consultant's review and response will be completed with reasonable promptness with a goal of ten (10) business days or less. The Consultant's review of a specific item shall not indicate approval of an assembly of which the item is a component.

2.7 The Consultant will prepare Change Orders for the Owner to direct changes in the Work. Minor changes in the Work, not involving modifications to the contract cost or completion times and that are consistent with the purpose of Work, may be directed by the Consultant through Architectural Supplemental Instructions (ASI).

2.9 When requested by the General Contractor, the Consultant will conduct inspections to determine if the Project is at the level of completion required by and in strict compliance with the Contract such that the Owner may enjoy beneficial use or occupancy and may use, operate, and maintain the project in all respects, for its intended purpose, as further defined in the Contract. If the level of completion warrants, the Consultant will confirm that all necessary approvals by public regulatory authorities or other authorities having jurisdiction have been given, will confirm that the Owner has received all required warranties and documentation, will recommend dates for certification of Substantial Completion and Final Completion by the Owner, and will complete and submit the Notice of Termination of coverage under the KPDES General Permit for Storm Water Discharges Associated with Construction Activity.

2.10 The General Contractor will accept direction for the Work on the Project only from the Owner's Project Manager or from the Consultant. Requests for information from the General Contractor shall be directed to the Consultant.

### **ARTICLE 3 - CORRELATION AND INTENT OF CONTRACT DOCUMENTS**

3.1 Execution of the Contract by the General Contractor is a representation that the General Contractor has or shall thoroughly and carefully examine the site of the of Work; shall timely investigate all conditions which can affect the Work or its cost, including but not limited to availability of labor, materials, supplies, water, electrical power, roads, access to the site, uncertainties of weather, water tables, the character of equipment and facilities needed to perform the Work, and local conditions under which the Work is to be performed; and further, that the General Contractor shall insure that the documents issued for bidding by Sub-contractors reflect the results of this investigation and are adequate to complete the Work. It is the responsibility of the General Contractor to be familiar with and comply with all Federal, State, and local laws, ordinances, and regulations which might affect those engaged in the Work, and to be familiar with the materials, equipment, or procedures to be used in the Work, or which in any other way could affect the completion of the Work. The General Contractor shall carefully study and compare the Contract Documents with each other and with other information provided to the General Contractor by the Consultant or the Owner pursuant to the Contract Documents and shall notify the Owner and the Consultant in writing of any errors, inconsistencies or omissions in the Contract Documents recognized by the General Contractor. Any failure to properly familiarize itself with the proposed Work shall not relieve the General Contractor from the responsibility for completing the Work in accordance with the Contract Documents.

3.2 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the General Contractor. Labor or materials which are reasonably inferable from the Contract Documents and which are necessary to produce the desired result, even though not specifically mentioned in the Contract Documents, shall be included in the Work at no additional cost to the Owner.

3.3 In the event a question arises regarding the meaning or intent of the Contract Documents, the General Contractor shall report it by preparing an RFI in eCommunication® to the Consultant. The Consultant shall furnish, with reasonable promptness and with a goal of three (3) business days and by whatever means as may be appropriate, additional instructions necessary for the proper execution of the Work. All such drawings and instructions shall be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom. The Work shall be executed in conformity therewith and the General Contractor shall do no Work without proper drawings and instructions. Items indicated on drawings as "N.I.C." or "Not In Contract" are shown for explanation purposes only and are not to be included in this Contract.

3.4 The Contract Documents are complementary, and what is required by one shall be binding as if required by all. In case of conflicts between the various documents, the order of precedence will be as follows: (1) Addenda, (2) Special Conditions, (3) General Conditions, (4) Technical provisions of the Specifications and (5) Drawings.

3.5 Any notice to the General Contractor from the Owner regarding this Contract shall be in writing and delivery and service of such notice shall be considered complete when sent by certified mail to the General Contractor at General Contractor's last known address. Such notice may also, at the Owner's election, be hand-delivered to the General Contractor or the General Contractor's authorized representative.

### **ARTICLE 4 - PRE-CONSTRUCTION CONFERENCE**

4.1 Following the execution of the Contract, a pre-construction conference will be held. Representatives of the Capital Project Management Division, Consultant, General Contractor, and all



major Sub-contractors shall be present to discuss the time for construction, methods and plan of operation, authority of the Consultant, procedures for handling shop drawings, progress estimates and requests for payments, and other relevant issues. The time and location of this meeting will be the responsibility of the General Contractor in consultation with the Consultant, Owner and other interested parties.

4.2 Environmental aspects of the project, including erosion prevention and sediment control (EPSC) and storm water management shall be discussed during this conference. The Group shall discuss the Storm Water Pollution Prevention Plan (SWPPP) to ensure that all parties understand the requirements. During this meeting the responsibility for reading the rain gage on a daily basis will be established. The Contractor will identify the initial measures to be installed prior to land disturbing activities beginning. Any modifications to the SWPPP due to constructability issues should be discussed at this conference.

## **ARTICLE 5 - SHOP DRAWINGS**

5.1 The General Contractor shall submit a shop drawing and product sample submittal schedule to the Consultant establishing dates for the submission of Shop Drawings and product samples prior to the submittal of the General Contractor's first application for payment for construction phase services. The schedule shall have been coordinated with all Sub-contractors and material suppliers as well as the General Contractor's construction schedule and shall allow for adequate and reasonable time for review of the samples and submittals by the Consultant. The General Contractor shall be responsible for compliance with the submittal schedule and shall insure that the Submittal Schedule is maintained in order to accurately reflect the status of processing all required submittals.

5.2 The General Contractor shall review product samples and shop drawings for compliance with the requirements of the Contract Documents, and shall submit them to the Consultant in accordance with submittal procedure and schedule established. The General Contractor's review and submittal to the Consultant of any shop drawing or sample shall constitute a representation to the Owner and Consultant that a) the General Contractor has determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, or assumes full responsibility for doing so, and that b) each shop drawing or sample has been reviewed or coordinated with the requirements of the Work and the Contract Documents. Shop drawings and submittal requirements shall not be deemed satisfied until approvable documents are received by the Consultant. Incorrect or incomplete submittals will be returned to the General Contractor without action. No claim for additional time or extension of the contract will be considered if such claim is the result of failure by the General Contractor to provide correct, accurate, complete and approvable submittals.

5.3 The Consultant will review submittals with reasonable promptness, and take appropriate action or return submittals to the General Contractor for corrections as may be required. The General Contractor shall make any corrections required by the Consultant for compliance with the Contract and shall return the required number of corrected copies of shop drawings and resubmit new samples until approved. The General Contractor shall direct specific attention, in writing, or on resubmitted shop drawings, to revisions other than the corrections called for by the Consultant on previous submissions.

5.4 Where a shop drawing or sample submission is required by the specifications, no related Work shall be commenced until the submission has been accepted in writing by the Consultant. The review and acceptance shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The acceptance of a separate item will not indicate acceptance of the assembly in which the item functions. A copy of each accepted

shop drawing and product sample shall be kept in good order by the General Contractor at the site and shall be made available to the Consultant on request.

5.5 The Consultant's acceptance of Shop Drawings or samples shall not relieve the General Contractor from the responsibility for any deviations from the requirements of the Contract Documents unless the General Contractor has in writing called the Consultant's attention to such deviation at the time of submission and the Consultant has given written approval to the specific deviation. Any acceptance by the Consultant does not relieve the General Contractor from responsibility for errors or omissions in the Shop Drawings.

## **ARTICLE 6 - LAYING OUT WORK**

6.1 The General Contractor will secure all data at the site of the building such as grades of lot, convenience of receiving and sorting material, location of public services, and other information which will have a bearing proposals or on the execution of the Work and shall address these issues in the preparation of scopes of work for the Subcontract bid packages. No allowance shall be made for failure of the General Contractor to obtain such site information prior to submitting their proposal or to include such information in the Subcontract bid packages, and no adjustment to the General Contractor's Contract amount or stipulated time for completion shall be allowed when due to failure by the General Contractor to do so.

6.2 The General Contractor shall be responsible for all lines, levels and measurements of all Work executed under the Contract. The General Contractor shall verify the figures before laying out the Work and will be held responsible for any error resulting from failure to do so. Working from lines and levels established by the property survey or by other Contract Documents, and as shown in relation to the Work, the General Contractor will establish and maintain bench marks and other dependable markers to set lines and levels for Work at each area of construction and elsewhere on the site as needed to properly locate each element of the entire Project. The General Contractor shall calculate and measure from the bench marks and dependable markers required dimensions as shown (within recognized tolerances if not otherwise indicated), and shall not scale drawings to determine dimensions. The General Contractor shall advise Sub-contractors and trades persons performing Work of marked lines and levels provided for their use in layout work. The General Contractor shall verify layout information shown on drawings as required for the Work.

6.3 The General Contractor shall be responsible for coordination of the installation of all elements of the Work, including preparation of coordination drawings if required by the Contract Documents or deemed necessary by the General Contractor for performance of the Work.

6.4 If any encroachments are made by the General Contractor or any Sub-contractor on any adjacent property, the General Contractor shall, at the General Contractor's expense, and within thirty (30) Calendar Days after written notice from the Owner or the Consultant, correct any encroachments and obtain approval from the owner of such adjacent property for any encroachments that cannot be feasibly corrected. The General Contractor shall not be entitled to any adjustment to the Contract Amount or the Contract Time as a result of any such encroachment or the correction thereof.

## **ARTICLE 7 - PLANS, DRAWINGS, SPECIFICATIONS AND RECORD DRAWINGS**

7.1 Unless otherwise provided in the Contract Documents, the Owner will furnish the General Contractor free of charge one electronic or reproducible copy of the Drawings and Specifications for execution of the Work. The General Contractor shall pay for the cost of duplication of all sets required over and above this amount.

7.2 The cost of additional plans, specifications and official contract documents for use by Sub-contractors for bidding and for construction shall be borne by the General Contractor or by the Sub-contractors. Arrangements for orders and payment for plans, specifications and other contract documents must be made with Lynn Imaging, Lexington, Kentucky (<http://www.ukplanroom.com>) or by phone at 1.800.888.0693 or 859.255.1021) before a set of documents will be issued.

7.3 The General Contractor shall keep one copy of all Contract Documents, including Drawings, Specifications and Shop Drawings on the site, in good order. A qualified representative of the General Contractor shall record on these documents, from day to day as Work progresses, all changes and deviations from the Contract Documents. Prior to Substantial Completion, the General Contractor shall complete and turn over to the Consultant the As-Built drawings, with a digital copy (in PDF format) submitted to the Owner simultaneously. The As-Built drawings shall consist of a set of drawings which indicate all field changes that were made to adapt to field conditions, changes resulting from Change Orders and all concealed and buried installations of piping, conduit and utility services. All buried and concealed items, both inside and outside the facility, shall be accurately located on the As-Built drawings as to depth and in relationship to not less than two permanent features such as interior or exterior wall faces. The As-Built drawings shall be clean and all changes, corrections and dimensions shall be given in a neat and legible manner in a contrasting color. For any changes or corrections in the Work which are made subsequent to the Substantial Completion Inspection, revisions shall be made to the As-Built drawings and submitted to the Consultant prior to final payment. Approval of the final payment request shall be contingent upon compliance with these provisions.

7.4 All drawings, specifications and copies thereof, furnished by the Consultant to the Owner, are the property of the University of Kentucky. They shall not be used by the Consultant, General Contractor, or any Sub-contractor or Supplier on any other Project.

## **ARTICLE 8 - TEMPORARY UTILITIES**

8.1 The General Contractor shall provide and pay for, unless modified in the Special Conditions, all temporary conveniences including, but not limited to, wiring, lighting, power and electrical outlets, heat, water, and sanitary facilities required for construction. In the event the Owner elects to make available, at no cost to the General Contractor, the electric power required for construction activities, the electric power supplied shall not be utilized as a means to provide temporary heat or for welding.

8.2 The General Contractor is responsible for paying all utility costs, whether the costs are from an outside utility company or from the University, for utility services used in the course of completing the Work. The General Contractor shall provide temporary heating, ventilation, telephones, water, electricity, portable gas, lighting for the Work, safety lighting, security lighting, and trash removal/dumpster service for both General Contractor and Sub-contractor use during the Project. Work and safety lighting shall be provided continuously during working hours. Security lighting shall be provided at all hours of darkness.

## **ARTICLE 9 - MATERIALS, EQUIPMENT, APPLIANCES, AND EMPLOYEES**

9.1 Unless otherwise provided in the Contract Documents, the General Contractor shall provide and pay for all materials, labor and personnel, tools, equipment, construction equipment and machinery, utilities, supplies, appliances, transportation, taxes, temporary facilities, licenses, permits and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and the proper execution and completion of the Work safely, without damage to persons and property, and in compliance with all applicable law. The General Contractor shall furnish, erect, maintain, and

remove at the completion of the Contract, all temporary installations as may be required during the construction period.

9.2 Immediately following the execution of each of the sub-contracts, the General Contractor shall determine the source of supply for all materials required under that sub-contracts and the length of time required for their delivery, and shall assure that orders are placed for such materials in sufficient time to assure delivery to the site so that such materials are available to be incorporated into the Work when needed to comply with the schedule of Work.

9.3 The General Contractor shall immediately notify the Consultant in writing of any known problems with the procurement, fabrication or ordering of any materials. Unless changes are approved in writing by the Consultant, the General Contractor will not be excused for delays in securing materials specified.

9.4 The General Contractor or Sub-contractors shall not place purchase orders or issue contracts for materials, supplies, equipment and services necessary to complete this Project using the name of the University of Kentucky. All orders placed by the General Contractor that are related to this Project must use the name of the General Contractor or Sub-contractor placing the order. The use of the University of Kentucky's name for ordering purposes is strictly prohibited. Payment for all goods and services required for the completion of the Work is the sole responsibility of the General Contractor. Any invoices received at the University that are related to this Project will be immediately forwarded to the General Contractor. Copies of these invoices will be made and placed in the General Contractor's file and proof must be provided that these invoices have been paid in full prior to the processing of the next scheduled application for progress payment.

9.5 The route for delivery of all materials to the Project shall be coordinated with the Owner's Project Manager.

9.6 The General Contractor shall be responsible for the proper and adequate storage of materials and equipment. Unless otherwise provided in the Contract Documents, all materials shall be of good quality and new. Workmanship and materials supplied and incorporated into this Work shall be of first quality. The General Contractor, if required, shall furnish satisfactory evidence as to the kind and quality of materials.

9.7 The General Contractor shall at all times enforce strict discipline and good order among all employees and Sub-contractors. The conduct of all individuals performing Work or operations related to the Work is the responsibility of the General Contractor. The consumption of alcohol or drugs on the job by any workers is strictly prohibited. Any individual apprehended under the influence of alcohol or drugs on the premises at any time shall be subject to automatic removal from the Project by the General Contractor, the Consultant or the Owner. Improper conduct of any kind will not be permitted and may result in the offending individual, Sub-contractor or General Contractor being barred from the Owner's premises. The General Contractor shall not permit the employment on the Project of any person unfit or not skilled in the Work assigned.

## **ARTICLE 10 - ROYALTIES AND PATENTS**

10.1 The General Contractor shall pay all royalties and license fees. If a particular process, product or device is specified in the Contract Documents and it is known to be subject to patent rights or copyrights, the existence of such rights shall be disclosed in the Contract Documents and the General Contractor is responsible for payment of all associated royalties. The General Contractor hereby agrees to indemnify, defend and hold the Owner, and any subsidiary, parent, or affiliates of the Owner, or other persons or entities designated by the Owner, and their respective directors, officers, agents,

employees and designees (collectively, the “Indemnities”) harmless from all losses, claims, liabilities, injuries, damages and expenses, including attorneys’ fees and legal expenses, that the Indemnities may incur as a result of the General Contractor’s failure to strictly comply with its obligations under this Paragraph 10.1.

## **ARTICLE 11 - SURVEYS, PERMITS, REGULATIONS, AND STANDARD CODES**

11.1 The Owner will furnish only such surveys that are specifically required by the Contract Documents. Approvals, assessments, and easements for permanent structures or permanent changes in existing structures shall be secured and paid for by the Owner, unless otherwise specified. All required utility tap-on fees shall be secured and paid for by the General Contractor, or included in a sub-contract, including the Lexington-Fayette Urban County Government (LFUCG) sewer tap-on fee. All construction permits, where required by local ordinances, except excavation permit, shall be obtained by the General Contractor, but no fee shall be charged to or paid by the General Contractor as the Owner is exempt from such charges. A Contractor's license fee for doing business in the locale, if applicable, shall be paid for by the General Contractor.

11.2 All branches of Work shown on the plans and specifications shall be executed in strict compliance with all state and federal regulations and codes, with all national codes, and with the requirements of both ADA and JCAHO when applicable.

11.3 The Contractor, on projects disturbing 1 acre or more, or projects less than 1 acre that are part of a large common development plan, including grading, clearing, excavation, material laydown or other earth moving activities, shall assure full compliance with the requirements of the KYR10 and shall:

11.3.1 File a Notice of Intent (KPDES FORM eNOI-SWCA) with the Kentucky Division of Water and copy the UKCPM Project Manager and Water Quality Manager prior to the start of any excavation, grading or site development work.

11.3.2 The permittee (contractor) shall develop a Stormwater Pollution Prevention Plan (SWPPP) based on the Erosion Prevention and Sediment Control Plan (EPSC) as a minimum design standard. Ensure all requirements of KYR10 are fully addressed in the SWPPP. **Once the SWPPP is written, forward a copy to the Capital Projects Project Manager and to the Water Quality Manager for approval. Work cannot begin until SWPPP is approved and permit coverage obtained.**

11.3.3 Install BMP’s such as, basins, traps, drainage, and sediment barriers before beginning land disturbing activities, including the construction entrance/exit. Once prevention measures have been installed, grading can commence. In the event a new construction entrance is added to the site, this new entrance must be built according to the EPSC design details with a wheel wash, a water supply and a sediment catch basin for washed wheel sediment.

11.3.4 Maintain all measures in working condition. Perform maintenance activities identified during inspections prior to the next rain event. Remove sediment from BMPs when 1/3 the storage volume has been filled.

11.3.5 Stabilize disturbed areas within 14 days of inactivity or reaching final grade on any portion of the site according to permit requirements.

11.3.6 Inspect the site every 7 calendar days and after each rainfall of ½” or more. Document site conditions, rainfall, maintenance activities needed and performed, stabilization needed and performed, and where new measures are needed. Discuss deficiencies with UK Project Manager and Water Quality Manager and note on the SWPPP Inspection Sheets.

Per the KPDES Permit, Section 2.1.7. “Inspections – Permittee Conducted”. “Inspections shall be performed by personnel knowledgeable and skilled in assessing conditions at the construction site that could impact storm water quality and assessing the effectiveness of erosion prevention measures, sediment control measures, and other site management practices chosen to control the quality of the storm water discharges. Inspectors shall have training in storm water construction management such as Kentucky Erosion Prevention & Sediment Control (KEPSC), Certified Professional in Stormwater Quality (CPSWQ), Certified Erosion, Sediment and Stormwater Inspector (CESSWI), or other similar training.”

Inspections shall include a tour of the total site and verification that all BMPs are performing as constructed. Inspector shall certify that all observations are correct as stated and sign and date the inspection form.

11.3.7 Keep Permit, SWPPP, weekly/rain event inspections sheets in binder in construction trailer. Any BMP change/alteration from SWPPP and EPSC plan must be noted on the EPSC and SWPPP.

**11.3.8 No soil and sediment shall leave the construction site. BMPs shall be repaired immediately if failure has occurred. No Mud shall be permitted on any street. All entrances/exits shall have a means by which to wash wheels. If an entrance/exit does not have a wheel wash, that exit shall not be used in muddy conditions. If for any reason mud is tracked offsite, the area must be cleaned in such a way as to prevent sediment from entering the storm sewer system. The use of tractor brooms solely will not be permitted.**

11.3.9 When it is necessary to dewater an excavation, proper BMPs must be implemented. Dewatering filter bags must be sized and used according to manufacturer’s requirements and Standard Operating Procedures for Dewatering Bags.

11.3.10 UK (the MS4) routinely inspects sites for compliance with the EPSC/SWPPP. Any deficiencies noted become record for the Kentucky Division of Water and shall be remedied/installed as soon as site conditions are favorable but no more than 7 days from the inspection date.

11.3.11 At the conclusion of the project and all bare areas, slopes and ditches are 70% vegetated with the permanent ground cover, the contractor shall notify the UK Project Manager and Water Quality Manager and request a final site inspection prior to filing a “Notice of Termination (NOT) with the state. This inspection verifies that Construction BMPs can be removed, and Post-Construction BMPs are in place and functioning.

**11.3.12 Failure of the site contractor (permittee of the KPDES Permit) to timely comply with requirements of KPDES, the Construction Manager shall inform the site contractor that a third party contractor shall be retained to remediate all BMP deficiencies immediately, and all third party costs shall be passed to the permittee of the KPDES Permit. Any fines or other costs resulting from failure to comply, levied against the Owner will be assessed against the Construction Manager’s or General Constructor’s funds.**

11.3.13 Refer to 334000S01 STORM DRAINAGE UTILITIES – Information for Consultants & Contractors.

11.3.14 Reference to standards, codes, specifications, and regulations refer to the latest edition of printing in effect at the date of issue shown in the Contract Documents unless another date is implied by the suffix number of the standard.

11.4 Reference to standards, codes, specifications, and regulations refer to the latest edition of printing in effect at the date of issue shown in the Contract Documents unless another date is implied by the suffix number of the standard.

11.5 The General Contractor shall furnish a final occupancy permit from the proper agency or agencies as required.

11.5 The General Contractor shall, by provision within each applicable sub-contract or by inclusion in the lump sum fee proposed to the Owner, insure the payment of all sales, consumer, use and similar taxes for materials, equipment and supplies incorporated into the Work, by unless otherwise specified in the bid documents.

## **ARTICLE 12 - PROTECTION OF WORK, PROPERTY, AND PUBLIC**

12.1 The General Contractor shall continuously maintain adequate protection of all Work from damage and shall protect the Owner's property from injury or loss arising in connection with this Contract. Except as otherwise covered by Builder's Risk insurance, the General Contractor shall pay for any such damage, injury, or loss, except such as may be directly due to errors in the Contract Documents or caused by agents or employees of the Owner. The General Contractor shall adequately protect adjacent property as provided by law and the Contract Documents.

12.2 In an emergency affecting the safety of life, or of the Work, or of adjoining property, the General Contractor, without special instruction or authorization from the Consultant or the Owner, is obligated to act to prevent such threatened damage, loss or injury.

12.3 The General Contractor shall maintain fire protection as required by the Kentucky Building Code. Access to the Project site and surrounding buildings for local fire truck access must be maintained during construction. The General Contractor shall maintain construction to allow access to new, existing or temporarily relocated standpipes, fire hydrant connections and fire alarm communication panels pursuant to Section 3018.8 of the Kentucky Building Code. If the General Contractor utilizes the Owner's fire protection equipment, the General Contractor shall replace any such materials lost, consumed or misplaced during the Contract period. The General Contractor is responsible for any false alarms caused by dust created in the Work area or dust traveling to areas beyond the Work area due to inadequate dust protection barriers. Should there be a need for any existing or newly installed fire alarm system, or parts of a system that requires service, to be removed from service or disconnected, prior approval must be obtained from the Owner and the General Contractor shall immediately provide alternate protection such as a fire watch until such systems are returned to full normal operations. When work or service is completed on a disabled fire alarm system, the Owner shall be immediately notified so the system can be placed in service.

12.4 The General Contractor and Sub-contractors are responsible for the security of their own materials, tools and equipment at the Project site.

12.5 The General Contractor shall provide to the Owner's Project Manager a key to General Contractor's field office or job trailer.

## **ARTICLE 13 - BLASTING**

13.1 Blasting is not allowed unless permission is granted in the Special Conditions. Should blasting be allowed by the Special Conditions, it shall be completed in accordance with all laws, regulations, ordinances and instructions contained in the Special Conditions.

## **ARTICLE 14 - CONSTRUCTION AND SAFETY DEVICES**

14.1 The General Contractor shall provide safety controls for protection of the life and health of employees and visitors. The General Contractor will utilize precautionary methods for the prevention of damage to property, materials, supplies, and equipment, and for avoidance of work interruptions in the performance of this Contract. In order to provide such safety control, the General Contractor shall comply with all pertinent provisions of the Kentucky Fire Prevention Code, Kentucky Building Code, Kentucky Labor Cabinet's Division of Occupational Safety and Health Program Construction Standards and Federal Occupational Safety and Health (Construction) Standards that are in effect at the time the Contract is entered into and during the period in which the Contract is to be performed.

14.2 The General Contractor shall provide a written safety program which includes all pertinent written specialty standards such as, but not limited to, Control of Hazardous Energy Sources (Lockout/Tagout), Hazard Communications Program, First Aid, Blood Borne Pathogen Program, Respirator Use Program and Hearing Conservation Program. The General Contractor shall require all Sub-contractors to have an effective written safety program or be required to follow the General Contractor's written safety program.

14.3 The General Contractor shall maintain an accurate record of and shall report to Kentucky Labor Cabinet's Division of Occupational Safety and Health in the manner and on the forms prescribed by that Division, exposure data and all accidents resulting in death, traumatic injury, occupational disease. The General Contractor shall maintain an accurate record of and shall report to the Owner's Project Manager, any damage to property, materials, supplies, and equipment incident to Work under this Contract.

14.4 The Kentucky Labor Cabinet's Division of Occupational Safety and Health may notify the General Contractor of any noncompliance with the foregoing provisions. The General Contractor shall, upon receipt of such notice, immediately correct the cited conditions. Notice delivered to the General Contractor or the General Contractor's representative at the site of the Work shall be deemed sufficient for this purpose. If the General Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the Work until satisfactory or corrective action has been taken. Failure or refusal to comply with the order will be grounds for reducing or stopping all payments due under the Contract to the General Contractor. No part of the construction time lost due to any such stop order shall be cause for, or the subject of a claim for, extension of time or for additional costs or damages by the General Contractor.

14.5 The General Contractor or any Sub-contractor shall immediately contact the University of Kentucky's Department of Occupational Health and Safety through the Owner's Project Manager should they be selected for an inspection by the Kentucky Occupational Safety and Health Compliance Division.

14.6 Compliance with the provisions of the foregoing sections by Sub-contractors shall be the responsibility of the General Contractor.

14.7 Nothing in the provisions of this Article 14 shall prohibit the U.S. Department of Labor or the Kentucky Department of Labor Division of Occupational Safety and Health from enforcing pertinent occupational safety and health standards as authorized under Federal or State Occupational Safety and Health Standards.

14.8 The General Contractor shall take all necessary precautions for the safety of employees on the Work, and shall comply with all applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises



where the Work is being performed. If the General Contractor or any Sub-contractor has questions related to the health or safety required by their written safety program, they should contact the Kentucky Labor Cabinet Occupational Safety and Health Program Division of Education and Training. The General Contractor shall designate a responsible member of the on-site Work force as the safety officer and shall report to the Consultant and to the Owner the name of the person selected. The duties of the safety officer include the enforcement of safety regulations.

## **ARTICLE 15 - HAZARDOUS MATERIALS**

15.1 If the General Contractor encounters material reasonably believed to be or suspected to be asbestos containing material, lead, polychlorinated biphenyls (PCBs), fluorescent light bulbs and ballasts, mercury or other hazardous material, the following procedures must be followed:

15.1.1 The General Contractor shall immediately stop Work in the affected area and notify the Owner's Project Manager. The Owner's Project Manager will contact the Owner's Environmental Health and Safety unit to arrange for collection of samples, review of existing data, or other testing necessary to confirm the presence of hazardous materials. The Owner's Project Manager will notify the General Contractor in writing of the results. Until that notification is received, the Work must not continue in the affected area.

15.1.2 If the material is confirmed to be asbestos, lead, polychlorinated biphenyls (PCBs), fluorescent light bulbs and ballasts, mercury or other hazardous material, the Owner will take appropriate action to remove the material before the General Contractor can continue Work in the affected area.

15.1.3 The General Contractor shall not be required to perform any Work related to asbestos, lead, polychlorinated biphenyls, or other hazardous material. The General Contractor is advised that certain classes of building materials (thermal system insulation, sprayed or troweled surfacing materials, and resilient flooring) installed before 1981 are required by law to be treated as asbestos containing until proven otherwise. These presumed asbestos containing materials must not be disturbed without confirmation from the Owner that asbestos is not present.

15.2 The Owner, the General Contractor, and Sub-contractors will be under the requirements of the OSHA Hazard Communication Standard (29) CFR 1910.1200. The General Contractor and Sub-contractors must provide their own written Hazard Communication Program. The Hazard Communication Standard must include: (1) A list of the hazardous chemicals to which the General Contractor's employees may be exposed; (2) Statement of the measures that General Contractor's employees and Sub-contractors may take to lessen the possibility of exposure to the hazardous materials; (3) The location of and access to the MSDS's related to the hazardous chemicals located in the Work area; (4) Procedures that the General Contractor's employees and Sub-contractors are to follow if they are exposed to hazardous chemicals above the Permissible Exposure Limit (PEL). Material Safety Data Sheets (MSDS) may be reviewed upon request by the General Contractor or any Sub-contractor as they pertain to the Work areas of the Project. Photocopies of the MSDS's may be made by General Contractor at its expense.

15.3 The General Contractor and Sub-contractors shall provide the Owner with a list of any hazardous materials that will be used on the job site that may be exposed to the Owner's employees. The General Contractor and Sub-contractors shall provide the Owner with copies of Material Data Sheets for materials to be used.

15.4 It is the policy of the Owner that PCB containing equipment will be treated by the General Contractor and the Owner in a manner that conforms to the intent of all applicable laws and

regulations (primarily 40 CFR Part 761). The following procedures shall be followed by the General Contractor and Sub-contractors while present on the Owner's Project or other property: (1) Only authorized, trained personnel may inspect, repair, or maintain PCB transformers; and (2) No combustible materials may be stored within a PCB transformer room or within five meters of a PCB transformer. Such materials include, but are not limited to, paints, solvents, plastic, paper, and wood. The General Contractor shall not use rooms containing PCB transformers for storage rooms, staging areas, job site offices or break rooms. Violation of this policy may be grounds for dismissal of the offending General Contractor and/or Sub-contractor from the Project. All PCB transformers at the University of Kentucky are identified by a PCB label as defined in federal regulations. If the General Contractor should have a question as to the location of a PCB transformer, it should contact the Owner's Project Manager.

15.5 The General Contractor shall ensure that NO asbestos-containing materials (including but not limited to: drywall, joint compound, roof mastic and floor tile adhesive) will be install on any University project without prior written approval of the University's Environmental Health and Safety Division. Additionally, the General Contractor shall submit MSDS sheets and have prior approval before installing any materials that contains hazardous substances or could pose an environmental hazard. If any environmental hazardous materials are installed without written approval of the University, the General Contractor will be responsible for all material replacement cost, all removal and all other associated damages. Any materials removed shall be taken out in accordance with all applicable federal, state and local regulations.

## **ARTICLE 16 - INSPECTION OF WORK**

16.1 Inspections, tests, measurements or other acts of the Consultant are for the sole purpose of assisting the Consultant in determining if the Work, materials, rate of progress, and quantities comply with the Contract Documents. These acts or functions shall not relieve the General Contractor from performing the Work in full compliance with the Contract Documents, nor relieve the General Contractor from any of the responsibility for the Work assigned to it by the Contract Documents. No inspection by the Consultant shall constitute or imply acceptance. Approval of material is general and shall not constitute waiver of the Owner's right to demand full compliance with Contract Documents.

16.2 All Work completed and all materials incorporated for the Project are subject to inspection by the Owner, the Consultant or their representatives to determine conformance with the Contract Documents. The Owner, Consultant and their representatives shall at all times have access to the Work whenever it is in preparation or progress. The General Contractor shall provide, at no additional cost to the Owner, any facilities necessary for sufficient and safe access to the Work to complete any inspections required. The Consultant shall be given timely notification in order to arrange for the proper inspections to be performed on any Work outside of the normal working day or week. If the Consultant provides the General Contractor with a list of construction milestones that require inspection, the General Contractor shall provide the Consultant with at least five (5) Business Days written notice prior to the commencement of Work with respect to such milestone in order to permit the Consultant time to coordinate an inspection of the commencement of the applicable Work.

16.2.1 Normal Work hours are defined as a period between 7:00 a.m. and 5:00 p.m. Monday through Friday. The General Contractor shall notify the Owner's Project Manager at least one working day prior to performance of any Work for permission to do any Work during non-normal Work hours.

16.3 If this Contract, the Specifications, the Consultant's instructions, laws, ordinances, or any public authority require any Work to be specially inspected, tested or approved, the General Contractor shall give the Consultant timely notice of the readiness of the Work for inspection. The Consultant shall promptly make all required inspections. If any portion of the Work should be

covered contrary to the request of the Consultant, or to the requirements specifically expressed in the Contract Documents, the Work must be uncovered for inspection and observation and shall be uncovered and replaced at the General Contractor's expense.

16.4 If any other portion of the Work has been covered, which the Consultant has not specifically requested to observe prior to being covered, the Consultant, with the Owner's approval, may request to see such Work and it shall be uncovered by the General Contractor. If such Work is found to be in accordance with the Contract Documents, the cost of uncovering and replacement shall be charged to the Owner by appropriate Change Order. If such uncovered Work is not in accordance with the Contract Documents, the General Contractor shall pay all costs for uncovering and replacement of such Work.

## **ARTICLE 17 - SUPERINTENDENT - SUPERVISION**

17.1 The General Contractor shall completely and thoroughly direct and superintend the Work in accordance with the highest standard of care for the General Contractor's profession so as to ensure expeditious, workmanlike performance in accordance with requirements of the Contract Documents. Except as otherwise dictated by specific requirements of the Contract Documents, the General Contractor shall be solely responsible for and have control over all construction means, methods, techniques, sequences and procedures. The General Contractor shall be responsible for the acts and omissions of all Sub-contractors and persons directly or indirectly employed by the General Contractor in the completion of the Work. The General Contractor shall be responsible for coordinating and scheduling all portions of the Work unless the Contract Documents give other specific instructions. The General Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by the activities of the Consultant in the administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the General Contractor.

17.2 The General Contractor shall have a competent superintendent on the Project site at all times during the process of the Work. The superintendent shall have authority to act on the General Contractor's behalf with regard to all aspects of performance of this Contract. The superintendent shall have such assistants with individual specialized competencies as may be necessary to fully understand and oversee all aspects of the Work. The General Contractor shall also provide administrative, supervisory and coordinating personnel required to fully perform the Work and for interfacing the Work with other work of the Project. The superintendent and all assistants shall be physically fit for their work and capable of going to all locations where Work is being performed. A communication given to the superintendent shall be binding on the General Contractor. Immediately after the award of Contract, the General Contractor shall submit to the Consultant a list of General Contractor's employees and consultants, including names, positions held, addresses, telephone numbers and emergency contact numbers.

17.3 The superintendent assigned shall not be changed except under the following circumstances: (1) Where the superintendent ceases to be employed by the General Contractor, in which case the General Contractor shall give timely written notice to the Owner of the impending change of the superintendent and a reasonable explanation for the change; or (2) Where the Owner or the Consultant have reasonable grounds for dissatisfaction with the performance of the superintendent and give written notice to the General Contractor of the grounds. In either case, the General Contractor shall obtain prior written approval from the Owner of the qualifications of the proposed replacement superintendent. Such prior approval will not be unreasonably withheld.

17.4 If the Owner or Consultant determines that the superintendent is not performing, or is incompetent to perform the required Work, the Owner may direct the General Contractor to remove the superintendent from the Project and replace the superintendent with an employee who has the necessary expertise and skills to satisfactorily perform the Work.

## **ARTICLE 18 - CHANGES IN THE WORK**

18.1 The Owner, at any time after execution of the Contract, may make changes within the general scope of the Contract or issue additional instructions, require additional Work, or direct the deletion of Work. The Owner's right to make changes shall not invalidate the Contract or relieve the General Contractor of any obligations under the Contract Documents. All such changes to the Work shall be authorized in writing by Change Order and shall be executed under the conditions of the Contract Document. Any adjustment of the Contract Amount or Time of Completion, as may be appropriate, shall be made only at the time of ordering such change. Change order proposals based on a reservation of rights, whether for additional compensation to be determined at a later date or for an extension of time to be determined at a later date, will not be considered for approval and shall be returned to the General Contractor without action.

18.2 The cost or credit resulting from a change in Work shall be determined in one or more of the following ways:

18.2.1 By unit prices named in the Contract or additional unit prices subsequently agreed upon;

18.2.2 By agreement on a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

18.2.3 By an amount agreed upon by the General Contractor and the Owner as a mutually acceptable fixed or percentage fee.

18.3 All lump sum proposals shall include a detailed cost breakdown satisfactory to the Consultant and to the Owner for each component of Work indicating both labor and material costs. In computing labor costs, the hourly labor rates shall not exceed a mutually agreeable combined hourly labor rate plus fringe benefits negotiated with the Owner based on a presentation of acceptable documentation by the GC. For the purposes of this Article, the term "fringe benefits" shall mean those funds transferred irrevocably to a third party for payment/distribution. In addition, there may be added by the General Contractor and/or Sub-contractor an amount agreed upon, but not to exceed a combined total of fifteen percent (15%) of the actual costs, for overhead and profit. This cost breakdown shall be submitted to the Consultant promptly and with a goal of seven (7) Calendar Days or less after receipt of the proposal request.

18.4 If none of the above methods are mutually agreed upon or if the General Contractor does not respond promptly, a change may be made by unilateral determination by the Owner and/or the Consultant of reasonable costs or savings attributable to the change, including a reasonable allowance for overhead and profit. If this method is utilized, the General Contractor shall promptly proceed with the Work involved in the change upon receipt of a written order signed by the Owner. In such case, the General Contractor shall keep and present an itemized accounting of labor, equipment, material and other costs, in such form as may be prescribed by the Consultant.

18.5 In determining the cost or credit to the Owner resulting from a change, the allowances for all overhead (including home office and field overhead) and profit combined, shall be negotiated and shall not exceed (15%) fifteen percent.

18.6 In all cases where Change Orders are determined by unit prices set forth in the Contract Documents, no amount is to be added for additional overhead and profit.

18.7 The General Contractor shall keep and present in such form as the Consultant may direct, a correct account of all items comprising the net cost of such Work, together with vouchers. The determination of the Consultant and/or the Owner shall be final upon all questions of the amount and cost of extra Work and changes in the Work, and it shall include in such cost, the cost to the General Contractor of all materials used, the cost of all labor (including social security, old age and unemployment insurance, fringe benefits to which the employee is entitled, and Workers Compensation insurance), and the fair rental of all machinery used upon the extra Work, for the period of such use, which was upon the Work before or which shall be otherwise required by or used upon the Work before or after the extra Work is done. If the extra Work requires the use of machinery not already on the Project site, or to be otherwise used upon the Work, then the cost of transportation of such machinery to and from the Project site shall be added to the fair rental value. Transportation costs shall not be allowable for distances exceeding one hundred (100) miles.

18.8 The General Contractor shall not include or allow to be included in the cost of change in the Work any cost or rental of small tools, or any portion of the time of the General Contractor or the superintendent, or any allowance for the use of capital, or for the cost of insurance or bond premium or any actual or anticipated profit, or job or office overhead. These items are considered as being covered under the added amount for general overhead addressed in Article 18.3

18.8.1 The Owner will not pay claims made for lost opportunities, claims made for lost production or production inefficiencies or claims made that are formula based.

18.9 Pending final determination of value, partial payments on account of changes in the Work may be made on recommendation of the Consultant. All Change Orders shall be in full payment and final settlement of all claims for direct, indirect and consequential costs, including all items covered and affected. Any such claim not presented by the General Contractor for inclusion in the Change Order shall be waived.

18.10 The Consultant may authorize minor changes in the Work which do not involve additional cost or extension of the Contract Time, and which are not inconsistent with the intent of the Contract Documents. Such changes shall be made by an ASI issued by the Consultant, and shall be binding on the Owner and the General Contractor. The General Contractor shall carry out such orders promptly. If the General Contractor should claim that an ASI involves additional cost or delay to the completion of the Work, the General Contractor shall give the Consultant written notice thereof within ten (10) Calendar Days after receipt of the written ASI. If this notification does not occur, the General Contractor shall be deemed to have waived any right to claim or adjustment to the contract sum or to the contract completion time.

18.10.1 If the General Contractor claims that any instructions by the Consultant involve additional cost or time extension, the General Contractor shall give the Consultant written notice thereof within ten (10) Calendar Days after the receipt of such instructions and before proceeding to execute the change in Work. The written notice shall state the date, circumstances, whether a time extension will be requested, and the source of the order that the General Contractor regards as a Change Order. Unless the General Contractor acts in accordance with this procedure, any oral order shall not be treated as a change and the General Contractor hereby waives any claim for an increase of the Contract amount or extension of the contract time.

18.11 Requests for extension of time related to changes in the Work shall be submitted in accordance with the requirements of Article 21 of these General Conditions

## **ARTICLE 19 - RULES AND MEASUREMENTS FOR EXCAVATION**

19.1 If applicable, the following Rules and Measurements shall apply to the use of Unit Prices for the excavation portion of the Work:

19.1.1 Except as provided in this Article 19 for arbitrary measurements, the quantity of excavation shall be its in-place volume before removal.

19.1.2 No allowance will be made for excavating additional material of any nature taken out for the convenience of the General Contractor beyond the quantity computed under these "Rules and Measurements."

19.1.3 The quantities of excavation shall be computed from instrument readings taken by the Consultant's representative in vertical cross sections located at such intervals that will assure accuracy.

19.1.4 "Trench Excavation" for pipes shall arbitrarily be assumed to be two feet (2') wider than the outside diameter of the pipe barrel and with sides vertical.

19.1.5 The quantities shall be computed from plan size, or if there are no drawings, from actual measurements of the Work in place.

19.1.6 Each unit price shall cover, among other things, engineering (surveying) costs and keeping excavating dry.

19.1.7 Earth excavation for structures will be measured between the vertical planes passing 18 inches beyond the outside of the footings and from the surface of the ground to the neat lines of the bottom of the structure.

19.1.8 Rock excavation for structures will be measured between the vertical planes passing 18 inches beyond the outside of the footings and from the surfaces of the rock to the neat lines of the bottoms of the structures or the actual elevation of the rock ledge.

19.1.9 Rock excavation for pipelines trenches, unless otherwise provided for in the Specifications, shall be measured as follows: An arbitrary width of 18 inches plus the nominal diameter of the pipe multiplied by the depth from the surface the rock to six (6) inches below the invert for pipe 24 inches in diameter or less and eight (8) inches below the invert for all pipe greater than 24 inches in diameter. No additional compensation will be allowed for excavation for bell holes, gates or other purposes. The measurement of rock excavation for manholes shall be in accordance with Section 19.1.8 above.

19.1.10 Unclassified excavation shall be measured in the same manner as earth excavation.

## **ARTICLE 20 - CONCEALED CONDITIONS**

20.1 The Contract Drawings show the approximate location of the existing and new utility lines. These lines have been identified and located as accurately as possible using available information. The General Contractor is responsible for verifying all actual locations. If utilities require relocation or rerouting that is not shown or indicated to be relocated or rerouted, the General Contractor shall contact and cooperate with the Consultant to make the required adjustments. Any request for change

in the Contract Amount by the General Contractor shall be made pursuant to Article 18 of the General Conditions.

20.2 If any charted or uncharted utility service is interrupted by activities of the General Contractor or the General Contractor's Sub-contractor(s) for any reason, the General Contractor shall work continuously to restore service to the satisfaction of the Owner.

20.2.1 If any charted utility service, or any uncharted utility service the existence of which could have been discovered by careful examination and investigation of the site of the Work by the General Contractor, is interrupted by activities of the General Contractor or the General Contractor's Sub-contractor(s) for any reason, the entire cost to restore service to the satisfaction of the Owner shall be paid by the General Contractor. Should the General Contractor fail to proceed with appropriate repairs in an expedient manner, the Owner reserves the right to have the work/repairs completed and the cost of such work/repairs deducted from the monies due or to become due to the General Contractor pursuant to Article 22 of the General Conditions.

20.3 The General Contractor shall promptly, but in no case more than ten (10) Calendar Days from the time of discovery, and before the conditions are disturbed, notify Consultant in writing of:

20.3.1 Subsurface or latent physical conditions or any condition encountered at the site which differ materially from those indicated in the Contract Documents and which were not known by General Contractor or could not have been discovered by careful examination and investigation of the site of the proposed Work;

20.3.2 Unknown and unexpected physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered in the locale or generally recognized as inherent in the Work provided for in this Contract or,

20.3.3 Concealed or unknown conditions in an existing structure which are at variance with the conditions indicated by the Contract Documents, which are of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the Work provided for in this Contract, and which were not known by the General Contractor and could not have been discovered by careful examination and investigation of the site of the Work.

20.4 The Consultant shall promptly investigate the conditions discovered. If the Consultant finds that conditions, which are materially different from those ordinarily encountered and generally recognized as inherent in the Work provided for in this Contract, were not known by the General Contractor, and could not have been discovered by careful examination and investigation of the site of the Work, have caused or would cause a material increase or decrease in the General Contractor's cost of construction or the time required for performance of any part of the Work under this contract, the Consultant will recommend and the Owner will make an equitable adjustment in the Contract Amount and/or the time allotted for performance in the Contract Documents. Failure by the General Contractor to provide written notice to the Owner of such claims for additional compensation or time for performance within ten (10) Calendar Days of discovery of such conditions shall constitute a waiver by the General Contractor of the right to make such claims. The Owner will not pay claims made for lost opportunities, claims made for lost production or production inefficiencies or claims made that are formula based.

20.5 If the Consultant determines that changed conditions do not exist or are not materially different and no adjustment in the Contract Amount or time is warranted, the General Contractor shall continue performance of the Contract as directed by the Consultant. No claim by the General Contractor under this clause shall be allowed unless the required written notice is given and the

Consultant is given adequate opportunity to investigate the conditions encountered prior to disturbance. The failure of the General Contractor to give the Consultant proper notice of a differing site condition shall not affect the Owner's right to an equitable adjustment of the contract price or time if there is a decrease in the Contract Amount or time required to perform the Work.

**ARTICLE 21 - DELAYS AND EXTENSION OF TIME**

21.1 It is agreed that time is of essence for each and every portion of this Contract and where additional time is allowed for the completion of the Work or any part of the Work under this Contract, the new time limit fixed by such time extension shall be of the essence of this Contract. An extension of time shall not be cause for extra compensation under this Contract, except as set forth in Article 21.10 below.

21.2 The General Contractor will, subject to the provisions of Articles 21.7, 21.8 and 21.9 below, be granted an extension of time and/or relief from liquidated damages when the delay in completion of the Work is due to:

21.2.1 Any preference, priority, or allocation order duly issued by the government;

21.2.2 Unforeseeable causes beyond the control and without the fault or negligence of the General Contractor including, but not limited to, acts of God, or of the public enemy, acts of the Owner, acts of another contractor in the performance of a contract with the Owner, floods, epidemics, quarantine restrictions, strikes, and freight embargoes.

21.2.2.1 For such delays which stop all work on the Project for thirty (30) Calendar Days or more, the General Contractor shall be authorized at its discretion to remove its people from the site and return when the normal progress of the work may continue.

21.2.3 Regardless of the cause of a delay, the General Contractor shall expend all reasonable effort to mitigate the impact of any delay.

21.2.4 Requests for additional time due to delays in transportation or due to failures of suppliers shall not be considered for approval.

21.3 Requests for extensions of time and/or relief from liquidated damages, except for weather related claims, shall be made in writing not later than ten (10) Calendar Days after the beginning of the delay. Requests for extension of time or relief from liquidated damages shall be stated in numbers of whole Calendar Days.

21.4 Except as otherwise provided in the Contract Documents, extensions of the contractually required completion dates may be granted for unusually bad weather on the Project. Unusually bad weather as used herein means daily temperature or precipitation that exceeds the normal weather recorded and expected for the locality and/or the season or seasons of the year. For the purposes of this contract, it is mutually agreed that the following chart accurately defines the number of days in each month on which bad weather can reasonably be anticipated to impact weather dependent construction operations, and the General Contractor shall anticipate this normal seasonal weather in the development of the Project baseline schedule.

Mean	Jan.	Feb	Mar	Ap	May	Jun	Jul.	Aug	Se	Oct	Nov.	Dec.
Number of		.	.	r.		.		.	p.	.		
Days When												



Max Temp 32° or Below	9	6	1	0	0	0	0	0	0	0	1	5
Precip. Is 0.10 Inch or Greater	7	6	9	7	8	8	8	6	5	5	7	7

For the purpose of this Contract, “unusually bad weather” shall be interpreted as either 1) those days in a given month on which rainfall was 0.10 inch or more that exceed the number of days shown in the row for “Precip” or 2) those days in a given month on which maximum temperature was 32 degrees F or below that exceed the number of days shown in the row for “Max Temp”, whichever is greater.

21.4.1 Requests for extension of time due to unusually bad weather that could not reasonably have been anticipated at the time of execution of the Contract shall be made in writing not later than the tenth calendar day of the month following the month in which the delay occurred.

21.4.2 Requests for an extension of time due to unusually bad weather shall be considered for approval only if it is shown that a) the unusual weather event delayed work on a specific weather dependent activity or activities that had been planned to be underway on the date(s) on which the weather event occurred, as shown in the most recent update to the Project schedule that had been submitted to the Owner prior to the date of the event, and b) only if the delay to that activity or activities is shown to be the proximate cause of a corresponding delay to the contractually required completion dates for the Project shown in the most recent update to the Project schedule. The actual dates on which the delay(s) occurred must be stated and the specific activities that were directly impacted must be identified. In the event of concurrent delays, only those activities actually impacting contractually required completion dates will be considered in evaluating the merit of a delay request. Time extensions will not be considered if such adjustments do not exceed the total or remaining “float” associated with the impacted activities at the time of delay as shown in the most recent update to the Project schedule, nor for concurrent delays not caused by the Owner.

21.4.3 In anticipation of the possibility of delay due to unusually bad weather, the General Contractor shall identify those activities in the baseline schedules, and those activities subsequently added to updated schedules, that might reasonably be expected to be delayed by such weather.

21.4.4 Delays caused by unusually bad weather shall be incorporated in the Project schedule when the schedule is next updated by showing actual dates and/or percent complete for those activities that were impacted by the unusually bad weather as well as the effects of any effort to mitigate such delays. When claims are submitted for time extensions resulting from more than one occurrence of unusually bad weather during a month, the Project schedule shall be updated to reflect such separate events sequentially so that the impact of each subsequent occurrence is shown on an adjusted Project schedule that includes all prior claims for additional time.

21.5 In addition to the requirements of Article 21.7 and Article 21.8 below, any request for an extension of time for strikes or lockouts shall be supported by a written statement of facts concerning the strike including, but not limited to, the dates, the craft(s) affected, the reason for the strike, efforts to resolve the dispute, and efforts to minimize the impact of the strike on the Project.

21.6 Approval of time extensions for changes in the Work will depend upon the extent, if any, to which the changes cause delay in the completion of the various elements of construction. The

Change Order granting the time extension may provide that the Contract Time will be extended only for those specific elements so delayed and that other Work will not be altered.

21.7 The Contract Time will only be adjusted for causes specified above. Extensions of time will only be approved if the General Contractor provides justification supported by the Project schedule or other acceptable data that 1) such changes are, in fact, on the critical path and extend the contractually required completion dates, and 2) the General Contractor has expended all reasonable effort to minimize the impact of such changes on the construction schedule. No additional extension of time will be granted subsequently for claims having the basis in previously approved extensions of time.

21.8 In support of requests for an extension of time not caused by unusual inclement weather, and concurrently with the submittal of any such request, the General Contractor shall submit to the Consultant and the Owner a written impact analysis showing the influence of each such event on contractually required completion dates as shown in the updated Project schedule most recently submitted to the Owner prior to the event. The analysis shall include a partial network diagram showing a sequence of new or revised activities and/or durations that are proposed to be added to the existing schedule including related logic (a “fragnet”). This impact analysis and the fragnet shall include the new activities and/or activity revisions proposed to be added to the existing schedule and shall demonstrate the claimed impact on the critical path and the contractually required completion dates. The General Contractor will not be granted an extension of time and/or relief from liquidated damages when the delay to completion of the work is attributable to, within the control of, or due to the fault, negligence, acts, or omissions of the General Contractor and/or the General Contractor’s contractors, subcontractors, suppliers, or their respective employees and agents. Time extensions will not be considered in the event such adjustments do not exceed the total or remaining “float” associated with the impacted activities at the time of delay, nor for concurrent delays not caused by the Owner. In the event of concurrent delays, only that event actually impacting contractually required completion dates will be considered in adjusting the schedule and evaluating the merit of a delay claim. Requests for an extension of time which are not supported by this information shall not be considered for approval.

21.9 Approved extensions of time not caused by unusual inclement weather shall be incorporated in a revised schedule at the time of approval. No subsequent requests for time extension will be considered unless all previous approved time extensions have been incorporated in the Project schedule on which the requests are based.

21.10 Except as provided for in Article 21.10.1 through 21.10.3 below, no payment or compensation shall be made to the General Contractor and extensions of the time fixed for completion of the Contract shall be the General Contractor’s sole remedy for any and all delays, hindrances, obstructions or impacts in the orderly progress of the Work.

21.10.1 In addition to the provisions of Articles 18.3 above, and subject to the requirements of Article 21.8 and 21.8.1 above, if the Owner orders changes to the scope of Work for the Project that extend the then current contractually required completion dates of the Project, the General Contractor shall be entitled to reimbursement for job site, general conditions and staffing costs associated with such delay.

21.10.2 If delays, hindrances, impacts or obstructions of the General Contractor’s performance of the Contract are in whole or in part within the control of the Owner and, subject to the requirements of Article 21.8 and 21.8.1, extend contractually required completion dates of the Project, the General Contractor shall be entitled to reimbursement for job site, general conditions and staffing costs for that portion of the costs caused by acts or omissions of the Owner.

21.10.3 Such reimbursements shall not include consequential or similar damages, exemplary damages, damages based on unjust enrichment theory, formula based delay claims, or any element of home office overhead.

## **ARTICLE 22 - CORRECTION OF WORK BEFORE FINAL PAYMENT**

22.1 The General Contractor shall promptly remove from the site and replace any material and/or correct any Work found by the Consultant to be defective or that fails to conform to the requirements of the Contract, whether incorporated in the Work or not, and whether observed before or after Substantial or Final Completion. The General Contractor shall bear all costs of removing, replacing or correcting such Work or material including the cost of additional professional services necessary, and the cost of repairing or replacing all Work of separate contractors damaged by such removal or replacement.

22.2 The Consultant will notify the General Contractor and the Owner immediately upon its knowledge that additional services will be necessary. The Owner may consent to accept such nonconforming Work and materials with an appropriate adjustment in the Contract Amount. Otherwise, the General Contractor shall promptly replace and re-execute the Work in accordance with the Contract Documents and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement. If the General Contractor fails to commence and continue to correct non-conforming Work within a reasonable time as determined by the Consultant, the Owner may without limitation of other rights available to the Owner and without prejudice to other remedies, take any necessary action to make the necessary corrections. If the Owner makes required corrections for non conforming Work or materials, a Change Order will be issued reflecting an equitable deduction from the Contract Amount. This amount will be deducted from payments due to the General Contractor or, if no additional payments are due, General Contractor or the General Contractor's surety shall be responsible for payment of this amount.

## **ARTICLE 23 - CORRECTION OF WORK AFTER FINAL PAYMENT**

23.1 Neither the final certificate of payment nor any provisions in the Contract Documents shall relieve the General Contractor of responsibility for materials and equipment incorporated into the Work that fail to meet specification requirements, or for use of faulty materials or poor quality workmanship. If within one year after the date of Substantial Completion of the Work or designated portion thereof, any of the Work is found to be defective or not in accordance with the requirements of the Contract Documents, the General Contractor shall correct it promptly after receipt of written notice from the Owner to do so. The General Contractor shall correct any defects due to these conditions and pay for any damage to other Work resulting from their use. Nothing contained in this clause shall be construed to establish a period of limitation with respect to any obligation of the General Contractor under the Contract including, but not limited to, Warranties. The obligation of the General Contractor under this section shall be in addition to and not in limitation of any obligations imposed by special guarantees or warranty required by the Contract, given by the General Contractor, or otherwise recognized or prescribed by law.

23.2 In addition to being responsible for correcting the Work and removing any non conforming Work or materials from the job site, the General Contractor shall bear all other costs of bringing the affected Work into compliance with the Contract requirements. This includes costs of any required additional testing and inspection services, Consultant's services and any resulting damages to other property or to work of other contractors or of the Owner.

23.3 If the General Contractor fails to correct nonconforming Work within a reasonable time as determined by the Consultant, the Owner may take necessary actions to make the necessary corrections. If the Owner makes required corrections for nonconforming Work or materials after Final Payment to the General Contractor, the Owner shall be entitled to recover all amounts for such corrections, including costs and attorney's fees, from General Contractor or surety.

#### **ARTICLE 24 - TERMINATION OF CONTRACT FOR CONVENIENCE OF OWNER**

24.1 The Owner, by written notice to the General Contractor, may terminate this Contract in whole or in part when it is in the interest of the Owner, at the sole discretion of the Owner. In such case, the General Contractor shall be paid for all Work in place and a reasonable allowance for profit and overhead on Work done, provided that such payments shall not exceed the total Contract price as reduced by the value of the Work as yet not completed. The General Contractor shall not be entitled to profit and overhead on Work not performed.

#### **ARTICLE 25- OWNER'S RIGHT TO STOP WORK**

25.1 If the General Contractor fails to correct defective Work as required, or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner by written notice may order the General Contractor to stop the Work or any portion of the Work, until the cause for the order has been eliminated to the satisfaction of the Owner. The Consultant may stop Work without written notice for 24 hours whenever in its professional opinion such action is necessary or advisable to insure conformity with the Contract Documents. The General Contractor shall not be entitled to an adjustment in the Contract Time or Amount under this clause in the event such stoppages are determined to be the fault of the General Contractor or its Sub-contractor(s). The right of the Owner or Consultant to stop Work shall not give rise to a duty on the part of the Owner or Consultant to exercise this right for the benefit of the General Contractor or others.

#### **ARTICLE 26 -TERMINATION OF CONTRACT FOR DEFAULT ACTION OF GENERAL CONTRACTOR**

26.1 In addition to its rights under Articles 24 and 25, the Owner may terminate the contract upon the occurrence of any one or more of the following events:

26.1.1 If the General Contractor refuses or fails to prosecute the Work (or any separable part thereof) with such diligence as will insure its completion within the agreed upon time; or if the General Contractor fails to complete the Work within such time;

26.1.2 If the General Contractor is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of creditors, or if the General Contractor or a third party files a petition to take advantage of any debtor's act or to reorganize under the bankruptcy or similar laws concerning the General Contractor, or if a trustee or receiver is appointed for the General Contractor or for any of the General Contractor's property on account of the General Contractor's insolvency, and the General Contractor or its successor in interest does not provide adequate assurance of future performance in accordance with the Contract within 10 days of receipt of a request for assurance from the Owner;

26.1.3 If the General Contractor repeatedly fails to supply sufficient qualified supervision of the work, or repeatedly fails to ensure that Sub-contractors supply adequate supervision, suitable materials or equipment, or adequate numbers of skilled workmen and supervision to the Work;

26.1.4 If the General Contractor repeatedly fails to make prompt payments to Sub-contractors or suppliers at any tier, or for labor, materials or equipment;

26.1.5 If the General Contractor disregards laws, ordinances, rules, codes, regulations, orders or similar requirements of any public entity having jurisdiction;

26.1.6 If the General Contractor disregards the authority of the Consultant or the Owner;

26.1.7 If the General Contractor performs Work which deviates from the Contract Documents, and neglects or refuses to correct rejected Work; or

26.1.8 If the General Contractor otherwise violates in any material way any provisions or requirements of the Contract Documents.

26.2 Once the Owner determines that sufficient cause exists to justify the action, the Owner may terminate the Contract without prejudice to any other right or remedy the Owner may have, after giving the General Contractor and its Surety three (3) Calendar Days notice by issuing a written Declaration of Default. The Owner shall have the sole discretion to permit the General Contractor to remedy the cause for the contemplated termination without waiving the Owner's right to terminate the contract.

26.3 In the event that the Contract is terminated, the Owner may demand that the General Contractor's Surety take over and complete the Work on the Contract. The Owner may require that in so doing, the General Contractor's Surety not utilize the General Contractor in performing the Work. Upon the failure or refusal of the General Contractor's Surety to take over and begin completion of the Work within twenty (20) Calendar Days after the demand, the Owner may take over the Work and prosecute it to completion as provided below.

26.3.1 In the event that the Contract is terminated and the General Contractor's Surety fails or refuses to complete the Work, the Owner may take over the Work and prosecute it to completion in accordance with the laws of the Commonwealth, by contract or otherwise, and may exclude the General Contractor from the site. The Owner may take possession of the Work and of all of the General Contractor's tools, appliances, construction equipment, machinery, materials, and plant which may be on the site of the Work, and use the same to the full extent they could be used by the General Contractor, without liability to the General Contractor. At the Owner's sole discretion, the Owner has the right to take assignment of any or all portions of the contract work in order to prosecute the completion of the Work. In exercising the Owner's right to prosecute the completion of the Work, the Owner may also take possession of all materials and equipment stored at the site or for which the Owner has paid the General Contractor but which are stored elsewhere, and finish the Work as the Owner deems expedient. In such case, the General Contractor shall not be entitled to receive any further payment until the Work is finished.

26.3.2 If the unpaid balance of the Contract Price exceeds the direct and indirect costs and expenses of completing the Work including compensation for additional professional and Consultant services, such excess shall be used to pay the General Contractor for the cost of the Work it performed and a reasonable allowance for overhead and profit. If such costs exceed the unpaid balance, the General Contractor or the General Contractor's Surety shall pay the difference to the Owner. In exercising the Owner's right to prosecute the completion of the Work, the Owner shall have the right to exercise its sole discretion as to the manner, methods, and reasonableness of the costs of completing the Work and the Owner shall not be required to obtain the lowest figure for Work performed in completing the Contract. In the event that the Owner takes bids for remedial Work or completion of the Project, the General Contractor shall not be eligible for the award of such Contract.

26.3.3 The General Contractor shall be liable for any damage to the Owner resulting from the termination or the General Contractor's refusal or failure to complete the Work, and for all costs necessary for repair and completion of the Project above the amount of the Contract. The General Contractor shall be liable for all attorney's fees, costs and expenses incurred by the Owner to enforce the provisions of the Contract.

26.3.4 If liquidated damages are provided in the Contract and the Owner terminates the Contract, the General Contractor shall be liable for such liquidated damages, as provided for in Article 29.2 and 29.3 below, until Substantial Completion and Final Completion of the Work are achieved.

26.3.5 In the event the Contract is terminated, the termination shall not affect any rights of the Owner against the General Contractor. The rights and remedies of the Owner under this Article are in addition to any other rights and remedies provided by law or under this Contract. Any retention or payment of monies to the General Contractor by the Owner will not release the General Contractor from liability.

26.3.6 In the event the Contract is terminated under this Article, and it is determined for any reason that the General Contractor was not in default under the provisions of this Article, the termination shall be deemed a Termination for Convenience of the Owner pursuant to Article 24 and the rights and obligations of the parties shall be determined in accordance with Article 24.

## **ARTICLE 27 - SUSPENSION OF WORK**

27.1 The Owner or the Consultant may, at any time and without cause, order the General Contractor in writing or cause the General Contractor to suspend, delay or interrupt all or any part of the Work for such period of time as the Owner may determine to be appropriate for its convenience. Adjustment may be made for any increase in the Contract time necessarily caused by such suspension or delay, in accordance with Article 21.

## **ARTICLE 28 - TIME OF COMPLETION**

28.1 The General Contractor shall begin the Work on the date of commencement as specified in the Work Order. All time limits stated in the Contract Documents are of the essence of the Contract. The end of the Contract Time shall be the date specified on the approved certificate of Substantial Completion. The time for completion set forth in the Contract is a binding part of the Contract upon which the Owner may rely in planning the use of the facilities to be constructed and for all other purposes.

28.2 Substantial Completion is defined in Article 1.1.17 of these General Conditions. Only incidental corrective Work under punch lists and final cleaning (if required) for Owner's full use shall remain for Final Completion. The ability to occupy or utilize shall include regulatory authority approval unless regulatory approval is delayed due to actions of the Owner or the Consultant. When the Owner accepts and occupies a portion of the Project, the operation, maintenance, utilities, and insurance of that portion of the Project becomes the responsibility of the Owner.

28.3 The date of Substantial Completion shall be that date certified by the Owner, in accordance with the following procedures, that the Work is sufficiently complete to occupy or utilize as defined above.

28.3.1 When the General Contractor considers the entire Work is substantially complete as defined in Article 1.1.17 of these General Conditions, and is ready for its intended use, the General Contractor shall notify the Consultant in writing and request an inspection. The declaration and request shall be

accompanied by a list prepared by the General Contractor of those items of Work still to be completed or corrected. The failure of the General Contractor or Consultant to include any item or items, which are not completed or which need correction, on such list shall not alter the responsibility of the General Contractor to complete all Work in accordance with the Contract Documents.

28.3.2 The Consultant shall, within a reasonable time after receipt of notification from the General Contractor of a declaration of Substantial Completion and request for inspection, make such inspection. Prior to the Substantial Completion Inspection and within sufficient time to allow the Consultant's review, the General Contractor shall submit all As-Built drawings, Notice of Termination, catalog data, complete operating and maintenance instructions, manufacturer specifications, certificates, warranties, written guarantees and related documents required by the contract. The Consultant shall review said documents for accuracy and compliance with the Contract Documents and incorporate them into complete operating instructions and deliver them to the Owner.

28.3.3 If the Consultant considers the Work substantially complete, the Consultant shall recommend that the Owner prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion and the responsibilities between the Owner and General Contractor for security, maintenance, heat, utilities and insurance, if not otherwise provided for in the Contract Documents, and a tentative list of items to be completed or corrected, and shall fix the time within which the General Contractor shall complete the items listed therein. This time shall not exceed thirty (30) Calendar Days unless otherwise provided for in the Work Order. The Certificate of Substantial Completion shall be submitted to the Consultant and General Contractor for their written acceptance of the responsibilities assigned to them in the certificate. The Project shall not be deemed substantially complete until the certificate is issued. If, after making the inspection, the Consultant does not consider the Work substantially complete, the Consultant will notify the Owner and the General Contractor in writing, giving the reasons therefore.

28.4 Operation and Maintenance Manual Deliverables. In anticipation and preparation of completion of the Work and the closing out of the Project, and to facilitate training of the Owner's personnel in the maintenance and operation of the new installations, the Contractor shall comply with the requirements of Article 8.7 of the Special Conditions. (For the purposes of this article, air test and balance reports may be submitted at a later date with the request for certification of substantial completion.) These manuals shall be submitted to the Consultant for approval, and subsequently forwarded to the Owner's Project Manager by or before the time construction is 75% complete, as reflected by the Contractor's most recently submitted Application for Payment.

28.4.1 The provisions of Article 30.11 notwithstanding, if the General Contractor meets the requirements of Article 28.4 above with respect to timely submittal of approvable Operation and Maintenance manuals and provided the project construction is 1) at least 75% complete and 2) is equal to or ahead of the approved progress schedule and 3) the Work completed is in compliance with the requirements of the contract documents, the Owner, at the sole discretion of the Director, Capital Projects Management Division may reduce the retainage to (5%) of the current Contract Amount.

28.4.2 In the event the General Contractor fails to submit acceptable O&M manuals prior to reaching 75% completion, it is agreed that the Owner at its sole discretion may deduct from the current and subsequent Applications for Payment an amount deemed by the Owner to be sufficient to encourage prompt compliance with this contractual requirement, until such time as acceptable O&M manuals are received.

28.5 Project Close Out. When the General Contractor considers that all Work required by the Contract is 100% complete, including correction of any remaining punch list work or deficiencies, the General Contractor shall notify the Consultant in writing and request a final inspection. The Consultant, upon receipt of written notice from the General Contractor that the Work is complete and

is ready for final inspection and acceptance, will promptly make such inspection and when the Consultant finds the Work completed and acceptable under the Contract Documents and the Contract fully performed, the Consultant will so notify the General Contractor in writing to submit, and will certify to the Owner a final Certificate for Payment submitted in accordance with Articles 30.9 and 30.9.1 of these General Conditions. If the General Contractor does not complete the punch items within the time designated, the Owner retains the right to have these items corrected at the expense of the General Contractor including all architectural, engineering and inspection costs and expenses incurred by the Consultant and the Owner, and to deduct such costs and expenses from the funds being held in retainage. The Owner shall not be required to release the retainage until such items have been completed.

## **ARTICLE 29 - LIQUIDATED DAMAGES**

29.1 The Owner and the General Contractor recognize and agree that time is of the essence of this Contract and that the Owner will suffer financial loss if the Work is not completed within the time specified in the Contract plus any extensions that may be allowed. The parties further recognize the delays, expense and difficulties involved in proving the actual loss suffered by the Owner should the Work not be completed on time. The Owner and the General Contractor agree on the amounts stated as liquidated damages in the Agreement. The Owner and General Contractor agree that the amount stated as liquidated damages are not intended to be penalties.

29.2 Should the General Contractor fail to satisfactorily complete the Work under Contract on or before the date stipulated for Substantial Completion, as adjusted by approved Change Orders, if any, the General Contractor will be required to pay liquidated damages to the Owner for each consecutive Calendar Day that the Owner is deprived of full use of the area beyond the date specified unless otherwise stipulated elsewhere by Owner. After the date for Substantial Completion has been certified by the Owner, the General Contractor shall cease to owe liquidated damages until the date established for Final Completion.

29.3 If Final Completion is not achieved by the date established for Final Completion, as adjusted by approved Change Orders, if any, liquidated damages in the amount stipulated in the Agreement will become due and collectable. The Contract will be considered complete and Final Completion shall be deemed to have occurred when all Work has been completed in compliance with the Contract Documents and the Certificate of Final Completion has been issued by the Owner. No deduction or payment of liquidated damages will, in any degree, release the General Contractor from further obligations and liabilities to complete the entire Contract. Permitting the General Contractor to continue and finish the Work, or any part of it, after expiration of the Contract Time, shall in no way constitute a waiver on the part of the Owner of any liquidated damages due under the Contract.

## **ARTICLE 30 - PAYMENT TO THE GENERAL CONTRACTOR**

30.1 Payments on account of this Contract shall be made monthly as Work progresses. The General Contractor shall submit to the Consultant, in the manner and form prescribed, an application for each payment, and, if required, receipts or other vouchers showing payments made for materials and labor, including payments to Sub-contractors. All payments shall be subject to any withholding or retainage provisions of this contract. All pay request documents, except the final payment, shall be submitted in whole dollar amounts. All payment applications from the General Contractor shall include line items for overhead, profit and general condition costs.

30.2 The Consultant shall, within ten (10) Business Days after receipt of each application for payment, certify approval of payment in writing to the Owner and present the application to the Owner, or return the application to the General Contractor indicating in writing its reasons for



refusing to approve payment. The Owner, provided no exception is taken to the application for payment submitted by the Consultant, will issue payment on or within thirty (30) Business Days from the date received from the Consultant. A reasonable delay on the part of the Owner in making payment to the General Contractor for any given payment shall not be grounds for breach of Contract. The Consultant may refuse to approve the whole or any part of any payment if it would be incorrect to make such presentation to the Owner.

30.3 If payment is requested on the basis of materials and equipment not incorporated in the Work, but delivered and suitably stored at an off jobsite location agreed to in writing by the Owner that meets the manufacturer's requirements for the stored material and not-comingled with other material, the General Contractor shall furnish the following:

30.3.1 A list of the materials consigned to the Project (which shall be clearly identified), giving the place of storage, together with copies of invoices.

30.3.2 Certification that all items have been tagged for delivery to the Project and that they will not be used for any other purpose.

30.3.3 A letter from the Surety indicating that the Surety agrees to the arrangements and that payment to the General Contractor shall not relieve either the General Contractor or its Surety of their responsibility to complete the Work.

30.3.4 Evidence of adequate insurance listing the Owner as an additional insured covering the material in storage.

30.3.5 Evidence that representatives of the Consultant have visited the General Contractor's place of storage and checked all items listed on the General Contractor's certificate. They shall certify, insofar as possible, that the items are in agreement with the Specifications and approve their incorporation into the Project.

30.4 The Owner will pay 80% of the invoiced value less retainage for materials stored off site providing the above conditions are met.

30.5 The General Contractor's signature on each subsequent application for payment shall certify that all previous progress payments received on account of the Work have been applied to discharge in full all of the General Contractor's obligations reflected in prior applications for payment.

30.6 Each payment made to the General Contractor shall be on account of the total amount payable to the General Contractor and the General Contractor warrants and guarantees that the title to all materials, equipment and Work covered by the paid partial payment shall become the sole property of Owner free and clear of all encumbrances. Nothing in this Article shall be construed as relieving General Contractor from the sole responsibility for care and protection of materials, equipment and Work upon which payments have been made or restoration of any damaged Work or as a waiver of the right of Owner to require fulfillment of all terms of the Contract Documents.

30.7 Prior to submitting the first application for payment, the General Contractor shall submit to the Consultant and the Owner for approval a detailed breakdown of the Contract Amount pursuant to CSI specification divisions, divided so as to facilitate payment and correlated to the schedule required by General Conditions Article 32 of the Contract Documents. The total value of all activities shall add up to the Contract Amount. When approved by the Consultant and the Owner, this schedule shall be used as a basis for General Contractor's applications for payment and may be used by the Owner to

determine costs or credits resulting from changes in the Work. Failure to obtain the approval of the Schedules of Values shall be a basis for withholding payment to the General Contractor.

30.8 Retainage – The Owner will retain ten percent (10%) of the General Contractor’s progress payments until fifty one percent (51%) of the construction project has been completed. Thereafter, if the Work is fully in compliance with the requirements of the Contract and except as provided for in Article 28.4.1 above, the Owner shall retain five percent (5%) of the total contract amount until Substantial Completion and acceptance of all Work covered by this Contract, as collateral security to insure successful completion of the Work. For the purposes of this Article, the term “in full compliance” shall mean 1) that the progress of the Work is equal to or ahead of that predicted by the Project Baseline schedule and 2) the Work completed is in compliance with the requirements of the contract documents. Subsequent to the issuance of the Substantial Completion Certificate and depending upon the cost involved for the completion and/or correction of punch list items, the Consultant may recommend to the Owner an adjustment to the amount being held as retainage and, if approved by Owner, the amount of retainage may then be reduced and a sufficient sum retained by Owner to assure completion of the remaining unfinished Work. Retainage reduction as provided for in this Article 30.8 is contingent upon the General Contractor and/or Sub-contractors being on or ahead of the approved progress schedule and on verification by the Consultant that the Work completed is in compliance with the requirements of the contract documents

30.8.1 In addition to the retainage set forth above, the Owner may withhold from any monthly progress payments or nullify any progress payments in whole or in part as necessary to protect the Owner from loss on account of:

30.8.1.1 Defective Work which has not been remedied or completed Work which has been damaged requiring correction or replacement, or

30.8.1.2 Action required by the Owner to correct Defective Work or complete Work which the General Contractor has failed or refused to correct or complete, or

30.8.1.3 Failure of the General Contractor to perform any of its obligations under the Contract, or

30.8.1.4 Failure of the General Contractor to make payment properly to Sub-contractors; suppliers of material, services or labor; or to reimburse the University for utilities or other services as provided for in the Contract;

30.8.1.5 Amounts to be withheld as liquidated damages for failure to complete the Project in the allotted Contract time.

30.8.2 When the Owner is satisfied that the General Contractor has remedied any such deficiency, payments shall be made of the amount being withheld on the next scheduled application for payment.

30.9 Final Payment – When all Work is completed and acceptable and the Contract is fully performed, the General Contractor will be directed to submit a final payment application for certification and the entire balance shall be due and payable upon a certification of completion by the Consultant that the Work is in accordance with the Contract Documents.

30.9.1 Upon issuance of the Certificate of Final Completion by the Owner and submittal by the General Contractor of all required documents and releases, all retained amounts shall be paid to the General Contractor as part of the Final Payment. By accepting such payment, the General Contractor certifies that all amounts due or that may become due to any Sub-contractor, any Consultant of the General Contractor, or any vendors or material suppliers, have been paid or will be paid from the

proceeds of the final payment; and that, further, there are not liens, claims or disputes involving the Owner or the Consultant that are outstanding or unresolved.

30.10 The General Contractor shall promptly pay each Sub-contractor and material supplier upon receipt of payment from the Owner the amount to which said Sub-contractor and supplier is entitled, reflecting the percentage actually retained from payments to the General Contractor on account of such Sub-contractor's work. The General Contractor shall, by an appropriate Agreement with each Sub-contractor and material supplier, require each Sub-contractor and supplier to make payments to their sub-contractors, vendors and suppliers in similar manner.

30.10.1 The Consultant may, on request, furnish to any Sub-contractor or material supplier information regarding the percentages of completion applied for by the General Contractor and the action thereon by the Consultant.

30.10.2 Neither the Owner nor the Consultant shall have any obligation to make payment to any Sub-contractor or material supplier except as may otherwise be required by law.

## **ARTICLE 31 - AUDITS**

31.1 The General Contractor's Trade Contractors', sub-contractors' and/or vendor's "records" shall upon reasonable notice be open to inspection and subject to audit and/or reproduction during normal business working hours as may be deemed necessary by the Owner at its sole discretion. Such audits may be performed by an Owner's representative or an outside representative engaged by the Owner. The Owner or its designee may conduct such audits or inspections throughout the term of this contract and for a period of three years after final payment, or longer if required by law. Owner's representative may (without limitation) conduct verifications such as counting employees at the Construction Site, witnessing the distribution of payroll, verifying information and amounts through interviews and written confirmations with General Contractor's employees, field and agency labor, Trade Contractors and vendors.

31.2 "Records" as referred to in this Contract shall include any and all information, materials and data of every kind and character, including without limitation, records, books, papers, documents, subscriptions, superintendents' reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information and matters that may in the Owner's judgment have any bearing on or pertain to any matters, rights, duties or obligations under or covered by any Contract Document. Such records shall include hard copy, as well as computer readable data if it can be made available, written policies and procedures; time sheets; payroll registers; cancelled payroll checks; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates; estimating work sheets; correspondence; change order files (including documentation covering negotiated settlements); back charge logs and supporting documentation; invoices and related payment documentation; general ledger; records detailing cash and trade discounts earned; insurance rebates and dividends; and any other General Contractor or contractor records which may have a bearing on matters of interest to the Owner in connection with the General Contractor's dealings with the Owner (all foregoing hereinafter referred to as the "records") to the extent necessary to adequately permit evaluation and verification of any or all of the following:

- Compliance with Contract requirements for deliverables;
- Compliance with approved plans and specifications;
- Compliance with Owner's business ethics expectations;
- Compliance with Contract provisions regarding the pricing of change orders;
- Accuracy of General Contractor representations regarding pricing of invoices; and
- Accuracy of General Contractor representations related to claims submitted by the General Contractor or its payees.

31.3 The General Contractor shall require all payees (examples of payees include Trade Contractors, Sub-contractors, vendors, and/or material suppliers) to comply with the provisions of this Article by including the requirements hereof in a written contract agreement between the General Contractor and payees. Such requirements to include flow-down right of audit provisions in contracts with payees will also apply to Subcontractors and Sub-subcontractors, material suppliers, etc. The General Contractor will cooperate fully and will cause all related parties and all of the General Contractor's Trade Contractors and/or subcontractors (including those entering into lump sum subcontracts) to cooperate fully in furnishing or in making available to Owner from time to time whenever requested, in an expeditious manner, any and all such information, materials and data.

31.4 Owner's authorized representative or designee shall have reasonable access to the General Contractor's facilities, shall be allowed to interview all current or former employees to discuss matters pertinent to the performance of this contract and shall provide adequate and appropriate work space in order to conduct audits in compliance with this Article. The General Contractor and its payees agree bear their costs and expenses relating to any inspections and audits.

31.5 If an audit inspection or examination in accordance with this Article discovers any fraud or misrepresentation, or discloses overpricing or overcharges (of any nature) by the General Contractor to the Owner, in addition to making adjustments for the overcharges, the reasonable actual cost of the Owner's audit shall be reimbursed to the Owner by the General Contractor. Any adjustments and/or payments that must be made as a result of any such audit or inspection of the General Contractor's invoices and/or records shall be made within Ninety (90) Calendar Days from presentation of the Owner's findings to the General Contractor.

31.6 The provisions of Articles 31.1, 31.2 and 31.5 notwithstanding, the Owner shall have the right to conduct inspections and audits of any matter relating to the Contract Documents or the Work, which shall be for the Owner's sole benefit and shall not relieve the General Contractor, its sureties, contractors, subcontractors suppliers and their respective employees and agents of any obligations under the Contract Documents.

31.7 Any audits or inspections under Article 31 shall not constitute a waiver of any right the Owner has to accounting or discovery of records in the possession, custody or control of the General Contractor, its sureties, contractors, subcontractors, vendors and their respective employees and agents

## **ARTICLE 32- PROGRESS & SCHEDULING**

32.1 The schedules submitted for this Project shall be prepared using Primavera P6 scheduling software. If approved by the University, and at the sole discretion of the University, schedules submitted in other versions of Primavera scheduling software (Primavera Contractor saved in .xer format, Primavera SureTrak or Primavera P3) may be converted to Primavera P6 format by the University for review purposes. However, the University will not be responsible for any inaccuracies that may result from such conversions.

3.2 The schedules submitted for this Project shall coordinate Work in accordance with all schedules included in the Owner's approved Program. Construction work shall be scheduled and executed such that operations of the University are given first priority. This applies particularly to outages and restriction of access.

32.2.1 The schedules submitted for this Project shall not exceed time limits established for the Project. Schedules which reflect a duration less than the Contract Time are for the convenience of the General Contractor and shall not be the basis of any claim for delay or extension of time.

32.2.2 Schedules shall be revised at appropriate intervals as required by the condition of the Work and the Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

32.2.3 The General Contractor shall also submit a payment schedule indicating the percentage of the Contract Amount and the amount of the anticipated monthly payments that will be requested as the Project proceeds.

32.2.4 The Owner may withhold approval of all or a portion of progress payments until the progress payment schedule and construction schedule have been submitted by the General Contractor.

32.3 The General Contractor shall prepare and keep current, for the Consultant's approval, a separate schedule of submittals coordinated with the General Contractor's CPM construction schedule that provides reasonable time for the Consultant to review the submittals.

32.4 The General Contractor shall cause the work to be performed pursuant to the most recent schedules.

### **ARTICLE 33 - USE OF COMPLETED PORTIONS**

33.1 Upon mutual Agreement between the Owner, General Contractor, and Consultant, the Owner may use a completed portion of the Project after an inspection is made. Such possession and use shall not be deemed as acceptance of any Work not completed in accordance with the Contract Documents, nor shall such possession and use be considered to alter warranty obligations or cause any warranty period to commence prior to Substantial Completion.

### **ARTICLE 34 - INDEMNIFICATION**

34.1 To the fullest extent permitted by law, the General Contractor shall indemnify and hold harmless the Owner, its consultants, and their respective employees and agents from and against all claims, damages, losses and expenses, including attorney's fees, provided that any such claim, loss, damage or expense: (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (b) is caused in whole or in part by any negligent act or omission of the General Contractor, any Sub-contractor or material supplier, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. This basic obligation to indemnify shall not be construed to nullify or reduce other indemnification rights which the Owner, its consultants, and their respective employees and agents would otherwise have.

34.2 The General Contractor shall also indemnify and hold harmless the Owner, its consultants, and their respective employees and agents from any claims relating to the Project brought against the Owner, its consultants, and their respective employees and agents by any Sub-contractor unless such claims are due to the gross negligence or misconduct of the Owner or Consultant.

34.3 In any and all claims against the Owner its consultants, and their respective employees and agents, by any employee of the General Contractor, any Sub-contractor, any one directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Article shall not be limited in any way by any limitation on the amount or type

of damages, compensation or benefits payable by or for the General Contractor or any Sub-contractor under Worker's Compensation acts, disability benefit acts or other employee benefit acts.

34.4 The obligations of the General Contractor under this Article shall not extend to the liability of the Consultant, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Consultant, his agents or employees, provided such giving or failure to give is the primary cause of injury or damage.

## **ARTICLE 35 - INSURANCE**

35.1 The General Contractor shall furnish the Owner the Certificates of Insurance or other acceptable evidence that insurance is effective, and guarantee the maintenance of such coverage during the term of the Contract. Each policy of insurance, except Workers Compensation, shall name the University of Kentucky and the directors, officers, trustees and employees of the University as additional insured on a primary and non-contributory basis as their interest appears. Waiver of subrogation in favor of the University of Kentucky shall apply to all policies. Any endorsements required to validate such waiver of subrogation shall be obtained by the General Contractor at the General Contractor's expense.

35.2 The General Contractor shall not commence, nor allow any Sub-contractor to commence Work under this Contract, until the Owner has reviewed the certificates and approved coverages and limits as satisfying the requirements of the bidding process.

35.3 Workers' Compensation and Employers' Liability Insurance. The General Contractor shall acquire and maintain Workers' Compensation insurance with Kentucky's statutory limits and Employers' Liability insurance as defined in the Special Conditions for all employees who will be working at the Project site. In the event any Work is sublet, the General Contractor shall require any Sub-contractor to provide proof of this insurance for the Sub-contractors' employees, unless such employees are covered by insurance provided by the General Contractor.

35.4. The General Contractor shall either require each Sub-contractor to procure and maintain insurance of the type and limits stated during the terms of the Contract, or insure the activities of such Sub-contractors under a blanket form as described below:

35.4.1 Commercial General Liability Insurance. The General Contractor shall acquire and maintain a Broad Form Comprehensive General Liability (CGL) Insurance Policy including premises - operations, products/completed operations, blanket contractual, broad form property damage, real property fire legal liability and personal injury liability coverage. The Insurance Policy must be on an "occurrence" form only, unless approved by the Owner. Contractual liability must be endorsed to include defense costs. Products and completed operations insurance must be carried for two years following completion of the Work. Policies which contain Absolute Pollution Exclusion endorsements are not acceptable. Coverage must include pollution from "hostile fires". Where required by the risks involved, Explosion, Collapse and Underground (XCU) coverages shall be added by endorsement. If the work involved requires the use of helicopters, a separate aviation liability policy as defined in the Special Conditions will be required. If cranes and rigging are involved, a separate inland marine policy with liability limits as defined in the Special Conditions will be required.

35.4.1.1 The limits of liability shall not be less than defined in the Special Conditions.

35.4.2 Comprehensive Automobile Liability Insurance. The General Contractor shall show proof and guarantee the maintenance of insurance to cover all owned, hired, leased or non-owned vehicles used on the Project. Coverage shall be for all vehicles including off the road tractors, cranes and rigging equipment and include pollution liability from vehicle upset or overturn. Policy limits shall not be less than defined in the Special Conditions.

35.4.3 Excess or Umbrella Liability Insurance. The General Contractor shall acquire and maintain a policy of excess liability insurance in an umbrella form for excess coverages over the required primary policies of broad form commercial general liability insurance, business automobile liability insurance and employers' liability insurance. This policy shall have a minimum as defined in the Special Conditions for each occurrence in excess of the applicable limits in the primary policies. The excess liability policy shall not contain an absolute pollution exclusion and shall include coverages for pollution that may occur due to hostile fires and vehicle upset and overturn. The limits shall be increased as appropriate to cover any anticipated special exposures.

35.5 Builders Risk Insurance. The General Contractor shall purchase and maintain an "all risk" Builder's Risk Insurance policy upon the Work at the site to the full insurable value thereof. Such insurance shall include interests of the Owner, General Contractor, and all Sub-contractors and of their subcontractors. It shall insure against perils of fire, extended coverage, vandalism and malicious mischief. General Contractor's work performed, and materials to be incorporated into the project and stored on the jobsite, will be covered. Builder's Risk does not include temporary buildings, or General Contractor or General Contractor's tools, equipment, or trailers and contents.

35.6 Insurance Agent and Company Insurance as required in the bidding process of the Project shall be written according to applicable state law in Kentucky. The policies shall be written by an insurer duly authorized to do business in Kentucky in compliance with KRS: 304.1-100 and -.110.

## **ARTICLE 36 - PERFORMANCE AND PAYMENT BONDS**

36.1 The General Contractor shall furnish a Performance Bond in the form provided in the Contract Documents in the full amount of the Contract Amount as security for the faithful performance of the Contract. The General Contractor shall also furnish a Payment Bond in the form provided in the Contract Documents in the full amount of the Contract Amount for the protection of all persons performing labor or furnishing materials, equipment or supplies for the General Contractor or its Sub-contractors for the performance of the Work provided for in the Contract, including security for payment of all unemployment contributions which become due and payable under Kentucky Unemployment Insurance Law.

36.2 Each bond furnished by the General Contractor shall incorporate by reference the terms of the Contract as fully as though they were set forth verbatim in such bonds. In the event the Contract Amount is adjusted by Change Order, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amounts.

36.3 The performance and payment bonds shall be executed by a surety company authorized to do business in the Commonwealth of Kentucky, and the contract instrument of bonds must be countersigned by a duly appointed and licensed resident agent.

## **ARTICLE 37 - DAMAGED FACILITIES**

37.1 The General Contractor shall repair or replace, at no expense to the Owner, any damaged section of existing buildings, paving, landscaping, streets, drives, utilities, watersheds, etc. caused by Work performed under the Contract or incidental thereto, whether by the General Contractor's own

forces, Sub-contractors or by material suppliers. Such repair or replacement shall be performed by craftsmen skilled and experienced in the trade or craft for the original Work.

37.2 Water damage to the interior of any building caused by Work performed under the Contract or incidental thereto, whether by the General Contractor's own forces, Sub-contractors, or by material suppliers, and whether occurring in a new or existing building, shall be repaired by the General Contractor at the General Contractor's expense, and any materials damaged inside the building, including personal property, shall be repaired or replaced at the full replacement cost by the General Contractor at the General Contractor's expense.

37.3 For existing buildings, the General Contractor, along with the Owner's Representative and Consultant, will tour the Project site to evaluate existing conditions and determine any existing damage before any Work on this Contract is done.

37.4 Should the General Contractor fail to proceed with appropriate repairs in an expedient manner, the Owner reserves the right to have the Work/repairs completed and deduct the cost of such Work/repairs from amounts due or to become due to the General Contractor. If the Owner deems it not expedient to repair the damaged Work, or if repairs are not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

#### **ARTICLE 38- CLAIMS & DISPUTE RESOLUTION**

38.1 All General Contractor's claims and disputes shall be referred to the Consultant for review and recommendation. All claims shall be made in writing to the Consultant and Owner, not more than ten (10) days from the occurrence of the event which gives rise to the claim or dispute, or not more than ten (10) days from the date that the General Contractor knew or should have known of the claim or dispute. Unless the claim is made in accordance with these requirements, it shall be waived. Any claim not submitted before Final Payment shall be waived. The Consultant shall render a written decision within fifteen (15) days following receipt of a written demand for the resolution of a claim or dispute.

38.1.1 The provisions of Article 43.2 notwithstanding, claims and disputes between the General Contractor and any Sub-contractor or supplier shall not be referred to the Consultant except to request interpretation and/or clarification of the intent of the plans or specifications. Such claims and disputes between the General Contractor and any Sub-contractor shall be resolved between those parties as required by Article 43.4 of these General Conditions.

38.2 The Consultant's decision shall be final and binding on the General Contractor unless the General Contractor submits to the Consultant and the Project Manager a written notice of appeal within fifteen (15) Calendar Days of the Consultant's decision. The General Contractor must present within fifteen (15) Calendar Days of the notice to appeal a narrative claim in writing with complete supporting documentation. After receiving the written claim, the Project Manager will review the materials relating to the claim and may meet with the Consultant and/or the General Contractor to discuss the merits of the claim. The Project Manager will render a decision within thirty (30) Calendar Days after receiving the written claim and supporting documentation. The decision of the Project Manager shall be final and binding pending further appeal as provided for in Article 39. If the Consultant or the Project Manager do not issue a written decision within thirty (30) calendar days after receiving the claim and supporting documentation, or within a longer period as may be established by the parties to the Contract in writing, then the General Contractor may proceed as if an adverse decision had been received.



38.3 If the Project Manager does not agree with the Consultant's decision on a claim by the General Contractor, the Project Manager shall notify the General Contractor and the Consultant and direct the General Contractor to perform the Work about which the claim was made and the General Contractor shall proceed with such Work in accordance with the Project Manager's instruction. If the General Contractor disagrees with a decision of the Project Manager concerning a General Contractor's claim, the General Contractor shall proceed with the Work as indicated by the Project Manager's decision.

38.4 The General Contractor shall continue to diligently pursue Work under the Contract pending resolution of any dispute, and the Owner shall continue to pay for undisputed work in place.

#### **ARTICLE 39 - CLAIMS FOR DAMAGE**

39.1 Should either party to the Contract suffer damage because of wrongful act or neglect of the other party, or of anyone employed by them, or others for whose act they are legally liable, or other controversy arising under the Contract, such claim or controversy shall be made in writing to the other party within thirty (30) days after the first occurrence of the event. Prior to the institution of any action in court, the claim or controversy (together with supporting data) shall be presented in writing to the Director of the Capital Project Management Division at the University of Kentucky ("Director") or his designee for the University of Kentucky. The Director, or designee, is authorized, subject to any limitations or conditions imposed by regulations, to settle, comprise, pay, or otherwise adjust the claim or controversy with the General Contractor. The Director, or designee, shall promptly issue a decision in writing. A copy of the decision shall be mailed or otherwise furnished to the General Contractor. The decision rendered shall be final and conclusive unless the General Contractor files suit pursuant to KRS 45A.245. If the Director, or designee, does not issue a written decision within one hundred and twenty (120) days after written request for a final decision, or within a longer period as may be established by the parties to the Contract in writing, then the General Contractor may proceed as if an adverse decision had been received.

39.2 Any legal action on the Contract shall be brought in the Franklin Circuit Court and shall be tried by the Court sitting without a jury. All defenses in law or equity, except the defense of government immunity, shall be preserved to the Owner. The Owner shall recover from the General Contractor all attorney's fees, costs and expenses incurred to the extent the Owner prevails in defending or prosecuting each claim in litigation of disputes under the Contract. The Owner is the prevailing party under this provision and is entitled to recover attorneys' fees, costs and expenses on a claim-by-claim basis to the extent the Owner successfully defeats or prosecutes each claim. A recovery of a net judgment by the General Contractor shall not be determinative of the Owner's right to recover attorneys' fees, expenses and costs. Rather, such a determination shall be made based on the extent that the Owner successfully defends or prosecutes each distinct claim in litigation under the Contract, even if the Owner does not prevail on every claim. The General Contractor shall be liable to the Owner for all attorney's fees, costs and expenses incurred by the Owner to enforce the provisions of the Contract.

#### **ARTICLE 40 - LIENS**

40.1 The filing and perfection of liens for labor, materials, supplies, and rental equipment supplied on the Work are governed by KRS 376.195 et seq.

40.2 Statements of lien shall be filed with the Fayette County Clerk and any action to enforce the same must be instituted in the Fayette Circuit Court, pursuant to KRS 376.250 (2).

40.3 The lien shall attach only to any unpaid balance due the General Contractor for the improvement from the time a copy of statement of lien, attested by the Fayette County Clerk, is delivered to the Owner, pursuant to the provisions of KRS 376.240.

#### **ARTICLE 41 - ASSIGNMENT**

41.1 Neither party to the Contract shall assign the Contract, or any portion thereof without the prior written consent of the other, which consent may be granted or withheld in the granting party's sole and absolute discretion. The General Contractor shall not assign any amount or part of the Contract or any of the funds to be received under the Contract unless the General Contractor has the prior written approval of the Owner (which approval may be granted or withheld in the Owner's sole and absolute discretion) and the Surety on the General Contractor's bond has given written consent to any such assignment.

#### **ARTICLE 42 - SEPARATE CONTRACTS**

42.1 The Owner reserves the right to enter into other Contracts in connection with the Project or to perform any work with the Owner's forces in the normal sequence of the work as depicted in the then current construction schedule. Except for work performed by University personnel, such contracts shall be assignable to the General Contractor and shall contain the same terms and conditions as the contracts between the General Contractor and the Sub-contractors. The General Contractor will be entitled to a maximum of 7% total fee on the value of such assigned contracts. The General Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate its Work with theirs in such manner as the Consultant may direct.

42.2 Should the General Contractor cause damage to any separate contractor on the Work, and the separate contractor sues the Owner on account of any damage alleged to have been so sustained, the General Contractor shall be responsible for all costs, attorney's fees and expenses incurred by the Owner for defending such proceedings unless the Owner prevails on behalf of the General Contractor in which case fees and expenses will be the responsibility of the separate contractor and if any judgment against the Owner arises therefrom, the General Contractor shall pay or satisfy it and shall pay all costs, attorney's fees and expenses incurred by the Owner.

42.3 If any part of the General Contractor's Work depends upon the work of any other separate contractor, the General Contractor shall promptly report to the Consultant any observed defects in such work that render it unsuitable for proper execution connection. The failure to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of the work, except as to defects which may develop in the other contractor's work after the execution of the work.

42.4 Whenever work being done by the Owner's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various parties involved shall be established by the Owner to secure the completion of the various portions of the Work in general harmony.

#### **ARTICLE 43 - GENERAL CONTRACTOR/SUB-CONTRACTOR RELATIONSHIP**

43.1 The General Contractor is fully responsible to the Owner for the acts and omissions of the Sub-contractors and of persons either directly or indirectly employed by them. The General Contractor is responsible for the acts and omissions of persons employed directly by the General Contractor and for the coordination of the Work, including placement and fittings of the various

component parts. No claims for extra costs as a result of the failure to coordinate the Work, or by acts or omissions of the various Sub-contractors, will be paid by the Owner.

43.2 Except as otherwise provided in these Contract Documents, the General Contractor agrees to bind every Sub-contractor by the terms and conditions of the Contract Documents as far as applicable to their portion of the Work. Upon request, the General Contractor shall provide copies of any subcontracts and purchase orders to the Owner or Consultant.

43.3 The General Contractor shall make no substitution or change in any Sub-contractor listed and accepted by the Consultant or Owner except as approved in writing by the Owner. The General Contractor shall not employ any Sub-contractor or supplier against whom the Owner or the Consultant has made reasonable and timely objection.

43.4 Nothing contained in the Contract Documents shall create any contractual relationship between the Owner and any Sub-contractor, Trade Contractor or Supplier, nor shall the General Contractor include any language in their contracts with any Sub-contractor, Trade Contractor and/or Supplier that might imply such a relationship. The General Contractor is hereby notified that it is the General Contractor's contractual obligation to settle disputes between Sub-contractors, Trade Contractors, and/or Suppliers. Neither the Owner nor the Consultant will settle disputes between the General Contractor and any Sub-contractor, Trade Contractor, and/or Supplier or between Sub-contractors, Trade Contractors, and/or Suppliers.

43.4.1 The Owner does not waive sovereign immunity under KRS 45A.245(1) for any claim or claims made by parties not having a written contract with the University of Kentucky.

43.4.2 Third party and/or flow-through type claims, from Sub-contractors and/or suppliers or any other entity not having a written contract directly with the University, are specifically prohibited by this Contract and no provision of the General Contractor's contracts with such entities shall indicate otherwise.

43.4.3 The General Contractor shall indemnify and hold harmless the Owner and its agents and employees from any claims relating to the Project brought against the Owner by any of the General Contractor's Sub-contractors or suppliers, or between their sub-contractors or suppliers.

#### **ARTICLE 44 - CASH ALLOWANCE**

44.1 The General Contractor is to provide or require the Sub-contractor(s) to include in the Contract Amount all costs necessary to complete the Work. Costs based on "allowances" shall be permitted only for objectively quantifiable material items and only with the prior written approval of the Owner.

#### **ARTICLE 45 - PROJECT SITE LIMITS**

45.1 The General Contractor shall confine the apparatus, the storage of materials, and the operations of Workmen to Project site limits indicated in the Contract Documents and as permitted by law, ordinances, and permits, and shall not unreasonably encumber the site with materials and equipment.

#### **ARTICLE 46 - CLEAN UP**

46.1 The General Contractor shall at all times keep the premises free from accumulation of waste material or rubbish caused by the operations in connection with the Work. All corridors and exit

doors must be kept clear at all times. All exit ways, walks, and drives must be kept free of debris, materials, tools and vehicles.

46.2 At the completion of the Work, and prior to final inspection and acceptance, the General Contractor shall remove all remaining waste materials, rubbish, General Contractor's construction equipment, tools, machinery, and surplus materials and shall leave the Work in a clean and usable condition, satisfactory to the Consultant and the Owner. If the General Contractor fails to clean up as provided in the Contract Documents, the Owner may perform the cleaning tasks and charge the cost to the General Contractor.

#### **ARTICLE 47 - POINTS OF REFERENCE**

47.1 The General Contractor shall carefully preserve bench marks, reference points and stakes, and in case of willful or careless destruction, the General Contractor shall be charged with the resulting expense of replacement and shall be responsible for any mistake that may be caused by their loss or disturbance.

#### **ARTICLE 48 - SUBSTITUTION - MATERIALS AND EQUIPMENT**

48.1 Reference to or the listing of items to be incorporated in the construction without referring to any specific article, device, equipment, product, material, fixture, patented process, form, method or type of construction, or by name, make, trade name, or catalog number shall be interpreted as establishing the general intent of the Contract and the general standard of quality for that item.

48.2 Specific references in the Contract Documents to any article, device, equipment, product, material, fixture, patented process, form, method or type of construction, or by name, make, trade name, or catalog number, with the words "or equal", shall be interpreted as establishing a minimum standard of quality, and shall not be construed as limiting competition.

48.2.1 Substitution of other equipment and materials as "or equal" to items named in the specifications will be allowed provided the proposed substitution is approved by the Consultant and will perform the functions called for by the general design, be similar and of equal quality to that specified and be suited to the same use and capable of performing the same function of that specified. The Contractor has the burden to prove equality of any substitution requested.

48.3 Specific references in the Contract Documents to any article, device, equipment, product, material, fixture, patented process, form, method or type of construction, or by name, make, trade name, or catalog number, without the words "or equal", shall be interpreted as defining an item or source that has after careful consideration been determined by the University as necessary to be compliant with, and/or to function properly within, the University operational system. No substitutions will be allowed.

48.3.1 In the event the Contract Documents contain specific reference to two (2) or more items as described in Article 48.3, any of those listed will be acceptable.

48.4 Substitution of equipment and materials previously submitted by the Contractor and approved by the Consultant will be considered only for the following reasons:

48.4.1 Unavailability of the materials or equipment due to conditions beyond the control of the supplier.

48.4.2 Inability of the supplier to meet Contract Schedule.

48.4.3 Technical noncompliance to specifications.

48.5 In substituting materials or equipment, the Contractor assumes responsibility for any changes in systems or modifications required in adjacent or related work to accommodate such substitutions, despite consultant approval, and all costs associated with the substitution shall be the responsibility of the Contractor. The Consultant shall be reimbursed by the Contractor for any architectural or engineering revisions required as the result of such substitutions.

48.6 Inclusion of a certain make or type of materials or equipment in the Contractor's bid proposal shall not obligate the Owner to accept such materials or equipment if they do not meet the requirements of the Contract Documents and any such substitutions in the preparation of the bid without written approval shall be at the sole risk of the Contractor.

#### **ARTICLE 49 - TEST AND INSPECTION**

49.1 Regulatory agencies of the government having jurisdiction may require any Work to be inspected, tested or approved. The General Contractor shall assume full responsibility therefore, pay all costs in connection therewith, unless otherwise noted, and furnish the Consultant the required certificates of inspection, testing or approval.

49.2 The General Contractor shall give the Consultant timely notice of readiness of the Work for all inspections, tests or approvals.

49.3 The technical specifications may indicate specific testing requirements to be performed by the General Contractor. Unless otherwise provided in the Contract Documents, the cost of all such testing shall be the responsibility of the General Contractor. Testing shall be completed using a testing facility or laboratory approved by the Owner.

49.4 The costs of all inspection fees as may be required to construct and occupy the Work shall be the responsibility of the General Contractor.

#### **ARTICLE 50 - WARRANTY**

50.1 The General Contractor warrants to the Owner and the Consultant that all materials and equipment furnished under this Contract shall be new and in accordance with the requirements of the Contract Documents, and that all Work shall be of good quality, free from faults and defects and in conformance with the Contract Documents. If required by the Consultant or the Owner, the General Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. If the General Contractor requests approval of a substitution of material or equipment, the General Contractor warrants that such installation, construction, material, or equipment will equally perform the function for which the original material or equipment was specified. The General Contractor explicitly warrants the merchantability, the fitness for a particular purpose, and quality of all substituted items in addition to any to any warranty given by the manufacturer and/or supplier. Approval of any such substitution is understood to rely on such warrant of performance. Prior to the Substantial Completion inspection, the General Contractor shall deliver to the Consultant all warranties and operating instructions required under the Contract or to which the General Contractor is entitled from manufacturers, suppliers, and Sub-contractors. All warranties for products and materials incorporated into the Work shall begin on the date of Substantial Completion. The warranty provided in this Article 50 shall be in addition to and not a limitation of any other warranty or remedy required by law or by the Contract Documents, and such warranty shall be interpreted to require the General Contractor to replace defective material and equipment and re-execute defective Work which

is disclosed to the General Contractor by or on behalf of the Owner within a period of one (1) year after Substantial Completion of the entire Work in addition to other warranty obligations beyond one (1) year from Substantial Completion as provided for by law or by the Contract Documents.

50.2 Neither the final payment, any provision in the Contract Documents nor partial or entire use or occupancy of the premises by the Owner shall constitute an acceptance of Work not done in accordance with Contract Documents or relieve the General Contractor or its Sureties of liability with respect to any warranties or responsibilities for faulty materials and workmanship. The General Contractor or its sureties shall remedy any defects in Work and any resulting damage to Work at the General Contractor's own expense. The General Contractor shall be liable for correction of all damage resulting from defective Work. If the General Contractor fails to remedy any defects or damage, the Owner may correct Work or repair damages and the cost and expense incurred in such event shall be paid by or be recoverable from the General Contractor or the surety. The Owner will give notice of observed defects with reasonable promptness.

50.3 The General Contractor shall guarantee that labor, material, and equipment will be free of defects for a period of one (1) year from the date shown on the Certificate of Substantial Completion unless special conditions or additional warranty periods are required by the contract pursuant to Article 23 in addition to warranty obligations which extend beyond one year from Substantial Completion. The Owner will give notice of observed defects with reasonable promptness. Expendable items and wear from ordinary use are excluded from this warranty.

50.4 Should the General Contractor be required to perform tests that must be delayed due to climate conditions, it is understood that such tests will be accomplished by the General Contractor at the earliest possible date with provisions of the general warranty beginning upon satisfactory completion of said test. The responsibility of the General Contractor under this Article will not be abrogated if the Owner should elect to initiate final payment. If the Owner initiates final payment, consent of General Contractor's surety acknowledging that Work not yet tested is required. The General Contractor shall warrant that the entire Project will conform to the Contract Documents.

50.5 In addition to the foregoing, the General Contractor shall warrant for a period of one (1) year that all buildings and other improvements constructed as a part of the Work shall be watertight and leak proof at every point and in every area. The General Contractor shall, immediately upon notification by or on behalf of the Owner of water penetration, determine the source of water penetration and, at the General Contractor's expense, (a) do any work to be necessary to make such buildings or improvements watertight and (b) repair and replace any other damaged material, fences and furnishings damaged as a result of such water penetration and return the buildings or other improvements to their original condition.

50.6 The General Contractor shall address and resolve to the Owner's satisfaction any warranty claims made by or on behalf of the Owner during the above described warranty period and all repairs and replacements made by the General Contractor pursuant to this Article 50 shall be warranted by the General Contractor, on the terms set forth in this Article 50, for a period of time commencing upon the completion of such repairs and replacements and ending on the later of (a) the expiration of the one (1) year warranty period provided for above or (b) six (6) months after the date such repair or replacement is completed.

50.7 All costs, attorney's fees and expenses incurred by the Owner as a result of the General Contractor's failure to honor any warranty for the Work shall be paid by or recoverable from the General Contractor.

**ARTICLE 51 - PREVAILING WAGE LAW REQUIREMENTS (NO LONGER USED AS OF 1/9/2017)**

**ARTICLE 52 - APPRENTICES**

52.1 Apprentices (for all classifications of work) shall be permitted to work only under an apprenticeship agreement approved by the Kentucky Supervisor of Apprenticeship and by the Kentucky Apprenticeship and Training, United States Department of Labor.

**ARTICLE 53 - GOVERNING LAW**

53.1 This Contract and all issues and disputes arising out of this Contract shall be governed by, construed and enforced in accordance with the laws of the Commonwealth of Kentucky without consideration of its conflicts of laws principles.

**ARTICLE 54 - NONDISCRIMINATION IN EMPLOYMENT**

54.1 During the performance of the Contract, the General Contractor agrees as follows:

54.1.1 The General Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, national origin, or disability in employment. The General Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, age, national origin, or disability in employment. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The General Contractor agrees to post in conspicuous places available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

54.1.2 The General Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the General Contractor; state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, age, national origin or disability in employment.

54.1.3 The General Contractor will send to each labor union or representatives of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or workers' representatives of the General Contractor's commitments under this Article, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

54.2 Failure to comply with the above nondiscrimination clause constitutes a material breach of Contract.

**ARTICLE 55 - AFFIRMATIVE ACTION; REPORTING REQUIREMENTS**

55.1 The General Contractor and any Sub-contractor is exempt from any affirmative action or reporting requirements, under the Kentucky Equal Employment Opportunity Act of 1978, KRS 45.550 to KRS 45.640 "The Act", if any of the following conditions are applicable:

55.1.1 The sub-contract awarded is in the amount of two hundred and fifty thousand dollars (\$250,000.00) or less, and the amount of the sub-contract is not a subterfuge to avoid compliance with the provisions of the Act;

55.1.2 The General Contractor or Sub-contractor utilizes the services of fewer than eight (8) employees during the course of the Contract;

55.1.3 The General Contractor or Sub-contractor employs only family members or relatives;

55.1.4 The General Contractor or Sub-contractor employs only persons having a direct ownership interest in the business and such interest is not a subterfuge to avoid compliance with the provisions of The Act.

55.2 The General Contractor and any Sub-contractor, not otherwise exempted, shall:

55.2.1 For the length of the Contract, hire DBE's from within the drawing area to satisfy the agreed upon goals and timetables. Should the union with which the General Contractor or Sub-contractor have collective bargaining agreements be unwilling to provide sufficient DBE's to satisfy the agreed upon goals and timetables, the General Contractor and Sub-contractors shall hire DBE's from other sources within the drawing area.

Diverse Business Enterprises (DBE) consist of minority, women, disabled, veteran and disabled veteran owned business firms that are at least fifty-one percent owned and operated by an individual(s) of the aforementioned categories. Also included in this category are disabled business enterprises and non-profit work centers for the blind and severely disabled. MBE, WBE, Veterans, Disabled Veterans and Disabled make up Diverse Business Enterprises (DBE)

55.2.2 The equal employment provisions of The Act may be met in part by the General Contractor contracting to a Diverse Business Enterprise (DBE) contractor or Sub-contractor.

55.2.3 Each General Contractor shall, for the length of the Contract, furnish such information as required by The Act and by such rules, regulations and orders issued pursuant thereto and will permit access to all books and records pertaining to its employment practices and Work sites by the contracting agency and the department for purposes of investigation to ascertain compliance with The Act and such rules, regulations and orders issued pursuant thereto.

55.3 If the General Contractor is found to have committed an unlawful practice against a provision of The Act during the course of performing under this Contract, a subcontract covered under The Act, the Owner may cancel or terminate the Contract, conditioned upon a program for future compliance approved by the Owner. The Owner may also declare such General Contractor ineligible to submit proposals on further contracts until such time as the General Contractor complies in full with the requirements of The Act.

55.4 Any provisions of The Act notwithstanding, no General Contractor shall be required to terminate an existing employee, upon proof that employee was employed prior to the date of the Contract, nor hire anyone who fails to demonstrate the minimum skills required to perform a particular job.



# 01000S01- Special Conditions - General Contractor

UNIVERSITY OF KENTUCKY  
SPECIAL CONDITIONS OF THE CONTRACT  
FOR CONSTRUCTION BY A GENERAL CONTRACTOR  
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# 010000S01- Special Conditions - General Contractor

## ARTICLE 01 GENERAL INFORMATION

1.1 These Special Conditions are intended to modify, supplement, or delete from, applicable Articles of the General Conditions.

1.2 Where any Article of the General Conditions is supplemented by these Special Conditions, the Article shall remain in effect and the supplement shall be added thereto.

1.3 Where Special Conditions conflict with General Conditions, provisions of the Special Conditions take precedence.

## ARTICLE 02 FIELD CONDITIONS

2.1 General Contractor will secure all data at the site of the building such as grades of lot, convenience of receiving and sorting material, location of public services, and other information which will have a bearing on proposals or on the execution of the Work and shall address these issues in the preparation of their bid. No allowance shall be made for failure of the General Contractor to obtain such site information prior to submitting their proposal, and no adjustment to the General Contractor's Contract amount or stipulated time for completion shall be allowed when due to failure by the General Contractor to do so.

## ARTICLE 03 (NOT USED)

## ARTICLE 04 CONSULTANT

4.1 Wherever in these Contract Documents reference is made to the Consultant, it shall be understood to mean [Stengel Hill Architecture](#) or their duly authorized representatives. (See Article 2 of the General Conditions.)

## ARTICLE 05 GEOTECHNICAL REPORT (NOT USED)

## ARTICLE 06 TIME FOR COMPLETION

6.1 The time for Substantial Completion as further defined in Article 1 of the General Conditions shall be 109 consecutive calendar days from the date of commencement as specified in the Work Order letter, and Final Completion shall be thirty (30) days thereafter.

## ARTICLE 07 LIQUIDATED DAMAGES

7.1 Should the General Contractor fail to achieve Substantial Completion of the Work under this Contract on or before the date stipulated for Substantial Completion (or such later date as may result from extensions in the Contract Time granted by the Owner), he agrees that the Owner is entitled to, and shall pay the Owner as liquidated damages the sum of [One Hundred Dollars \(\\$100.00\)](#) for each consecutive calendar day that Substantial Completion has not been met. See Article 3 of the Agreement.

7.2 Should the General Contractor fail to achieve Final Completion of the Work under this Contract on or before the date stipulated for Final Completion (or such later date as may result from extensions in the Contract Time granted by the Owner), he agrees that the Owner is entitled to, and shall pay the Owner as liquidated damages the sum of [Seventy Five Dollars \(\\$75.00\)](#) for each consecutive calendar day until Final Completion is reached. See Article 3 of the Agreement.

# 010000S01- Special Conditions - General Contractor

## ARTICLE 08 SUBMITTALS AND SHOP DRAWINGS

### 8.1 SUBMISSIONS - GENERAL

8.1.1 The General Contractor shall submit each set of Shop Drawings, product data, samples, and test and/or certification reports as a separate item in UK E-Communication<sup>®</sup>.

8.1.2 All sample selections for color shall be submitted for approval at the same time. Color selections shall not be submitted individually.

8.1.3 Any deviation from the Contract Documents shall be noted on the transmittal form comment section.

8.1.4 All submittals are to be reviewed by the General Contractor for compliance with the Contract Documents before submission for approval. All submittals are to be initiated by the General Contractor. Submittals made directly to the Consultant by sub-contractors, manufacturers or suppliers will not be accepted or reviewed.

8.1.5 Re-submittals shall conspicuously note all changes from earlier submissions. Special notation by the General Contractor shall be made to any changes other than those in response to the Consultant's review.

8.1.6 Manufacturers shall, when requested by the Consultant, submit test reports prepared by reputable firms or laboratories certifying as to performance, operation, construction, wearability, etc., to support claims made by the manufacturer of the equipment or materials proposed for inclusion in the Work. General Contractor shall also submit a list of three (3) installations where said equipment or materials have been in service for a minimum of five (5) years.

### 8.2 SUBMISSIONS - REVIEW

8.2.1 Review of submittals is only for compliance with the design concept and the contract documents. THE CONSULTANT SHALL NOT BE RESPONSIBLE FOR CHECKING DEVIATIONS FROM CONTRACT DOCUMENT REQUIREMENTS OR CHANGES FROM EARLIER SUBMISSIONS NOT SPECIFICALLY NOTED.

8.2.2 The following shall be verified prior to making submittals:

Field Measurements, Field Construction Criteria, Catalog numbers and similar data, Quantities and Capacities, and Compliance with requirements, including verification of all dimensions,

8.2.3 Review Stamp designations shall be as follows:

8.2.3.1 "NET = No Exceptions Taken" : Proceed with the Work, no corrections needed.

8.2.3.2 "FC= Furnish as Corrected": Proceed with the Work, noting the corrections/conditions of the approval.

8.2.3.3 "RR = Revise and Resubmit": Do not proceed with the Work, as the submittal does not comply with the Contract Documents. Revisions to the submittal are required for approval. On projects utilizing UK E-Communication, "Send Back a Step" is used in lieu of "Revise and Resubmit"

8.2.3.4 "R = Rejected": Do not proceed with the Work, the submittal is rejected.

### 8.3 SUBMISSIONS - SPECIAL PROVISIONS

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8.3.1 In making a submittal, the General Contractor shall be deemed to be making the following representations:

8.3.1.1 The General Contractor understands and agrees that he shall bear full responsibility for the products furnished. The General Contractor expressly warrants that products described in the attached submittal will be usable and that they conform to the Contract requirements unless specifically noted otherwise.

8.3.1.2 The General Contractor understands and agrees that, without assuming design responsibility, he expressly warrants that products described in the attached submittal are capable of being used in accordance with the intent of the design documents and that they conform to the Contract requirements unless specifically noted otherwise.

8.3.1.3 The General Contractor acknowledges that the Owner will rely on the skill, judgment, and integrity of the General Contractor as to conformance requirements and subsequent usability.

### 8.4 SHOP DRAWING AND PROCUREMENT SUBMITTAL LOG

8.4.1 The General Contractor, within ten (10) days after the Pre-Construction meeting, shall begin uploading submittals using UK E-Communication<sup>®</sup>, to generate a log fixing the dates for submission of Shop Drawings, special order material items, certifications, guarantees, and any other items required to be submitted to the Consultant for review, approval, or acceptance. Projects not utilizing UK E-Communication<sup>®</sup> will submit a Shop Drawing Log provided by the Owner during the Pre-Construction Meeting.

8.4.2 The log shall track all submittals to date. The updated log shall then be reviewed and discussed at each progress meeting to determine items that may impact the construction schedule.

### 8.5 Shop Drawings

8.5.1 The General Contractor shall review, approve, and submit Shop Drawings to the Consultant, in accordance with the Consultant's Shop Drawing & Procurement Submittal Log or UK E-Communication<sup>®</sup>, as herein detailed. By approving and submitting Shop Drawings, the General Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

8.5.2 The General Contractor shall submit Shop Drawings required for the Work and the Consultant will review and take appropriate action. The review and approval shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The approval of a separate item will not indicate approval of the assembly in which the item functions.

8.5.3 The General Contractor shall make any corrections required by the Consultant for compliance to the Contract and shall return the required number of corrected copies of Shop Drawings and resubmit new samples until approved. The General Contractor shall direct specific attention, in writing, or on resubmitted Shop Drawings, to revisions other than the corrections called for by the Consultant on previous submissions. The General Contractor's stamp of approval on any shop drawing or sample shall constitute a representation to Owner and Design Consultant that the General Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar date, or he assumes full responsibility for doing so, and that he has reviewed or coordinated each shop drawing or sample with the requirements of the Work and the Contract Documents.

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8.5.4 Where a shop drawing or sample submission is required by the specifications, no related Work shall be commenced until the submission has been approved by the Design Consultant. A copy of each approved shop drawing and each approved sample shall be kept in good order by the General Contractor at the site and shall be available to the Consultant.

8.5.5 The Consultant's approval of Shop Drawings or samples shall not relieve the General Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless the General Contractor has in writing called the Consultant's attention to such deviation at the time of submission and the Consultant has given written approval to the specific deviation. Any approval by the Consultant shall not relieve the General Contractor from responsibility for errors or omissions in the Shop Drawings.

8.5.6 All submittals are to be submitted electronically by the contractor. Shop Drawings submitted through UK E-Communication® shall be scanned and submitted in color. Mark-ups must be made using visible color when printed. Workflow in UK E-Communication® will be established during the workflow meeting. Each individual Shop Drawing shall have its respective specification number and description highlighted.

8.5.7 Where Shop Drawings include fire alarm, communication systems schematics, sprinkler systems, etc., a sepia of each drawing shall be submitted to the Consultant as part of the "Record" set of drawings.

### 8.6 SUBMISSIONS - SAMPLES

8.6.1 Office samples shall be of sufficient size and quantity to clearly illustrate functional characteristics of the product with integrally related parts and attachment devices, and full range of color, texture, and pattern.

8.6.2 Products shall not be used until the sample has been submitted to and approved by the Consultant.

8.6.3 A minimum of two (2) samples are required to be submitted to the Consultant for review and approval and will be distributed as follows:

- a) One (1) to be retained by the University;
- b) One (1) to be retained by the Design Consultant;
- c) An additional sample or samples may be submitted, at the General Contractor's option, for distribution to a third party.

8.6.4 Field samples (block, brick, etc.) of materials to be constructed at the site shall be submitted for review as required by the individual section of the Contract Documents.

### 8.7 SUBMISSIONS - OPERATION AND MAINTENANCE MANUALS

8.7.1 The University requires a minimum of one (1) digital copy of the final installation, training, operation, maintenance, and repair manuals to be turned over to the Owner's Project Manager and approved for content by the Consultant by or before the time construction is 75% complete. Projects utilizing e-Communication will create digital copy from the Document Library (Closeouts) in e-Communication. Operation and maintenance manuals and materials, where specified, for mechanical and electrical equipment and for operating items other than mechanical and electrical equipment must be submitted in PDF format with a separate PDF file for each item. In the event the Construction Manager fails to provide these required electronic submittals prior to reaching seventy-five (75%) completion, it is agreed that the Owner at its sole discretion may deduct from the current and subsequent Applications for Payment an amount deemed by the Owner to be sufficient to encourage prompt compliance with this contractual requirement, until such time as acceptable O&M manuals are received.

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8.7.2 Manuals provided must be of sufficient detail to enable the Owner or others to install, calibrate, train, operate, maintain, service and repair every system, subsystem, and/or piece of equipment installed on or as part of this Contract. Manuals submitted through UK E-Communication® shall be scanned and submitted in color. Mark-ups must be made using visible color when printed. Each manual must contain:

8.7.2.1 Project Title, Project number, Location, dates of submittals, names, addresses and phone number for the Consultant, Construction Manager, and Construction Manager's Sub-contractors;

8.7.2.2 An Equipment Index that includes vendors' names, addresses, and telephone numbers for all equipment purchased on the Project;

8.7.2.3 Emergency instructions with phone numbers and names of contact persons on warranty items shall be uploaded to UK E-Communication®;

8.7.2.4 Copies of each system's air balancing record and each system's hydronic balancing record (1) physical copy and (1) digital copy in eCommunication;

8.7.2.5 Copy of valve tag list;

8.7.2.6 Copy of As-Built temperature control system drawings and components and sequence of operation;

8.7.2.7 Original copies of the following provided by the manufacturer:

Installation manuals	Instruction Manuals
Training manuals	Calibration manuals
Service Manual	Operation manuals
Parts list	Repair manuals
Reviewed Shop Drawings	Wire list
	Keying Bit List

8.7.2.8 Any Computer, Micro controller, and/or Microprocessor equipped equipment installed shall be provided with source code copies of all software and firmware (prom, eprom, rom, other) supplied on this Contract; and

8.7.2.9 Copies of all inspection and guarantee certificates, manufacturers' warranties with the University of Kentucky listed as the Owner for all equipment provided and/or installed.

8.7.2.10 Refer to the Official Design Standards **017800S01 – Closeout Submittals** for full details <https://www.uky.edu/cpmd/download/file/fid/78986>

8.7.2.11 If the O&M manuals from any one vendor covering several different model numbers, the model used on the Project must be highlighted.

8.7.2.12 Included in the front of the "Operation and Maintenance Manual" shall be a copy of the Interior and Exterior Finish plan and Schedule listing all finish materials, the manufacturer, the finish color, and the manufacturer's paint number.

8.7.2.13 Photograph album containing photos and negatives or digital images (.pdf format) showing buried utilities and concealed items shall be included.

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### 8.8 SUBMISSIONS – AS - BUILT SET OF DRAWINGS

8.8.1 The General Contractor shall submit one (1) electronic copy of As - Built set of drawings in .pdf format indicating all deviations of construction as originally specified in the Contract Documents. These As-Built Drawings will compile information from the General Contractor as well as all Sub-contractors. The General Contractor shall provide a qualified representative to update the As - Built set of drawings as construction progresses. As-Built submitted through UK E-Communication® shall be scanned and submitted in color. Mark-ups must be made using visible color when printed.

8.8.2 The General Contractor shall provide and utilize a camera to photograph the installation of buried utilities and concealed items. The General Contractor shall provide standard 3 1/2" x 5" photographs with negatives, or digital images (.pdf format), which shall be submitted as part of the Operation and Maintenance Manuals submission. These photos should be mounted in a bound album with labeling as to subject of photo, date, and Project. Such album is to be kept at job site with the As - Built set of drawings until submittal of same.

8.8.3 Approval of the Final Payment request will be contingent upon compliance with these provisions. The General Contractor's As – Built set of drawings shall be delivered to the Consultant at their completion so that the Consultant may make any changes on the original contract drawings.

### 8.9 SUBMISSIONS - SAP EQUIPMENT LIST

8.9.1 Complete equipment list for use with SAP software in electronic spreadsheet format. Data is to be provided in Unifomat format with the information being provided for individual locations as noted in Attachment A – Unifomat Component List. Information is to be provided as follows (PPDMC or CPPD will provide blank Excel spreadsheets in electronic form for use in compiling the information, if desired)

8.9.2 All materials that require preventative maintenance (PM) are listed as in Attachment A. The equipment list is to be provided in Excel spreadsheet format and is to include the information listed in Attachment B

8.9.3 Required maintenance procedure listing each work task in Excel spreadsheet format as shown in Attachment C.

8.9.4 Required frequency of maintenance for the work tasks outlined in 8.9.3 above and included in the Attachment C spreadsheet

8.9.5 Listing of maintenance parts and items: i.e. filters, lubricants, etc. for each work task listed in 8.9.3 above.

### 8.10 SUBMISSIONS – MAINTENANCE MATERIALS

8.10.1 If specified, Maintenance/Replacement Materials, Spare Parts, and special maintenance tools for proper maintenance shall be provided by the General Contractor.

## ARTICLE 09 PLANS, DRAWINGS, AND SPECIFICATIONS

9.1 The successful Construction Manager will receive a digital copy (.pdf) sets of plans and specifications. Construction Manager will be required to pay for cost of duplication for all sets required. One official, physically printed, clean copy of the permit set is to be located at the jobsite at all times.

9.2 The University will provide a digital copy (.pdf) of the 'Official Contract Documents' book to the successful Construction Manager. One official, physically printed, clean copy of the permit set is to be located at the jobsite at all times.



## 010000S01- Special Conditions - General Contractor

9.3 All drawings, specifications and copies, thereof, prepared by the Consultant, are the property of the University of Kentucky. They are not to be used on other Work.

### ARTICLE 10 PROGRESS MEETINGS

10.1 In addition to specific coordination and pre-installation meetings for each element of Work, and other regular Project meetings held for other purposes, progress meetings will be held as outlined at the Preconstruction Meeting. Each entity then involved in planning, coordination or performance of Work shall be properly represented at each progress meeting. The following areas will be covered at each progress meeting: current status of work in place, General Contractor's review of upcoming work (1 month look ahead), schedule status, upcoming outages, new outage requests, shop drawings due from contractors, shop drawings being reviewed, outstanding RFI's, outstanding proposed change orders, change orders, new business, As-Built updated, close-out documents status, defective work in place issues, review "pencil copy" of payment application, safety issues and new business or other issues not covered above. With regard to schedule status, discuss whether each element of current work is ahead of schedule, on time, or behind schedule in relation with updated progress schedule; determine how behind-schedule Work will be expedited, and secure commitments from entities involved in doing so; discuss whether schedule revisions are required to ensure that current Work and subsequent Work will be completed within Contract Time; and review everything of significance which could affect the progress of the Work.

10.2 General Contractor shall prepare and submit at each progress meeting an updated schedule indicating Work completed to date and any needed revisions.

10.3 With the express purpose of expediting construction and providing the opportunity for cooperation of affected parties, progress meetings will be held and attended by representatives of:

- (1) The Owner's Project Manager
- (2) The Consultant.
- (3) General Contractor.
- (4) Sub-contractors.
- (5) Others requested to attend (as deemed necessary by CPMD).
- (6) Physical Plant Division Representative

10.4 A location near the site will be designated where such progress meetings will be held. Participants will be notified of the dates and times of the meetings by the Consultant.

### ARTICLE 11 CRITICAL PATH METHOD (CPM) SCHEDULE

11.1 General Contractor shall prepare Critical Path Method (CPM) type schedules in accordance with General Conditions Article 32 with separate divisions for each major portion of the Work or operation. The schedules submitted for this Project shall be prepared using Primavera P6 scheduling software. If approved by the University, and at the sole discretion of the University, schedules submitted using earlier versions of Primavera scheduling software (Primavera SureTrak or Primavera P3) may be converted to Primavera P6 format by the University for review purposes. However, the University will not be responsible for any inaccuracies that may result from such conversions. All schedule submittals shall include a copy in portable document (.pdf) format as well as a complete copy of the schedule in Primavera P6 electronic file (.xer) format.

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11.1.1 CPM schedules shall be based on generally accepted good practices for the development of construction schedules including limited use of long activity durations, long total float values or relationships based on leads or lags. Schedules shall include all activities necessary for performance of the work showing logic (sequences, dependencies, etc.) and duration of each activity. The schedules shall provide information for all elements of the Work in sufficient detail to accurately demonstrate the relative importance of each activity to the successful completion of the Project including but not necessarily limited to the following.

- a) Activities to be performed by the University or the Design Team.
- b) Activities describing time sensitive submittals and submittal processing.
- c) Activities describing fabrication and delivery of key materials or equipment.
- d) Activities to identify equipment start-up and testing, system commissioning, and Owner training.
- e) Activities to identify Owner Furnished /Contractor Installed and Owner Furnished / Owner Installed material or equipment.
- f) Activities to denote all required inspections by the Owner or Design Team, and inspections by state or local agencies including receipt of necessary Certificate(s) of Occupancy.
- g) Activities to identify all dates and durations for major utility outages requiring coordination with the Owner and the Owner's operations.
- h) Activities to identify all contractually mandated constraints. Non-contractual constraints shall not be included in the Initial or Final Baseline schedules without explanation. Non-contractual constraints are for the convenience of the General Contractor, shall not be a basis for delay claims, and may be temporarily removed by the University when schedules and updates are reviewed.
- i) Software coding of each activity to identify the applicable Phase; area and/or sub area where the work occurs; the trade subcontractor or party responsible for completion of the activity; whether the activity is a design activity, a bidding or procurement activity, a submittal activity, or a construction activity; and whether the activity is potentially weather dependent.
- j) The University may, at its sole discretion, also require that each activity be coded to indicate the section of the Technical Specifications that applies to the work.

11.1.2 Schedules shall include divisions for Work to be accomplished remote from the central construction site, (for example, modular or prefabricated units to be constructed off-site, or utilities to the site from outside the construction site such as chilled water, steam, electrical, communications, and fire service). Such Work shall be scheduled so that disruption resulting from construction will be minimized. Start dates and completion dates for utility construction must be maintained and completed in the shortest reasonable time.

11.2 An Initial Baseline Schedules shall be submitted to the Consultant and to the Owner within thirty (30) calendar days after award of the first bid Package or trade contract, and shall include detailed information regarding Work to be performed during the first ninety (90) days of the Project as well as milestone dates based on hammock or Level of Effort type activities that identify all major elements of the remainder of the Work. Any necessary revisions to the Initial Baseline Schedule shall be completed prior to submittal of the Final Baseline Schedule.

11.3 The Final Critical Path Baseline Schedule shall be submitted to the Consultant and to the Owner within seventy five (75) calendar days after award of the first bid Package or trade contract, shall be consistent with the information contained in the Initial Baseline Schedule prepared in accordance with Article 11.2 above, shall be a complete and comprehensive description of the General Contractor's plan to complete the Work in accordance with the Contract, shall include all activities necessary to complete the Work, and shall show the complete sequence of construction by activity, with dates for beginning and completion of each element of construction as well as an indication of whether the activity might reasonably be delayed or impacted by bad weather. Sub-schedules shall be provided as may be necessary to define critical portions of the entire schedule.

11.3.1 If the Project is to be constructed in multiple phases or using multiple Bid Packages, the date for the start of work on each phase of the Project shall be the date on which the University approves the award of the first Trade Contract for work in that phase or Bid Package.

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11.3.2 A separate schedule including decision dates for selection of finishes and delivery dates for Owner furnished items, if any, shall be provided showing submittal dates for Shop Drawings, product data, and material samples, as appropriate.

11.3.3 A separate schedule shall be provided identifying dates and durations for major utility outages requiring coordination with the Owner and the Owner's operations.

11.3.4 Activities, including Outages, which require action by or which are the responsibility of, the Owner or the Consultant under the terms of the Contract shall be properly indicated, and the responsible party shall be identified in the CPM schedule.

11.4 The Consultant will review schedules only for compliance with the intent of the Contract Documents. Such review shall not relieve the General Contractor of any responsibility for compliance with the provisions of the Contract nor shall such review or any review comments constitute an amendment or modification of the Contract requirements. The General Contractor shall be solely responsible for the means and methods to be employed to assure constructions proceeds in accordance with the submitted schedule and for identifying all necessary activities, establishing activity sequencing and assigning activity durations and relationships to assure that the CPM schedule is an accurate and comprehensive description of the plan for the Work.

11.5 Updated progress schedules shall be submitted to the Consultant and to the Owner concurrently with each Application for Payment to indicate progress on each remaining activity as of the last working day prior to the date of the submittal and the projected completion date of each activity. Updated CPM schedules shall show the accumulated percentage of completion of each activity, and total percentage of Work completed, as of the data date of the update. Each submittal of an update to the schedule shall include a narrative report that identifies and explains activities modified since the previous submittal, major changes in scope and other identifiable changes, problem areas, anticipated delays and impact on the schedule, and shall describe corrective action taken or proposed, and its effect. Schedules will be uploaded in UK E-Communication's Schedules Item Log.

11.6 Submittals shall include a copy in portable document (.pdf) format as well as a complete copy of the schedule in Primavera P6 electronic file (.xer) format along with a transmittal letter and related narrative report.

11.7 Copies of updated CPM schedules are to be provided to the job site file and, as appropriate, to subcontractors, suppliers, and other concerned entities, including separate contractors. Recipients are to be instructed to promptly report, in writing, any problems anticipated in meeting the projected dates shown in the schedules.

11.8 The processing of all progress payments is contingent upon the submission of an updated CPM schedule. Only payment for bonds and limited General Contractor mobilization costs will be approved for processing prior to receipt of the Initial and Final Baseline schedules

11.9 The processing of all change orders requesting a time extension to the contract is subject to the terms of Article 21 of the General Conditions to this Contract and is contingent upon the submission of a CPM schedule showing that the change order does indeed impact the contractually required completion dates for the Work. Time extensions for Change Orders that do not impact the contractually required completion dates for the Work will not be considered.

11.10 All time extensions shall be negotiated and made full, equitable and final, and incorporated in a revised CPM schedule at the time of Change Order issuance. No reservation of rights shall be allowed.

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11.11 Float available in the schedule at any time shall not be considered for the exclusive use of either party to the contract, but will be a resource available to both the Owner and the General Contractor. No time extensions will be granted for a delay unless the delay impacts the Project critical path as shown in the updated Project schedule most recently submitted to the Owner prior to the event, consumes all available float or contingency time, and extends the Work beyond the then current Contract completion date(s).

### **ARTICLE 12 WALK-THROUGH**

12.1 After the "Work Order" is issued but before Work by the General Contractor is started, a walk-through of the area is required to document the condition of the space, surfaces, or equipment. It is the responsibility of the General Contractor to schedule the walk-through with the Owner's Project Manager, the Consultant, and other interested parties.

12.2 During the walk-through, General Contractor shall identify all damaged surfaces or other defective items that exist prior to construction.

12.3 The walk-through shall be attended by Owner's Project Manager, a Representative of the user of the facility, the General Contractor and the Consultant

12.4 Written documentation of the walk-through is to be provided by the Consultant with copies distributed to all parties. Digital photos will be provided as needed to fully document found conditions. All parties attending the walk-through agree on the list of damages.

### **ARTICLE 13 OWNER'S CONSTRUCTION REPRESENTATIVE**

The Owner and Consultant may have personnel or representatives on this job that are to have access to the Construction Manager's field office and reasonable office accommodations including a work area, internet, seating, and basic utilities.

### **ARTICLE 14 FIELD OFFICE**

14.1 General Contractor shall make his own provision for field office for his own personnel and for incidental use by their Sub-contractors. Quantity and location are subject to approval of the Consultant and the Owner's Project Manager.

### **ARTICLE 15 TELEPHONE SERVICE**

15.1 General Contractor shall arrange through UKIT Communications and Network Systems for installation of on-site phone, internet and other communications services. Telephone service during the length of construction shall be paid for by the General Contractor. (Cell phone service in lieu of UKIT Communications and Network Systems phone service may be utilized at General Contractor's option.)

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## ARTICLE 16 CONSTRUCTION FENCE

16.1 Construction fencing will be designed and erected around job sites where there is a possibility of injury to employees, students or the public. Special precautions must be taken to protect the visually impaired, disabled, children and others using the University facilities. During active excavation/trenching operations, fencing shall be erected to prevent unauthorized entry into the site. All fencing shall comply with the current requirements of the International Building Code except where the following requirements are more stringent.

16.1.1 All job site perimeter fencing within 5 feet of a walkway, street, plot line, or public right-of-way shall be 8 feet in height. Perimeter fencing that blocks sidewalks must include signs directing pedestrians to a safe walkway or crosswalk. Signage may be attached to the fence, but may also be required to inform pedestrians of sidewalk closures and detours prior to arriving at the closed area. General Contractor shall provide electrical pedestrian and general lighting along the top rail of the perimeter of the construction site fence to provide a minimum illumination level of 1.5 foot candles. Pedestrian and perimeter fence lighting shall be installed in conduit, raceway, and/or pathway system properly supported to the perimeter fence. Open or flexible cabling will not be acceptable.

16.1.2 All job site perimeter fencing more than 5 feet from a walkway, street, plot line, or public right-of-way shall be a minimum of 6 feet in height unless International Building Code requirements are more restrictive due to the height of the structure and setback.

16.1.3 All fencing shall be of a woven material such as chain link or a solid type fence. Fencing shall include gates required for construction operations. Gates shall be lockable with both the General Contractor's lock, and a lock provided by the Owner. Lock by Owner shall be keyed for the University Best GA key core. All locks to be "daisy-chained" to provide access to the Owner.

16.1.4 It shall be the General Contractor's responsibility to determine the proper quality of materials and methods of installation of the fencing, with the understanding that it must be maintained in good condition, good appearance, rigid, plumb, and safe throughout the construction period. The fence does not have to be new material. The fence is to be erected on fence posts securely anchored in the ground. Provide a top bar or, with prior approval of the owner, a wire shall be run through the top of the fence and attached to the end posts. A tension control device shall be installed as necessary. Use of sandbags, concrete weights, stakes, etc. to hold fence posts in place are not allowed. Penetrations in pavement or landscape walking surfaces may not be made without the approval of the owner. Any damage caused by the fence installation shall be repaired in a manner satisfactory to the owner. When fencing is to remain in place for six (6) months or more a green fabric mesh must be provided for the full height and length of the fence. Fabric should be omitted for one (1) section of fencing where blind corners occur or at pedestrian/vehicle intersections.

16.1.5 The General Contractor shall be responsible for removing and replacing any fence sections and/or posts necessary for access to the site on a daily basis. The General Contractor shall police such conditions to assure the fence and posts are reset in a timely manner and are specifically in place at the close of the working day.

16.1.6 If the General Contractor fails to comply with the requirements of this Article 16, the Owner may proceed to have the work done and the General Contractor shall be charged for the cost of the Work done by unilateral deductive change order.

16.1.7 Plastic construction fencing is not acceptable as a perimeter protection fence.

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## **ARTICLE 17 PROJECT SIGN**

17.1 Not Used

17.2 No signs, except those attached to vehicles or equipment, may be displayed without permission from the Consultant and the Owner's Project Manager. No political signs will be permitted.

## **ARTICLE 18 PARKING**

18.1 No on-campus parking is available. The Contractor shall develop a parking plan as part of the required Pre-Construction Services element of this Contract in anticipation that the majority of required parking will have to be off-campus.

18.2 The Director, Parking and Transportation Services, or a designee will determine if parking is available for employees of the Contractor and subcontractors in the K lots at Commonwealth Stadium or elsewhere on Campus. The Contractor will be given thirty (30) days notice should conditions change that will affect parking at the designated parking area and it is necessary to relocate parking or terminate parking privileges. If parking is available, permits may be purchased from Parking Services, 721 Press Avenue at the appropriate monthly cost.

## **ARTICLE 19 SANITARY FACILITIES**

19.1 Restroom facilities in one of the surrounding buildings will be designated at the Pre-Construction Meeting for use by the General Contractor's workforce during construction. The designated restroom(s) and areas accessible to General Contractor must be kept clean and neat during construction. Failure to keep them clean will result in the General Contractor being required to provide portable toilets at his cost at the site. Drinking water shall be provided from an approved safe source so piped or transported as to be kept clean and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing governing health regulations.

## **ARTICLE 20 RULES OF MEASUREMENT**

20.1 Rules of Measurement shall be established by the Consultant in the field. Actual measurement shall be taken in the field. These amounts shall become binding upon the General Contractor and be adjusted as before mentioned.

20.2 The General Contractor shall pay for and coordinate through the Consultant and/or the Owner's Project Manager all associated Work by utility companies including relocation of utility poles, installation of new street lights, relocation of overhead or underground lines, and any other Work called for on the Plans and in the Specifications.

# 01000S01- Special Conditions - General Contractor

## ARTICLE 21 ALLOWANCES

21.1 As stated in the General Conditions to the Contract, the General Contractor shall have included in the Contract Amount all costs necessary to complete the Work. Costs based on “allowances” shall be permitted only for objectively quantifiable items and only with the prior written approval of the Owner.

21.2 The University of Kentucky has entered into a price contract agreement with JCI for procurement of fire alarm and security systems. JCI will provide an allowance for this project which may include Fire Alarm Equipment and Security Equipment, including all required cable/wire, labor to install cable and wire and terminations of JCI supplied devices and panels. JCI will be a sub-contractor under the General Contractor.

The General Contractor shall include an allowance of \$\_\_42,000.00 for the work by JCI in the base bid.

The electrical contractor is to provide and install conduits and back boxes/junction boxes. All conduits will include a pull string. JCI will furnish and install all fire alarm and security equipment.

**(UK Project Manager to provide a copy of JCI scope of Work)**

## ARTICLE 22 SEQUENCE OF CONSTRUCTION

22.1 **Not Used**

22.2 All materials and equipment are to be brought into the project site from the approved staging location and are not to be brought through the existing buildings or loading docks. Any and **all** exceptions shall be approved by, and closely coordinated with, the Owner’s Project Manager in advance of scheduling or performing the work.

22.2.1 The General Contractor shall coordinate any road and sidewalk closings, utility disruptions, etc. which will affect the use of the existing building(s) with the Owner's Project Manager prior to commencing that Work.

22.3 The adjacent buildings and public areas will remain in use and the Owner shall have access to the existing building(s) throughout the duration of the Project. The General Contractor shall coordinate construction activity to assure the safety of those who must cross the Project site and shall provide and maintain the necessary barriers and accommodations for a completely safe route of accessibility. The General Contractor is to insure that all exits provide for free and unobstructed egress. If exits must be blocked, prior arrangements must be made with the Owner's Project Manager.

22.4 The General Contractor shall cooperate with the Owner to minimize inconvenience to, or interference with normal use of existing buildings and grounds by staff, students, other Contractors, or the public. General Contractor shall conduct operations to prevent damage to adjacent building structures and other facilities and in such a manner to protect the safety of building's occupants.

22.5 Special effort shall be made by the General Contractor to prevent any employee from entering existing buildings for reasons except construction business. In particular, use of toilets, drinking fountains, vending machines, etc. is strictly prohibited.

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## ARTICLE 23 CRANE & MATERIAL HOIST OPERATIONS

23.1 General Contractor shall provide appropriate barriers around crane and material hoist to protect pedestrian-and vehicular traffic around operating area. When crane is operating or moving, flag men provided by General Contractor shall be utilized to prevent pedestrian and vehicular traffic from crossing the pathway of crane lift. General Contractor's flag men shall coordinate these activities with the appropriate security personnel.

23.2 Cranes and material hoists shall be safely secured and inaccessible during non-operating hours. General Contractor shall coordinate operation or erection of a crane or material hoist in the vicinity of the Medical Center with Medical Center Aeromedical Operations (Med-evac helicopter).

23.3 Any damage to trees, shrubs or plant material at the placement of crane or material hoist shall be repaired by tree surgery or replaced as directed by Consultant.

## ARTICLE 24 UTILITIES

24.1 This Article modifies Article 8 of the General Conditions. The Owner will provide water and electricity for this Project. The General Contractor shall provide for all temporary taps, hoses, lines, boxes, lighting and installation of the same for construction operations. Electricity shall not be used for heating purposes. In the event that the General Contractor is wasteful with these utilities, the Owner shall charge the General Contractor accordingly.

24.1.1 Steam is \$15.00/million BTU (1000 lb.) condensate measured through the building condensate meter (all condensate is to be returned).

24.1.2 Chilled Water is \$11.00/million BTU (1000 lb.) measured through the building BTU meter.

24.1.3 Electricity is \$0.08/KWH measured through the building electric meter.

24.1.4 Water is supplied by Kentucky American Water Company (KAWC); General Contractor shall pay KAWC directly until the Owner's beneficial occupancy date. The General Contractor shall pay KAWC directly for fire service.

24.1.5 General Contractor shall furnish gas meter and pay Columbia Gas Company directly for service until the until the Owner's beneficial occupancy date.

24.1.6 General Contractor shall obtain from and pay UKIT Communications and Network Systems for the use of telephone services.

## 24.2 UTILITY OUTAGES

24.2.1 Interruption of Utilities and Services: No utilities or services may be interrupted without full consent and prior scheduling of the Owner. Owner approval is required in writing for each disruption.



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### 24.2.1.1 ENTIRE BUILDING OUTAGE

The Owner's Project Manager is the General Contractor's contact with the University for requesting Utility Outages. The Owner's Project Manager will contact the proper departments and divisions within the University and receive approval from those units prior to allowing a planned outage to occur. The established standard within the University Departments and Divisions of an entire building or group of buildings shall be three weeks written notice. The written notice shall include the type of utility to be interrupted, reason for outage, length of outage, what will be affected by the outage and a statement of whether or not the materials are on hand to complete the Work. If a specific time is desired for the outage it should be included. The Owner's Project Manager will insure that all parties affected are contacted and that a time which is least disruptive to all parties is selected. At the appointed outage time, Work shall begin and proceed continuously with all required manpower until Work is complete at no added cost to the University. The Owner's Project Manager will then notify all affected departments or divisions.

### 24.2.1.2 SECTION OF A BUILDING OUTAGE

The Owner's Project Manager is the General Contractor's contact with the University for requesting Utility Outages. The Owner's Project Manager will contact the proper departments and divisions within the University and receive approval from those units prior to allowing a planned outage to occur. The established standard within the University Departments and Divisions of a section of a building shall be a written request one week prior to outage. The written request shall include the type of utility to be interrupted, when the outage is desired, reason for outage, length of outage, and what will be affected by the outage. The Owner's Project Manager will insure that all parties affected are contacted and that a time which is least disruptive to all parties is selected. At the appointed outage time Work shall begin and proceed continuously with all required manpower until Work is complete at no added cost to the University. The Owner's Project Manager will then notify all affected departments or divisions.

## **ARTICLE 25 CLEANING AND TRASH REMOVAL**

25.1 The General Contractor shall keep clean the entire area of new construction and shall keep streets used as access to and from the site free of mud and debris.

25.2 All exit ways, walks, drives, grass areas, and landscaping must be kept free from debris, materials, tools and vehicles at all times. Trim weeds and grass within the site area.

25.3 Upon completion of the Work, General Contractor shall thoroughly clean and re-sod grass areas damaged to match existing areas.

26.4 All utility markings are to be made with water based marking paint with low Volatile Organic Compounds (VOC's) and high solids.

26.5 Upon Completion of the project, buried utility paint markings sprayed on walks and hardscapes are to be removed by non-destructive means such as pressure washing. Do not use chemicals. If a washed area is noticeable, the entire surface must be washed and or blended to match surrounding areas.

25.6 The General Contractor shall be responsible for removal from the site of all liquid waste or other waste (i.e. hazardous, toxic, etc.) that requires special handling on a daily basis.

25.7 Dumpsters will be provided and maintained by the General Contractor.

25.8 During Work at the Project site, the General Contractor shall clean and protect Work in progress and adjoining Work on a continuing basis. General Contractor shall apply suitable protective covering on newly installed Work where needed to prevent damage or deterioration until the time of Substantial Completion. General Contractor shall clean and perform maintenance on newly installed Work as frequently as necessary through remainder of construction period.

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25.9 The General Contractor shall be responsible for daily cleaning of spillage's and debris resulting from his and his Sub-contractor's operations, (includes removal of dust and debris from wall cavities), and for providing closed, tight fitting (dustproof if required), waste receptacles to transport construction debris from the work area to the dumpster. Broom clean all floors no less than once a week. The General Contractor shall empty such receptacles into the trash container when full or when directed to be emptied by the Consultant and/or Owner's Project Manager, but not less than weekly. The use of hospital waste and trash receptacles is strictly prohibited, except as otherwise provided by the project specifications.

25.10 Failure to comply with the above requirements shall be cause for stopping work until the condition is corrected.

### ARTICLE 26 BLASTING

26.1 There shall be no blasting under any conditions on University of Kentucky property unless specified in these Special Conditions.

### ARTICLE 27 CUTTING AND PATCHING - NEW AND EXISTING WORK

27.1 New Work - Cutting and patching shall be done by craftsmen skilled and experienced in the trade or craft that installed or furnished the original Work. Repairs shall be equal in quality and appearance to similar adjacent Work and shall not be obviously apparent as a patch or repair. Work that cannot be satisfactorily repaired shall be removed and replaced.

27.2 Existing Construction - Refer to Architectural, Mechanical, and Electrical drawings for cutting and patching. All new Work shall be connected to the existing construction in a neat and workmanlike manner, presenting a minimum of contrast between old and new Work. Do all patching of the existing construction as may be required for the new construction to be done. Necessary patching, closing of existing openings, repairing and touching up shall be included as required for a proper, neat and workmanlike finished appearance. Any existing item that is to remain and is damaged during construction shall be replaced at the General Contractor's expense.

### ARTICLE 28 UNRELATED PROJECTS

28.1 Unrelated construction Projects may be under way in the vicinity of this Project or the site utility work during the course of the Work related to this Project. The General Contractor for this Project must coordinate with any other contractors regarding overlapping areas. See Article 42 - Separate Contracts of the General Conditions.

### ARTICLE 29 OWNER SUPPLIED MATERIALS (Not Used)

### ARTICLE 30 REMOVED ITEMS

30.1 The following is a list of items to be turned over to the Owner by the General Contractor after removal by the General Contractor. If there are additional items listed in the drawings to be turned over to the Owner, but not listed here, it shall be construed as being listed here.

1. **None**

30.2 All items which are identified to be turned over to the Owner must be treated with the utmost care and protected during removal and transport from damage.

30.3 Materials to be turned over to the Owner by the General Contractor shall be delivered to a warehouse within a five (5) mile radius of the Project site. **Not Applicable**

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## ARTICLE 31 INTERIOR ENCLOSURE AND DUST ENCAPSULATION

31.1 Areas under construction or renovation shall be separated from occupied areas by suitable temporary enclosures furnished, erected and maintained by the General Contractor. Temporary enclosures shall be dust and smoke tight and constructed of non-combustible materials to prohibit dirt and air borne dust from entering occupied spaces. General Contractor to review with Consultant ways to provide ventilation for dust generated by demolition and fumes/vapors produced during installation of new materials.

31.2 General Contractor is responsible for coordinating with the Owner's Project Manager any equipment to be turned off prior to erecting temporary enclosures.

31.3 General Contractor shall protect all exhaust diffusers, equipment and electrical devices from the collection of dust. All areas shall be checked and cleaned prior to final acceptance of Work.

31.4 Dust and debris from Work operations shall be held to a minimum.

31.5 General Contractor shall construct temporary dust partitions at locations and as detailed on drawings. Closures used for dust barricade shall be constructed of non-combustible materials, (metal studs and gypsum board or fire retardant plywood).

31.6 General Contractor shall provide additional devices and materials and required to contain dust within Work area and protect personnel during course of Work.

31.7 Areas of minor renovation, consisting of the removal of doors and frames, blocking of openings, and other limited Work shall be separated by a dust partition of fire retarded polyethylene on studs.

31.8 Existing corridor doors may serve as dust barriers, except if removed for refinishing. In such cases, temporary wood doors must be substituted until original doors are replaced.

31.9 The General Contractor may assume existing walls which extend full height, floor to structure, shall be deemed appropriate to contain air borne dust. Cover any voids or penetrations.

31.10 Doors or windows in the perimeter walls surrounding the Project work area shall be sealed off with protective materials in a manner to prohibit dust from escaping the work area. These shall be left in place until all work creating dust is completed. Protective materials shall consist of fire retardant wood, metal studs, gypsum board or flame resistant plastic.

31.11 Entry passage to Work area shall be sealed off with zippered plastic opening or other acceptable means which allows periodic entry and closure of barricade closure.

31.12 Install and maintain a "sticky mat" on the floor in locations where construction crews leave the construction area and prior to entering ANY existing space in the building.

31.13 Install and maintain a temporary floor covering in any and all elevators being utilized for this project.

## ARTICLE 32 UKIT COMMUNICATIONS AND NETWORK SYSTEMS

32.1 The communications wiring is to be provided, installed and terminated by the General Contractor using a certified and approved communications contractor. All work shall be done in compliance with the latest UKIT Communications and Network Systems Standards, and closely coordinated with UKIT-Communications and Network Systems.

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## **ARTICLE 33 EMERGENCY VEHICLE ACCESS**

33.1 Emergency Vehicle Access must be maintained during construction. The General Contractor shall coordinate with the local Fire and Emergency Medical Services department(s) that would respond to an emergency during the initial start up of construction to ensure a complete understanding of their requirements.

## **ARTICLE 34 SMOKE DETECTORS / FIRE ALARM SYSTEMS- EXISTING AND/OR NEW FACILITIES**

34.1 General Contractor shall protect all smoke detectors in Work areas to prevent false alarms. The General Contractor will be responsible for any false alarm caused by dust created in their Work areas or dust traveling to areas beyond the Work past inadequate protection barriers. If there is a need for an existing or newly installed fire alarm system or parts of that system to be serviced, turned off, or disconnected, prior approval must be obtained from the Owner's Project Manager and notification given to the Campus Dispatch Office. The General Contractor must follow the procedure outlined for Utility Outages and any documented costs charged by the responding fire department due to a false alarm shall be paid by the General Contractor. As soon as all Work is completed, notification must be given to the Owner's Project Manager and to the Campus Dispatch Office prior to reactivation of the system. Prior to Final Payment to the General Contractor, all protected smoke detectors will be uncovered and tested.

34.1.1 When the function of any fire alarm, detection or suppression system is impaired, a temporary system shall be provided. General Contractor shall provide daily reports indicating the Superintendent has walked through the project at the end of each work period, to satisfy himself there are no present conditions that may result in an accidental fire. Portable fire extinguishers shall be on site during this time. The General Contractor is responsible for inspecting and testing any temporary systems on a monthly basis.

## **ARTICLE 35 SURVEYS, RECORDS, and REPORTS**

35.1 General: Working from lines and levels established by property survey, and as shown in relation to the Work, the General Contractor will establish and maintain bench marks and other dependable markers to set lines and levels for Work at each area of construction and elsewhere on site as needed to properly locate each element of the entire Project. The General Contractor shall calculate and measure from the bench marks and dependable markers required dimensions as shown (within recognized tolerances if not otherwise indicated), and shall not scale drawings to determine dimensions. General Contractor shall advise Sub-contractors performing Work of marked lines and levels provided for their use in layout of Work.

35.2 Survey Procedures: The General Contractor shall verify layout information shown on drawings, as required for his own Work. As Work proceeds, surveyor shall check every major element for line, level, and plumb (as applicable), and maintain an accurate Surveyor's log or Record Book of such checks available for General Contractor or Design Consultant's reference at reasonable times. Surveyor shall record deviations from required lines and levels, and advise Design Consultant or General Contractor promptly upon detection of deviations exceeding indicated or recognized tolerances. The General Contractor shall record deviations which are accepted (not corrected) on Record Drawings.

## **ARTICLE 36 TOBACCO PRODUCTS PROHIBITED**

36.1

For areas located within Fayette County, Kentucky, the use of all tobacco products is prohibited on all property that is owned, operated, leased, occupied, or controlled by the University. This includes the use of smokeless/vaping products. "Property" for purposes of this paragraph includes buildings and structures, grounds, parking structures, enclosed bridges and walkways, sidewalks, parking lots, and vehicles, as well as personal vehicles in these areas. To view the Lexington campus boundaries:

<http://www.uky.edu/TobaccoFree/files/map.pdf>.

## 010000S01- Special Conditions - General Contractor

36.2 For areas not located within Fayette County, Kentucky, smoking is prohibited in all owned, operated, leased, or controlled University buildings and structures, parking structures, enclosed bridges and walkways, and vehicles. Smoking is also prohibited outside buildings and structures within 20 feet of entrances, exits, air intakes, and windows, unless further restricted by division policy.

36.3 General Contractor employees violating this prohibition will be subject to dismissal from the Project.

36.4 For the full Administrative Regulation see University AR 6:5.  
<http://www.uky.edu/Regs/files/ar/ar6-5.pdf>

### ARTICLE 37 ALTERNATES

37.1 Alternate(s) will be accepted in the sequence of the Alternates listed on the Bid Form, and the lowest Bid Sum will be computed on the basis of the sum of the base Bid and any alternates accepted, within the budgeted amount.

37.2 Schedule of Alternates:

**None**

### ARTICLE 38 FIELD CONSTRUCTED MOCK UPS (Not Used)

### ARTICLE 39 PROJECT COORDINATION VIA COMPUTER

39.1 The General Contractor and subcontractors are required to have an active email account to facilitate coordination of the project during construction and warranty.

39.2 To facilitate project construction coordination between the Consultant, the General Contractor, Subcontractors, and the University of Kentucky as the Owner, UK Capital Project Management Division (CPMD) is hosting an Internet/ Web-based Project Management System (WPMS) to help improve project communication and collaboration. The Consultant shall participate in the use of the WPMS (UK E-Communication® or other system at the Owner's discretion) providing collaboration between Owner, the Consultant and selected contractors.

39.2.1 Owner shall provide the General Contractor and subcontractors with user accounts and appropriate training for the web-based project management tool.

39.2.2 Utilization of, and training in the use of, the WPMS will be arranged for and supervised by Owner.

39.2.3 Participation of General Contractor is mandatory; others as determined by Owner. Participation of Subcontractors is not mandatory but will be offered at their discretion.

39.2.4 All participants are required to have access to the internet and the Microsoft Internet Explorer browser (version 5.0 or higher). A broadband connection to the internet (e.g. Cable modem, ISDN, DSL) is recommended, but not required.

39.2.5 The WPMS shall be utilized for the following functions, as a minimum: Posting Project Files, AE Amendments, Architect's Supplemental Information (ASI's), Closeouts, Consultant Invoices, Contracts, Defective Work in Place, Meeting Minutes, Payment Applications, Proposed Change Orders – Change Orders (PCO to CO's), Punch Lists, Reports (Contractor Daily Reports, Field Reports, Commissioning Reports), RFIs, SAP Equipment List, Schedules, and Submittals. The Document Library (Bid set Plans, Specifications and Addenda will be uploaded by Lynn Imaging.

## 010000S01- Special Conditions - General Contractor

39.2.6 Site camera monitors may be included at Owner's discretion.

39.2.7 Utilization of the WPMS shall be implemented by the Owner's representative.

39.2.8 Use of the system will provide consistent, real-time information for decision making. Additionally, all project data entered into the system will be archived to facilitate project record keeping. It is anticipated that proper use of the WPMS will improve efficiency of communications and reduce project related paperwork and clerical workload.

### ARTICLE 40 HOT WORK PERMITS

40.1 All work involving open flames or producing heat and/or sparks in occupied buildings on the University of Kentucky campus will require the General Contractor to obtain approval to perform "Hot Work" on site. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing, and Cadwelding. A copy of the Hot Work Permit and the Hot Work Permit Procedure will be passed out at the Preconstruction Conference for the General Contractor's use.

### ARTICLE 41 INSURANCE

41.1 Employers' Liability Insurance. The General Contractor shall acquire and maintain Employers' Liability insurance with at least \$500,000/\$500,000/\$500,000 limits of liability for all employees who will be working at the Project site.

41.2.1 Commercial General Liability Insurance. If the work involved requires the use of helicopters, a separate aviation liability policy with limits of liability of \$100,000,000 will be required. If cranes and rigging are involved, a separate inland marine policy with liability limits of \$10,000,000 will be required.

41.2.1.1 The limits of liability shall not be less than \$2,000,000 each occurrence combined single limits for bodily injury and property damage. If split limits are used, they shall not be less than \$2,000,000 for each person and each occurrence and \$1,000,000 for property damage.

41.2.2 Comprehensive Automobile Liability Insurance. Policy limits shall not be less than \$2,000,000 for combined single limits for bodily injury and property damage for each occurrence. As an alternative, split limits of not less than \$1,000,000 for bodily injury and \$500,000 for property damage for each occurrence shall be maintained.

41.2.3 Excess or Umbrella Liability Insurance. This policy shall have a minimum of \$1,000,000 combined single limits for bodily injury and property damage for each occurrence in excess of the applicable limits in the primary policies.

41.2.4 Workers' Compensation - Statutory Requirements (Kentucky)

### ARTICLE 42 KEY ACCESS

42.1 If Construction Cores are NOT utilized, then one set of keys for access to the renovation project area will be provided to the General Contractor by the University's Project Manager. The General Contractor assumes responsibility for the safekeeping of the key(s) and its use. When leaving the renovation area all doors must be secured.

42.2 All keys must be returned to the University's Project Manager upon completion of project work as one of the requirements for Final Payment. Failure to return the keys may require re-keying of all doors in the work area up to and including the entire building if master keys are issued. The cost of re-keying of the door(s) accessed by the key(s) will be subtracted from the remaining contract dollars including contract retainage.

## **010000S01- Special Conditions - General Contractor**

42.3 All lost or stolen keys must be reported immediately to the University's Project Manager.

### **ARTICLE 43 CEILING CLEARANCE**

43.1 Work above ceiling: All work above an area with lay-in ceiling must be coordinated and installed so there is a minimum of 4" between the top of the ceiling grid runners and bottom of the installation. Installation shall not obstruct equipment access space or equipment removal space. Also, conduit and pipe attached to the wall must be above the 4" minimum level.

43.2 Coordination Between Trades: Request and examine all drawings and specifications pertaining to the construction before installing above ceiling work. Cooperate with all other contractors in locating piping, ductwork, conduit, openings, chases, and equipment in order to avoid conflict with any other contractor's work. Give special attention to points where ducts or piping must cross other ducts and piping, and where ducts, piping and conduit must fur into the walls and columns. Make known to other trades intended positioning of materials and intended order of work. Determine intended position of work of other trades and intended order of installation.

### **ARTICLE 44 METAL ANCHORS**

44.1 All anchoring devices utilized to secure materials to the building shall be metal. Plastic or plastic expansion components shall not be used. This shall include all fasteners for mechanical/electrical hangers.

### **ARTICLE 45 CONTRACTOR/SUPERINTENDENT EXPERIENCE**

45.1 For those projects impacting patient care the Construction Manager and Superintendent are required to have a minimum of five (5) years of construction experience in the past 10 years with projects involving patient care areas.

### **ARTICLE 46 TREE PROTECTION STANDARDS**

Contractor will adhere to all provisions outlined in 010000S02 Tree Protection Standards.

## Index to Drawings

ELEVATOR MODERNIZATION	
A2.0E	COMPOSITE BASEMETN DEMOLITION PLAN
M0.0	MECHANICAL LEGEND
M1.0	BASEMENT - MECHANICAL DEMOLITION / NEW WORK
E0.0	ELECTRICAL LEGEND
E0.1	ELECTRICAL NOTES
E1.0	BASEMENT - LIGHTING - DEMOLITION
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E3.0	BASEMENT - LIGHTING - NEW WORK
E4.0	BASEMENT - POWER - NEW WORK
E6.0	EXISTING ONE-LINE DIAGRAM
E6.1	NEW WORK ONE-LINE DIAGRAM

## Code Information

GOVERNING REGULATIONS	
Kentucky Building Code	KBC - 2018 Edition
→ INTERNATIONAL BUILDING CODE	IBC - 2015
Accessible and Usable Buildings and Facilities	2009 ICC / ANSI A117.1
National Fire Protection Association Life Safety Code	NFPA - 101 - 2012

PROJECT DESCRIPTION	
The scope of work includes the selective demolition and renovation of the existing fifth floor of the Multidisciplinary Science Building at The University of Kentucky in Lexington, Kentucky. The new work will accommodate the expansion of both The College of Health Sciences and The College of Nursing. The total project area is ~13,500 GSF.	

BUILDING CLASSIFICATIONS	
FIRE PROTECTION, DETECTION, AND ALARM SYSTEMS	
All code analysis is based upon work within a facility which is fully protected by an Approved Automatic Sprinkler System and an Approved Fire Alarm System.	

USE GROUPS/OCCUPANCIES	
B	Business
A-3	Assembly

TYPE OF CONSTRUCTION	
Kentucky Building Code (KBC)	Type 1B (Fire Resistive Non-Combustible)

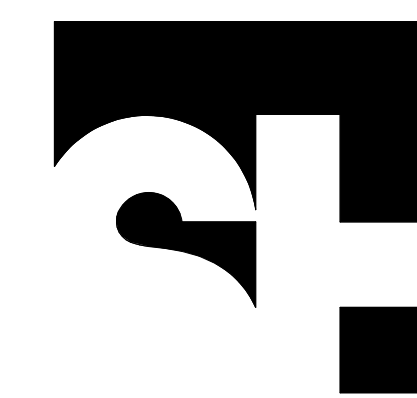


## MDS FIFTH FLOOR RENOVATION UNIVERSITY OF KENTUCKY

725 ROSE STREET  
LEXINGTON, KENTUCKY 40508

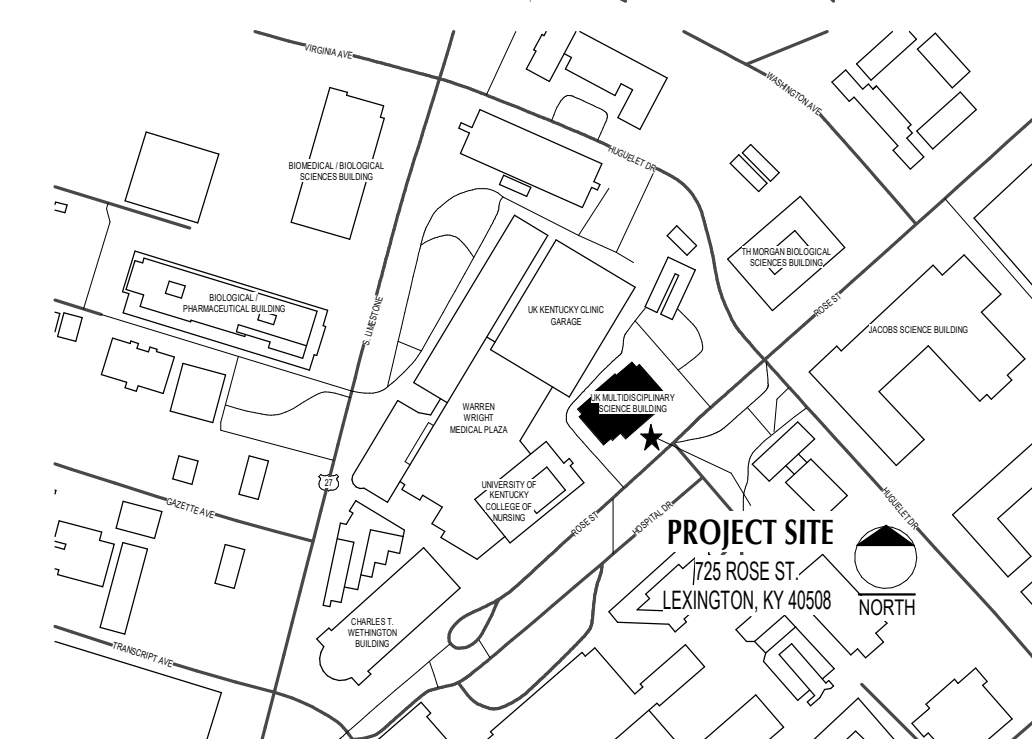
ELEVATOR MODERNIZATION - EARLY  
PROCUREMENT

17 MARCH 2023  
UKY2205  
CPMD 2590.1



STENGEL HILL ARCHITECTURE  
501 EAST HIGH STREET LEXINGTON, KENTUCKY 40502 859.402.8008

## Location Map



Structural Engineering



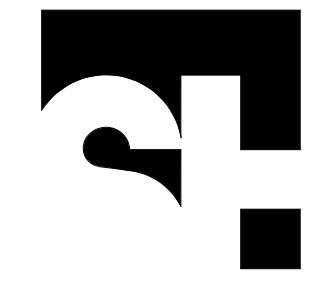
Brown + Kubican  
546 East Main Street, Ste 300 / Lexington, KY / 40508  
859.543.0933

Mechanical/Electrical Engineering



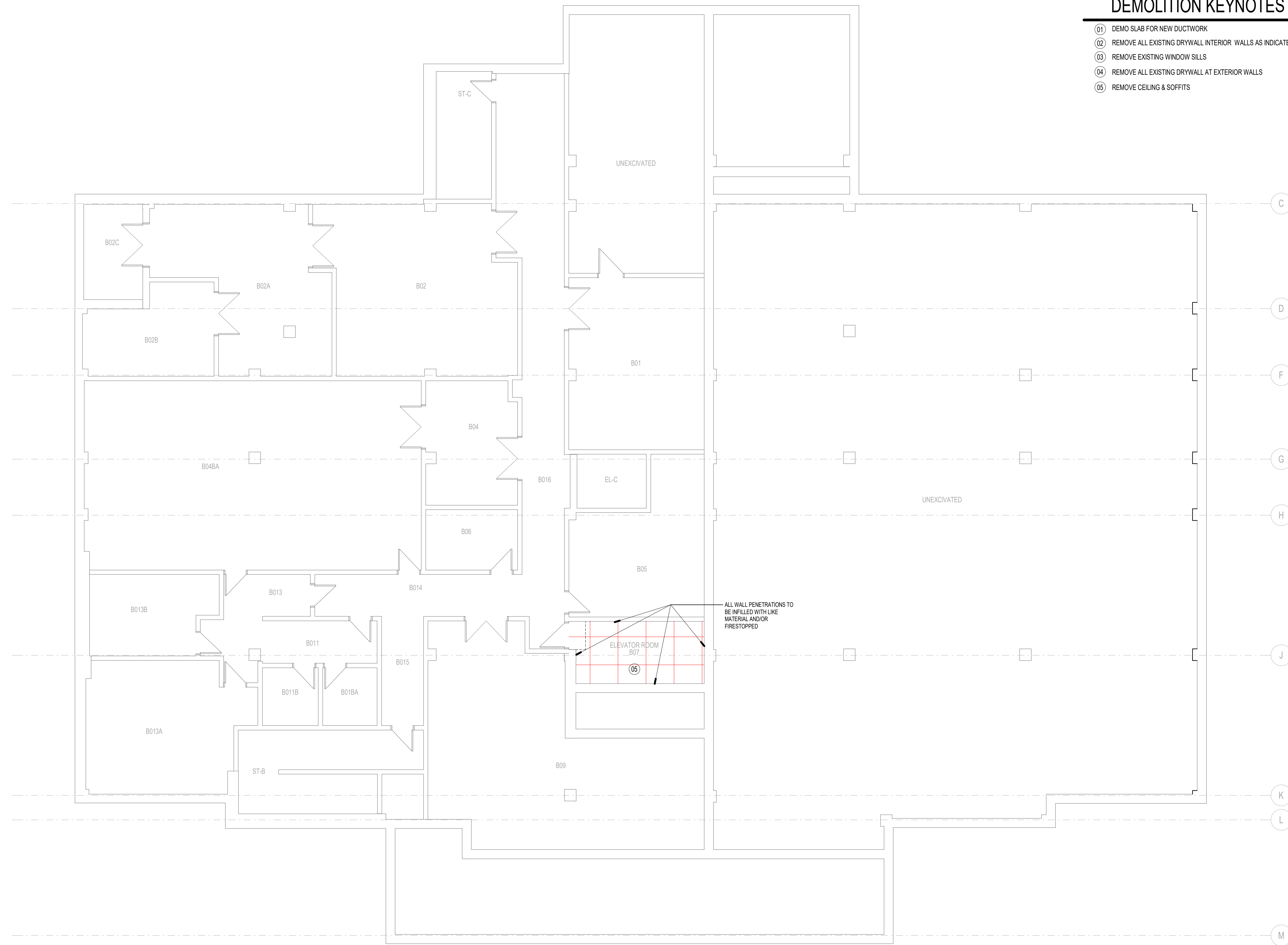
CMTA, Inc.  
220 Lexington Green Circle, Ste. 600 /  
Lexington, KY / 40503  
859.253.0892

Interior Design



Stengel Hill Architecture  
613 West Main Street / Louisville, KY / 40202  
502.893.1875 / 502.893.1876 fax





**DEMOLITION KEYNOTES**

- (01) DEMO SLAB FOR NEW DUCTWORK
- (02) REMOVE ALL EXISTING DRYWALL INTERIOR WALLS AS INDICATED
- (03) REMOVE EXISTING WINDOW SILLS
- (04) REMOVE ALL EXISTING DRYWALL AT EXTERIOR WALLS
- (05) REMOVE CEILING & SOFFITS

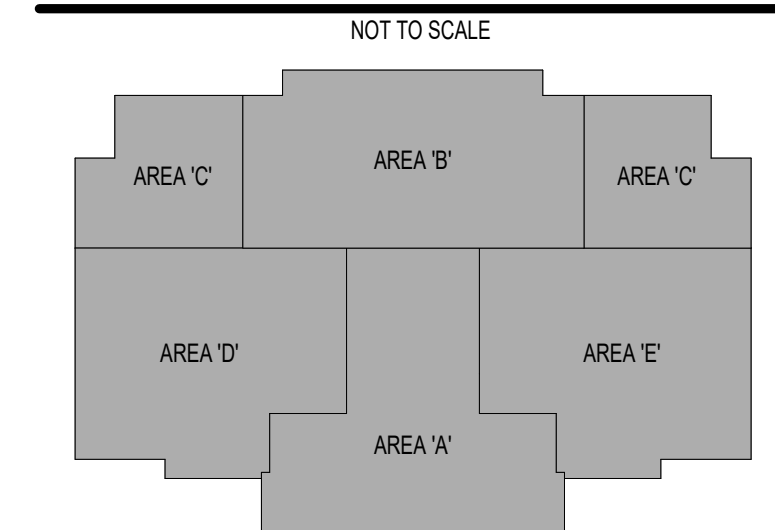
**GENERAL NOTES**

1. BOLD RED DASHED LINES INDICATE ITEMS TO BE REMOVED. REFER TO DEMOLITION NOTES FOR SPECIFIC INSTRUCTIONS.
2. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND SHALL NOTIFY ARCHITECT IMMEDIATELY OF DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONFIGURATIONS SHOWN IN THE CONSTRUCTION DRAWINGS.
3. INFORMATION REGARDING MECHANICAL, PLUMBING, AND ELECTRICAL ITEMS TO BE REMOVED HAS BEEN INCLUDED FOR REFERENCE ONLY. REFER TO MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR COMPLETE INSTRUCTIONS ON THE REMOVAL OF THESE ITEMS.
4. EXISTING MECHANICAL, PLUMBING AND ELECTRICAL SYSTEMS MUST CONTINUE TO OPERATE AS REQUIRED TO SATISFY OWNER THROUGHOUT THE CONSTRUCTION PERIOD.
5. ALL ADJACENT SURFACES TO THE AREA OF DEMOLITION WHICH ARE SCHEDULED TO REMAIN AND ARE IN ANY MANNER AFFECTED BY THE WORK SHALL BE PATCHED AS REQUIRED TO MATCH THE ADJACENT FINISHED SURFACES.
6. ALL LOCATIONS OF DUCTWORK AND PIPING REMOVAL THROUGH EXISTING WALL CONSTRUCTION SCHEDULED TO REMAIN SHALL BE PATCHED WITH MATERIALS IDENTICAL ADJACENT CONSTRUCTION AS REQUIRED FOR UNIFORM TRANSITIONS TO ADJACENT FINISH SURFACES.
7. CONTRACTOR SHALL REMOVE PORTIONS OF EXISTING CONSTRUCTION AS REQUIRED FOR INSTALLATION OF NEW MECHANICAL, PLUMBING AND/OR ELECTRICAL ITEMS AS INDICATED ON MEP DRAWINGS. ALL SURFACES AFFECTED SHALL BE PATCHED UPON COMPLETION OF MECHANICAL, PLUMBING AND/OR ELECTRICAL WORK AS REQUIRED TO MATCH ADJACENT SURFACES.
8. CUTTING AND PATCHING OF EXISTING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING THE WORK FOR WHICH THE CUTTING IS REQUIRED. THE WORK SHALL BE PERFORMED BY A PERSON OR PERSONS SKILLED IN THE TRADE INVOLVED.
9. ALL DEMOLITION DEBRIS SHALL BE DISPOSED OF IN A MANNER ACCEPTABLE TO THE REGULATORY AUTHORITY HAVING JURISDICTION.
10. NOISE AND DUST LEVELS SHALL BE KEPT TO A MINIMUM TO AVOID DISTURBANCES TO ONGOING ACTIVITIES IN THE ADJACENT AREAS.
11. CONTRACTOR SHALL PROVIDE TEMPORARY PARTITION/DOORS AS REQUIRED TO SECURE PROJECT AREA AT ALL TIMES AND AS REQUIRED TO AVOID MIGRATION OF DUST INTO ADJACENT OCCUPIED AREAS.
12. CONTRACTOR IS TO REMOVE ALL SIGNAGE DURING DEMOLITION AND RETURN TO THE OWNER.
13. ALL MATERIALS, FIXTURES, CASEWORK, EQUIPMENT, AND OTHER ITEMS REMOVED FROM THE AREAS OF DEMOLITION ARE AND SHALL REMAIN THE PROPERTY OF THE OWNER UNLESS OTHERWISE STIPULATED BY THE OWNER OR ARCHITECT.
14. IF THE CONTRACTOR ENCOUNTERS ANY MATERIAL SUSPECTED TO CONTAIN ASBESTOS, THE OWNER SHALL BE NOTIFIED IMMEDIATELY. THE OWNER SHALL BE RESPONSIBLE FOR ALL ASBESTOS REMOVAL.
15. ANY EXISTING ITEM NOT SCHEDULED FOR REMOVAL WHICH IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED TO MATCH ADJACENT SURFACES AT NO COST TO OWNER.
16. REFERENCE PLUMBING, MECHANICAL, AND ELECTRICAL CONSTRUCTION DRAWINGS FOR SCOPE OF PLUMBING, MECHANICAL, AND ELECTRICAL DEMOLITION WORK ON ROOF AND OUTSIDE OF PROJECT LIMITS SHOWN ON THE ARCHITECTURAL DRAWINGS AS REQUIRED FOR NEW WORK.
17. COORDINATE REMOVAL OF ALL FURNITURE AND EQUIPMENT IN PROJECT AREA WITH OWNER PRIOR TO CONSTRUCTION.
18. ANY EXISTING CONSTRUCTION TO REMAIN IS TO BE PROTECTED FOR THE DURATION OF THE CONSTRUCTION PROCESS.
19. WHERE NEW ELEMENTS (ARCHITECTURAL, STRUCTURAL, MECHANICAL, OR OTHER) ATTACH TO EXISTING STRUCTURE, REMOVE EXISTING FIRE-PROOFING AS REQUIRED TO COMPLETE THE ATTACHMENT. PATCH THE AREA OF DAMAGED FIRE-PROOFING AFTER COMPLETING INSTALLATION OF THE NEW ATTACHMENT.
20. REMOVE WALLS, DOORS, CASEWORK, CEILINGS, PLUMBING, LIGHTING AND FINISHES AS NOTED THROUGHOUT SUITE

**DEMOLITION LEGEND**

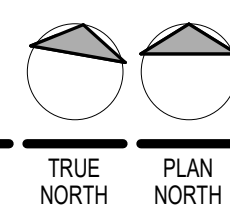
WALL TO BE REMOVED COMPLETE	DOOR AND FRAME TO BE REMOVED (UNLESS OTHERWISE NOTED)	LAVATORY/SINK TO BE REMOVED COMPLETE (REFER TO PLUMBING DRAWINGS)
WATER CLOSET TO BE REMOVED COMPLETE (REFER TO PLUMBING DRAWINGS)	SHOWER TO BE REMOVED COMPLETE (REFER TO PLUMBING DRAWINGS)	MOP/CLINICAL SINK TO BE REMOVED COMPLETE (REFER TO PLUMBING DRAWINGS)
CONCRETE SLAB TO BE REMOVED COMPLETE (REFER TO PLUMBING & STRUCTURAL DRAWINGS)	NOT IN SCOPE	CEILING TO BE REMOVED COMPLETE (REFER TO MEP DRAWINGS)

**KEYPLAN**



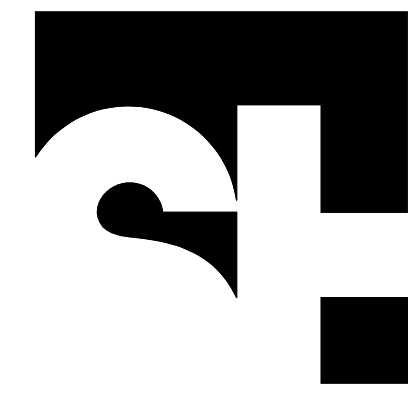
**01**

**COMPOSITE BASEMENT DEMOLITION PLAN**



1/8" = 1'-0"

A2.0



**STENGEN HILL ARCHITECTURE**

501 EAST HIGH STREET  
LEXINGTON, KENTUCKY 40502  
859.402.8008  
502.893.1876 fax

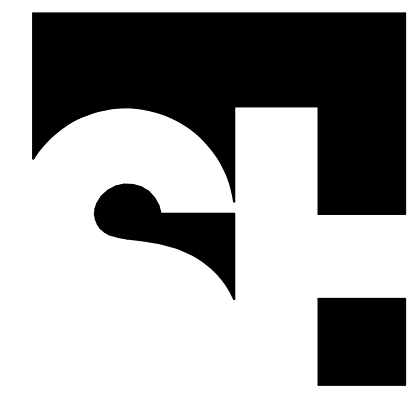


COMPOSITE BASEMENT DEMOLITION PLAN  
MDS FIFTH FLOOR RENOVATION  
UNIVERSITY OF KENTUCKY  
LEXINGTON, KENTUCKY

**ELEVATOR MODERNIZATION - EARLY PROCUREMENT**

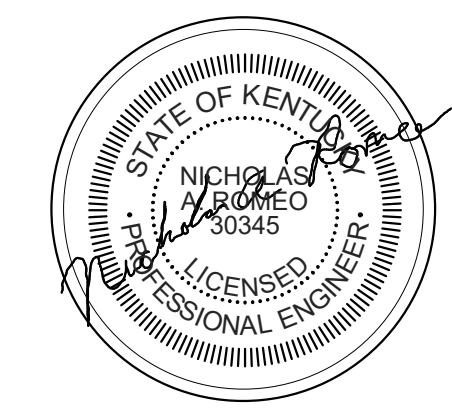
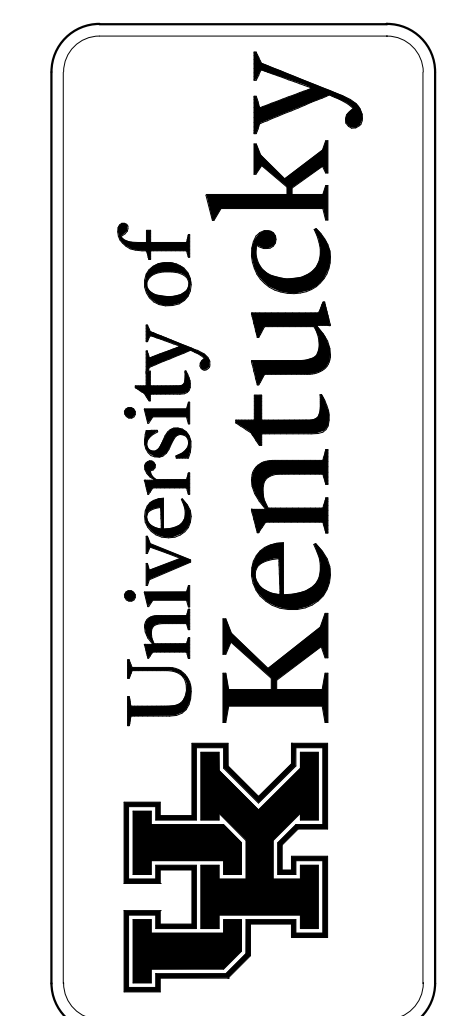
17 MARCH 2023  
UKY2205

**A2.0**



STENGEL HILL  
ARCHITECTURE

501 EAST HIGH STREET  
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MECHANICAL LEGEND  
MDS FIFTH FLOOR RENOVATION  
UNIVERSITY OF KENTUCKY  
LEXINGTON, KENTUCKY



17 MARCH 2023  
UKY2205



ELEVATOR MODERNIZATION - EARLY PROCUREMENT

**MECHANICAL PIPING LEGEND**

—○—	PIPE ELBOW TURNING UP
—○↓	PIPE ELBOW TURNING DOWN
—○—○—	PIPE TEE: CONNECTION ON TOP
—○—○—	PIPE TEE: CONNECTION ON BOTTOM
—└—	PIPE CAP
—BFW—	BOILER FEEDWATER
—CAI/E—	COMBUSTION AIR INTAKE/EXHAUST
—CBS/R—	CHILLED BEAM SUPPLY/RETURN
—CD—	CONDENSATE DRAIN
—CHWS/R—	CHILLED WATER SUPPLY/RETURN
—CST—	CLEAN STEAM PIPING
—CWS/R—	CONDENSER WATER SUPPLY/RETURN
—DTS/R—	DUAL TEMP. WATER SUPPLY/RETURN
—GS/R—	GEOTHERMAL WATER SUPPLY/RETURN
—HPC—	HIGH PRESSURE STEAM CONDENSATE
—HPS(#)—	HIGH PRESSURE STEAM; (#) DENOTES PRESSURE
—HPS/R—	HEAT PUMP WATER SUPPLY/RETURN
—HRS/R—	HEAT RECOVERY SUPPLY/RETURN PIPING
—HWS/R—	HEATING WATER SUPPLY/RETURN
—LPC—	LOW PRESSURE STEAM CONDENSATE
—LPS(#)—	LOW PRESSURE STEAM; (#) DENOTES PRESSURE
—MPC—	MEDIUM PRESSURE STEAM RETURN
—MPS(#)—	MEDIUM PRESSURE STEAM; (#) DENOTES PRESSURE
—SPD—	STEAM CONDENSATE PUMPED DISCHARGE
—SVT—	STEAM VENT PIPING
---D(XXX)---	PIPING TO BE DEMOLISHED - (XXX) DENOTES SYSTEM
—E(XXX)—	EXISTING PIPING - (XXX) DENOTES SYSTEM
—A(XXX)—	ABANDONED IN PLACE PIPING - (XXX) DENOTES SYSTEM
—◇—	TWO-WAY CONTROL VALVE
—◇—◇—	THREE-WAY CONTROL VALVE
—◇—	AUTOMATIC AIR VENT (AAV)
—◇—	MANUAL AIR VENT (MAV)
—◇—	MANUAL BALANCING VALVE (BV)
—○—	BALL VALVE
—◇—	BUTTERFLY VALVE
—◇—	TRIPLE DUTY VALVE (TDV)
—└—└—	STRAINER
—◇—	MANUAL ISOLATION VALVE
—◇—	GLOBE VALVE
—◇—	OS&Y (GATE) VALVE
—◇—	PRESSURE REDUCING VALVE (STEAM, GAS, WATER, ETC.)
—◇—	AUTO-FLOW CONTROL VALVE
—└—└—	CHECK VALVE
—└—└—└—└—	DOUBLE CHECK VALVE ASSEMBLY
—▨—	FLEXIBLE PIPE CONNECTION
—◇—	FLOW METER (VENTURI)
—  —	PIPING UNION
—P—	FLOW SWITCH
—P—	PRESSURE SWITCH
—P—	TAMPER SWITCH
—T—	THERMOMETER
—T—	PETE'S PLUG; TEMPERATURE/PRESSURE PORT

**GENERAL SYMBOLS**

⊕	TAGGED NOTE DESIGNATOR
△	REVISION TRIANGLE
ROOM NAME (BOX #)	ROOM TAG
TAG XXX-# INSTANCE XXXX	EQUIPMENT TAG
⊕	POINT OF CONNECTION / CONNECT TO EXISTING
⊕	POINT OF DEMOLITION

**HVAC LEGEND**

⊕	SUPPLY AIR DIFFUSER
⊕	RETURN AIR DIFFUSER
⊕	EXHAUST AIR DIFFUSER
⊕	TRANSFER AIR DIFFUSER W/ SOUND ATTENUATING BOOT
—	SIDEWALL DIFFUSER/GRILLE
⊕	SIDEWALL DIFFUSER/GRILLE
TAG (XXX) AIRFLOW #,###	AIR DEVICE TAG (REGISTER, GRILLE, DIFFUSER, LOUVER)
##x##	RECTANGULAR DUCT
##o	ROUND/SPIRAL DUCT
##/##	FLAT OVAL DUCT
SA	SUPPLY AIR DUCT
RA	RETURN AIR DUCT
EA	EXHAUST AIR DUCT
OA	OUTSIDE AIR DUCT
TA	TRANSFER AIR DUCT
CAE	COMBUSTION AIR EXHAUST DUCT
CAI	COMBUSTION AIR INTAKE DUCT
⊕ SA	SA AIR DUCT TURNING UP
⊕ SA	SA AIR DUCT TURNING DOWN
⊕ RA	RA AIR DUCT TURNING UP
⊕ RA	RA AIR DUCT TURNING DOWN
⊕ EA	EA AIR DUCT TURNING UP
⊕ EA	EA AIR DUCT TURNING DOWN
E(XXX)	EXISTING DUCT - (XXX) DENOTES SYSTEM
D(XXX)	DUCT TO BE DEMOLISHED - (XXX) DENOTES SYSTEM
A(XXX)	DUCT TO BE ABANDONED IN PLACE - (XXX) DENOTES SYSTEM
⊕	MITERED ELBOW WITH TURNING VANES
	FLEXIBLE DUCT
⊕	THERMOSTAT
⊕	TEMPERATURE SENSOR
⊕	HUMIDITY SENSOR
⊕	CARBON DIOXIDE SENSOR
⊕	TEMPERATURE & CARBON DIOXIDE SENSOR
⊕	MANUAL BALANCING/VOLUME DAMPER
⊕	MOTORIZED DAMPER
⊕	FIRE DAMPER
⊕	SMOKE DAMPER
⊕	COMBINATION FIRE & SMOKE DAMPER

**ABBREVIATIONS (CONTINUED)**

NO	NORMALLY OPEN <b>OR</b> NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DI (-AMETER, -MENSION)
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OR	OPEN RECEPACLE
OZ	OUNCE (-S)
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PH	PHASE [ELECTRICAL]
PLBG	PLUMBING
PPM	PARTS PER MILLION
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE (STEAM, WATER, GAS)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	PPSI GAUGE
RH	RELATIVE HUMIDITY [%]
RLA	RUNNING LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
SD	SMOKE DAMPER
SP	STATIC PRESSURE
SQ	SQUARE
SQ FT	SQUARE FEET <b>OR</b> FOOT
SQ IN	SQUARE INCH <b>OR</b> INCHES
TAB	TESTING AND BALANCING
TBD	TO BE DETERMINED
TE	TOP ELEVATION
TEMP	TEMPERATURE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VOLT (-AGE, -S)
VAR	VARI (-ABLE, -IES)
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FEQUENCY DRIVE
W	WATT (-AGE, -S)
WB	WET BULB
WBT	WET BULB TEMPERATURE
WPD	WATER PRESSURE DROP
WT	WEIGHT
W/	WITH
W/O	WITHOUT
%	PERCENT
ΔP	DIFFERENTIAL PRESSURE
ΔT	TEMPERATURE DIFFERENCE
℄	CENTERLINE

**ABBREVIATIONS (CONTINUED)**

FD	FIRE DAMPER
FL	FLOOR
FLA	FULL LOAD AMPS
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPC	FIRE PROTECTION CONTRACTOR
FBM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET <b>OR</b> FOOT
FUT	FUTURE
FV	FACE VELOCITY
GA	GAGE/GAUGE
GAL	GALLON (-S)
GC	GENERAL CONTRACTOR
GD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRAINS
H	HUMIDITY
HD	HEAD
HG	MERCURY
HORIZ	HORIZONTAL
HP	H (-ORSEPOWER, -EAT PUMP)
HR	HOUR (-S)
HVAC	HEATING, VENTILATING, & AIR-CONDITIONING
HZ	HERTZ
ID	I (-DENTIFICATION, -NSIDE DIAMETER, -NSIDE DIMENSION)
IN	INCH (-ES)
INSUL	INSULAT (-ED, -ION)
INT	INTER (-IOR, -ERVAL)
IPS	IRON PIPE SIZE
kw	KILOWATT
kWh	KILOWATT HOUR
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LF	LINEAR FEET/FOOT
LRA	LOCKED ROTOR AMPS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	BTU PER HOUR [THOUSANDS]
MCA	MINIMUM CIRCUIT AMPS
MFG	MANUFACTURER
MIN	MIN (-IMUM, -UTE)
MISC	MISCELLANEOUS
MOCPP	MAXIMUM OVERCURRENT PROTECTION [AMPS]
MTG	MOUNTING
N/A	NOT APPLICABLE
NC	NOISE CRITERIA <b>OR</b> NORMALLY CLOSED
NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU
NIC	NOT IN CONTRACT

**ABBREVIATIONS (CONTINUED)**

AC	ALTERNATING CURRENT
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AFR	ABOVE FINISHED ROOF
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY
AHJ	AUTHORITY HAVING JURISDICTION
AMP	AMPERE (AMP, AMPS)
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
APD	AIR PRESSURE DROP
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR-CONDITIONING ENGINEERS
ATU	AIR TERMINAL UNIT
AVG	AVERAGE
BAS	BUILDING AUTOMATION SYSTEM
BHP	BREAK HORSEPOWER
BTU	BRITISH THERMAL UNIT
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CD	CONDENSATE DRAIN
CFM	CUBIC FEET PER MINUTE
C.I.	CAST IRON
CLG	CEILING
CLR	CLEAR
CO	CARBON MONOXIDE
CO2	CARBON DIOXIDE
COND	CONDENS (-ER, -ING, -ATION, -ATE)
CONT	CONTINU (-ED, -OUS)
CU FT	CUBIC FEET
CU IN	CUBIC INCHES
CV	VALVE FLOW COEFFICIENT
dB	DECIBEL
DB	DRY BULB
DBT	DRY BULB TEMPERATURE
DC	DIRECT CURRENT
DD	DUCT SMOKE DETECTOR
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE (-S)
DIA	DIAMETER (-S)
DN	DOWN
DWG	DRAWING
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ELEV	ELEVA (-TION, -TOR)
ENGR	ENGINEER
EQ	EQUAL
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EVAP	EVAPORAT (-E, -ING, -ED, -OR, -ION)
EWT	ENTERING WATER TEMPERATURE
EXP	EXPANSION
EXT	EXTERIOR
FA	FREE AREA

**ABBREVIATIONS**

A	COORDINATE THE LOCATION OF DRAINS, THERMOSTATS, GAS OUTLETS, ETC., WITH ALL CASEWORK EQUIPMENT, MECHANICAL ROOM EQUIPMENT, ETC., PRIOR TO COMMENCING INSTALLATION. WORK NOT SO COORDINATED SHALL BE REMOVED AND PROPERLY INSTALLED AT THE EXPENSE OF THE CONTRACTOR.
B	THE CONTRACTOR SHALL EXERCISE EXTREME CARE IN THE COURSE OF THEIR WORK SO AS TO ENSURE THAT THEY DO NOT INTERRUPT ANY EXISTING SERVICE. FOR SAFETY PURPOSES, PAY PARTICULAR ATTENTION TO THIS PRECAUTION RELATIVE TO NATURAL GAS AND ELECTRICAL LINES. VERIFY THE LOCATION, SIZE, TYPE, ETC., OF EACH UNDERGROUND OR OVERHEAD UTILITY. ALL WORK SHALL BE PERFORMED IN ACCORD WITH ALL FEDERAL, STATE AND/OR LOCAL RULES, REGULATIONS, STANDARD AND SAFETY REQUIREMENTS. UTILITIES SHALL BE INSTALLED IN ACCORD WITH THE APPLICABLE MUNICIPALITY OR UTILITY COMPANY STANDARDS. IN ALL CASES, THE MOST STRINGENT REQUIREMENT SHALL APPLY.
C	WHERE WORK IS REQUIRED ABOVE EXISTING LAY-IN, PLASTER OR GYPSUM BOARD CEILINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND REINSTALLATION (OR REPLACEMENT, IF DAMAGED) OF ALL CEILING OR TILE AND GRID MEMBERS NECESSARY TO PERFORM HIS WORK. NEW TILE AND GRID SHALL MATCH THE SURROUNDING AREAS. ALL PATCHING WORK SHALL MATCH ADJACENT SURFACES.
D	ALL NEW WORK SHALL BE HUNG FROM STRUCTURE, NOT FROM THE WORK OF OTHER TRADES, WHETHER EXISTING OR NEW.
E	COORDINATE ALL WORK WITH PROJECT PHASING REQUIREMENTS.
F	PATCH, REPAIR AND PAINT OR PROVIDE WALL COVERING FOR (TO OWNER'S STANDARDS) EXISTING WALLS, CEILINGS, ETC., THAT ARE TO REMAIN IF DAMAGED DURING CONSTRUCTION. REPAIRS SHALL MATCH ADJACENT SURFACES TO THE SATISFACTION OF THE ARCHITECT AND OWNER.
G	OBSERVE ALL APPLICABLE CODES, RULES AND REGULATIONS THAT MAY APPLY TO THE WORK UNDER THIS CONTRACT. (CITY, COUNTY, LOCAL, FEDERAL, MUNICIPALITY, UTILITY COMPANY, COMMONWEALTH OF KENTUCKY, ETC.)
H	CONTRACTOR SHALL BE AWARE OF UNSEEN PLUMBING, HVAC AND ELECTRICAL WORK DURING DEMOLITION. IF ITEMS ARE UNCOVERED DURING DEMOLITION THEN FIELD VERIFY THE USE OF THE ITEMS AND PLAN AN ALTERNATE ROUTE TO RUN THESE ITEMS. THEN CONTACT THE ENGINEERS TO REVIEW THE ROUTING.
I	IF AREA OF CONSTRUCTION HAS A POST TENSION FLOOR SLAB. CONTRACTOR SHALL USE ULTRA SOUND OR OTHER APPROVED METHODS TO SURVEY THE EXISTING FLOOR STRUCTURE BEFORE MAKING ANY AND ALL FLOOR PENETRATIONS.
J	WHERE FIRE PROOFING IS SPRAYED ON EXISTING STRUCTURE ALL EXISTING CONDUITS, WATER, HYDRAONIC, STEAM, CHILLED WATER, FIRE PROTECTION LINES, MED GAS, ETC. SHALL BE LOWERED TO BE BELOW FULL THICKNESS OF FIRE PROOFING WITH NO INTERFERENCE.
K	ALL PENETRATIONS OF FIRE AND SMOKE RATED ASSEMBLIES SHALL BE APPROPRIATELY FIRE STOPPED PER AN APPROVED U.L. LISTED STANDARD. CONTRACTOR SHALL PAY PARTICULAR ATTENTION TO INSULATED PIPING PENETRATIONS.
L	ALL WORK REQUIRING DOWNTIME OF ANY AREA IN THE BUILDING SHALL BE SCHEDULED 2 WEEKS IN ADVANCE, AND SHALL COMPLY WITH INTERIM LIFE SAFETY MEASURES.
M	ALL DUCTWORK, PIPING, CONDUITS, ETC. IN ROOMS WITH CEILINGS SHALL BE ABOVE CEILING EXCEPT AS NOTED.
N	INSTALL AIR VENTS AT HIGH POINTS IN PIPING AND DRAINS IN LOW POINTS. USE CARE TO AVOID FREEZING OF EXTERIOR VENTS.
O	LOCATIONS OF PIPING, DUCTS AND EQUIPMENT ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. DO NOT SCALE THE DRAWINGS.
P	ALL OFFSETS IN DUCTS AND PIPING ARE NOT NECESSARILY SHOWN. PROVIDE ADDITIONAL OFFSETS WHERE NECESSARY.
Q	COORDINATE ALL HVAC WORK WITH ELECTRICAL, PLUMBING AND OTHER TRADES TO AVOID INTERFERENCE WITH PIPING, DUCTS, CONDUIT AND OTHER EQUIPMENT.
R	INSTALL ALL PIPING, DUCTWORK AND EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTION. IF IN CONFLICT WITH THE DESIGN INDICATED IN CONTRACT DOCUMENTS, ADVISE THE ENGINEERS PRIOR TO INSTALLATION FOR CLARIFICATION. PROVIDE RECOMMENDED ACCESS AND SERVICE CLEARANCES FOR ALL EQUIPMENT.
S	SEAL AIRTIGHT AROUND ALL DUCTS AND PIPING PENETRATIONS THROUGH WALLS, FLOORS AND ROOF. PROVIDE FIRE STOPPING IN FIRE PARTITION.
T	SEAL ALL NEW DUCTWORK JOINTS WITH UNITED MCGILL, IRONGRIP 601 OR EQUAL WATER BASED SEALANT.
U	ALL MOTOR DRIVEN EQUIPMENT SHALL BE INSTALLED WITH FLEXIBLE CONNECTIONS TO DUCTWORK, PIPING, ETC., UNLESS OTHERWISE NOTED.
V	THE CONTRACTOR SHALL RELOCATE OR AVOID ANY EXISTING EQUIPMENT APPURTENANCES, ETC., THAT CONFLICT WITH NEW WORK.
W	WHERE MOUNTING HEIGHTS ARE NOT INDICATED OR ARE IN CONFLICT WITH ANY OTHER BUILDING SYSTEM, CONTACT THE ENGINEERS BEFORE INSTALLATION. REFER ALSO TO ARCHITECTURAL WALL INTERIOR AND EXTERIOR WALL ELEVATIONS, CEILING HEIGHTS AND OTHER DETAIL OF THESE DOCUMENTS.
X	DOUBLE WIDTH TURNING VANES SHALL BE INSTALLED IN ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK ELBOWS. TURNING VANES NOT REQUIRED FOR KITCHEN EXHAUSTS.
Y	ANY VIBRATING, OSCILLATING OR OTHER NOISE OR MOTION PRODUCING EQUIPMENT SHALL BE ISOLATED FROM SURROUNDING SYSTEMS IN AN APPROVED MANNER. NOISY OR STRUCTURALLY DAMAGING INSTALLATIONS SHALL BE SATISFACTORILY REPLACED OR REPAIRED AT THE INSTALLING CONTRACTOR'S EXPENSE. THE FINAL DECISION ON THE SUITABILITY OF A PARTICULAR INSTALLATION'S ACCEPTABILITY SHALL BE THAT OF THE ENGINEER.
Z	DEVIATIONS IN SIZE, CAPACITIES, FIT, FINISH, ETC. FOR EQUIPMENT FROM THAT USED AS BASIS OF DESIGN SHALL BE THE RESPONSIBILITY OF THE PURCHASER OF THAT EQUIPMENT. ANY PROVISIONS REQUIRED TO ACCOMMODATE A DEVIATION, WHETHER APPROVED BY THE ENGINEERS OR NOT, SHALL BE THE RESPONSIBILITY OF THE PURCHASER.
AA	VALVES, BALANCING DAMPERS OR ANY MECHANICAL/ELECTRICAL ITEM REQUIRING ACCESS SHALL NOT BE LOCATED ABOVE A HARD CEILING. IF THIS IS NOT POSSIBLE, THEN AN APPROPRIATELY SIZED ACCESS DOOR SHALL BE PLACED UNDER THE ITEM TO ALLOW EASY MAINTENANCE AND ADJUSTMENT. ADDITIONALLY ALL SUCH ITEMS SHALL NOT BE LOCATED AN UNREASONABLE DISTANCE ABOVE THE CEILINGS. IN GENERAL ALL SUCH ITEMS UNLESS INDICATED OTHERWISE SHALL BE MOUNTED SIX TO TWELVE INCHES ABOVE THE CEILING. IF IN DOUBT, CONTACT ENGINEER PRIOR TO INSTALLING.
AB	PIPING SHALL NOT BE LOCATED UNDER A FOOTER OR IN THE ZONE OF INFLUENCE. THE ZONE OF INFLUENCE IS THE AREA UNDER THE FOOTER WITHIN A 45 DEGREE ANGLE PROJECTED DOWN FROM THE BOTTOM EDGE OF THE FOOTER OF ALL SIDES OF THE FOOTER. ADDITIONALLY, GREASE TRAPS, MANHOLES, VAULTS AND OTHER UNDERGROUND STRUCTURES SHALL BE HELD AWAY FROM BUILDING WALLS FAR ENOUGH TO BE OUTSIDE OF THE ZONE OF INFLUENCE.
AC	THE DOCUMENTS COMPLY WITH 2015 IMC, 2018 KBC, AND 2012 IECC.
AD	WORK IN CONFINED AREAS SHALL BE IN ACCORDANCE WITH THE OWNER'S SAFETY POLICY REQUIREMENTS.

**MECHANICAL PHASING NOTES**

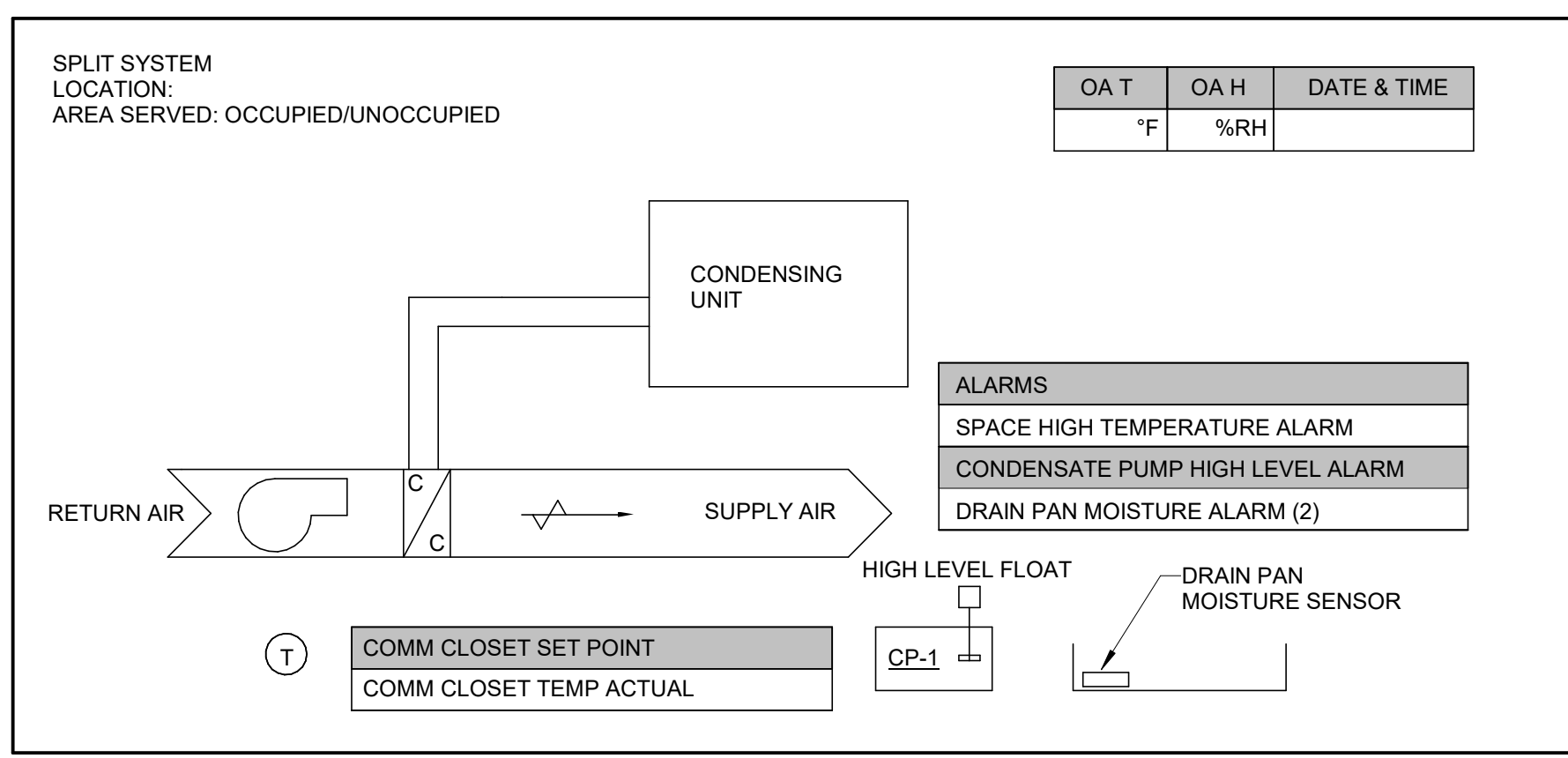
A	THIS PROJECT INTERFACES EXTENSIVELY WITH EXISTING BUILDING SERVICES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE AND PHASE ALL TIE-INS AND INTERRUPTIONS OF EXISTING SERVICES TO MINIMIZE OR ELIMINATE DOWNTIME. AS AN EXAMPLE, MAIN GAS SERVICE, WATER SERVICE, ELECTRICAL SERVICE, HVAC SERVICES, STEAM GENERATION, ETC., WILL BE AFFECTED AND REPLACED OR MOVED DURING THIS PROJECT. THE CONTRACTOR SHALL INSTALL ALL NEW SERVICES AND EQUIPMENT AND HAVE THEM TESTED AND FULLY AND RELIABLY FUNCTIONAL PRIOR TO INTERRUPTING, RELOCATING OR REMOVING ANY EXISTING SERVICES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO BARE ANY AND ALL COSTS ASSOCIATED WITH PHASING, INCLUDING TEMPORARY SERVICES, TEMPORARY RELOCATION, PREMIUM TIME WORK, ETC. CONTRACTOR SHALL COORDINATE ALL SAID WORK WITH THE OWNER AND APPLICABLE UTILITIES PER THE CONTRACT DOCUMENTS.
B	THE CONTRACTOR IT IS HEREBY ADVISED THAT IS POSSIBLE THAT ASBESTOS AND/OR OTHER HAZARDOUS MATERIALS ARE OR WERE PRESENT IN THIS BUILDING(S). ANY WORKER, OCCUPANT, VISITOR, ETC., WHO ENCOUNTERS ANY MATERIAL OF WHOSE CONTENT THEY ARE NOT CERTAIN SHALL PROMPTLY REPORT THE EXISTENCE AND LOCATION OF THAT MATERIAL TO THE OWNER. FURTHERMORE, THE CONTRACTOR SHALL INSURE THAT NO ONE COMES NEAR TO OR IN CONTACT WITH ANY SUCH MATERIAL OR FUMES THEREFROM UNTIL ITS CONTENT CAN BE ASCERTAINED TO BE NON-HAZARDOUS.
C	IF THE WORK WHICH IS TO BE PERFORMED INTERFACES, CONNECTS OR RELATES IN ANY PHYSICAL WAY WITH OR TO EXISTING COMPONENTS WHICH CONTAIN OR BEAR ANY HAZARDOUS MATERIAL, ASBESTOS BEING ONE, THEN IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO CONTACT THE OWNER AND SO ADVISE HIM IMMEDIATELY.
D	THE CONTRACTOR BY EXECUTION OF THE CONTRACT FOR ANY WORK AND/OR BY THE ACCOMPLISHMENT OF ANY WORK THEREBY AGREE TO BRING NO CLAIM RELATIVE TO HAZARDOUS MATERIALS FOR NEGLIGENCE, BREACH OF CONTRACT, INDEMNITY, OR ANY OTHER SUCH ITEM AGAINST CMTA, ITS PRINCIPALS, EMPLOYEES, AGENTS OR CONSULTANTS. ALSO, THE CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD CMTA, ITS PRINCIPALS, EMPLOYEES, AGENTS AND CONSULTANTS HARMLESS FROM ANY SUCH RELATED CLAIMS WHICH MAY BE BROUGHT BY ANY SUBCONTRACTORS, SUPPLIERS OR ANY OTHER THIRD PARTIES.
E	THE CONTRACTOR IS DIRECTED TO THE SPECIFICATIONS FOR FURTHER INFORMATION.

**MECHANICAL HAZARDOUS MATERIALS NOTES**

A	THE CONTRACTOR IT IS HEREBY ADVISED THAT IS POSSIBLE THAT ASBESTOS AND/OR OTHER HAZARDOUS MATERIALS ARE OR WERE PRESENT IN THIS BUILDING(S). ANY WORKER, OCCUPANT, VISITOR, ETC., WHO ENCOUNTERS ANY MATERIAL OF WHOSE CONTENT THEY ARE NOT CERTAIN SHALL PROMPTLY REPORT THE EXISTENCE AND LOCATION OF THAT MATERIAL TO THE OWNER. FURTHERMORE, THE CONTRACTOR SHALL INSURE THAT NO ONE COMES NEAR TO OR IN CONTACT WITH ANY SUCH MATERIAL OR FUMES THEREFROM UNTIL ITS CONTENT CAN BE ASCERTAINED TO BE NON-HAZARDOUS.
B	CMTA, INC. HAS NO EXPERTISE IN THE DETERMINATION OF THE PRESENCE OF ANY HAZARDOUS MATERIAL. THEREFORE, NO ATTEMPT HAS BEEN MADE BY CMTA TO IDENTIFY THE EXISTENCE OR LOCATION OF ANY SUCH HAZARDOUS MATERIAL. FURTHERMORE, CMTA NOR ANY AFFILIATE HEREOF WILL NOT OFFER OR MAKE ANY RECOMMENDATIONS RELATIVE TO THE REMOVAL, HANDLING OR DISPOSAL OF SUCH MATERIAL.
C	IF THE WORK WHICH IS TO BE PERFORMED INTERFACES, CONNECTS OR RELATES IN ANY PHYSICAL WAY WITH OR TO EXISTING COMPONENTS WHICH CONTAIN OR BEAR ANY HAZARDOUS MATERIAL, ASBESTOS BEING ONE, THEN IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO CONTACT THE OWNER AND SO ADVISE HIM IMMEDIATELY.
D	THE CONTRACTOR BY EXECUTION OF THE CONTRACT FOR ANY WORK AND/OR BY THE ACCOMPLISHMENT OF ANY WORK THEREBY AGREE TO BRING NO CLAIM RELATIVE TO HAZARDOUS MATERIALS FOR NEGLIGENCE, BREACH OF CONTRACT, INDEMNITY, OR ANY OTHER SUCH ITEM AGAINST CMTA, ITS PRINCIPALS, EMPLOYEES, AGENTS OR CONSULTANTS. ALSO, THE CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD CMTA, ITS PRINCIPALS, EMPLOYEES, AGENTS AND CONSULTANTS HARMLESS FROM ANY SUCH RELATED CLAIMS WHICH MAY BE BROUGHT BY ANY SUBCONTRACTORS, SUPPLIERS OR ANY OTHER THIRD PARTIES.
E	THE CONTRACTOR IS DIRECTED TO THE SPECIFICATIONS FOR FURTHER INFORMATION.

NOTE: NOT ALL SYMBOLS AND ABBREVIATIONS MAY BE USED ON THIS PROJECT

APPLICABLE BUILDING CODES		
APPLICABLE BUILDING CODES	DOCUMENT	YEAR
ACCESSIBLE AND USEABLE BUILDINGS AND FACILITIES	ANSI A117.1	2009
FIRE SPRINKLER CODE	NFPA 13	2013
INTERNATIONAL BUILDING CODE (IBC)	STATE EDITION	2015
INTERNATIONAL ENERGY CONSERVATION CODE (IECC)	STATE EDITION	2012
INTERNATIONAL FIRE CODE (IFC)	STATE EDITION	2015
INTERNATIONAL FUEL GAS CODE (IFGC)	STATE EDITION	2015
INTERNATIONAL MECHANICAL CODE (IMC)	STATE EDITION	2015
INTERNATIONAL PLUMBING CODE (IPC)	STATE EDITION	2015
INTERNATIONAL EXISTING BUILDING CODE (IEBC)	STATE EDITION	2009
NATIONAL ELECTRIC CODE (NEC)	NFPA 70	2017
NATIONAL FIRE ALARM & SIGNALING CODE	NFPA 72	2013
UNIFORM STATEWIDE BUILDING CODE		2018

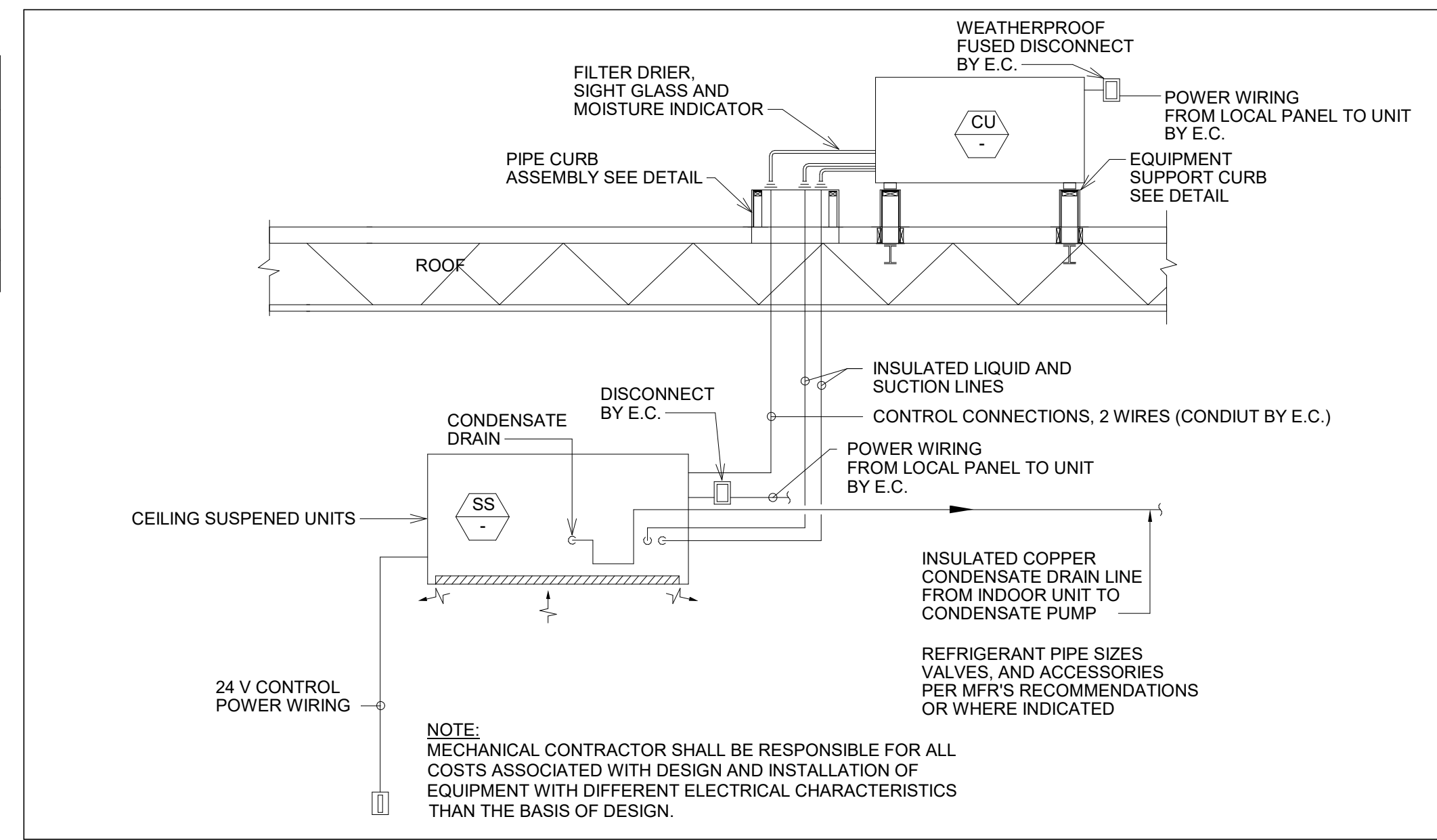


1. SPLIT SYSTEM SS-30/CU-30

- Unit shall be provided with factory controls and wired thermostat. The DDC system shall monitor space temperature and provide a high temperature alarm. Provide all necessary wiring conduit, etc. as required to interlock the DDC thermostat with unit and condensing unit. Space shall have space temperature and the split system shall control to maintain all spaces a minimum of 72°F (adj.).
- The control system shall monitor the condensate pump's high level alarm contact and shall enunciate an alarm at the front end in case of condensate overflow.
- The control system shall monitor the drain pan moisture sensor and shall enunciate an alarm at the front end if moisture is detected in the drain pan.

SPLIT SYSTEM POINTS LIST						
Point Description	Object Name	DI	DO	AI	AO	Override
Zone Temp Setpoint	ZN-1-T-SP				X	X
Zone Temp Actual	ZN-1-T			X	X	
Condensate Pump High Level Limit	CP-HL	X				
Drain Pan Moisture Sensor	DP-MS	X			X	

TAGGED NOTES		#
F9	THE EXISTING OUTLINE AREA IS PRESENTLY SPRINKLED WITH AN EXISTING WET PIPE SPRINKLER SYSTEM. REMOVE THE EXISTING SPRINKLER HEADS IN AREA. PROVIDE NEW UPTURN SPRINKLER HEADS AND NEW BRANCH PIPING AS NECESSARY FOR THE NEW FLOOR PLAN LAY-OUT TO MAINTAIN 100% SPRINKLER COVERAGE IN COMPLIANCE WITH THE NFPA-13 AND KENTUCKY BUILDING CODE.	
H2	ROUTE PUMP DISCHARGE PIPE TO NEAREST FLOOR DRAIN.	
H3	PROVIDE GALVANIZED DRIP PAN UNDER SANITARY AND ROOF LEADER PIPING INSIDE ELEVATOR MACHINE ROOM. ROUTE 3/4" DRAIN LINE FROM PAN TO CONDENSATE PUMP. PROVIDE MOISTURE SENSOR IN PAN THAT SHALL BE CONNECTED TO THE TRIDIUM SYSTEM.	
H4	INSTALL SUSPENDED SPLIT SYSTEM'S INDOOR UNIT BELOW PIPING. ROUTE 3/4" CONDENSATE DRAIN LINE TO CP-1.	
H5	MOUNT CONDENSATE PUMP 5 FEET ABOVE FINISHED FLOOR.	
H6	ROUTE R/LRS PIPING TO MECHANICAL ROOM 165'S ROOF. SET CU-1 ON EQUIPMENT BASE RAILS AND KEEP 10' FROM ROOF'S EDGE.	
H7	SIZE REFRIGERANT PIPE AS PER MANUFACTURER'S RECOMMENDATIONS.	
MD42	DEMOLISH AND REMOVE EXHAUST FAN INCLUDING ALL HANGERS, SUPPORTS AND ALL OTHER APPURTENANCES. INFILL WALL OPENING WITH LIKE MATERIAL AND SEAL. MAINTAIN WALL'S 2-HOUR FIRE RATING.	
MD43	DEMOLISH AND REMOVE TRANSFER AIR DUCTWORK IN IT'S ENTIRETY, INCLUDING FIRE DAMPERS, HANGERS, SUPPORTS DIFFUSERS, GRILLES AND ALL OTHER APPURTENANCES. INFILL WALL OPENINGS WITH LIKE MATERIAL AND SEAL. MAINTAIN WALL'S 2-HOUR FIRE RATING.	



SPLIT-SYSTEM INDOOR UNIT SCHEDULE												
MARK	MANUF.	MODEL #	DIMENSIONS (IN.)			WEIGHT (LBS)	AIRFLOW (CFM)	ELECTRICAL				REMARKS
			LENGTH	WIDTH	HEIGHT			VOLTAGE	PHASE	MCA	MOCP	
SS-30	DAIKIN	FHQ30PVJ	63	27	8	90	790	208 V	1	1 A	15	ALL

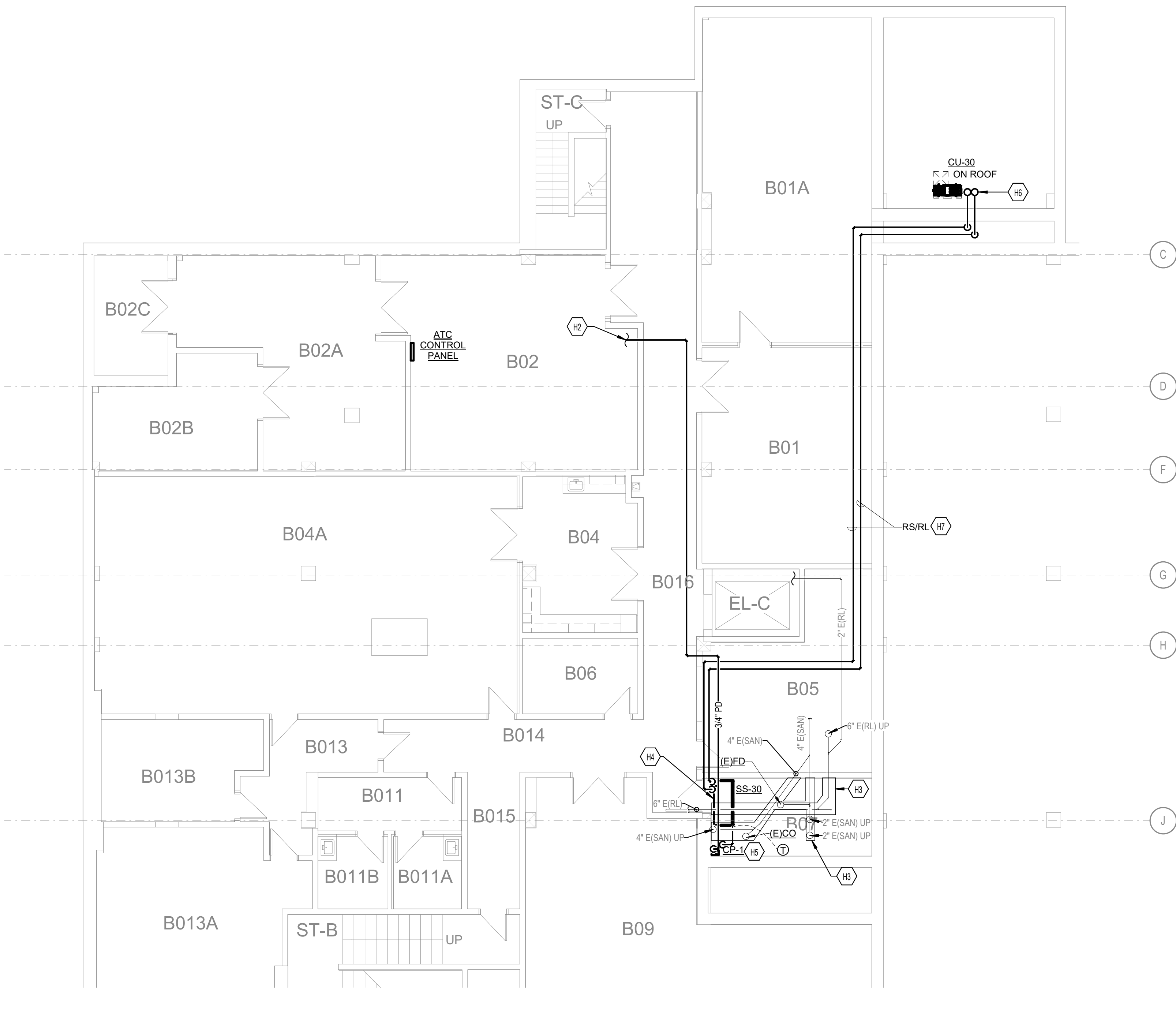
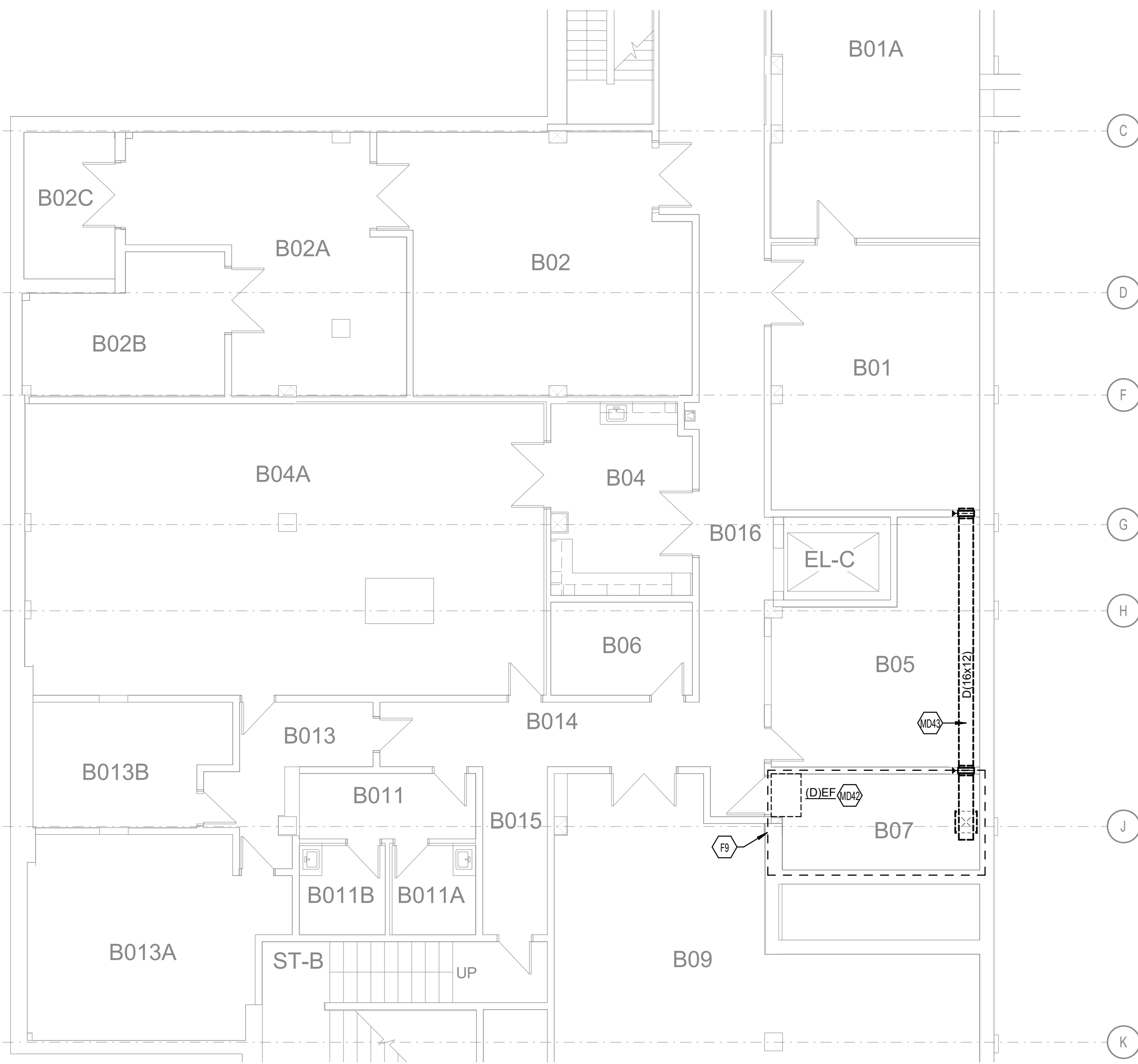
- REMARKS:
- PROVIDE WITH WIRED THERMOSTAT.

SPLIT-SYSTEM OUTDOOR UNIT SCHEDULE														
MARK	MANUF.	MODEL #	DIMENSIONS (IN.)			WEIGHT (LBS)	TOTAL COOLING (MBH)	SENSIBLE COOLING (MBH)	MINIMUM SEER	ELECTRICAL				REMARKS
			LENGTH	WIDTH	HEIGHT					VOLTAGE	PHASE	MCA	MOCP	
CU-30	DAIKIN	FHQ30PVJ	36	12	53	225	30.0	21.0	16	29 A	35	208 V	1	ALL

- REMARKS:
- COOLING ONLY UNIT. PROVIDE WITH WIND BAFFLE.
  - INSTALL ON EQUIPMENT BASE RAILS.

CONDENSATE PUMPS AND RECEIVERS										
MARK	MANUFACTURER	MODEL #	PUMPS				RECEIVER			REMARKS
			GPM	DISCHARGE (PSI)	HP	VOLTAGE	PHASE	CAPACITY (GALS)	INLET SIZE	
CP-1	LITTLE GIANT	VCL-45ULS	6.3	19.50	0.2	115 V	1	1.0	1"	ALL

- REMARKS:
- PROVIDE UNIT WITH 6' 3 PRONG PLUG, OVERFLOW DETECTION SWITCH AND CHECK VALVE.



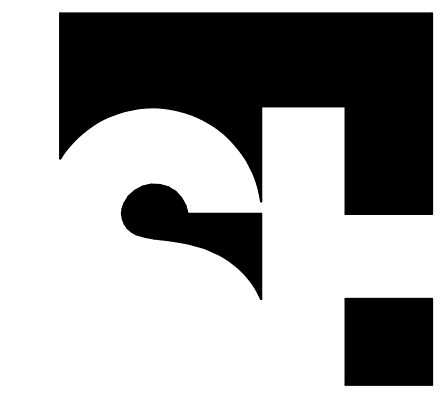
DESCRIPTION	MOUNTING HEIGHT	SYMBOL
<b>FIRE ALARM</b>		
MAIN CONTROL PANEL CENTRAL PROCESSING UNIT (CPU)	6'-6" TO TOP	FACP
REMOTE L.C.D. FIRE ALARM ANNUNCIATOR	54"	FAA
REMOTE FIRE ALARM ANNUNCIATOR W/ MICROPHONE	54"	FAAM
LOCAL OPERATOR CONSOLE	54"	LOC
SMOKE EVACUATION CONTROL PANEL	54"	SECP
POWER SUPPLY CONTROL FOR AUDIOVISUAL DEVICES	46"	NAC
TRANSPONDER CABINET	46"	TRAN
GRAPHICS DISPLAY TERMINAL		GDPT
FIRE ALARM CONTROL EXTENDER		EXT
POST INDICATOR VALVE		PIV
PULL STATION - DOUBLE ACTION	46" TO LEVER	F
KEYED, LOCKED PULL STATION - DOUBLE ACTION, STATION SHALL ONLY BE OPERABLE VIA KEY IN POSSESSION OF STAFF.	46" TO LEVER	F <sup>K</sup>
AUDIOVISUAL NOTIFICATION APPLIANCE	WALL, CLG	F <sup>V</sup>
AUDIO-ONLY NOTIFICATION APPLIANCE	WALL, CLG	F <sup>A</sup>
VISUAL-ONLY NOTIFICATION APPLIANCE	WALL, CLG	F <sup>V</sup>
BELL / LIGHT	80"	BL
BELL ONLY	80"	B
PHOTO-ELECTRIC SMOKE DETECTOR	CLG	SD
PHOTO-ELECTRIC SMOKE DETECTOR FOR PATIENT ROOM MONITORING (SEE RISER)	CLG	SD <sup>P</sup>
PROJECTED BEAM SMOKE DETECTOR, EMITTER (BE) AND RECEIVER (BR)		BE BR
HEAT DETECTOR	CLG	HD
CARBON MONOXIDE DUCT DETECTOR	ABOVE CEILING	CD
CARBON MONOXIDE ALARM, SINGLE STATION W/SOUNDER BASE	CLG	CM
CARBON MONOXIDE AUDIOVISUAL NOTIFICATION APPLIANCE	WALL	CM <sup>AV</sup>
DOOR HOLDER - WALL TYPE	WALL	DH
DOOR HOLDER - CLOSURE TYPE	ABV DOOR	DH <sup>C</sup>
DUCT SMOKE DETECTOR	ABV CLG	DD
CONNECTION TO SPRINKLER FLOW SWITCH WITH ADDRESSABLE MODULE		FS
CONNECTION TO SPRINKLER TAMPER SWITCH WITH ADDRESSABLE MODULE		TS
PRESSURE SWITCH		PS
ISOLATION MODULE	WALL	II
ZONE ADDRESSABLE MODULE		Z
H.V.A.C. SMOKE DAMPER CONNECTION		SDM
FLUSH MOUNTED REMOTE ALARM INDICATING STATION/TEST SWITCH	7'-6"	R
FIREMAN'S PHONE JACK	4'-6"	FP
FIREMAN'S KNOX BOX CONNECTION		KB
ADDRESSABLE RELAY MODULE		R
INDICATES VANDAL-PROOF POLYCARBONATE COVER, VANDAL PROOF COVERS SHALL BE UL LISTED FOR USE WITH THE SPECIFIC DEVICE THEY ARE PROTECTING		VR
INDICATES CHIME AUDIBLE NOTIFICATION		CH
DEVICE USED FOR ELEVATOR CONTROL		EL

DESCRIPTION	MOUNTING HEIGHT	SYMBOL
<b>LIGHTING CONTROLS</b>		
LIGHT SWITCH LOW VOLTAGE (WHEN PRESENT, # INDICATES QUANTITY OF CHANNELS)	46"	\$ #
EXAM LIGHT SWITCH	46"	\$ X
NIGHT LIGHT SWITCH WITH CONSTANTLY ILLUMINATED HANDLE	46"	\$ N
SURGICAL LIGHT INTENSITY CONTROL	46"	\$ SL
LOW VOLTAGE DIMMER SWITCH (WHEN PRESENT, # INDICATES QUANTITY OF CHANNELS)	46"	\$ DW
GRAPHIC TOUCHSCREEN CONTROL STATION	46"	\$ G
LINE VOLTAGE SWITCH	46"	\$ LV
LINE VOLTAGE THREE-WAY, FOUR-WAY SWITCH	46"	\$ LV3 LV4
LINE VOLTAGE THREE-WAY, FOUR-WAY DIMMER SWITCH	46"	\$ LV3D LV4D
KEYED SWITCH	46"	\$ K
OCCUPANCY OR VACANCY SENSOR SWITCH	46"	\$ OS \$ VS
OCCUPANCY OR VACANCY SENSOR SWITCH WITH DIMMING	46"	\$ DOS
LIGHT SWITCH FOR UNDER-CABINET LIGHTS	46"	\$ U
ILLUMINATED HANDLE LIGHT SWITCH (ILLUMINATED WHEN LOAD IS OFF)	46"	\$ IL
PILOT LIGHT SWITCH (ILLUMINATED WHEN LOAD IS ON)	46"	\$ PL
TIMER SWITCH	46"	\$ T
OCCUPANCY OR VACANCY SENSOR, CEILING MOUNT	CLG	\$ OS (S)
OCCUPANCY SENSOR, CORNER MOUNT	CLG	\$ OS (C)
DAYLIGHT SENSOR	AS NOTED	\$ OS (D)
PHOTOCELL	AS NOTED	\$ OS (P)
LIGHTING RELAY	AS NOTED	\$ LR
EMERGENCY AUTOMATIC TRANSFER SWITCH FOR LIGHTING CONTROLS (REFER TO DETAIL)	CLG	\$ ER
<b>POWER OUTLETS</b>		
SIMPLEX RECEPTACLE (TEXT INDICATES NEMA TYPE)	1'-6"	⊕ ⊙
DUPLEX RECEPTACLE	1'-6"	⊕ ⊕
SLASH THROUGH ANY DEVICE INDICATES MOUNTING ABOVE COUNTERTOP 4" ABOVE BACKSPASH		⊕ ⊕
'G' INDICATES INTEGRAL GROUND FAULT PROTECTION (GFCI)	1'-6"	⊕ ⊕
DEAD FRONT GFCI DEVICE, LABEL AND INSTALL IN READILY ACCESSIBLE LOCATION		⊕ ⊕
DUPLEX RECEPTACLE WITH TWO INTEGRAL USB CHARGING PORTS	1'-6"	⊕ ⊕
USB CHARGING OUTLET WITH FOUR INTEGRAL USB PORTS	1'-6"	⊕ ⊕
GANG RECEPTACLE IN COMBINATION WITH SWITCH (PROVIDE DIVIDER IF LIGHTING CIRCUIT IS 277V)	46"	⊕ ⊕ S
DUPLEX RECEPTACLE, CEILING MOUNTED	CLG	⊕ ⊕
QUADRUPLEX RECEPTACLE	1'-6"	⊕ ⊕ ⊕ ⊕
JUNCTION BOX, CEILING OR WALL		⊕ ⊕
VOLTAGE/3 POLE RECEPTACLE, TEXT INDICATES NEMA TYPE	1'-6"	⊕ ⊕ ⊕
VOLTAGE/3 POLE RECEPTACLE, TEXT INDICATES NEMA TYPE	1'-6"	⊕ ⊕ ⊕
SS INDICATES SURGE SUPPRESSION TYPE OUTLET(S)		⊕ ⊕ SS
GROUND FAULT PROTECTED DUPLEX WITH WEATHER-PROOF "WHILE IN USE" TYPE DIE-CAST METAL COVER/PLATE WITH LOCKABLE ENCLOSURE AT OUTLET - SEE SPECIFICATIONS	2'-2"	⊕ ⊕ WP
DUPLEX FOR ELECTRIC WATER COOLER, COORDINATE EXACT LOCATION WITH PLUMBING CONTRACTOR TO CONCEAL OUTLET BEHIND COOLER, PROVIDE READILY ACCESSIBLE GFI DEVICE AT 18" ADJACENT TO WATER COOLER		⊕ ⊕ WWC
BOX ON ANY DEVICE INDICATES SURFACE MOUNTED BACKBOX/REMOLD		⊕ ⊕
CIRCLE ON ANY DEVICE INDICATES DEVICE FED FROM STUB UP CONDUIT		⊕ ⊕
<b>PANEL FURNITURE</b>		
PANEL FURNITURE DUPLEX RECEPTACLE, PROVIDE ALL WIRING AS REQUIRED, COORDINATE EXACT INSTALLATION REQUIREMENTS AND LOCATIONS WITH OWNERS PANEL FURNITURE VENDOR		⊕ ⊕
PANEL FURNITURE DATA/VOICE OUTLET, PROVIDE ALL WIRING AS REQUIRED, COORDINATE EXACT INSTALLATION REQUIREMENTS AND LOCATIONS WITH OWNERS PANEL FURNITURE VENDOR		⊕ ⊕
POWER CONNECTION TO PANEL FURNITURE, PROVIDE SEAL-TIGHT CONDUIT CONNECTION FROM RECESSED WALL BOX TO PANEL FURNITURE, PROVIDE FINAL CONNECTIONS TO PANEL FURNITURE AS REQUIRED BY PANEL FURNITURE VENDOR	1'-6"	⊕ ⊕
COMBINATION POWER AND LOW VOLTAGE CONNECTION TO PANEL FURNITURE, PROVIDE SEAL-TIGHT CONDUIT CONNECTION FROM RECESSED WALL BOX TO PANEL FURNITURE, PROVIDE FINAL CONNECTIONS TO PANEL FURNITURE AS REQUIRED BY PANEL FURNITURE VENDOR	1'-6"	⊕ ⊕
<b>LINETYPE LEGEND</b>		
_____	EXISTING	
-----	DEMOLISHED	
_____	NEW	

DESCRIPTION	MOUNTING HEIGHT	SYMBOL
<b>LIGHTING FIXTURES AND EQUIPMENT</b>		
SURFACE OR SUSPENDED CEILING FIXTURE		
RECESSED CEILING FIXTURE		
POLE MOUNTED AREA LIGHT WITH CONCRETE BASE		
LIGHTED BOLLARD WITH CONCRETE BASE		
EMERGENCY BATTERY WALL-PACK		
WALL MOUNT FIXTURE		
TRACK COMPLETE WITH POWER SUPPLIES AND FIXTURE HEADS		
FLOODLIGHT		
EXIT LIGHT (CEILING, END, WALL MOUNT) WITH OR WITHOUT DIRECTIONAL ARROWS, WITH OR WITHOUT EGRESS HEADS		
STRIP FIXTURE		
PARALLEL-HATCHING INDICATES LIGHT IS POWERED FROM THE EMERGENCY-LIFE SAFETY BRANCH		
REMOTE LIGHT FIXTURE DRIVER	AS NOTED	\$ RD
REMOTE BATTERY BACKUP	AS NOTED	\$ RB
CENTRAL BATTERY INVERTER	AS NOTED	\$ INV
<b>MISCELLANEOUS</b>		
CONDUIT CONCEALED IN WALLS OR IN CEILING SPACE: ARROWS INDICATE(S) HOME RUN & # OF CIRCUITS. HASHMARKS INDICATE # OF CONDUCTORS.		
NON-REVERSING MOTOR STARTER SNAP SWITCH	AS NOTED	\$ M
MOMENTARY CONTACT SWITCH	46"	\$ MC
HAND-OFF-AUTO 2-POSITION SWITCH	46"	\$ HOA
DISCONNECT SWITCH	5'-0"	\$ D
MAGNETIC STARTER	5'-0"	\$ MS
MAGNETIC COMBINATION STARTER	5'-0"	\$ MCS
VARIABLE FREQUENCY DRIVE	5'-0"	\$ VF
ENCLOSED FLUSH MTD. CIRCUIT BREAKER	5'-0"	\$ CB
MUSHROOM SWITCH	46"	\$ MS
PUSHBUTTON STATION WITH 1, 2, OR 3 BUTTONS.	46"	\$ PB
PANELBOARD, SURFACE OR FLUSH MOUNTED, HATCHING INDICATES EMERGENCY	6'-6" TO TOP	\$ PB
TRANSFORMER	AS NOTED	\$ TR
EQUIPMENT HARDWARE CONNECTION (SEE DETAIL)		
KITCHEN EQUIPMENT OUTLET COUPLING CONNECTION (SEE DETAIL)		
MOTOR CONNECTION, REFER TO EQUIPMENT CONNECTION SCHEDULE		
PLUMBING FIXTURE SOLENOID VALVE/ELECTRIC EYE SENSOR CONNECTION, COORDINATE EXACT CONNECTION REQUIREMENTS WITH MANUFACTURER.		
PLUMBING FIXTURE ELECTRIC EYE TRANSFORMER CONNECTION TRANSFORMER SHALL BE 120V-24V, MOUNT ABOVE SUSPENDED ACCESSIBLE CEILING IN J-BOX, PROVIDE ADDITIONAL TRANSFORMERS OF SAME TYPE AS IF NEEDED		
PROVIDE CONNECTION TO HAND DRYER (SEE ARCHITECTURAL SPECIFICATIONS)	VERIFY WITH ARCHITECT	
SURGE PROTECTION DEVICE (SURFACE OR FLUSH MOUNTED)		\$ SPD
GENERATOR ANNUNCIATOR PANEL (SURFACE OR FLUSH MOUNTED) - SEE SPECIFICATIONS	46"	\$ GENA
CONDUIT UP		
CONDUIT DOWN		
FLEXIBLE CONDUIT		
GROUND BUS BAR ON INSULATED STANDOFFS	2'-0"	
BUS DUCT, AMPERAGES AS NOTED	AS SHOWN	
WIREWAY WITH REMOVABLE COVER (SIZE AS NOTED)	AS SHOWN	
TRENCH DUCT (SIZE AS NOTED)	AS SHOWN	
WIRE BASKET CABLE TRAY, SIZE AS NOTED	AS SHOWN	
LADDER CABLE TRAY, SIZE AS NOTED	AS SHOWN	
SOLID BOTTOM CABLE TRAY, SIZE AS NOTED	AS SHOWN	
J-HOOK PATHWAY		
EQUIPMENT TAG, REFER TO EQUIPMENT SCHEDULE		\$ EQUIP-#
MECHANICAL EQUIPMENT DESIGNATOR (SEE MECH. SCHEDULES)		\$ EQUIP-#
TAGGED NOTE		
REVISION TAG		

DESCRIPTION	MOUNTING HEIGHT	SYMBOL
<b>ABBREVIATIONS</b>		
UNLESS OTHERWISE NOTED		UON
OWNER FURNISHED CONTRACTOR INSTALLED		OFCI
OWNER FURNISHED OWNER INSTALLED		OFUI
CONTRACTOR FURNISHED CONTRACTOR INSTALLED		CFCI
CONTRACTOR FURNISHED OWNER INSTALLED		CFUI
INDICATES EMERGENCY POWER		EM
WIREGUARD - PROVIDE MANUFACTURER'S SPECIFIC GUARD FOR DEVICE NOTED		WG
WEATHERPROOF - NEMA-3R, WET LOCATION LISTED, PROVIDE COVERS, RATINGS, ETC. AS SUITABLE FOR OUTDOORS.		WP
EXPLOSION PROOF - PROVIDE WIRING METHODS, ENCLOSURES, RATINGS, ETC. AS SUITABLE FOR HAZARDOUS LOCATION.		XP
<b>SPECIAL OUTLETS</b>		
FLOORBOX, AS SCHEDULED	FLOOR	F <sup>FB</sup>
POKE-THRU, AS SCHEDULED	FLOOR	F <sup>P</sup>
WALLBOX, AS SCHEDULED	WALL	F <sup>WB</sup>
AUDIOVISUAL SYSTEM OUTLET WITH DUPLEX RECEPTACLE, REFER TO ASSOCIATED DETAIL FOR ADDITIONAL INFORMATION	1'-6"	AV
COMBINATION POWER AND DATA OUTLET LOCATION, REFER TO ASSOCIATED DETAIL FOR ADDITIONAL INFORMATION	1'-6"	
COMBINATION POWER AND DATA OUTLET LOCATION, GFCI DUPLEX RECEPTACLE, REFER TO ASSOCIATED DETAIL FOR ADDITIONAL INFORMATION	1'-6"	
OVERHEAD PROJECTOR, PROVIDE DUPLEX RECEPTACLE, ONE DATA, HDMI, 3.5mm AUDIO, AND VGA OUTLET ON (3) PLATES	CLG	
SPECIAL VIDEO SYSTEM SIGNAL INPUT		-NA-
SURFACE PLUG-MOLD		
SURFACE WIRE-MOLD		
POWER POLE AS NOTED		PP
<b>TELEVISION</b>		
TELEVISION HEADEND (SPLITTERS/AMPLIFIERS/DISTRIBUTION)	46"	T <sup>V</sup>
TELEVISION SYSTEM OUTLET WITH DUPLEX RECEPTACLE, COORDINATE LOCATION WITH WALL BRACKET WHERE APPLICABLE	7'-0"	T
<b>OVERHEAD PAGING</b>		
PAGING SPEAKER: CEILING	CLG	\$ P
PAGING SPEAKER W/ VOLUME CONTROL	CLG	\$ PV
PAGING SPEAKER: WALL	8'-0"	\$ P
RECESSED WALL MOUNTED PAGING SPEAKER DUKANE 5A606 SPEAKER ATLAS 417-8WD	8'-0"	\$ P
VANDAL PROOF / WEATHERPROOF WALL MOUNTED PAGING SPEAKER, QUAM VP1	SEE FLOOR PLANS	\$ VP
EXTERIOR VANDAL PROOF / WEATHERPROOF WALL MOUNTED PAGING SPEAKER, SHALL BE PAINTED COLOR SELECTED BY ARCHITECT/OWNER, QUAM VP6	SEE FLOOR PLANS	\$ VP
WALL MOUNTED PAGING HORN	9'-0"	\$ P
CALL INITIATION STATION	46"	\$ P
WALL VOLUME CONTROL	46"	\$ P
PAGING MICROPHONE	1'-6"	\$ P
PANIC BUTTON (MOUNTING PER DRAWINGS)	46" UNDER DESK	\$ P
NOTIFICATION LIGHT (MOUNTING PER DRAWINGS)	7'-6", CLG	\$ P
LCD WALL DISPLAY		LCD
PAGING SYSTEM HEADEND	46"	PA
<b>CLOCKS</b>		
TYPICAL CLOCK MOUNTING HEIGHTS: FOR CEILING HEIGHTS < 9'-8": MOUNT CENTER OF BACKBOX AT 8" BELOW CEILING. FOR CEILING HEIGHTS >= 9'-8": MOUNT CENTER OF BACKBOX AT 9'-0" AFF.		
ANALOG CLOCK: SINGLE FACE	SEE ABOVE	
ANALOG CLOCK: DUAL FACE	SEE ABOVE	
DIGITAL CLOCK: SINGLE FACE	SEE ABOVE	
DIGITAL CLOCK: DUAL FACE	SEE ABOVE	
CLOCK SYSTEM HEAD END	84"	ELOCK
<b>AV SYSTEMS</b>		
PROJECTOR WITH MOUNT (CEILING OR WALL AS INDICATED)	REFER TO DRAWINGS	
LOCAL SOUND SPEAKER: CEILING	CLG	\$ S
WIRELESS MICROPHONE ANTENNA	CLG	\$ S
LOCAL SOUND SPEAKER: WALL	REFER TO SPECS.	\$ S
MICROPHONE INPUT: INDICATES NUMBER OF INPUTS.	1'-6"	\$ M
WIRELESS MICROPHONE ANTENNA, WALL MOUNT	REFER TO SPECS.	\$ S
AV INPUT (OR OUTPUT) WALL PLATE, REFER TO DRAWINGS AND SPECIFICATIONS FOR TYPE AND QUANTITY OF CONNECTIONS.	1'-6"	\$ I
BLUETOOTH INPUT MODULE	1'-6"	\$ BT
AV TOUCHSCREEN CONTROL STATION	46"	\$ S
LOCAL SOUND SYSTEM HEADEND	REFER TO SPECS.	\$ S

DESCRIPTION	MOUNTING HEIGHT	SYMBOL
<b>SECURITY PANIC ALARM</b>		
PANIC ALARM BUTTON		
PANIC ALARM ANNUNCIATOR	46"	
PANIC ALARM STROBE - REFER TO SPECIFICATIONS FOR LENS AND HOUSING COLOR	SAME AS FIRE ALARM	
PANIC ALARM POWER SUPPLY CABINET	5'-0"	SECP
<b>SECURITY INTERCOM</b>		
AUDIO/VIDEO INTERCOM STATION: MASTER WITH SELECTIVE DOOR CONTROLS, POWER SUPPLIES & DOOR RELAY CONTACTS AS REQUIRED FOR OPERATION OF ANY DOOR IN THE SYSTEM AND VIEWING OF ANY AUDIO/VIDEO INTERCOM REMOTE ON THE SYSTEM. AIPHONE#IX-MV W/DESK STAND - COLOR BY ARCHITECT.	DESK MOUNT	
AUDIO/VIDEO INTERCOM STATION: REMOTE WITH FLUSH-MTD S.S. ENCLOSURE. AIPHONE #IX-DVF.	46"	
<b>SECURITY ACCESS CONTROL</b>		
DOOR ALARM	DOOR FRAME	
DOOR POSITION SWITCH	DOOR FRAME	
MAGNETIC LOCK(S)	ABV DOOR	
ELECTRIC LOCKSET	AT LATCH	
DOOR DELAYED EGRESS/ELECTRIFIED PANIC MECHANISM	ABV DOOR	
ELECTRIC STRIKE	AT LATCH	
AUTOMATIC DOOR CONNECTION, MAY ALSO HAVE ELECTRIC STRIKE/MAG-LOCK/ELECTRIFIED PANIC CONNECTION - (SEE ARCHITECTURAL HARDWARE SPECIFICATIONS)	CLG	
DOOR RELEASE PUSH-PLATE / INFRARED OPERATOR STATION, PROVIDE ANY ADDITIONAL ROUGH-IN FOR 'EMERGENCY RELEASE' OPERATOR STATIONS AS REQUIRED.	46"	
DOOR RELEASE KEYSWITCH STATION	6'-0"	
DOOR RELEASE KEYPAD STATION	46"	
DOOR RELEASE PROXIMITY READER STATION, PROVIDE ANY ADDITIONAL ROUGH-IN FOR 'EMERGENCY RELEASE' OPERATOR STATIONS AS REQUIRED.	46"	
SAME AS "PR" EXCEPT MULLION MOUNT	46"	
MOTION SENSOR DOOR CONTROL	CLG	
PUSH-TO-EXIT BUTTON	46"	
REMOTE DOOR RELEASE PUSH-BUTTON	8" ACT	
RECESSED JUNCTION BOX	SEE DRAWINGS	
ACCESS CONTROL HEADEND	5'-0"	SECA
<b>SECURITY CCTV VIDEO SURVEILLANCE</b>		
CCTV CAMERA: CEILING MOUNT DOME (TEXT INDICATES TYPE) REFER TO SCHEDULE FOR TYPES	CLG	
CCTV CAMERA: WALL MOUNT DOME (TEXT INDICATES TYPE) REFER TO SCHEDULE FOR TYPES	WALL	
INDICATES EXTERIOR CAMERA RATED FOR CONDITIONS, WET LOCATION LISTED, WITH AUXILIARY HEATER		WP
INDICATES CAMERA WITH PAN/TILT/ZOOM FUNCTION		PTZ
CCTV HEAD END	SEE DRAWINGS	SECC
<b>SECURITY INTRUSION DETECTION</b>		
MOTION DETECTOR (WALL OR CEILING MOUNT)	CLG	
GLASS BREAK SENSOR (WALL OR CEILING MOUNT)	CLG	
LOCAL SOUNDER	SEE DRAWINGS	
INTRUSION DETECTION KEYPAD CONTROLLER	46"	
SECURITY SYSTEM HEAD END	5'-0"	SECS
<b>DATA / VOICE</b>		
DATA OUTLET - NUMBER BESIDE OUTLET INDICATES NUMBER OF DATA JACKS, NO NUMBER INDICATES 1 JACK.	1'-6"	2D
VOICE OUTLET - NUMBER BESIDE OUTLET INDICATES NUMBER OF VOICE JACKS, NO NUMBER INDICATES 1 JACK.	1'-6"	2D/V
COMBINATION OUTLET - NUMBER BESIDE OUTLET INDICATES NUMBER OF DATA/VOICE JACKS	1'-6"	2D/V
SLASH THROUGH ANY DEVICE INDICATES MOUNTING ABOVE COUNTERTOP 4" ABOVE BACKSPASH		
OUTLET (VOICE ONLY) - PAYPHONE TYPE	AS REQ'D.	PAY
DATA RACK, TWO POST. REFER TO COMMUNICATIONS RISERS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.		
DATA RACK, FOUR POST. REFER TO COMMUNICATIONS RISERS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.		
TELECOMMUNICATIONS SYSTEM BACKBOARD, PROVIDE 80"x 34" D FIRE-RETARDANT PLYWOOD BACKBOARD WITH TWO (2) COATS OF NON-CONDUCTIVE, FIRE-RETARDANT LIGHT GRAY PAINT, #30 TO GROUND BAR AT MAIN SERVICE SWITCHBOARD, 3/4" PT GROUND BAR AND A 6"x 6" #4 AWG PISTAL AT BACKBOARD, INSTALL BOARD AT 2" AFF. (LENGTH OF BOARD AS INDICATED ON FLOOR PLAN)		
WIRELESS ACCESS POINT OUTLET WITH PROVISIONS FOR (2) DATA OUTLET FOR ANTENNA, PROVIDE A COMPLETE DATA OUTLET WITH FACEPLATE ABOVE CEILING, MOUNTED AT AN ACCESSIBLE HEIGHT NO MORE THAN 24" ABOVE CEILING, AT EACH OUTLET, PROVIDE A 20' COIL OF CABLE AHEAD OF THE OUTLET FOR ADJUSTMENT OF FINAL OUTLET LOCATION. THE CONTRACTOR SHALL COORDINATE EXACT LOCATIONS WITH THE OWNER AND ADJUST OUTLET LOCATIONS AT SUBSTANTIAL COMPLETION TO ACCOMMODATE OWNER'S WAP LOCATIONS.	CEILING	WAP

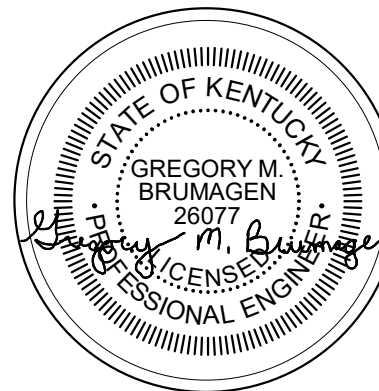


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ELECTRICAL LEGEND  
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UNIVERSITY OF KENTUCKY  
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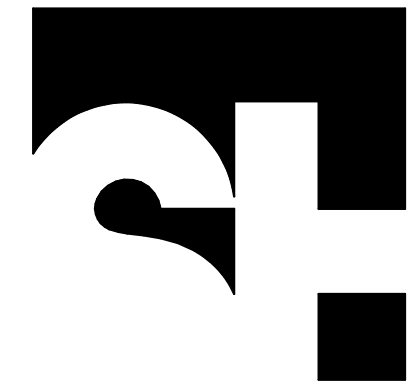
ELEVATOR MODERNIZATION - EARLY PROCUREMENT

## ELECTRICAL GENERAL NOTES

- A EACH CONTRACTOR, PROPOSER, SUPPLIER AND/OR MANUFACTURER SHALL REFER TO ALL DOCUMENTS PERTAINING TO THIS PROJECT AND COORDINATE ACCORDINGLY SO AS TO ENSURE ADEQUACY OF FIT, COMPLIANCE WITH SPECIFICATIONS, PROPER VOLTAGE AND CURRENT CHARACTERISTICS TO AVOID CONFLICT WITH ANY OTHER BUILDINGS SYSTEMS. VERIFY SAME WITH SHOP DRAWINGS.
- B ADDITIONAL ELECTRICAL REQUIREMENTS MAY BE SHOWN ON PLANS FROM OTHER DISCIPLINES IN THIS SET. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW ALL PLANS AND SPECIFICATIONS FOR A COMPLETE UNDERSTANDING OF THE PROJECT REQUIREMENTS.
- C WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ALL LOCAL, STATE, AND NATIONAL CODES. INCLUDING BUT NOT LIMITED TO NFPA 70 (NEC), NFPA 72, INTERNATIONAL BUILDING CODES, ETC.
- D CONTRACTOR SHALL FOLLOW SEISMIC RESTRAINT AND DESIGN REQUIREMENTS CONTAINED IN LATEST ADOPTED STATE AND INTERNATIONAL BUILDING CODES, WITH ALL AMENDMENTS AS ADOPTED BY THE CURRENT LEGISLATION. REFER TO ELECTRICAL AND STRUCTURAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- E ALL OFFSETS, TURNS, FITTINGS, TRIM, DETAIL, ETC. MAY NOT BE INDICATED, BUT SHALL BE PROVIDED AS REQUIRED. ADDITIONAL ALLOWANCES SHALL BE INCLUDED FOR SAME AT EACH PROPOSER'S DISCRETION.
- F INSTALL NO PIPING, CONDUIT, DUCTWORK, ETC. IN A LOCATION OR IN A MANNER WHICH WILL ALLOW FREEZING OR THE COLLECTION OF CONDENSATION THEREON. IF IN DOUBT, CONTACT THE ENGINEER.
- G ADVISE THE ENGINEER OF ANY CONFLICTS, ERRORS, OMISSIONS, ETC. AT LEAST TEN DAYS PRIOR TO BID DATE, TO ALLOW CLARIFICATION BY WRITTEN ADDENDUM.
- H WHERE CONFLICTS ARE FOUND BETWEEN DRAWINGS, DETAILS, OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL APPLY. NOTIFY ARCHITECT OF DISCREPANCY IN WRITING.
- I DEVIATION FROM SPECIFICATIONS OR PLANS REQUIRES PRIOR WRITTEN APPROVAL FROM THE ENGINEERS AND MUST BE SUBMITTED IN WRITING NO LATER THAN TEN DAYS PRIOR TO THE BID DATE.
- J OBSERVE ALL APPLICABLE CODES, RULES AND REGULATIONS THAT MAY APPLY TO THE WORK UNDER THIS CONTRACT. (CITY, COUNTY, LOCAL, STATE, FEDERAL, MUNICIPALITY, UTILITY COMPANY, OSHA, ETC.).
- K MOUNTING HEIGHTS FOR WALL MOUNTED DEVICES INDICATED ABOVE FINISHED FLOOR ARE TO CENTER OF DEVICE UON. MOUNTING HEIGHTS TO CEILING SUSPENDED DEVICES ARE TO BOTTOM OF DEVICE UON.
- L INSTALL EQUIPMENT, MATERIALS, ETC. IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND DIRECTIONS. IF IN CONFLICT WITH THE DESIGN INDICATED IN CONTRACT DOCUMENTS, ADVISE THE ENGINEER PRIOR TO INSTALLATION FOR CLARIFICATION.
- M DO NOT RECESS PANELBOARD TUBS OR OTHER FLUSH-MOUNTED EQUIPMENT IN WALLS THAT HAVE A FIRE RATING. NO INSTALLATION SHALL DIMINISH OR VOID FIRE RESISTIVE RATINGS IN ANYWAY.
- N THE PURPOSE AND INTENT OF ALL OF THE DOCUMENTS PERTAINING TO THIS PROJECT IS TO PROVIDE A COMPLETE, FUNCTIONAL, SAFE, LIKE-NEW FACILITY. ANYTHING LESS SHALL BE UNACCEPTABLE.
- O ALL SYSTEMS, EQUIPMENT AND MATERIALS ARE TO BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. WORK NOT MEETING THIS CRITERION SHALL BE REMOVED AND REINSTALLED SATISFACTORILY. FINAL DETERMINATION OF THE ACCEPTABILITY OF THE QUALITY OF WORK RESIDES WITH THE ENGINEER.
- P ALL WORK, MATERIALS, EQUIPMENT, ETC. SHALL BE FULLY GUARANTEED FOR ONE FULL CALENDAR YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION AS DOCUMENTED BY THE ENGINEER, UNLESS LONGER WARRANTY PERIODS FOR EQUIPMENT ARE SPECIFIED.
- Q UNLESS OTHERWISE SPECIFIED OR INDICATED, ALL EQUIPMENT AND/OR MATERIALS WITHIN OCCUPIED SPACES OR EXPOSED TO VIEW ON THE BUILDING EXTERIOR SHALL BE PRIMED AND FINISHED SO AS TO COMPLEMENT ADJACENT SURFACE, UNLESS OTHERWISE NOTED. COORDINATE WORK AND COLORS WITH ARCHITECT.
- R WHERE PENETRATING ROOFING MEMBRANE OR OTHER MATERIALS USED FOR WEATHERPROOFING THE BUILDING, MAKE SUCH PENETRATION IN A WAY THAT WILL NOT VOID OR DIMINISH THE ROOFING WARRANTY OR INTEGRITY IN ANYWAY. COORDINATE ALL SUCH PENETRATIONS WITH THE ROOFING MANUFACTURER AND ARCHITECT.
- S THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY COMPANY FEES, CASH CONTRIBUTIONS OR OTHER COSTS THAT THE UTILITY COMPANY MAY REQUIRE TO COMPLETE THEIR WORK. (ELECTRIC, TELEPHONE, TELEVISION, DATA, ETC.).
- T COORDINATE WITH ARCHITECTURAL FLOOR PLANS, ELEVATIONS AND CASEWORK DETAILS FOR LOCATION OF ADDITIONAL RECEPTACLES, UTILITY OUTLETS, ELECTRICAL DEVICES, ETC.
- U CEILING-MOUNTED ELECTRICAL DEVICES SHALL BE CENTERED IN 2'X2' CEILING TILE AND INSTALLED CENTERED ON 2' DIMENSION OF 2'X4' TILE AND ON CENTERLINE OR A QUARTER POINT ON 4' DIMENSION.
- V ANY VIBRATING, OSCILLATING OR OTHER NOISE OR MOTION PRODUCING EQUIPMENT SHALL BE ISOLATED FROM SURROUNDING SYSTEMS IN AN APPROVED MANNER. NOISY OR STRUCTURALLY DAMAGING INSTALLATIONS SHALL BE SATISFACTORILY REPLACED OR REPAIRED AT THE INSTALLING CONTRACTORS' EXPENSE. THE FINAL DECISION ON THE SUITABILITY OF A PARTICULAR INSTALLATION'S ACCEPTABILITY SHALL BE THAT OF THE ENGINEER.
- W CHECK ALL THREE PHASE MOTORS WITH A PHASE ROTATION METER, PRIOR TO PLACING IN SERVICE.
- X PROVIDE DETAILED SHOP DRAWINGS TO ENGINEER PRIOR TO PURCHASING OR INSTALLING ANY EQUIPMENT
- Y DEVIATIONS IN SIZES, CAPACITIES, FIT, FINISH, ETC. FOR EQUIPMENT FROM THAT PRIME SPECIFIED SHALL BE THE RESPONSIBILITY OF THE PURCHASER OF THAT EQUIPMENT. ANY PROVISIONS REQUIRED TO ACCOMMODATE A DEVIATION, WHETHER APPROVED BY THE ENGINEER OR NOT, SHALL BE THE RESPONSIBILITY OF THE PURCHASER.
- Z THE CONSTRUCTION MANAGER, GENERAL CONTRACTOR, OR WHOMEVER HOLDS THE PRIME CONTRACT(S) FOR THIS CONSTRUCTION IS RESPONSIBLE FOR THE COORDINATION, APPEARANCE, SCHEDULING AND TIMELINESS OF THE WORK OF ALL TRADES, CONTRACTORS, SUPPLIERS, INSTALLERS, ETC. POOR OR UNTIMELY WORK ON THE PART OF ANY SUBCONTRACTOR SHALL BE RESOLVED BY THE PARTY WHO ENGAGED THEM ON THIS PROJECT.
- AA WHERE MOUNTING HEIGHTS ARE NOT INDICATED OR ARE IN CONFLICT WITH ANY OTHER BUILDING SYSTEM, CONTACT THE ENGINEER BEFORE AFFECTING INSTALLATION. REFER ALSO TO ARCHITECTURAL INTERIOR AND EXTERIOR ELEVATIONS, CEILING HEIGHTS AND OTHER DETAILS OF THESE DOCUMENTS, AS APPLICABLE.
- AB WHERE FIRE-RATED CEILING ASSEMBLIES ARE NOTED, PROVIDE UL-LISTED FIRE-RATED GYPSUM BOARD OR PRE-MANUFACTURED ENCLOSURES ABOVE LUMINAIRES, CEILING DEVICES, ETC. IN OR ON CEILING, AS REQUIRED TO MAINTAIN CEILING RATINGS.
- AC COORDINATE THE LOCATION OF DRAINS, ELECTRICAL OUTLETS, GAS OUTLETS, ETC. WITH ALL CASEWORK, KITCHEN EQUIPMENT, MECHANICAL ROOM EQUIPMENT, ETC. PRIOR TO COMMENCING INSTALLATION. WORK NOT SO COORDINATED SHALL BE REMOVED AND PROPERLY INSTALLED AT THE EXPENSE OF THE RESPONSIBLE CONTRACTOR(S).
- AD ALL ELECTRICAL COMPONENTS OR EQUIPMENT SHALL BE LISTED AND LABELED BY UNDERWRITER'S LABORATORIES OR OTHER APPROVED LISTING AGENCY. APPROVAL AND LABELING OF INDIVIDUAL COMPONENTS ON AN ASSEMBLY IS NOT ACCEPTABLE AS MEETING THIS REQUIREMENT, UNLESS WAIVED BY THE ENGINEER IN WRITING.
- AE ALL WIRING SYSTEMS SHALL BE INSTALLED WITH A MINIMUM OF SPLICES. CONDUCTORS, WHETHER SINGLE OR MULTI-PAIR, SHALL BE INSTALLED CONTINUOUS UNLESS AS POSSIBLE FROM TERMINAL POINT TO TERMINAL POINT.
- AF NO CONDUIT, SUPPORTS, ETC. SHALL BE RUN THROUGH ACCESS CLEARANCES OF EQUIPMENT BY OTHER TRADES (I.E. VAV BOXES). COORDINATE WITH ALL TRADES PRIOR TO CONSTRUCTION.
- AG ALL CONTRACTORS SHALL EXERCISE EXTREME CARE IN THE COURSE OF THEIR WORK SO AS TO ENSURE THAT THEY DO NOT INTERRUPT ANY EXISTING SERVICE OR SUB-SERVICE FOR SAFETY PURPOSES. PAY PARTICULAR ATTENTION TO THIS PRECAUTION RELATIVE TO NATURAL GAS AND ELECTRICAL LINES. VERIFY THE LOCATION, SIZE, TYPE, ETC. OF EACH UNDERGROUND OR OVERHEAD UTILITY. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL FEDERAL, STATE AND/OR LOCAL RULES, REGULATIONS, STANDARD AND SAFETY REQUIREMENTS. UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE MUNICIPALITY OR UTILITY COMPANY STANDARDS. IN ALL CASES, THE MOST STRINGENT REQUIREMENT SHALL APPLY.
- AH ALL SUPPORTS FOR EQUIPMENT, DEVICES OR FIXTURES SHALL BE UNIQUE, DIRECTLY FROM THE BUILDING STRUCTURE. DO NOT SUPPORT WORK FROM OTHER TRADES EQUIPMENT OR SUPPORTS WITHOUT WRITTEN PERMISSION FROM THE ENGINEER AND CONSENT OF THE OTHER TRADE, IN WRITING.
- AI WHERE INTERRUPTING AN EXISTING UTILITY OR SERVICE DELIBERATELY OR ACCIDENTALLY, THE RESPONSIBLE CONTRACTOR SHALL WORK CONTINUOUSLY AS NEEDED TO RESTORE SAME, PROVIDING PREMIUM TIME AS NEEDED.
- AJ REFER TO ARCHITECTURAL WALL ELEVATIONS (WHERE GIVEN) FOR HEIGHTS AND MOUNTING RELATIONSHIP OF OUTLETS AND EQUIPMENT. IF IN DOUBT, CONTACT ENGINEER FOR DIRECTION PRIOR TO ROUGH IN.
- AK FLUSH OR PEDESTAL TYPE FLOOR OUTLETS/BOXES, AS INDICATED ON PLAN, SHALL BE LOCATED BY DIMENSIONS PROVIDED BY THE ARCHITECT, UNLESS OTHERWISE SHOWN ON PLANS. IF IN DOUBT, CONTACT THE ENGINEER PRIOR TO ROUGHING-IN ANY WORK.
- AL AS APPLICABLE, REFER TO ARCHITECTURAL PHASING PLANS AND PHASING BOUNDARIES ON THESE DRAWINGS FOR SEQUENCING OF WORK, FULL EXTENT OF AREAS INVOLVED, EXTENT OF CEILING WORK, ETC. PROVIDE TEMPORARY CONNECTIONS FOR CIRCUITS AND WORK AS REQUIRED TO MAINTAIN SEQUENCE OF THE WORK FROM PHASE TO PHASE.
- AM THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR HIS WORK. ALL CUTTING AND PATCHING SHALL BE IN ACCORDANCE WITH THE ARCHITECT'S STANDARDS FOR SUCH WORK.
- AN ALL WORK SHALL BE CONCEALED UNLESS SPECIFICALLY INDICATED TO BE EXPOSED, OR REQUIRED TO BE EXPOSED. IF IN DOUBT, CONTACT THE ENGINEER FOR CLARIFICATIONS PRIOR TO INSTALLING ANY SUCH WORK.
- AO INTERRUPTION OF ANY EXISTING SERVICES SHALL BE COORDINATED WITH THE OWNER, GENERAL CONTRACTOR, UTILITY COMPANY AS NECESSARY, AND THE ARCHITECT, AT LEAST TWO WEEKS IN ADVANCE OF ANTICIPATED INTERRUPTION. A SCHEDULE FOR THESE OUTAGES SHALL BE DEVELOPED AND AGREED UPON BETWEEN THE PARTIES MENTIONED TO AVOID UNNECESSARY INCONVENIENCE TO THE OWNER OR ANY AFFECTED PARTY. NOTIFY THE UTILITY COMPANY OF ANY ANTICIPATED SERVICES REQUIRED TWO WEEKS IN ADVANCE, IN WRITING. IF UTILITY COMPANY REQUIRES A LONGER NOTIFICATION PERIOD, SO PROVIDE.
- AP WHERE BACKBOXES ARE LOCATED IN THE SAME VERTICAL CHANNEL/STUD SPACE ON OPPOSITE SIDES OF THE SAME WALL, PROVIDE SOUND-INSULATING PUTTY AROUND BOXES AS REQUIRED TO ELIMINATE SOUND TRANSMISSION FROM ROOM TO ROOM.
- AQ JUNCTION BOXES LOCATED ABOVE ACCESSIBLE CEILINGS SHALL BE LOCATED NO MORE THAN 36" ABOVE CEILING LEVEL. LABEL EACH BOX IN AREA OF WORK WITH A PERMANENT MARKER OR IN ACCORDANCE WITH SPECIFICATIONS, WHICHEVER IS MORE STRINGENT.
- AR ALL MATERIALS FURNISHED AND ALL WORK INSTALLED SHALL COMPLY WITH THE CURRENT EDITION OF THE NATIONAL ELECTRICAL CODES, NATIONAL FIRE CODES OF THE NATIONAL FIRE PROTECTION ASSOCIATION, THE REQUIREMENTS OF LOCAL UTILITY COMPANIES, AND WITH THE REQUIREMENTS OF ALL GOVERNMENTAL AGENCIES OR DEPARTMENTS HAVING JURISDICTION. IF ANY CONFLICTS OR DISCREPANCIES OCCUR THE MOST STRINGENT SHALL APPLY.
- AS DO NOT SCALE FROM DRAWINGS, AS PRINTING DISTORTS SCALE. WORK SHALL BE LAID OUT FROM DIMENSIONED DRAWINGS, OR DIMENSIONS SUPPLIED TO THE CONTRACTOR.
- AT NOISY WORK, WORK OUTSIDE CONSTRUCTION BARRIERS, WORK IN OCCUPIED AREAS, ETC. SHALL BE PERFORMED AFTER HOURS OR ON WEEKENDS. COORDINATE EXACT SCHEDULING WITH FACILITY PRIOR TO CONSTRUCTION.
- AU ALL ITEMS HAVING KEYED LOCKS/OPERATORS SHALL HAVE CORED LOCKS/OPERATORS. ALL KEYING SHALL MATCH THE OWNER'S EXISTING KEY-WAYS. COORDINATE EXACT REQUIREMENTS WITH OWNER PRIOR TO CONSTRUCTION.
- AV REFER TO ARCHITECTURAL PLANS FOR PHASING REQUIREMENTS. WORK SHALL BE COMPLETED IN PHASES PER THE PHASING PLAN AND AS COORDINATED WITH OWNER AND GENERAL CONTRACTOR. PROVIDE ALL REQUIRED INCREMENTAL INSPECTIONS, CERTIFICATIONS, ETC. AND ALL TEMPORARY SERVICES AS REQUIRED BY OWNER TO ACCOMPLISH THE PHASING PLAN.

## ELECTRICAL DEMOLITION...

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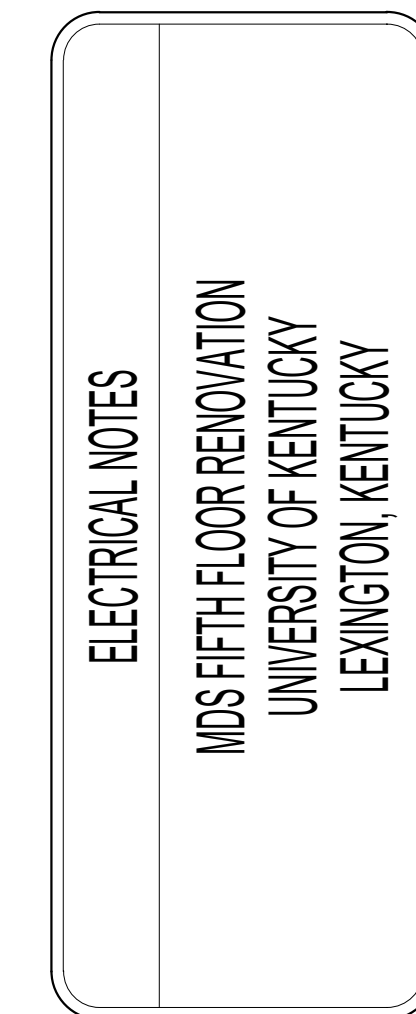
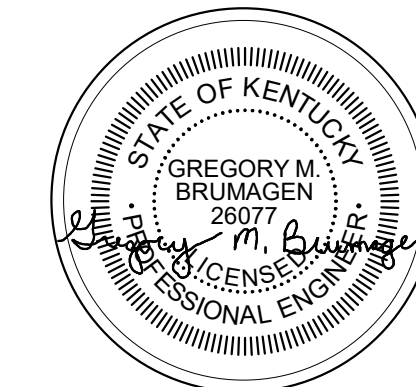
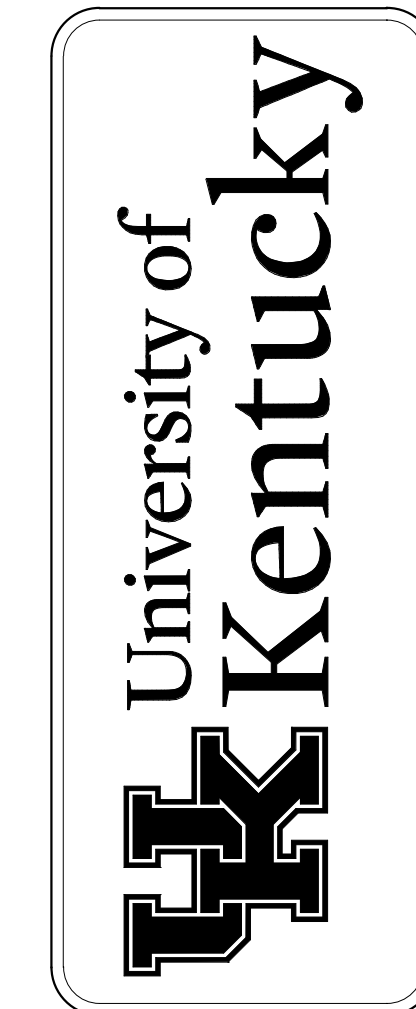
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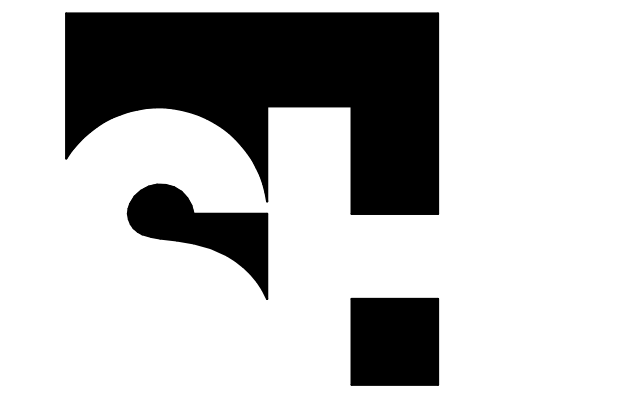


17 MARCH 2023  
UKY2205

E0.1

ELEVATOR MODERNIZATION - EARLY PROCUREMENT

TAGGED NOTES	
ED5	DEMOLISH EXISTING INDUSTRIAL STRIP FIXTURES. RETAIN THE CIRCUIT IN THE ROOM TO REFEED NEW SWITCH AND LIGHT FIXTURES. REFER TO NEW WORK PLAN FOR ADDITIONAL INFORMATION.

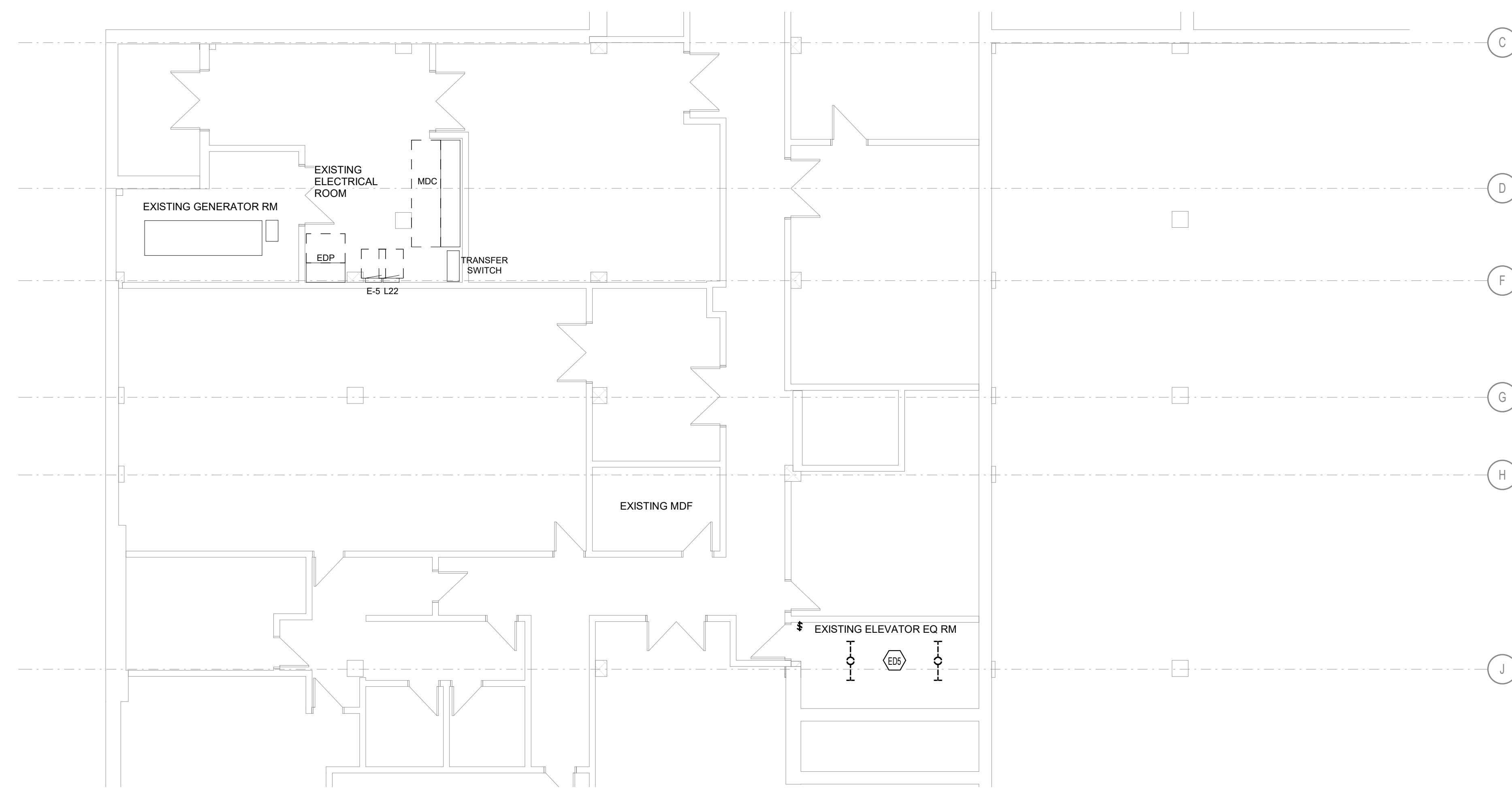


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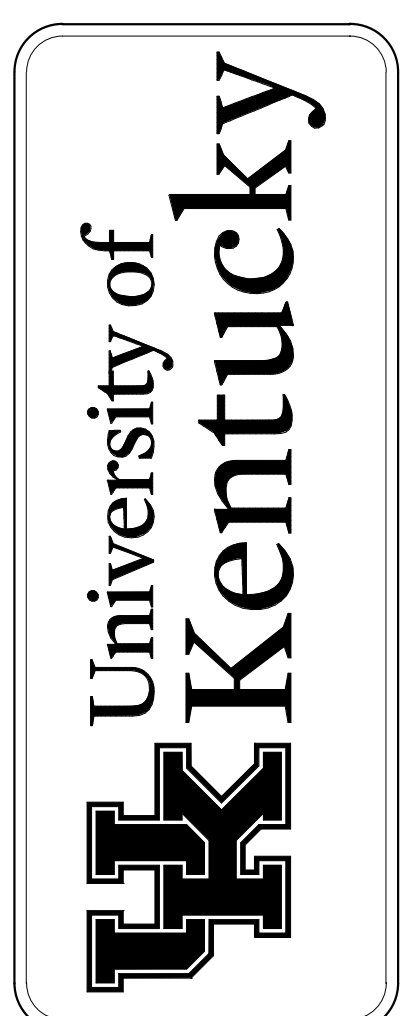
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SCALE: 1/8" = 1'-0"  
0 2' 4' 8' 16' 24' 32'

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BASEMENT-LIGHTING-DEMOLITION  
MDS FIFTH FLOOR RENOVATION  
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E1.0

ELEVATOR MODERNIZATION - EARLY PROCUREMENT

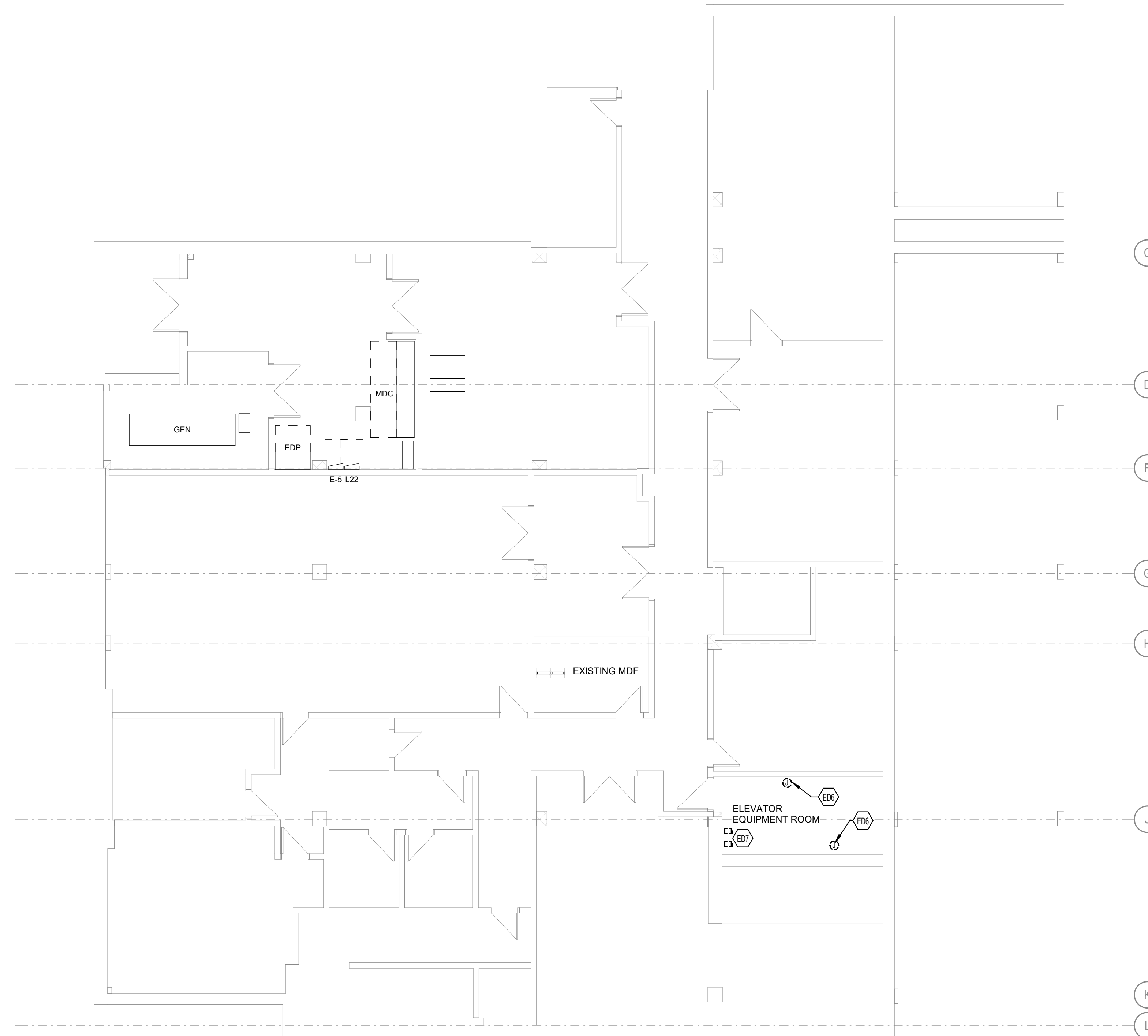
TAGGED NOTES	
ED6	CONTRACTOR TO COORDINATE DISCONNECTION OF POWER AND DATA TO ELEVATOR CONTROL PANELS WITH ELEVATOR CONTRACTOR.
ED7	DEMOLISH EXISTING DISCONNECT SWITCHES FEEDING THE ELEVATOR CONTROL PANELS. REFER TO THE ONE-LINE DIAGRAM FOR FEEDER LOCATION IN SWITCHBOARD EDP. CONTRACTOR SHALL RETAIN FEEDERS TO BE INTERCEPTED ABOVE CEILING AND EXTENDED TO NEW DISCONNECT LOCATIONS. CONTRACTOR SHALL ALSO RETAIN THE EMERGENCY GENERATOR SYSTEMS TO BE EXTENDED TO THE NEW LOCATIONS. REFER TO NEW WORK SHEET FOR ADDITIONAL INFORMATION.



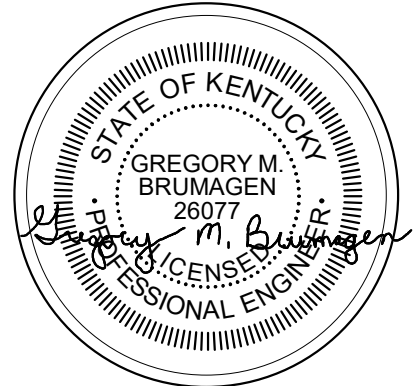
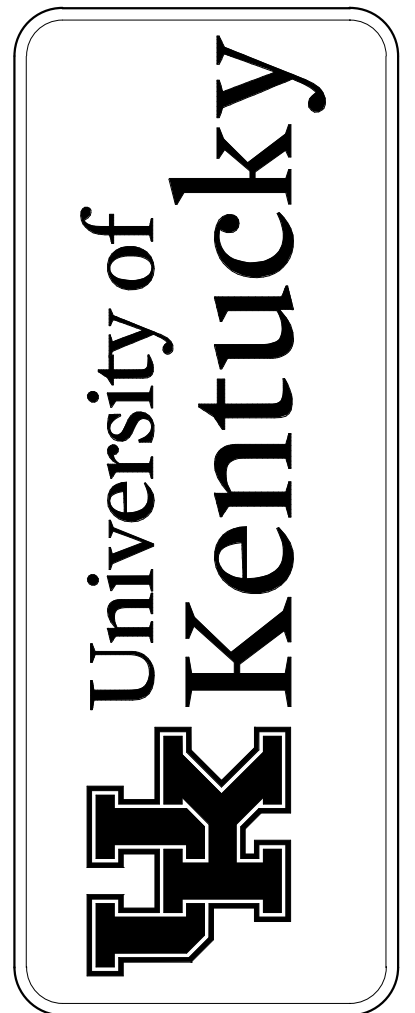
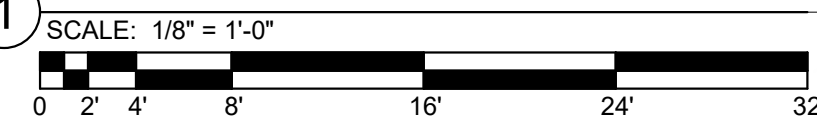
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1 BASEMENT - POWER - DEMOLITION



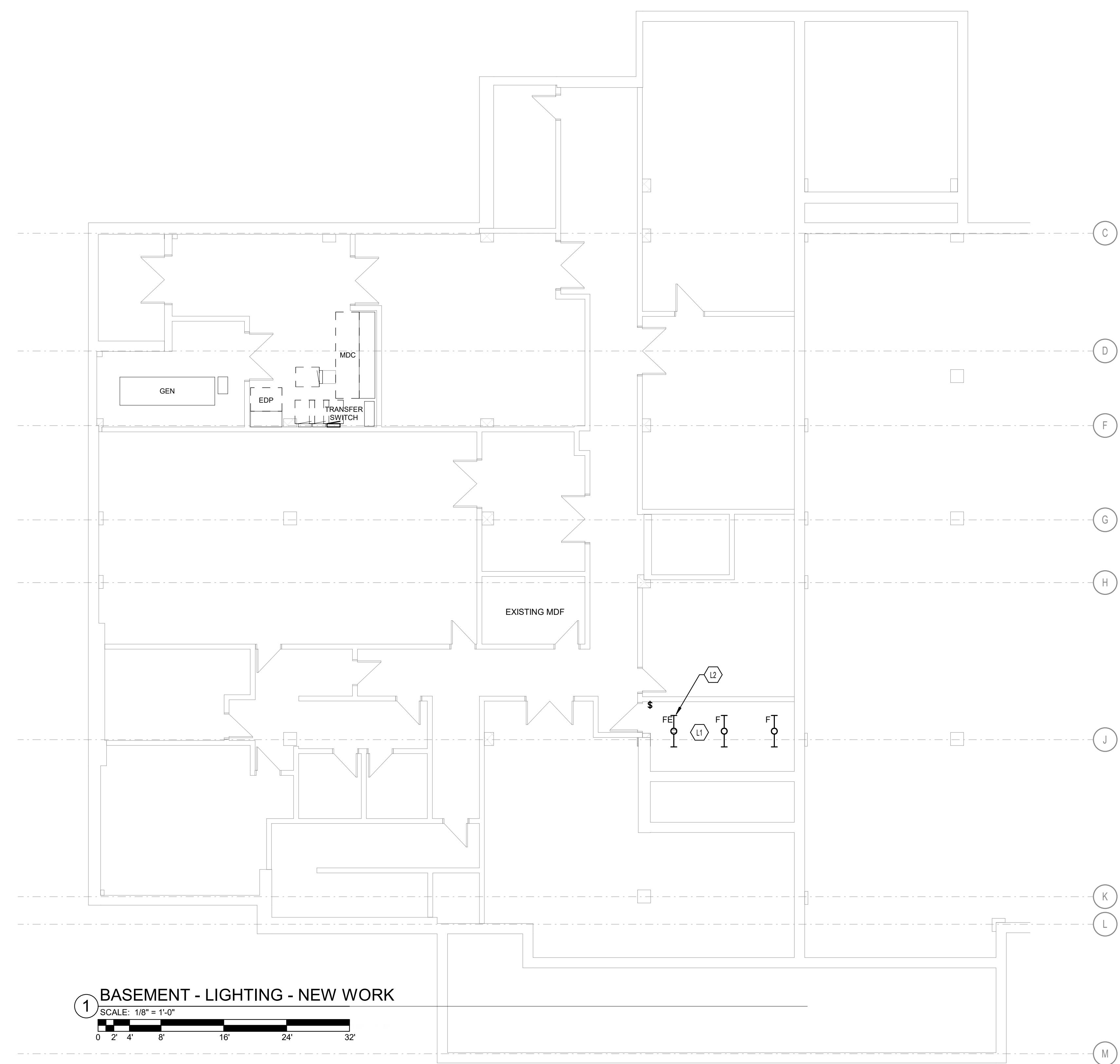
BASEMENT - POWER SYSTEMS DEMOLITION  
MDS FIFTH FLOOR RENOVATION  
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LEXINGTON, KENTUCKY

17 MARCH 2023  
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**E2.0**

ELEVATOR MODERNIZATION - EARLY PROCUREMENT

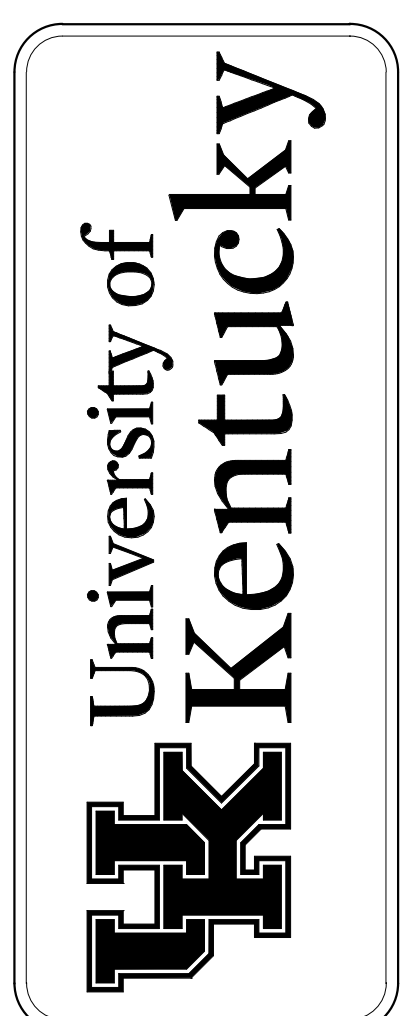
TAGGED NOTES	
L1	UTILIZE EXISTING CIRCUITS IN SPACE TO FEED NEW LIGHT FIXTURES. INSTALL NEW LIGHT SWITCH AS SHOWN ON WALL. NEW EMERGENCY FIXTURE SHALL BE FED FROM NEW PANEL 68.
L2	FIXTURE TYPE 'F1E' BASIS OF DESIGN IS LITHONIA ZL1N-L48-SMR-5000LM-FST-MVOLT-40K-90 CRI OR EQUAL. FIXTURES TO HANG AT 9'-0" AFF.



1 BASEMENT - LIGHTING - NEW WORK  
 SCALE: 1/8" = 1'-0"



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BASEMENT - LIGHTING - NEW WORK  
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 UNIVERSITY OF KENTUCKY  
 LEXINGTON, KENTUCKY



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**E3.0**

**ELEVATOR MODERNIZATION - EARLY PROCUREMENT**

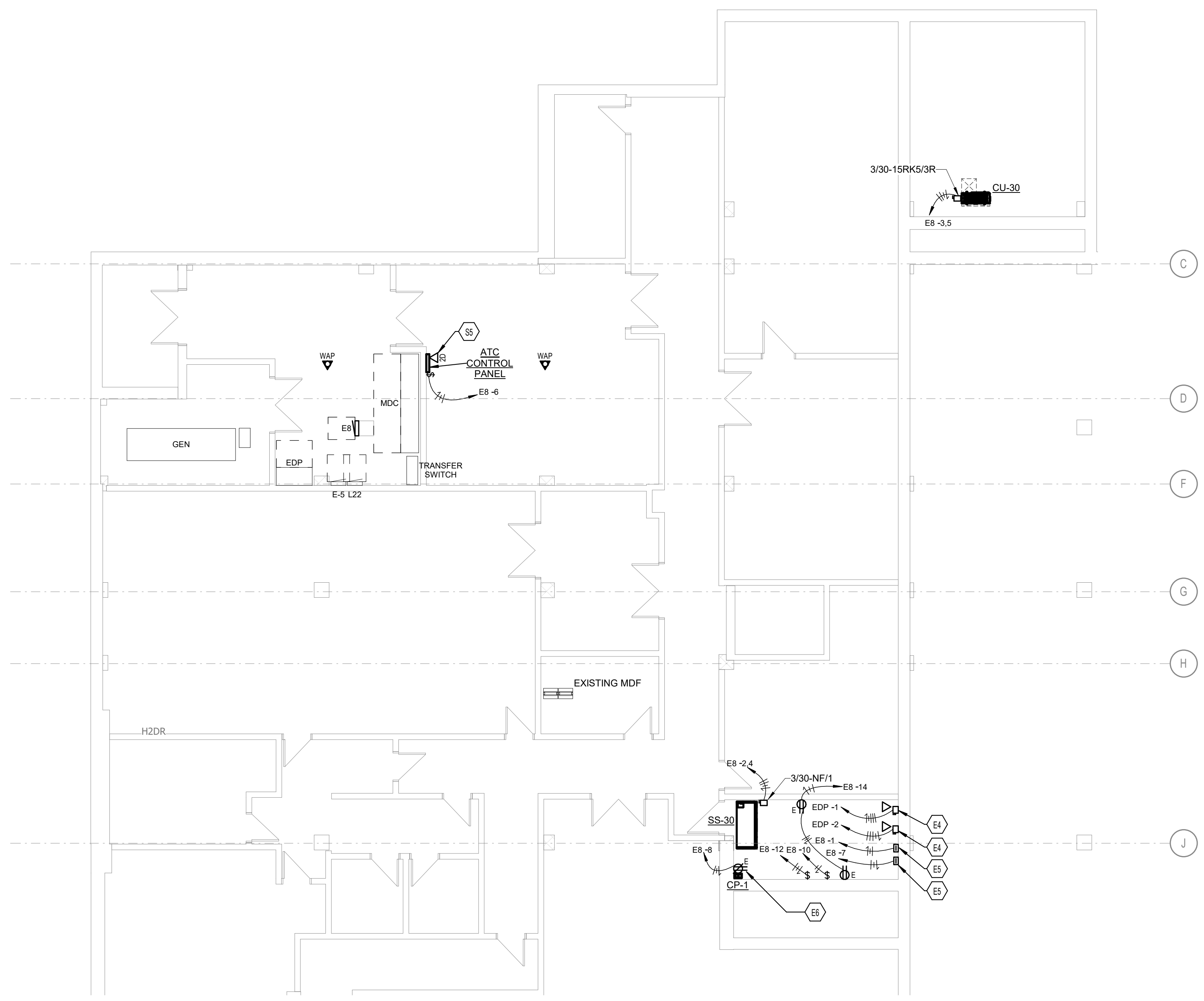


**PANELBOARD AND WIRING SCHEDULE**

NOTES	CIRCUIT DESCRIPTION	HOT, NEUT, GND	OCB	P	CKT	MOUNTING: SURFACE			CKT	P	OCB	HOT, NEUT, GND	CIRCUIT DESCRIPTION	NOTES	
						A	B	C							
	ELEVATOR LIGHTING	1-#10, 1-#10, 1-#10	20	1	1	1.0	3.5			2	2	30	2-#8, 1-#8, 1-#8	SS-30	
	CU-30	2-#12, 1-#12, 1-#12	15	2	3		0.5	3.5		4	4	20	1-#12, 1-#12, 1-#12	HVAC CONTROL PANEL	
	ELEVATOR LIGHTING	1-#10, 1-#10, 1-#10	20	1	7	1.0	0.2			8	1	20	1-#12, 1-#12, 1-#12	OP-1 RECEPTACLE	
	LTNG ELEVATOR EQUIPMENT RM	1-#12, 1-#12, 1-#12	20	1	9			0.1	0.0	10	1	20	1-#12, 1-#12, 1-#12	ELEVATOR EQUIPMENT	
	SPACE	--	--	1	11					12	1	20	1-#12, 1-#12, 1-#12	ELEVATOR EQUIPMENT	
	SPACE	--	--	1	13		0.4			14	1	20	1-#12, 1-#12, 1-#12	REC ELEV EQ ROOM	
	SPACE	--	--	1	15					16	1	--	--	SPACE	
	SPACE	--	--	1	17					18	1	--	--	SPACE	
	SPACE	--	--	1	19					20	1	--	--	SPACE	
	SPACE	--	--	1	21			0.0	0.0	22	2	30	--	SPACE	
	SPACE	--	--	2	23			0.0	0.0	24	--	--	--	SPACE	
	SPACE	--	--	20	25			0.0	0.0	26	1	20	--	SPACE	
	SPACE	--	--	20	1	27				28	1	20	--	SPACE	
	SPACE	--	--	20	1	29				30	1	20	--	SPACE	

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
EQUIP	10000 VA	100.00%	10000 VA	TOTAL CONNECTED LOAD: 10599 VA
LTNG	59 VA	100.00%	59 VA	TOTAL ESTIMATED DEMAND: 10599 VA
REC	540 VA	100.00%	540 VA	TOTAL CONNECTED CURRENT: 29 A
				TOTAL ESTIMATED DEMAND CURRENT: 29 A
				25 % ADDITIONAL CAPACITY: 7 A
				TOTAL PANEL CURRENT: 37 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.



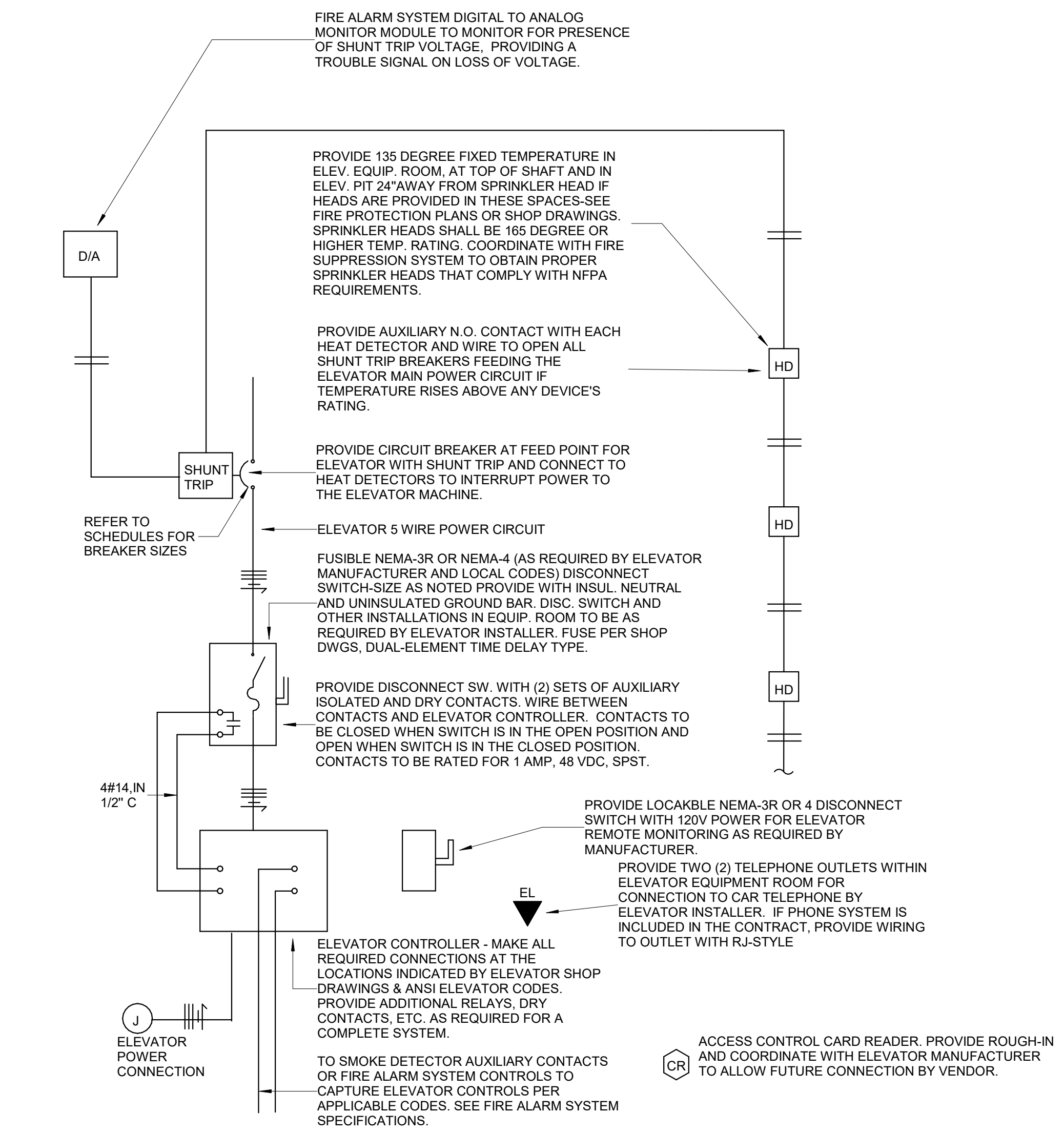
**1 BASEMENT - POWER - NEW WORK**  
SCALE: 1/8" = 1'-0"

**ELECTRICAL POWER NOTES**

- A REFER TO THE ARCHITECT'S REFLECTED CEILING PLANS, ELEVATIONS, AND CASEWORK DETAILS FOR EXACT LOCATIONS OF ALL WALL AND CEILING MOUNTED ELECTRICAL DEVICES.
- B CONTRACTOR SHALL FOLLOW BRANCH CIRCUITING LAY-OUT, AS INDICATED ON THE FLOOR PLANS, WITH A MAXIMUM OF THREE (3) BRANCH CIRCUITS PER HOMERUN. EACH BRANCH CIRCUIT SHALL BE PROVIDED WITH A DEDICATED NEUTRAL CONDUCTOR. DEDICATED NEUTRAL CONDUCTORS SHALL BE CONSIDERED CURRENT CARRYING. IF ADDITIONAL CONDUCTORS ARE RAN IN THE SAME CONDUIT WITH THOSE INDICATED, CONTRACTOR SHALL DEBATE ALL CURRENT CARRYING CONDUCTORS PER NEC 310.15(B)(3), AND UPSIZE CONDUIT AS REQUIRED PER NEC 300.17 AND ANNEX C. MULTIWIRED BRANCH CIRCUITS AS DEFINED IN NEC 100 / 210.4 (CIRCUITS SHARING A COMMON NEUTRAL CONDUCTOR) SHALL NOT BE PERMITTED.
- C IDENTIFY THE PANEL AND CIRCUIT NUMBER FOR ALL RECEPTACLES, SWITCHES, ETC. IN AREA OF CONSTRUCTION. PROVIDE CLEAR ADHESIVE LABELS WITH BLACK LETTERING. IN HEALTHCARE FACILITIES, ENGRAVE EMERGENCY DEVICE COVERPLATES IN PATIENT CARE AREAS. MARK INSIDES OF ALL DEVICE BOXES WITH PANEL AND CIRCUIT NUMBER.
- D RECEPTACLES THAT ARE CONTROLLED BY AN AUTOMATIC MEANS SUCH AS OCCUPANCY SENSOR OR ENERGY MANAGEMENT SYSTEM SHALL BE MARKED IN ACCORDANCE WITH NEC 406.3(E).
- E LOCATIONS OF ELECTRICAL CONNECTIONS AND LOCAL DISCONNECTS SHALL BE COORDINATED WITH MECHANICAL AND PLUMBING CONTRACTORS TO ENSURE ACCESS AND WORKING CLEARANCE IS MAINTAINED PER NEC. NOTIFY OTHER TRADES OF REQUIRED CLEARANCE AREAS TO AVOID ROUTING OF OTHER SYSTEMS IN THESE AREAS. DO NOT INSTALL ELECTRICAL EQUIPMENT OVER EQUIPMENT NAMEPLATES OR ACCESS PANELS OR THROUGH ACCESS/MAINTENANCE CLEARANCES OF EQUIPMENT BY OTHER TRADES.

**TAGGED NOTES**

#	NOTE
E4	POWER FOR ELEVATOR CONNECTION. EXTEND WIRING TO CONTROL CABINET/MOTOR PER MANUFACTURERS RECOMMENDATIONS. COORDINATE FUSE SIZE WITH APPROVED SUBMITTALS. REFER TO ELEVATOR POWER WIRING DIAGRAM FOR ADDITIONAL INFORMATION.
E5	POWER FOR ELEVATOR CAB LIGHTING AND NPOWER. EXTEND WIRING TO CAB PER MANUFACTURERS RECOMMENDATIONS. COORDINATE FUSE SIZE WITH APPROVED SUBMITTALS. REFER TO ELEVATOR POWER WIRING DIAGRAM FOR ADDITIONAL INFORMATION.
E6	COORDINATE RECEPTACLE LOCATION WITH PUMP ROUGHLY 5'-0" AFF PRIOR TO ROUGH IN.
S5	COORDINATE DATA CONNECTION WITH BUILDING CONTROLS PANEL PRIOR TO ROUGH IN.

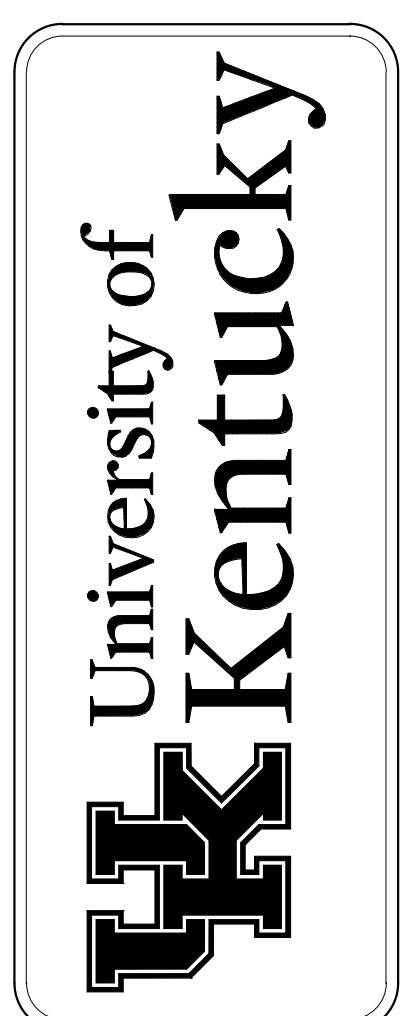


**2 ELEVATOR POWER WIRING DIAGRAM**  
SCALE: NONE



**STENGEN HILL ARCHITECTURE**

501 EAST HIGH STREET  
LEXINGTON, KENTUCKY 40502  
859.402.8008  
502.893.1876 fax

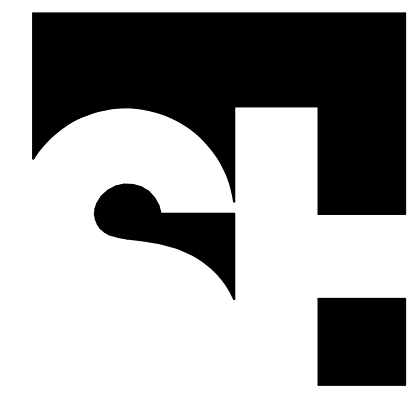


BASEMENT - POWER - NEW WORK  
MDS FIFTH FLOOR RENOVATION  
UNIVERSITY OF KENTUCKY  
LEXINGTON, KENTUCKY

17 MARCH 2023  
UKY2205

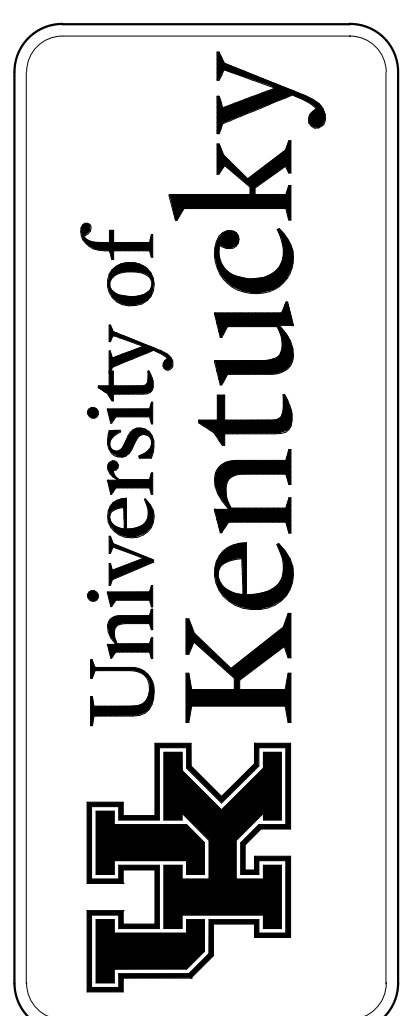
**E4.0**

**ELEVATOR MODERNIZATION - EARLY PROCUREMENT**



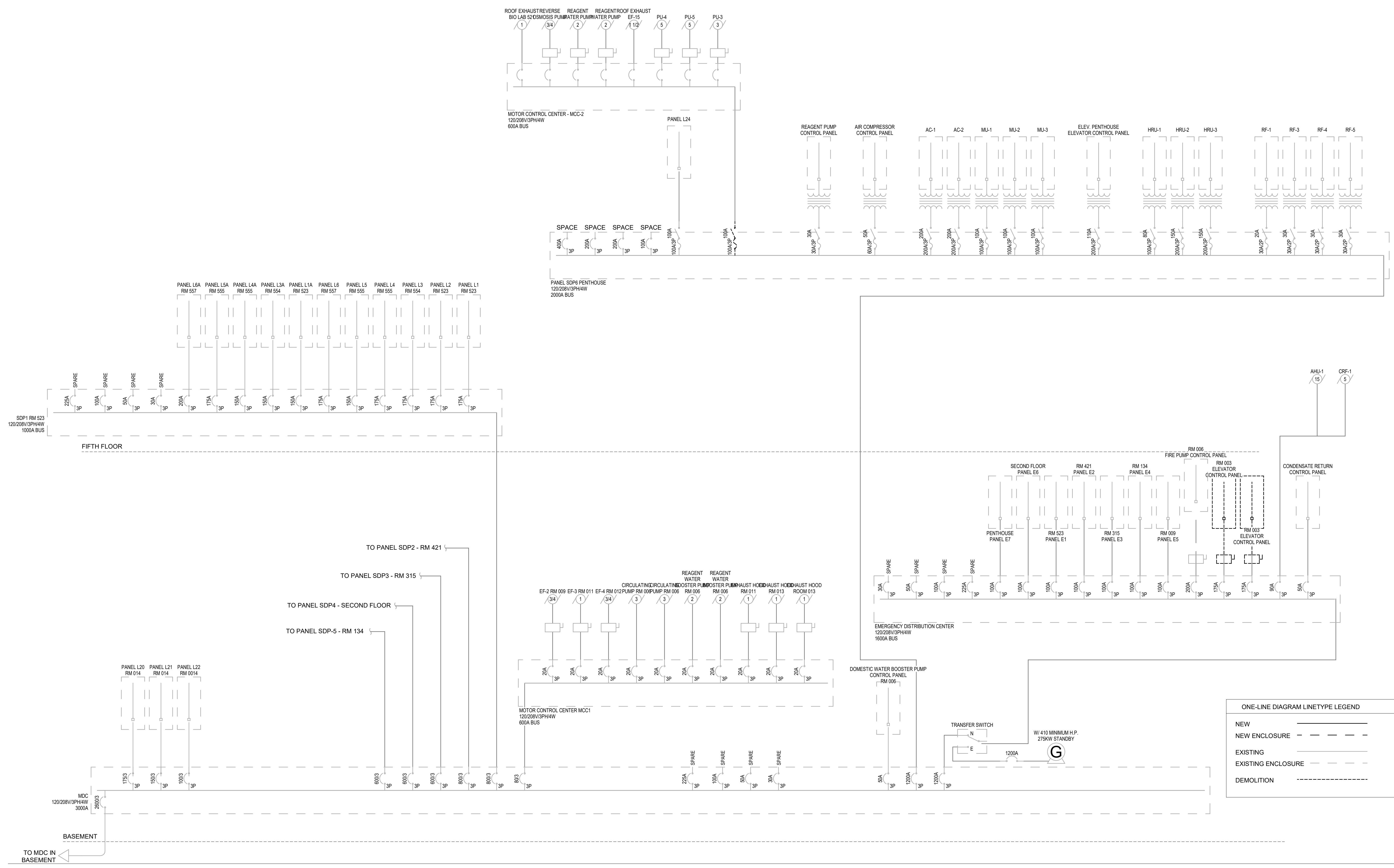
STENGENL HILL ARCHITECTURE

501 EAST HIGH STREET  
LEXINGTON, KENTUCKY 40502  
859.402.8008  
502.893.1876 fax



EXISTING ONE-LINE DIAGRAM ELEVATOR MODERNIZATION  
MDS FIFTH FLOOR RENOVATION  
UNIVERSITY OF KENTUCKY  
LEXINGTON, KENTUCKY

ELEVATOR MODERNIZATION - EARLY PROCUREMENT

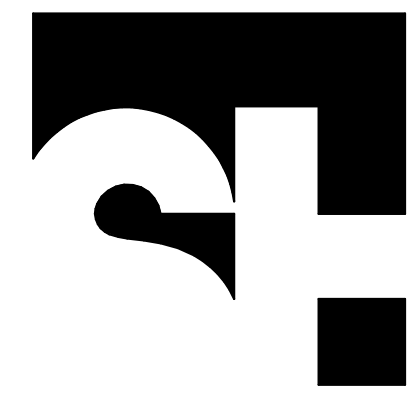


ONE-LINE DIAGRAM LINETYPE LEGEND

NEW	—
NEW ENCLOSURE	- - - -
EXISTING	—
EXISTING ENCLOSURE	- - - -
DEMOLITION	· · · ·

17 MARCH 2023  
UKY2205

E6.0



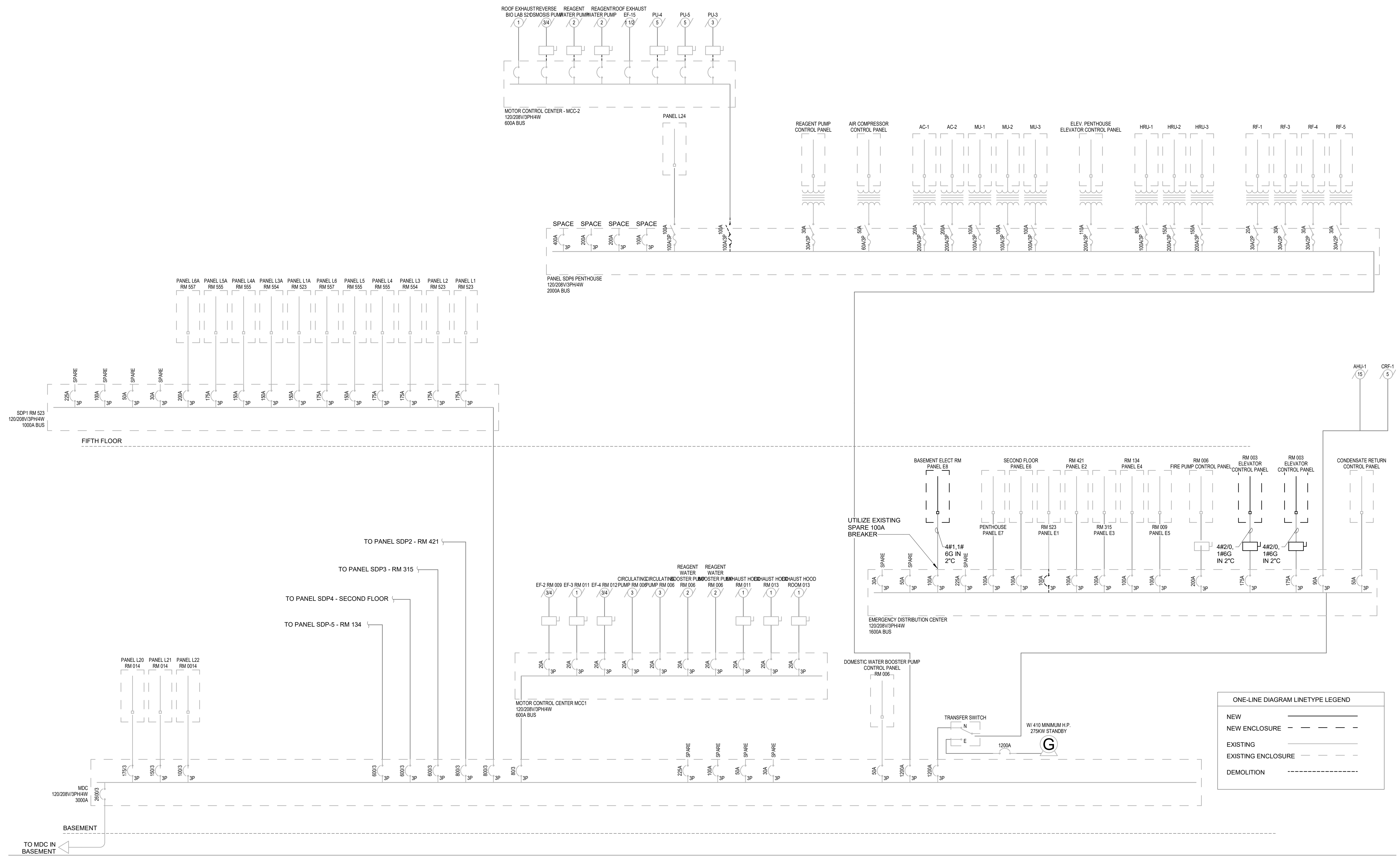
STENGEN HILL ARCHITECTURE

501 EAST HIGH STREET  
LEXINGTON, KENTUCKY 40502  
859.402.8008  
502.893.1876 fax



NEW WORK ONE-LINE DIAGRAM ELEVATOR MODERNIZATION  
MDS FIFTH FLOOR RENOVATION  
UNIVERSITY OF KENTUCKY  
LEXINGTON, KENTUCKY

ELEVATOR MODERNIZATION - EARLY PROCUREMENT



ONE-LINE DIAGRAM LINETYPE LEGEND

NEW	—————
NEW ENCLOSURE	- - - - -
EXISTING	—————
EXISTING ENCLOSURE	- - - - -
DEMOLITION	-----

17 MARCH 2023  
UKY2205

E6.1

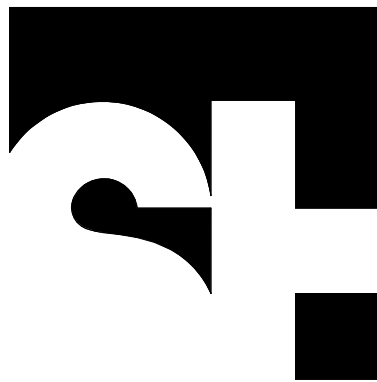


MDS FIFTH FLOOR RENOVATION  
UNIVERSITY OF KENTUCKY

LEXINGTON, KENTUCKY

ELEVATOR MODERNIZATION - EARLY PROCUREMENT

CPMD 2590.1  
UKY2205  
17 MARCH 2023



STENGE L HILL ARCHITECTURE

501 EAST HIGH STREET LEXINGTON, KENTUCKY 40502 859.402.8008 502.893.1876 fax

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26 05 05	Demolition, Restoration and Salvage
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**END OF SECTION**

**SECTION 000001**

**ARCHITECT'S SEAL**



**END OF SECTION**



**SECTION 000002**  
**PROJECT DIRECTORY**

**OWNER**

**University of Kentucky**  
Lexington, Kentucky 40536

**ARCHITECT**

**Stengel Hill Architecture Incorporated**  
501 East High Street  
Lexington, KY 40502  
859.402.8008

**MPE ENGINEER**

**CMTA, Inc.**  
220 Lexington Green Circle, Suite 600  
Lexington, KY 40503  
859.253.0892

**INTERIOR DESIGN**

**Stengel Hill Architecture Incorporated**  
611 West Main, Suite 100  
Louisville, KY 40202  
502.893.1875

**END OF SECTION**

**SECTION 00 01 00**

**INSTRUCTIONS TO BIDDERS**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Should the drawings and the specifications contradict each other or have contradictions within themselves, or require clarification, the contractor must call the same to the attention of the Architect, and his decision shall be obtained at least ten (10) working days prior to bidding, otherwise the Architect's interpretation will govern the performance of the work and/or the specific product(s) to be provided and no additional compensation shall be made in behalf of the Contractor regarding this conflict. **Without the Architect's interpretation, the Contractor shall be required to bid the most expensive of the contradictory items and once a clarification is obtained from the Architect, a credit to the Owner shall be issued if it is determined that a less expensive item is to be provided.**

**PART 2 PRODUCTS** (Not Applicable)

**PART 3 EXECUTION** (Not Applicable)

**END OF SECTION**

**SECTION 002000**

**INFORMATION AVAILABLE TO BIDDERS**

**PART 1 GENERAL**

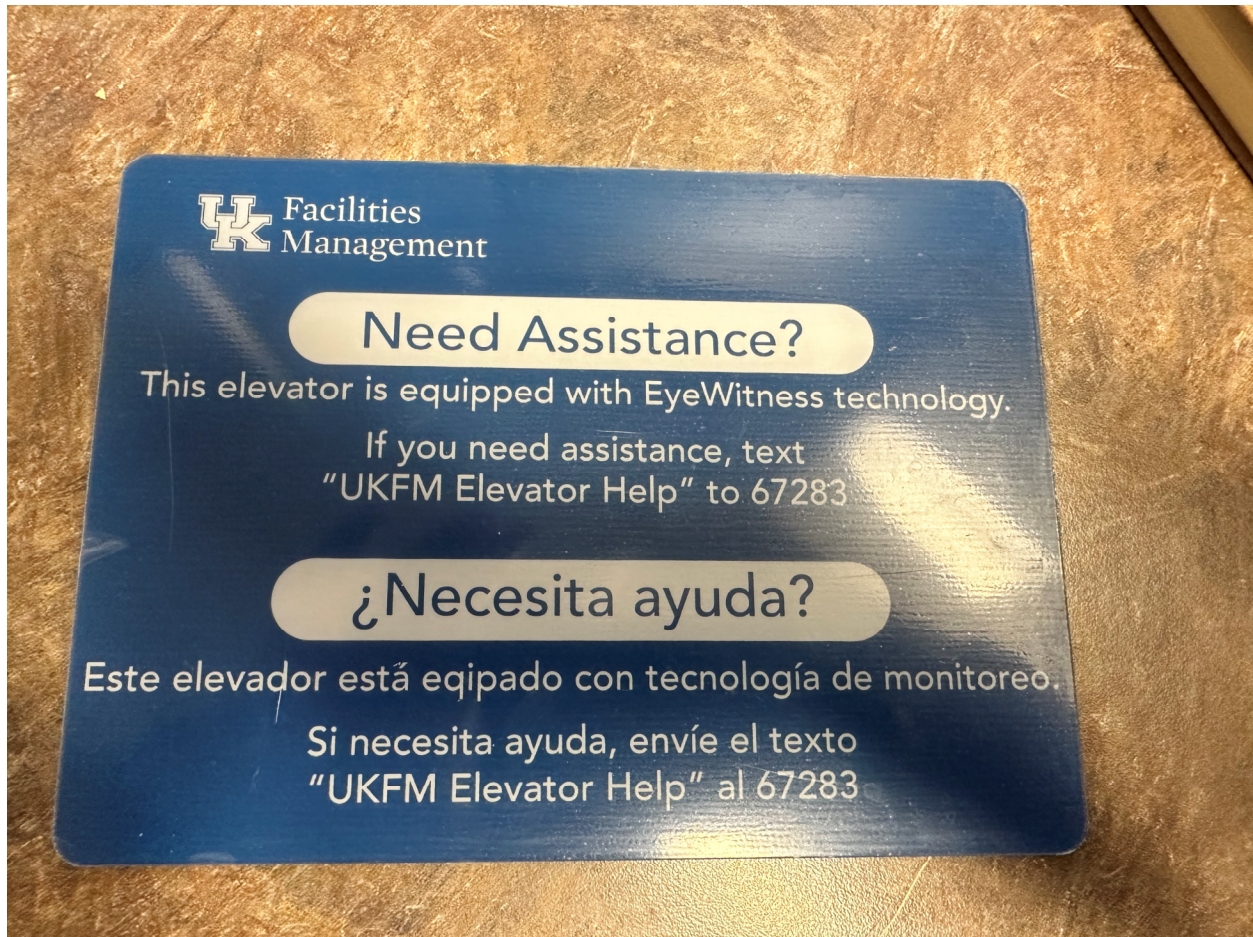
1.01 SECTION INCLUDES

- A. Information available to Bidders, unless noted otherwise, shall not be considered part of the Contract Documents. The following documents are bound immediately hereafter unless otherwise noted.
  - a. Elevator Signage 1.jpg – provided on the following page.
    - i. This image demonstrates signage requirement as indicated in University of Kentucky Specification section 142000S02 Hydraulic and Traction Elevators.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**



## SECTION 010100

### SUMMARY OF WORK

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Work covered by Contract Documents.

##### 1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. This project includes the cover the complete modernization of the 2 existing hydraulic passenger elevators within the Multidisciplinary Science building on the University of Kentucky campus. The intent is to provide a turnkey proposal that furnishes the owner with a 100% code compliant modernized elevator system (including any/all related scope of work to complete the project).

References to work by others or other trade sections does not exclude this work but is intended to help identify required work that may be needed that is not directly elevator related. It is up to the contractor to survey the site and determine the nature and quantity of work necessary to furnish a code compliant installation.

All related University of Kentucky standards are to be followed as provided by this project manual.

1. Project Location: 725 Rose St, University of Kentucky, Lexington, KY 40536.
2. Owner: University of Kentucky, Lexington, Kentucky, 40536.

- B. Reference Documents, dated 17 March 2023 were prepared for this Project by Stengel Hill Architecture Incorporated, 501 East High Street, Lexington, Kentucky, 40202.

##### 1.03 WORK SEQUENCE

- A. Construct the Work concurrently (modernize both existing elevators at the same time) to accommodate the Owner's use of The Project Area and the premises surrounding the Project Area during the construction period, and to provide for continuous public usage of The Project Area and areas immediately adjacent to Project Area. Coordinate construction schedule and operations with Owner and Architect.
- B. Do not close off public usage of facilities until use of one phase of the Work will provide alternate usage.

##### 1.05 OWNER OCCUPANCY

- A. The Owner will occupy the premises surrounding the Project Area during the entire construction period for conduct of their normal operations. Cooperate with the Owner in scheduling operations to minimize conflict and to facilitate Owner usage areas immediately adjacent to Project Area.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 010190

### CONTRACT CONSIDERATIONS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Cash Allowances.
- B. Schedule of Values.
- C. Application for Payment.
- D. Change Procedures.
- E. Measurement and Payment - Unit Prices
- F. Alternates.

##### 1.02 RELATED SECTIONS

- A. Section 013000 - Submittals: Schedule of Values.
- B. Section 016000 - Material and Equipment: Product substitutions.

##### 1.03 CASH ALLOWANCES

- A. Costs Included in Allowances: Cost of Product to Contractor or Subcontractor (less applicable trade discounts), delivery to site, and applicable taxes.
- B. Costs Not Included in the Allowance (Unless Noted Otherwise): Product handling at the site (including unloading, uncrating, and storage), protection of Products from elements and from damage, and labor for installation and finishing shall be included in the Base Scope of the Contract (not in Allowance).
- C. Architect/Engineer Responsibilities:
  - 1. Consult with Contractor in consideration and selection of Products, suppliers and installers.
  - 2. Select Products in consultation with Owner and transmit decision to Contractor.
  - 3. Prepare Change Order.
- D. Contractor Responsibilities:
  - 1. Assist Architect/Engineer in selection of Products, suppliers and installers.
  - 2. Obtain proposals from suppliers and installers and offer recommendations.
  - 3. On notification of selection by Architect/Engineer, and or Owner, execute purchase agreement with designated supplier and installer.
  - 4. Arrange for and process Shop Drawings, product data, and samples. Arrange for delivery.
  - 5. Promptly inspect Products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- E. Funds will be drawn from Cash Allowances only by Change Order.

- F. Cash Allowance Schedule: Reference the Cash Allowance Schedule at the end of this Section for all applicable Cash Allowances.

#### 1.04 SCHEDULE OF VALUES

- A. Submit typed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 20 days after date of Notice to Proceed.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization, bonds and insurance.
- D. Include in each line item, the amount of Allowances specified in this Section.
- E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise Schedule of Values to list approved Change Orders with each Application for Payment.
- G. Schedule of Values shall be in accordance with all applicable provisions of the enclosed University of Kentucky General Conditions of the Contract for Consideration.

#### 1.05 APPLICATIONS FOR PAYMENT

- A. Reference the enclosed University of Kentucky General Conditions of the Contract for Consideration - Article 30 - Payment to the Contractor.
- B. Submit three copies of each application on AIA Form G702 - Application and Certificate for Payment.
- C. Content and Format: Utilize Schedule of Values and Cost Summary Report for listing items in Application for Payment.
- D. Waiver of Liens: Waivers shall be submitted with each Application for Payment certifying that all Work for which Certificates for Payment have been previously issued and payments received from the Owner are free and clear of liens, claims, security interests, or encumbrances per the provisions of the enclosed University of Kentucky General Conditions of the Contract for Consideration.

#### 1.06 CHANGE PROCEDURES

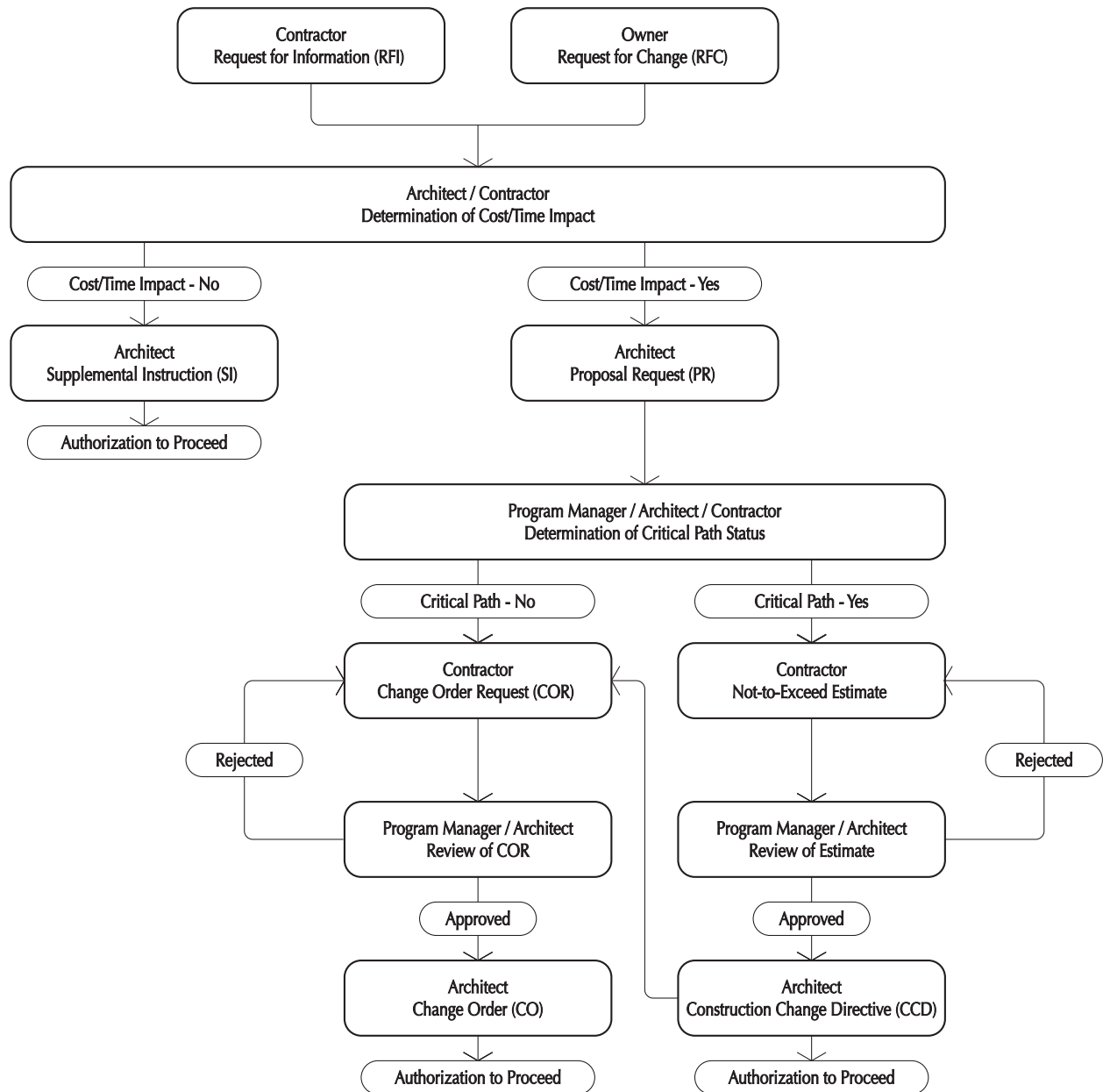
- A. Supplemental Instructions: The Architect/Engineer will issue Supplemental Instructions to advise the Contractor of minor modifications to the Work not involving an adjustment to Contract Sum/Price or Contract Time per the provisions of the enclosed University of Kentucky General Conditions of the Contract for Consideration. Proceeding with the Work in accordance with a Supplemental Instruction represents an acknowledgement by the Contractor that there will be no change in the Contract Sum/Price or Contract Time.

- B. Proposal Request: The Architect/Engineer will issue Proposal Requests, consisting of detailed descriptions of proposed modifications to the Work which may involve an adjustment to Contract Sum/Price or Contract Time, to request a formal proposal from the Contractor for the Work identified therein. A Proposal Request is not a Change Order, a Supplemental Instruction, or a direction to proceed with the Work described in the proposed modifications.
1. Non-Critical Path Issues: Contractor shall prepare and submit a Change Order Request within 14 days for the review of the Owner, Program Manager and Architect. If approved, the Architect shall issue a Change Order consisting of an authorization to proceed with the Work.
  2. Critical Path Issues: Contractor shall prepare and submit a Not-to-Exceed Estimate within 2 days for the review of the Owner, Program Manager and Architect. If approved, the Architect shall issue a Construction Change Directive consisting of an authorization to proceed with the Work.
- C. Construction Change Directive: The Architect/Engineer will issue Construction Change Directives, consisting of authorizations to proceed with Work associated with Critical Path Issues, for which the Contractor has issued a Not-to-Exceed Estimate which has been reviewed and accepted by the Owner, Program Manager and Architect. Following completion of authorized Work identified in a Construction Change Directive, the Contractor shall prepare a formal Change Order Request reconciling the cost of the Work with the associated Not-to-Exceed Estimate for review and approval/rejection by the Owner, Program Manager, and Architect.
- D. The Contractor shall propose changes identified within Proposal Requests or Construction Change Directives by submitting a Change Order Request to the Architect/Engineer, describing the proposed change and its full effect on the Work. The Change Order Request shall include a statement describing the reason for the change, the effect on the Contract Sum/Price and Contract Time with full documentation, and a statement describing the effect on Work by separate or other contractors. The Contractor shall document any requested substitutions in accordance with Section 01600.
- E. Stipulated Sum/Price Change Order: The Change Order shall be executed based on Proposal Request and Contractor's Change Order Request, as approved by Architect/Engineer and Owner.
- F. Unit Price Change Order (Pre-Determined Unit Prices): For pre-determined unit prices and quantities and only with written approval of Owner prior to commencement of Work, the Change Order will be executed on a fixed unit price basis.
- G. Unit Price Change Order (Non-Pre-Determined Unit Prices): For unit costs or quantities of units of Work which are not pre-determined, the Change Order will be executed only with written approval of Owner prior to commencement of Work, and all units stated by Contractor shall be subject to independent measurement and verification of all Work. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- H. Time and Material Change Order: For use only with written approval of Owner prior to commencement of Work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Architect/Engineer will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.
- I. Maintain detailed records of Work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- J. Change Order Forms: Modified AIA G701 Change Order.
- K. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.



- L. Project Revision Flowchart: The following Project Revision Flowchart delineates the process which shall be followed by the Owner, Program Manager, Architect, and Contractor with regards to the preceding change procedures:

**PROJECT REVISION FLOWCHART**



1.07 MEASUREMENT AND PAYMENT

- A. Authority: Measurement methods are delineated in the individual specification Sections.
- B. Payment Includes: Full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.
- C. Defect Assessment: The Work, or portions of the Work, not conforming to specified requirements, shall be replaced. If, in the opinion of the Architect/Engineer and or Owner, it is not practical to remove and replace the Work, the Architect/Engineer and or Owner will direct an appropriate remedy or adjust payment.

1.08 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.
- B. Coordinate related Work and modify surrounding Work as required.

**END OF SECTION**

## SECTION 010390

### COORDINATION AND MEETINGS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Coordination.
- B. Field engineering.
- C. Alteration project procedures.
- D. Cutting and patching.
- E. Preconstruction and site mobilization conference.
- F. Progress meetings.
- G. Preinstallation conferences.

##### 1.02 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

##### 1.03 ALTERATION PROJECT PROCEDURES

- A. Materials: As specified in product Sections; match existing products and work for patching and extending work.
- B. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

- C. Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original and or specified condition.
- D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
- E. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.
- F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect/Engineer.
- G. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Architect/Engineer review.
- H. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- I. Finish surfaces as specified in individual product Sections.

#### 1.04 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements, which affects:
  - 1. Structural integrity of element.
  - 2. Integrity of weather-exposed or moisture-resistant elements.
  - 3. Efficiency, maintenance, or safety of element.
  - 4. Visual qualities of sight-exposed elements.
  - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
  - 1. Fit the several parts together, to integrate with other Work.
  - 2. Uncover Work to install or correct ill-timed Work.
  - 3. Remove and replace defective and non-conforming Work.
  - 4. Remove samples of installed Work for testing.
  - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute Work by methods, which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- J. Identify any hazardous substance or condition exposed during the Work to the Architect/Engineer for decision or remedy.

1.05 PRECONSTRUCTION/SITE MOBILIZATION CONFERENCE

- A. Reference the enclosed University of Kentucky Special Conditions.

1.06 PROGRESS MEETINGS

- A. Reference the enclosed University of Kentucky Special Conditions.

1.07 PREINSTALLATION CONFERENCES

- A. When required in an individual specification Section, convene a preinstallation conference at Work site prior to commencing Work of the Section.
- B. Require attendance of parties directly affecting, or affected by, Work of the specific Section.
- C. Notify Architect/Engineer four days in advance of meeting date.
- D. Prepare agenda, preside at conference, record minutes, and distribute copies within two days after conference to participants, with two copies to Architect/Engineer, and Owner.
- E. Review conditions of installation, preparation and installation procedures, and coordination with related Work.

**END OF SECTION**

## SECTION 013000

### SUBMITTALS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed products list.
- D. Shop Drawings.
- E. Product data.
- F. Samples.
- G. Manufacturers' instructions.
- H. Manufacturers' certificates.
- I. Construction photographs.

##### 1.02 RELATED SECTIONS

- A. Section 010190 - Contract Considerations: Schedule of Values.
- B. Section 014000 - Quality Control: Manufacturers' field services and reports.
- C. Section 017000 - Contract Closeout: Contract, warranty and manufacturer's certificates, and closeout submittals.

##### 1.03 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect/Engineer accepted form.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

- G. Provide space for Contractor and Architect/Engineer review stamps.
- H. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

#### 1.04 CONSTRUCTION PROGRESS SCHEDULES

- A. Reference the enclosed University of Kentucky Special Conditions.

#### 1.05 PROPOSED PRODUCTS LIST

- A. Within 15 days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

#### 1.06 SHOP DRAWINGS

- A. Shop Drawings shall be submitted electronically. Note that as part of the Contract Closeout, the Owner shall require two (2) hardcopies and one (1) electronic copy of all Shop Drawings.
- B. After review, reproduce and distribute in accordance with Article on Procedures above and for Record Documents described in Section 017000 - Contract Closeout.

#### 1.07 PRODUCT DATA

- A. Product Data shall be submitted electronically. Reference University of Kentucky Special Conditions for Contract Closeout requirements for quantity of hard copies and electronic copies.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 017000 - Contract Closeout.

#### 1.08 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors in custom colors selected, textures, and patterns for Architect/Engineer's selection.
- C. Include identification on each sample, with full Project information.
- D. Submit the number or samples specified in individual specification Sections; minimum of two (2). One of which will be retained by Architect/Engineer, and one of which will be retained by the Owner.

1.09 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.10 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate to Architect/Engineer for review, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.11 CONSTRUCTION PHOTOGRAPHS

- A. Monthly, submit photographs to Architect/Engineer with Application for Payment.
- B. Photographs: Two prints of each shot, color, glossy finish, 8x10 size, in three-hole punched photographic sleeves.
- C. Take a minimum of four site photographs from the same locations each period, and other photographs as required to indicate the relative progress of the Work, 5 days maximum prior to submitting.
- D. Identify photographs with date, time, orientation, and project identification.

**END OF SECTION**



**SECTION 014000**  
**QUALITY CONTROL**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. References.
- C. Field samples.
- D. Inspection and testing laboratory services.
- E. Manufacturers' field services and reports.

1.02 RELATED SECTIONS

- A. Section 013000 - Submittals: Submission of Manufacturers' Instructions and Certificates.
- B. Section 016000 - Material and Equipment: Requirements for material and product quality.

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 REFERENCES

- A. Conform to reference standard by date of issue current as of date of Contract Documents.
- B. Obtain copies of standards when required by Contract Documents.
- C. Should specified reference standards conflict with Contract Documents, request clarification for Architect/Engineer before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications Sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect/Engineer.

1.06 INSPECTION AND TESTING LABORATORY SERVICES

- A. Unless noted otherwise, Contractor shall appoint, employ, pay for, and coordinate services of an independent firm to perform inspection and testing.
- B. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the Architect/Engineer.
- C. Reports will be submitted by the independent firm to the Architect/Engineer, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
  - 1. Notify Architect/Engineer and independent firm hours prior to expected time for operations requiring services.
  - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- E. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

1.07 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Architect/Engineer, and or Owner.
- B. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, and test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
- C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Submit report in duplicate within 30 days of observation to Architect/Engineer for review.

**END OF SECTION**

**SECTION 016000**  
**MATERIAL AND EQUIPMENT**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.

1.02 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer, for similar components.

1.03 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.04 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Provide mixing with foreign matter.

- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

#### 1.05 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named subject to Substitutions requirements specified herein.

#### 1.06 SUBSTITUTIONS

- A. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.
- B. No Substitution will be considered prior to receipt of Bids unless written request for approval has been received by Architect at least ten days prior to the date for receipt of Bids. Written requests for substitutions are subject to the conditions and procedures specified in this Section.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A Request for Substitution constitutes a representation that the Bidder:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the Substitution as for the specified product.
  - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
  - 5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
  - 1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
  - 2. Submit Shop Drawings, product data, and certified test results attesting to the proposed product equivalence.
  - 3. The Architect/Engineer will notify Contractor, in writing, of decision to accept or reject request.

G. Permitted Requests for Substitutions:

1. Substitutions after award of Contract shall only be considered when a product becomes unavailable through no fault of the Contractor, subject to the conditions and procedures specified in this Section.
2. **No other substitutions shall be permitted after award of Contract.**

**END OF SECTION**

**SECTION 016500**  
**STARTING OF SYSTEMS**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and balancing.

1.02 RELATED SECTIONS

- A. Section 014000 - Quality Control: Manufacturers field reports.
- B. Section 017000 - Contract Closeout: System operation and maintenance data and extra materials.

1.03 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer and or Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible manufacturer's representative and or Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

1.04 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment on site with instruction by a qualified manufacturers' representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.05 TESTING, ADJUSTING, AND BALANCING

- A. The **Mechanical Subcontractor** shall appoint, employ, pay for, and coordinate services of an independent firm to perform testing, adjusting and balancing. Contract with independent firm shall be held and administered by the Contractor, not by the mechanical subcontractor.
- B. The independent firm will perform services specified in Mechanical Specifications.
- C. Reports will be submitted by the independent firm to the Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.

**END OF SECTION**

**SECTION 017000**  
**CONTRACT CLOSEOUT**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Warranties.
- G. Spare parts and maintenance materials.
- H. Operation and Maintenance Manuals.

1.02 RELATED SECTIONS

- A. Section 015000 - Construction Facilities and Temporary Controls: Progress cleaning.
- B. Section 016500 - Starting of Systems: System start-up, testing, adjusting, and balancing.

1.03 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's inspection.
- B. Provide submittals to Architect/Engineer and or Owner that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- D. Owner will occupy all portions of the building as specified in Section 010100.

1.04 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to a sanitary condition.
- D. Clean or replace filters of operating equipment.



- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site: sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

#### 1.05 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

#### 1.06 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:

- 1. Contract Drawings.
- 2. Specifications.
- 3. Addenda.
- 4. Change Orders and other Modifications to the Contract.
- 5. Reviewed Shop Drawings, product data, and samples.

- B. Store Record Documents separate from documents used for construction.

- C. Record information concurrent with construction progress.

- D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

- 1. Manufacturer's name and product model and number.
- 2. Product substitutions or alternates utilized.
- 3. Changes made by Addenda and Modifications.

- E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

- 1. Measured depths of foundations in relation to finish first floor datum.
- 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
- 4. Field changes of dimension and detail.
- 5. Details not on original Contract Drawings.

- F. Delete Architect/Engineer title block and seal from all documents.

- G. Submit documents to Architect/Engineer with claim for final Application for Payment.

#### 1.07 OPERATION AND MAINTENANCE DATA

- A. Reference University of Kentucky Special Conditions for Operation and Maintenance Manuals requirements.

1.08 WARRANTIES

- A. Provide duplicate notarized copies.
- B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.
- C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.
- D. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.09 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

**END OF SECTION**

**SECTION 017200**

**INTERIM LIFE SAFETY MEASURES (ILSM)**

**PART 1 GENERAL**

1.01 DESCRIPTION OF POLICY

- A. To ensure a safe environment during any period of construction, the Owner requires implementation of Interim Life Safety Measures, hereinafter referred to as ILSM, whenever the environment is altered in such a way as to create a Life Safety Code deficiency or other significant hazard. ILSM applies to all personnel, including construction workers, and shall be implemented based on deficiencies in the Life Safety Code (LSC) or other specific hazards.

1.02 PROCEDURE

- A. Before construction begins, the Owner will orient the Contractor to the Owner’s Interim Life Safety Program. Because ILSM are based on specific deficiencies and/or hazards, the specific measures required may change during the life of the Project.
  - 1. During all preconstruction, coordination, and progress meetings, the Contractor shall outline all upcoming Work activities that will/could result in LSC deficiencies or other significant construction hazards and the Owner’s representatives and the Contractor will review and agree upon required ILSM and responsibility for implementation. ILSM required during the interim between such meetings will be documented on an ILSM matrix, which will be dated, signed by the Owner’s representative and Contractor, and posted outside the construction site.
- B. All employees of the Owner affected by the construction will be informed of specific ILSM by the Owner’s designated Safety Officer.
- C. Monitoring of the construction site will be a shared responsibility of the Owner’s designated Safety Officer, the Project Manager, and the Contractor. The Contractor’s Project Coordinator shall be responsible for completing all daily and monthly inspection logs.
- D. Interim Life Safety Measures, as outlined by the Owner, may include the following:

Construction Hazard or LSC Deficiency	Interim Measures
<ul style="list-style-type: none"> <li>→ Alter or compromise integrity of exit access, exit, or exit discharge.</li> </ul>	<ul style="list-style-type: none"> <li>→ Ensure free and unobstructed exit.</li> <li>→ Ensure escape route for construction workers. Inspect daily.</li> <li>→ Provide additional training for staff and signage when alternative exits are designated.</li> <li>→ Increase debris removal schedule to reduce buildings flammable and combustible load to lowest feasible level.</li> <li>→ Conduct at least two fire drills per shift per quarter.</li> </ul>
<ul style="list-style-type: none"> <li>→ Significantly compromise integrity of building’s defend in place compartments/features: <ul style="list-style-type: none"> <li>→ Fire barriers</li> <li>→ Smoke barriers</li> <li>→ Floor slabs</li> <li>→ Corridor walls</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>→ Ensure that construction partitions are smoke tight and built of noncombustible or limited combustible materials.</li> </ul>

Construction Hazard or LSC Deficiency	Interim Measures
→ Impair building's fire alarm, detection, or suppression systems.	→ Implement temporary, but equivalent, fire alarm, detection, or suppression systems. → Inspect and test temporary systems monthly. → Ensure that construction partitions are smoke tight and built of noncombustible or limited combustible materials. → Provide additional fire-fighting equipment (a fire extinguisher every 50 feet) and train staff to use.
→ Involve temporary sources of ignition: → Cutting → Welding → Plumber's torch	→ Obtain "Hot Work Permit" and follow guidelines. → Ensure free and unobstructed walkways. → Ensure fire alarm, detection, and suppression systems are in working order. → Provide additional fire-fighting equipment (a fire extinguisher every 50 feet) and train staff to use. → Decrease combustible load to lowest feasible level.
→ Involve presence of large quantities of combustibles or debris.	→ Increase debris removal schedule. → Provide additional fire-fighting equipment (a fire extinguisher every 50 feet) and train staff to use. → Ensure that construction partitions are smoke tight and built of noncombustible or limited combustible materials.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION**

3.01 CONTRACTOR REPORTING

- A. The Contractor shall be responsible for administering ILSM within the construction area. The Contractor shall be responsible for maintaining all ILSM reports as required herein and providing evidence of such to Owner.
- B. The following Interim Life Safety Reports shall be prepared by the Contractor, in a format approved by the Owner and Architect prior to the commencement of construction, and complete record of all Reports shall be kept on site at all times. Reports that require Owner to sign off prior to associated activity shall be prepared at least 48 hours prior to designated construction activity start time.
  - 1. Daily Life Safety Site Inspection Report.
  - 2. Utility Disruption Request.
  - 3. 4. Hot Work Permit.
  - 5. Monthly Life Safety Construction Meeting Report.

- B. Failure to comply with required reporting activities shall result in the discontinuation of all Work by the Contractor, at the expense of the Contractor, until all required reporting is updated to the satisfaction of the Owner and Architect.

**END OF SECTION**

## SECTION 017340

### INDOOR AIR QUALITY CONTROL

#### PART 1 GENERAL

##### 1.01 INTRODUCTION

- A. The Owner is committed to providing a safe environment for all visitors and staff. This Specification/Policy is intended to ensure that the air quality of the Owner's facilities are not compromised in any manner during renovation or construction projects. All Contractors, Vendors, or Others involved in the installation of fixed materials within the Owner's facilities shall review and adhere to this Specification/Policy. Refer to *"Infection Control Risk Assessment (ICRA) for Construction, Renovation, or Maintenance"* information contained herein.
- B. Aspergillosis and related nosocomial fungal infections may result when immuno-compromised persons inhale aspergillus spores, or other spores which can be present in construction dust. Control of construction dust/debris and excavation dust, as required in this Section, is imperative to help prevent aspergillosis or related nosocomial fungal infections in immuno-compromised persons.
  - 1. Inhalation of aspergillus spores or other related fungal spores by immuno-compromised persons can lead to serious complications, even death.
  - 2. Aspergillus and other related spores are present in the natural environment and thus are not a risk to healthy construction workers.
- C. Airborne contaminant control is critical in all most of the Owner's facility areas. Contractor shall limit dissemination of airborne contaminants produced by construction-related activities.
  - 1. Dust in ceilings and construction debris may contain fungus spores. Construction activities causing disturbance of existing dust, or creating new dust, or other airborne contaminants, must be conducted in tight enclosures cutting off any flow of particles into adjacent areas.
  - 2. Ceilings and walls in protection areas and other areas in the Owner's facilities, as indicated on Drawings or in this Policy, must be secure at all times. If access into the ceiling in occupied areas is indicated or required, procedures as described in this Section shall be followed.

##### 1.02 GENERAL SUMMARY

- A. The following *"Infection Control Risk Assessment (ICRA) for Construction, Renovation, or Maintenance"* information is provided as a guideline to the use of this Specification/Policy. In order to use the information below, the Contractor/Vendor must know and understand the following Factors:
  - 1. Construction/Maintenance Activity: Types listed - "A", "B", "C", and "D".
  - 2. Risk Groups/Areas: Groups listed - "Low Risk", "Medium Risk", and "High Risk".
- B. From these two Factors, a *"Class of Precaution"* is assigned by the Precautions Matrix, listed from "Class I" to "Class IV". The following information shall be utilized as a planning tool and shall serve as a minimum guideline only. The Contractor shall verify the classification assigned by the Precautions Matrix with an authorized representative of the Owner prior to the performance of any investigations or actual Work, regardless of Infection Control Risk Level or Construction Activity.

C. Construction/Maintenance Activity Chart:

Type	Activities
Type A	Non-invasive activities - includes but is not limited to: → Removal of ceiling tiles for visual inspection, limited to 1 or 2 tiles. → Painting, no sanding. → Wall papering. → Installation of outlet covers and other electrical trim. → Other activities that do not generate dust or require cutting of walls or access to ceilings.
Type B	Work that creates minimal dust - includes but is not limited to: → Cutting of walls or ceilings where dust migration can be controlled.
Type C	Work that creates a moderate-to-high level of dust or requires demolition of fixed components - includes but is not limited to: → Sanding walls for painting or wall papering. → Removal of floor coverings, ceiling tiles, and casework. → Work above ceiling that requires removal of sections of ceiling tile.
Type D	Major demolition and construction activities - includes but is not limited to: → Activities that require heavy demolition. → Major new construction.

D. Risk Groups/Areas Chart:

Level of Risk	Usage
Low Risk	→ Office Areas → Classrooms/Offices/Waiting
Medium Risk (not applicable)	→ Echo → Clinical Laboratory → Endoscopy → Pharmacy → Nuclear Medicine → Nursing Units not listed as High Risk → Physical Therapy → Other → Radiology/MRI → Respiratory Therapy
High Risk (not applicable)	→ Emergency Department → Telemetry → Cardiac Cath Lab → Med/Surg. → Central Sterile → PACU → Intensive Care Units → Other → Negative Pressure Isolation Rooms → Oncology Areas → OR

E. Precautions Matrix (Use to Identify the Appropriate Class of Precaution):

Risk Group	Construction/Maintenance Activity Type			
	Type A	Type B	Type C	Type D
Low Risk	I	II	II	III
Medium Risk	I	II	III	IV
High Risk	I	IV	IV	IV

F. Precautions Chart:

Class	Precautions during Demolition	Precautions upon Demolition Completion
I	<ul style="list-style-type: none"> <li>→ Use methods designed to minimize dust.</li> <li>→ Immediately replace a ceiling tile displaced for visual inspection.</li> </ul>	<ul style="list-style-type: none"> <li>→ None.</li> </ul>
II	<ul style="list-style-type: none"> <li>→ Provide active means to prevent dust from dispersing.</li> <li>→ Mist work surfaces to control dust.</li> <li>→ Seal unused doors with duct tape.</li> <li>→ Block off and seal vents.</li> </ul>	<ul style="list-style-type: none"> <li>→ Wipe work surfaces.</li> <li>→ Contain construction waste before transport.</li> <li>→ Wet mop before leaving work area.</li> <li>→ Place and maintain sticky mat at exit to construction site.</li> </ul>
III	<ul style="list-style-type: none"> <li>→ Seal air vents.</li> <li>→ Construct dust-tight barriers to seal area from non-work area. Do not remove barriers from work area until demolition is complete.</li> <li>→ Seal holes, pipes, conduits, and punctures in construction area walls.</li> <li>→ Maintain negative air pressure within work area.</li> <li>→ Cover construction waste before transport.</li> <li>→ Install and maintain sticky mats immediately outside construction area.</li> </ul>	<ul style="list-style-type: none"> <li>→ Remove barriers carefully to minimize spreading of dirt and debris.</li> <li>→ Vacuum work area.</li> <li>→ Wet mop area.</li> <li>→ Place and maintain sticky mat at exit to construction site.</li> </ul>

IV	<ul style="list-style-type: none"> <li>→ Seal air vents.</li> <li>→ Construct dust-tight barriers with ante-rooms. Do not remove until demolition is complete.</li> <li>→ Seal holes, pipes, conduits, and punctures in construction area walls.</li> <li>→ Maintain negative air pressure within work area utilizing HEPA-equipped air filtration system.</li> <li>→ Require all construction personnel to wear coveralls and to remove coveralls in ante-room prior to leaving area.</li> <li>→ All personnel entering work area must wear shoe covers. Shoe covers shall be removed each time the worker leaves the area.</li> <li>→ Install and maintain sticky mats immediately outside construction area.</li> </ul>	<ul style="list-style-type: none"> <li>→ Remove barriers carefully to minimize spreading of dirt and debris.</li> <li>→ Vacuum work area.</li> <li>→ Wet mop area with disinfectant.</li> <li>→ Place and maintain sticky mat at exit to construction site.</li> </ul>
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Note: If the assessment team elects not to implement any of the measures suggested by the criteria, written justification must be provided.



- G. Final determination of the Construction Activity / Infection Control Precautions will be made by the Owner's Facilities Department and/or Owner's Infection Control Representative and is subject to change to accommodate special conditions within the Facilities.

#### 1.03 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the Work of this Section.
- B. No demolition Work shall be performed until all provisions of this Section related to temporary partitions and indoor air quality control have been satisfied and inspected by Owner's Infection Control Representative.

#### 1.04 DESCRIPTION

- A. Work of this Section includes Infection Control Procedures to be implemented by all Contractors for Construction Projects, and specifies procedural requirements for Work in the Owner's healthcare facility patient and clinic areas, laboratories, and other areas where airborne contaminants must be strictly limited due to their effects on patients, staff, diagnostic operations, sensitive procedures and/or equipment.
- B. The Work shall include, but not be limited to infection control measures pertaining to the following:
  - 1. Demolition and removal of walls, ceilings and finish systems.
  - 2. Demolition, removal, or remodeling of existing plumbing, mechanical equipment and ductwork.
  - 3. Demolition, removal, or remodeling of light fixtures and other electrical devices.
  - 4. Removal of millwork, casework, or other fixed equipment.
  - 5. Finish operations which generate contaminants, including sanding, painting, and application of special surface coatings.
  - 6. Location of and erection methods of interim dust barriers, preceding erection and/or demolition of barriers around construction demolition areas.
  - 7. Location of and erection methods for impervious dust barriers around construction and demolition areas.
  - 8. Negative air flow ventilation and air flow filtration within and around the construction areas.
  - 9. Dust/debris and removal control.
  - 10. Cleaning frequency at:
    - a. Dust barrier entrance: Daily or more often as needed.
    - b. Elevators and corridors used for both debris removal and patient circulation: Daily or more often as needed.
    - c. Circulation control patterns for construction personnel: Daily or more often as needed.

#### 1.05 SUBMITTALS

- A. Prior to starting Work, submit for subsequent review and approval by the Owner's Infection Control Representative, an outline of proposed equipment and/or procedures showing compliance with specification for each of the following:
  - 1. Systems, arrangements and locations of interim and impervious dust barriers.
  - 2. Clean-up, debris removal, and dust/debris control systems.
  - 3. Circulation control systems to and from Work areas for construction personnel and materials.

- 4 Filtered vacuum equipment, negative air flow ventilation equipment, HEPA filtration equipment and negative air flow measurement equipment.

#### 1.06 TESTING

- A. Air Samples: If the Owner determines that it is necessary, the Owner will provide baseline particle counts and conduct periodic air sampling of Protection Areas during construction to monitor effectiveness of containment procedures.
- B. Air Pressure: Using mechanical differential pressure monitors, Contractor shall verify the maintenance of negative air pressure in Containment Area relative to Protection Areas on a continuous basis and shall keep a written log of such verification activities.

#### 1.07 PERFORMANCE REQUIREMENT

- A. Owner's Infection Control Representative's Responsibilities:
  1. Determination and illustration of required Containment and Protection Areas and development of standards/limitations of Contractor's responsibilities required for the Project.
  2. Statement for Requirements: Description in graphic and written form as required to communicate the above, based on evaluation of the construction area and the impact of the Project on patient care as directed by the Owner's Infection Control Representative.
- B. Owner's Responsibilities:
  1. Assist Owner's Infection Control Representative to determine Containment and Protection Areas.
  2. Arrange review testing and monitoring as specified.
  3. Inform the Medical Staff along with adjacent Department Staff as determined necessary.
- C. Contractor's Responsibilities:
  1. Compliance with applicable codes and referenced controls, and the use of installation procedures and methods which satisfy applicable code requirements and referenced controls and procedures.
  2. Development of specific means and methods of achieving and maintaining control of airborne contaminants during construction.
  3. Development of proposed Work plan and procedures for control of airborne contaminants, as noted below.
  4. Plan Certification: Contractor's plan shall be approved by the Owner's Infection Control Representative.
  5. Notification: Contractor shall notify Owner's Infection Control Representative a minimum of 48 hours prior to starting construction activity which might be expected to produce excess levels of airborne contaminants in containment area so that any additional precautions may be taken and ensure that base-line air samples have been taken.
  6. The Contractor shall provide all dustproof enclosures and warning signs to protect the public, the existing building, storage areas, and materials or equipment. All enclosures shall be approved and inspected by Owner's Infection Control Representative.

## **PART 2 PRODUCTS**

### 2.01 MATERIALS

- A. Sticky Mats: Provide adhesive faced contamination control mats with disposable sheets in lieu of vacuumed mats, Tacky Mat by Liberty Industries or approved equal. Remove sticky mat surface four times daily at a minimum at morning break, lunch break, afternoon break, and end of shift.
- B. Duct Caps: Block of all existing ventilation ducts within the construction area. Method of capping ducts shall be dust tight and withstand air flow.
- C. Portable Enclosures: Whenever Work is done outside existing enclosed Work area, provide 4 mil portable polyethylene enclosure, enclosing ladder and sealing off opening fitted tight to ceiling, or provide prefabricated unit. Use of Owner's "Work Cube" will be permitted on a limited basis.
- D. Polyethylene: Polyethylene shall be 6 mil fire retardant type listed by Fire Underwriter's Laboratories, Griffolyn #T55R or Star-Tex of Lakeville, MN, with Griffolyn fire retardant tape, or equal.
- E. Air Pressure Monitor: Differential gauge to monitor differential pressure between the construction containment area and protection area. Submit proposed gauge to Owner for review and acceptance.
- F. Temporary local exhaust ventilation system equipped with HEPA Filtration System complying with ANSI Z 9.2 capable of maintaining a minimum negative pressure differential of minus 0.01 inch of water column relative to adjacent unsealed areas.
- G. Refer to applicable Specification Sections for additional building materials utilized in the execution of this Work.

## **PART 3 EXECUTION**

### 3.01 GENERAL REQUIREMENTS

- A. Access for Work:
  - 1. All Construction access shall be limited to corridors, stairs, roofs and elevators as designated by Owner. All requests for access into existing areas for remodeling, or utility connections and/or disconnections shall be made to the Owner with sufficient prior notice. Permission for access is not guaranteed and shifting of Work to after hours shift may be required.
    - a. Construction access in facility shall be via designated point of entry through the lower level corridors to a designated elevator.
    - b. Only designated elevators may be used by the Contractor for all project and general travel use.
  - 2. Circulation Control Patterns for Construction Personnel: Construction personnel shall enter and leave construction area only through traffic control patterns established for debris removal and material delivery, and segregated from Building Users' circulation to minimize cross-contamination when at all possible.

B. Dust and Debris Control Measures Prior to Start of Construction/Demolition:

1. Vacuum area above removed suspended ceiling, including ductwork and pipes within construction area.
2. Prior to utility shut-down preparations necessitating removal of ceilings for access at floors below construction, review dust containment procedures at each specific location with the Owner's Infection Control Representative.
3. Coordinate with Owner's Infection Control Representative the maintenance of existing ventilation systems likely to be affected by construction.
4. Verify that the existing facility ventilation system can produce the proper air exchange rates and pressure relationships in critical areas near construction activity, and that air is not being circulated from construction areas into other occupied areas.
5. Provide and maintain sticky mats at entrances to construction areas for dust collections from shoes.
6. At final completion of construction, review and ensure that ventilation systems are balanced and cleaned as specified and replace filters.
7. Conduct an Air Quality Control with the Owner's Infection Control Representative. Complete check list and post at site.

C. Equipment Removal Procedures: Clean surfaces of incoming and outgoing equipment and materials thoroughly with HEPA vacuum equipment prior to bringing into the building or removing from Work area.

D. Dumpster Location and Debris Removal:

1. Debris Removal: Bundle all debris, equipment and materials for disposal into convenient and manageable sizes and wrap with plastic sheets. Seal with duct tape to make air-tight or use proper lids. Use of debris carriers is an acceptable option provided carriers are covered with plastic and sealed tight or have tight lids. Wipe down each sealed bundle and debris carrier prior to removal from curtained area.
2. Contractor shall use water to control dust generated by debris removal at exterior of building.
3. Construction dumpster location shall be approved by Owner. Dumpster shall be located 50 feet minimum away from any existing fresh air intake.
4. All construction dumpsters shall remain closed or covered by any industry standard means.
5. No trash chutes will be allowed on the job unless authorized in writing by Owner. If trash chutes are allowed, Contractor shall provide airtight connection from the chute to the dumpster enclosure.

E. Temporary Partitions:

1. Temporary Partitions: During the execution of the Work, primary consideration shall be given to the protection of adjacent areas from all hazards associated with demolition and new construction work. Provide and maintain smoke tight temporary partitions and dust barriers of type and at locations as needed and/or as indicated on the Drawings, adequate to keep dirt, dust, noise, and other particles from being transferred to adjacent areas. All doors through partitions shall be equipped with dust proof weatherstripping and a closer. Repair or replace damage to temporary partitions immediately.
2. Interim Dust Barriers: Prior to erection and demolition of temporary partitions around construction areas, Contractor shall install an interim air-tight reinforced plastic dust abatement curtain, approximately four (4) feet outside construction limits at existing corridors to isolate occupied areas from area of Work.
3. Dust abatement curtain shall be completely taped to walls, floor, and ceiling with duct tape, or sealed with spackling compound.

4. At completion of impervious dust barrier erection (or demolition), completely clean floor, ceiling and walls within 4'-0" limits using HEPA filtered vacuum equipment. Prior to removal of interim dust barrier obtain approval of the Owner's Infection Control Representative of the ceiling, wall, and floor conditions.
  5. Where existing mechanical and electrical systems prohibit full height barriers, terminate barriers at obstruction and seal off balance of opening with reinforced fire retardant plastic and duct tape.
  6. Review interior and exterior perimeter of construction area for existing miscellaneous openings, penetrations, registers, doors, windows, and completely seal openings with solid barriers to confine construction dust, dirt and air pollution to construction areas.
  7. All Temporary Partition Types are to be approved by the Owner's Infection Control Representative.
- F. Use fire retardant plywood or taped gypsum board in lieu of plastic at high cart traffic areas, at corridors, and/or as indicated on Drawings.

### 3.02 ENFORCEMENT AND FINES

- A. Process: Failure to maintain containment precautions will result in issuance of written warning; if situation is not corrected within eight (8) hours of receipt of warning, Owner will have cause to stop the Work as provided in the General Conditions.
- B. The following will be performed by the Owner's Infection Control Representative:
  1. Periodic Inspections.
  2. A record of all violations of precautions will be maintained, whether in occupied areas or not.

**END OF SECTION**

**SECTION 024119**  
**SELECTIVE DEMOLITION**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Demolition and removal of selected portions of a building.

1.02 RELATED SECTIONS

- A. Section 017340 - Indoor Air Quality Control.

1.03 DEFINITIONS

- A. Remove: Remove and legally dispose of items, except those indicated to be reinstalled, salvaged, or to remain the property of the Owner.
- B. Remove and Salvage: Items indicated to be removed and salvaged remain the property of the Owner. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in new locations indicated.
- D. Existing to Remain: Protect construction indicated to remain against damage and soiling during demolition activities. When permitted by the Owner and Architect, items may be removed to a suitable, protected storage location during demolition activities and then cleaned and reinstalled in their original locations.

1.04 OWNERSHIP OF MATERIALS

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the property of the Owner, demolished materials shall become the property of the Contractor and shall be removed from the Site with further disposition at the option of the Contractor.

1.05 SUBMITTALS

- A. General: Submit each item in this Section according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.
- B. Proposed dust-control measures.
- C. Proposed noise-control measures.

D. Schedule of selective demolition activities indicating the following:

1. Detailed sequence of selective demolition and removal Work, with starting and ending dates for each activity.
2. Interruption of utility services.
3. Coordination for shutoff, capping and continuation of utility services.
4. Use of elevator and stairs
5. Detailed sequence of selective demolition and removal Work to ensure uninterrupted progress of on-site operations of Owner.
6. Coordination of continuing occupancy by Owner of portions of existing building and of partial occupancy by Owner of completed Work.
7. Locations of temporary partitions and means of egress.

E. Inventory of items to be removed and salvaged.

F. Inventory of items to be removed by Owner.

G. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.

H. Record drawings at Project closeout, in accordance with Section 017000 - Contract Closeout, which identify and accurately locate capped utilities and other subsurface structural, mechanical, and/or electrical conditions.

I. Landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.06 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition Work similar to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition operations. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Predemolition Conference: Conduct conference at Project Site to comply with Preinstallation Conference Requirements of Section 010390 - Coordination and Meetings.

1.07 PROJECT CONDITIONS

A. Owner will occupy portions of the building immediately adjacent to selective demolition area. Conduct selective demolition so that ongoing operations of Owner are not disrupted. Provide not less than 72 hours notice to Owner of construction and/or demolition activities that will affect ongoing operations of Owner.

B. Owner assumes no responsibility for actual condition of buildings to be selectively demolished.

1. Conditions existing at the time of inspection by the Contractor for bidding purposes will be maintained by the Owner as far as practical.

## 1.08 WARRANTY

- A. Existing Special Warranty: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition operations by methods and with materials which do not void existing warranties.

## PART 2 PRODUCTS

### 2.01 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
  - 1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
  - 2. Use materials whose installed performance equals or surpasses that of existing materials.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing site conditions and correlate with requirements indicated to determine extents of selective demolition required.
- C. Inventory and record the condition of items designated to be removed and reinstalled and items designated to be removed and salvaged.
- D. When unanticipated structural, mechanical, or electrical elements are encountered that conflict with the intended function or design, investigate and measure the extent of the conflict and promptly submit a written report to the Architect.
- E. Survey the condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during or as a result of selective demolition operations. If any such conditions are encountered, identify the condition and promptly submit a written report to the Architect.
- F. Perform surveys to detect hazards as selective demolition operations progress.

### 3.02 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by the Owner and other authorities having jurisdiction. Provide temporary services during interruptions to existing utilities which are acceptable to the Owner and other authorities having jurisdiction.
    - a. Reference enclosed University of Kentucky General Conditions and Special Conditions for information regarding Utility Services.



- B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving buildings or areas to be selectively demolished.
  - 1. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.
  - 2. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.
- C. Utility Requirements: Refer to Divisions 20 through 28 Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition Work until utility disconnection and sealing operations have been completed and verified in writing.

### 3.03 PREPARATION

- A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Employ a certified, licensed exterminator and to control rodents and vermin before and during selective demolition operations.
- C. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- D. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
  - 1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
  - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
  - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
  - 4. Provide temporary weather protection on exterior surfaces, during interval between demolition and removal of existing construction and installation of new construction, to ensure that no water leakage or damage occurs to structure or interior areas.
  - 5. Protect walls, ceilings, floors, and other existing finish Work that are indicated to remain and are exposed during selective demolition operations.
  - 6. Cover and protect furniture, furnishings, and equipment that have not been removed.
- E. Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise generated from selective demolition operations.
  - 1. Construct dustproof partitions of not less than 5/8 inch gypsum wall board over 3 5/8 inch metal studs with joints taped on occupied side.
  - 2. Insulate partition to provide noise protection to occupied areas.
  - 3. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
  - 4. Protect all air handling equipment.

### 3.04 POLLUTION CONTROLS

- A. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level, subject to approval of method by Owner.
- B. Clean adjacent surface and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition before start of selective demolition operations.

### 3.05 SELECTIVE DEMOLITION

- A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition work above each floor or tier before disturbing supporting members on lower levels.
  - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering or chopping. Temporarily cover openings to remain.
  - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  - 5. Maintain adequate ventilation when using cutting torches.
  - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - 7. Remove structural framing members and lower to ground by method suitable to avoid free-fall and to prevent ground impact or dust generation.
  - 8. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 9. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
  - 10. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
- B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.
- C. Break-up and remove concrete slabs on grade, unless otherwise shown to remain.
- D. Remove resilient floor coverings and adhesive according to recommendations of the Resilient Floor Covering Institute's (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings" and all subsequent addenda.
  - 1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by the RFCI.

- E. Remove air-conditioning equipment scheduled for demolition without releasing refrigerants.

### 3.06 PATCHING AND REPAIRS

- A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations per Cutting and Patching Requirements of Section 101390 - Coordination and Meetings.
- B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for application of new finishes.
  - 1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to manufacturer's printed recommendations.
- C. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.
- D. Patch and repair floor and wall surfaces in the new space where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance.
  - 1. Closely match texture and finish of existing adjacent surfaces.
  - 2. Patch with durable seams that are as invisible as possible and are in compliance with specified tolerances.
  - 3. Where patching smooth painted surfaces, extend final paint coat over entire unbroken surface containing the patch after the surface has received primer and second coat.
  - 4. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - 5. Inspect and test patched areas to determine integrity of the installation, where feasible.
- E. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

### 3.07 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport off property of Owner and legally dispose of demolished materials.

### 3.08 CLEANING

- A. Sweep the building broom clean on completion of selective demolition operations.
- B. Change filters on air-handling equipment upon completion of selective demolition operations.

**END OF SECTION**

## SECTION 078400

### FIRESTOPPING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Through-penetration firestopping in fire rated wall and floor construction.
- B. Construction gap and joint firestopping within fire-rated walls, floors or floor-ceiling assemblies.
- C. Construction gap and joint firestopping at intersections of the same or different materials in fire-rated construction.
- D. Construction gap and joint firestopping at the top of fire-rated walls.
- E. Through-penetration and construction gap/joint smoke-stopping in smoke partitions.

##### 1.02 RELATED SECTIONS

- A. Section 079200 - Joint Sealants.
- B. Section 092116 - Gypsum Board Systems.

##### 1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM) Publications:
  - 1. E 84 - Standard Test Methods for Surface Burning Characteristics of Building Materials.
  - 2. E 119 - Methods of Fire Tests of Building Construction and Materials.
  - 3. E 814 - Standard Method of Fire Tests of Through-Penetration Firestops.
  - 4. C 719 - Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement.
  - 5. C 920 - Standard Specification of Elastomeric Joint Sealants.
- B. Underwriters Laboratories Inc. (UL) Publications:
  - 1. UL 263 - Fire Tests of Building Construction and Materials
  - 2. UL 723 - Surface Burning Characteristics of Building Materials.
  - 3. UL 1479 - Fire Tests of Through-Penetration Firestops.
  - 4. UL 2079 - Standard for Fire Tests of Joint Systems.
  - 5. Underwriters Laboratories "Fire Resistance Directory" (Current Year).
    - a. Through-Penetration Firestop Device (XHJI).
    - b. Fire-Resistive Ratings (BXUV).
    - c. Through-Penetration Firestop Systems (XHEZ).
    - d. Fill, Void, or Cavity Material (XHHW).
    - e. Joint Systems (XHBN).
- C. Miscellaneous Publications:
  - 1. Factory Mutual Approval Guide (Current Year).
  - 2. Intertek Testing Service (Warnock Hersey) Certification Listings.

#### 1.04 DEFINITIONS

- A. Fire Rated Assembly: Includes all fire rated walls, floors, floor/ceiling and roof system assemblies. Ratings shall be per ASTM E 119 or UL 263 (See Paragraph 1.03).
- B. Barriers: Time rated fire walls, smoke barrier walls, time rated ceiling/floor assemblies and structural floors.
- C. Firestopping: Use of a material or combination of materials to fill or seal openings in a fire-rated assembly, to restore the integrity of the assembly, and to prevent the spread of heat, fire, gases and smoke.
- D. System: Specific products and applications, classified and numbered by Underwriter’s Laboratories, Inc. to seal openings in fire-rated assemblies.
- E. Penetration: An opening or object passing through or into a fire-rated wall or floor that breaches the fire-rated assembly.
- F. Construction Gaps: Any gap, joint or opening (static or dynamic) between adjacent sections of walls or floors, at wall tops between top of wall and ceiling, exterior walls and structural floors or roof decks. Where dynamic movement is required the system must comply with UL 2079.

#### 1.05 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
  - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
  - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
  - 3. Fire-resistance-rated floor assemblies.
  - 4. Fire-resistance-rated roof assemblies.
  - 5. Fire-resistance-rated joint assemblies between edges of fire-resistance-rated floor assemblies and exterior curtain walls.
- B. Fire-Test Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in “Performance Requirements” Paragraph:
  - 1. Firestopping materials shall conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions.
- C. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E814, but not less than one (1) hour or the fire resistance rating of the assembly being specified.
- D. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
  - 1. Penetrations located outside wall cavities.

2. Penetrations located outside fire-resistive shaft enclosures.
  3. Penetrations located in construction containing fire-protection-rated openings.
  4. Penetrating items larger than 4 inch diameter nominal pipe or 16 square inches in overall cross-sectional area.
- E. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction:
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
  2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
  3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- F. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E84.
- G. Firestopping for joints must meet or exceed the requirements for ASTM E1966.E1399 or UL 2079 with movement capabilities equal to those of the anticipated conditions.

#### 1.06 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
  2. Where Project conditions require modification of qualified testing and inspecting agency's illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Submit document from manufacturer wherein manufacturer recognizes the installer as qualified.

#### 1.07 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction conditions indicated, from a single manufacturer.

- C. Firestopping materials and systems must be capable of closing or filling through-openings created by:
  - 1. The burning or melting of combustible pipes, cable jacketing, or pipe insulation materials
  - 2. Deflection of sheet metal due to thermal expansion (electrical & mechanical duct work).
- D. Firestopping material shall be asbestos and lead free and shall not incorporate nor require the use of hazardous solvents.
- E. Firestopping sealants must be flexible, allowing for normal pipe movement.
- F. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
- G. Firestopping materials shall be moisture resistant, and may not dissolve in water after curing.
- H. All firestopping materials shall be manufactured by one manufacturer (to the maximum extent or approved by the firestop manufacturer).
- I. Installation of firestopping systems shall be performed by a contractor (or contractors) trained or approved by the firestop manufacturer.
- J. Material used shall be in accordance with the manufacturer's written installation instructions.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- C. All firestop materials shall be installed prior to expiration of shelf life.

#### 1.09 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per the manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.
- C. Verify the condition of the substrates before starting Work.
- D. Care should be taken to ensure that firestopping materials are installed so as not to contaminate adjacent surfaces.

## 1.10 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until building inspector, if required by authorities having jurisdiction, have examined each installation.
- D. Schedule firestopping after installation of penetrants but prior to concealing the openings. **Penetrations shall be firestopped the same day the penetration is created. Provide temporary approved firestopping system if required due to scheduling conflicts amongst trades.**
- E. Firestopping shall precede gypsum board finishing.

## PART 2 PRODUCTS

### 2.01 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to the following items:
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Poly-Ethylene/Poly-Urethane backer rod.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars/Devices.
  - 5. Steel Sleeves.
- C. All firestop products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.
- D. For applications where combustible penetrants are involved, i.e. insulated and plastic pipe, a suitable intumescent material must be used.



## 2.02 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials required by the manufacturer. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Device: A metallic sleeve lined with an intumescent material sized to fit a specific diameter for non-metallic penetrants.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled or field assembled collars or sleeves formed from galvanized steel and lined with intumescent material sized to fit the specific diameter of a non-metallic penetrant.
- E. Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric strips with polyethylene on both sides.
- G. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form an expanding homogeneous mortar.
- H. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

## 2.03 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## 2.04 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the requirements contained herein, provide single-source firestopping products from only one of the following manufacturers:
  - 1. Hilti, Inc. (Tulsa, OK).
  - 2. International Protective Coatings Corp. (IPC) (Hatfield, PA).
  - 3. Isolatek International (Stanhope, NJ).
  - 4. 3M Fire Protection Products (St. Paul, MN).
- B. Substitutions: Under provisions of Section 016000.

## 2.05 MATERIALS

### A. Intumescent Firestop Sealants and Caulks:

1. FlameSafe FS1900.
2. Cafco Type I.
3. 3M CP 25 WB+.

### B. Latex Firestop Sealant:

1. FlameSafe FS900.
2. Cafco Type C.
3. 3M Firedam 150.

### C. Elastomeric Water-Based Sealant:

1. FlameSafe FS1900, FS900+.
2. 3M Firedam 150+, CP 25 WB+.

### D. Firestop Putty:

1. FlameSafe FSP1000 Putty & FSP1077 Putty Pads.
2. Cafco Type P.
3. 3M MPS-2+ Putty, MPP-4S+.

### E. Firestop Collars:

1. FlameSafe FSWS-1", FSWS-1.5", FlameSafe Devices, FSIS Sleeve.
2. 3M PPD, PPD Ultra Device.

### F. Wrap Strips:

1. FlameSafe FSWS 100 Wrap Strip, FSWS 150 Wrap Strip.
2. 3M PPD, PPD Ultra Device.

### G. Firestop Mortars:

1. FlameSafe Mortar.
2. Cafco TPS Mortar.
3. 3Mfire barrier Mortar.

### H. Firestop Pillows:

1. FlameSafe Bags, FlameSafe Pillows.
2. 3M CS-195+ Composite Sheet.

### I. Elastomeric Spray:

1. FlameSafe FS3000, FS2900.
2. 3M Firedam Spray.

### J. Accessories: Forming/Damming Materials: Mineral fiberboard or other type as per manufacturer's recommendations.

- K. Color: All firestopping materials shall be red.

### **PART 3 EXECUTION**

#### **3.01 CONDITIONS REQUIRING FIRESTOPPING**

- A. General: Provide firestopping for conditions specified.
- B. Through-Penetrations: Firestopping shall be installed in all open penetrations and in the annular space in all penetrations in any bearing or non-rated barrier.
- C. Membrane-Penetrations: Where required by code, all membrane-penetrations in rated walls shall be protected with firestopping products that meet the requirements of third party time/temperature testing.
- D. Construction Joints/Gaps: Firestopping shall be provided:
1. Between the edges of floor slabs and exterior walls (as required for enclosed areas).
  2. Between the tops of rated walls and the underside of floors/roof decks.
  3. In the control joint in masonry walls and floors.
  4. In expansion joints.
- E. Smoke-Stopping: As required by the other Sections, smoke-stops shall be provided for through-penetrations, membrane-penetrations, and construction gaps with a material approved and tested for such application.

#### **3.02 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify that all pipes, conduits, cables, and/or other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

#### **3.03 PREPARATION**

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
  2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
  3. Remove laitance and form-release agents from concrete.

### 3.04 THROUGH-PENETRATION FIRESTOP SYSTEM

- A. General: Install through-penetration firestop systems to comply with “Performance Requirements” Article and firestop system manufacturer’s written installation instructions and published drawings for products and applications indicated.
1. Installation of firestopping shall be performed by an applicator/installer qualified and trained by the manufacturer.
  2. Apply firestopping in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer’s recommendations.
  3. Unless specified and approved, all insulation used in conjunction with through-penetrants shall remain intact and undamaged and may not be removed.
  4. Seal holes and penetrations to ensure an effective smoke seal.
  5. In areas of high traffic, protect firestopping materials from damage. If the opening is large, install firestopping materials capable of supporting the weight of a human.
  6. Insulation types specified in other Sections shall not be installed in lieu of firestopping material specified herein.
  7. All combustible penetrants (e.g. non-metallic pipes or insulated metallic pipes) shall be firestopped using products and systems tested in a configuration representative of the field condition.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems. Noncombustible damming materials may be left as a permanent component of the firestop system.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.05 IDENTIFICATION

- A. Retain this article if labels are required; revise if labeling is limited to selected applications. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  2. Contractor's name, address, and phone number.
  3. Designation of applicable testing and inspecting agency.
  4. Date of installation.
  5. Manufacturer's name.
  6. Installer's name.

### 3.06 FIELD QUALITY CONTROL

- A. Inspecting Agency: The building inspector, if required by authorities having jurisdiction, shall be allowed to inspect through-penetration firestop systems. All areas of Work must be accessible until inspection by the applicable Code Authorities.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspections are complete.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

### 3.067 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur. Leave finished Work in neat, clean condition with no evidence of spillovers or damage to adjacent surfaces.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

**END OF SECTION**

# 142000S02 Hydraulic and Traction Elevators

## I. GENERAL

### A. ELEVATOR STANDARD - UPDATES AND REVISIONS

This standard is to be used for design, installation, construction, and/or renovation of elevators for and in University of Kentucky buildings. It is a living document; therefore, updates will be made as conditions and/or new regulations require. Further, when a user of this standard perceives the need for revisions, additions, deletions, and/or other changes, a request for revision should be put in writing to the Campus and/or Med Center Physical Plant Director for consideration. A request for a revision may not necessarily result in the Elevator Standard being revised.

### B. TERMS

1. University Project Manager  
"University Project Manager" means the individual from the Capital Project Management Division (CPMD), the Campus Physical Plant Division (CPPD), or the Medical Center Physical Plant Division, or other University Facility Division who is designated to be in charge of the Project.
2. Consultant  
"Consultant" means the individual, the Elevator Consultant, the Engineer, and/or the Architect who is responsible for the design of the elevator system or renovation project. The consultant may be an employee of the University of Kentucky Facilities Management Division.
3. Contractor  
"Contractor" means the successful bidder/firm to whom the contract to construct the elevator system has been awarded.
4. Owner  
When used, "Owner" shall mean the University of Kentucky and/or one of the Facilities Management Divisions.

### C. DEPARTMENT SPECIFIC CONDITIONS

This University of Kentucky Elevator Standard applies to a variety of conditions and types of elevators. Some specific peripheral requirements may differ between the Lexington Campus elevators and those for service in the Medical Center and/or other University Departments; however, the basic requirements of this standard shall be used in any elevator design or renovation.

### D. CODES AND REGULATOR AGENCIES

Refer to University of Kentucky Official Design Standards for General Conditions and Special Conditions for code and regulatory compliance requirements. However, it must be understood that all codes and requirements of Federal, State, and Local regulatory agencies are to be applied to all elevator purchases, installations, maintenance, and construction projects in University of Kentucky buildings. Some of the conditions following make reference to these; however, such limited references do not exclude University departments, the Consultant, or the contractor from fully applying all codes and regulatory requirements to University of Kentucky situations.

### E. INTENT

It is the intent of these standards to provide guidelines in developing vertical transportation systems that:

1. Provide acceptable levels of elevator service as related to the Average Interval and Handling Capacity.

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2. Provide safe and convenient transport of passengers and material.
3. Provide systems that meet the highest level of accessibility for people with disabilities.
4. Incorporate specifically identified standardized parts for easy maintenance and rapid repair and/or replacement.
5. Provide reliability and achieve desired lifecycle service and cost, and
6. Provide for standardized control systems and other identified equipment as chosen by the University of Kentucky thereby eliminating the installation of manufacturer proprietary equipment, parts, and controls.

### F. NON-PROPRIETARY EQUIPMENT, PARTS, AND CONTROLS

The University of Kentucky does not have in-house maintenance personnel and therefore relies upon contractor(s) to maintain the equipment. The maintenance contractor is acquired through a bid process and is not necessarily the original equipment manufacturer or installer. Therefore, it is required that, for specific items indicated in this standard, University of Kentucky approved and non-proprietary equipment, parts, and controls items (including circuit boards, chips, diagnostic tools, etc.) be bid and installed. Approved and acceptable non-propriety equipment, parts, and controls are listed in the sections following. Further, all non-propriety controls, tools, passwords, equipment, parts, and training necessary to service the elevator be provided to the University of Kentucky by the manufacturer and/or the Contractor.

Note: (Revised 02/14/2014): An elevator manufacturer and/or their suppliers may bid for and if successful furnish and install their as-designed elevator systems for installation in University of Kentucky buildings or construction projects. With their bid documents there must be submitted a statement that there are no proprietary parts or equipment in the elevator system(s) and that they are meeting the intent of this standard (i.e. that any and/or all parts, materials, maintenance drawings, maintenance tools, circuit boards, etc. will be available to the University and/or its elevator service provider(s) at the prevailing wholesale market prices at the time of need. The following statement will be part of elevator bid requests to satisfy the requirement of this item.

“The undersigned bidder/company hereby agrees that no proprietary situations will be imposed as to the providing to the University’s elevator service providers any maintenance drawings, equipment, part, or control items (including circuit boards, chips, diagnostic tools, etc.), etc. required for the maintenance and upkeep of the elevators provided on this project. Further, the items will be sold to the University’s elevator service providers at current wholesale costs and without undue delay.”

### G. REQUIRED DESIGN CRITERIA

The Consultant shall use and/or obtain and use the following in the design of a new elevator installation including elevators in and for building renovations and/or additions and/or for elevator modernization and upgrades.

1. Elevators shall be installed in buildings that are two stories and higher. The design shall provide direct service to all floors in the building, including floors where mechanical rooms are located.
2. Elevators shall be given an individual numbering identity. The number shall be the University 4-digit number followed by an alpha digit assigned to the individual elevator and shown on the construction documents. If the building has only one elevator the number would be XXXX-A; if two elevators the numbers would be XXXX-A and XXXX-B, etc.

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~~Note: When a building addition is undertaken, and additional elevators are added, the new elevators must be numbered consecutively after the existing elevators. If existing elevators are numbered xxxx-A and xxxx-B the next elevator added shall be "xxxx-C" etc. The reason being that the existing elevators are already listed as such in the State Elevator Inspector's files and there can be no duplicates.~~

3. All elevator design must be done with consideration of and for the existing University of Kentucky elevator maintenance agreements. Copies of the contracts are available from the departments and/or the Purchasing Division.
  - a. The maintenance agreements for different Facilities Divisions may not be identical having area-specific or use-specific deviations.
  - b. At the end of the contractual obligation (warranty period) of any new elevator installation, the new elevator will be maintained under the service agreements then in existence.
  - c. The end-of-warranty maintenance contract for a new elevator installation will be awarded through existing Purchasing Division procedures.

### ~~H. PRE-DESIGN ANALYSIS (NEW CONSTRUCTION)~~

~~For each individual project and/or system, the Consultant shall, including but not limited to, provide traffic analysis for all buildings, especially high-rise and/or complex-use buildings and identify the type, size, and capacities of proposed elevator(s).~~

### I. SPECIAL REQUIREMENTS BY UK FIRE MARSHAL

1. When emergency power is provided for the new or modernized elevator system, the elevator(s) shall be tested under a FULL load on the generator. This would include all emergency lighting and other emergency loads connected to the generator.
2. Fireman's Service shall be tested under emergency power conditions.
3. For Fireman Service priority floor designations, the UK Fire Marshal's office shall be consulted as to which floors will become Priority 1 and Priority 2 for emergency return situations.
4. Provide a lockable secure storage box on the Priority 1 floor for the firemen's service key(s). The Consultant shall request storage box keying information from the UK Fire Marshal.

## II. ELEVATOR EQUIPMENT

### ~~A. TRACTION ELEVATORS~~

- ~~1. Geared traction elevators shall be used for all medium-duty and heavy-duty applications that exceed 50 feet of travel or four stops.
  - a. Overhead traction elevators to be used when conditions allow a penthouse above 50 feet of travel. (No maximum on size or speed).
  - b. Basement set traction elevators to be used on elevator capacities of 4000# or more if penthouse is not an option (due to building conditions). (No maximum on size, speed limited to 200 fpm).~~
- ~~2. Geared traction elevators shall be used in parking ramps regardless of travel or number of stops.~~



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- ~~3. Unless specified otherwise or emergency power is not available, emergency power shall be provided to a single elevator system, or, with selectivity switching, for one elevator in a bank of elevators.~~
- ~~4. Elevator equipment must include hall floor indicators on every level.~~
- ~~5. Controllers:
  - ~~a. Non-proprietary controllers:
    - ~~• Virginia Controls, Inc. (<http://www.vacontrols.com>)~~
    - ~~• Smartrise Engineering, Inc. [www.smartrise.us](http://www.smartrise.us)~~
    - ~~• G. A. L. Manufacturing Corp. [www.gal.com](http://www.gal.com))~~~~
  - ~~b. The controller shall be capable of continuous operation in ambient temperatures between 65 degrees F and 90 degrees F.~~
  - ~~c. Specialized diagnostic devices used to check the operation of the microprocessor and not permanently attached to the controller, shall be provided as part of the contract and shall become university property.~~
  - ~~d. Diagnostic tools or devices requiring "reloading" or "recharging" by the manufacturer shall not be used on a University of Kentucky project.~~~~
- ~~6. Car Speed:  
Minimum 200 feet per minute (The Consultant may require and/or propose a higher speed for high-rise or group systems)~~
- ~~7. Rise:  
Any elevator utilizing more than four openings in line, or having abnormally tall floor heights (more than 12 feet), must be reviewed for speed requirements.~~

### B. HYDRAULIC ELEVATORS

Note: As the current 2004 code requires a PVC jack casing and oil monitoring, vegetable oil for use in the University of Kentucky elevators is not to be specified unless there is a specific requirement for such.

1. Conventional In-ground single jacks to be used up to 50' of travel with a code machine room adjacent or remote as required.
2. Hydraulic freight elevators shall be limited to a maximum travel of 50 feet.
3. Unless specified otherwise or emergency power is not available, emergency power shall be provided to a single elevator system, or, with selectivity switching, for one elevator in a bank of elevators.
4. Elevator equipment must include hall floor indicators on every level.
5. Controllers:
  - a. Non-proprietary controllers:
    - VAC's MH series for group (3 or more car) operation applications.
    - Smartrise Engineering, Inc. [www.smartrise.us](http://www.smartrise.us)
    - G. A. L. Manufacturing Corp. [www.gal.com](http://www.gal.com))
  - b. The controller shall be capable of continuous operation in ambient temperatures between 65 degrees F and 90 degrees F.
  - c. Use non-proprietary mechanical or solid-state starter systems. Proprietary

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manufacturer's starter systems are prohibited.

- d. Specialized diagnostic devices used to check the operation of the microprocessor not permanently attached to the controller shall be provided as part of the contract and shall become university property.
  - e. Diagnostic tools or devices requiring "reloading" or "recharging" by the manufacturer shall not be used on a University of Kentucky project.
6. A battery-operated lowering device for emergency use in the event of a main power supply failure shall be installed if required by codes. (This may not be required if emergency power is supplied to the elevator system).
  7. Speeds:
    - a. Typical car speed is 125-150 feet per minute.
    - b. ~~Two stop applications may successfully use 100-125 fpm.~~
  8. Rise:

~~Where the building rise is more than 50 feet, or the elevator requires staggered openings on either end of the car, use traction system.~~
  9. Power Units:

Submersible only.
  10. Control Valves:
    - a. Elevator Equipment Corporation (EECO) control valves  
www.elevatorequipment.com (1-888-577-33260)
    - b. Maxton Manufacturing Co control valves www.maxtonvalve.com (1- (775) 782-1700)
    - c. Vertical Xpress I-2 control valves  
www.verticalxpress.com (1-866-448-3789)
  11. ~~Hydraulic Tank:~~

~~Provide internal tank heater for elevators in parking garages, unheated buildings, or where exposed to extremely cold and/or freezing temperatures.~~

### ~~C. MACHINE ROOM LESS ELEVATORS (MRL)~~

- ~~1. Hydraulic MRL elevators shall be limited to two stage pistons and 27 feet of travel and shall have a code control room at the bottom floor (adjacent on left, right or rear side of hoistway). All other hydraulic elevator requirements listed in this standard apply.~~
- ~~2. Traction MRL elevators shall be specified above 50 feet travel and shall have a control room at the top floor (adjacent if possible). Maximum capacity 5000# and speeds to 500 fpm. All other traction elevator requirements listed in this standard apply.~~

### ~~D. HOLELESS ELEVATORS~~

~~Holeless elevators will be considered for use on a case by case basis.~~

### ~~E. CHAIR AND PLATFORM LIFTS~~

~~Chair and platform lifts shall be chosen and approved on a case by case basis.~~

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### F. PUSHBUTTON FIXTURES

1. Provide vandal resistant pushbutton fixtures with tamper proof screws as manufactured by:
  - a. Innovation Industries, Inc. [www.innovationind.com](http://www.innovationind.com)
  - b. GAL Manufacturing Corp. [www.gal.com](http://www.gal.com), or
  - c. Elevator manufacturer tamper-proof push-button system. Refer to "NON-PROPRIETARY EQUIPMENT, PARTS, AND CONTROLS" elsewhere in this Standard.
2. Locate digital car position indicators on each floor in the elevator lobby over the door opening, adjacent to the hoist way door entrance, or contained within the hall pushbutton fixture.
3. Use vandal resistant car direction indicators located on the elevator car to indicate direction of travel and visual arrows for car direction.
4. Provide arrival gongs at each elevator lobby.
5. Provide the Fire Service key switch at the main fire-recall lobby pushbutton.
  - a. Provide a lighted jewel to indicate Fire Service Operation.
  - b. Engrave, etch, or emboss fire service instructions on the fixture cover in accordance with ASME A17.1a.
  - c. Provide etched, embossed, or engraved Fire Service Signage located on each hall pushbutton cover.
- d. All Campus (CPPD) Fireman Service Keying requirements shall be for key number **FEOK1** (Barrel shaped Key). Other Facilities Management Divisions may specify their keying options in specifications if different.
6. Push button designation numbering shall match the architectural room numbering designation i.e. if architectural drawing calls the lowest floor "Ground Floor" the elevator floor designation shall not be "Basement" etc.
7. Surface applied signage is prohibited.

### G. POWER DOOR OPERATOR EQUIPMENT

#### 1. Passenger Elevators

For passenger elevators, use only door operator equipment that includes drive operator, hangers, locks, closures, etc. as manufactured by GAL manufacturing Corp. ([www.gal.com](http://www.gal.com)) 1-877-425-3538.

- a. Door operators and related equipment for passenger elevator and freight elevators with bi-parting doors shall be by GAL Corp. model MOVFR with VVVF drive.
  - Use low speed operators up to three-stop elevators.
  - Use high-speed operators at all other locations.

#### 2. ~~Freight Elevators~~

~~Freight elevators having bi-parting horizontal doors, equipment shall be by EMS Group, St. Louis, MO (800-489-4889 or 314-381-0500).~~

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## III. CARS

### A. CAR DESIGN

#### 1. Interiors:

- a. The car enclosure shall meet the requirements required by ASME A17 for smoke development and flame spread.
- b. Car platforms shall be standard manufacturer sizes unless the University specifically requests a non-standard platform size.
- c. Standard interior walls shall be small-patterned Rimex Metals 5WL Stainless Steel (unless approved otherwise).

Note: For a new building project or architectural renovations where the atmosphere of the building design will require an exceptionally refined interior, the architect may design the interior to suit the features and use of the building and present the design for review and approval.

- d. The Contractor/manufacturer shall provide to the Owner/Consultant for review, car interior designs, and finish selections.
- e. Install moving pad hooks in all elevator cars.
- f. When moving pads are specified, provide a locked fireproof cabinet in the elevator equipment room for hanging storage of the pads.
- g. Install ADA compliant handrails in the car.
- h. For all medical facilities and buildings in which cart usage is anticipated or are to be used, bump rails shall be installed 4 to 6 inches above the floor level.
- i. Car Flooring:
  - For all medical facilities, flooring shall be terrazzo.
  - **All other buildings will have water resistant flooring of black radial rubber flooring unless otherwise approved.**

#### 2. Indicators:

- a. Locate the car digital position indicator over the transom or within the car-operating panel.
- b. Place the Car Direction Indicators in the car doorframe where they will be visible from the vicinity of the hall pushbutton.
- c. Every car direction indicator must be visible from the immediate vicinity of the hall pushbutton.

#### 3. In-car lighting:

Each elevator car shall have an aesthetic ceiling structure that properly supports the installation of the number of lamp holders using LED low watt bulbs to appropriately laminate the interior of the car to system and code standards. Replacement of the lamps shall be easy access from the interior of the car.

### B. CONTROL PANEL

#### 1. Keys and switches:

- a. Provide switches for lights, fan (2-speed), emergency stop and service and/or inspection.
  - Toggle switches shall be located behind a locked door keyed with a best 7-pin small format cylinder. Door to have "Slam door lockset for service cabinet with a Yale or Best 7-pin security switch with removable core by Innovation Industries, Inc. or equal.

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- Key should be removable only in the normal locked position.
  - Use Best Cylinder with removable core and 7-pin small format for CPPD Division and 7-pin small format Yale cylinders with removable core for MPPD. Other Facilities Management Divisions will specify their keying options in specifications.
- b. Provide a two-speed fan switch; key should be removable in all positions; use Best Cylinder with removable core for CPPD and 7-pin Yale with removable core for MPPD). Other Facilities Management Divisions will specify their keying options in specifications.
  - c. Provide each car-operating panel with an emergency stop key switch, key should be removable in all positions; use Best Cylinder with removable core for CPPD and 7-pin Yale with removable core for MPPD). Other Facilities Management Divisions will specify their keying options in specifications.
    - Position the cylinder near the bottom of the pushbuttons with the key removable in either position and with one set of normally closed contacts.
    - Mark the switch with etched, engraved, or embossed “ON” and “OFF.”
  - d. Where special key switches or card readers and/or other devices are used to lock out particular floor and/or functions:
    - Wire controls so as not to interfere with Fire Service operation.
    - Provide temporary inactivated push buttons for each floor even if a key switch, card reader, and/or other devices are required.
  - e. For restricted access to a Penthouse mechanical room, provide lock-out keyed switch on the Penthouse push button (the push button is to be activated by the keyed switch); **key shall not be removable** in the activation position. (Use Best Cylinder with removable core for CPPD and 7-pin Yale with removable core for MPPD). Other Facilities Management Divisions will specify their keying options in specifications.
  - f. For unrestricted elevator service to the penthouse, provide a keyed switch to over-ride the Penthouse mechanical room keyed button lock-out switch; **key shall be removable** in all positions (Use Best Cylinder with 7-pin small format removable core). Place this over-ride switch in the top area of the car panel. Other Facilities Management Divisions will specify their keying options in specifications.
2. Fireman Service Controls

In-car Fireman Service Controls shall be in a reachable, recessed, and in a locked panel in the control panel and at the top portion of the panel.

    - a. Engrave, etch, or emboss fire service instructions inside the fixture cover in accordance with ASME A17.1a.
    - b. Key number shall be **FEOK1** (Barrel shaped Key) for all campus buildings.
  3. Provide each car-operating panel with special language etched, engraved, or embossed pertaining to the posting of the Elevator Permit and the Capacity of the elevator.

### C. TWO-WAY COMMUNICATIONS

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1. The device shall consist of a single pushbutton, automatic dialer with appropriate indicator lights, and all other essential features necessary to comply with ADA.
2. **The emergency phone shall be Ramtel model RR833-OEM and be mounted flush on the back of a hinged door at the bottom portion of the in-car control panel and locked with a barrel key #EX513.**
3. **The communication device shall be as manufactured by Ramtel model RR833-OEM to match the existing elevator emergency communication system including remote location indicator and other existing features now in use.**
4. A stand-alone flush box-type device is not to be used without approval of the Owner.
5. The face plate shall have, including but not necessarily limited to:

**EMERGENCY PHONE  
UNIVERSITY OF KENTUCKY**

(include **UK** logo - Contact UK Public Relations for most recent logo updates)

Other information and instructions on the faceplate are as provided by the Ramtel communication device.

6. **RAVE Eyewitness Signage** should be included in every University of Kentucky owned elevator. The signs are 7.5 inches wide and 5.5 inches tall and should be installed at eye level as close to the emergency elevator call box as possible inside the elevator car. The signs are constructed from a hard plastic with quality 3M 467MP 200MP adhesive on the back. They should be UK Blue with white wording. The University Sign Shop has this on file.
  - a. Wording should be as follows in both English and Spanish:

**Need Assistance?  
This elevator is equipped with EyeWitness technology.**

**If you need assistance, text  
"UKFM Elevator Help" to 67283**

### IV. PIT, HOISTWAY, AND WELL HOLES

- A. PIT AND HOISTWAY
  1. Pit Access:
    - a. Provide a metal ladder from each pit floor starting 12" above the pit floor and extending to 48" above the lowest landing floor level.
    - b. Locate the ladder at strike jamb side of hoistway when single panel or two speed doors are used.
    - c. Where center opening doors are used, locate the ladder on the nearest sidewall.
  2. Sump Pit:
    - a. Provide a sump pit with easily removable sump pump and approved cover below normal pit grade for all elevators.
    - b. Pipe the sump pump discharge into an open gap drain connected to nearest

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- c. sanitary sewer.
  - c. Furnish the sump pump with integral oil sensor so that pump will not operate if hydraulic fluid is contaminating the water.  
Products are available from SEEWATER, Inc.  
(www.seewaterinc.com) 1-888-733-9283 or (EECO)  
www.elevatorequipment.com (1-888-577-33260).
  - d. Provide a high-water alarm and run conduit and wire to the building Energy Management System's designated location.
3. Hoistway Entrances:
- a. Provide nickel silver or chrome plated cast iron sill plate at entrance threshold as manufactured by Plymouth Engineering Shapes of Hopkinsville, Kentucky [www.plymouth.com/](http://www.plymouth.com/) or approved substitute. Grout sills in place with using a non-shrink, non-metallic grout.
  - b. Set entrances in vertical alignment with car openings and aligned with plumbed hoist way lines. Use ¼" clearances around frame and doors as standard. Fill or slush hoist way doorframes.
  - c. Provide dust covers at hoist way entrances that conceal the hoist way door tracks and interlocks. Provide covers no less than the width of the door opening plus 12". Mount covers securely to the header by use of metal screws with keyhole openings. The cover shall be capable of being removed without need of removing screws entirely.
  - d. Provide sight guards permanently fastened to the hoist way door and of the same color or finish as the hoist way door. There shall be no holes in the guards other than those used to fasten the guard to the door.
  - e. Provide a means of emergency access for each hoist way door as selected by the Owner and or current codes.
  - f. Provide stainless steel hoistway doors and entrances with brushed stainless steel finish.
  - g. Provide an approved automatic fire detection system (smoke detector) that will respond to visible or invisible particles of combustion connected to building fire alarm system at elevator lobbies and top of the hoistway.
  - h. Provide hoistway venting as may be required by the KENTUCKY BUILDING CODE Section 3004.
  - i. Provide car door protective device extending the full height. This device will be designed to sense an obstruction in its path while the doors are closing and automatically cause the car and hoistway door to return to the open position. The doors will remain open until the expiration of a time interval and then close automatically. Device shall be Janus Pana40 Plus 3D. For manufacturer package systems, their system plug and play protective device is acceptable.
4. Maintain hoistway temperature between 50 to 90 degrees F.
5. Piping, conduit, and other Items unrelated to the elevator are prohibited in the hoistway or pit.
- B. FIRE PROTECTION
- 1. If the building is fully sprinkled, it is required to have sprinklers in the top of the shaft and in the pit.
    - a. All codes associated with a hoistway as to life safety, fire alarm, and sprinkler installation shall be applied.
    - b. There shall be a sump provided in the pit with a sump pump satisfying all conditions for sump pump installations as described in this standard.

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Note: Hoistway exemption allowed by the KBC (2007):

If the Hoistway is of noncombustible construction (concrete or concrete block) and the car enclosure meets the requirements of ASME A17.1 for smoke development and flame spread, the sprinkler in the top of the shaft may be omitted (also found in NFPA 13 code rule 8.14.5.5). (Always check current codes before applying this exemption.)

3. For fully sprinkled building, the pit shall always be sprinkled. The pit sprinkler shall be a sidewall sprinkler type with down-direction spray and the head must be located within 2' of the pit floor.

### C. WELL HOLES, CASINGS & CYLINDERS

1. Use steel cased holes for hydraulic applications sized properly for each set of circumstances. Place hydraulic cylinders in the pre-drilled casing and use a jack aligning disk light to align the cylinder in the presence of the Consultant.
2. Enclose hydraulic cylinders in PVC to prevent corrosion and electrolysis. Cap the bottom of the PVC liner extend it upward to a point higher than the pit floor.
3. Back fill the cylinder with dry sand from the bottom of the cylinder to the pit floor to prevent the bottom of the casing from moving. Provide a minimum of four (4) inches of concrete at the top of the cylinder to finish the pit floor.
4. Fasten top of cylinder to prevent unit from moving during operation. The elevator shall operate without the piston rubbing, bumping or otherwise contacting the inside wall of the cylinder during operation.

## V. ELEVATOR EQUIPMENT ROOMS

### A. ELEVATOR EQUIPMENT ROOM

1. Design:
  - a. Integrate the elevator penthouses into the overall building architectural design to create a unified and compatible appearance from the exterior.
  - b. For new construction, provide approved stairs for access to elevator equipment rooms. Ship's ladders and alternating tread stairs are prohibited.
  - c. Equipment, piping, conduit, etc. unrelated to the elevator are prohibited in the elevator equipment room.

### 2. Fire Protection:

- a. If the building is fully sprinkled, it is required to have sprinklers in the equipment room.

Note: Equipment Room Exemption allowed by the KBC (2007): If the equipment room is two-hour rated, the sprinklers may be omitted. To apply this exemption, the contractor shall have the approval of the University Fire Marshal. (Always check current codes before applying this exemption.)

- c. Provide 2-hour fire-resistant, labeled, and latching door with closer and Storeroom function mortise lockset.
- d. Provide a fire extinguisher in machine room mounted on the wall near the entrance door. A cabinet for the fire extinguisher is not required.
- e. Provide an approved automatic fire detection system (smoke detector)



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that will respond to visible or invisible particles of combustion connected to building fire alarm system.

3. Elevator Machine Room Power Panel (Emergency Power When available): All lighting and general power requirements of the machine rooms, cars, hoistways, sump pumps, and pits shall be extended from this panel and shall satisfy all codes and have the approval of the Kentucky State Electrical Inspector.
  - a. Furnish and install a Square D 120/208V 3- $\Phi$  panel board located in the Equipment Room sized for the elevator system general power and lighting requirements for the machine room, hoistway(s), sump pump(s), and pit(s).
  - b. The panel board may only be used for general power and lighting loads related to the elevator system.
  - c. The panel board shall be clearly labeled as "For Elevator Circuits Only."
  - d. For each 110/120 VAC car light system, provide a lockable circuit breaker in the panel board.
  - e. Use only code-sized rigid conduit in the elevator Equipment Room for main power equipment. Minimum  $\frac{3}{4}$  inch.
  - f. Provide GFI duplex receptacles in the elevator pit and one in the elevator equipment room.
4. Climate Control:
  - a. Provide HVAC building or self-contained equipment and ducting to maintain machine room temperature between 50 to 90 degrees F.
5. Data/Communications:
  - a. Furnish data line terminated in a telephone jack in each elevator equipment room (only if specified and/or required on the specific project).
  - b. Furnish two (2) telephone lines in each elevator equipment room. One line is to be used for the emergency call system and one line is to be used for a remote monitoring system. The University will be responsible for activation of the telephone lines.
  - c. For Medical Center installations, the elevator is to be connected to the existing Tridium Building Automation System. All associated hardware, software, cabling and conduit for a complete connection to the system is to be included as part of the elevator contract. Connection is to be made via BacNet/IP, BacNet/MSTP or Modbus protocols.
6. Sound Control:

If elevator equipment room is adjacent to an occupied space, provide drop seal and sound gaskets on door with sound batten insulation in walls. The Consultant is responsible for determining if additional sound absorbing materials are needed inside of the elevator equipment room to meet program requirements such as pipe isolators, submersed pumps, etc..
7. Equipment Room Security:
  - a. CPPD – Key to building mechanical room system; Owner to supply information.
  - b. MPPD – Install card reader to match building system.
  - c. Other Departments – Key by department instructions.
8. Equipment room signage:

The contractor shall provide and install a sign on the door stating that "Combustible storage prohibited by Fire Codes." The sign shall match the signage in the building and prior to installation shall have the approval of the Owner. Adhesive applied

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signs are disallowed.

### B. WIRING AND LIGHTING

#### 1. Elevator Equipment Room:

- a. For each elevator, provide properly sized main line disconnect mounted on the wall adjacent to machine room door.
- b. Elevator Machine Room Emergency Panel  
See Elevator Machine Room – Line Item 3 - Elevator Power Panel
- c. Use only rigid conduit in the elevator machine room for main power equipment. Minimum conduit size of  $\frac{3}{4}$ ".
  - EMT may be used for low-voltage control wiring.
  - Provide adequate machine room LED lighting, especially at controller and around equipment.
  - Locate lighting to avoid conflict with installation of equipment such as motors and cables.
- d. Provide a hoist way lighting system for every elevator as follows:
  - Provide a light at the top of the hoist way.
  - Provide 4-way switch control system for the lights in the elevator pit, at the top of the hoist way, and in the elevator equipment room. In the elevator equipment room, use a pilot light or lighted toggle to indicate an "on" circuit.
  - Locate Pit light switch next to pit ladder and located 42" above lobby floor level.
- e. Provide LED lighting throughout.

### VI. MANUFACTURERS, SUPPLIERS, AND INSTALLERS

#### A. The following Elevator Manufacturing Companies are approved; including, but not limited to:

1. CemcoLift, Inc. (Manufacturer of Traction and Hydraulic Elevators)  
2801 Township Line Road  
Hatfield, PA 19440-0500  
Toll Free: (800) 962-3626  
Phone: (215) 799-2900  
Fax: (215) 703-0358  
www.cemcolift.com
2. Canton Elevator Incorporated (Manufacturer of Hydraulic Elevators only)  
647 Third Street N.W.  
Massillon, Ohio 44647  
Phone: (330) 833-3600  
Fax: (330) 833-0229  
www.cantonelevator.com

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3. ThyssenKrupp Elevator Company (Manufacturer of Traction and Hydraulic Elevators)  
7217 East 87th Street, 46256  
Indianapolis, IN  
Phone: (317) 595-1125  
www.thyssenkruppelevator.com
  4. Kone, Inc. (Manufacturer of Traction and Hydraulic Elevators)  
5201 Park Emerson Dr., Suite E,  
Indianapolis, IN 46203  
Phone: (317) 788-0061 d.  
www.kone.com
  5. Schindler Elevator Corporation (Manufacturer of Traction and Hydraulic Elevators)  
1761 North Sherman Drive, Suite E,  
Indianapolis, IN 46218  
Phone: (317)486-0906  
www.us.schindler.com
  6. Global-Tardif Elevator Manufacturing Group Inc.  
120 De Naples Saint-Augustine-de-Desmaures  
Quebec, Canada G3A 2Y2  
Phone: (800) 661-6316  
Fax: (418) 878-1595  
www.globaltardif.com
  7. Otis Elevator Company  
1901 Production Drive  
Louisville, KY 40299  
Phone: (502)491-3636  
Fax: (502)491-8611
- B. The following Elevator Installing Companies may supply and install elevator equipment purchased from third party manufacturers but must meet the requirements of this standard and be approved by the University Project manager; including, but not limited to:
1. DC Elevator (Supplier and installer of Traction and Hydraulic Elevators)  
124 Venture Court- Suite 1  
Lexington, KY 40511  
Phone: (859) 254-8224  
Fax: (859) 231-8740
  2. The Murphy Elevator Co., Inc. (Supplier and installer of Traction and Hydraulic Elevators)  
128 East Main Street,  
Louisville, KY 40202  
Phone: (800)321-1527  
www.murphyelevator.com
  3. Oracle Elevator Company (Supplier and installer of Traction and Hydraulic

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Elevators)  
4523 Knopp Avenue,  
Louisville, KY 40213  
PH. (502)363-9300  
[www.oracleelevator.com](http://www.oracleelevator.com)

End - University of Kentucky Elevator Standard

**142000S02 ELEVATORS Appendix 1**

<b>APPENDIX 1</b>			
<b>Elevator Monitoring Tridium Minimum Points List – UK MCPPD</b>			
<b>Point List</b>	<b>Point Type</b>	<b>Alarmable</b>	<b>Description</b>
Floor	ANALOG INPUT	NO	Current Floor Card is on or floor being called to
Controller Power	BINARY INPUT	YES	Power condition of controller
Controller Communications	BINARY INPUT	YES	Communication condition of controller
Up Direction	BINARY INPUT	NO	Travel Direction
Down Direction	BINARY INPUT	NO	Travel Direction
Door Open	BINARY INPUT	NO	Door Open Limit
Door Closed	BINARY INPUT	NO	Door Close Limit
In Normal Service	BINARY INPUT	NO	Service Condition
Inspection Service	BINARY INPUT	NO	Service Condition
Independent Service	BINARY INPUT	NO	Service Condition
Fire Service	BINARY INPUT	NO	Service Condition
Door Disabled	BINARY INPUT	YES	The doors appear to be disabled for use.
Emergency Power	BINARY INPUT	YES	Power condition of controller
Safety Circuit	BINARY INPUT	YES	An electrical contact wired in the main safety circuit is open. Car will not run. May be a temporary condition.
Door Fully Open and Locked at the Same Time	BINARY INPUT	YES	The doors appear to be locked and fully open simultaneously.
Bypass System Fault	BINARY INPUT	YES	Either the car door or hall door bypass switch (or circuit) has failed.
Door Lock Relay Fault	BINARY INPUT	YES	Either the car gate or the hall door relay (or input) has failed.
Door Zone Relay Fault	BINARY INPUT	YES	The door zone relay (or input) has failed)
Emergency Stop Relay Fault	BINARY INPUT	YES	Either the GTS or GTSX relay has failed.
Inspection Switch Fault	BINARY INPUT	YES	An Inspection switch or input has failed.
Level Relay Fault	BINARY INPUT	YES	The LVL relay has failed.
Stop Relay Fault	BINARY INPUT	YES	The STOP relay has failed.
Door Lock System Fault	BINARY INPUT	YES	Either the car gate or a hall door lock has been shunted.
Governor Contact System Fault	BINARY INPUT	YES	The overspeed governor has activated.
Front Door Limit System Fault	BINARY INPUT	YES	One of the two front door limit switches has failed in the open state.
Rear Door Limit System Fault	BINARY INPUT	YES	One of the two rear door limit switches has failed in the open state.
Contactor Drop System Fault	BINARY INPUT	YES	Contactor proofing fault (a monitored contactor did not drop as expected).
Unintended Movement System Fault	BINARY INPUT	YES	The car has left the floor with doors open.
Car Stop Bypass Relay Fault	BINARY INPUT	YES	The CSB relay has failed.
Drive Fault	BINARY INPUT	YES	The drive has declared a fault (or the DDRV relay has failed).
Down Relay Fault	BINARY INPUT	YES	The D relay has failed.
Up Relay Fault	BINARY INPUT	YES	The U relay has failed.

**SECTION 14 21 23.13**

**HYDRAULIC ELEVATOR MODERNIZATION**

**PART 1 GENERAL**

1.01 SUMMARY

- A. This specification is intended to cover the complete modernization of 2 hydraulic passenger elevators. The intent is to provide a turnkey proposal that furnishes the owner with a 100% code compliant modernized elevator system. References to work by others or other trade sections does not exclude this work but is intended to help identify work that may be needed that is not directly elevator related. It is up to the contractor to survey the site and determine the nature and quantity of work necessary to furnish a code compliant installation.
- B. Existing Elevator information:
1. Present Capacity and Speed of the existing elevators will be retained as follows:

<b>MACHINE #</b>	<b>CAPACITY (Pounds)</b>	<b>SPEED (Feet per Minute)</b>
MDS 1	2500	150
MDS 2	2500	150

2. Existing Travel, Stops & Openings will be retained as follows:
  - a. MDS 1

<b>LANDINGS</b>	<b>OPENINGS</b>		<b>Distance Between Floors</b>
	Front	Rear	
5	Yes	No	0 ft 0 in 0
4	Yes	No	14 ft 0 in 0
3	Yes	No	14 ft 0 in 0
2	Yes	No	14 ft 0 in 0
1	Yes	No	16 ft 0 in 0
B	Yes	No	12 ft 0 in 0

b. MDS 2

LANDINGS	OPENINGS		Distance Between Floors
	Front	Rear	
5	Yes	No	0 ft 0 in 0
4	Yes	No	14 ft 0 in 0
3	Yes	No	14 ft 0 in 0
2	Yes	No	14 ft 0 in 0
1	Yes	No	16 ft 0 in 0
B	Yes	No	12 ft 0 in 0

C. Section includes: Machine room, hydraulic passenger elevators as shown and specified Elevator work includes:

1. Operation

a. Access Key Switches

- (1) Install new access keyswitches on the top and bottom floors for each elevator.
- (2) Keyswitches will either be on separate SS#4 faceplates or inside the elevator entrance jamb

b. Automatic Self-Leveling

- (1) Provide each elevator with automatic self-leveling that shall typically bring the elevator car level with the floor landings + 1/4" regardless of direction of travel.
- (2) The automatic self-leveling shall correct for over travel or under travel and rope stretch

c. Special Emergency Service

- (1) Special Emergency Service operation shall be provided in compliance with the latest applicable revision of the ASME/ANSI A17.1 Code.
- (2) Special Emergency Service Phase I to return the elevator(s) non-stop to a designated floor shall be initiated by an elevator smoke detector system or a keyswitch provided in a lobby fixture.
- (3) Provide contacts on the elevator controller to receive signals from the smoke detector system.
- (4) If no smoke detector identified, one should be provided.
- (5) A keyswitch in the car shall be provided for in-car control of each elevator when on Phase II of Special Emergency Service.
- (6) If an elevator is on independent service when the elevators are recalled on Phase I operation, a buzzer shall sound in the car and a jewel shall be illuminated, subject to applicable codes.

d. Independent Service

- (1) When the Independent Service switch in the car operating panel is actuated; it shall cancel previously registered car calls, disconnect the elevator from the hall buttons,

- and allow operation from the car buttons only. Door operation shall occur only after actuation of the “DOOR CLOSE” button.
- e. Inspection Operation
    - (1) For inspection purposes, an enabling keyswitch shall be provided in the car operating panel to permit operation of the elevator from on top of the car and to make car and hall buttons inoperative.
  - f. Remote Elevator Monitoring Maintenance
    - (1) A microprocessor system that continuously monitors the Unit(s) on a 24-hour per day, year-round basis will be provided. Contractor to coordinate with the University of Kentucky where the system will notify a dispatching center that the elevator is inoperative by sending a message via telephone line. This makes it possible to have a mechanic dispatched rapidly in response to such a message.
2. Machine Room Equipment
- a. Power Supply
    - (1) The power supply of 208V\_60HZ
    - (2) Alternating current will be retained with the new equipment arranged for this power supply.
  - b. Controller
    - (1) NEW control system shall be provided to perform all the functions of safe elevator motion and elevator door control. This shall include all the hardware required to connect, transfer and interrupt power, and protect the motor against overloading. The system shall also perform group operational control.
  - c. Soft Starter
    - (1) NEW solid-state starter is to be provided.
      - (a) To be of the same power requirement and starting configuration as presently exists.
  - d. Pump Motor
    - (1) NEW motor to be provided to replace existing motor.
      - (a) New motor is to be of the same power characteristics and starting configuration as presently exists.
  - e. Power Unit – submersible
    - (1) NEW power unit to be provided to replace existing power unit.
      - (a) The new power unit consists of a positive displacement pump, motor, integral 4-coil control valve, oil tank and muffler. The pump and motor are submerged and are mounted to the tank with rubber isolators to reduce vibration and noise.
  - f. Valve
    - (1) NEW integral 4-coil control valve to be installed to replace existing valve.
      - (a) The valve consists of up, up leveling, down and down leveling controls along with manual lowering and a pressure relief valve.
3. Door Equipment
- a. Closed Loop Door Operator
    - (1) NEW closed loop door operator to be installed.
    - (2) Car and hoist way doors shall be power operated by means of a closed loop door operator mounted on top of the car designed to give consistent door performance with changes in temperature, wind or minor obstruction in the door track. The system continually monitors door speed and position and adjusts it accordingly to match the pre-determined profile.



- b. Door-Protection Device
  - (1) NEW solid state, infrared passenger protection device to be installed on the car door.
  - (2) Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
- c. Interlocks
  - (1) NEW interlocks to be installed.
  - (2) The interlocks shall prevent operation of the elevator unless all doors for that elevator are closed and shall maintain the doors in their closed position while the elevator is away from the landing.
- d. Car Door Tracks and Hangers
  - (1) Retain Existing
  - (2) Inspect for proper alignment and adjust as required.
- e. Hoistway Entrances
  - (1) Retain Existing
- f. Hoistway Door Tracks and Hangers
  - (1) Retain Existing
- g. Hoistway Door Restrictors
  - (1) NEW folding hoistway door restrictors shall be installed
- 4. Hoistway Equipment
  - a. Hoistway Operating Devices
    - (1) Retain Existing
  - b. Car Guides
    - (1) Retain Existing
  - c. Pit Switch
    - (1) NEW Emergency Stop Switch shall be located in the pit, accessible from the pit access door.
  - d. Spring Buffers
    - (1) Retain Existing
  - e. Hoistway Safety Device
    - (1) Furnish and install all the necessary components, circuitry and wiring for a new safety system, which will operate on the elevator car top and pit; this system is to allow the elevator to be controlled in a safe manner when an authorized person accesses the elevator hoistway.
    - (2) System required to meet all applicable safety codes.
- 5. Car Fixtures
  - a. Applied Car Operating Panel
    - (1) NEW applied car operating panel shall be furnished.
      - (a) Shall contain a bank of mechanical illuminated buttons marked to correspond with the landings served, an emergency call button, emergency stop button, door open and door close buttons and a light switch. All buttons, when applicable, to be long life LED illumination.
      - (b) Panel shall be equipped with a button that shall initiate two-way communication between the car and a location inside the building, switching over to alternate location if call is unanswered.
  - b. Emergency Car Lighting

- (1) NEW emergency power unit employing a 6-volt sealed rechargeable battery and totally static circuit shall be provided.
  - (a) Power unit shall illuminate the elevator car and provide current to the alarm bell in the event of normal power failure.
  - (b) Equipment shall comply with the requirements of the latest applicable revision of the ASME/ANSI A17.1 Code.
- c. Car Position Indicator
  - (1) NEW car position indicator shall be installed.
    - (a) The position of the car in the hoistway shall be shown by illumination of the indication corresponding to the landing at which the car is stopped or passing.
- d. Audible Signal
  - (1) NEW Equipment shall be furnished to allow an audible announcement in each car of the name of the next selected landing at which the elevator will stop and the committed direction of travel. Several advisory messages shall also be available to indicate the need for elevator on special service or passenger delay of elevator.
6. Hall Fixtures
  - a. Hall buttons
    - (1) NEW Hall Buttons shall be installed at each landing.
    - (2) Up button and Down button at each intermediate landing and a single button at each terminal landing shall be installed.
    - (3) All buttons, when applicable, shall be long-life LED illumination.
  - b. Hall Lanterns
    - (1) NEW Hall Direction Lanterns shall be provided at all hoistway entrances, with “UP” and “DOWN” indicators at intermediate landings and single indicators at terminal landings.
    - (2) A chime shall sound for both “UP” and “DOWN” directions (different sound for each) to announce the impending arrival of the associated elevator car.
  - c. Combination Hall Lantern / Position Indicator
    - (1) NEW Combination Hall Lantern/Position Indicators shall be installed at: ELV 1 & 2 Group/Unit 1 Front: 1, Unit 2 Front: 1, landing(s).
7. Elevator car interior upgrades
  - a. Provide labor and material necessary to install two new cab interiors for MDS 1 & 2.
  - b. Include the following:
    - (1) NEW Wilsonart laminate panels (to be selected by Architect)
    - (2) NEW LED drop ceiling
    - (3) RETAIN existing rear handrail.
    - (4) NEW Flooring to be provided per Interior Design Drawings
8. Materials and accessories as required to complete the elevator installation and meet current codes and requirements of the local AHJ (Authority having Jurisdiction)

D. Related Sections:

1. Division 1 General Requirements: Meet or exceed all referenced sustainability requirements.
2. Division 5 Metals:  
Providing pit ladders, steel framing, auxiliary support steel, metal guarding for hoistway and rotating equipment, miscellaneous steel as needed for a complete installation.

3. Division 9 Finishes: Providing elevator car finish and field painting unfinished and shop primed ferrous materials and build out of revised elevator machine room
  4. Division 26 Sections:
    - a. Providing electrical service to elevators, including fused disconnect switches. Emergency power supply, transfer switch and auxiliary contacts.
    - b. Heat and smoke sensing devices.
    - c. Convenience outlets and illumination in control room, hoistway and pit.
  5. Division 23 Heating, Ventilation and Air Conditioning
    - a. Heating and ventilating control room if required.
- E. Related Work: Elevator contractor shall provide the following in accordance with the requirements of the Model Building Code and ANSI A17.1 Code. State or local requirements must be used if more stringent. Not all this work may be necessary, but the elevator contractor will be responsible for all “work by Others” code enhancements necessary to pass inspection - could include, but not limited to:

1. AIR CONDITIONING

- a. Provide suitable ventilation and cooling equipment, if required, to maintain the machine-room temperature between 60°F and 100°F. The relative humidity should not exceed 95 percent non- condensing. Hoistway must be maintained between 32°F (0°C) and 122°F (50°C) measured at the machine.

2. BUILDING POWER

- a. Provide electrical power for light, tools, hoists, etc. during installation as well as electric current for starting, testing, and adjusting the elevator. Power of permanent characteristics to be provided to properly operate all the elevators concurrently scheduled to be modernized. Power must be a 3-phase 4 wire system with ground and bonded disconnects. Grounded leg delta systems are not acceptable.

3. SMOKE AND HEAT SYSTEM

- a. Provide elevator lobby, machine room and hoistway smoke detecting devices located as required and wired from the fire control center to a controller in the machine room. Hoistway devices are required to be made accessible from outside the elevator hoistway. Coordinate signal connections and necessary testing with the Elevator Contractor. Provide the following zones and locate signal circuits in a properly labeled junction box in the machine room:

- (1) Main Floor Recall: Provide one set of normally closed contacts that will open when any smoke sensor related to the elevators at the designated main landing senses smoke. This excludes other devices located in the machine room, hoistway or main egress floor.
- (2) Alternate Floor Recall: Provide one set of normally closed contacts that will open when the smoke sensor at the main egress floor senses smoke.
- (3) Machine Room/Hoistway Recall: Provide one set of normally closed contacts that will open when any smoke sensor located in the machine room or hoistway/pit senses smoke.

4. SPRINKLERS

- a. Provide code compliant sprinkler system, as required, in the hoistway, pit and machine room. If sprinklers are being installed or altered in the hoistway(s), pit or the machine

rooms, a means must be provided to disconnect three-phase power before water is applied. This is usually accomplished with a shunt trip breaker that must be located outside the elevator machine room. The shunt trip breaker may be activated by heat detectors located within 24" of the sprinkler heads and arranged to trip at a lower temperature than the sprinkler heads. A heat detector is not required in the pit if the sprinkler head is within 24" of the pit floor. Heat and smoke devices in elevator hoistways must be installed with UL rated and lockable panels that are accessible for servicing from outside the hoistway. The panel interiors are to be guarded using a minimum 13 gauge metal with a pattern of maximum 3/4 inch holes.

5. CUTTING AND PATCHING

- a. Do any cutting, (including cutouts to accommodate hall signal fixtures, entrances and/or machine room access) patching and painting of walls, floors or partitions.

6. MAIN DISCONNECT

- a. Provide a fused lockable disconnect switch or circuit breaker for each elevator per the National Electrical Code with feeder or branch wiring to the transformer. Size to suit elevator contractor. Provide a SHUNT TRIP disconnect, as required, if sprinklers are being provided. Provide suitable connections from the main disconnect to the elevator control equipment.
- b. Electrical Feeder system to limit available short circuit to not more than 10k amps at the load side of the elevator main line disconnect.

7. GROUND WIRE

- a. Provide a properly sized ground wire from the elevator controller(s) to the primary building ground.

8. TEMPORARY CROSS DISPATCHING (CDT)

- a. For each group provide a 120VAC 15A single phase power supply with fused disconnect switch (or circuit breaker) with GFCI outlet located in elevator machine room.

9. GFI OUTLETS

- a. Provide 120volt GFCI type convenience outlets in the machine room and in each pit.
- b. Provide additional non-GFCI outlet in each pit for use by sump pump.
- c. Pits subject to sprinklers shall have NEMA 4 rated fixtures if located below 48" above pit floor.

10. CAR LIGHT POWER SUPPLY AND DISCONNECT

- a. For each car provide a 120 volt AC, 15 amp, single-phase power supply with fused disconnect switch (or circuit breaker) capable of being locked in the open (off) position with feeder wiring to each controller located in the machine room.

11. REMOTE MONITORING POWER SUPPLY AND DISCONNECT

- a. Provide a separate 120 volt, 15 amp, single-phase power supply with fused SPST disconnect switch or circuit breaker for remote monitoring capable of being locked in the open position.

12. REMOTE MONITORING MAINTENANCE TELEPHONE LINE REQUIREMENTS

- a. Provide one (1) outside telephone line to the elevator machine room that allows data calls to and from a toll-free number at a dispatching center. The telephone line may be either a separate line dedicated to the remote monitoring maintenance equipment or may be an existing line that is shared between another telephone and the remote monitoring maintenance equipment.

13. REMOTE PANELS

- a. Provide required conduit, with adequate pull boxes and ells from the elevator hoistway(s) to the location or locations required to facilitate the installation of Lobby Panels, Fire Control Room Panels or Elevator Monitoring Systems.
  - b. Size and number as specified by elevator manufacturer/provider.
  - c. Leave a measured pull tape in the conduit.
  - d. Elevator manufacturer/provider to furnish and pull required conductors.
14. EMERGENCY (STANDBY) POWER – provide the following (and refer to Electrical)
- a. Power that meets the load characteristic requirements of the new control system. Power that is capable of operating and providing sufficient power to non-linear elevator loads and that is capable of absorbing regenerated power resulting from running elevators with overhauling loads.
  - b. Two conductors to the machine room from a normally closed auxiliary contact on the Owner’s EP transfer switch. Contacts to open when power transfers to the emergency source.
  - c. Two additional conductors to the machine room from an adjustable timed relay on the Owner’s EP transfer switch to indicate “request to transfer” from standby to normal power.
  - d. Power for 115VAC circuits that supply elevator cab lights, cab fan, communication means, EMS and Compass dispatching systems (if applicable).
  - e. Power for machine room lighting, ventilation and cooling means.
15. LIGHTING (refer to Electrical)
- a. Provide sufficient lighting in the buildings common areas to facilitate a safe working environment.
  - b. Provide new or modify machine room lighting to provide a minimum of 19 ft. candles of illumination and new pit lighting to provide a minimum of 10ft. candles of illumination.
  - c. Pit light switches shall be adjacent to the pit ladder and a minimum of 24” above the threshold level.
  - d. Lighting must have code compliant guards of either grounded metal, plastic or comparable.
  - e. Pits subject to sprinklers shall have NEMA 4 rated fixtures.
16. FIRE EXTINGUISHER
- a. Provide fire extinguisher in elevator machine room.
17. NON-ELEVATOR MATERIAL IN HOISTWAY
- a. Remove or encapsulate, as required, any non-elevator related pipes or wiring located in the elevator machine room or hoistway.
18. HOISTWAY VENTILATION
- a. Provide code compliant hoistway ventilation. Code requires a means to prevent the accumulation of hot air and gasses at the top of the hoistway. Pressurizing the hoistways, or providing vents from the top of the hoistway to the outside of the building usually accomplishes this. Vents shall not be less than 3 1/2% of the area of the hoistway nor less than 3 sq. ft. for each elevator car, whichever is greater. You may not vent the hoistway to the machine room.
19. HOISTWAY LEDGES
- a. Provide a 75o angle constructed of a non-combustible material on all ledges that are 2” greater in the hoistway, excluding multi-hatch divider beams.
20. SIDE COUNTERWEIGHT GUARDING

- a. Provide and install guarding of counterweights in a multiple elevator hoistway as required, when a counterweight is located between elevators, the counterweight runway shall be guarded on the side next to the adjacent elevator. The guarding must meet or exceed the requirements of ASME A17.1 – 2007, section 2.3.2.3.

21. STORAGE

- a. Provide dry, protected and secure storage space adjacent to or within close proximity to the hoistway.

22. DISPOSAL/REMOVAL

- a. It is the responsibility of the contractor to ensure safe removal and disposal of any hazardous materials or fluids (including but not limited to hydraulic fluid, oils, etc).
- b. Provide a dumpster to deposit waste material (including removed elevator components, machines, controllers, ropes, buffers, packing materials from new equipment, and any related materials).
- c. Coordinate dumpster location with the Owner.

23. PIT LADDERS

- a. Provide pit ladder, as required, in each pit that does not have walk-in access doors.
- b. Ladder shall extend 48" above first landing access door.

24. EMERGENCY RETURN UNIT (ERU)

- a. If an ERU battery-operated lowering device is being provided with your hydraulic elevator modernization then it is required to provide an auxiliary contact in either the existing lockable disconnect (if currently code compliant) or in a new code compliant lockable disconnect.

25. ASBESTOS

- a. Follow University of Kentucky standards/requirements regarding asbestos.

26. HAZARDOUS MATERIALS

- a. Owner will notify contractor if aware or become aware prior to the completion of the work of the existence of asbestos or other hazardous material in any elevator hoistway, machine room, hallway or other place in the building where contractor personnel are or may be required to perform their work.
- b. In the event it should become necessary to abate, encapsulate or remove asbestos or other hazardous material from the building, you agree to be responsible for such abatement, encapsulation or removal, and any governmental reporting, and in such event contractor shall be entitled to (i) delay its work until it is determined to contractor's satisfaction that no hazard exists and (ii) compensation for delays encountered.

27. MATERIAL RESPONSIBILITY

- a. Contractor maintains no responsibility for material delivered to the jobsite. The Owner is financially responsible for all cost to replace any damaged, stolen or missing material or equipment. The contractor will not be responsible for deductibles on "Builder's Risk" insurance policies. The contractor will provide a change order, police report and affidavits as needed to substantiate the claim. The contractor will not procure replacement equipment until a signed change order is received.

28. LOCKOUT TAG OUT

- a. In furtherance of OSHA's directive contained in 29 C.F.R. § 1910.147(f)(2)(i), which requires that a service provider (an "outside employer") and its customer (an "on-site employer") must inform each other of their respective lock out/tag out ("LOTO")

procedures whenever outside servicing personnel are to be engaged in control of hazardous energy activities on the customer’s site.

- b. University of Kentucky to provide LOTO procedure.

#### 29. CONFINED SPACES

- a. The machine room, hoistway, pit and mezzanine (“Elevator Spaces”) may be considered Permit- Required Confined Spaces as defined by the Occupational Safety and Health Organization (“OSHA”), 29 C.F.R. § 1910.146(b) and § 1926 Subpart AA. The contractor shall have a documented process to control or eliminate hazards and classify such Elevator Spaces as non-permit required confined spaces. In the event that the Customer, others, or unique site conditions or hazards (such as chemical manufacturing sites) require the contractor to handle such Elevator Spaces as Permit-Required Confined Spaces, the Customer or owner will be responsible for supplying, at its expense, all resources, including monitoring, permitting, attendants and rescue planning associated with handling such Elevator Spaces as Permit-Required Confined Spaces. The Customer or owner is required to inform the contractor of all known or potential hazards related to Elevator Spaces that the contractor may be required to access prior to the contractor performing any work in such spaces. Further, the Customer or owner is required to communicate any changes in the conditions associated with such Elevator Spaces or activities in or around such spaces that could introduce a hazard into such spaces.

### 1.02 SUBMITTALS

- A. Product data: When requested, the elevator contractor shall provide standard cab, entrance, and signal fixture data to describe product and available options for approval.
- B. Shop drawings:
  - 1. Show equipment arrangement and the proposed machine room build out to achieve safe and code compliant clearances for all equipment. Full layouts may not be necessary unless changes are proposed for the existing structure.
  - 2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
  - 3. Indicate electrical power requirements and branch circuit protection device recommendations.
- C. Powder Coat paint selection: Submit manufacturer’s standard selection charts for exposed finishes and materials.
- D. Plastic laminate selection: Submit manufacturer’s standard selection charts for exposed finishes and materials.
- E. Metal Finishes: Upon request, standard metal samples are to be provided.
- F. Operation and maintenance data. Include the following:
  - 1. Owner’s manuals and wiring diagrams.
  - 2. Parts list, with recommended parts inventory.

### 1.03 QUALITY ASSURANCE

- A. Manufacturers, suppliers, and installers – refer to UK section 142000S02 Hydraulic and Traction Elevators specification for list of approved companies.
- B. Manufacturer Qualifications: An approved manufacturer/Installer with minimum 15 years of experience in manufacturing, installing, and servicing elevators of the type required for the project.
  - 1. Use only approved manufacturers of machines, controllers, signal fixtures, door operators, cabs, entrances, and all other major parts of elevator operating equipment.
  - 2. The manufacturer shall have a documented, on-going quality assurance program.
  - 3. ISO-9001:2000 Manufacturer Certified
  - 4. ISO-14001:2004 Environmental Management System Certified
- C. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than 15 years of satisfactory experience installing elevators equal in character and performance to the project elevators.
- D. Regulatory Requirements:
  - 1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
  - 2. NFPA 70 National Electrical Code.
  - 3. NFPA 80 Fire Doors and Windows.
  - 4. Americans with Disabilities Act - Accessibility Guidelines (ADAAG)
  - 5. Section 407 in ICC A117.1, when required by local authorities
- E. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, UL10(b), and NFPA Standard 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing.
- F. Inspection and testing:
  - 1. Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
  - 2. Arrange for inspections and make required tests.
  - 3. Deliver to the Owner upon completion and acceptance of elevator work.

### 1.04 DELIVERY, STORAGE AND HANDLING

- A. Manufacturing shall deliver elevator materials, components and equipment and the contractor shall coordinate with the owner to provide secure, dry, and safe storage on job site.

### 1.05 PROJECT CONDITIONS

- A. Temporary Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.
- B. Both passenger elevators in this project should be modernized concurrently. The existing freight elevator can be utilized for public traffic during construction.



## 1.06 WARRANTY

Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after final acceptance.

## 1.07 MAINTENANCE

- A. Furnish maintenance and call back service for a period of 12 months for each modernized elevator after completion of installation or acceptance thereof by beneficial use of all elevators, whichever is earlier.
- B. Service shall consist of monthly examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours. If emergency service or repair is provided outside of normal working hours the owner shall be responsible for the premium time labor cost only.
- C. All new components and any reused components shall be fully warranted under this service program so that the complete elevator system is covered.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Refer to University of Kentucky specification/standard 142000S02 Hydraulic and Traction Elevators for list of acceptable manufacturers, suppliers, and installers.

### 2.02 MATERIALS, GENERAL

- A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.

### 2.03 REFER TO PART 1 OF THIS SPECIFICATION FOR SCOPE INCLUDING, BUT NOT LIMITED TO:

- A. Hoistway Equipment – including platform, sling, deflector sheaves, guide rails, guides, buffers, machines.
- B. Hoistway Entrances – interlocks, door hanger and tracks, sills
- C. Elevator Car Enclosures
  - 1. Submit standard finish options (walls, rails, ceilings) for selection by Architect.
- D. Door Operation
- E. Car Operating Station – including push buttons, emergency communications system, call lanterns, etc.
- F. Control Systems – including controller, operation, load weighing device, anti-nuisance call control, position selector, motion control, motor pre-torque, emergency operation, automatic light and fan shut down.
- G. Hall Stations

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and/or control room, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- A. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

#### **3.02 INSTALLATION**

- A. Install elevator systems components.
  - 1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
  - 2. Comply with the National Electrical Code for electrical work required during installation.
- B. Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.
- C. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.
- D. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.
- E. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation, or vibration.
- F. Lubricate operating parts of system, including ropes, as recommended by the manufacturer.

#### **3.03 FIELD QUALITY CONTROL**

- A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.
- B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.04 ADJUSTING

- A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.05 CLEANING

- A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.
- B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.
  - 1. Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.

3.06 PROTECTION

- A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.07 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.08 ELEVATOR SCHEDULE

- A. REFER TO PART 1.01 OF THIS SPECIFICATION FOR EXISTING ELEVATOR INFORMATION

- 3.09 SPECIAL CONDITIONS: With bid you must submit a proposed schedule and a scope description of included work to be provided by any subcontractor.

**END OF SECTION**

## SECTION 200100

### GENERAL PROVISIONS - MECHANICAL

#### 1. GENERAL

- A. The Advertisement for Bids, Instructions to Bidders, Bidding Requirements, General, Special and Supplementary Conditions, and all other contract documents shall apply to the Contractor's work as well as to each of his Sub-Contractor's work. All manufacturers, suppliers, fabricators, contractors, etc. submitting proposals to any part if for work, services, materials or equipment to be used on or applied to this project are hereby directed to familiarize themselves with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.
- B. Each Proposer shall also be governed by any unit prices and Addenda insofar as they may affect his part of the work or services.
- C. The work included in this division consists of the furnishing of all labor, equipment, transportation, excavation, backfill, supplies, material, appurtenances and services necessary for the satisfactory installation of the complete and operating Mechanical System(s) indicated or specified in the Contract Documents.
- D. Any materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the Mechanical Systems in a substantial manner, in compliance with the requirements stated, implied or intended in the drawings and/or specifications, shall be included as part of this Contract.
- E. It is not the intent of this section of the specifications to make any Contractor, other than the General Contractor (or Construction Manager, if applicable), responsible to the Owner, Architect and Engineer. All transactions such as submittal of shop drawings, claims for extra costs, requests for equipment or materials substitution, shall be routed through the General Contractor to the Architect (if applicable), then to the Engineer. Also, this section of the specifications shall not be construed as an attempt to arbitrarily assign responsibility of work, material, equipment or services to a particular trade or Contractor. Unless stated otherwise, the subdivision and assignment of work under the various sections shall be optional.
- F. It is the intent of this Contract to deliver to the Owners a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be the responsibility of the Contractors involved to remove and/or relocate or re-attach any existing or new systems which interfere with new equipment or materials required for the complete installation without additional cost to the Owner.
- G. In general, and to the extent possible, all work shall be accomplished without interruption of existing facilities operations. The Contractor shall advise the Owners at least two weeks prior to the interruption of any services or utilities. The Owners shall be advised of the exact time that interruption will occur and the length of time the interruption will last. Failure to comply with this requirement may result in complete work stoppage by the Contractors involved until a complete schedule of interruptions can be developed.
- H. Definitions and Abbreviations

- (1) Contractor - Any Contractor whether proposing or working independently or under the supervision of a General Contractor and/or Construction Manager and who installs any type of mechanical work (Controls, Plumbing, HVAC, Sprinkler, Gas Systems, etc.) or, the General Contractor.
- (2) Engineer - The Consulting Mechanical-Electrical Engineers either consulting to the Owners, Architect, other Engineers, etc. In this case: CMTA, Inc., Consulting Engineers.
- (3) Architect - The Architect of Record for the project.
- (4) Furnish - Deliver to the site in good condition and turn over to the Contractor who is to install.
- (5) Provide - Furnish and install complete, tested and ready for operation.
- (6) Install - Receive and place in satisfactory operation.
- (7) Indicated - Listed in the Specifications, shown on the Drawings or Addenda thereto.
- (8) Typical - Where indicated repeat this work, method or means each time the same or similar condition occurs whether indicated or not.
- (9) Contract Documents - All documents pertinent to the quality and quantity of work to be performed on this project. Includes, but not limited to: Plans, Specifications, Instructions to Bidders, General and Special Conditions, Addenda, Alternates, Lists of Materials, Lists of Sub-Contractors, Unit Prices, Shop Drawings, Field Orders, Change Orders, Cost Breakdowns, Schedules of Value, Periodical Payment Requests, Construction Contract with Owners, etc.
- (10) Proposer - Any person, agency or entity submitting a proposal to any person, agency or entity for any part of the work required under this contract.
- (11) OSHA - Office of Safety and Health Administration.
- (12) KBC - Kentucky Building Code.
- (13) The Project - All of the work required under this Contract.
- (14) NEC - National Electrical Code.
- (15) NFPA - National Fire Protection Association.
- (16) ASME - American Society of Mechanical Engineers.
- (17) AGA - American Gas Association.
- (18) SMACNA - Sheet Metal and Air Conditioning Contractors National Association.
- (19) ANSI - American National Standards Institute.
- (20) ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers.

(21) NEMA - National Electrical Manufacturers Association.

(22) UL - Underwriters Laboratories.

(23) ADA - Americans with Disabilities Act.

(24) IMC - International Mechanical Code.

(25) IECC - International Energy Conservation Code.

(26) IFGC - International Fuel Gas Code.

I. Required Notices:

(1) Ten days prior to the submission of a proposal, each proposer shall give written notice to the Engineer of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, Proposers signify that they have included the cost of all required items in the proposal and that the Proposer will be responsible for the safe and satisfactory operation of the entire system.

J. All work shall conform to University of Kentucky official design standards. A complete copy of the design standards is located at the following location:

<https://www.uky.edu/cpmd/design-standards/divisions-20---29---facility-services-subgroup>

All contractors shall familiarize themselves with this standard and bid the project accordingly. If a conflict arises between the specifications and the facility standard, the proposer shall notify the engineer of the conflict prior to his bid.

2. INTENT

A. It is the intention of the Contract Documents to call for finished work, tested and ready for operation.

B. Details not usually shown or specified, but necessary for the proper installation and operation of systems, equipment, materials, etc., shall be included in the work, the same as if herein specified or indicated.

3. DRAWINGS AND SPECIFICATIONS

A. The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Engineer for approval before proceeding with the work. The drawings are not intended to show every item which may be necessary to complete the systems. All proposers shall anticipate that additional items may be required and submit their bid accordingly.

B. The drawings and specifications are intended to supplement each other. No Proposer shall take advantage of conflict between them, or between parts of either. Should this condition exist, the Proposer shall request a clarification not less than twelve days prior to the submission of the proposal so that the condition may be clarified by Addendum. In the event that such a condition arises after work is started, the interpretation of the Engineer shall be final.

- C. The drawings and specifications shall be considered to be cooperative and anything appearing in the specifications which may not be indicated on the drawings or conversely, shall be considered as part of the Contract and must be executed the same as though indicated by both.
- D. Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.
- E. The Engineer shall reserve the right to make adjustments in location of piping, ductwork, equipment, etc. where such adjustments are in the interest of improving the project.
- F. Should conflict or overlap (duplication) of work between the various trades become evident, this shall be called to the attention of the Engineer. In such event neither trade shall assume that he is to be relieved of the work which is specified under his branch until instructions in writing are received from the Engineer.
- G. Unless dimensioned, the mechanical drawings only indicate approximate locations of equipment, piping, ductwork, etc. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions, whether given in figures or scaled, shall be verified in the field to ensure no conflict with other work.
- H. Each Proposer shall review all drawings including Architectural, Mechanical, Electrical, Fire Protection, Structural, etc., to ensure that the work he intends to provide does not encroach a conflict with or affect the work of others in any way. Where such effect does occur, it shall be the Proposer's responsibility to satisfactorily eliminate any such encroachment conflict or effect prior to the submission of his proposal. Each Proposer shall in particular ensure that there is adequate space to install his equipment and materials. Failure to do so shall result in the correction of such encroachment conflict or effect of any work awarded the proposer and shall be accomplished fully without expense to others and that they are reasonably accessible for maintenance. Check closely all mechanical and electrical closets, chases, ceiling voids, wall voids, crawl spaces, etc., to ensure adequate spaces.
- I. Where on the drawings a portion of the work is drawn out and the remainder is indicated in outline, or not indicated at all, the parts drawn out shall apply to all other like portions of the work. Where ornamentation or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts of the work, unless otherwise indicated.
- J. Details not usually shown or specified, but necessary for the proper installation and operation of systems, equipment, materials, etc., shall be included in the work, the same as if herein specified or indicated.
- K. Where on the Drawings or Addenda the word typical is used, it shall mean that the work method or means indicated as typical shall be repeated in and each time it occurs whether indicated or not.
- L. Special Note: Always check ceiling heights indicated on Architectural Drawings and Schedules and ensure that they may be maintained after all mechanical and electrical equipment is installed. Do not install equipment in the affected area until the conflict is resolved.

#### 4. EXAMINATION OF SITE AND CONDITIONS

- A. Each Proposer shall inform himself of all of the conditions under which the work is to be performed, the site of the work, the structure of the ground, above and below grade, the obstacles that may be encountered, the

availability and location of necessary facilities and all relevant matters concerning the work. Each Proposer shall also fully acquaint himself with all existing conditions as to ingress and egress, distance of haul from supply points, routes for transportation of materials, facilities and services, availability of utilities, etc. His proposal shall cover all expenses or disbursements in connection with such matters and conditions. No allowance will be made for lack of knowledge concerning such conditions after bids are accepted.

## 5. EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS

- A. When any Contractor requests approval of materials and/or equipment of different physical size, capacity, function, color, access, it shall be understood that such substitution, if approved, will be made without additional cost to anyone other than the Contractor requesting the change regardless of changes in connections, space requirements, electrical characteristics, electrical services, etc., from that indicated. In all cases where substitutions affect other trades, the Contractor requesting such substitutions shall advise all such Contractors of the change and shall remunerate them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., required to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Review of Shop Drawings by the Engineers does not in any way absolve the Contractor of this responsibility.
- B. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make or catalog number, such reference shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; any devices, products, materials, fixtures, forms, or types of construction which, in the judgment of the Engineer, are equivalent to those specified are acceptable, provided the provisions of Paragraph (A) immediately preceding are met. Requested substitutions shall be submitted to the Engineer a minimum of twelve days prior to bids.
- C. Wherever any equipment and material is specified exclusively only such items shall be used unless substitution is accepted in writing by the Engineers.
- D. Each Proposer shall furnish along with his proposal a list of specified equipment and materials which he is to provide. Where several makes are mentioned in the specifications and the Contractor fails to state which he proposes to furnish, the Engineer shall choose any of the makes mentioned without change in price. Inclusion in this list shall not ensure that the Engineers will approve shop drawings unless the equipment, materials, etc., submitted in shop drawings is satisfactorily comparable to the items specified and/or indicated.

## 6. SUPERVISION OF WORK

- A. The Contractor shall personally supervise the work for which he is responsible or have a competent superintendent, approved by the Engineers, on the work at all times during progress with full authority to act for him.

## 7. CODES, RULES, PERMITS, FEES, INSPECTIONS, REGULATIONS, ETC.

- A. The Contractor shall give all necessary notices, obtain and pay for all permits, government sales taxes, fees, inspections and other costs, including all utility connections, meters, meter settings, taps, tap fees, extensions, water and/or sewer system development charge, etc. in connection with his work. He shall also file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments and/or the appropriate municipality or utility company having jurisdiction, whether indicated or specified or not. He shall hire an independent Registered Engineer to witness installations and provide necessary certifications where required by utility companies, municipal agencies or others that have review authority.



He shall also obtain all required certificates of inspection for his work and deliver same to the Engineers before request for acceptance and final payment for the work. Ignorance of Codes, Rules, Regulations, Laws, etc. shall not render the Contractor irresponsible for compliance. The Contractor shall also be versed in all Codes, Rules and Regulations pertinent to his part of the work prior to submission of a proposal.

- B. The Contractor shall include in his work, without extra cost, any labor, materials, services, apparatus and drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not indicated or specified.
- C. All materials furnished and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, with the requirements of local utility companies, or municipalities and with the requirements of all governmental agencies having jurisdiction.
- D. All materials and equipment so indicated and all equipment and materials for the electrical portion of the mechanical systems shall bear the approval label of, or shall be listed by the Underwriters' Laboratories (UL), Incorporated. Each packaged assembly shall be approved as a package. Approval of components of a package shall not be acceptable. Where required by the Code and/or the Authority Having Jurisdiction, provide the services of a field labeling agency to provide a UL label for the entire system in the field under evaluation.
- E. All plumbing work is to be constructed and installed in accordance with plans and specifications which have been approved in their entirety and/or reflect any changes requested by the State Department of Health. Plumbing work shall not commence until such plans are in the hands of the Contractor.
- F. All Heating, Ventilation and Air Conditioning work shall be accomplished in accordance with the Kentucky Building Code (KBC) and amendments thereto, the latest standards recognized by the American Society of Heating, Refrigerating and Air Conditioning and the National Fire Protection Association. Contractor shall secure a permit from the Division of HVAC. Final inspection certificate shall be provided by Contractor and a copy included in Operation and Maintenance Manuals.
- G. All pressure vessel installations shall comply with the State, and/or Federal Code applicable. A Certificate of Final Boiler Inspection shall be required.
- H. The Contractor shall furnish three (3) copies of all Final Inspection Certificates obtained to the Engineer when work is complete. Final payment for work will be contingent upon compliance with this requirement.
- I. Where minimum code requirements are exceeded in the Design, the Design shall govern.
- J. The Contractor shall ensure that his work is accomplished in accord with the OSHA Standards and that he conducts his work and the work of his personnel in accord with same.
- K. Work in elevators, elevator shafts and elevator equipment rooms shall comply with the Elevator Code enforced by the Commonwealth of Kentucky.
- L. All work relating to the handicapped shall be in accord with regulations currently enforced by the Department of Housing, Buildings and Construction, Commonwealth of Kentucky and the American Disabilities Act.
- M. All work in conjunction with a natural gas installation shall, in addition to all other Codes, Rules, Regulations, Standards, etc., comply with the requirements of the local gas supplier and/or standards and recommendations of the American Gas Association.

- N. All work in relation to domestic water systems shall, in addition to all other Codes, Rules, Regulations and Standards, be in compliance with the requirements of the local water utility company and the adopted edition of the 10 States Standards.
- O. All work in relation to the installation of sanitary or storm sewers shall, in addition to all other Codes, Rules, Regulations and Standards, be in compliance with the local agency governing such installations and the adopted edition of the 10 States Standards.
- P. All work relating to the handicapped shall be in accord with regulations currently enforced by the Department of Housing, Buildings, and Construction, Commonwealth of Kentucky and the American Disabilities Act.

#### 8. EQUIPMENT AND PIPING SUPPORT

- A. Each piece of equipment, apparatus, piping, or conduit suspended from the structure or mounted above the floor level shall be provided with suitable structural support, pipe stand, platform or carrier in accordance with the best recognized practice. Such supporting or mounting means shall be provided by the Contractor for all equipment and piping. Exercise extreme care that structural members of building are not overloaded by such equipment. Provide any required additional bracing, cross members, angles, support, etc., as indicated or required by the Structural Engineer. This, in some instances, will require the Contractor to add an angle to a joist to transfer the load to a panel point. If in doubt, contact the Structural Engineer.

#### 9. DUCT AND PIPE MOUNTING HEIGHTS

- A. All exposed or concealed ductwork, piping, etc., shall be held as high as possible unless otherwise noted and coordinated with all other trades. Exposed piping and ductwork shall, insofar as possible, run perpendicular or parallel to the building structure.

#### 10. COST BREAKDOWNS (SCHEDULE OF VALUES)

- A. Within thirty days after acceptance of the Contract, the Contractor shall furnish to the Engineer, one copy of a detailed cost breakdown on each respective area of work. These cost breakdowns shall be made in a format approved by the Engineer. Payments will not be made until satisfactory cost breakdowns are submitted.

#### 11. CORRECTION PERIOD

- A. All equipment, apparatus, materials, and workmanship shall be the best of its respective kind. The Contractor shall replace all parts at his own expense, which are proven defective as described in the General Conditions. The effective date of completion of the work shall be the date of the Architect's or Engineer's Statement of Substantial Completion. Items of equipment which have longer guarantees, as called for in these specifications, shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Owner reserves the right to use equipment installed by the Contractor prior to date of final acceptance. Such use of equipment shall not invalidate the guarantee except that the Owner shall be liable for any damage to equipment during this period, due to negligence of his operator or other employees. Refer to other sections for any special or extra warranty requirements.

- B. It is further clarified that all required and specified warranties shall begin on the date of Substantial Completion, not at the time of equipment start-up.
- C. All compressors shall have five-year warranty.

## 12. COMPUTER-BASED SYSTEM SOFTWARE

- A. For all equipment, controls, hardware, computer-based systems, programmable logic controllers, and other materials provided as a part of the work, software that is installed shall be certified in writing to the Engineer and Owner by the manufacturer and/or writer to be free of programming errors that might affect the functionality of the intended use.

## 13. CHANGES IN MECHANICAL WORK

REFER TO GENERAL AND SPECIAL CONDITIONS.

## 14. CLAIMS FOR EXTRA COST

REFER TO GENERAL AND SPECIAL CONDITIONS.

## 15. SURVEY, MEASUREMENTS AND GRADE

- A. The Contractor shall lay out his work and be responsible for all necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so.
- B. The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.
- C. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the contract documents, he shall promptly notify the Engineer and shall not proceed with this work until he has received instructions from the Engineer on the disposition of the work.

## 16. TEMPORARY USE OF EQUIPMENT

- A. The permanent heating and plumbing equipment, when installed, may be used for temporary services, with the consent of the Engineers. Should the permanent systems be used for this purpose the Contractors shall make all temporary connections required at their expense. They shall also make any replacement required due to damage wear and tear, etc., leaving the same in "as new" condition.
- B. Permission to use the permanent equipment does not relieve the Contractors from the responsibility for any damages to the building construction and/or equipment which might result because of its use.
- C. A pre-start-up conference shall be held with the Architect, Owner, General Contractor and the Mechanical Contractor. Equipment shall not be started until after this meeting.
- D. During all phases of construction:

(1) Air Handling Units:

- a. At a minimum, four complete sets of filter media are required for each unit. In each unit, install two sets of filter media during construction (more shall be required if construction activities dictate more frequent changes). In each unit, install one set of filter media at substantial completion. Leave one set of filter media in boxes in appropriate mechanical room as a spare set for the Owner. All other filters shall be used by the Contractor during construction. Dispose of all construction filter media.
- b. On the outside of all return air openings install a minimum of two sets of fiberglass filter media, such as cheesecloth, to be utilized as pre-filters for the “construction” filters. Install first set upon start-up and then install second set when first set is dirty. Dispose of all dirty construction filters. Change filters as often as necessary to keep units from becoming dirty at no additional cost.
- c. At substantial completion of the project the entire unit shall be cleaned to present a like “new” unit for the Owner and all filters shall be replaced with new.

17. TEMPORARY SERVICES

- A. The Contractor shall arrange any temporary water, electrical and other services which he may require to accomplish his work. Refer also to General and Special Conditions.

18. RECORD DRAWINGS

- A. The Contractor shall ensure that any deviations from the Design are as they occur recorded in red, erasable pencil on record drawings kept at the jobsite. The Engineer shall review the record documents from time to time to ensure compliance with this specification. Compliance shall be a contingency of final payment. Pay particular attention to the location of under floor sanitary and water lines, shut-off valves, cleanouts and other appurtenances important to the maintenance and operation of Mechanical Systems. Also, pay particular attention to Deviations in the Control Systems and all exterior utilities. Keep information in a set of drawings set aside at the job site especially for this purpose. Deliver these record drawings electronically in AutoCAD 2007 format along with the hand marked field set to the Engineer. Electronic bid drawings will be furnished to the Contractor for his use.

19. MATERIALS AND WORKMANSHIP

- A. All equipment, materials and articles incorporated in the work shall be new and of comparable quality to that specified. Each Proposer shall determine that the materials and/or equipment he proposes to furnish can be brought into the building(s) and installed within the space available. In certain cases, it may be necessary to remove and replace walls, floors and/or ceilings and this work shall be the responsibility of the Contractor. All equipment shall be installed so that all parts are readily accessible for inspection, maintenance, replacement of filters, etc. Extra compensation will not be allowed for relocation of equipment for accessibility or for dismantling equipment to obtain entrance into the building(s). Ensure, through coordination, that no other Contractor seals off access to space required for equipment, materials, etc.
- B. Materials and equipment, where applicable, shall bear Underwriters' Laboratories label where such a standard has been established.

- C. Use extreme care in the selection of equipment and its installation to ensure that noise and vibration are kept at a minimum. The Engineer's determination shall be final and corrections to such discrepancies shall be made at the cost of the Contractor.
- D. Each length of pipe, fitting, trap, fixture and device used in the plumbing or drainage systems shall be stamped or indelibly marked with the weight or quality thereof and with the manufacturer's mark or name.
- E. All equipment shall bear the manufacturer's name and address. All electrically operated equipment shall bear a data plate indicating required horsepower, voltage, phase and ampacity.

## 20. COOPERATION AND COORDINATION WITH OTHER TRADES

- A. The Contractor shall give full cooperation to all other trades and shall furnish in writing with copies to the Engineer, any information necessary to permit the work of other trades to be installed satisfactorily and with the least possible interference or delay.
- B. Where any work is to be installed in close proximity to, or will interfere with work of other trades, each shall cooperate in working out space conditions to make a satisfactory adjustment. If so directed by the Engineer, the Contractor shall prepare composite working drawings and sections at a suitable scale not less than 1/4" = 1'-0", clearly indicating how his work is to be installed in relation to the work of other trades, or so as not to cause any interference with work of other trades. He shall make the necessary changes in his work to correct the condition without extra charge.
- C. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

## 21. QUALIFICATIONS OF WORKMEN

- A. All mechanical work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. Untrained and incompetent workmen, as evidenced by their workmanship, shall be summarily relieved of their responsibilities in areas of incompetency. The Engineer shall reserve the right to determine the quality of workmanship of any workman and unqualified or incompetent workman shall refrain from work in areas not satisfactory to him. Requests for relief of a workman shall be made through the normal channels of Architect, Contractor, etc.
- B. All plumbing work shall be accomplished by Journeymen Plumbers under the direct supervision of a Master Plumber as defined and clarified under Kentucky State Plumbing Law Regulations and Code. Proof and Certification may be requested by the Engineer.
- C. All sheet metal, insulation and pipe fitting work shall be installed by workmen normally engaged or employed in these respective trades, except where only small amounts of such work are required and are within the competency of workmen directly employed by the Contractor involved.
- D. All automatic control systems shall be installed by workmen normally engaged or employed in this type work, except in the case of minor control requirements (residential type furnaces, packaged HVAC equipment with integral controls, etc.) in which case, if a competent workman is the employee of this Contractor, he may be utilized subject to review of his qualifications by the Engineer and after written approval from same.

- E. All special systems (Vacuum, Compressed Air, Automatic Sprinkler Equipment, etc.) shall be installed only by workmen normally engaged in such services. Exception to this specification may only be made in writing by the Engineer.
- F. All electrical work shall be installed only by competent workmen under direct supervision of a fully qualified Electrician.

## 22. CONDUCT OF WORKMEN

- A. The Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workman to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. The consumption of alcoholic beverages or other intoxicants, narcotics, barbiturates, hallucinogens or debilitating drugs on the job site is strictly forbidden.

## 23. PROTECTION OF MATERIALS AND EQUIPMENT

- A. The Contractor shall be entirely responsible for all material and equipment furnished by him in connection with his work and special care shall be taken to properly protect all parts thereof from physical, sun, and weather damage during the construction period. Such protection shall be by a means acceptable to the manufacturer and Engineer. All rough-in soil, waste, vent and storm piping, ductwork, etc., shall be properly plugged or capped during construction in a manner approved by the Engineer. Equipment damaged, stolen or vandalized while stored on site, either before or after installation, shall be repaired or replaced by the Contractor at his own expense.

## 24. SCAFFOLDING, RIGGING AND HOISTING

- A. The Contractor shall furnish all scaffolding, rigging, hoisting and services necessary for erection and delivery onto the premises of any equipment and apparatus furnished. All such temporary appurtenances shall be set up in strict accord with OSHA Standards and Requirements. Remove same from premises when no longer required.

## 25. BROKEN LINES AND PROTECTION AGAINST FREEZING

- A. No conduits, piping, troughs, etc. carrying water or any other fluid subject to freezing shall be installed in any part of the building where danger of freezing may exist without adequate protection being given by the Contractor whether or not insulation is specified or indicated on the particular piping. All damages resulting from broken and/or leaking lines shall be replaced or repaired at the Contractor's own expense. If in doubt, contact the Engineer. Do not install piping across or near openings to the outside whether they are carrying static or moving fluids or not. Special Note: Insulation on piping does not necessarily ensure that freezing will not occur.

## 26. CLEANING

- A. The Contractor shall, at all times, keep the area of his work presentable to the public and clean of rubbish and debris caused by his operations; and at the completion of the work, shall remove all rubbish, debris, all of his tools, equipment, temporary work and surplus materials from and about the premises, and shall leave the area clean and ready for use. If the Contractor does not attend to such cleaning upon request, the Engineer may cause cleaning to be done by others and charge the cost of same to the Contractor. The Contractor shall

be responsible for all damage from fire which originates in, or is propagated by, accumulations of his rubbish or debris.

- B. After completion of all work and before final acceptance of the work, the Contractor shall thoroughly clean all equipment and materials and shall remove all foreign matter such as grease, dirt, plaster, labels, stickers, etc., from the exterior of piping, equipment, fixtures and all other associated or adjacent fabrication.

## 27. NOISE, VIBRATION OR OSCILLATION

- A. All work shall operate under all conditions of load without any sound or vibration which is objectionable in the opinion of the Engineer. In case of moving machinery, sound or vibration noticeable outside of room in which it is installed, or annoyingly noticeable inside its own room, will be considered objectionable. Sound or vibration conditions considered objectionable by the Engineer shall be corrected in an approved manner by the Contractor at his expense.
- B. All equipment subject to vibration and/or oscillation shall be mounted on vibration supports whether indicated or not suitable for the purpose of minimizing noise and vibration transmission, and shall be isolated from external connections such as piping, ducts, etc. by means of flexible connectors, vibration absorbers, or other approved means. Unitary equipment, such as small room heating units, small exhaust fans, etc., shall be rigidly braced and mounted to wall, floor or ceiling as required and tightly gasketed and sealed to mounting surface to prevent air leakage and to obtain quiet operation. Flush and surface mounted equipment such as diffusers, grilles, etc., shall be gasketed and affixed tightly to their mounting surface.
- C. The Contractor shall provide supports for all equipment furnished by him. Supports shall be liberally sized and adequate to carry the load of the equipment and the loads of attached equipment, piping, etc. All equipment shall be securely fastened to the structure either directly or indirectly through supporting members by means of bolts or equally effective means. If strength of supporting structural members is questionable, contact Engineers.

## 28. ACCESSIBILITY

- A. The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in double partitions and hung ceilings for the proper installation of his work. He shall cooperate with all others whose work is in the same space. Such spaces and clearances shall, however, be kept to the minimum size required.
- B. The Contractor shall locate and install all equipment so that it may be serviced, and maintained as recommended by the manufacturer. Allow ready access and removal of the entire unit and/or parts such as valves, filters, fan belts, motors, prime shafts, etc.
- C. The Contractor shall provide access panels for each concealed valve, control damper or other device requiring service as shown on engineer's plans or as required. Locations of these panels shall be identified in sufficient time to be installed in the normal course of work.

## 29. MAINTENANCE OF EXISTING UTILITIES AND LINES

- A. The locations of all piping, conduits, cables, utilities and manholes existing, or otherwise, that comes within the contract construction site, shall be subject to continuous uninterrupted service with no other exception than the Owner of the utilities permission to interrupt same temporarily.

- B. Utilities and lines, where known, are indicated on the drawings. Locations and sizes are approximate. Prior to any excavation being performed, the Contractor shall ascertain that no utilities or lines are endangered by new excavation. Exercise extreme caution in all excavation work.
- C. If utilities or lines occur in the earth within the construction site, the Contractor shall probe and locate the lines prior to machine excavation or blasting in the respective area. Electromagnetic utility locators and acoustic pipe locators shall be utilized to determine where metallic and non-metallic piping is buried prior to any excavation.
- D. Cutting into existing utilities and services where required shall be done in coordination with and only at times designated by the Owner of the utility.
- E. The Contractor shall repair to the satisfaction of the Engineer, any surfaces or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.
- F. Machine excavation shall not be permitted with ten feet of electrical lines or lines carrying combustible and/or explosive materials. Hand excavate only.
- G. Protect all new or existing lines from damage by traffic, etc. during construction. Repairs or replacement of such damage shall be at the sole expense of the party responsible.

### 30. SMOKE AND FIRE PROOFING

- A. The Contractor shall fire and smoke stop all openings made in fire or smoke rated walls, chases, ceilings and floors in accord with the KBC. Patch all openings around ductwork and piping with appropriate type material to stop smoke at smoke walls and provide commensurate fire rating at fire walls, floors, ceilings, roofs, etc. Back boxes in rated walls shall be a minimum distance apart as allowed by code to maintain the rating. If closer provide rated box or fireproofing in code approved manner.

### 31. MOTORS

- A. Motors shall be built in accordance with the latest standards of NEMA and as specified. Motors shall be tested in accordance with standards of A.S.A. C50, conforming to this and all applicable standards for insulation resistance and dielectric strength.
- B. Each motor shall be provided by the equipment supplier, installer or manufacturer with conduit terminal box, and N.E.C. required disconnecting means as specified or required. Three-phase motors shall be provided with external thermal overload protection in their starter units. Single-phase motors shall be provided with thermal overload protection, integral to their windings or external, in control unit. All motors shall be installed with NEMA-rated starters as specified and shall be connected per the National Electrical Code.
- C. The capacity of each motor shall be sufficient to operate associated driven devices under all conditions of operation and load and without overload, and at least of the horsepower indicated or specified. Each motor shall be selected for quiet operation, maximum efficiency and lowest starting KVA per horsepower. Motors producing excessive noise or vibration shall be replaced by the responsible contractor. See Division 26 of Specifications for further requirements related to installation of motors.

### 32. CUTTING AND PATCHING



- A. The Contractor shall provide his own cutting and patching necessary to install his work. Patching shall match adjacent surfaces and shall be to the satisfaction of the Architect and Engineer.
- B. No structural members shall be cut without the approval of the Engineer and all such cutting shall be done in a manner directed by him.
- C. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore, all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

### 33. CURBS, PLATES, ESCUTCHEONS & AIR TIGHT PENETRATIONS

- A. In all areas where ducts are exposed and ducts pass thru floors, the opening shall be surrounded by a 4-inch-high by 3-inch-wide concrete curb.
- B. Escutcheon plates shall be provided for all pipes and conduit passing thru walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing thru sleeves which extend above the floor surface, provide deep recessed plates to conceal the pipe sleeves.
- C. Seal all duct, pipe, conduit, etc., penetrations through walls and floors air tight. If wall or floor assembly is rated then use similarly rated sealing method.

### 34. WEATHERPROOFING

- A. Where any work pierces waterproofing including waterproof concrete, the method of installation shall be as approved by the Engineer before work is done. The Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings permanently watertight.

### 35. OPERATING INSTRUCTIONS, MAINTENANCE MANUALS AND PARTS LISTS

- A. Upon completion of all work tests, the Contractor shall instruct the Owner or his representative(s) fully in the operations, adjustment and maintenance of all equipment furnished. The time and a list of representatives required to be present will be as directed by the Engineer. Turn over all special wrenches, keys, etc., to the owner at this time.
- B. The Contractor shall furnish three (3) complete bound sets for delivery to the Engineer of typewritten and/or blueprinted instructions for operating and maintaining all systems and equipment included in this contract prior to substantial completion. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs alone will not be acceptable for operating and maintenance instructions.
- C. The Contractor, in the instructions, shall include a preventive maintenance schedule for the principal items of equipment furnished under this contract and a detailed, parts list and the name and address of the nearest source of supply.

- D. Per University standards, provide as part of the IOM, an equipment schedule list on 8.5x11 inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the specification section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.
- E. Per University standards, provide as part of IOM, a detailed valve schedule list. Refer to valve identification specification for details.
- F. The Contractor shall frame under Lexan in the main mechanical room all temperature control diagrams and all piping diagrams.
- G. Per University standards, IOM information shall include a complete copy of the reviewed TAB report.

### 36. PAINTING

- A. In general, all finish painting shall be accomplished under the Painting Section of the specifications by the Contractor; however, unless otherwise specified under other sections of these specifications, the following items shall be painted:
  - (1) All exposed piping, valve bodies and fittings (bare and insulated), including hangers, platforms, etc.
  - (2) All mechanical equipment not factory finished. Aluminum and stainless-steel equipment, motors, identification plates, tags, etc. shall not be painted. All rust and foreign matter shall be thoroughly removed from surfaces prior to painting. All baked enamel factory finish of equipment which may have been scratched or chipped shall be touched up with the proper paint as recommended and supplied by the manufacturer.
  - (3) All ductwork exposed in finished areas (bare and insulated), all grilles, diffusers, etc. not factory finished. Paint the inside surfaces of all interior duct surfaces visible from any register, grille or diffuser opening on all jobs; surfaces shall receive one (1) prime coat of Rustoleum 1225 red "galvinoleum" or other approved equivalent primer and rust inhibitor and one (1) coat of Rustoleum 1579 jet black "Speedy Dry" enamel or approved equivalent applied in accordance with the manufacturer's recommendations.
  - (4) All insulated piping, ductwork and equipment shall be properly prepared for painting by the Contractor where mechanical items are to be painted. In the case of externally insulated duct and pipe, the Contractor shall provide 6 oz. canvas jacket with fire retardant lagging. The jacket shall be allowed to dry properly before applying paint to avoid shrinking after painting and exposing unpainted surfaces. The Contractor, at his option, may provide double wall ductwork in lieu of externally insulated ductwork with canvas jacket and lagging.

### 37. ELECTRICAL CONNECTIONS

- A. The Contractor shall furnish and install all (1) temperature control wiring; (2) equipment control wiring and (3) interlock wiring. The Contractor shall furnish and install all power wiring complete from power source to motor or equipment junction box, including power wiring thru starters, and shall furnish and install all required starters not factory mounted on equipment.

- B. The Contractor shall, regardless of voltage, furnish and install all temperature control wiring and all associated interlock wiring, all equipment control wiring and conduit for the equipment that the Contractor furnishes. He may, at his option, employ at his own expense, the Electrical Contractor to accomplish this work.
- C. After all circuits are energized and completed, the Contractor shall be responsible for all power wiring, and all control wiring shall be the responsibility of the Contractor. Motors and equipment shall be provided for current characteristics as shown on the drawings.
- D. The Contractor shall furnish motor starters of the type and size required by the manufacturer for all equipment provided by him, where such starters are necessary. Starters shall have overloads for each phase.

#### 38. FINAL CONNECTIONS TO EQUIPMENT

- A. The Contractor shall finally connect to mechanical services, any terminal equipment, appliances, etc., provided under this and other divisions of the work. Such connections shall be made in strict accord with current codes, safety regulations and the equipment manufacturer's recommendations. If in doubt, contact the Engineers prior to installation.

#### 39. REQUIRED CLEARANCE FOR ELECTRICAL EQUIPMENT

- A. The NEC has specific required clearances above, in front, and around electrical gear, panels etc. The Contractor shall not install any piping, ductwork, etc., in the required clearance. If any appurtenance is located in the NEC required clearance, it shall be relocated at no additional cost.

#### 40. INDEMNIFICATION

- A. The Contractor shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expense and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, any subcontractor, any employee, agent or representative.

#### 41. HAZARDOUS MATERIALS

- A. The Contractor is hereby advised that it is possible that asbestos and/or other hazardous materials are or were present in this building(s). Any worker, occupant, visitor, inspector, etc., who encounters any material of whose content they are not certain shall promptly report the existence and location of that material to the Contractor and/or Owner. The Contractor shall, as a part of his work, ensure that his workers are aware of this potential and what they are to do in the event of suspicion. He shall also keep uninformed persons from the premises during construction. Furthermore, the Contractor shall ensure that no one comes near to or in contact with any such material or fumes therefrom until its content can be ascertained to be non-hazardous.
- B. CMTA, Inc., Consulting Engineers, have no expertise in the determination of the presence of hazardous materials. Therefore, no attempt has been made by them to identify the existence or location of any such material. Furthermore, CMTA nor any affiliate thereof will neither offer nor make any recommendations relative to the removal, handling or disposal of such material.

- C. If the work interfaces, connects or relates in any way with or to existing components which contain or bear any hazardous material, asbestos being one, then, it shall be the Contractor's sole responsibility to contact the Owner and so advise him immediately.
- D. The Contractor by execution of the contract for any work and/or by the accomplishment of any work thereby agrees to bring no claim relative to hazardous materials for negligence, breach of contract, indemnity, or any other such item against CMTA, its principals, employees, agents or consultants. Also, the Contractor further agrees to defend, indemnify and hold CMTA, its principals, employees, agents and consultants, harmless from any such related claims which may be brought by any subcontractors, suppliers or any other third parties.

#### 42. ABOVE-CEILING AND FINAL PUNCH LISTS

- A. The Contractor shall review each area and prepare a punch list for each of the subcontractors, as applicable, for at least two stages of the project:
  - (1) For review of above-ceiling work that will be concealed by tile or other materials well before substantial completion.
  - (2) For review of all other work as the project nears substantial completion.
- B. When all work from the Contractor's punch list is complete at each of these stages and prior to completing ceiling installations (or at the final punch list stage), the Contractor shall request that the Engineer develop a punch list. This request is to be made in writing seven days prior to the proposed date. After all corrections have been made from the Engineer's punch list, the Contractor shall review and initial off on each item. This signed-off punch list shall be submitted to the Engineer. The Engineer shall return to the site once to review each punch list and all work prior to the ceilings being installed and at the final punch list review.
- C. If additional visits are required by the Engineer to review work not completed by this review, the Engineer shall be reimbursed directly by the Contractor at a rate of \$140.00 per hour for extra trips required to complete either of the above-ceiling or final punch lists.



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The following is CMTA’s guide for Division 20-25 required information relative to the Schedule of Values. Please utilize all items that pertain to this project and add any specialized system as required. A thorough and detailed schedule of values will allow for fair and equitable Pay Application approval and minimize any discrepancies as to the status of the job.

<b><u>DIVISION 20-25 – MECHANICAL</u></b> Field Representative: _____ Project Engineer: _____			
Description of Work	Scheduled Value	Labor	Material
Shop Drawings			
Mobilization/Permits			
Demolition			
Geothermal Horizontal Piping and Vault			
Geothermal Wells, Vertical pipe and grout			
Plumbing Underslab			
Sanitary Above Slab Rough-in			
Plumbing Fixtures			
Plumbing Inspections			
Sprinkler Plan Submittals			
Fire Protection Exterior			
Fire Protection Vault			
Fire Protection Interior			
Storm Piping Exterior			
Storm Piping Interior			
Plumbing Shop Drawings			
Mechanical Shop Drawings			

Domestic Water Piping			
Domestic Water Insulation			
Hydronic Piping			
Gas Piping Exterior			
Gas Piping Interior			
Steam Piping			
HVAC Sheet Metal			
Heat Pumps			
Boiler			
Chiller			
Cooling Tower			
Pumps & Assoc. Equipment			
Grilles & Diffusers			
Insulation			
Controls			
Air Balance			
Water Balance			
Chemical Treatment			
Boiler Inspection			
Factory Start-Up Reports			
Owner Training			
Record Drawings			
O & M Manuals			
Punchlist/Closeout			
Controls Check-out			

**END OF SECTION**

## SECTION 200200

### SCOPE OF THE MECHANICAL WORK

#### 1. GENERAL

- A. The Mechanical work for this Contract shall include all labor, materials, equipment, fixtures, excavation, backfill and related items required to completely install, test, place in service and deliver to the Owner the complete mechanical systems in accordance with the accompanying plans and all provisions of these specifications. This work shall primarily include, but is not necessarily limited to the following:
- (1) 100% automatic sprinkler system.
  - (2) All insulation associated with mechanical systems.
  - (3) Condensate drainage systems.
  - (4) Complete heating, ventilation and air conditioning systems.
  - (5) All applicable services and work specified in Section 200100; General Provisions - Mechanical.
  - (6) All specified or required control work.
  - (7) Provide all required motor starters, etc. not provided under the electrical sections.
  - (8) One year guarantee of all mechanical equipment, materials and workmanship.
  - (9) Thorough instruction of the owner's maintenance personnel in the operation and maintenance of all mechanical equipment.
  - (10) Thorough coordination of the installation of all piping, equipment and any other material with other trades to ensure that no conflict in installation.
  - (11) Approved supervision of the mechanical work.
  - (12) Excavation, backfilling, cutting, patching, sleeving, concrete work, etc., required to construct the mechanical systems.
  - (13) Prior to submitting a bid, the Contractor shall contact all serving utility companies to determine exactly what each utility company will provide and exactly what is required of the Contractor and shall include such requirements in his base bid.
  - (14) Procurement of all required permits and inspections, including fees for all permits and inspection services and submission of final certificates of inspection to the Engineers (Plumbing, Boiler, HVAC, etc.).
  - (15) Factory start-up of all major equipment (including terminal HVAC equipment) and submission of associated factory start-up reports to the Engineer.

**END OF SECTION**

## SECTION 200300

### SHOP DRAWINGS, DESCRIPTIVE LITERATURE, MAINTENANCE MANUALS, PARTS LISTS, SPECIAL KEYS & TOOLS

#### 1. GENERAL

- A. The Contractor's attention is directed also to the General and Special Conditions and Section 200100 - General Provisions - Mechanical as well as to all other Contract Documents as they may apply to his work.
- B. The Contractor shall prepare and submit to the Engineer, through the General Contractor and the Architect (where applicable) within thirty (30) days after the date of the Contract, all shop drawings, certified equipment drawings, installation, operating and maintenance instructions, samples, wiring diagrams, etc. on all items of equipment specified hereinafter through Ecomm. In addition to the electronic submittal, hard copies of the Fire Protection drawings shall be submitted.
- C. Submittal data shall include specification data including metal gauges, finishes, accessories, etc. Also, the submittal data shall include certified performance data, wiring diagrams, dimensional data, and a spare parts list. Submittal data shall be reviewed by the Engineer before any equipment or materials is ordered or any work is begun in the area requiring the equipment.
- D. All submittal data shall have the stamp of approval of the Contractor submitting the data as well as the General Contractor and the Architect (if applicable) to show that the drawings have been reviewed by the Contractor. Any drawings submitted without these stamps of approval may not be considered and will be returned for proper resubmission.
- E. It shall be noted that review of shop drawings by the Engineer applies only to conformance with the design concept of the project and general compliance with the information given in the contract documents. In all cases, the Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, for seeing that all equipment fits the available space in a satisfactory manner and that piping, electrical and all other connections are suitably located.
- F. The Engineers review of shop drawings, schedules or other required submittal data shall not relieve the Contractor from responsibility for: adaptability of the item to the project; compliance with applicable codes, rules, regulations and information that pertains to fabrication and installation; dimensions and quantities; electrical characteristics; and coordination of the work with all other trades involved in this project. Any items that differ from the Drawings or Specifications shall be flagged by the Contractor so the Engineer will be sure to see the item. Do not rely on the Engineer to "catch" items that do not comply with the Drawings or Specifications. The Contractor is responsible for meeting the Drawings and Specification requirements, regardless of whether or not something does not get caught by the Contractor or Engineer during shop drawing reviews.
- G. Equipment shall not be ordered and no final rough-in connections, etc., shall be accomplished until reviewed equipment shop drawings are in the hands of the Contractor. It shall be the Contractor's responsibility to obtain reviewed shop drawings and to make all connections, etc. in the neatest and most workmanlike manner possible. The Contractor shall coordinate with all the other trades having any connections, roughing-in, etc. to the equipment.



- H. If the Contractor fails to comply with the requirements set forth above, the Engineer shall have the option of selecting any or all items listed in the Specifications or on the drawings; and the Contractor shall be required to furnish all materials in accordance with this list.
- I. Colors for equipment in other than mechanical spaces shall be selected from the Manufacturer's standard and factory optional colors. Color samples shall be furnished with the shop drawing submission for such equipment.
- J. Shop Drawing Submittals
  - (1) All submittals for HVAC equipment shall include all information specified. This shall include air and water pressure drops, RPM, noise data, face velocities, horsepower, voltage motor type, steel or aluminum construction, and all accessories clearly marked.
  - (2) All items listed in the schedules shall be submitted for review in a tabular form similar to the equipment schedule.
  - (3) All items submitted shall be designated with the same identifying tag as specified on each sheet.
  - (4) Any submittals received in an unorganized manner without options listed and with incomplete data will be returned for resubmittal.

## 2. SHOP DRAWINGS

Shop Drawings, descriptive literature, technical data and required schedules shall be submitted on the following:

Split System / Condensing units  
Pipe Insulation  
Controls

### SPECIAL NOTES:

- 1) Upon substantial completion of the project, the Contractor shall deliver to the Engineers (in addition to the required Shop Drawings) three (3) complete copies of operation and maintenance instructions and parts lists for each item marked (1) above. These documents shall include at least:
  - a. Detailed operating instructions
  - b. Detailed maintenance instructions including preventive maintenance schedules.
  - c. Addresses and phone numbers indicating where parts may be purchased.
- 2) Shop drawings for the Control Systems shall include detailed, scaled plans and schematic diagrams indicating the function and operation of the system.
- 3) Shop drawings for the Building Fire Protection System shall be prepared and stamped by a Certified Contractor and shall meet the criteria of the Department of Housing, Buildings and Construction and submitted to the Engineer. After the Engineer's review, they shall be submitted by the Contractor to the proper state authorities along with the required State review fee.

- 4) The Contractor shall submit to the Boiler Inspector's Office the required documentation and review fees for a boiler permit. The boiler permit shall be submitted to the Engineer along with the Boiler Shop Drawings.
- 5) The Contractor shall submit shop drawings for the kitchen hood system(s) along with all required supporting documentation and review fees to the Department of Housing, Buildings and Construction and receive approval prior to submittal to the Engineers.
- 6) The Contractor shall submit Material Safety Data sheets for all chemical treatment and anti-freeze solutions.

3. SPECIAL WRENCHES, TOOLS, ETC.

- (1) The Contractor shall furnish, along with equipment provided, any special wrenches or tools necessary to dismantle or service equipment or appliances installed under the Contract. Wrenches shall include necessary keys, handles and operators for valves, cocks, hydrants, etc. A reasonable number of each shall be furnished.

**END OF SECTION**

## SECTION 200400

### DEMOLITION AND SALVAGE

#### 1. GENERAL

- A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

#### 2. DEMOLITION

##### A. INTENT

It is the intent of this section to completely remove all components of any existing mechanical system no longer in use that will be open to view in, or will interfere with the operations of the completed building, or which will, in any way, interfere with project construction. Components of the existing mechanical systems which do not meet the above criteria, may be abandoned in place in a safe, workmanlike, code approved manner.

##### B. HVAC

- (1) Remove from the project area all piping not to be reused and hangers, specialties, etc. that are accessible or that become accessible during construction and/or interfere in any way with any part of the construction or would be exposed in the completed building.
- (2) Remove all temperature controls and related items that are accessible or become accessible during construction.
- (3) Remove all existing heating and ventilating equipment not indicated to be reused from the building.
- (4) The Contractor shall be responsible for the removal and/or relocation of any HVAC piping, equipment, fittings, valves, etc. which may, in the course of construction, interfere with the installation of any new and/or relocated Architectural, Structural, Mechanical or Electrical Systems at no increase in the contract price.
- (5) Unless otherwise indicated, the Contractor shall be responsible for the patching and repairing of all holes, etc. in the ceiling, wall and floors where HVAC equipment is removed.

##### C. THERMOSTAT, THERMOMETER, AND MERCURY BEARING DEVICE DISPOSAL

- (1) The Contractor shall dispose of all mercury bearing materials in accordance with state and federal guidelines. The Contractor shall take all necessary precautions to not accidentally allow mercury to be released from the device during demolition.

3. SALVAGE

- A. It is the intent of this section to deliver to the owner all components of any mechanical system which may be economically reused by him. The Contractor shall make every effort to remove reusable components without damage and deliver them to a location designated by the Owner.
- B. Other items become the property of the Contractor and are to be removed from the site.

**END OF SECTION**

## SECTION 200500

### COORDINATION AMONG TRADES, SYSTEMS INTERFACING AND CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

#### 1. COORDINATION

- A. The Contractor is expressly directed to read the General Conditions and all detailed sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural and Structural drawings, to the end that complete coordination between trades will be affected. Special attention shall be given to the points where ducts or piping must cross other ducts or piping, where lighting fixtures must be recessed in ceilings, and where ducts, piping and conduit must fit into walls, soffits, columns, etc. It shall be the responsibility of the Contractor to leave the necessary room for other trades. No extra compensation will be allowed to cover the cost of removing piping, conduit, ducts, etc., or equipment found encroaching on space required by others.
- B. The Contractor shall be responsible for coordination with the Electrical trade to ensure that he has made provision for connections, operational switches, disconnect switches, fused disconnects, etc. for electrically operated equipment provided under this division of the specifications, or called for on the plans.
- C. If any discrepancies occur between accompanying drawings and these specifications and drawings and specifications covering other Contracts, each trade shall report such discrepancies to the Architect far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of piping, ductwork, conduit, and equipment not installed in accordance with the above instructions, and which interfered with work and equipment of other trades.
- D. In all areas where air diffusers and lighting fixtures are to be installed, the Contractor shall coordinate their respective construction and installations so as to provide combined symmetrical arrangements.

#### 2. INTERFACING

The Contractor shall ensure that coordination is affected relative to interfacing of systems. Some interface points are (but not necessarily all):

- A. Connection of all controls to equipment.
- B. Electrical power connections to electrically operated (or controlled) equipment.

#### 3. CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

- A. The Contractor shall make all connections to equipment furnished by others, or relocated from the existing structure, whenever such equipment is shown on any part of the drawings or mentioned in any part of the Specifications, unless otherwise specifically specified hereinafter.
- B. Supervision to assure proper functioning and operation shall be provided by the Contractor.
- C. Items indicated on the drawings as rough-in only (RIO) will be connected by others. The Contractor shall be responsible for rough-in provisions only.

- D. For items furnished by others, relocated, or RIO, the Contractor shall obtain from the supplier or shall field determine as appropriate, the exact rough-in locations and connection sizes for the referenced equipment.
- E. The Contractor shall be responsible for coordinating to determine any and all final connections that he is to make to equipment furnished by others.

#### 4. COORDINATION DRAWINGS AND RECORD DRAWINGS

##### A. COORDINATION as follows:

- (1) Coordination Drawings shall be provided on this project by each Trade (Mechanical, Fire Protection, Electrical). Drawings shall be 30 x 42 sheet size and shall be at ¼" scale and shall match the drawing setup as included in the Architectural Drawings. The Architect and Engineer will supply electronic drawings files of the Contract Documents upon the Contractor's request and release.
- (2) Pre-Coordination Meetings with all necessary trades shall occur. During these meetings, the Contractors shall discuss locations/elevations where piping, conduits, cable trays, etc will be installed with respect to the sheet metal fabrication drawings and other trades. The sheetmetal ductwork and gravity piping systems shall be given the first priority. Within 30 days of the meeting, each Trade shall provide the Mechanical Contractor electronic drawings of all of their systems (with elevation noted), coordinated with the ductwork and other trades for them to incorporate into the Coordination Drawings. Coordination Meetings shall then occur so that all conflicts can be resolved between Trades. All conflicts shall be resolved between all Trades at these Coordination Meetings and the Mechanical Contractor shall then amend the Drawings to include the Final Coordinated Work.
- (3) It is realized that not all systems can be completely detailed. The coordination drawings shall include the following at a minimum:
  - a. All hydronic, plumbing, and sprinkler piping. Indicate all valves and ensure that appropriate access is provided for all valves.
  - b. Provide all conduits (existing or new) 2" and above. Multiple smaller conduits hung on a common trapeze hanger that is larger than 6" wide
  - c. All cable tray and enclosed wireway shall be indicated and shall indicate all required access.
  - d. All wall, roof, floor penetrations.
- (4) After completion of the Final Coordination Drawings, a Final Review with the all Trades shall occur to provide any final comments and approval by all Trades. Other interim coordination meeting will be required to ensure successful coordination drawings. Any additional coordination items will be updated by the Mechanical Contractor. The Final Approved Coordination Drawings shall distributed electronically (on CD) to each Trade by the Mechanical Contractor. The Mechanical Contractor shall also furnish a complete 30x42 paper set of drawings to the jobsite main office and shall utilize them for updates of field conditions/deviations that occur during construction. Final Approved Coordination Drawings shall also be distributed to the General Contractor, Owner, Architect and Engineer for their Records. This process shall be completed prior to starting any work.
- (5) RECORD DRAWINGS - Each Contractor shall ensure that any deviations from the Coordination Drawings are recorded as they occur, in red erasable pencil on Coordination Drawings kept at the jobsite. Upon completion of a particular phase, the Mechanical Contractor shall incorporate all field deviations into the Coordination Drawings to be utilized as Record Drawings. The Engineer

shall review the Record Documents from time to time to ensure compliance with this specification. Compliance shall be a contingency of final payment. Pay particular attention to the location of under floor sanitary and water lines, shut-off valves, cleanouts and other appurtenances important to the maintenance and operation of Mechanical Systems. Also, pay particular attention to Deviations in the Control Systems and all exterior utilities. Keep information in a set of drawings set aside at the job site especially for this purpose. The Record Drawings shall be distributed electronically (on CD) to the Construction Manager, Owner, Architect and Engineer for their Records.

**END OF SECTION**

## SECTION 201100

### SLEEVING, CUTTING, PATCHING AND REPAIRING

#### 1. GENERAL

- A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.
- B. The Contractor shall be responsible for all openings, sleeves, trenches, etc., that he may require in floors, roofs, ceilings, walls, etc., and shall coordinate all such work with the General Contractor and all other trades. Coordinate with the General Contractor, any openings which he is to provide before submitting a bid proposal in order to avoid conflict and disagreement during construction. Improperly located openings shall be reworked at the expense of the Contractor.
- C. The Contractor shall plan his work ahead and shall place sleeves, frames or forms through all walls, floors and ceilings during the initial construction, where it is necessary for piping, ductwork, conduit, etc., to go through; however, when this is not done, the Contractor shall do all cutting and patching required for the installation of his work, or he shall pay other trades for doing this work when so directed by the Engineer. Any damage caused to the buildings by the workmen of the responsible Contractor must be corrected or rectified by him at his own expense.
- D. The Contractor shall notify other trades in due time where he will require openings or chases in new concrete or masonry. He shall set all concrete inserts and sleeves for his work. Failing to do this, he shall cut openings for his work and patch same as required at his own expense.
- E. The Contractor shall be responsible for properly shoring, bracing, supporting, etc., any existing and/or new construction to guard against cracking, settling, collapsing, displacing or weakening while openings are being made. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements shall be promptly and properly made good to the satisfaction of the Engineer.
- F. All work improperly done or not done at all as required by the Mechanical Trades in this section, will be performed by the Contractor at the direction of the trade whose work is affected.

#### 2. SLEEVES, PLATES AND ESCUTCHEONS

- A. The Contractor shall provide and locate all sleeves and inserts required for his work before the floors and surface being penetrated are built, otherwise the Contractor shall core drill for pipes where sleeves and inserts were not installed, or where incorrectly located. Core drilling is the only acceptable alternative to sleeves. Do not chisel openings. Where sleeves are placed in exterior walls or in slabs on grade, the space between the pipe or conduit and the sleeves shall be made completely and permanently water tight.
- B. Pipe that penetrates fire and/or smoke rated assemblies shall have sleeves installed as required by the manufacturer of the rating seal used.
- C. At all other locations either pipe sleeves or core drilled openings are acceptable.



- D. Where thermal expansion does not occur, the wall may be sealed tight to the pipe or insulation.
- E. Insulation, that requires a vapor barrier (i.e., cold water or refrigerant piping, etc.), must be continuous through the sleeve/cored hole. For other piping, insulation may stop on either side of the sleeve.
- F. Sleeves shall be constructed of 24-gauge galvanized sheet steel with lock seam joints or Schedule 40 pipe. Sleeves in floors shall extend 1" above finished floor level.
- G. Fasten sleeves securely in floors, walls, so that they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeve during construction.
- H. In all areas where ducts are exposed and ducts pass thru floors, the opening shall be surrounded by a 4-inch-high by 3-inch-wide concrete curb.
- I. Escutcheon plates shall be provided for all pipes and conduit passing thru walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing thru sleeves which extend above the floor surface, provide deep recessed plates to conceal the pipe sleeves.

### 3. CUTTING

- A. All rectangular or special shaped openings in plaster, stucco or similar materials, including gypsum board, shall be framed by means of plaster frames, casing beads, wood or metal angle members as required. The intent of this requirement is to provide smooth even termination of wall, floor and ceiling finishes as well as to provide a fastening means for grilles, diffusers, lighting fixtures, etc.
- B. Mechanical, plumbing, and fire protection contractors shall coordinate all openings in new and existing masonry walls with the General Contractor; and, unless otherwise indicated on the Architectural drawings, provide lintels for all openings required for the work (Louvers, wall boxes, exhaust fans, etc.). Lintels shall be sized as follows:
  - (1) New Openings under 48" in width: Provide one 3-1/2"x3-1/2"x3/8" steel angle for each 4" of masonry width. Lintel shall have 8" bearing on either side.
  - (2) New Openings 48" to 96" in width: Provide one 3-1/2"x6"x3/8" steel angle for each 4" of masonry width. Lintel shall have 8" bearing on either side.
  - (3) New Openings over 96" in width: Consult the Project Structural Engineer.
- C. No cutting is to be done at points or in a manner that will weaken the structure and unnecessary cutting must be avoided. If in doubt, contact the Engineer.
- D. Pipe openings in slabs and walls shall be cut with core drill. Hammer devices will not be permitted. Edges of trenches and large openings shall be scribe cut with a masonry saw.
- E. Openings in metal building walls shall be made in strict accord with building suppliers recommendations.

#### 4. PATCHING AND REPAIRING

- A. Patching and repairing made necessary by work performed under this division shall be included as a part of the work and shall be done by skilled mechanics of the trade or trades for work cut or damaged, in strict accordance with the provisions herein before specified for work of like type to match adjacent surfaces and in a manner acceptable to the Engineer.
- B. Where portions of existing lawns, shrubs, paving, etc. are disturbed for installation of work of this Division, such items shall be repaired and/or replaced to the satisfaction of the Engineer.
- C. Where the installation of conduit, ducts, piping, etc. requires the penetration of fire or smoke rated walls, ceilings or floors, the space around such conduit, duct, pipe, etc., shall be tightly filled with an approved non-combustible fire insulating material satisfactory to maintain the rating integrity of the wall, floor or ceilings affected.
- D. Where ducts penetrate fire rated assemblies, fire dampers shall be provided with an appropriate access door.
- E. Piping passing through floors, ceilings and walls in finished areas, unless otherwise specified, shall be fitted with chrome plated brass escutcheons of sufficient outside diameter to amply cover the sleeved openings and an inside diameter to closely fit the pipe around which it is installed.
- F. Stainless steel collars shall be provided around all ducts, large pipes, etc., at all wall penetrations; both sides.
- G. Where ducts, pipes, and conduits pass through interior or exterior walls, the wall openings shall be sealed air tight. This shall include sealing on both sides of the wall to ensure air does not enter or exit the wall cavity. This is especially critical on exterior walls where the wall cavity may be vented to the exterior.
- H. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore, all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

**END OF SECTION**

## SECTION 201300

### PIPE, PIPE FITTINGS AND PIPE SUPPORT

#### 1. GENERAL

- A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.
- B. When a pipe size is not indicated, the Contractor shall request the pipe size from the Engineers. All piping shall be installed straight and true, parallel or perpendicular to the building construction. Piping shall be installed so as to allow for expansion without damage to the building finishes, structure, pipe, equipment, etc., use offsets, U-bends or expansion joints as required. Where a section of piping is not indicated but is obviously required for completion of the system, the Contractor shall provide same at no additional cost to the project. No mitered joints or field fabricated pipe bends shall be accepted. Pipe shall clear all windows, doors, louvers and other building openings.
- C. All pipe shall be supported in a neat and workmanlike manner and wherever possible, parallel runs of horizontal piping shall be grouped together on trapeze type hangers. Vertical risers shall be supported at each floor line with approved steel pipe riser clamps. The use of wire or perforated metal to support pipes will not be permitted. Hanging pipes from other pipes shall not be permitted. Spacing of pipe supports shall not exceed eight feet for pipes up to 1-1/4 inches and ten feet on all other piping. Small vertical pipes (1 inch and less) shall be bracketed to walls, structural members, etc. at four (4) foot intervals so as to prevent vibration or damage by occupants. Insulated piping shall be supported on a rigid insulation block at each hanger so as to prevent crushing of insulation by hangers. Hangers shall pass completely around the insulation jacket and a steel protective saddle shall be applied to prevent compression of the insulation. (Refer to Specifications Section entitled INSULATION-MECHANICAL).
- D. Where piping rests directly on a hanger, clip, bracket or other means of support, the support element shall be of the same material as the pipe, (e.g., copper to copper, ferrous to ferrous, etc.) or shall be electrically isolated one from the other so as to prevent pipe damage by electrolysis. Pay particular attention and do not allow copper pipe to rest on ferrous structural members, equipment, etc. without electrolytic isolation.
- E. In general, piping shall be installed concealed except in Mechanical, Janitor Rooms, etc. unless otherwise indicated, and shall be installed underground or beneath concrete slabs only where indicated. All lines at ceilings shall be held as high as possible and shall run so as to avoid conflicts with other trades, and to facilitate the Owner's use and maintenance. Location of pipe in interior partitions shall be carefully coordinated with whoever will construct the partitions after the piping is in place. Where exposed risers occur, they shall be kept as close to walls as possible.

- F. Installation of pipe shall be in such a manner as to provide complete drainage of the system toward the source. Drain valves shall be provided at all drainage points on pipes. Drain valves shall be 1/2" size gate type with 3/4" hose thread end and vacuum breaker. Label each drain valve.
- G. All hot and cold-water piping shall be kept a sufficient distance apart so as to prevent heat transfer between them. Cold water piping shall also be kept apart from refrigerant hot gas lines.
- H. Piping carrying water or other fluids subject to freezing shall not be installed in locations subject to freezing; if in doubt, consult Engineer.
- I. Piping for all drainage systems shall be installed to permit flow, trapping, and venting in accord with current codes and sound practice.
- J. All cast iron soil pipe and fittings shall be coated inside and out with coal tar varnish.
- K. Non-metallic piping shall be installed in strict accordance with the manufacturer's instructions. If no such instructions are available, consult Engineers.
- L. Per University standards, no plastic pipe is to be used inside any building or structure unless explicitly approved within the project specification.
- M. Nipples shall be of the same material, composition and weight classification as pipe with which installed.
- N. Where piping is not indicated on the plans, but is obviously or apparently required, contact the Engineers prior to submission of a bid proposal.
- O. Pay particular attention to conflict of piping with other work. Do not install until conflict is resolved. If necessary, contact Engineers.
- P. Piping materials in each system shall, to the extent practicable, be of the same material. Frequent changes of material (for example, from copper to steel) shall be avoided and in no case, shall be accomplished without use of insulating unions and permission of the Engineers.
- Q. Apply approved pipe dope (for service intended) to all male threaded joints. Pay particular attention to dope for fuel gas lines. The dope shall be listed for such use.
- R. High points of closed loop hot water heating systems shall have manual or automatic air vents as indicated or required unless automatic air vents are specifically indicated. Pipe to suitable drainage point.
- S. All piping shall be capped or plugged during erection as required to keep clean and debris and moisture free.

- T. The entire domestic hot, cold and recirculating hot water piping system shall be sterilized in strict accord with requirements of the Department of Health Codes, Rules and Regulations for the State which the work is being accomplished in.
  - U. Provide expansion joints where shown on the plans and where required by good practice. Expansion joints shall be guided and anchored in accordance with the recommendations of the Expansion Joint Manufacturer's Association.
  - V. Where plastic pipe penetrates a fire rated assembly, it shall be replaced with a metal threaded adapter and a metal pipe per code.
  - W. Foam Core PVC is not permitted
  - X. Where piping penetrates interior or exterior walls, the wall shall be sealed air tight. Refer to the sleeving, cutting, patching and repairing section of the specifications for additional requirements.
  - Y. Provide thrust blocks on all storm, sanitary, water, steam, hot, chilled, condenser, etc., and any other piping subject to hammering. Thrust blocks shall be provided at all turns.
  - Z. All piping to hydronic coils shall be full size all the way to the coil connection on the unit. If control valve is smaller than pipe size indicated, transition immediately before and after control valve. Also, if coil connection at unit is a different size than the branch pipe size indicated, provide transition at coil connection to unit. On 3-way valve applications, the coil bypass pipe shall be full size.
  - AA. Provide check valves on individual hot and cold-water supplies to each mixing valve (including each sensor style faucet, safety shower, mop sink, etc.) and each showerhead with a diverter valve (including all ADA showers). This requirement shall not be satisfied by mixing valves or fixtures with internal check valves. Independent external check valves are required.
  - BB. Ends of piping shall be reamed and , where applicable, all threads shall be sharp and true.
2. UNIONS AND FLANGES AND WELDED TEES
- A. Screwed unions, soldered unions or bolted flanges shall be provided as required to permit removal of equipment, valves and piping accessories from the piping system. Keep adequate clearances for coil removal, rodding, tube replacement, motor lubrication, filter replacement, etc. Flanged joints shall be assembled with appropriate flanges, gaskets and bolting. Gaskets for steam piping systems shall be flexitalic spiral wound type. The clearance between flange faces shall be such that the connections can be gasketed and bolted tight without imposing undue strain on the piping system.
  - B. Dielectric insulating unions or couplings shall be used wherever the adjoining materials being connected are of dissimilar metals such as connections between copper and steel pipe.
  - C. Tee connections for welded pipe shall be made up with welding fittings. Where the size of the side outlet is such that a different connection technique than on the run is required, a weldolet,

socket, or threadolet type fitting may be used for the branch in place of reducing tees only where the branch is 2/3 the run size or smaller.

### 3. SPECIFICATIONS STANDARDS

All piping and material shall be new, full weight, made in the United States and shall conform to the following minimum applicable standards:

- A. Steel pipe; ASTM A-120, A-53 Grade A, A-53 Grade B.
- B. Copper tube; Type K, L, M; ASTM B88-62; Type DWV ASTM B306-62.
- C. Cast iron soil pipe; ASA A-40.1 and CS 188-59.
- D. Cast iron drainage fittings; ASA B16.12.
- E. Cast iron screwed fittings; ASA B16.4.
- F. Welding fittings; ASA B16.9.
- G. Cast brass and wrought copper fittings; ASA B16.18.
- H. Cast brass drainage fittings; ASA B16.23.
- I. Reinforced concrete pipe; ASTM-C-76-64T.
- J. Solder; Handy and Harmon, United Wire and Supply; Air Reduction Co. or equivalent.
- K. ABS plastic pipe; ASTM D1788-73.

### 4. PITCH OF PIPING

All piping systems shall be installed so as to drain to a low point. Certain minimum pitches shall be required for this drainage. For proper flow and/or for proper operation, the following pitches shall be required:

- A. Condensate Drain Lines from Cooling Equipment:

Not less than 1/4 inch per foot in direction of flow.

- B. All Other Lines:

Provide ample pitch to a low point to allow 100 percent drainage of the system.

## 5. APPLICATIONS

### A. General Notes

- (1) Where plastic piping penetrates a fire rated assembly, it shall be replaced with a threaded metal adapter and metal pipe or whatever means necessary to maintain the separation rating in accordance with local plumbing and fire codes.
- (2) Plastic piping or any materials with a flame and smoke spread rating not approved for plenum use shall not be permitted in supply, return, relief or exhaust plenums.
- (3) PVC, CPVC, or plastic piping shall not be used under paving, roads or areas where vehicular traffic is expected.
- (4) PVC or plastic piping whether specifically listed or not may not be used in high rise buildings or anywhere else prohibited by code.

### B. Refrigerant Piping

Interior Piping for Variable Refrigerant Flow Systems 1/8" to 1-3/8" shall be ACR soft copper tube with long radius bends of soft copper tube. Provide ACR hard copper tube in all sizes for systems other than Variable Refrigerant Flow. Interior lines larger than 1-3/8" shall be ACR hard copper tube. All exterior lines shall be ACR hard copper tube. Fitting shall be wrought or forged copper with silver solder joints and minimum 15% silver content.

#### (1) General Installation Notes:

- a. Contact Engineer 24 hours prior to installation of refrigerant lines or evacuation of refrigerant system.
- b. Refrigerant lines installation must meet HVAC equipment manufacturer's recommendations.
- c. While installing or soldering refrigerant lines, system must continuously be purged with nitrogen.
- d. After system is installed, the refrigerant system must be evacuated to 25 microns for eight hours.

### C. Condensate Drain Lines

- (1) Type "DWV" copper, wrought copper, lead free solder.

**END OF SECTION**



## **SECTION 202110**

### **ACCESS TO VALVES, EQUIPMENT, FILTERS, ETC.**

#### **1. GENERAL**

- A. The Contractor's attention is directed to the General and Special Conditions, General Requirements-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.
- B. All mechanical equipment shall be installed in a manner which allows ready access to all components requiring service, adjustments, shutoff, etc.
- C. Filters shall be accessible, removable and replaceable without disconnecting mounting brackets, piping, wiring, etc.
- D. Provide access doors or panels for all equipment, valves, dampers, filters, fire dampers, etc. in concealed spaces not otherwise provided with suitable access. (Lay-in ceilings shall be considered acceptable access; splined or drywall ceilings shall not).
- E. All valves, unions, strainers, cleanouts, volume dampers, and test points shall be accessible.
- F. Access panels in lay-in ceilings shall be labeled with a lamacoid plate to indicate location of equipment, filters, valves, etc.
- G. Access panels in fire rated walls shall bear the same rating as the wall.
- H. Contractor shall coordinate the finish of all access doors and panels installed in finished areas with Architect.

#### **2. ACCESS DOORS**

Refer to Sheet Metal and Flexible Duct section of the specifications.

**END OF SECTION**

## SECTION 202200

### INSULATION - MECHANICAL

#### 1. GENERAL

- A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.
- B. Work under this section shall include all labor, equipment, accessories, materials and services required to furnish and install all insulation, fittings and finishes for all mechanical systems specified herein and/or as indicated.
- C. Application of insulation materials shall be done in accordance with manufacturer's written recommendations. Where thickness of insulation is not specified, use applicable thickness recommended by manufacturer for specific use. Insulation shall be applied by a company regularly engaged in the application of insulation and any work deemed unacceptable by the Engineers shall be removed and properly installed at the expense of the Contractor.

#### 2. MANUFACTURERS

- A. Insulation shall be as manufactured by Manville, Knauf, CertainTeed, Owens-Corning, Armacell or approved equivalent. Insulation sundries, adhesives, and jackets/covers shall be as made by Benjamin Foster, Zeston, Speedline, Proto, Childers, Vimasco or approved equivalent.

#### 3. FIRE RATINGS AND STANDARDS

- A. Insulations, jackets and facings shall have composite fire and smoke hazard ratings as tested by ASTM E-84, NFPA 255 and UL 723 procedures not exceeding Flame Spread 25, Smoke Developed 50.
- B. Adhesives, mastics, tapes and fitting materials shall have component ratings as listed above.
- C. All products and their packaging shall bear a label indicating above requirements are not exceeded.
- D. Duct linings shall meet the Erosion Test Method in compliance with UL Publication No. 181.

#### 4. GENERAL APPLICATION REQUIREMENTS

- A. Insulation shall be applied on clean, dry surfaces in a neat and workmanlike manner reflecting the best current practices in the trade. Insulation shall not be applied to piping, ductwork or equipment until tested, inspected and released for insulation.
- B. All insulation shall be continuous through walls, ceiling openings and sleeves. However, insulation shall be broken through fire walls. All covered pipe and ductwork is to be located a sufficient distance from walls, other pipe, ductwork and other obstacles to permit the application of the full thickness of insulation specified. If necessary, extra fittings and pipe are to be used. No noticeable deformation of insulation or discontinuity of vapor seal, where required, will be accepted.

- C. "Concealed", where used herein, shall mean hidden from sight as in trenches, chases, furred spaces, pipe shafts, or above hung finished ceilings. "Exposed" shall mean that piping or equipment is not "concealed" as defined above. Piping and equipment in service tunnels, mechanical equipment rooms, mechanical platform, mezzanine, penthouse, etc. storage areas, or unfinished rooms is to be considered as "exposed".
- D. Existing and/or new insulation removed and/or damaged during course of construction shall be repaired or replaced as directed by the Engineer.
- E. Vapor barrier jackets shall be applied with a continuous unbroken vapor seal. Do not use staples thru the jacket. NO EXCEPTIONS!
- F. All insulation shall be installed with joints butted firmly together.
- G. The Contractor shall ensure that all insulation (piping, ductwork, equipment, etc.) is completely continuous along all conduits, equipment, connection routes, etc. carrying cold fluids (air, water, other) and that condensation can, in no way, collect in or on the insulation, equipment, conduits, etc. Any such occurrence of condensation collection and/or damage therefrom shall be repaired solely at the expense of the Contractor.

## 5. PIPING SYSTEMS

### A. GENERAL

- (1) Bevel insulation and jacket at all points where insulation terminates at unions, flanges, valves and equipment. Note: Applies to hot water lines only; cold water lines require continuous insulation.
- (2) Pipe insulation shall extend around valve bodies to above drain pans in hydronic equipment over pumps, etc. to ensure no condensation drip or collection.
- (3) Factory molded fittings may be installed in lieu of built-up fittings. Jackets to be the same as adjoining insulation. Insulated fittings must have same or better K factors than adjoining straight run insulation.
- (4) Valves, flanges and unions shall only be insulated when installed on piping whose surface temperature will be at or below the dew point temperature of the ambient air.
- (5) Insulation shall not extend through fire and smoke walls. A UL-listed penetration system shall be used for each fire or smoke wall penetration in accordance with KBC. Materials used such as caulk, sleeves, etc. shall be manufactured by 3M, Hilti, or equal.

### B. INSULATION SHIELDS

- (1) Metal insulation shields are required at all pipe hangers where the piping is insulated. Metal shields shall be constructed of galvanized steel, formed to a 180-degree arc. Insulation shields shall be the following size:

PIPE SIZE	SHIELD GAUGE	SHIELD LENGTH
2" AND LESS	20	12"
2 1/2" TO 4"	18	12"
5" TO 10"	16	18"
12" AND GREATER	14	24"

C. INSULATION MATERIAL (FOR THE FOLLOWING SYSTEMS)

Insulation shall be Owens-Corning Model 25ASJ/SSL, or approved equivalent fiberglass pipe insulation with an all service jacket. The insulation shall be a heavy density, pipe insulation with a K factor .23 at 75°F mean temperature. The insulation shall be wrapped with a vapor barrier jacket. Approved manufacturers are listed in Section 2 – Manufacturers. The jacket shall have an inside foil surface with self sealing lap and a water vapor permeability of .02 perm/inch. All circumferential joints shall be vapor sealed with butt strips. All insulation shall be installed in strict accordance with the manufacturers’ recommendations. The following pipes shall be insulated with the thickness of insulation as noted.

(1) Condensate Drain Lines.

- a. Piping 1 ½” or less – use 1/2” thick insulation
- b. Piping 2” or greater – use 1” thick insulation

(2) Refrigerant Liquid and Suction Lines - Interior & Exterior

IMCOA, Nomaco, or Armacell closed cell polyethylene, 1.5 Lbs/Ft<sup>3</sup> density, 0.24 BTU-Hr.-Ft<sup>3</sup>-°F/in at 75°F thermal conductivity, zero vapor permeance, 25/50 flame and smoke spread per NFPA 90 requirements. Elastomeric closed cell insulations that meet the above requirements are also allowed. Install insulation per the manufacturer’s requirements. Provide UV protective coating for all exterior refrigerant lines.

- a. All pipe sizes: 1 ½” thick

D. JACKETS

(1) Exposed (Mechanical Rooms, Interior Finished Rooms and Storage Rooms)

All insulated piping installed in the above areas shall have a canvas or PVC jacket:

- a. 6 oz. canvas jacket with fire retardant lagging. Apply to the insulation specified for the piping.
- b. For all systems except steam, plenum rated PVC jacket equal to LoSmoke PVC jacket with flame/smoke rating of 25/50, ASTM-E84 test method. Minimum thickness 0.04 inches. Steam systems shall utilize plenum rated CPVC jacket with minimum thickness of 0.04 inches. Jackets shall be applied over top of specified pipe insulation. Approved equal manufacturers are Zeston and Speedline. Approved equal manufacturers are Zeston and Speedline.

(2) Exposed (Exterior)

In addition to the insulation specified for the exterior pipe, provide .016" aluminum jacket or PVC jacket 0.05" thick. The jackets shall be installed as recommended by the manufacturer to maintain water tight seal. All longitudinal and transverse seams to be sealed water tight. PVC jacket shall be Ceel-Co, Proto, or Zeston.

**END OF SECTION**

**SECTION 202500**

**HANGERS, CLAMPS, ATTACHMENTS, ETC.**

1. GENERAL

- A. The Contractor's attention is directed to the General and Special Conditions, General Provisions - Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.
- B. Each Contractor's attention is also directed to Section 201300, Pipe, Pipe Fittings and Pipe Support.
- C. This section includes, but is not limited to, furnishing and installing dampers, supports, anchors, and accessories for piping, ductwork, equipment, etc. Furnishing and installing shall be by each trade for the completion of their work.
- D. Power driven anchors and expansion anchors shall be permitted only when permission is granted in writing by the Architect and Engineer.

2. MATERIALS AND EQUIPMENT

- A. Hangers, Clamps, Attachments, Etc.:

	SIZE	SPECIFICATION
1. Pipe Rings	2" pipe and smaller	Adjustable swivel split ring or split pipe ring, Grinnell Figures 104 and 108, Elcen, Fee & Mason, or approved equivalent.
2. Pipe Clevis	2-1/2" pipe and larger	Adjustable wrought Clevis type, Grinnell Figure 260, Elcen, Fee & Mason, or approved equivalent.
3. Pipe Clevis	All	Steel Clevis for insulated pipe, Elcen Figure 12A, Grinnell, Fee & Mason or approved equivalent.
4. Rise Clamps	All	Extension pipe or riser clamp, Grinnell Figure 261, Elcen, Fee & Mason or approved equivalent.
5. Beam Clamps and Attachments	All	Grinnell Figure numbers listed or, Elcen, Fee & Mason, or approved equivalent. Malleable beam clamp with extension piece figure 229; I-beam clamp figure 131; C-clamp figures 83, 84, 85, 86, 87, and 88.
6. Brackets	All	Welded steel brackets medium weight, Grinnell Figure 195, Elcen, Fee & Mason or

		approved equivalent.
7. Concrete Inserts	All	Grinnell Figure numbers listed or, Elcen, Fee & Mason or approved equivalent. Wrought steel insert Figure 280 and wedge type insert Figure 281.
8. Concrete Fasteners	All	Self-drilling concrete inserts, Phillips, Grinnell, Elcen or approved equivalent.
9. Ceiling	All	Grinnell Figure numbers listed or Elcen, Fee & Mason, or approved equivalent. Pipe hanger flange Figure 153, adjustable swinging hanger flange Figure 155, ceiling flanges Figures 128 and 128R, and adjustable ceiling flange Figure 116.
10. Rod Attachments	All	Grinnell Figure numbers listed or Elcen, Fee & Mason, or approved equivalent. Extension piece Figure 157, rod coupling Figure 136, and forged steel turnbuckle Figure 230.
11. U-Bolts	All	Standard, U-bolt, Grinnell Figure 137, Elcen, Fee & Mason, or approved equivalent.
12. Welded Pipe Saddles	All	Pipe covering protection saddle sized for thickness of insulation, Grinnell Figure 186, Elcen, Fee & Mason or approved equivalent.
13. Pipe Roll	All	Adjustable swivel pipe roll, Grinnell Figure 174, Elcen, Fee & Mason, or approved equivalent.
14. Protection Saddle	All	18-gauge sheet metal pipe protection saddle, Elcen Figure 219, Fee & Mason, Power Strut, or approved equivalent.
15. Hanger Rods	All	Steel, diameter of the hanger threading, ASTM A-107.
16. Miscellaneous Steel	All	Steel angles, rods, bars, channels, etc., used in framing for supports and fabricated brackets, anchors, etc., shall conform to ASTM-A-7.
17. Concrete Channel Inserts	All	Continuous slot inserts, Unistrut, or approved equivalent. Heavy duty Series P-3200 or Light Duty Series P-3300 as required.
18. Adjustable Spot Insert	All	Adjustable spot insert Unistrut, or approved equivalent, P-3245. Design load 1000 lbs.

3. INSTALLATION

- A. Unless otherwise specifically indicated or hereinafter specified in the specifications, all supporting, hanging and anchoring of piping, ductwork, equipment, etc., shall be done by each trade as is necessary for completion of the work and shall be as directed in the following paragraphs:
- (1) Supporting and hanging shall be done so that excessive load will not be placed on any one hangers so as to allow for proper pitch and expansion of piping. Hangers and supports shall be placed as near as possible to joints, turns and branches.
  - (2) For concrete construction, utilize adjustable concrete inserts for fasteners. Expansion anchors and power-driven devices may be used when approved in writing by the Architect/Engineer. Utilize beam clamps for fastening to steel joists and beams and expansion anchors in masonry construction. When piping is run in joists, piping shall be top mounted on trapeze type hangers with each pipe individually clamped to trapeze hanger.
  - (3) Trapeze hangers shall be supported by steel rods of sufficient diameter to support piping from joists or concrete construction. Where desired or required, piping may be double mounted on trapeze hangers. Where conditions permit, trapeze hangers may be surface mounted on exposed joists by means of approved beam clamps, or to concrete construction by means of approved adjustable inserts or expansion anchors.
  - (4) Install all miscellaneous steel other than designed building structural members as required to provide means of securing hangers, supports, etc., where piping does not pass directly below or cross steel joists.
  - (5) Piping shall not be supported by the equipment to which it is connected. Support all piping so as to remove any load or stress from the equipment.
  - (6) Where piping, etc., is run vertically, approved riser clamps, brackets or other means shall be utilized at approximately 10'-0" center to center minimum and an approved adjustable base stand or fitting on concrete support base shall be utilized at the base of the vertical run.
  - (7) Where piping is run along walls, knee braced angle frames or pipe brackets with saddles, clamps, and rollers (where required) mounted on structural brackets fastened to walls or columns shall be used.
  - (8) Support all ceiling hung equipment, with approved vibration isolators.
  - (9) Where copper tubing is specified, hangers shall be of copper clad type when piping is uninsulated.
  - (10) Uninsulated piping hung from above shall be supported with ring and clevis type pipe hangers. Uninsulated piping mounted on trapeze and wall bracket type support shall be held in place with U-bolts. U-bolts shall allow for axial movement in the piping.
  - (11) All insulated piping shall be supported with clevis type and/or pipe roll hangers. Hangers shall be sized to allow the pipe insulation to pass through the hangers. Install insulation protection saddles at all hanger locations. Welded pipe saddles shall be installed at all hangers on piping 5" and larger. The pipe saddles shall be sized for the thickness of insulation used. Hangers shall fit snugly around outside of insulation saddles.
  - (12) Under no conditions will perforated band iron or steel wire driven hangers be permitted.



(13) In general, support piping at the following spacing:

- a. Steel and copper piping - 5 feet intervals for piping 3/4" and smaller. 6 feet intervals for 1 ¼" and 1" pipe. 8-foot intervals for piping 1 ½" to 3". 10-foot intervals piping 3 ½" and larger.
- b. Where the manufacturer of the pipe has more strict guidelines, the manufacturer's recommendations shall be followed.

**END OF SECTION**

## SECTION 210100

### FIRE PROTECTION SYSTEM

#### 1. GENERAL

- A. The General Conditions, Instructions to Bidders, Section 200100, 1. A, and other Contract Documents are a part of this specification and shall be binding on the Contractor. It shall be the Contractor's responsibility to apprise himself of all information pertinent to his work prior to submitting his proposal. No adjustments will be made in this Contract which is a result of failure to comply with this requirement.
- B. No Contractor, other than those regularly engaged in the installation of approved and franchised automatic sprinkler systems, will be considered or approved for the work under this section of the specifications. Bidders must have had not less than five (5) years experience in the fabrication and erection of such systems: wet, dry and rack storage types, and shall have completed installations similar and equivalent in scope to this system under approval by one or more of the recognized Underwriting Associations in the Insurance Field.
- C. Before submitting bid, examine all Mechanical, Architectural, and Structural Drawings, visit the site and become acquainted with all conditions that may, in any way whatsoever, affect the execution of this work. Also, the Contractor shall coordinate with the rating bureau and insuring agency to verify adequacy of water supply for the proposed sprinkler system extension.
- D. The Contractor shall take his own measurements and be responsible for exact size and location of all openings required for installation of this work. Figured dimensions where indicated are reasonably accurate and should govern in setting out work. Detailed method of installation is not indicated. Where variations exist between described work and approved practice, the Engineer shall be consulted for directive.
- E. It is the intent of the Plans and Specifications to provide a general layout only and locate major equipment, piping, etc. Variations in head locations, pipe routing, etc., may be anticipated by the Contractor and shall be coordinated with all other trades and indicated on the drawings and descriptive literature called for hereinafter. It shall be the express responsibility of the Contractor to provide all required materials and equipment and perform all work required to install a complete and approved installation.
- F. All materials and methods shall be in accordance with applicable codes, regulations and/or ordinances and meet approval of local inspection authority and the State Fire Marshal. Also, all work shall comply with the latest editions of the National Board of Fire Underwriters, National Fire Protection Association, OSHA Regulations, the National Building Code, the Life Safety Code, IMC Code and the Southern Building Code (Where applicable). The local insuring agency shall review plans prepared and submitted by the Contractor but shall have no authority to make changes once work has begun.
- G. All work performed under this section shall be accomplished in close harmony with all other trades. All work not so coordinated shall be removed and reinstalled at the expense of the Contractor.
- H. The Contractor shall submit a proposed layout to the Engineer prior to submittal to the Fire Marshal's Office.

- I. Per University standards, provide labels on ceiling grid and/or at access panels to locate concealed valves and switches. Refer to section 202400 for additional requirements.

## 2. SCOPE OF WORK

- A. Furnish all material, labor, tools, equipment and supervision required for installation of a complete fire protection and stand pipe system as indicated on the project drawings. Include all necessary piping, sprinkler heads, test connections, valves, drains, cabinets, siamese connections, fire hydrants, fire pump, etc.
- B. The Contractor shall provide flushing and sterilization of all water lines in accordance with current Kentucky Plumbing Codes, Rules and Regulations and shall make connection to domestic water mains in accord with current rules and regulations of the State Department of Sanitary Engineering and Division of Water.
- C. Per University standards, provide stand pipes with 2-1/2 inch connections in a labeled cabinet with glass breakout panel. Do not provide with fire hose or 1-1/2 inch connection.

## 3. WATER SUPPLIES AND SYSTEM LAYOUT CRITERIA

- A. Where flow and pressure data are available, they are indicated on the project drawings. The Contractor shall independently verify all such information and notify the engineer of any discrepancies discovered prior to beginning the work. Where no flow information is indicated on the project drawings, the Contractor shall obtain it and indicate it on the shop drawing submittal.
- B. Piping systems shall be hydraulically sized based on the most conservative flow information obtained. No adjustments in the contract amount will be allowed for failure of the Contractor to obtain adequate flow information.
- C. Per University standards, water velocity in sprinkler pipes is not to exceed 32 ft/sec.
- D. Per University standards, all newly installed sprinkler systems must be fully flow-tested by the Contractor in the presence of the Consultant's engineer, University Project Manager, and the University Fire Marshall.

## 4. DRAWINGS AND DESCRIPTIVE LITERATURE

- A. The Contractor shall prepare and submit to the Engineers, seven (7) copies of detailed drawings indicating his proposed Automatic Sprinkler System. These drawings shall indicate minimally the following components when they are used in the system.

- (1) Name and address of Owner, Architect and Engineers.
- (2) Make and type of sprinkler heads (Catalog cuts).
- (3) Make and type of fire department connection (Catalog cuts).
- (4) Make and type of post indicator valve (Catalog cuts).
- (5) Make and type of detector check valve (Catalog cuts).
- (6) Make and type of electric alarm bell (Catalog cuts).
- (7) Make and type of retard chamber (Catalog cuts).
- (8) Make and type of dry pipe alarm valve (Catalog cuts).
- (9) Make and type of flanged check valve (Catalog cuts).
- (10) Make and type of flanged gate valve (Catalog cuts).
- (11) Make and type of automatic drains (Catalog cuts).
- (12) Make and type of pipe hangers (1 catalog cut of each make and/or type).
- (13) Make, type and electrical characteristics of:

- a. The pressure sensing switch\*.
  - b. The post indicator supervisory switch\*.
  - c. The main gate valve supervisory switch\*.
  - d. The flow switch\*.
  - e. Air compressor.
- (14) Make and type of fire pump (Catalog cuts).
- (15) Make and type of jockey pump (Catalog cuts).
- (16) Make and type of supervised O.S & Y valve.
- (17) Make and type of indicating butterfly valve.
- (18) Make and type of fire hose cabinets.
- (19) Make and type of reduced pressure backflow preventer.

Note: All layouts and drawings are to be closely coordinated with the work of all other trades. The Engineers will, upon request, provide a complete set of Architectural, Structural, Mechanical and Electrical Plans and Specifications to aid the Contractor in this work.

\*SPECIAL NOTE: 1) The items (indicated by asterisk) must be clearly coordinated with the Fire Alarm System supplier. 2) Supervisory switches located in wet locations (i.e., fire protection vault) shall be provided with NEMA 6 enclosures.

- (20) On a set of drawings to the same scale as the drawings accompanying these specifications, indicate:
- a. Each head location coordinated with lights, diffusers and other ceiling mounted device.
  - b. Location of all risers, mains, runout lines, etc.
  - c. Size of all risers, mains, runout lines, etc.
  - d. Location and type of pipe hangers.
  - e. All other information required by the Kentucky Department of Housing, Buildings and Construction.

The Contractor shall submit these drawings to the Engineer through the General Contractor/Construction Manager and Architect where applicable. The Contractor shall submit reviewed drawings to the Kentucky Department of Housing, Buildings and Construction for their review and approval. No work shall be done until drawings are approved by the Kentucky Department of HBC.

## 5. SYSTEM DRAINAGE

- A. The entire Standpipe and Sprinkler System (except that part which is below grade and will not freeze) shall be installed so as to allow 100% drainage.
- B. All sprinkler branch piping shall be installed so as to drain back to the main riser.
- C. Approved 2" drawoff piping shall be provided on sprinkler risers with discharge piping running to nearest floor drain or open air.
- D. Where sprinkler piping is trapped, an approved auxiliary draw-off shall be provided and neatly installed.
- E. All draw-offs shall have a metal tag labeled "Sprinkler Drain."

6. INSPECTIONS AND TESTS

- A. Furnish all labor, equipment and conduct all required tests in the presence of the Owner and Engineer or designated representative.
- B. All piping and devices comprising the fire protection system shall be tested under hydrostatic pressure of not less than 200 PSI and maintained for not less than two (2) hours.
- C. Upon completion of his work, the Contractor shall submit a written and signed certificate to the Engineers indicating that he performed the above prescribed tests and rectified all malfunctions arising there from.

7. PERMITS

- A. The Contractor shall obtain and pay for all necessary state, municipal, county, city and other permits and fees and pay all State taxes which are applicable.

8. GUARANTEE

- A. All workmanship, equipment and material shall be guaranteed in writing against defects from any cause, other than misuse, for a period of one year after date of final acceptance.

9. ACCEPTANCE CERTIFICATE

- A. Upon completion, the Contractor shall submit to the Engineers, a properly filled out "Sprinkler Contractor's Certificate Covering Materials and Tests." (4 copies).

10. CLEANING

- A. Upon completion of this work all debris, material, and equipment shall be removed from the building and premises; all piping shall be cleaned ready for finish painting. Note: Do not remove rust inhibitive primer specified hereinafter.

11. PAINTING

- A. All fire protection piping, fittings, etc., shall have one factory or shop coat of rust inhibitive primer. The Contractor shall thoroughly clean all such items in areas where the piping will be exposed so as to readily receive the finish coat specified in the Architectural Division of Painting. Colors shall be as specified in Identification Section of these specifications.

12. PIPE LAYING

- A. Bell holes shall be excavated accurately to size and barrel of pipe shall bear firmly on bottom of trench throughout its length. All foreign matter and dirt shall be removed from the inside of the pipe before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying. At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe. Cutting of pipe, where necessary, shall be done in a neat and workmanlike manner, without damage to pipe. Refer also to Excavation.

### 13. EQUIPMENT AND MATERIALS

#### A. Signs

Appropriate code approved and required signs shall be installed on all control valves, drains, inspector's test, etc., indicating the function, installation, etc. Signs shall be neatly affixed with rust inhibitive screws, rivets or where hung from piping; with stainless steel No. 14 AWG wire.

#### B. Finish

All exposed materials such as valves, fire department connections, sprinkler heads, fire pump test headers, etc., shall be brass or chrome-plated brass.

#### C. Check Valves

- (1) 2-1/2" and over; listed and approved by UL and FM; marked SV-FM; 175# working pressure; 1 BBM; flanged; equivalent to Mueller, Scott or Lunkenheimer.
- (2) 2" and under; 150# working pressure; bronze; screwed; equivalent to Jenkins, Scott or Lunkenheimer.

#### D. Pipe & Fittings

- (1) Nipples and fittings shall be of same material, composition, and weight classification as pipe in which installed.
- (2) Up to 2" (Interior) Schedule 40 ASTM A-53 black steel; 125# cast iron screwed fittings or Schedule 10, ASTM A-135 black steel with victaulic or similar type approved fittings.
- (3) 2-1/2" and larger (Interior) Schedule 40 black steel with flanged, welded or victaulic (or similar) type approved fittings or Schedule 10, ASTM A-135 black steel with victaulic or similar type approved fittings.

#### E. Clamps and Anchors

- (1) Furnish and install approved clamps, as required, at all (45 degree) 1/8 bends, (90 degree) 1/4 bends and flange and spigot pieces to the straight pipe to ensure permanent anchorage of all fire lines. Clamps, clamp rods, nuts, washers, and glands shall be coated with a quick drying coal tar bituminous paint after installation.

#### F. Hangers

- (1) All piping shall be adequately and permanently supported in an approved manner on approved hangers (Submit with drawings).

#### G. Sleeves and Escutcheon Plates

- (1) Furnish and install sleeves for pipes where piping penetrates masonry walls; exterior wall sleeves to be watertight. Fire and smoke stop all penetrations through fire and smoke walls and coordinate with General Contractor for locations.

- (2) Furnish and install cast brass chrome plated split ring type escutcheons where piping penetrates walls, ceilings and floors, whether in finished areas or not.

H. Sprinkler Heads

Gem, Grinnell, Star, Viking, Reliable, Central or approved equivalent as follows:

- (1) Where piping is exposed: "Standard up right."
- (2) Where piping is concealed above finished ceilings, provide two pieces, semi recessed, white plated sprinkler heads with removable escutcheon.
- (3) Install sprinkler head guards where heads are subject to physical abuse. Heads located below seven (7) feet above floor, etc.
- (4) Sprinkler head degree ratings shall be determined by the area serviced in accord with current Codes and Standard Practices. Indicate degree ratings on submitted Shop Drawings.
- (5) The Contractor shall submit to the Engineer for inspection, one (1) sample of each type of sprinkler head, proposed to be used on the project.
- (6) Where heads are installed in a tile ceiling, they shall be installed in the middle of the tiles, at half or quarter points along the length of the tiles. Install sprinkler heads at quarter points of center scoured 2' X 4' ceiling tiles.
- (7) Provide high temperature heads around range hoods, kitchen equipment, kilns, boilers, water heaters and other heat producing equipment.
- (8) Per University standards, provide guards where sprinkler heads are to be located in mechanical spaces, in work shops, in athletic spaces, below eight (8) ft AFF or any other location in which heads may be subject to damage. If in doubt, consult with engineer.
- (9) **[Light hazard occupancies only]** – Install quick response heads.
- (10) Per University standards, automatic reset or self-closing sprinkler heads are prohibited.
- (11) Per University standards, concealed sprinkler heads are prohibited.
- (12) Per University standards, extended range sprinkler heads are prohibited.

14. GUARANTEE

- A. All workmanship, equipment and material shall be guaranteed in writing against defects from any cause, other than misuse, or vandalism, for a period of one year after date of final acceptance.

**END OF SECTION**

## SECTION 230200

### HVAC EQUIPMENT AND HYDRONIC SPECIALTIES

#### 1. GENERAL

- A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.
- B. The Contractor shall provide in complete working order the following heating, ventilation and air conditioning equipment located as indicated and installed, connected and placed in operation in strict accordance with the manufacturer's recommendations. All equipment shall be factory painted and, where applicable, factory insulated and shall, where such standards exist, bear the label of the Underwriters Laboratory.
- C. Each subcontractor shall be responsible for their own completion of System Verification Checklists/Manufacturer's Checklist.
- D. Factory startup is required for all HVAC equipment. In general, as part of the verification process, equipment suppliers shall perform start-up by their factory authorized technicians and shall complete and submit start-up reports/checklists. This shall include air handling units, chillers, VFDs, etc.
- E. All HVAC equipment shall comply with the latest provisions of ASHRAE Standard 90 and/or International Energy Conservation Code 2006, whichever is more stringent.
- F. Installation of all heating, ventilating and air conditioning systems shall be performed by a master HVAC contractor licensed in the state the work will be performed.
- G. Note to Suppliers and Manufacturers Representative furnishing proposals for equipment for the project:
  - (1) Review the Controls Section of these Specifications (if applicable) to determine controls to be furnished by the equipment manufacturer, if any. The Contractor shall provide all controls with equipment unless specifically listed otherwise.
  - (2) Review the section of these specifications entitle: REQUIRED SHOP DRAWINGS, DESCRIPTIVE LITERATURE, MAINTENANCE MANUALS, PARTS LISTS, SPECIAL KEYS, TOOLS, ETC., and provide all documents called for therein.
  - (3) Insure that the equipment which you propose to furnish may be installed, connected, placed in operation and easily maintained at the location and in the space allocated for it.



- (4) Determine from the Bid Documents the date of completion of this project and insure that equipment delivery schedules can be met so as to allow this completion date to be met.
- (5) Where manufacturers' temperature controls are specified, they shall be in full compliance with International Mechanical Code Section 606 including automatic smoke shut down provisions.
- (6) Provide factory start-up on site by a factory representative (not a third party contractor) for all HVAC equipment, including pumps, VFDS, chillers, etc. Submit factory start-up reports to the Engineer.
- (7) Provide general orientation training to the Owner. Training shall occur only when the systems are complete and 100% functional. All training shall be videotaped. Refer to Section 15000 for training session requirements.
- (8) Review the Section on Motor Starters and Electrical Requirements for Mechanical Equipment.
- (9) Requirements for motors controlled by variable frequency drives:
  - a. All motors shall be inverter duty rated.
  - b. Motors less than 100 HP in size shall be furnished with shaft grounding kit, Aegis SGR Bearing Protection Ring or equal. One shaft grounding ring and related hardware shall be provided on drive end or non-drive end of motor per manufacturer's instructions. These shall be factory mounted and installed on the exterior of the motor to allow for visual inspection. Ground motor frame per manufacturer's instructions. Install kit in strict accordance with manufacturer's instructions.
- (10) All condensate producing equipment shall be provided with a condensate trap as recommended by the equipment manufacturer.
- (11) Provide a complete air tight enclosure with opening door that seals air tight for all filters on air moving equipment.
- (12) All equipment shall be furnished for a single point electrical connection unless specifically excluded as a requirement.

## 2. SPLIT SYSTEM

### A. MANUFACTURERS

- (1) Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Carrier Corporation; Home Comfort and HVAC Building & Industrial Systems.
  - b. Daikin, Inc.

- c. LG
- d. Mitsubishi Electric & Electronics USA, Inc.; HVAC Advanced Products Division.

(2) INDOOR UNITS (5 TONS OR LESS)

- a. Ceiling Hung Evaporator-Fan Components:
  - 1) Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
  - 2) Insulation: The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
  - 3) Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 210/240.
  - 4) Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.
  - 5) Fan Motors:
    - (a) Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
    - (b) Multitapped, multispeed with internal thermal protection and permanent lubrication.
    - (c) Wiring Terminations: Connect motor to chassis wiring with plug connection.
  - 6) Filters: Permanent, cleanable.
  - 7) The cabinet shall be affixed to factory supplied wall/ceiling hanging brackets and located in the conditioned space.
  - 8) Condensate Drain Pans:
    - (a) Single-wall, Stainless Steel-steel sheet.
    - (b) Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
    - (c) Units with stacked coils shall have an intermediate drain pan to collect condensate from top coil.

B. OUTDOOR UNITS (5 TONS OR LESS)

- (1) Air-Cooled, Compressor-Condenser Components:
  - a. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
  - b. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
    - 1) Compressor Type: Variable Speed Scroll.
    - 2) Refrigerant Charge: R-410A.
    - 3) Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 210/240.
  - c. Fan:

- 1) The fan shall be direct-drive cross flow fan type with statically and dynamically balanced impeller with high and low fan speeds available.
  - 2) The fan motor shall operate on 208-230 volts, 1 phase, 60 hertz with a motor output of 130 watts.
  - 3) The air flow rate shall be available in high and low settings.
  - 4) The fan motor shall be thermally protected.
- d. Motor: Permanently lubricated, with integral thermal-overload protection.
  - e. Mounting Base: Polyethylene.
- (2) REFRIGERANT PIPING
- a. The system shall be capable of refrigerant piping up to 230 total feet with a 98 feet maximum vertical difference, without any oil traps or additional components.
- (3) COOLING OPERATING RANGE
- a. The operating range in cooling will be 0°F DB ~ 122°F DB when used with an optional wind baffle.
- (4) ACCESSORIES
- a. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
  - b. The unit shall be compatible with interfacing with connection to BACnet and LonWorks networks or interfacing with connection to BMS system. Consult with Daikin prior to applying controls.
  - c. Automatic-reset timer to prevent rapid cycling of compressor.
  - d. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
  - e. Drain Hose: For condensate.

END OF SECTION

## **SECTION 230300**

### **CONDENSATE DRAINAGE SYSTEM (FOR COOLING EQUIPMENT)**

#### **1. GENERAL**

- A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this section of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.
- B. The Contractor shall provide a complete condensate drainage system to carry all condensate discharge from all cooling equipment from the building. Condensate system shall be installed in accordance with IMC. Provide condensate overflow switch for all condensate producing equipment.
- C. Pipe installation and fabrication shall be in accordance with the section of these specifications entitled PIPE, PIPE FITTINGS AND PIPE SUPPORT and as hereinafter specified.
- D. All piping shall be installed concealed, unless specifically noted otherwise and shall be installed under slabs or underground only when specifically indicated.
- E. Lines installed in ceiling spaces shall be held at the maximum possible elevation and shall be coordinated with all other trades to avoid conflicts.
- F. Condensate drain lines shall be pitched 1/4 inch per foot and installed with cleanout plugs at each change in direction and/or at thirty (30) foot intervals. Where this minimum pitch cannot be attained, contact Engineers.
- G. Horizontal runs of condensate drain lines shall be supported at six (6) foot intervals maximum, or more frequently where required to prevent sags and low spots.
- H. Lengths of horizontal lines shall be held at a minimum due to potential lint collection.
- I. Provide condensate traps in accordance with the manufacturer's recommendations.

#### **2. MATERIAL**

- A. Refer to Section of these Specifications entitled: PIPE, PIPE FITTINGS AND SUPPORT.

#### **3. INSULATION**

- A. Refer to Section of these Specifications entitled: INSULATION - MECHANICAL.

**END OF SECTION**

## SECTION 250100

### MOTOR STARTERS AND OTHER ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

#### 1. MOTOR STARTERS-GENERAL

- A. Where motor starters are required for mechanical equipment they are to be the responsibility of the Contractor furnishing the equipment as outlined herein.
- B. Motor starters shall be furnished by the Equipment Supplier with his equipment. Coordinate all requirements for starters with equipment suppliers and other trades.
- C. Motor starters shall be NEMA style. I.E.C.-style starters are not to be provided. Their sizing and installation shall be coordinated with the equipment manufacturer's requirements and in accordance with the National Electrical Code.
- D. Unless otherwise noted, provide combination starter/disconnects for all equipment requiring a starter.

#### 2. ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

- A. All mechanical equipment shall be provided for single point electrical connection unless specifically noted to the contrary. Refer to schedules and other sections of these specifications for further requirements. It is the responsibility of the Contractor to coordinate the electrical characteristics of all equipment with the electrical provisions indicated on the Contract Documents. The Contractor shall notify the Engineer in writing ten calendar days prior to bid of any discrepancy so a written clarification by Addendum may be made. If such notice is not given, the Contractor shall be responsible for any and all costs or delays associated with any changes required. Specification of equipment characteristics made during review of shop drawings shall not relieve the Contractor of this responsibility.
- B. The equipment manufacturer shall provide internally mounted fuses with his equipment, as required, to comply with the U.L. listing on the equipment name plate. (i.e., hermetically sealed compressors or equipment with name plate data that recommends or requires fuse protection.) See also, National Electrical Code, Article 440, and other applicable sections of the N.E.C.
- C. It is the Contractor's responsibility to furnish and install fusible or non-fusible disconnect switches or circuit breakers for disconnecting means as required by the Code for all electrically powered equipment. All power wiring from source, thru disconnecting means and motor starters to motor terminals or equipment junction box is to be furnished and installed by the Contractor. Each separate contractor engaged for the project shall coordinate with all other trades to ensure all necessary equipment and labor is included for fully functioning mechanical systems, installed per code requirements. Unless otherwise notes, provide combination starter/disconnects for all equipment requiring a starter.
- D. Final electrical connection of equipment shall be verified for proper voltage requirements in conjunction with the motor nameplate patch and actual wiring configuration. Any costs associated with damage to appliances motors, equipment, etc., connected to incorrect supply voltage shall be borne by the Contractor.
- E. Refrigeration condensing units with internal compressors shall be furnished with integral starter. The Contractor is to furnish and install a fusible disconnecting means with fuses sized to motor nameplate requirements. Coordinate wiring, mounting and style of disconnect switch at unit in field.

- F. All interlock or other control wiring, unless specifically noted otherwise, is the responsibility of the Contractor.
- G. All equipment shall be suitably enclosed. All enclosures for equipment shall be rated and approved for the environment in which it operates. (i.e., NEMA 1, NEMA 3R, NEMA 7, NEMA 12, etc.) Verify the requirement with the installation condition if not indicated on the plans.
- H. Observe the following standards for manufacturers of equipment and selection of components.
  - (1) Starters, control devices and assemblies: NEMA, U.L. - (I.E.C. style not acceptable)
  - (2) Enclosures for electrical equipment: NEMA, U.L.
  - (3) Enclosed switches: NEMA, U.L.
  - (4) All electrical work, generally: National Electrical Code
  - (5) All electrical work in industrial occupancies: J.I.C. standards
  - (6) All electrical components and materials: U.L. listing required.
- I. Where required, the Contractor is to provide mounting rails or channels to install starters with code-required clearances. Framing shall be solidly anchored by welding expansion shields in masonry or other approved anchorage. Frames are to be constructed of steel angles or pre-manufactured channel systems such as Unistrut, Kindorf or B-Line Company. Framing material shall be pre-finished with corrosion-resistant material or painted with two coats corrosion-resistant oil-based enamel.

### 3. REQUIREMENTS FOR MECHANICAL EQUIPMENT, 1/2 H.P OR LESS

- A. This section describes requirements for small mechanical equipment such as (but not limited to) package terminal heating/cooling units, (water source heat pumps, etc.) VAV boxes, unit heaters, vertical and horizontal unit ventilators, exhaust fans, in-line fans, fan coil units, cabinet heaters and the like.
- B. Small equipment with motor(s) of 1/2 H.P., single phase or less are generally not required to be furnished with NEMA-style starter(s), unless otherwise noted.
- C. For such equipment, provide integral contactor or horsepower-rated relay where controlled by thermostat or other type of switch. Contactors or relays shall be as recommended by the manufacturer of the equipment, suitable for the service duty.
- D. Provide transformer within unit as required to derive low voltage A.C. for thermostat control or derive from temperature controls panel, if available.
- E. Provide internal fusing for unit motor and other loads in fuse block or in-line fuseholder. See also Article 2-B, this Section.
- F. Where externally-mounted disconnecting means is required and would be impractical, unsightly or inappropriate in the judgment of the Engineer, disconnects shall be located within the unit. These disconnects may be fusible H.P.-rated snap switches or manual starters with overload elements, as required.

Locate this and other electrical equipment within enclosure where easily accessible behind access panel or door on unit, and as acceptable to the electrical inspector or local authority having jurisdiction. Refer to mechanical equipment schedules for further information.

- G. Where fractional horsepower duplex pumps such as water circulators, sump pumps, etc. are provided, they shall be provided with alternators, cordsets, etc., as required for a complete installation.

#### 4. REQUIREMENTS FOR MECHANICAL EQUIPMENT, 3/4 H.P. OR LARGER

- A. This section describes requirements for mechanical equipment such as (but not limited to) exhaust fans, larger air handling units, cooling tower fans, water source heat pumps, chilled or hot water pumps, D.X. roof-top units, air compressors and the like.
- B. Provide premium efficiency motors.
- C. Equipment provided with motor(s) of 3/4 H.P. and larger, single or three-phase are required to be furnished with starters suitable for the load(s) specified. It is recommended that starters be furnished integrally with or mounted on equipment for field wiring by the Contractor. Where starters are furnished separate from equipment, furnish templates or rough-in diagrams to the appropriate contractor for his use in installation.
- D. All starters shall be size 0 minimum. They shall be constructed and tested in accord with latest edition of NEMA standards. All starters shall be across-the-line magnetic type, unless indicated otherwise. On motors of 20 H.P. or greater rating, the supplier shall provide starters capable of limiting inrush currents. These shall be of the wye-delta, reduced voltage open-transition type, or electronic controlled, as required. Do not utilize closed transition starters unless specifically indicated.
- E. Magnetic starters shall be furnished with the following characteristics and accessories as a minimum. See other sections of these specifications and mechanical schedules for further requirements.
- (1) Contacts shall be silver-alloy, double-break type. Contacts shall be replaceable without removal of wiring or removal of starter from enclosure. Number of contacts shall be as required for service indicated. Contacts shall be gravity dropout type, positive operation.
  - (2) Coil voltage shall be 120 volts, A.C., 60 HZ or less, as required to suit control systems available voltages. Coils shall be of molded construction, rated for continuous duty. Provide coil clearing contact as required.
  - (3) Provide control transformer of adequate K.V.A. as required on all starters with line-to-line voltages higher than 120 volts A.C. Provide fuse block and slow-blow fuse to protect control transformer per NEMA, N.E.C. and U.L.
  - (4) Provide hand-off-auto selector switch in face of starter, wired into hand and off switch positions. Auto position (if needed) to be field wired as indicated on plans or schedules for automatic control. Provide a green run pilot light.
  - (5) Provide NEMA Class 20 resettable overload relays, accurately sized to the motor nameplate rating of the motor served and the temperature differential between motor and controller. Overloads shall be easily replaceable, and resettable without opening enclosure, via a push button or similar means. Class 10 or Class 30 overloads may be used, depending on the type of anticipated service.

- (6) Provide at least one N.O. and one N.C. auxiliary contact (field-convertible to opposite operation) with each starter. Refer to mechanical details or schedules for additional requirements, if any. All starters shall have space for two additional single-pole contacts.
- (7) All starters shall be thru-wiring type.
- (8) Provide phase failure sensing relay to open starter coil circuit (on loss of one or more phases) on all three-phase starters controlling motors of 15 H.P. or larger.
- (9) Provide power factor correction capacitors on motors of 15 H.P. or larger where predicted power factor based on manufacturer's data will fall below 0.90%. Capacitors shall be of the unit-cell type, in single enclosure with discharge resistors and tank overpressure circuit interrupter for safety.

## 5. REQUIREMENTS FOR WIRING

- A. All wiring, including controls, interlock, miscellaneous power, sensors, thermostats, etc., shall be installed in metallic raceway systems that are in compliance with all Division 26 requirements of these Specifications, unless specifically noted otherwise. Open cabling systems will only be permitted where specifically permitted within the Division 26 Specifications and if less than 50 volts A.C. peak-to-peak or 50 volts maximum D.C.
- B. Where open cabling is permitted, it shall be installed with proper support as specified in the Division 26 Specifications.
- C. Where open cabling is permitted, and installed in environmental air plenum (return, relief, supply, etc.), the materials installed shall be in compliance with N.E.C. Articles 700, 725, 770 (for fiber optic), 780 and 800.
- D. Where open cabling is permitted, it shall only be installed open in accessible spaces. Where concealed in walls, it shall be routed through raceways to outlet box(es) for the terminal device.

## 6. INVERTER DUTY MOTORS

- A. Motors which are controlled by variable frequency drive shall be:
  - (1) NEMA MG-1 Part 31 rated for Inverter Duty.
  - (2) Furnished with shaft grounding kit for all motors:
    - a. Motors less than 100 HP in size shall be furnished with shaft grounding kit, Aegis SGR Bearing Protection Ring or equal. One shaft grounding ring and related hardware shall be provided on drive end or non-drive end of motor per manufacturer's instructions. These shall be factory mounted and installed on the exterior of the motor to allow for visual inspection. Ground motor frame per manufacturer's instructions. Install kit in strict accordance with manufacturer's instructions.
    - b. Motors Pumps greater than 100 HP to 1000 HP in size shall be furnished with shaft grounding kit, Aegis SGR Bearing Protection Ring or equal. Provide shaft grounding ring on drive end and non-drive end of motor per manufacturer's instructions. Additionally, provide insulated bearing journals to further reduce risk of current dissipation through bearings. Ground motor



frame per manufacturer's instructions. Install kit in strict accordance with manufacturer's instructions.

**END OF SECTION**

## SECTION 250200

### INSTRUMENTATION AND CONTROL FOR HVAC

#### PART 1 - GENERAL

##### RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions, General Mechanical Provisions and General Requirements, Division 1 Specification Sections apply to the work specified in this section.

##### DESCRIPTION OF WORK:

Furnish a BACnet system compatible with existing University systems. All building controllers, application controllers, and all input/output devices shall communicate using the protocols and network standards as defined by ANSI/ASHRAE Standard 135-2001, BACnet. This system shall communicate with the University of Kentucky Facility Management's existing BACnet head-end software using BACnet/IP at the tier 1 level and BACnet/MSTP at the tier 2 level. No gateways shall be used for communication to controllers installed under section. BACnet/MSTP or BACnet/IP shall be used for all other tiers of communication. No servers shall be used for communication to controllers installed under this section. If servers are required, all hardware and operating systems must be approved by the Facilities Management Controls Engineering Manager and/or the Facilities Management Information Technology Manager.

All Building Automation Devices should be located behind the University firewall, but outside of the Medical Center Firewall and on the environmental VLAN.

Provide all necessary hardware and software to meet the system's functional specifications. Provide Protocol Implementation Conformance Statement (PICS) for Windows-based control software and every controller in system, including unitary controllers. These must be in compliance with Front End systems PICS and BIBBS and attached Tridium PICS and BIBBS. Provide all hardware and software to backup, restore, troubleshoot and install system. Software licensing upgrades will also need to be included to support all new BACnet devices/points added within the project for the University of Kentucky Facilities Management's head-end system. Software, backups, unitary, and ASC files shall be delivered to UEM (Utilities & Energy Management) for archiving purposes.

When providing a JACE or equivalent tier-1 controller, the licenses for ALL available points must be purchased by the installing contractor. It will not be acceptable for an installing contractor to install a JACE in a manner in which only part of the licenses for the available capacity have been purchased. Any contractor who is required to utilize an existing JACE to accomplish his final Tie-in to Tridium, must include the cost to accommodate his additional points BOTH at the local JACE level as well as the head-end Tridium level.

Prepare individual hardware layouts, interconnection drawings and software configuration from project design data.

Design, provide, and install all equipment cabinets, panels, data communication network cables needed, and all associated hardware.

Provide and install all interconnecting cables between supplied cabinets, application controllers, and input/output devices.

Provide complete manufacturer's specifications for all items that are supplied. Include vendor name of every item supplied.

Provide supervisory specialists and technicians at the job site to assist in all phases of system installation, startup, and commissioning.

Provide a comprehensive operator, administrator and technician training program as described herein.

Provide as-built documentation, programming software for use site wide, electronic copies of all diagrams, and all other associated project operational documentation (such as technical manuals on approved media, the sum total of which accurately represents the final system).

Furnish, install, and fit-up in complete working order, with all accessories required, the automatic temperature control and monitoring systems shown on the Drawings and specified herein. The systems shall be properly connected, piped and wired in a manner conforming to the laws, ordinances and codes now in force in the Commonwealth of Kentucky.

The controls and all listed I/O points from this project shall communicate with the University of Kentucky Facilities Management's existing BACnet software head-end station using BACnet/IP. All BACnet points shall be exposed to the University of Kentucky Facilities Management's head-end station. Graphics will be installed by UEM on the head-end system. All point and device names shall comply with the University Facilities Management standards and shall be approved before and included in the shop drawings submittal. Cooperate with the Owner (UEM) to ensure that all specified points and alarms communicate and operate on the head-end system. All point and device names shall comply with the University Facilities Management standards (format listed below, consult Utilities and Energy Management (UEM) for the correct abbreviations) and shall be included in the shop drawings submittal for review and approval. Point naming conventions and formats are listed further in this specification in the Direct Digital Controls Equipment section. Refer to University Standard 230553S02 for the AHU Naming Convention.

Related to the alarms, the contractor is to set up the alarm parameters specified by the system sequences of operations without enabling the alarms. Contractor is to provide a list of points containing alarm extensions to Owner (UEM). UEM will be responsible for doing the alarm names, alarm texts and enabling the alarm points provided on the list.

All work must be coordinated and scheduled with the UEM Controls group prior to any work being done on site.

Thermostats: Each terminal unit requires a thermostat for operation, unless specifically indicated on the Drawings to be slaved to another unit. Slaved terminal units shall be controlled to match the CFM and discharge air temperature of the master unit. Thermostat locations have been identified on the Drawings to the extent possible, but all such locations may not be shown. Provide the required thermostats whether or not shown on the Drawings. For those thermostats not shown on the Drawings, work out an acceptable location with the Architect/Engineer. Thermostats are to be provided with no doors.

Provide DDC controls for the air terminal units. Provide electronic operators controlled and monitored by direct digital control systems which shall include, but not be limited to, air handling systems, pumps, terminal units, etc.

The control equipment shall be complete and shall include, but not be limited to, all necessary valves, damper operators, pipe, fittings, etc.

Electronic Control System installer must physically demonstrate to Owner and Owner's representatives (UEM) via software simulations that the proposed building automation system and control sequences will function as outlined in the contract documents prior to field implementation.

Provide VFD's as specified in other sections.

The control and monitoring system for this project shall be made up using standard materials, equipment and components regularly manufactured for systems of this type. The system shall be complete in every respect and shall be a functioning system.

Electrical power wiring and interlock wiring for all controls, signal devices, equipment, alarms, etc., shall be in accordance with diagrams and instructions from the supplier of the systems. All power and control wiring, conduit and wiring connections required for the complete installation, including wiring to smoke dampers and combination fire/smoke dampers and their motors, shall be provided by this Contractor in accordance with Electrical specification requirements. Controls shall be on emergency power.

Refer to other Mechanical Division sections for installation of instrument wells, valve bodies, and dampers in mechanical systems; not work of this section.

#### QUALITY ASSURANCE:

Manufacturer: Subject to compliance with requirements, manufacturers offering controls that may be incorporated into the work at Tier 1 BACnet/IP include the following:

Honeywell  
Johnson Controls  
Vykon

Subject to compliance with requirements, manufacturers offering controls that may be incorporated into the work at Tier 2 BACnet/MSTP include the following:

Honeywell  
Johnson Controls  
Alerton  
Distech

Acceptable controls manufacturers shall include any controls manufacturers which utilize a BACnet protocol in accordance with the specification. If the bidding manufacturer is not listed above, documentation for approval as an equal must be submitted 10 days prior to the bid opening date to allow for evaluation by the university.

Installing Contractor: Installing controls contractors must comply with the following requirements:

The installing systems integration contractor has been in the business of installing BACnet controls for the last 5 years minimum. In addition, the installing systems integration contractor needs to demonstrate with documentation that they have provided the controls in a minimum of (3) hospital or university renovation projects of similar size and scope where they utilized a BACnet system.

The systems integration contractor must have on staff the following number of key personnel as a minimum, each with a minimum of 5 years of related BACnet controls installation experience: Project Manager - 2, Controls Applications Engineer - 2, Programmer - 2, Installation Supervisor - 2, Controls Technician - 5.

Prefer contractor staff to include Niagara Tridium AX/N4 certified technicians.

Contractor to have experience with successful integrations of controls with Niagara Tridium systems.

Contractor to have a minimum of 3 years of installation history with the brand of controls being bid.

Contractor must have a help desk operation or staff available for phone contact 24/7 for providing technical support to university staff. Call forward and emergency service numbers are not acceptable during normal business hours.

Codes and Standards:

Electrical Standards: Provide electrical components of pneumatic control systems which have been UL-listed and labeled, and comply with NEMA standards.

NFPA Compliance: Comply with NFPA 90A "Standard for the installation of Air Conditioning and Ventilating Systems" where applicable for controls and control sequences.

Kentucky Building Code: Comply with requirements where applicable for controls.

Provide products of the temperature control system with the following agency approvals:

- UL-916**; Energy Management Systems
- UL-873**; Temperature Indication and Regulating Equipment
- UL-864**; Subcategories UUKL, OUXX, UDTZ; Fire Signaling and Smoke Control Systems
- CSA**; Canadian Standards Association
- FCC**, Part 15, Subpart J., Class A Computing Devices

All products shall be labeled with the appropriate approval markings. System installation shall comply with NFPA, NEMA, NEC, Local and National Codes.

SUBMITTALS:

Product Data: Submit manufacturer's technical product data for each control device furnished, indicating dimensions, capacities, performance and electrical characteristics, and material finishes, also include installation and start-up instructions.

- A. Shop Drawings, Product Data, and Samples
  - 1. Each submittal shall have a cover sheet with the following information provided: submittal ID number; date; project name, address, and title; BAS Contractor name, address and phone number; BAS Contractor project manager, quality control manager, and project engineer names and phone numbers.
  - 2. Each submittal shall include the following information.
    - a. BAS riser diagram showing all DDC controllers, network repeaters, and network wiring.
    - b. One-line schematics and system flow diagrams showing the location of all control devices.

- c. Points list for each DDC controller, including: Tag, Point Type, System Name, Object Name, Expanded ID, Display Units, Controller Type, Address, Cable Destination, Module Type, Terminal ID, Panel, Slot Number, Reference Drawing, and Cable Number. The initial shop drawing submittal for review needs to include all point names meeting the naming convention outlined in this specification for UEM approval at the shop drawing phase prior to the contractor beginning any programming.
- d. Vendor's own written description for each sequence of operations, to include the following:
  - Sequences shall reference input/output and software parameters by name and description.
  - The sequences of operations provided in the submittal by the BAS Contractor shall represent the detailed analysis needed to create actual programming code from the design documents.
  - Points shall be referenced by name, including all software points such as programmable setpoints, range limits, time delays, and so forth.
  - The sequence of operations shall cover normal operation and operation under the various alarm conditions applicable to that system.
- e. Detailed Bill of Material list for each panel, identifying: quantity, part number, description, and associated options.
- f. Control Damper Schedules. This spreadsheet type schedule shall include a separate line for each damper and a column for each of the damper attributes, including: Code Number, Fail Position, Damper Type, Damper Operator, Blade Type, Bearing Type, Seals, Duct Size, Damper Size, Mounting, and Actuator Type.
- g. Control Valve Schedules. This spreadsheet type schedule shall include a separate line for each valve and a column for each of the valve attributes, including: Code Number, Configuration, Fail Position, Pipe Size, Valve Size, Body Configuration, Close off Pressure, Capacity, Valve CV, Calc CV, Design Pressure, Actual Pressure, and Actuator Type.
- h. Cataloged cut sheets of all equipment used. This includes, but is not limited to, the following: DDC panels, peripherals, sensors, actuators, dampers, and so forth.
- i. Range and scale information for all transmitters and sensors. This sheet shall clearly indicate one device and any applicable options. Where more than one device to be used is on a single sheet, submit two sheets, individually marked.
- j. Hardware data sheets for all local access panels.
- k. Software manuals for all applications programs to be provided as a part of the programming devices, and so forth for evaluation for compliance with the performance requirements of this Specification.

- I. The controls contractor shall include their BACnet PICS and BIBB statements (as described in ASHRAE 135-2001) for each device.
3. BAS Contractor shall not order material or begin fabrication or field installation until receiving authorization to proceed in the form of an approved submittal. BAS Contractor shall be solely responsible for the removal and replacement of any item not approved by submittal at no cost to the Owner.
4. Submittal shall have approved point names.

Maintenance Data: Submit maintenance instructions and spare parts lists for each type of control device. Include that type data, product and shop drawings in maintenance manual.

Operation and Maintenance Instructions:

This contractor shall prepare an electronic Operations Manual entitled "Automatic Temperature Control and Monitoring Systems Operation and Maintenance Data." Manual shall be PDF files with separate PDFs for each of the items noted below.

Each manual shall contain the following information:

Name and address of Consulting Engineer, Contractor, and index of equipment, including vendor (name and address).

Complete brochures, descriptive data and parts list, etc., on each piece of equipment, including all approved shop drawings.

Complete maintenance and operating instructions, prepared by the manufacturer, on each major piece of equipment, including preventative maintenance instructions.

Complete shop drawing submittal on temperature and monitoring controls including control diagrams updated to reflect "as-built" conditions.

All wiring and component schematics necessary for Owner (UEM) to troubleshoot, repair and expand the system.

All manuals shall be submitted to the Engineer prior to final inspection of the building.

Provide a laminated copy mounted in a sleeve on the outside of the panels for the controls sequences pertinent to equipment supplied by that specific controls panel.

Controls Program Backup: At the end of the project, the contractor is to supply digital back-up copies of all final complete operating controls programs. These shall be delivered to UEM for archiving purposes.

DELIVERY, STORAGE AND HANDLING:

Provide factory shipping cartons for each piece of equipment and control device. Maintain cartons while shipping, storage and handling as required to prevent equipment damage and to eliminate dirt and moisture from equipment. Store equipment and materials inside and protect from weather.

## PART 2 - PRODUCTS

### DIRECT DIGITAL CONTROL SYSTEM

General: This specification defines the minimum hardware and performance requirements for a computer-based building automation system to be furnished and installed.

#### SCOPE OF WORK:

##### System Requirements:

Contractor shall provide all equipment, engineering and technical specialist time to check the installation required for a complete and functioning system. The contractor shall furnish and install all interconnecting system components. Components to include, but not be limited to: power line conditioners, field panels, sensors, motor starter interfaces, and any other hardware items not mentioned above but required to provide the Owner with a complete workable system.

Any feature or item necessary for complete operation, trouble-shooting, and maintenance of the system in accordance with the requirements of this specification shall be incorporated, even though that feature or item may not be specifically described herein. This shall include hardware and software.

All materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed especially for this project. All systems and components shall be thoroughly tested and proven in actual use.

##### Input/Output Summary:

The system as specified shall monitor, control and calculate all of the points and functions as listed in the Input/Output Summary.

##### System Start-Up and Acceptance:

Upon completion of the installation, the BAS Contractor shall start-up the system and perform all necessary testing and debugging operations. An acceptance test in the presence of the Owner's representative shall be performed. The vendor shall check all sensors that exhibit any problems or faulty reading. When the system performance is deemed satisfactory in whole by UEM, the system parts will be accepted for beneficial use and placed under warranty. The BAS Contractor is to be available for system commissioning at the end of the installation when requested by the Engineer and/or Owner. The contractor is to also be available for seasonal commissioning for the other seasons beyond the initial commissioning.

This Contractor shall work with the Owner (UEM), who is developing the graphics, to ensure that all points report, function and alarm as required on the BACnet head-end system. The Contractor will also work with the Project Manager or CNS/MCIS to obtain all necessary IP's and Ethernet drops needed for BACnet panel. The Owner (UEM) will assign all BACnet/IP instance numbers and all BACnet/MSTP network numbers for use by the Contractor. All BACnet/IP devices will report directly to the head-end system.

UEM will be performing their own complete point by point evaluation as part of this project, independently of the commissioning activity. This will occur during the warranty period of the project.



#### Facilities Management’s Instruction:

The BAS Contractor shall provide two copies of an electronic version of the operator's manual describing all operating and routine procedures to be used with the system. This user's manual should contain subjects such as: standard operation, error message explanations, software usage, commands, system troubleshooting, etc. The Contractor shall also provide wiring schematics for all system components.

The BAS Contractor shall instruct the Owner's designated representatives in these procedures during the start-up and test period. The duration of the instruction period shall be no less than four (4) hours during two 2 hour sessions. (Number of hours may be adjusted to a max of 40 dependent upon the size and scope of project. For larger projects, training vouchers for instructional training at the manufacturer’s facilities may be requested in lieu of on-site training.) These instructions are to be conducted during normal working hours at the Owner's convenience and are to be prearranged with the Owner. The owner can request this training any time within the one year warranty period and may request any number of classes adding up to the total number of hours. The contractor shall provide an hourly unit price for additional on-site training.

The instructions shall consist of both hands-on at the job site and classroom training at a classroom location on the University of Kentucky campus coordinated with the Project Manager and UEM.

Upon completion, the attendees shall be able to operate the system and implement system changes including start-up, boot load, add point to the data base, enter messages, and down line load field units.

Prior to the scheduling of the sessions, an agenda outlining the training topics must be submitted for approval. Agenda items shall include, but not be limited to, the following topics:

- 1) Explanation of control sequences. Include which sensors are used and how output device operates.
- 2) Explanation of control drawings and manuals, including symbols, abbreviations, and overall organization.
- 3) Walk-through of project to identify controller locations and general routing of network cabling.
- 4) Review of operation and maintenance of hardware devices including air compressor, air dryers, controllers, instruments, and sensors. Include schedule for routine maintenance.
- 5) Programming Application Specific Controllers
  - (a) Backing up and Restoring Application Specific Programming
  - (b) Adding/Deleting/Editing points on Application Specific controllers
  - (c) Troubleshooting Application Specific controllers (inputs/outputs/logic/master – slave relationships/bus issues)
- 6) Programming Building Specific Controllers
  - (a) Backing up and Restoring Building Specific Controllers Programming
  - (b) Adding/Deleting/Editing points on Building Specific Controllers controllers
  - (c) Troubleshooting Building Specific Controllers controllers (inputs/outputs/logic/network issues)
- 7) How to use tools and cables

#### Warranty:

The system including all hardware and software components shall be warranted for a period of one year when the system performance is deemed satisfactory in whole by UEM. The system parts will be accepted for beneficial use and placed under warranty at that time. A Certificate of Occupancy does not initiate the control system warranty. Any defects in materials and workmanship arising during this warranty period shall be corrected without cost to the Owner.

All applicable software as detailed in this specification shall be updated by the BAS Contractor free of charge during the warranty period. This will ensure that all system software will be the most up-to-date software available from the BAS Contractor.

## DIRECT DIGITAL CONTROL (DDC) EQUIPMENT

### System Software

All software required for monitoring, modifying, configuring and backup for the system shall be embedded in the controller and accessible via VT terminal, hyper-terminal or the web. This software shall allow any computer with access (and security) to the University's network to perform the work described above using a web browser or provided software. No software upgrades should be required unless provided at no additional cost to the customer. The software version used for installation of any new devices must either be at the current software version used on the University Facilities Management campus at the current JAVA version or the new software at the most current JAVA version must be installed on all devices and the current system prior to the installation of the new devices. All software is to also operate on the latest version of Microsoft Windows operating system. All configuration and programming tools required for the upgraded version must be provided at the time of installation.

Provide a USB, standard RS-232 9 pin female, Bluetooth, RJ11, RJ12 or RJ45 connection for on-site access.

### BACnet Conformance

Building Controller shall as a minimum support MS/TP and Ethernet BACnet LAN types. It shall communicate directly via these BACnet LANs as a BACnet device and shall support simultaneous routing functions between all supported LAN types. Global controller shall be a BACnet conformance class 3 device and support all BACnet services necessary to provide the following BACnet functional groups:

1. Clock Functional Group
2. Files Functional Group
3. Reinitialize Functional Group
4. Device Communications Functional Group
5. Event Initiation Functional Group

Please refer to end of this section for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data.

Standard BACnet object types supported shall include as a minimum: Analog Value, Binary Value, Calendar, Device, File, Group, Notification Class, Program and Schedule object types. Alarms should also be setup on this system with limits. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data.

The Building Controller shall comply with Annex J of the BACnet specification for IP connections. This device shall use Ethernet to connect to the IP internetwork. It must support interoperability on the campus area network and function as a BACnet Broadcast Management Device (BBMD) and/or a BACnet router.

### Building Controller (B-BC)

#### General

Building Controller (B-BC) shall be minimum 16 bit microcomputer based, utilizing a multi-tasking, multi-user operating system.

The B-BC controllers shall permit the simultaneous operation of all control, communication facilities management and operator interface software, as programmed by the Contractor or User. Modification of the on-board B-BC controller database shall be performed on-line using the built-in software. Systems which require the B-BC to be removed from service while DDC control sequences are modified shall not be acceptable.

B-BC controllers shall utilize true floating point arithmetic capabilities.

All B-BC controllers shall have open licensing to connect to existing UK UEM Tridium BACnet BAS.

#### Databases and Memory Back-Up

All programming defining the functions to be performed by the B-BC, including but not limited to application programs and point database within each B-BC, shall be protected from loss due to power failure for a minimum of 72 hours. All database and backup shall be provided to the UK UEM Controls group.

#### Service Ports

B-BC controllers shall be equipped with a minimum of one operator service port for the connection of a laptop computer. The service port shall be either a built-in standard RS-232 data terminal port, USB port, CAT5 cable or RJ11/12 connection.

Connection of a service device, to a service port, shall not cause the B-BC controller to lose communications with its peers or other networked device controllers.

#### Display and Readout Capability

The B-BC controller shall additionally provide diagnostic LED indication of device transmit and receive data communications for all communication port and peripheral ports, normal operation, abnormal operation and control relay operation indication.

#### Manual/Auto Control and Notification

The B-BC controller shall provide commanded override capability from the built-in operator interface. Such overrides shall be annunciated to the head-end station. Such overrides shall be valid as long as power is applied to the controller.

#### Adjustments

Every control panel shall provide adjustments for the functions specified. In general, adjustments shall be provided for all setpoints used by controllers within each control panel. In addition, adjustments shall be provided for throttling ranges, mixed air damper minimum positions, or other items as specified. Adjustments shall be integral to each individual B-BC. The built-in operator interfaces shall allow the easy execution of the adjustment through named identifiers within the B-BC. From a single B-BC user interface, any other B-BC shall be accessible and full adjustment capabilities shall be provided.

#### B-BC Naming Convention

B-BC devices shall be named using the following naming convention:

*B-BC devices shall be named using the following format:*

*BuildingName\_BuildingNumber\_Floor\_RoomNumber\_B-BC Device Type OR  
BuildingNumber\_BuildingName\_Floor\_RoomNumber\_B-BC Device Type*

*All B-AAC points shall be named using the following format:*

*Building\_Floor\_RoomNumber\_Device Type\_Equipment ShortName\_Function*

Examples:

A B-BC device located in the Pavilion HA mechanical room HA4001 would be named as follows:

PAVHA\_0293\_04\_HA4001\_JACE

An exhaust fan status point for a fan in Pavilion HA mechanical room HA3001 fed directly from the above panel would be named as follows:

PAVHA\_03\_HA3001\_HVA\_EF1\_STAT

For function short names and building short names and numbers, contact the University Controls Engineering Department.

#### Advanced Application Controller (B-AAC)

##### General

Controls shall be microprocessor based, Advanced Application Controllers (B-AAC's). B-AAC's shall be provided for Air Handling Units, packaged Rooftops, primary and secondary pumping loop systems and other applications as shown on the drawings. B-AAC's shall be based on a minimum 16 bit microprocessor working from software program memory which is physically located in the B-AAC. The application control program shall be resident within the same enclosure as the input/output circuitry which translates the sensor signals. All input/output signal conversion shall be performed through a minimum of a 10 bit A to D converter. All input points shall be universal in nature allowing their individual function definition to be assigned through the application software. All unused input points must be available as universally definable at the discretion of the owner. If the input points are not fully universal in nature, unused points must be equal in quantity between Analog Inputs and Digital Inputs.

All B-AAC controllers shall have open licensing to connect to existing UK UEM Tridium BACnet BAS.

Contractor shall provide a minimum of one B-AAC controller per air handling or mechanical system as shown on the drawings.

The BAS contractor shall provide and field install all B-AAC's specified under this section. Mechanical equipment manufacturers desiring to provide B-AAC' type controls as factory mounted equipment, shall provide a separate bid for their products less all controls, actuators, valve assemblies and sensors, which are specified to be provided by the BAS/Temperature control contractor.

All input/output signals shall be directly hardwired to the B-AAC. Troubleshooting of input/output signals shall be easily executed with a volt-ohm meter (VOM). As a result of this intent, it is specified that power line carrier systems, or other systems which command multiple outputs over a single pair of wires, shall not be utilized.

B-AAC's shall be in continuous direct communication with the network which forms the facility wide Building Automation System. The B-AAC's shall communicate with the B-BC at a minimum baud rate of 9,600 baud.

#### Non-Volatile Memory

All control sequences programmed into the B-BC shall be stored in non-volatile memory, which is not dependent upon the presence of a battery, to be retained. Power failures shall not cause the GDC memory to be lost, nor shall there be any need for batteries to be recharged or replaced to maintain the integrity of the controller database. The B-BC shall allow for the creation of unique application control sequences. Systems that only allow selection of sequences from a library or table are not acceptable.

All control sequences shall be fully programmable at the B-AAC, allowing for the creation and editing of an application control sequence, while at the unit.

The B-AAC shall be provided with an interface port (standard RS232 data terminal port or USB port) for a laptop computer. The interface port shall allow the laptop to have full functionality as described above. From the interface port or *network terminal*, the laptop shall be able to directly access any B-AAC or B-ASC in the network.

The B-AAC shall provide an input/output point trending utility that is capable of accumulating 48 analog point samples and 10 digital point samples, per Input/Output point. Each sample shall be taken on a user defined interval, ranging from 1 second to 255 hours per sample. The digital readings shall be on a change of state occurrence for the digital points. All samples shall be recorded with the engineering units for the value, along with a time and date identifier for each sample taken. The samples shall be protected against loss due to power interruptions through a battery or capacitor backup method for a minimum of 30 days.

Systems unable to provide the above capability shall provide for the individual Input/Output point trending at the B-BC. Specifics as to how each B-AAC point will be trended, at the B-BC, shall be provided in the submittal documents. Included in the explanation shall be the sample intervals, the memory allocation in the B-BC and the number of B-AAC's per B-BC that can be expected.

The B-AAC shall provide LED indication of transmit/receive communications performance, as well as for the proper/improper operation of the controller itself.

The B-AAC shall be provided with a battery backed time clock that is capable of maintaining the time of day and calendar for up to thirty days, upon loss of power to the B-AAC, without loss of setting. The battery for the time clock shall be replaceable by the customer. The B-AAC shall be provided with integral time schedules; as a minimum, two seven day schedules with eight on/off periods per day shall be provided. Holiday override of weekly schedules shall be provided for pre-scheduling of holidays, for the year in advance.

#### Controller Location

To simplify controls and mechanical service troubleshooting, the B-AAC shall be capable of being mounted directly in or on the controls compartment of the air handling system. The B-AAC shall be housed in a NEMA 1 enclosure to accommodate direct mounting on the equipment to be controlled. The B-AAC shall be constructed in a modular orientation such that service of the failed components can be done quickly and easily. The modular construction should limit the quantities of printed circuit boards to a maximum of two. All logic, control system, power supply and input/output circuitry shall be contained on a single plug-in circuit board. When required to replace a printed circuit board, it shall not be necessary to disconnect any field wiring. This shall allow all controls maintenance and troubleshooting to be made while at the air handling unit. The B-AAC shall be directly wired to sensory devices, staging relays or modulating valves for heating and cooling.

Every controller and control panel shall be labeled with a lamacoid plate permanently secured to the device. Sticky tape or glued labels are not acceptable. The labeling shall describe the device and include related information such as MAC address, IP address, BACnet Instance numbers, etc.

All power feeds shall be clearly identified and shall include panel number, breaker and electrical panel location if not in the same room.

For compatibility to the environment of the air handling unit, B-AAC's shall have wide ambient ratings. B-AAC's shall be rated for service from -40 DegF (Degrees Fahrenheit) to 140 DegF.

Contractor shall submit description of location of B-AAC's on all mechanical and air handling equipment.

#### B-AAC Naming Convention

B-AAC devices shall be named using the following naming convention:

*B-AAC devices shall be named using the following format:  
Building\_Floor\_RoomNumber\_B-AAC Device Type\_Equipment Short Name*

*All B-AAC points shall be named using the following format:  
Function*

Examples:

An Air Handler controller in the Pavilion HA mechanical room HA4001 for AHU7 would be named as follows:

PAVHA\_04\_HA4001\_HVA\_AHU7

The mixed air temperature point for the above system would be named as follows:

MAT

Therefore, when this point is learned, the entire point name will be:

PAVHA\_04\_HA4001\_HVA\_AHU7\_MAT

For function short names and building short names and numbers, contact the University Controls Engineering Department.

#### Application Specific Controller (B-ASC)

##### General

Controls shall be microprocessor based Application Specific Controller (B-ASC). B-ASC's shall be provided for Unit Ventilators, Fan Coils, Heat Pumps and other applications as shown on the drawings. B-ASC's shall be based on a minimum 16 bit microprocessor working from software program memory which is physically located in the B-ASC. The application control program shall be resident within the same enclosure as the input/output circuitry which translates the sensor signals. All input/output signal conversion shall be performed through a minimum of a 10 bit A to D converter.

Contractor shall provide a minimum of one B-ASC controller per unitary system as shown on the drawings.

The BAS contractor shall provide and install all B-ASC's specified under this section.

All input/output signals shall be directly hardwired to the B-ASC. Troubleshooting of input/output signals shall be easily executed with a volt-ohm meter (VOM). As a result of this intent, it is specified that power line carrier systems, or other systems which command multiple outputs over a single pair of wires, shall not be utilized.

B-ASC's shall be in continuous, direct communication with the network which forms the facility wide building automation system. The B-ASC's shall communicate with the B-BC at a baud rate of no less than 38,400 baud.

#### Non-Volatile Memory

All control sequences programmed into the B-ASC shall be stored in non-volatile memory, which is not dependent upon the presence of a battery, to be retained. Power failures shall not cause the B-ASC memory to be lost, nor shall there be any need for batteries to be recharged or replaced to maintain the integrity of the controller database. The B-ASC shall allow for the creation of unique application control sequences.

The B-ASC shall be provided with the ability to interface with a laptop computer. The interface port shall be provided at the wall sensor or within the unitary equipment. Connection to the wall sensor must be a standard RJ-45 or USB port.

The B-ASC shall provide an input/output point trending utility that is capable of accumulating 48 analog point samples and 10 digital point samples per Input/Output point. Each sample shall be taken on a user defined interval, ranging from 1 second to 255 hours per sample. The digital readings shall be on a change of state occurrence for the digital points. All samples shall be recorded with the engineering units for the value, along with a time and date identifier for each sample taken.

Systems unable to provide the above capability shall provide for the individual input/output point trending at the B-BC. Specifics as to how each B-ASC point will be trended, at the B-BC, shall be provided in the submittal documents. Included in the explanation shall be the sample intervals, the memory allocation in the B-BC and the number of B-ASC's per B-BC that can be expected.

#### Controller Location

To simplify controls and mechanical service troubleshooting, the B-ASC shall be mounted directly in the controls compartment of the unitary system. The B-ASC shall be provided with a sheet metal or polymeric enclosure that is constructed of material allowing for the direct mounting within the primary air stream, as defined by UL-465. The direct mounting shall allow all controls maintenance and troubleshooting to be made while at the unitary equipment. The B-ASC shall be directly wired to sensory devices, staging relays or modulating valves for heating and cooling.

For compatibility to the environment of the unitary equipment, B-ASC shall have wide ambient ratings. B-ASC's shall be rated for service from 32 DegF (Degrees Fahrenheit) to 140 DegF.

Contractor shall submit description of location of B-ASC's on all mechanical and unitary equipment.

#### B-ASC Naming Convention

B-ASC devices shall be named using the following naming convention:

*B-ASC devices shall be named using the following format:  
Building\_Floor\_RoomNumber\_B-ASC Device Type*

*All B-ASC points shall be named using the following format:  
Function*

Examples:

A VAV controller in the Pavilion HA room HA498 would be named as follows:

PAVHA\_04\_HA498\_VAV

The discharge air temperature point for the above room would be named as follows:

DAT

Therefore, when this point is learned, the entire point name will be:

PAVHA\_04\_HA498\_VAV\_DAT

For function short names and building short names and numbers, contact the University Controls Engineering Department.

## CONTROL PANELS

Panelboard shall contain all instruments and accessories. Provide each item of equipment with an engraved nameplate. Panelboard shall be wall-mounted or stand-mounted and shall be completely enclosed.

As far as is practical, the control components for each system shall be grouped. Provide each group of components with identification.

The entire panelboard shall be pre-wired and brought to a main terminal strip. All relays, switches, etc., shall be installed, furnished and wired on panelboard. Clearly mark each terminal strip as to which wire from which component is to be connected.

Fabricate panels of 0.06-inch- (1.5-mm-) thick, furniture-quality steel or extruded-aluminum alloy, totally enclosed, with hinged doors and keyed lock, with manufacturer's standard shop-painted finish and color.

Panel-Mounted Equipment: Temperature and humidity controllers, relays, and automatic switches; except safety devices. Mount devices with adjustments accessible through front of panel.

Door-Mounted Equipment: Flush-mount (on hinged door) manual switches, including damper-positioning switches, changeover switches, thermometers, and gages.

Graphics: Color-coded graphic, laminated-plastic displays on doors, schematically showing system being controlled, with protective, clear plastic sheet bonded to entire door.



## SENSORS

Electronic Sensors used in air ducts or liquid lines shall utilize non-adjustable RTD or thermostat sensing elements with + or -0.36°F, accuracy and stability of at least + or -0.05°F per year. All sensors used in liquid line shall be provided with separable stainless steel immersion wells. Averaging sensors shall be a minimum of five (5) feet in length, and shall be installed in such a manner so as to sense representative sample of the medium being controlled.

Equipment Operation Sensors: As follows:

Status Inputs for Fans: Differential-pressure switch with adjustable range set to 175 percent of rated fan static pressure. A hawkkey sensor should also be provided so that the owner knows if belts are lost or fans are running backwards.

Status Inputs for Electric Motors: Current-sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

Digital-to-Pneumatic Transducers: Convert plus or minus 12-V dc pulse-width-modulation outputs (preference is 4-20mA or 0-10 Volts), or continuous proportional current or voltage to 0 to 20 psi (0 to 138 kPa).

Damper Position Indication: Potentiometer mounted in enclosure with adjustable crank-arm assembly connected to damper to transmit 0 to 100 percent damper travel.

### SENSOR INPUT AND OUTPUT DEVICES:

The following sensors and devices, or their equivalents, shall be considered acceptable. Other sensors and devices required for this specification are outlined in their respective subsystem.

Analog sensing elements for remote indication shall be independent of local pneumatic sensors used for local control loops.

System Accuracy: The system shall maintain an end-to-end accuracy for one year from sensor to operator's console display for the application specified.

STANDARD	Temperature Sensors
TYPE	Electronic
APPLICATION	BAS, HVAC, BTU, Boiler Control
STANDARD	100 or 1000 ohm platinum wire wound RTD element Standard J (3 wire) configuration European curve, Alpha = .00385 Ohms/Ohm/deg.C., meets DIN SID 43760 Wire in conduit
MECHANICAL	1/4" stainless steel sheath
SPACE TEMPERATURE	Sensor housing to be similar in appearance to existing thermostats except that thermometers are not required. Similarity to be Owner's decision. Locate on an outside wall if possible.

DUCT TEMPERATURE	Standard lengths -- 5.5", 11.5" and 17.5"  Other lengths with owner's written approval.  Locate in central area of airstream at minimum of 18" from reheat coil.  1/2" NPT mounting thread and flange and conduit connection.  Glass encapsulated element unless otherwise approved.
THERMOWELL	Drilled brass or stainless steel or brass fitting with stainless steel sheath built-up well with Owner approval.  Glass encapsulated element unless otherwise approved.  3/4" process connection with drilled wells.  1/2" NPT process connection on built-up wells.  Insertion into measured medium - 1" + 1/2" diameter of pipe.  Cast iron connector head - 1/2" NPT process connection and conduit connection.  Rated thermowell pressure = 250 psi.
ELEMENT ACCURACY	must meet .1% DIN and the DIN 43760 standard.
OVERALL ACCURACY	+ 1 deg.F. General duct, space and thermowell temperatures. + .75 deg.F. for thermowell ele. on 4" or larger pipes. + .5 deg.F. for thermowell ele. on 8" or larger pipes.
OVERALL RANGE	-20% to 120% of possible operating conditions.
GENERAL NOTE	If wires from RTD probe to DGP are to be more than 200 feet long, provide extra large cast iron connector head (nominal size 2-11/16 x 1/4) or junction box to accommodate a resistance to 4-20 mA convertor transmitter.
STANDARD	Pressure Sensor
TYPE	Electronic with LVDT element.
APPLICATION	4-20 mA Output (2 wire) Wire in conduit Input voltage 10-35 volts DC Loop resistance greater than or equal to 500 ohms
MECHANICAL	Linear variable differential transformer

(LVDT) element  
Allowable Standard Ranges            0- 30 PSI  
   0-100 PSI  
   0-200 PSI  
Other ranges with Owner written approval  
1/2" NPT input thread and conduit connection.  
Provide differential inputs unless otherwise approved.  
Provide an air filter on unused differential ports.  
Provide with a NEMA 4 watertight enclosure unless otherwise approved.  
Min. rate pressure - 150% FS proof and 450 PSI static.

OVERALL ACCURACY            + 0.5% F.S. including Linearity, hysteresis and repeatability.

ACCURACY NOTE:            If pressure transducer is used to calculate flow with a pilot tube, then the accuracy of the pressure sensor should be dictated by the overall accuracy requirement of the system and would probably require a high accuracy sensor.

This section covers all new transducers provided. All new transducers provided shall be of the following type:

INPUT	OUTPUT
1.     Temperature (deg.F.) Temperature (deg.F.)	4-20 mA, 2 wire 100 ohm platinum wire RTD
2.     Pressure	4-20 mA, 2 wire
3.     Flow Instantaneous	4-20 mA, 2 wire
4.     Flow Integrated	Pulse 10 PPS Max A25 msec open (min.) 40 msec closed (min.)
5.     KW Instantaneous	4-20 mA, 2 wire
6.     KWH - Integrated	Pulse – 10 PPS Max A25 msec open (min.) 40 msec closed (min.)

Digital inputs from devices with isolated, dry type contacts (no grounds, no voltage) of either normally open (N.O.) or normally closed (N.C.) configuration. Live contact inputs, those that have voltage present, shall be provided with isolating devices to meet dry contact requirement.

**THERMOSTATS:**

Room Thermostats: Provide room thermostats that work in conjunction with the B-AAC and B-ASC terminal unit controllers. Thermostats shall have visible thermometers, setpoint indication and exposed setpoint adjustment in all areas except public spaces. Thermostats are to have push buttons on the front face for adjusting the temperature setpoints. Thermostats are to have no doors.

In cases where a single room sensor is to be shared by multiple controllers the slave box reheat control valves and dampers shall be individually controlled to track the discharge temperature of the master unit. The Master shall be identified locally and on the FMS.

An RJ-11 type connection to serial port shall allow a local portable operator or programmer's terminal to access all program blocks and attributes for complete programmability.

Room Thermostat Accessories: As follows:

Insulating Bases: For all thermostat installations.

Thermostat Guards: Locking transparent-plastic mounted on separate base.

Adjusting Key: As required for device.

Aspirating Boxes: Where indicated for thermostats requiring flush installation.

#### DAMPERS:

Provide automatic control dampers as indicated, with damper frames not less than 13-gage galvanized steel. Provide mounting holes for enclosed duct mounting. Provide damper blades not less than formed 16-gage galvanized steel, with maximum blade width of 8".

Secure blades to 1/2" diameter zinc-plated axles using zinc-plated hardware. Seal off against spring stainless steel blade bearings. Provide blade bearings of nylon and provide thrust bearings at each end of every blade. Construct blade linkage hardware of zinc-plated steel and brass. Submit leakage and flow characteristics plus size schedule for controlled dampers.

Do not exceed maximum 48"x48" damper size. For sizes larger than this maximum in either dimension, use multiple dampers with a separate operator for each damper. Do not link separate dampers together.

Operating Temperature Range: From -20 degrees to 200 degrees F. (-29 degrees to 93 degrees C.). The occupant shall have an operation local range of 68 degrees and 74 degrees on rooms with Occupancy sensors.

For standard applications as indicated, provide parallel or opposed blade design (as selected by manufacturer's sizing techniques) with inflatable steel blade edging, or replaceable rubber seals, rated for leakage less than 10 CFM/sq.ft. of damper area, at differential pressure of 4" w.g. when damper is being held by torque of 50 inch-pounds.

Smoke Dampers: Provide smoke and combination fire/smoke dampers in accordance with applicable requirements of Specification Section "Ductwork Accessories".

#### ACTUATORS:

Electric Valve and Damper Motors: Size each motor to operate dampers or valves with sufficient reserve power to provide smooth modulating action or 2-position action as specified.

For reheat coils in branch ductwork and heating coils for air terminal units and fan terminal units, provide non-spring return, fully proportional, floating valve actuators.

For all other applications, provide permanent split-capacitor or shaded pole type motors with gear trains completely oil-immersed and sealed. Equip spring-return motors, with integral spiral-spring mechanism. Furnish entire spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.

Equip motors for outdoor locations and for outside air intakes with "O ring" gaskets designed to make motors completely weatherproof, and equip with internal heaters to permit normal operation at -40 degrees F. (-40 degrees C.)

Provide separate motor for each outside air, return air and exhaust air damper. Do not link dampers with different functions together on one damper motor.

Provide separate motor for each damper when overall damper size exceeds 48" in either dimension. Do not link different dampers together on one damper motor.

Binary backed-up motors are not acceptable.

#### MISCELLANEOUS:

Wells for Pipe Mounted Sensor: Wells shall have minimum working pressure of 150 WOG psig. Wells shall be brass or stainless steel.

Lightning Protection: All electric/electronic equipment supplied must be internally or externally lightning/transient surge voltage protected on all external power feeder and input/output connections which are subject to surge voltage transients. Provide high speed clamping elements which meet IEEE. STD. 472 (SWC) on all digital or analog data channels.

#### Pressure Instruments:

Differential Pressure and Pressure Sensors: Sensors shall have 4-20 mA output proportional signal with provisions for field checking. Sensors shall withstand up to 150% of rated pressure, without damaging device. Accuracy shall be within 2% of full scale.

Pressure Switches: Pressure switches shall have repetitive accuracy of +2% of range and withstand up to 150% of rated pressure. Sensors shall be diaphragm or bourdon tube design. Switch operation shall be adjustable over operating pressure range. Switch shall have application rated Form C, snap-acting, self-wiping contact of platinum alloy, silver alloy or gold plating.

Current Sensing Relays: Relays shall monitor status of motor loads. Switch shall have self-wiping, snap-acting Form C contacts rated for application. Setpoint of contact operation shall be field adjustable.

Low Voltage Wiring: Control wiring for analog functions shall be 18 AWG minimum with 600 volt insulation, twisted and shielded, 2 or 3 wire to match analog function hardware.

Low Voltage Wiring: Wiring for electric or electronic circuits less than 25 volts shall be cabling manufactured for express use in air plenums. The plenum cable shall be 24 gauge or larger as required, tinned copper, Teflon insulated, twisted pairs, shielded or unshielded, as required, a color coded, overall tape wrap, with transparent Teflon jacket, 150V., NEC725, Class 2 classified for use in air plenum non-conduit signaling application.

Manual Override Switches: In case of failure of the DDC system, provide override switches to operate fans, pumps, air handling units, cooling tower, heat exchangers, etc., manually in local interface control panel. Also for temperature and pressure control provide switches to allow supply temperatures, water temperatures, supply air pressure and fans to be manually regulated. All switches shall be located in locked panel to prevent unauthorized use of the manual override switches.

### PART 3 - EXECUTION

#### INSPECTION:

Examine areas and conditions under which control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### INSTALLATION OF AUTOMATIC TEMPERATURE CONTROLS

General: Install systems and materials in accordance with manufacturer's instructions, roughing-in drawings and details shown on the Drawings.

#### CONTROL WIRING:

Contact the project manager for all required Ethernet connections for this project.

Install control wiring, without splices between terminal points, color-coded. Install in neat workmanlike manner, securely fastened. Install in accordance with National Electrical Code. Install wiring in electrical conduit in all areas. All controls conduit shall be green in color.

Conceal conduit, except in mechanical rooms and areas where other conduit and piping are exposed.

Install all control wiring with color-coded wire in  $\frac{3}{4}$ " minimum size conduit. Wire gauge to be in accordance with National Electrical Code.

Connect electrical components to wiring systems and to ground as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts, according to equipment manufacturer's published torque-tightening values for equipment connectors. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals according to tightening requirements specified in UL 486A.

#### POWER WIRING:

Provide power wiring and conduit to air terminal units (if required) and to smoke dampers and combination fire/smoke dampers and their damper motors.

Furnish and install power cabling and conduit for temperature controls panels and equipment from emergency power panels. Each temperature control panel shall be connected to a separate circuit. Conduits shall connect to panels at the locations directed by the Contractor under Division 26. Final connection in the power panels shall be by Temperature Control Contractor in coordination with Division 26 Contractor.

#### MISCELLANEOUS:

Software Programming: All software programs shall be programmed by this Contractor.

Installation of Mechanical Devices: Refer to Mechanical Division sections for installation of valve bodies, control wells and dampers; not work of this section.

#### ADJUSTMENT AND SERVICE:

After completion of the installation, the automatic temperature control manufacturer shall regulate and adjust all thermostats, control valves, motors, and other equipment provided under his contract and shall place them in complete operating condition, subject to approval by the Engineer and Owner.

This shall include but not be limited to “tuning” of all control systems. Systems shall be tuned for decaying wave response and minimal overshoot of setpoint. Contractor is to not leave any system in an Auto Tune mode.

Room temperature controls shall have one temperature setpoint with less than a 0.5°F between calculated heating and cooling temperatures.

This Contractor shall work with Balancing Contractor to provide verification of CFM reading from the DDC terminal unit controllers.

Final adjustment shall be performed by specially trained personnel in direct employ of manufacturer of primary temperature control system.

After completion of installation, perform the following:

#### Installation.

- Check proper installation and connection of each control device.
- Verify electric power.
- Verify each sensor and actuator connection to field computer.

#### Field Computer Operation.

- Point Test.
  - check of wiring of each sensor and actuator end-to-end
  - verify calibration of each sensor.
  - verify manual operation of each actuator.

#### Local loop control.

- bring each local loop under control.
- check response to upset, change in setpoint.
- check full and partial load operation.

#### Supervisory functions.

- verify time clock schedules.
- verify reset control.

Verify communication with each field device.

- perform end-to-end sensor and actuator checks.
- verify that the database is correct.

Test other software.

Trend Logging.  
Report Generation.  
Remote Access.  
System Documentation.

Verify proper operation of every control point in the presence of the Engineer. Include point-by-point checkout.

The control manufacturer shall provide a period of free service extending through one complete heating season and one complete cooling season, after acceptance of the control system, and shall report the condition of the control equipment to the Owner and the Architect.

#### PART 4 - SEQUENCE OF OPERATION:

(The consultant is responsible for providing the appropriate Sequences of Operation required by the project. Following are some guidelines for use in the development of the drawings and specifications as they relate to University projects.)

#### AIR HANDLING UNITS (AHU)

For all AHUs, the following is a minimum points list that is required for each unit:

Supply discharge temperature  
Return temperature  
Mixed Air temperature  
Preheat temperature  
OA temperature  
Damper positions – OA, RA, MA  
Pressures – Discharge Static, 2/3 Static, Return Static  
Fan Commands & Statuses of all fans – Supply, Return and Exhaust  
Heating & Cooling Coil Valve Commands  
All VFD information – Fans and Pumps  
Pump Commands and Status  
CFM readings – Discharge, Return, Outside Air  
Humidifier Commands and Humidity points  
Setpoints for temperature and pressures  
Filter pressure differentials

Related to freezestat operation for all AHUs, the following sequence needs to be added to each sequence: *Upon tripping of the freezestat, the heating control valve is to modulate to maintain a heating plenum space temperature of 3 degrees F (adj) less than the specific unit DAT setpoint. Example: For unit with 55 DAT setpoint, plenum temperature is to control to 52 degrees.*

All AHUs shall be programmed to restart on their own without any software lockout reset required.

Reference University Standard 230553S02 for the AHU naming convention.

#### CHILLED WATER SYSTEMS

For buildings and installations that require a chilled water system decoupled loop, refer to University Standard 236000S01.



**ROOM TERMINAL HVAC**

For all rooms, provide the following points as a minimum:

- VAV supply and/or return damper position
- Heating valve position
- CFM reading
- Room DAT
- Room temperature
- Room temperature setpoint
- Radiant Heat valve position (if applicable)

For any space that may be unoccupied during periods of operation, consideration needs to be given in the design of the space to the University Energy Guidelines.

**HYDRONIC WATER SYSTEMS**

All hydronic water systems shall be developed using an outside air temperature reset schedule developed for each particular building.

**BACnet Protocol Implementation Conformance Statement:**

The controls contractor shall include their BACnet PICS and BIBB statements (as described in ASHRAE 135-2001) for their BACnet Interface with their shop drawings. The interface shall comply with the following as a minimum.

Vendor Name: Tridium, Inc.

Product Family: Niagara Framework, including N4 Web Supervisor, JACE 6XX at Release 3.8, JACE 8xxx at release 4.6 or greater using the most current version of JAVA or HTML 5. All control work associated with this project must be fully compatible with this version of Tridium such that all alarms, points, etc. communicate and clear alarms seamlessly with the existing system.

Description: This product family provides bi-directional communication between the Tridium Niagara Framework and a BACnet system operating at BACnet Conformance Class 3, over Ethernet media.

BACnet Protocols are documented in Appendices A, B & C.

**REQUIRED SUBMITTALS:**

The following chart is supplied for the benefit of the Owner, Architect, Engineer and contractor to assure a complete submission of required information. It is a reference listing of documents required by the Specifications under this Section. Refer to Specifications Section - General Provisions for the general requirements of submittals.

ITEM	SHOP DRAWING	M&O MANUAL	PARTS LIST	WRITTEN DESCRIPTION
Control equipment	x	x	x	
Control systems	x			
Control sequence				x
“As-builts” drawings	x	x	x	

Frequency drives	x	x	x	
Air terminal units	x	x	x	
I/O Summary Charts	x			

Print and Save Excel I/O Summary Sheet in Spec Directory ([Add general IO Point list](#))

Appendix A – Vykon Niagara Compatibility Statement (NiCS)



VYKON Niagara<sup>AX</sup>  
Compatibility  
Statement (NiCS)  
Includes all VYKON  
branded JACE and  
Software Products

## VYKON Niagara<sup>AX</sup> Compatibility Statement (NiCS)

Includes all VYKON branded JACE and Software Products

The following information describes Tridium's VYKON branded Niagara<sup>AX</sup> product licensing.

Tridium's VYKON AX branded products utilizes an open access licensing procedure. VYKON AX branded products can be connected to and managed by any Niagara based tools or systems without the need to modify the license. This means the end user does not have to authorize changes to a VYKON AX license for another systems integrator to gain access to the system. The end user does need to have the necessary user names and passwords installed by the original system integrator so they can be used by another Niagara trained system integrator.

The following is an explanation of the VYKON licensing scheme.

### BrandID

Every licensed station and tool has a Brand Identifier (BrandID). This field holds a text descriptor that the OEM chooses as the identifier for its product line. Each station or tool can have only one BrandID entry.

Tridium's VYKON products have the following:

### BrandID – VYKON

#### Station Compatibility In

This field is a list of brands that this local station will allow Niagara AX data to come in from. Simply stated from the point of view of a JACE, "this is the list of brands that can I can accept data from". Tridium's VYKON products contain:

#### Station Compatibility In – All (In the actual license ALL is define by an \*)

Note: The compatibility fields can contain; a single brand "ABC", a list of multiple brands "ABC, XYZ", no brand

"None" or all brands "All".

#### Station Compatibility Out

This field is a list of brands that this local station will allow Niagara AX data to be shared with. Simply stated, "This is the list of brands that I can share data with". Tridium's VYKON products contain:

#### Station Compatibility Out – All





*Tool Compatibility In*

This field is a list of brands that this station will allow to be connected to it for engineering of its application. Simply stated, "This is the list of brands that can engineer me". Tridium's VYKON products contain:

**Tool Compatibility In – All**

*Tool Compatibility Out*

This field is a list of brands that this tool is allowed to connect to and engineer. Simply stated, "This is the list of brands that I can engineer". Tridium's VYKON products contain:

**Tool Compatibility Out – All**

As long as VYKON branded products are purchased by the end user any Tridium Certified (TCP) system integrator can provide support for the end user without the need for the owner to be involved in the licensing process. For more information on Niagara Connectivity and Security visit our website library at: [http://www.vykon.com/cs/library/white\\_papers](http://www.vykon.com/cs/library/white_papers)

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V-NICS-092009

Appendix B – Tridium Niagara 3.8 BACnet PICS



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## TRIDIUM NIAGARA<sup>AX</sup> 3.8 BACnet PICS

### BACnet Protocol Implementation Conformance Statement

**Date:** August 31, 2016  
**Vendor Name:** Tridium  
**Product Name:** Niagara AX BACnet Integration  
**Product Model Number:** Tridium JACE models  
**Application Software Version:** 3.8.112 or higher  
**Firmware Revision:** 3.8.112.1 or higher  
**BACnet Protocol Revision:** 7

**Product Description:**

Niagara AX provides the ability to view, monitor, and control BACnet devices over IP, raw Ethernet, or MS/TP media. Devices, points, schedules, alarms, and logs can be learned and managed from Niagara AX. In addition, Niagara points, schedules, histories, and alarming can be exposed to BACnet for monitor and control by foreign BACnet clients.

**BACnet Standardized Device Profile (Annex L):**

- BACnet Advanced Operator Workstation (B-AWS)
- BACnet Operator Workstation (B-OWS)
- BACnet Operator Display (B-OD)
- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
- BACnet Smart Sensor (B-SS)
- BACnet Smart Actuator (B-SA)



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**Additional BACnet Interoperability Building Blocks Supported (Annex K):**

<b>Data Sharing</b> DS-RP-A, B DS-RPM-A, B DS-WP-A, B DS-WPM-A, B DS-COV-A, B DS-COVU-A, B DS-V-A DS-M-A DS-COVP-B	<b>Device &amp; Network Management</b> DM-DDB-A, B DM-DOB-A, B DM-DCC-B DM-RD-B DM-TS-B DM-UTC-B DM-LM-A, B DM-BR-B DM-ANM-A DM-ADM-A DM-ATS-A DM-MTS-A
<b>Alarm &amp; Event Management</b> AE-N-A, -I-B AE-ACK-A, B AE-ASUM-B AE-ESUM-B AE-INFO-B AE-VN-A AE-VM-A	<b>Trending</b> T-VMT-A, I-B, -E-B T-ATR-A, B T-V-A
<b>Scheduling</b> SCHED-A, I-B, -E-B SCHED-VM-A SCHED-WS-I-B	<b>Network Management</b> NM-CE-A



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**Segmentation Capability:**

Feature	Supported	Window size
Transmit Segmented Messages	yes	10
Receive Segmented Messages	yes	any

**Standard Object Types Supported:**

- The CreateObject and DeleteObject services are not supported, so no objects are dynamically creatable or deletable through BACnet service requests, although these objects are dynamically creatable and deletable through Niagara.
- No general range restrictions exist; however, certain specific applications may have specific range restrictions.
- All potentially available properties are listed for each object type.
- Optional properties are listed in *italics*. Not all instances support all optional properties.
- Writable properties are listed in **bold**. Any range limitations are expressed in parentheses following the property name.

**Notes from Table**

1. The File\_Size property of File objects is only writable if the underlying system file is changeable.
2. The Setpoint property of Loop objects is writable only if the setpoint is not linked from within Niagara.
3. The Recipient\_List property of the Notification Class object will maintain entries that are internally configured within Niagara.
4. The List\_Of\_Object\_Property\_References property of the Schedule object will maintain entries that are internally configured within Niagara.
5. The Priority\_For\_Writing property of Schedule objects is not important for internal Niagara operation, as the priority at which a point is commanded is determined by the input to which the Schedule output is linked.
6. These Trend Log object properties are not writable if the backing history for the exported Trend Log is a Niagara-generated history. If the history is created as a BACnet Trend Log, then they are writable.
7. Trend Logs in Niagara use internal triggering and are either COV or Interval. So the Log\_Interval property cannot be written from BACnet.



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Object Type	Properties
Analog Input	Object_Identifier <b>Object_Name</b> Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability <b>Out_Of_Service</b> Units Min_Pres_Value Max_Pres_Value Resolution COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps
Analog Output	Object_Identifier <b>Object_Name</b> Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability <b>Out_Of_Service</b> Units Min_Pres_Value Max_Pres_Value Resolution Priority_Array Relinquish_Default COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps
Analog Value	Object_Identifier <b>Object_Name</b> Object_Type Present_Value Description Status_Flags Event_State Reliability <b>Out_Of_Service</b> Units Priority_Array Relinquish_Default COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps





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Object Type	Properties
Binary Input	Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity Inactive_Text Active_Text Change_Of_State_Time Change_Of_State_Count (0) Time_Of_State_Count_Reset Elapsed_Active_Time (0) Time_Of_Active_Time_Reset Time_Delay Notification_Class Alarm_Value Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps
Binary Output	Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity Inactive_Text Active_Text Change_Of_State_Time Change_Of_State_Count (0) Time_Of_State_Count_Reset Elapsed_Active_Time (0) Time_Of_Active_Time_Reset Minimum_Off_Time Minimum_On_Time Priority_Array Relinquish_Default Time_Delay Notification_Class Feedback_Value Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps
Binary Value	Object_Identifier Object_Name Object_Type Present_Value Description Status_Flags Event_State Reliability Out_Of_Service Inactive_Text Active_Text Change_Of_State_Time Change_Of_State_Count (0) Time_Of_State_Count_Reset Elapsed_Active_Time (0) Time_Of_Active_Time_Reset Minimum_Off_Time Minimum_On_Time Priority_Array Relinquish_Default Time_Delay Notification_Class Alarm_Value Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps



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Object Type	Properties	
Calendar	Object_Identifier	Description
	Object_Name	Present_Value
	Object_Type	Date_List
Device	Object_Identifier	Segmentation_Supported
	Object_Name	Max_Segments_Accepted
	Object_Type	Local_Time
	System_Status	Local_Date
	Vendor_Name	UTC_Offset
	Vendor_Identifier	Daylight_Savings_Status
	Model_Name	APDU_Segment_Timeout
	Firmware_Revision	APDU_Timeout
	Application_Software_Revision	Number_Of_APDU_Retries
	Location	Max_Master
	Description	Max_Info_Frames
	Protocol_Version	Device_Address_Binding
	Protocol_Revision	Database_Revision
	Protocol_Services_Supported	Configuration_Files
Protocol_Object_Types_Supported	Last_Restore_Time	
Object_List	Backup_Failure_Timeout	
Max_APDU_Length_Accepted	Active_COV_Subscriptions	
File (Stream Access Only)	Object_Identifier	File_Size <sup>1</sup>
	Object_Name	Modification_Date
	Object_Type	Archive
	Description	Read_Only
	File_Type	File_Access_Method



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Object Type	Properties
Loop	<p>Object_Identifier  <b>Object_Name</b>  Object_Type  Present_Value  <i>Description</i>  Status_Flags  Event_State  <i>Reliability</i>  <b>Out_Of_Service</b>  Output_Units  Manipulated_Variable_Reference  Controlled_Variable_Reference  Controlled_Variable_Value  Controlled_Variable_Units  Setpoint_Reference  <b>Setpoint<sup>2</sup></b>  Action  <i>Proportional_Constant</i></p> <p><i>Proportional_Constant_Units</i>  <i>Integral_Constant</i>  <i>Integral_Constant_Units</i>  <i>Derivative_Constant</i>  <i>Derivative_Constant_Units</i>  <i>Bias</i>  <i>Maximum_Output</i>  <i>Minimum_Output</i>  Priority_For_Writing  <i>COV_Increment</i>  <i>Time_Delay</i>  <i>Notification_Class</i>  <i>Error_Limit</i>  <i>Event_Enable</i>  <i>Acked_Transitions</i>  <i>Notify_Type</i>  <i>Event_Time_Stamps</i></p>
Multi-state Input	<p>Object_Identifier  <b>Object_Name</b>  Object_Type  Present_Value  <i>Description</i>  <i>Device_Type</i>  Status_Flags  Event_State  <i>Reliability</i>  <b>Out Of Service</b></p> <p>Number_Of_States  <i>State_Text</i>  <i>Time_Delay</i>  <i>Notification_Class</i>  <i>Alarm_Values</i>  <i>Fault_Values</i>  <i>Event_Enable</i>  <i>Acked_Transitions</i>  <i>Notify_Type</i>  <i>Event_Time_Stamps</i></p>
Multi-state Output	<p>Object_Identifier  <b>Object_Name</b>  Object_Type  Present_Value  <i>Description</i>  <i>Device_Type</i>  Status_Flags  Event_State  <i>Reliability</i>  <b>Out_Of_Service</b>  Number_Of_States</p> <p><i>State_Text</i>  Priority_Array  <b>Relinquish_Default</b>  <i>Time_Delay</i>  <i>Notification_Class</i>  <i>Feedback_Value</i>  <i>Event_Enable</i>  <i>Acked_Transitions</i>  <i>Notify_Type</i>  <i>Event_Time_Stamps</i></p>



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Object Type	Properties
Multi-state Value	<i>Object_Identifier</i> <b>Object_Name</b> <i>Object_Type</i> Present_Value <i>Description</i> Status_Flags Event_State <i>Reliability</i> <b>Out_Of_Service</b> Number_Of_States <i>State_Text</i> Priority_Array Relinquish_Default Time_Delay Notification_Class Alarm_Values Fault_Values Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps
Notification Class	Object_Identifier <b>Object_Name</b> Object_Type <i>Description</i> Notification_Class Priority Ack_Required Recipient_List <sup>3</sup>
Schedule	Object_Identifier <b>Object_Name</b> Object_Type <i>Description</i> <b>Effective_Period</b> <i>Weekly_Schedule</i> <i>Exception_Schedule</i> Schedule_Default List_Of_Object_Property_References <sup>4</sup> Priority_For_Writing <sup>5</sup> Status_Flags Reliability Out_Of_Service
Trend Log	Object_Identifier <b>Object_Name</b> Object_Type <i>Description</i> <b>Log_Enable</b> <sup>6</sup> Start_Time Stop_Time Log_DeviceObjectProperty Log_Interval <sup>6,7</sup> COV_Resubscription_Interval Client_COV_Increment Stop_When_Full Buffer_Size Log_Buffer Record_Count (0) <sup>6</sup> Total_Record_Count Notification_Threshold Records_Since_Notification Last_Notify_Record Event_State Notification_Class Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps



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**Data Link Layer Options:**

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) \_\_\_\_\_
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 76800
- MS/TP slave (Clause 9), baud rate(s): \_\_\_\_\_
- Point-To-Point, EIA 232 (Clause 10), baud rate(s): \_\_\_\_\_
- Point-To-Point, modem, (Clause 10), baud rate(s): \_\_\_\_\_
- LonTalk, (Clause 11), medium: \_\_\_\_\_
- Other:

**Device Address Binding:**

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)  Yes  No

**Networking Options:**

- Router, Clause 6 – Routing configurations: Ethernet-IP, Ethernet-MS/TP, IP-MS/TP
- Annex H, BACnet Tunneling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)  
Does the BBMD support registrations by Foreign Devices?  Yes  No

**Character Sets Supported:**

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- ANSI X3.4  IBM™/Microsoft™ DBCS  ISO 8859-1
- ISO 10646 (UCS-2)  ISO 10646 (UCS-4)  JIS C 6226

**If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:**

This product supports communications between BACnet and any third-party system to which Niagara can connect. Contact Tridium for a list of supported protocols.

Appendix C – BACnet Testing Laboratories Product Listing



BACnet is a registered trademark of ASHRAE. ASHRAE does not endorse, approve or test products for compliance with ASHRAE standards. Compliance of listed products to the requirements of ASHRAE Standard 135 is the responsibility of BACnet International (BI). BTL is a registered trademark of BI.

## BACnet Testing Laboratories Product Listing

*This product has been tested at a qualified BACnet Testing Laboratory and found to comply with all the necessary interoperability requirements in place on the published test date. This listing represents the tested capability of the Listed Product. For information on additional functionality that was not covered in the test process, refer to the Manufacturer's PICS statement on the BI website.*

### Listing Information

Vendor		Listing Status
Tridium, Inc. 3951 Westerre Parkway, Suite 350 Richmond, VA 23233 USA		Listed Product
Test Requirements	BACnet Protocol Revision	Date Tested
Requirements as of July 2009	Revision 7 (135-2008)	July 2011

Product Name	Model Number(s)	Software Version
Niagara AX Supervisor with BACnet B-AWS	S-AX-AWS	3.6.35

### Device Profiles

Profile	Model Numbers
BACnet Advanced Workstation (B-AWS)	S-AX-AWS

### BIBBs Supported

Data Sharing	ReadProperty-A	DS-RP-A
	ReadProperty-B	DS-RP-B
	ReadPropertyMultiple-A	DS-RPM-A
	ReadPropertyMultiple-B	DS-RPM-B
	WriteProperty-A	DS-WP-A
	WriteProperty-B	DS-WP-B
	WritePropertyMultiple-A	DS-WPM-A
	WritePropertyMultiple-B	DS-WPM-B
	COV-A	DS-COV-A
	View-A	DS-V-A
	Advanced View-A	DS-AV-A
	Modify-A	DS-M-A
	Advanced Modify-A	DS-AM-A

Alarm and Event Management	Alarm and Event-Notification-A	AE-N-A
	Alarm and Event-ACK-A	AE-ACK-A
	Alarm and Event-View Notifications-A	AE-VN-A
	Alarm and Event-Advanced View Notifications-A	AE-AVN-A
	Alarm and Event-View and Modify-A	AE-VM-A
	Alarm and Event-Advanced View and Modify-A	AE-AVM-A
	Alarm and Event-Alarm Summary View-A	AE-AS-A
Alarm and Event-Event Log View and Modify-A	AE-ELVM-A	

Scheduling	Scheduling-View and Modify-A	SCHED-VM-A
	Scheduling-Advanced View and Modify-A	SCHED-AVM-A
	Scheduling-Weekly Schedule-A	SCHED-WS-A

Trending	Trending-View-A	T-V-A
	Trending-Advanced View and Modify-A	T-AVM-A
	Automated Trend Retrieval-A	T-ATRA

Device and Network Management	Dynamic Device Binding-A	DM-DOB-A
	Dynamic Device Binding-B	DM-DOB-B
	Dynamic Object Binding-A	DM-DOB-A
	Dynamic Object Binding-B	DM-DOB-B
	Automatic Device Mapping-A	DM-ADM-A
	Automatic Network Mapping-A	DM-ANM-A
	Time Synchronization-A	DM-TS-A
	Time Synchronization-B	DM-TS-B
	UTC Time Synchronization-A	DM-UTC-A
	UTC Time Synchronization-B	DM-UTC-B
	Automatic Time Synchronization-A	DM-ATS-A
	Manual Time Synchronization-A	DM-MTS-A
	DeviceCommunicationControl-A	DM-DCC-A
	DeviceCommunicationControl-B	DM-DCC-B
	ReinitializeDevice-A	DM-RD-A
	ReinitializeDevice-B	DM-RD-B
	Backup and Restore-A	DM-BR-A
	Restart-A	DM-R-A
	Object Creation and Deletion-A	DM-CCD-A
List Manipulation-A	DM-LM-A	
List Manipulation-B	DM-LM-B	

**Object Type Support**

Device		
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**Data Link Layer Options**

Media	Options
BACnet/IP (Annex J)	BBMD
Ethernet	

### Networking Options

Networking Functionality	Media
Router	BACnet/IP (Annex J) – Ethernet

### Character Set Support

ANSI X3.4 ISO 10646 (UCS-2)
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## SECTION 26 05 01

### GENERAL REQUIREMENTS - ELECTRICAL

#### PART 1 - GENERAL

- 1.1 The Instructions to Bidders, General and Special Conditions, and all other contract documents shall apply to the Contractor's work as well as to each of his Sub Contractor's work. Each Contractor is directed to familiarize himself in detail with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.
- 1.2 Each Contractor shall be governed by any alternates, unit prices and Addenda or other contract documents insofar as they may affect his part of the work.
- 1.3 The work included in this division consists of the furnishing of all labor, equipment, transportation, supplies, material and appurtenances and performing all operations necessary for the satisfactory installation of complete and operating Electrical Systems indicated on the drawings and/or specified herein.
- 1.4 Any materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the Electrical Systems in a substantial manner, in compliance with the requirements stated, implied, or intended in the drawings and specifications, shall be included as part of this Contract. The Contractor shall give written notice of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted a minimum of ten days prior to bid. In the absence of such written notice and by the act of submitting his bid, it shall be understood that the Contractor has included the cost of all required items in his bid, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensations.
- 1.5 It is not the intent of this section of the specifications (or the remainder of the contract documents) to make any specific Contractor, other than the Contractor holding the prime contract, responsible to the Owner, Architect and Engineer. All transactions such as submittal of shop drawings, claims for extra costs, requests for equipment or materials substitution, shall be done through the Contractor to the Architect (if applicable), then to the Engineer.
- 1.6 This section of the Specifications or the arrangement of the contract documents shall not be construed as an attempt to arbitrarily assign responsibility for work, material, equipment or services to a particular trade Contractor or Sub-Contractor. Unless stated otherwise, the subdivision and assignment of work under the various sections shall be the responsibility of the Contractor holding the prime contract.
- 1.7 It is the intent of this Contract to deliver to the Owners a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be responsibility of the Contractors involved to remove and/or relocate or re-attach any existing or new systems which interfere with new equipment or materials to be installed by other trades without additional cost to the Owner.
- 1.8 In general, and to the extent possible, all work shall be accomplished without interruption of the existing facilities' operations. Each Contractor shall advise the Architect, Owner and Engineer in writing at least one week prior to the deliberate interruption of any services. The Owners shall be advised of the exact time that interruption will occur and the length of time the interruption will occur.

cur. Failure to comply with this requirement may result in complete work stoppage by the Contractors involved until a complete schedule of interruptions can be developed. Contractor will not be entitled to additional compensation due to work stoppage mandated by unscheduled interruption.

- 1.9 Whenever utilities are interrupted, either deliberately or accidentally, the Contractor shall work continuously to restore said service. The Contractor shall provide tools, materials, skilled journeymen of his own and other trades as necessary, premium time as needed and coordination with all applicable utilities, including payment of utility company charges (if any), all without requests for extra compensation to the Owner, except where otherwise provided for in the contract for the work. The contractor shall abide by the requirements on the Special Conditions and the University's outage request program.
- 1.10 Definitions:
- 1.10.1 Prime Contractor - The Contractor who has been engaged by the Owner in a contractual relationship to accomplish the work.
- 1.10.2 Electrical Contractor - Any Contractor whether bidding or working independently or under the supervision of a General Contractor, that is: the one holding the Prime Contract and who installs any type of Electrical work, such as: power, lighting, underground or overhead electrical, etc.
- 1.10.3 Electrical Sub-Contractor - Each or any Contractor contracted to, or employed by, the Electrical Contractor for any work required by the Electrical Contractor.
- 1.10.4 Engineer - The Consulting Mechanical-Electrical Engineers either consulting to the Owner, Architect, other Engineers, etc.
- 1.10.5 Architect - The Architect of Record for the project, if any.
- 1.10.6 Furnish - Deliver to the site in good condition.
- 1.10.7 Provide - Furnish and install in complete working order.
- 1.10.8 Install - Install equipment furnished by others in complete working order.
- 1.10.9 Contract Documents - All documents pertinent to the quality and quantity of all work to be performed on the project. Includes, but not limited to: Plans, Specifications, Addenda, Instructions to Bidders, (both General and Sub-Contractors), Unit Prices, Shop Drawings, Field Orders, Change Orders, Cost Breakdowns, Construction Manager's Assignments, Architect's Supplemental Instructions, Periodical Payment Requests, etc.
- 1.11 Note: Any reference within these specifications to a specific entity, i.e., "Electrical Contractor" is not to be construed as an attempt to limit or define the scope of work for that entity or assign work to a specific trade or contracting entity. Such assignments of responsibility are the responsibility of the Contractor or Construction Manager holding the prime contract, unless otherwise provided herein.

## PART 2 - INTENT

- 2.1 It is the intent of these specifications and all associated drawings that the Contractor provide finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."

- 2.2 Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

### PART 3 - ELECTRICAL DRAWINGS AND SPECIFICATIONS

- 3.1 The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed insofar as possible. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted in writing to the Engineer for approval before proceeding with the work. The Contract Drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Contractors shall, however, anticipate that additional offsets may be required and submit their bid accordingly.
- 3.2 The drawings and specifications are intended to supplement each other. No Contractor or supplier shall take advantage of conflict between them, or between parts of either, but should this condition exist, the Contractor or supplier shall request a clarification of the condition at least ten days prior to the submission of bids so that the condition may be clarified by Addendum. In the event that such a condition arises after work is started, the interpretation of the Engineer shall be the determining factor. In all instances, unless modified in writing and agreed upon by all parties thereto, the Contract to accomplish the work shall be binding on the affected Contractor.
- 3.3 The drawings and specifications shall be considered to be cooperative and complimentary and anything appearing in the specifications which may not be indicated on the drawings or conversely, shall be considered as part of the Contract and must be executed the same as though indicated by both.
- 3.4 This Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.
- 3.5 The Engineer shall reserve the right to make minor adjustments in location of conduit, fixtures, outlets, switches, etc., where he considers such adjustments desirable in the interest of concealing work or presenting a better appearance.
- 3.6 Each Contractor shall evaluate ceiling heights called for on Architectural Plans. Where the location of Electrical equipment may interfere with ceiling heights, the Contractor shall call this to the attention of the Engineer in writing prior to making the installation. Any such changes shall be anticipated and requested sufficiently in advance so as to not cause extra work on the part of the Contractor or unduly delay the work.
- 3.7 Should overlap of work between the various trades become evident, this shall be called to the attention of the Engineer. In such event neither trade shall assume that he is to be relieved of the work which is specified under his branch until instructions in writing are received from the Engineer.
- 3.8 The Electrical drawings are intended to show the approximate location of equipment, materials, etc. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions whether given in figures or scaled shall be verified in the field. In case of conflict between small and large scale drawings, the larger scale drawings shall take precedence.
- 3.9 The Electrical Contractor and his Sub Contractors shall review all drawings in detail as they may relate to his work (structural, architectural, site survey, mechanical, etc.). Review all drawings for general coordination of work, responsibilities, ceiling clearances, wall penetration points, chase access, fixture elevations, etc. Make any pertinent coordination or apparent conflict comments to the Engineers at least ten days prior to bids, for issuance of clarification by written addendum.

- 3.10 Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, or not indicated at all, the parts drawn out shall apply to all other like portions of the work. Where ornament or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts of the work, unless otherwise indicated.
- 3.11 Special Note: Always check ceiling heights indicated on Drawings and Schedules and insure that these heights may be maintained after all mechanical and electrical equipment is installed. If a conflict is apparent, notify the Engineer in writing for instructions.

#### PART 4 - EXAMINATION OF SITE AND CONDITIONS

- 4.1 Each Contractor shall inform himself of all of the conditions under which the work is to be performed, the site of the work, the structure of the ground, the obstacles that may be encountered, the availability and location of necessary facilities and all relevant matters concerning the work. All Contractors shall carefully examine all Drawings and Specifications and inform themselves of the kind and type of materials to be used throughout the project and which may, in any way, affect the execution of his work.
- 4.2 Each Contractor shall fully acquaint himself with all existing conditions as to ingress and egress, distance of haul from supply points, routes for transportation of materials, facilities and services, availability of temporary or permanent utilities, etc. The Contractor shall include in his work all expenses or disbursements in connection with such matters and conditions. Each Contractor shall verify all work shown on the drawings and conditions at the site, and shall report in writing to the Engineer ten days prior to bid, any apparent omissions or discrepancies in order that clarifications may be issued by written addendum. No allowance is to be made for lack of knowledge concerning such conditions after bids are accepted.
- 4.3 The Electrical Contractor is required to provide a coordination set of drawings on this project. It is the responsibility of the Electrical Contractor to provide coordination data to the collaborative effort for the electrical, telecommunication, and low-voltage systems. See Divisions 25, 27, & 28 for additional information.

#### PART 5 - EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS

- 5.1 When any Contractor requests review of substitute materials and/or equipment, and when under an approved formal alternate proposal, it shall be understood and agreed that such substitution, if approved, will be made without additional cost regardless of changes in connections, spacing, service, mounting, etc. In all cases where substitutions affect other trades, the Contractor offering such substitutions shall advise all such Contractors of the change and shall reimburse them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., required to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Special Note: Review of Shop Drawings by the Engineer does not absolve the Contractor of this responsibility.
- 5.2 References in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Each Contractor, in such cases, may, at his option, use any article, device, product, material, fixture, form, or type of construction which in the judgment of the Engineer is equivalent to that specified, provided the provisions of paragraph (A) immediately preceding are met. Substitutions shall be submitted to the Engineer a minimum of ten days prior to bid date for approval to bid in written form thru addenda or other method selected by

the Engineer. If prevailing laws of cities, towns, states or countries are more stringent than these specifications regarding such substitutions, then those laws shall prevail over these requirements.

- 5.3 Wherever any equipment and material is specified exclusively only such items shall be used unless substitution is accepted in writing by the engineers.
- 5.4 Each Contractor shall furnish along with his proposal a list of specified equipment and materials which he proposes to provide. Where several makes are mentioned in the Specifications and the Contractor fails to state which he proposes to furnish, the Engineer shall have the right to choose any of the makes mentioned without change in price.

#### PART 6 - SUPERVISION OF WORK

- 6.1 Each Contractor and Sub-Contractors shall personally supervise the work or have a competent superintendent on the project site at all times during progress of the work, with full authority to act for him in matters related to the project.

#### PART 7 - CODES, RULES, PERMITS, FEES, REGULATIONS, ETC.

- 7.1 The Contractor shall give all necessary notices, obtain and pay for all permits, government sales taxes, fees, and other costs including utility connections or extensions, in connection with his work. As necessary, he shall file all required plans, utility easement requests and drawings, survey information on line locations, load calculations, etc., prepare all documents and obtain all necessary approvals of all utility and governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Engineer before request for acceptance and final payment for the work.
- 7.2 Ignorance of Codes, Rules, regulations, utility company requirements, laws, etc., shall not diminish or absolve Contractor's responsibilities to provide and complete all work in compliance with such.
- 7.3 The Contractor shall include in the work, without extra cost, any labor, materials, services, apparatus or drawings required in order to comply with all applicable laws, ordinances rules and regulations, whether or not shown on drawings and/or specified.
- 7.4 All materials furnished and all work installed shall comply with the current edition of the National Electrical Codes, National Fire Codes of the National Fire Protection Association, the requirements of local utility companies, and with the requirements of all governmental agencies or departments having jurisdiction.
- 7.5 All material and equipment for the electrical systems shall bear the approval label, or shall be listed by the Underwriters' Laboratories, Incorporated. Listings by other testing agencies may be acceptable with written approval by the Engineer.
- 7.6 All electrical work is to be constructed and installed in accordance with plans and specifications which have been approved in their entirety and/or reflect any changes requested by the State Fire Marshal, as applicable or required. Electrical work shall not commence until such plans are in the hands of the Electrical Contractor.
- 7.7 The Contractor shall insure that his work is accomplished in accord with OSHA Standards and any other applicable government requirements.

- 7.8 Where conflict arises between any code and the plans and/or specifications, the code shall apply except in the instance where the plans and specifications exceed the requirements of the code. Any changes required as a result of these conflicts shall be brought to the attention of the Engineer at least ten working days prior to bid date, otherwise the Contractor shall make the required changes at his own expense. The provisions of the codes constitute minimum standards for wiring methods, materials, equipment and construction and compliance therewith will be required for all electrical work, except where the drawings and specifications require better materials, equipment, and construction than these minimum standards, in which case the drawings and specifications shall be the minimum standards.

#### PART 8 - COST BREAKDOWNS

- 8.1 Within thirty days after acceptance of the Contract, each Contractor is required to furnish to the Engineer one copy of a detailed cost breakdown on each respective area of work. These cost breakdowns shall be made on forms provided or approved by the Engineer or Architect. Payments will not be made until satisfactory cost breakdowns are submitted.

#### PART 9 - GUARANTEES AND WARRANTIES

- 9.1 Each Contractor shall unconditionally guarantee all equipment, apparatus, materials, and workmanship entering into this Contract to be the best of its respective kind and shall replace all parts at his own expense, which fail or are deemed defective within one year from final acceptance of the work by the Engineer. The effective date of completion of the work shall be the date each or any portion of the work is accepted by the Engineer as being substantially complete.
- 9.2 Items of equipment which have longer guarantees, as called for in these specifications or as otherwise offered by the manufacturer, such as generators, engines, batteries, transformers, etc., shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Owner reserves the right to use equipment installed by the Contractor prior to date of final acceptance. Such use of equipment shall in no way invalidate the guarantee except that Owner shall be liable for any damage to equipment during this period due to negligence of his operator or other employee.

#### PART 10 - INSPECTION, APPROVALS AND TESTS

- 10.1 Before requesting a final review of the installation from the Architect and/or Engineer, the Contractor shall thoroughly inspect his installation to assure that the work is complete in every detail and that all requirements of the Contract Documents have been fulfilled. Failure to accomplish this may result in charges from the Architect and/or Engineers for unnecessary and undue work on their part.
- 10.2 The Contractor shall provide as a part of this contract electrical inspection by a competent Electrical Inspection Agency, licensed to provide such services. The name of this agency shall be included in the list of materials of the Form of Proposal by the Contractor. All costs incidental to the provision of electrical inspections shall be borne by the Electrical Contractor.
- 10.3 The Contractor shall advise each Inspection Agency in writing (with an information copy of the correspondence to the Architect and/or Engineer) when he anticipates commencing work. Failure of the Inspection Agency to inspect the work in the stage following and submit the related reports may result in the Contractor's having to expose concealed work not so inspected. Such exposure will be at the expense of the responsible Contractor.

- 10.4 Inspections shall be scheduled for rough as well as finished work. The rough inspections shall be divided into as many inspections as may be necessary to cover all roughing-in without fail. Report of each such inspection visit shall be submitted to the Architect, Engineer and the Contractor within three days of the inspection.
- 10.5 Approval by an Inspector does not relieve the Contractor from the responsibilities of furnishing equipment having a quality of performance equivalent to the requirements set forth in these plans and specifications. All work under this contract is subject to the review of the Architect and/or Engineer, whose decision is binding.
- 10.6 Before final acceptance, the Contractor shall furnish three copies of the certificates of final approval by the Electrical Inspector (as well as all other inspection certificates) to the Engineer with one copy of each to the appropriate government agencies, as applicable. Final payment for the work shall be contingent upon completion of this requirement.
- 10.7 The Contractor shall test all wiring and connections for continuity and grounds before equipment and fixtures are connected, and when indicated or required, demonstrate by Megger Test the insulation resistance of any circuit or group of circuits. Where such tests indicate the possibility of faulty insulation, locate the point of such fault, pull out the defective conductor, replacing same with new and demonstrate by further test the elimination of such defect.

#### PART 11 - CHANGES IN ELECTRICAL WORK

REFER TO GENERAL AND SPECIAL CONDITIONS.

#### PART 12 - CLAIMS FOR EXTRA COST

REFER TO GENERAL AND SPECIAL CONDITIONS.

#### PART 13 - SURVEYS, MEASUREMENTS AND GRADES

- 13.1 The Contractor shall lay out his work and be responsible for all necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so.
- 13.2 The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.
- 13.3 Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Engineer thru normal channels of job communication and shall not proceed with his work until he has received instructions from the Engineer.

#### PART 14 - TEMPORARY USE OF EQUIPMENT

- 14.1 The permanent electrical equipment, when installed, may be used for temporary services, subject to an agreement among the Contractors involved, the Owner, and with the consent of the Engineer. Should the permanent systems be used for this purpose, each Contractor shall pay for all temporary connections required and any replacements required due to damage without cost, leaving the equipment and installation in "as new" condition. The Contractor may be required to bear utility costs, user fees, etc.

- 14.2 Permission to use the permanent equipment does not relieve the Contractors who utilize this equipment from the responsibility for any damages to the building construction and/or equipment which might result because of its use.

#### PART 15 - TEMPORARY SERVICES

- 15.1 The Contractor shall arrange for temporary electrical and other services which he may require to accomplish his work. In the absence of other provisions in the contract, the Contractor shall provide for his own temporary services of all types, including the cost of connections, utility company fees, construction, removal, etc., in his bid.

#### PART 16 - RECORD DRAWINGS

- 16.1 The Contractor shall insure that any deviations from the design are being recorded daily or as necessary on record drawings being maintained by the Contractor. Dimensions from fixed, visible permanent lines or landmarks shown in vertical and horizontal ways shall be utilized. Compliance shall be a requirement for final payment. Pay particular attention to the location of underfloor or underground exterior in-contract or utility-owned or leased service lines, main switches and other appurtenances important to the maintenance and safety of the Electrical System. Deliver these record drawings to the Engineer at the completion of the work.

#### PART 17 - MATERIALS AND WORKMANSHIP

- 17.1 All electrical equipment, materials and articles incorporated in the work shall be new and of comparable quality to that specified. All workmanship shall be first-class and shall be performed by electricians skilled and regularly employed in their respective trades. The Contractor shall determine that the equipment he proposes to furnish can be brought into the building(s) and installed within the space available. All equipment shall be installed so that all parts are readily accessible for inspection, maintenance, replacement, etc. Extra compensation will not be allowed for relocation of equipment for accessibility or for dismantling equipment to obtain entrance into the building(s).
- 17.2 All conduit and/or conductors shall be concealed in or below walls, floors or above ceilings unless otherwise noted. All fixtures, devices and wiring required shall be installed to make up complete systems as indicated on the drawings and specified herein.
- 17.3 All materials, where applicable, shall bear Underwriters' Laboratories label or that of another Engineer-approved testing agency, where such a standard has been established.
- 17.4 Each length of conduit, wireway, duct, conductor, cable, fitting, fixture and device used in the electrical systems shall be stamped or indelibly marked with the makers mark or name.
- 17.5 All electrical equipment shall bear the manufacturer's name and address and shall indicate its electrical capacity and characteristics.
- 17.6 All electrical materials, equipment and appliances shall conform to the latest standards of the National Electric Manufacturers Association (NEMA) and the National Board of Fire Underwriters (NBFU) and shall be approved by the Owner's insuring agency if so required.

#### PART 18 - QUALIFICATIONS OF WORKMEN



- 18.1 All electrical contractors bidding this project must have been a licensed company for a minimum of three years to qualify to bid this project. Individual employee experience does not supercede this requirement.
- 18.2 All subcontractors bidding the electrical work must have completed one project of 70% this subcontract cost size and two projects of 50% this subcontract cost size.
- 18.3 All electrical work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. Untrained and incompetent workmen as evidenced by their workmanship shall be relieved of their responsibilities in those areas. The Engineer shall reserve the right to determine the quality of workmanship of any workman and unqualified or incompetent workmen shall refrain from work in areas not satisfactory to him. Requests for relief of a workman shall be made through the normal channels of responsibility established by the Architect or the contract document provisions.
- 18.4 All electrical work shall be accomplished by Journeymen electricians under the direct supervision of a licensed Electrician. All applicable codes, utility company regulations, laws and permitting authority of the locality shall be fully complied with by the Contractor.

#### PART 19 - CONDUCT OF WORKMEN

- 19.1 The Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workmen to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. The consumption or influence of alcoholic beverages, narcotics or illegally used controlled substances on the jobsite is strictly forbidden.

#### PART 20 - COOPERATION AND COORDINATION BETWEEN TRADES

- 20.1 The Contractor is expressly directed to read the General Conditions and all detailed sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural, Mechanical, Structural and other pertinent Drawings, to the end that complete coordination between trades will be effected.
- 20.2 Refer to Coordination Among Trades, Systems Interfacing and Connection of Equipment Furnished by Others section of these Specifications for further coordination requirements.

#### PART 21 - PROTECTION OF EQUIPMENT

- 21.1 The Contractor shall be entirely responsible for all material and equipment furnished by him in connection with his work and special care shall be taken to properly protect all parts thereof from damage during the construction period. Such protection shall be by a means acceptable to the Engineer. All rough-in conduit shall be properly plugged or capped during construction in a manner approved by the Engineer. Equipment damaged while stored on site either before or after installation shall be repaired or replaced (as determined by the Engineer) by the responsible Contractor.

#### PART 22 - SMOKE AND FIRE PROOFING

- 22.1 The Contractor shall not penetrate rated fire walls, ceilings or floors with conduit, cable, bus duct, wireway or other raceway system unless all penetrations are protected in a code compliant manner which maintains the rating of the assembly. Smoke and fire stop all openings made in walls, chases, ceiling and floors. Patch all openings around conduit, wireway, bus duct, etc., with appropriate

type material to smoke stop walls and provide needed fire rating at fire walls, ceilings and floors. Smoke and fire proofing materials and method of application shall be approved by the local authority having jurisdiction.

- 22.2 Contractor to provide heat detectors in the area of construction with complete fire detection until fire alarm system is operational and construction is complete.

#### PART 23 - QUIET OPERATION, SUPPORTS, VIBRATION AND OSCILLATION

- 23.1 All work shall operate under all conditions of load without any objectionable sound or vibration, the performance of which shall be determined by the Engineer. Noise from moving machinery or vibration noticeable outside of room in which it is installed, or annoyingly noticeable noise or vibration inside such room, will be considered objectionable. Sound or vibration conditions considered objectionable by the Engineer shall be corrected in an approved manner by the Contractor (or Contractors responsible) at his expense.
- 23.2 All equipment subject to vibration and/or oscillation shall be mounted on vibration supports suitable for the purpose of minimizing noise and vibration transmission, and shall be isolated from external connections such as piping, ducts, etc., by means of flexible connectors, vibration absorbers or other approved means. Surface mounted equipment such as panels, switches, etc., shall be affixed tightly to their mounting surface.
- 23.3 The Contractor shall provide supports for all equipment furnished by him using an approved vibration isolating type as needed. Supports shall be liberally sized and adequate to carry the load of the equipment and the loads of attached equipment, piping, etc. All equipment shall be securely fastened to the structure either directly or indirectly through supporting members by means of bolts or equally effective means. No work shall depend on the supports or work of unrelated trades unless specifically authorized in writing by the Architect or Engineer.

#### PART 24 - FINAL CONNECTIONS TO EQUIPMENT

- 24.1 The roughing-in and final connections to all electrically operated equipment furnished under this and all other sections of the contract documents or by others, shall be included in the Contract and shall consist of furnishing all labor and materials for connection. The Contractor shall carefully coordinate with equipment suppliers, manufacturer's representatives, the vendor or other trades to provide complete electrical and dimensional interface to all such equipment (kitchen, hoods, mechanical equipment, panels, refrigeration equipment, etc.).

#### PART 25 – NOT USED

#### PART 26 - ACCESSIBILITY

- 26.1 The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in partitions and above suspended ceilings for the proper installation of his work. He shall cooperate with the General Contractor (or Construction Manager) and all other Contractors whose work is in the same space, and shall advise each Contractor of his requirements. Such spaces and clearances shall be kept to the minimum size required to ensure adequate clearance and access.
- 26.2 The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to junction boxes, pull boxes, contactors, panels, disconnects, controllers, switchgear, etc. Minor deviations from drawings may be

made to allow for better accessibility, and any change shall be approved where the equipment is concealed.

26.3 Each Contractor shall provide (or arrange for the provision by other trades) the access panels for each concealed junction box, pull box, fixtures or electrical device requiring access or service as shown on Engineer's plans or as required. Locations of these panels shall be identified in sufficient time to be installed in the normal course of work. All access panels shall be installed in accord with the Architect's standards for such work.

26.4 Access Doors; in Ceilings or Walls:

In mechanical, electrical, or service spaces:

14 gauge aluminum brushed satin finish, 1" border.

In finished areas:

14 gauge primed steel with 1" border to accept the architectural finishes specified for the space. Confirm these provisions with the Architect prior to obtaining materials or installing any such work.

In fire or smoke rated partitions, access doors shall be provided that equal or exceed the required rating of the construction they are mounted in.

#### PART 27 - ELECTRICAL CONNECTIONS

27.1 The Contractor shall furnish and install all power wiring complete from power source to motor or equipment junction box, including power wiring through starters. The Contractor shall install all starters not factory mounted on equipment. Unless otherwise noted, the supplier of equipment shall furnish starters with the equipment. Also refer to Division 15 of Specifications, shop drawings and equipment schedules for additional information.

27.2 All control, interlock, sensor, thermocouple and other wiring required for equipment operation shall be provided by the Contractor. All such installations shall be fully compliant with all requirements of Division 16 regardless of which trade actually installs such wiring. Motors and equipment shall be provided for current and voltage characteristics as indicated or required. All wiring shall be enclosed in raceways unless otherwise noted.

27.3 Each Contractor or sub-contractor, prior to bidding the work, shall coordinate power, control, sensor, interlock and all other wiring requirements for equipment or motors with all other contractors or sub-contractors, to ensure all needed wiring is provided in the Contract. Failure to make such coordination shall not be justification for claims of extra cost or a time extension to the Contract.

#### PART 28 - MOTORS

28.1 Each motor shall be provided by the equipment supplier, installer or manufacturer with conduit terminal box and N.E.C. required disconnecting means as indicated or required. Three-phase motors shall be provided with external thermal overload protection in their starter units. Single-phase motors shall be provided with thermal overload protection, integral to their windings or external, in control unit. All motors shall be installed with NEMA-rated starters as specified and shall be connected per the National Electrical Code.

28.2 The capacity of each motor shall be sufficient to operate associated driven devices under all conditions of operation and load and without overload, and at least of the horsepower indicated or speci-

fied. Each motor shall be selected for quiet operation, maximum efficiency and lowest starting KVA per horsepower as applicable. Motors producing excessive noise or vibration shall be replaced by the responsible contractor. See Division 15 of Specifications for further requirements and scheduled sizes.

#### PART 29 - CUTTING AND PATCHING

- 29.1 Unless otherwise indicated or specified, the Contractor shall provide cutting and patching necessary to install the work specified in this Division. Patching shall match adjacent surfaces to the satisfaction of the Engineer and shall be in accord with the Architect's standards for such work, as applicable.
- 29.2 No structural members shall be cut without the approval of the Structural Engineer and all such cutting shall be done in a manner directed by him.

#### PART 30 - SLEEVES AND PLATES

- 30.1 Each Contractor shall provide and locate all sleeves and inserts required for his work before the floors and walls are built, or shall be responsible for the cost of cutting and patching required where sleeves and inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers. Drilling of anchor holes may be prohibited in post-tensioned concrete construction, in which case the Contractor shall request approved methods from the Architect and shall carefully coordinate setting of inserts, etc., with the Structural Engineer and/or Architect.
- 30.2 Sleeves shall be provided for all electrical conduit passing thru concrete floor slabs and concrete, masonry, tile and gypsum wall construction. Sleeves shall not be provided for piping running embedded in concrete or insulating concrete slabs on grade, unless otherwise noted.
- 30.3 Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be packed with oakum and lead, mechanical waterstop or other approved material and made completely water tight by a method approved by the Engineer and/or Architect.
- 30.4 Where conduit motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Check floor and wall construction finishes to determine proper length of sleeves for various locations; make actual lengths to suit the following:
- 30.4.1 Terminate sleeves flush with walls, partitions and ceiling.
- 30.4.2 In areas where pipes are concealed, as in chases, terminate sleeves flush with floor.
- 30.4.3 In all areas where pipes are exposed, extend sleeves 1/2 inch above finished floor, except in rooms having floor drains, where sleeves shall be extended 3/4 inches above floor.
- 30.5 Sleeves shall be constructed of 24 gauge galvanized sheet steel with lock seam joints for all sleeves set in concrete floor slabs terminating flush with the floor. All other sleeves shall be constructed of galvanized steel pipe unless otherwise indicated on the drawings.
- 30.6 Fasten sleeves securely in floors, walls, so that they will not become displaced when concrete is poured or when other construction occurs around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeve during construction. Fire and smoke stop all sleeves in a manner approved by the local authority having jurisdiction or per prevailing codes.

#### PART 31 - WEATHERPROOFING

- 31.1 Where any work pierces waterproofing, including waterproof concrete, the method of installation shall be as approved by the Architect and/or Engineer before work is done. The Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings absolutely watertight.
- 31.2 Wherever work penetrates roofing, it shall be done in a manner that will not diminish or void the roofing guarantee or warranty in any way. Coordinate all such work with the roofing installer.

#### PART 32 - OPERATING INSTRUCTIONS

- 32.1 Upon completion of all work and all tests, each Contractor shall furnish the necessary skilled labor and helpers for operating his systems and equipment for a period of three days of eight hours each, or as otherwise specified. During this period, instruct the Owner or his representative fully in the operations, adjustment, and maintenance of all equipment furnished. Give at least one week's written notice to the Owner, Architect and Engineer in advance of this period. The Engineer may attend any such training sessions or operational demonstrations. The Contractor shall certify in writing to the Engineer that such demonstrations have taken place, noting the date, time and names of the Owner's representative that were present.
- 32.2 Each Contractor shall furnish three complete bound sets for approval to the Engineer of typewritten and/or blueprinted instructions for operating and maintaining all systems and equipment included in this contract. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.
- 32.3 Each Contractor, in the above mentioned instructions, shall include the maintenance schedule for the principal items of equipment furnished under this contract and a detailed, easy to read parts list and the name and address of the nearest source of supply.

#### PART 33 - SCAFFOLDING, RIGGING AND HOISTING

- 33.1 The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

#### PART 34 - CLEANING

- 34.1 The Contractor shall, at all times, keep the area of his work presentable to the public and clean of rubbish caused by his operations; and at the completion of the work, shall remove all rubbish, all of his tools, equipment, temporary work and surplus materials, from and about the premises, and shall leave the work clean and ready for use. If the Contractor does not attend to such cleaning immediately upon request, the Engineer may cause cleaning to be done by others and charge the cost of same to the responsible Contractor. Each Contractor shall be responsible or all damage from fire which originates in, or is propagated by, accumulations of his rubbish or debris.
- 34.2 After completion of all work and before final acceptance of the work, each Contractor shall thoroughly clean all equipment and materials and shall remove all foreign matter such as grease, dirt, plaster, labels, stickers, etc., from the exterior of materials, equipment and all associated fabrication. Pay particular attention to finished area surfaces such as lighting fixture lenses, lamps, reflectors, panels, etc.

#### PART 35 - PAINTING

- 35.1 Each fixture device, panel, junction box, etc., that is located in a finished area shall be provided with finish of color and type as selected or approved by the Architect or Engineer. If custom color is required, it shall be provided at no additional cost to the Owner. All other equipment, fixtures or devices located in finished or unfinished areas, that are not required to have or are provided with finish color or coating shall be provided in a prime painted condition, ready to receive finish paint or coating. All galvanized metal in finished areas shall be properly prepared with special processes to receive finish paint as directed and approved by the Architect.

#### PART 36 - INDEMNIFICATION

- 36.1 The Contractor shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expense and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, any subcontractor, any employee, agent or representative.

#### PART 37 - HAZARDOUS MATERIALS

- 37.1 The Contractor is hereby advised that it is possible that asbestos and/or other hazardous materials are or were present in this building(s). Any worker, occupant, visitor, inspector, etc., who encounters any material of whose content they are not certain shall promptly report the existence and location of that material to the Contractor and/or Owner. The Contractor shall, as a part of his work, insure that his workers are aware of this potential and what they are to do in the event of suspicion. He shall also keep uninformed persons from the premises during construction. Furthermore, the Contractor shall insure that no one comes near to or in contact with any such material or fumes therefrom until its content can be ascertained to be non-hazardous.
- 37.2 CMTA, Inc., Consulting Engineers, have no expertise in the determination of the presence of hazardous materials. Therefore, no attempt has been made by them to identify the existence or location of any such material. Furthermore, CMTA nor any affiliate thereof will neither offer nor make any recommendations relative to the removal, handling or disposal of such material.
- 37.3 If the work interfaces, connects or relates in any way with or to existing components which contain or bear any hazardous material, asbestos being one, then, it shall be the Contractor's sole responsibility to contact the Owner and so advise him immediately.
- 37.4 The Contractor by execution of the contract for any work and/or by the accomplishment of any work thereby agrees to bring no claim relative to hazardous materials for negligence, breach of contract, indemnity, or any other such item against CMTA, its principals, employees, agents or consultants. Also, the Contractor further agrees to defend, indemnify and hold CMTA, its principals, employees, agents and consultants, harmless from any such related claims which may be brought by any subcontractors, suppliers or any other third parties.

#### PART 38 – ABOVE-CEILING AND FINAL PUNCH LISTS

- 38.1 The Contractor shall review each area and prepare a punch list for each of the subcontractors, as applicable, for at least two stages of the project.
- 38.1.1 For review of the above-ceiling work that will be concealed by tile or other materials well before substantial completion.

- 38.1.2 For review of all other work as the project nears substantial completion.
- 38.2 When all work from the Contractor's punch list is complete at each of these stages and prior to completing ceiling installations (or at the final punch list stage), the Contractor shall request that the Engineer develop a punch list. This request is to be made in writing seven days prior to the proposed date. After all corrections have been made from the Engineer's punch list, the Contractor shall review and initial off on each item. This signed-off punch list and all work prior to the ceilings being installed and at the final punch list review.
- 38.3 If additional visits are required by the Engineer to review work not completed by this review, the Engineer shall be reimbursed directly by the Contractor by check or money order (due net 10 days from date of each additional visit) at a rate of \$125.00 per hour for extra trips required to complete either of the above-ceiling or final punch lists.

**END OF SECTION**

## SECTION 26 05 02

### SCOPE OF THE ELECTRICAL WORK

#### PART 1 - GENERAL

- 1.1 Each Electrical Contractor's attention is directed to Section 260501 - General Provisions, Electrical, and all other Contract Documents as they apply to his work.
- 1.2 Refer to the front-end documents for Electrical and Integrated Technology Form of Proposal. Any discrepancies between Sections are to be forwarded to the purchasing agent, architect, and engineer for consideration.

#### PART 2 - SCOPE OF THE ELECTRICAL WORK

- 2.1 The Electrical work for this project includes all labor, materials, equipment, fixtures, and related items required to completely demolish, install, test, place in service and deliver to the Owner complete electrical systems to the revitalized elevator and elevator machine room in accordance with the accompanying plans and all provisions of these specifications. This work shall primarily include, but is not limited to the following:
  - 2.1.1 Selective demolition of existing electrical systems, light fixtures and mechanical equipment connections in the basement.
  - 2.1.2 All conduits, conductors, outlet boxes, fittings, etc. (NOTE: Conduit is to be colored per UK Standards – Reference Section 260533).
  - 2.1.3 Switchgear, distribution panels, disconnect switches, fuses, starters, etc.
  - 2.1.4 Replacement of existing breakers and rework of existing distribution and branch panels
  - 2.1.5 Fault Current Coordination Study and recertification of panels with labels.
  - 2.1.6 Replacement of existing light fixtures with new LED type.
  - 2.1.7 Electrical connection to all electrically operated equipment furnished and/or installed by others. This includes but is not limited to mechanical equipment and low-voltage systems.
  - 2.1.8 Inspection of electrical system by licensed Electrical Inspector.
  - 2.1.9 Functional grounding system.
  - 2.1.10 Paying all necessary fees and cost for permits, inspections, work, etc.
  - 2.1.11 Expansion of existing fire alarm system and interfacing to new detection and annunciation devices as required per NFPA. Includes new supply and return duct detectors for each new air handler.
  - 2.1.12 Telecommunication connection (including all cabling, terminations, faceplates, patch cords, and coordination with UK CNS) for HVAC control panel(s). All telecommunication system work is to comply with UK CNS Standards (available at <https://www.uky.edu/cpmd/design-standards/divisions-20---29---facility-services-subgroup> )



- 2.1.13 Rework of existing fire alarm system to allow selective removal and new installation of duct detectors and all new devices on the 5<sup>th</sup> floor.
- 2.1.14 Coordination of electrical distribution layout of panels, VFD's, or disconnects to allow code required accessibility and prevent duct or piping from being located directly over equipment.

**END OF SECTION**

## SECTION 26 05 03

### SHOP DRAWINGS, LITERATURE, MANUALS, PARTS LISTS, AND SPECIAL TOOLS

#### PART 1 - SHOP DRAWINGS

- 1.1 Each Contractor shall submit to the Architect and/or Engineer, within thirty days after the date of the Contract, one set of shop drawings and/or manufacturer's descriptive literature on all equipment. Each shop drawing and/or manufacturer's descriptive literature shall have proper notation indicated on it and shall be clearly referenced so the specifications, schedules, light fixture numbers, panel names and numbers, etc., so that the Architect and/or Engineer may readily determine the particular item the Contractor proposes to furnish. All data and information scheduled, noted or specified by hand shall be noted in color red on the submittals. The Contractor shall make any corrections or changes required and shall resubmit for final review as requested. Review of such drawings, descriptive literature and/or schedules shall not relieve the Contractor from responsibility for deviation from drawings or specifications unless they have, in writing, directed the reviewer's attention to such deviations at the time of submission of drawings, literature and manuals; nor shall it relieve them from responsibility for errors or omissions of any nature in shop drawings, literature and manuals. The term "as specified" will not be accepted.
- 1.2 If the Contractor fails to comply with the requirements set forth above, the Architect and/or Engineer shall have the option of selecting any or all items listed in the specifications or on the drawings, and the Contractor will be required to provide all materials in accordance with this list.
- 1.3 Review of shop drawings by the Engineer applies only to conformance with the design concept of the project and general compliance with the information given in the contract documents. In all cases, the installing Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, for seeing that all equipment fits the available space in a satisfactory manner and that piping, electrical and all other connections are suitably located.
- 1.4 The Engineer's review of shop drawings, schedules or other required submittal data shall not relieve the Contractor from responsibility for the adaptability of the equipment or materials to the project, compliance with applicable codes, rules, regulations, information that pertains to fabrication and installation, dimensions and quantities, electrical characteristics, and coordination of the work with all other trades involved in this project.
- 1.5 No cutting, fitting, rough-in, connections, etc., shall be accomplished until reviewed equipment shop drawings are in the hands of the Contractors concerned. It shall be each Contractor's responsibility to obtain reviewed shop drawings and to make all connections, etc. in the neatest and most workmanlike manner possible. Each Contractor shall coordinate with all the other Contractors having any connections, roughing-in, etc., to the equipment, to make certain proper fit, space coordination, voltage and phase relationships are accomplished.
- 1.6 In accord with the provisions specified hereinbefore, shop drawings, descriptive literature and schedules shall be submitted on each of the following indicated items as well as any equipment or systems deemed necessary by the Engineer:

#### Power Equipment

- Panelboards.
- Circuit breakers.
- Disconnect switches.
- Light Fixtures

Systems  
-Fire Alarm

## PART 2 - SPECIAL WRENCHES, TOOLS AND KEYS

- 2.1 Each Contractor shall provide, along with the equipment provided, any special wrenches or tools necessary to dismantle or service equipment or appliances installed by him. Wrenches shall include necessary keys, handles and operators for valves, switches, breakers, etc. and keys to electrical panels, emergency generators, alarm pull boxes and panels, etc. At least two of any such special wrench, keys, etc. shall be turned over to the Architect prior to completion of the project. Obtain a receipt that this has been accomplished and forward a copy to the Engineer.

## PART 3 - FIRE ALARM SHOP DRAWINGS

- 3.1 The contractor and equipment supplier shall submit to the Architect and/or Engineer, fire alarm device shop drawings complete with catalog cuts, descriptive literature and complete system wiring diagrams for their review prior to submittal to the governing authority for their review. Contractor shall be responsible for approval of fire alarm drawings by all governing authorities as required.

## PART 4 - MAINTENANCE AND OPERATION MANUALS

- 4.1 Upon substantial completion of the project, the Electrical Contractor shall deliver, (via Constructware) to the Engineers (in addition to the required Shop Drawings) one complete copy of operation and maintenance instructions and parts lists for all equipment provided. These documents shall at least include:
- 4.1.1 Detailed operating instructions.
  - 4.1.2 Detailed maintenance instructions including preventive maintenance schedules.
  - 4.1.3 Addresses and phone numbers indicating where parts may be purchased.

**END OF SECTION**

## SECTION 26 05 04

### SLEEVING, CUTTING, PATCHING AND REPAIRING

#### PART 1 - GENERAL

- 1.1 The Contractor shall be responsible for all openings, sleeves, trenches, etc. that he may require in floors, roofs, ceilings, walls, etc. and shall coordinate all such work with the General Contractor and all other trades. He shall determine and coordinate any openings which he is to provide before submitting a bid proposal in order to avoid conflict and disagreement during construction. Improperly located openings shall be reworked at the expense of the responsible Contractor.
- 1.2 The Contractor shall plan his work ahead and shall place sleeves, frames or forms through all walls, floors and ceilings during the initial construction, where it is necessary for conduit, conductors, wireways, etc. to go through; however, when this is not done, this Contractor shall do all cutting and patching required for the installation of his work, or he shall pay other trades for doing this work when so directed by the Architect. Any damage caused to the buildings by the workmen of the responsible Contractor must be corrected or rectified by him at his own expense.
- 1.3 The Contractor shall cut holes in casework, equipment panels, etc. (if any), as required to pass pipes in and out.
- 1.4 The Contractor shall notify other trades in due time where he will require openings of chases in new concrete or masonry. He shall set all concrete inserts and sleeves for his work. Failing to do this, he shall cut openings for his work and patch same as required at his own expense.
- 1.5 Openings in slabs and walls shall be cut with core drill. Hammer devices will not be permitted. Edges of trenches and large openings shall be scribe cut with a masonry saw.
- 1.6 Cast iron sleeves shall be installed through all walls where pipe enters the building below grade. Sleeves shall be flush with each face of the wall and shall be sufficiently larger than the entering pipe to permit thorough caulking with lead and oakum between pipe and sleeve for waterproofing.
- 1.7 In all cases, sleeves shall be at least two pipe sizes larger than nominal pipe diameter.
- 1.8 Sleeves passing through roof or exterior wall or where there is a possibility of water leakage and damage shall be caulked water tight for horizontal sleeves and flashed and counter-flashed with lead (4 lb.) or copper and soldered to the piping, lapped over sleeve and properly weather sealed.
- 1.9 All rectangular or special shaped openings in plaster, stucco or similar materials including gypsum board shall be framed by means of plaster frames, casing beads, wood or metal angle members as required. The intent of this requirements is to provide smooth even termination of wall, floor and ceiling finishes as well as to provide a fastening means for lighting fixtures, panels, etc. Lintels shall be provided where indicated over all openings in bearing walls, etc.
- 1.10 No cutting is to be done at points or in a manner that will weaken the structure and unnecessary cutting must be avoided. If in doubt, contact the Architect.
- 1.11 The Contractor shall be responsible for properly shoring, bracing, supporting, etc. any existing and/or new construction to guard against cracking, settling, collapsing, displacing or weakening while openings are being made. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements, shall be promptly and properly made good to the satisfaction of the Architect.

- 1.12 All work improperly done or not done at all as required by the Electrical trades in this section will be performed by others. The cost of this work shall be paid for by the Contractor who is in non-compliance with the Contract.

**END OF SECTION**

## SECTION 26 05 05

### DEMOLITION, RESTORATION AND SALVAGE

#### PART 1 - GENERAL

- 1.1 Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division A Specification Sections to apply to work specified in this section.

#### PART 2 - DESCRIPTION OF WORK

- 2.1 This section covers all demolition, restoration and salvage required to perform the electrical work indicated on the drawings, specified and/or as required to complete the project. It is the intent of this section of work to remove all existing electrical equipment, materials, etc. which are not required for the completed building and to restore any and all finished surfaces to their original type and conditions. To accomplish these requirements, the Contractor(s) shall, at his own expense, engage the services of others already performing finish work on this project. All work shall be completed to the satisfaction of the Architect/Engineers whose decisions shall be final. This requirement shall apply to all restoration work whether indicated or specified.
- 2.2 All adjacent areas need to remain in operation and services to other areas need to be maintained during demolition.
- 2.3 Schedule all demotion and any outages affecting other areas with owner.
- 2.4 Provide and maintain temporary partitions and/or dust barrier per owners dust control plan.

#### PART 3 - ELECTRICAL

- 3.1 Where electrical fixtures, equipment or other materials are removed and/or relocated, all abandoned conduit and conductors shall be removed in exposed areas. In concealed areas removed as indicated and patch all openings.
- 3.2 The Contractor shall be responsible for the removal and/or relocation of any electrical equipment, fixtures, devices, appurtenances, etc. which may, in the course of construction, interfere with the installation of any new and/or relocated Architectural, Mechanical, Electrical, Structural or Fire Protection Systems whether indicated or not.

#### PART 4 - REPAIR

- 4.1 Unless otherwise indicated, the Contractor shall be responsible for the patching and repairing of all holes, etc. in the ceiling, wall and floors where electrical equipment is removed.

#### PART 5 – SALVAGE

- 5.1 It is the intent of this section to deliver to the Owner all components of any electrical system which may be economically reused by him. The Contractor shall make every effort to remove reusable components without damage.

#### PART 6 - LAMP DISPOSAL

- 6.1 Contractor shall be responsible for the careful removal of all lamps and fluorescent tubes without breakage from existing lighting fixtures.

- 6.2 Lamps removed from fluorescent, metal halide, mercury vapor, and sodium fixtures that do not have green end caps shall be placed by the Contractor in cardboard boxes. The Contractor shall label each box with type and quantity of lamps in each box and seal the box. Boxes shall be properly disposed of.
- 6.3 Broken, fluorescent, metal halide, mercury vapor, and sodium lamps without green end caps shall be immediately and carefully cleaned up by the Contractor and placed in a 55 gallon steel drum. The Contractor shall properly dispose of.
- 6.4 All lamps and tubes with green end caps as well as incandescent lamps shall be disposed of by the Contractor in his dumpster. Green end cap lamps and broken lamps shall not be placed in any box designated for recycling lamps.

**END OF SECTION**



## SECTION 26 05 08

### COORDINATION AMONG TRADES, SYSTEMS INTERFACING AND CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

#### PART 1 - COORDINATION

- 1.1 The Contractor is expressly directed to read the General Conditions and all sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural, Plumbing Fire Protection, Mechanical and Structural drawings, to the end that complete coordination between trades will be affected. Each Contractor shall make known to all other contractors the intended positioning of materials, raceways, supports, equipment and the intended order of his work. Coordinate all work with other trades and proceed with the installation in a manner that will not create delays for other trades or affect the Owner's operations.
- 1.2 Special attention to coordination shall be given to points where raceways, fixtures, etc., must cross other ducts or conduit, where lighting fixtures must be recessed in ceilings, and where fixtures, conduit and devices must recess into walls, soffits, columns, etc. It shall be the responsibility of each Contractor to leave the necessary room for other trades. No extra compensation or time will be allowed to cover the cost of removing fixtures, devices, conduit, ducts, etc. or equipment found encroaching on space required by others.
- 1.3 The Contractor shall be responsible for coordination with all trades to insure that they have made provision for connections, operational switches, disconnect switches, fused disconnects, etc., for electrically operated equipment provided under this or any other division of the specifications, or as called for on the drawings. Any connection, circuiting, disconnects, fuses, etc. that are required for equipment operation shall be provided as a part of this contract.
- 1.4 If any discrepancies occur between accompanying drawings and these specifications and drawings and specifications covering other trade's work, each trade shall report such discrepancies to the Architect far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of fixtures, devices, conduit, and equipment not installed or connected in accordance with the above instructions.
- 1.5 In all areas where air diffusers, devices, lighting fixtures and other ceiling-mounted devices are to be installed, the Mechanical Trade(s) and the Electrical Trade and the General Trades shall coordinate their respective construction and installations so as to provide a combined symmetrical arrangement that is acceptable to the Architect and Engineer. Where applicable, refer to reflected ceiling plans. Request layouts from the Architect or Engineer where in doubt about the potential acceptability of an installation.
- 1.6 In addition to requirements associated with Coordination Drawings and Record Drawings, the contractor shall include in their costs the time and expertise required for multiple BIM coordination meetings held by the contractor to furnish a fully integrated BIM that all designers, contractors and owners can review. This shall be conducted by the General Contractor, however, if they do not have the expertise this will be administered by the design team utilizing the 3-D Model required in the contract documents.
- 1.7 Contractor is to provide all necessary measures to ensure cleanroom remains functional and certification is not compromised.

#### PART 2 - INTERFACING

- 2.1 Each Electrical Trade, Specialty Controls Trade, Mechanical Trade and the General Trades, etc., shall insure that coordination is effected relative to interfacing of all systems. Some typical interface points are (but not necessarily all):
  - 2.1.1 Connection of all controls to equipment.
  - 2.1.2 Electrical power connections to electrically operated (or controlled) equipment.
  - 2.1.3 Electrical provisions for all equipment provided by other trades or suppliers within this contract.
  - 2.1.4 Contractor is to provide conduit whips and back boxes as needed to power systems furniture.

### PART 3 - CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

- 3.1 Each Contractor shall make all connections to equipment furnished by others, whenever such equipment is shown on any part of the drawings or mentioned in any part of the Specifications, unless otherwise specifically specified hereinafter.
- 3.2 All drawings are complementary, one trade of the other. It is the Contractor's responsibility to examine all drawings and specifications to determine the full scope of his work. The project Engineers have arranged the specifications and drawings in their given order solely as a convenience in organizing the project, and in no way shall they imply the assignment of work to specific trades, contractors, subcontractors or suppliers.
- 3.3 Supervision to assure proper installation, functioning and operation shall be provided by the Contractor furnishing the equipment or apparatus to be connected.
- 3.4 Items indicated on the drawings as rough-in only (RIO) will be connected by the equipment supplier or Owner, as indicated. The Contractor shall be responsible for rough-in provisions only as indicated. These rough-ins shall be in accord with the manufacturer's or supplier's requirements.
- 3.5 For items furnished by others, relocated, or RIO, the Contractor shall obtain from the supplier or shall field determine as appropriate, the exact rough-in locations and connection sizes for the referenced equipment.
- 3.6 The Contractor shall be responsible for coordinating with the General and all other trades, as necessary, to determine any and all final connections that he is to make to equipment furnished by others.

**END OF SECTION**

## SECTION 26 0 519

### CONDUCTORS, IDENTIFICATIONS, SPLICING DEVICES AND CONNECTORS

#### 1. GENERAL

- A. This section of the Specifications covers all of the electrical power, lighting, and control power (line voltage) conductors, but does not include communications, data or signal system conductors, which are specified separately in these specifications.
- B. All conduits installed without conductors shall have a 200 lb. test nylon string installed for future use, tied off securely at each end.
- C. No more than 40% conduit fill is permitted for any conduit system, including video, intercom, data, power or other signal circuits unless specifically indicated otherwise on the plans.
- D. Lighting circuits: No more than five conductors shall be installed in conduit except for switch legs and travelers in multi-point switching arrangements.
- E. Receptacle circuits: If multiple circuits are pulled in a single homerun, a dedicated neutral shall be provided for each phase conductor. In these cases, a maximum of seven conductors are permitted in a single conduit. Conductors shall be derated per N.E.C.
- F. Intentional or unintentional painting of exposed low voltage or line voltage cabling is prohibited. The contractor shall ensure that exposed cabling is adequately protected from direct painting or overspray whether painting is required within the electrical specifications or required by other disciplines/trades. The contractor shall review the painting requirements for all disciplines and shall provide cabling protection as required. Where exposed cabling is being installed in exposed ceiling or wall spaces that are required to be painted, the contractor shall provide alternate options for cable colors and shall provide submittals for such cabling to engineer for approval.

#### 2. MATERIALS

##### A. CONDUCTORS

- (1) All conductors shall be 98% conductive annealed copper unless otherwise noted, UL listed and labeled.
- (2) Lighting and receptacle branch circuits shall be not less than No. 12 copper wire or of the sizes shown on the drawings with Type THW, THHN or THWN insulation. All feeder circuits shall be Type THW or THWN of the size as shown on the Contract Drawings. THHN wiring shall only be installed in overhead, dry or damp locations. THWN or THW wiring shall be used for all circuits pulled in underground or other wet locations.
- (3) Conductors No. 10 and smaller sizes of wire shall be solid. Conductors No. 8 and larger sizes shall be stranded.
- (4) Conductors for fire alarm wiring shall be stranded and in full compliance with N.E.C. 760. All fire alarm conductors shall be installed within conduit and enclosed junction boxes.

- (5) All wire on the project shall be new, in good condition, and shall be delivered in standard coils or reels.
- (6) The color of the wire shall be selected to conform with Section 210-5 of the latest edition of the National Electrical Code. Refer also to Color Coding in these specifications.
- (7) All equipment grounding conductors shall have green color insulation or if larger than #8, shall be taped for two inches, green color at every termination and pullbox access point.
- (8) Conductors used for motor connections and connections to vibrating or oscillating equipment shall be extra flexible.
- (9) Conductors for main ground from neutral bus, equipment grounding bus, building steel, grounding grid and main cold water pipe connection shall be bare copper.
- (10) All conductors shall be identified by color code and by means of labels placed on conductors in all junction boxes and at each terminal point with Brady, Ideal, T & B or approved equivalent labels indicating source, circuit No. or terminal No.
- (11) Branch wiring and feeder conductors that are greater than 100' in length shall be increased at least one size to compensate for voltage drop. All circuits shall be installed and sized for a maximum 2% voltage drop. As calculated using 80% of the supply breaker rating as the load. Adjust conductors and conduit size accordingly for actual field installed conditions.

#### B. SPLICING DEVICES & CONNECTORS

- (1) Splicing devices for use on No. 14 to No. 10 AWG conductors shall be pressure type such as T & B "STA-KON", Burndy, Reliable or approved equivalent.
- (2) Wire nuts shall be spring pressure type, insulation 600V, 105°C insulation, up to #8 size. Greater than #6 Cu shall be a compression type connection, 600V insulation, cold shrink tubing, taped to restore full insulation value of the wire being spliced.
- (3) Pressure crimp-applied ring type (or fork with upturned ends) terminations shall be employed on motor and equipment terminals where such terminals are provided on motor and equipment leads or on all stranded wire terminations using No. 10 AWG or smaller conductors.
- (4) Splices, where necessary, shall be made with hydraulically-set "Hy-press" or equivalent crimped connectors. All splices shall be insulated to the full value of the wiring insulation using a cold-shrink kit or the equivalent in built-up materials.
- (5) Large connectors (lugs) at terminals shall be mechanical type, hex-head socket or crimp-on style, installed per the manufacturer's recommendations.
- (6) Exterior underground connections made between bare ground wires or to ground rods shall be exothermically welded, "Cadweld" or equivalent.
- (7) The use of split-bolt clamps will be permitted in wireways at service entrance only. Torque to 55 foot-pounds or as recommended by manufacturer.
- (8) No aluminum conductors shall be used.

### 3. INSTALLATION

- A. The pulling of all wires and cable on this project shall be performed in strict compliance with applicable sections of the National Electrical Code. No conductor entering or leaving a cabinet or box shall be deflected in such a manner as to cause excess pressure on the conductor insulation. Conductors shall only be installed after insulating bushings are in place.
- B. The radius of bending of conductors shall be not less than eighteen times the outside diameter of the conductor insulation or more, if recommended by the manufacturer.
- C. Conductors installed within environmental air plenums shall be per N.E.C. Article 800 and other applicable codes, with FEP-type insulation or an approved equivalent. Also provide plenum-rated tie-wraps where plastic straps or other supports, etc., are installed in plenum areas.
- D. Conductors for isolated power systems shall be installed in as short a run of conduit as practicable. No pulling soap shall be used on conductors in isolated power systems.
- E. Where conductors are installed in industrial facilities, they shall be per J.I.C. standards.
- F. Maximum permissible pulling tensions, as recommended by the manufacturer for any given type of cable or wire installed shall not be exceeded. Utilize special remote readout equipment as required to ensure compliance. Use particular caution when installing twisted pair data cable or fiber optic cables -- forces permitted for pulling in are typically very low for these cable types.
- G. All cables and wiring, regardless of voltage, installed in manholes or cable vaults shall be routed in such a manner to provide a minimum of 6 feet of slack cable for future splicing. Install cables along walls by utilizing the longer route from entry to exit. If both routes are symmetrical, provide a loop of cable secured to wall. All cables shall be tied to insulated cable supports on wall-mounted racks, spaced a maximum of three feet apart.
- H. Where multiwire branch circuits are allowed the phases and neutral shall be wire-tied together in the panelboard and in all pull boxes.

### 4. COLOR CODING DISTRIBUTION VOLTAGE CONDUCTORS, 600 VOLT OR LESS

- A. Conductors to be color coded as follows:
  - (1) 120/208 Volt Conductors
    - Phase A - Black
    - Phase B - Red
    - Phase C - Blue
    - Neutral - Solid White or White with tracer stripe to match phase conductor
  - (2) Control Wiring - Red, or as indicated.
  - (3) Conductors within enclosures that may be energized when enclosure disconnect is off - yellow, or taped with 1/2" yellow tape every 6" of length, inside enclosure. Provide lamacoid plate warning sign on front of enclosure where this condition occurs.
  - (4) D.C. Wiring - Positive - Light Blue
    - Negative - Dark Blue

**END OF SECTION**

## SECTION 26 05 26

### GROUNDING AND BONDING

#### PART 1 - GENERAL

- 1.1 All metallic conduit, raceways, wireways, supports, cabinets and equipment shall be grounded in accordance with the latest issue of the National Electrical Code, as shown on the Contract Drawings and in accord with the requirements of the local authority having jurisdiction, as applicable.
- 1.2 The size of the equipment shall be not less than that given in Article No. 250 of the National Electrical Code, and/or as shown on the Contract Drawings.
- 1.3 Grounding bus and non-current carrying metallic parts of all equipment and raceway systems shall be securely grounded by connection to common ground.

#### PART 2 - MATERIALS

- 2.1 Ground wires and cables shall be of the AWG sizes shown on the Contract Drawings or shall be sized in accord with the prevailing codes. All ground wires and cables shall be copper.
- 2.2 Other bonding clamps or fittings in above ground locations shall be as manufactured by O.A. Co., T & B, Burndy, or approved equivalent.

#### PART 3 - INSTALLATION

- 3.1 All grounding conductors shall be protected from mechanical injury and shall be rigidly supported. Where ground conductors are run through flexible conduit and through panelboard switchboard or motor control center feeders, they shall be securely bonded to such conduit thru the use of grounding bushings at the entrance and exit. All connection of equipment shall be made with an approved type of solderless connection and same shall be bolted or clamped to equipment or conduit.
- 3.2 All equipment grounding conductors to lighting fixtures, devices, receptacles, electric heaters, furnace and other equipment not exceeding No. 8 AWG in size shall be green colored Type "THWN".
- 3.3 Equipment ground connections to GFI circuit breakers shall be carried and bonded to each outlet on the circuit. Provide a separate equipment grounding conductor with green color insulation.
- 3.4 Resistance to the grounding at the service entrance equipment shall be in accordance with the N.E.C. for style of construction and shall not exceed five ohms as measured by the described testing method.
- 3.5 All circuits shall have a separate grounding conductor, except as otherwise noted.
- 3.6 When grounding systems are completely installed and all grading in the area of the service grounding electrode has been completed up to finish elevations, perform a fall-of potential or other approved test to determine actual system resistance to earth. Report results to the Engineer in writing. Refer to testing provisions in this section of specifications.
- 3.7 The Contractor shall ensure that the ground return path thru building structural steel or other means is electrically continuous back to the service grounding electrode and is of adequate capacity and impedance to carry the maximum expected fault or other current. Where no electrically continuous

- steel building frame is available, the Contractor shall provide a properly sized ground bar and ground conductor routed back to the main facility ground bus.
- 3.8 Where a building's steel frame is made electrically discontinuous by masonry breaks (as at firewalls, etc.), the Contractor shall provide an accessible thermically welded bonding jumper of #500MCM copper to bond the building steel frame sections together, making the entire steel frame electrically continuous. The installation of these bonding jumpers shall be reviewed by the Engineer prior to their being covered by construction.
- 3.9 Grounding connections shall **never** be made to fire protection, natural gas, flammable gas or liquid fuel piping, except where specifically indicated on the plans.
- 3.10 Where dielectric fittings are utilized in piping systems, the piping system shall **not** be utilized as a ground path. Bonding jumpers shall not be utilized to bridge over such fittings. Piping systems shall not be utilized as ground paths except where specifically required by codes in the case of water piping.

**END OF SECTION**

## SECTION 26 05 31

### CABINETS, OUTLET BOXES AND PULL BOXES

#### PART 1 - GENERAL

- 1.1 This section of the specifications covers all electrical outlet boxes and pull boxes.
- 1.2 Continuous runs of conduit shall have pull boxes at least each eighty-five (85) feet of run, or as near as possible to that limit.
- 1.3 Comply with requirements in Division 17, Division 28.

#### PART 2 - MATERIALS & INSTALLATION

- 2.1 Outlet & Pull Boxes:
  - 2.1.1 Cabinets for lighting and power, telephone, pull boxes, outlet boxes, or any other purposes specified or shown on the Contract Drawings, shall be constructed of code gauge, galvanized steel with sides formed and corner seams riveted or welded before galvanizing. Boxes assembled with sheet metal screws will not be accepted. Pull boxes shall include all boxes used to reduce the run of conduit to the required number of feet or bends, supports, taps, troughs, and similar applications and shall also be constructed as specified above.
  - 2.1.2 All boxes for NEMA 1 and 1A application shall be provided with knockouts, as necessary, or shall be cut in the field by approved cutting tools which will provide a clean, symmetrically cut opening. All boxes, except panelboards, shall be provided with code gauge fronts with hex head or pan head screw fasteners. Fronts for panelboards shall be as specified for panelboards.
  - 2.1.3 Ceiling outlet boxes shall be galvanized steel, 4" octagonal, not less than 2 1/8" deep, with lugs or ears to secure covers, and those for use with ceiling lighting fixtures shall be fitted with 3/8" fixture studs fastened to the back of the boxes, where applicable. Provide adequate support with at least a 2 x safety factor for the anticipated fixture weight.
  - 2.1.4 Special size concealed outlet boxes for clocks, speakers, alarms, TV, etc., shall be provided by the manufacturer of the equipment.
  - 2.1.5 The location of outlets, as shown on the drawings, shall be considered as approximate only. It shall be incumbent upon this Contractor to study the general building drawings, with relation to spaces surrounding each outlet, in order to make his work fit the work of others and in order that when the devices or fixtures are installed, they will be symmetrically located and will not interfere with any other work or equipment. Any change in fixture or layout shall be coordinated with and approved by the Engineer before this change is made. Regardless of the orientation shown on the drawings, all devices shall be easily accessible when installed.
  - 2.1.6 All outlets, pull boxes, junction boxes, cabinets, etc., shall be sized per the current edition of the National Electrical Code.
- 2.2 Outlet boxes and junction or pull boxes shall be threaded for rigid-threaded conduit, dust-tight vapor-tight or weatherproof as required for areas other than for NEMA 1 or 1A application. These shall be as manufactured by Crouse-Hinds, Appleton, Killark, or approved as equivalent.
  - 2.2.1 NEMA 1 or 1A outlet boxes or pull or junction boxes shall be as manufactured by Appleton, Steel



City, T & B, or approved equivalent.

1. Outlet boxes for switches, receptacles, etc., concealed in walls shall be galvanized steel, 4 11/16" x 4 11/16" x 2 1/8" deep with plaster cover for the number of devices as required and to be flush with finished wall. Where outlet boxes are installed in walls of glazed tile, brick, concrete block, or other masonry which will not be covered with plaster or in walls covered by wood wainscot or paneling, deep sectional masonry boxes shall be used and they shall be completely covered with the plates or lighting fixtures. This Contractor shall cooperate with the brick layers, block layers and carpenters to insure that the outlet boxes are installed straight and snugly in the walls. Receptacles shall be set vertically in walls.
  2. Outlet boxes for data/telephone locations shall be no smaller than 5" x 5" x 2 7/8" with a double gang plaster ring and integral wire management, unless otherwise noted on the drawings. Randl 5-square series or equal.
- 2.2.2 Boxes for more than two devices shall be for number of devices required and shall be one piece. No ganging of single switch boxes will be allowed.
- 2.2.3 Outlets provided shall have only the holes necessary to accommodate the conduit at the point of insulation and shall be rigidly secure in position. Boxes with knockout removed and openings not used shall be replaced or provided with a listed knockout closure.
- 2.2.4 Openings for conduit entrance in cabinets and boxes shall be prefabricated, punched, drilled and/or reamed. The use of a cutting torch for this purpose is prohibited.

#### PART 3 - SPECIAL NOTICE

- 3.1 Openings for conduit entrance in cabinets and boxes shall be prefabricated, punched, drilled and/or reamed. The use of a cutting torch for this purpose is prohibited.

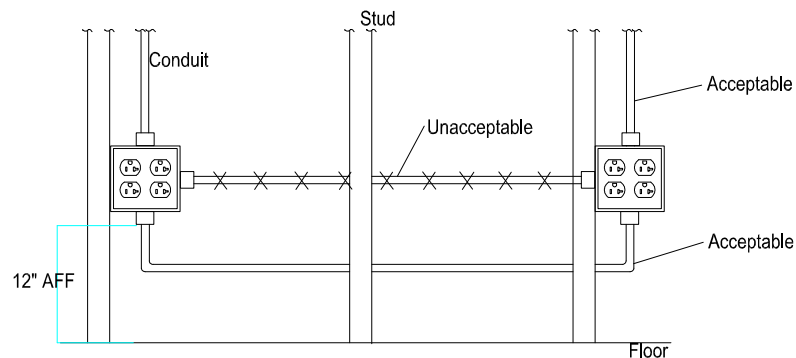
**END OF SECTION**

## SECTION 26 05 33

### RACEWAYS AND FITTINGS

#### PART 1 - GENERAL

- 1.1 This section is intended to specify the raceways, conduit, conduit fittings, hangers, junction boxes, splice boxes, specialties and related items necessary to complete the work as shown on the drawings and specified herein.
- 1.2 This section specifies basic materials and methods and is a part of each Division 16 Section that implies or refers to electrical raceways specified therein.
- 1.3 The types of raceways specified in this section include the following:
  - 1.3.1 Steel electrical metallic tubing. (E.M.T.)
  - 1.3.2 Rigid galvanized steel conduit. (G.R.S.)
  - 1.3.3 Intermediate metal conduit (I.M.C.).
  - 1.3.4 Flexible metal conduit.
- 1.4 All raceways, as listed in 1.3. above and otherwise specified herein shall be provided in compliance with UK standards.
- 1.5 Horizontal conduit shall not be installed directly from the side of one junction box to another junction box. The conduit needs to be either installed vertically to each box or from the junction box bottoms at a level lower than 12 inches AFF. See sketch



- 1.6 Conduit and raceways, as well as supporting inserts in contact with or enclosed in concrete shall comply with the latest edition of all A.C.I. standards and the equipment manufacturer's recommendations for such work.

- 1.7 The decision of the Engineer shall be final and binding in any case where a question or inquiry arises regarding the suitability of a particular installation or application of raceways, supports or materials, if other than outlined herein.
- 1.8 Minimum size of conduit shall be 3/4" trade size for power and 1" for phone / data / tv unless otherwise noted on the drawings. All conduit and raceways shall be sized for the number of conductors contained, in accord with the latest edition of the National Electrical Code or any other applicable standards.
- 1.9 The installer of raceway systems shall avoid the use of dissimilar metals within raceway installations that would result in galvanic-action corrosion.
- 1.10 Color
- Conduit in major renovations and new construction in Medical Center and campus buildings shall follow the following coloring scheme:
- Life Safety Branch – Yellow
  - Critical Branch – Orange
  - Normal Branch – White
  - Equipment Branch – Silver
  - Fire Alarm System – Red
  - Controls – Green
  - Data - Blue

## PART 2 - MATERIALS

### 2.1 STEEL ELECTRICAL METALLIC TUBING

- 2.1.1 Electrical metallic tubing, (E.M.T.) of corrosion-resistant steel construction shall be permitted for concealed installation in dry interior locations. Electrical metallic tubing shall not be installed in concrete slabs or where exposed to physical damage. Electrical metallic tubing shall be permitted for exposed work in mechanical and electrical rooms and other exposed structure areas where not subjected to physical damage, as determined by the Engineer.

### 2.2 RIGID GALVANIZED STEEL CONDUIT

- 2.2.1 Rigid galvanized steel conduit shall be used where subject to physical damage for exposed work in mechanical spaces, within factory or other industrial work areas, for exposed fit-up work on machinery, for exposed exterior damp or wet location work, in hazardous atmospheres, in exterior underground locations where installed beneath roadways, where ells occur in underground P.V.C. conduits, or where turning out of concrete encased duct banks, and at other locations as specifically called out on the drawings.

### 2.3 FLEXIBLE METAL CONDUIT

- 2.3.1 Flexible conduit may be used where permitted by NEC and these specifications. It shall be constructed of steel. It shall be installed with connectors designed for the purpose. All flexible metal conduit shall be installed as a single piece. No joints shall be installed. Flexible conduit shall not be used in wet or dusty locations or where exposed to oil, water or other damaging environments. An equipment grounding conductor or bonding jumper shall be used at all flexible conduit installa-

tions. Flexible metal conduit shall not be used in lengths over six feet. Flexible metal conduit shall not be used in telephone, fire alarm, intercom, security, and other communication systems.

## 2.4 RACEWAY FITTINGS

- 2.4.1 Raceway fittings (or condulets) shall be of gray iron, malleable iron or heavy copper-free cast aluminum. They shall be furnished in proper configurations, avoiding excessive plugged openings. Any openings that are left shall be properly plugged. All coverplates shall be gasketed with neoprene or similar approved materials, rated for the environment.
- 2.4.2 Where required, raceway fittings shall be provided in explosion-proof configurations rated for the atmosphere. Place conduit seal off fittings at each device in accord with applicable codes. Seal off fittings shall be packed with wadding, and poured with an approved non-shrink sealing compound.
- 2.4.3 Where conduit transitions in a run from a cold to a warm environment, (such as at a freezer, refrigerator or exterior wall) seal off fittings shall be placed on the warm side immediately at the boundary to prevent migration of condensation within raceway systems.
- 2.4.4 Expansion fittings shall be provided at all locations where conduits or other raceways cross over expansion joints. Provide copper ground bonding jumpers across expansion fittings.
- 2.4.5 Conduit bodies, junction boxes and fittings shall be dust tight and threaded for dusty areas, weatherproof for exterior locations and vapor tight for damp areas. Conduit fittings shall be as manufactured by Crouse Hinds, Appleton, Killark or approved equivalent. All surface mounted conduit fittings as with "FS", "FD", "GUB" Types etc., shall be provided with mounting hubs.
- 2.4.6 Where lighting fixtures, appliances or wiring devices are to be suspended from ceiling outlet boxes, they shall be provided with 3/4" rigid conduit pendants. Outlet boxes shall be malleable iron, provided with self-aligning covers with swivel ball joint and No. 14 gauge steel locking ring. Provide safety chain between building structure and ballast housing of light fixtures for all fixtures, appliances or devices greater than 10 lbs weight. Fixtures shall be installed plumb and level.
- 2.4.7 Fittings for threaded raceways shall be tapered thread with all burrs removed, reamed ends and cutting oil wiped clean.
- 2.4.8 Fittings for E.M.T. conduit shall be of the compression type on all conduits 2" and smaller. Conduit stops shall be formed in center of couplings. All EMT connectors and couplings shall be of formed steel construction. Setscrew or compression connectors may be used for 2-1/2" and larger conduit.
- 2.4.9 Indentation or die-cast fittings shall not be permitted in any raceway system.
- 2.4.10 Compression type fittings shall be utilized for EMT conduit installed in damp or dusty locations, or where otherwise indicated.
- 2.4.11 All conduit fittings shall be securely tightened. All threaded fittings shall engage seven full threads. Fasteners shall be properly torqued to manufacturer's recommendations.

## 2.5 SUPPORTS AND HANGERS

- 2.5.1 Supports and hangers shall be installed in accord with all applicable codes and standards. They shall be corrosion - resistant, galvanized or furnished with an equivalent protective coating. All electrical raceways shall be hung independently from the building structure with U.L. listed and approved materials. Hangers and supports depending from the support systems of other trades work

- shall not be permitted, except with specific approval in writing from the Engineer. The use of tie wire for support or fastening of any raceway system is prohibited. Perforated metal tape shall not be used for raceway support.
- 2.5.2 No raceway shall be installed on acoustic tile ceiling tees, or in any location that will impair the functioning, access or code-required clearances for any equipment or system.
- 2.5.3 Supports for raceways shall be of materials compatible with the raceway, of malleable iron, spring steel, stamped steel or other approved material. Die-cast fittings are not permitted for supports.
- 2.5.4 The installing contractor shall provide all necessary supports and braces for raceways, in a rigid and safe installation, complying with all applicable codes.
- 2.5.5 Individual conduits run on building walls or equipment shall be secured by one hole galvanized malleable iron or stamped steel pipe strap or "minerallac" 2-piece straps. The straps are to be anchored by an approved means such as expansion anchors, toggle bolts, through bolts, etc. Where required by codes or other standards, provide spacers behind mounting clamps to space conduits off walls.
- 2.5.6 Individual conduits run on building steel shall be secured by means of clamp supports similar and equal to those manufactured by the C.C. Korn Company, Elcen Co., B-Line or approved equivalent. Provide korn clamps, bulb tee clamps, flange clamps, beam clamps, "minerallacs", etc.
- 2.5.7 Where feasible, vertical and/or horizontal runs of conduit shall be grouped in common hangers on "trapezes" of channel stock as manufactured by "Unistrut" or equivalent, 1-5/8" minimum depth. Utilize conduit clamps appropriate to the channel.
- 2.5.8 Channel strut systems for supporting electrical equipment or raceways shall be constructed of 16 gauge minimum hot dip galvanized steel with 9/16" diameter holes on 8" centers, with finish coat of paint as manufactured by Unistrut, B-Line, Kindorf, or approved equivalent.
- 2.5.9 The minimum diameter of round all-thread steel rods used for hangers and supports shall be 1/4", 20 threads per inch. All-thread rod shall be furnished with a corrosion-resistant finish.
- 2.5.10 Welding directly on conduit or fittings is not permitted.
- 2.5.11 Provide riser support clamps for vertical conduit runs. Riser support clamps shall be of heavy gauge steel construction. Install riser support clamps at each floor level penetration, or as otherwise required.
- 2.5.12 Provide conduit cable support clamps for vertical conductor runs as required or indicated on plans. Clamps to be insulating wedging plug, with malleable iron support ring. Install within properly sized and anchored junction box.
- 2.5.13 Spring steel clips and fittings such as those manufactured by HITT-Thomas, Caddy-Erico, or approved equivalent, with black oxide finish are permitted in any indoor dry location for concealed work, where acceptable to the local authority having jurisdiction.
- 2.6 FIRESTOPPING MATERIALS
- 2.6.1 All conduits, and cables penetrating fire rated floors and walls must be firestopped. Firestopping assembly must be UL listed. All corridor walls, storage room walls and mechanical room walls are to be considered on hour fire rated. The second floor slab shall also be considered one hour rated.

- 2.6.2 Provide shop drawings indicating penetration detail for each type of wall and floor construction. Shop drawings must be specific for each individual type. (i.e., one hour fire rated gypsum wall board with insulated metal pipe penetration.)
- 2.6.3 3M fire protection products are listed below. Equivalent products may be submitted if they are UL listed.
- 2.6.4 The manufacturer of the firestopping materials must provide on site training for the contractor. The training session shall demonstrate to the contractors the proper installation techniques for all the firestopping materials. The training session shall be four hours minimum. Contact the Engineer prior to conducting this training session.
- 2.6.5 Firestopping materials to include but not limited to the following:
  - 2.6.5.1 3M fire barrier FS-195 wrap/strip.
  - 2.6.5.2 3M fire barrier CP 25 caulk.
  - 2.6.5.3 3M fire barrier MP moldable putty.
  - 2.6.5.4 3M fire barrier RC-1 restricting collar with steel hose clamp.
  - 2.6.5.5 3M fire barrier damming materials.
  - 2.6.5.6 3M fire barrier CS-195 composite sheet.
  - 2.6.5.7 3M fire barrier fire dam 150 caulk.
  - 2.6.5.8 Steel sleeves.

### PART 3 - INSTALLATION

- 3.1 Horizontal runs of conduit between outlet boxes shall not be permitted.
- 3.2 This Contractor shall lay out and install all conduit systems so as to avoid any other service or systems, the proximity of which may prove injurious to the conduit, or conductors which it confines. All conduit systems, except those otherwise specifically shown to the contrary, shall be concealed in the building construction or run above ceilings. Size of all conduit shall conform to Table No. 1, Chapter 9, of the National Electrical Code, unless otherwise shown on the Contract Drawings.
- 3.3 No conduit shall be installed in or below poured concrete slabs except with permission of the architect or engineer. Conduit shall be held at least 6" from flues or hot water pipes.
- 3.4 All exposed conduit shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of cast metal fittings or symmetrical bends unless otherwise shown. All conduit shall have supports spaced not more than eight feet apart.
- 3.5 Conduit shall be installed in such a manner so as to insure against collection of trapped condensation. All runs of conduit shall be arranged so as to be devoid of traps. Trapped conduit runs shall be provided with explosion proof drains at low points. Runs of conduit between junctions shall not have more than the equivalent of three 90° bends.
- 3.6 Junction boxes shall be installed so that conduit runs will not exceed 85', or as shown on the Contract Drawings.
- 3.7 Stub out as many spare conduits as possible via knockouts from flush-mounted panelboards into the nearest accessible area for future use. Provide suitable closures for these stubs. Identify each stub with a suitable hang tag.

- 3.8 Install electrical raceways in accordance with manufacturer's written instructions, applicable requirements of latest edition of the N.E.C., and NECA "Standard of Installation", complying with recognized industry practices.
- 3.9 Coordinate with other trades, including metal and concrete deck trades, as necessary to interface installation of electrical raceways and components.
- 3.10 Level and square raceway runs, and install at proper elevations and required heights. Hold tight to structure wherever possible, to maximize available space and not restrict other trades.

#### PART 4 - SPECIALTIES

- 4.1 All EMT terminations at junction boxes, panels, etc. shall be made with case hardened locknuts and appropriate fittings, with insulated throat liners. Insulating terminations shall be manufactured as a single unit. The use of split sleeve insulators is not permitted.
- 4.2 All rigid conduit, except main and branch feeders, shall have heavy fiber insulating bushings reinforced with double locknuts. All branch and main feeders shall have insulated bushings with grounding lugs and shall be bonded to enclosures with appropriately sized copper jumpers, except at pad mounted transformers. Bonding jumpers shall be installed as required by the N.E.C. and other applicable codes.
- 4.3 All conduit stubbed through floor during construction shall have openings protected with plastic caps approved for this purpose. Connections on both ends of all flexible conduit shall be equivalent to Thomas and Betts, Ideal, Appleton, Efcor, or approved equivalent, rated for the environment.
- 4.4 All pulling lines left in open conduit systems shall be non-metallic, left securely tied off at each end.
- 4.5 Where spare raceways terminate in switchboards or motor control centers a fishtape barrier shall be provided.

**END OF SECTION**

## SECTION 26 05 53

### IDENTIFICATIONS

#### PART 1 – GENERAL

- 1.1 Equipment, disconnect switches, special device plates, and similar materials shall be clearly marked as to their function and use. Markings shall be applied neatly and conspicuously to the front of each item of equipment with 1/2" black lamacoid plate (or equivalent) with white letters 1/4" high.
- 1.2 The Contractor shall provide clearly legible typewritten directories in each electrical panel indicating the area, item of equipment, etc. controlled by each switch, breaker, fuse, etc. These directories are to be inserted into plastic card holders in each panel.
- 1.3 Branch circuit panelboards and switch gear shall be provided with a black lamacoid plastic plate with 1/2" white letters for panel designation and 1/4" white letters showing voltage and feeder information. Branch circuit switches shall be designated as to function. Panelboard and switchgear labels shall indicate the source they are fed from, and the circuit number at that source. Clearly indicate the exact label legend to be furnished with each panelboard and switchgear on the shop drawings for each item of equipment prior to submission of shop drawings.

#### EXAMPLE:



- 1.4 Where branch circuit panelboards and switchgear are connected to an emergency source, the lamacoid plate shall be red, and the word "emergency" shall be incorporated into the legend. In health care applications, the NEC - designated branch (life safety, critical or equipment branch) shall also be incorporated into the legend, all in 1/4" letters. Also provide similar plates and legends for automatic transfer switches, as appropriate.
- 1.5 Lamacoid plates shall be located at center of top of trim for branch circuit panels, switch gear, and centered at side for branch circuit switches. Fasten with self-tapping stainless steel screws or other approved method.
- 1.6 All nomenclature on lamacoid labeling shall be per University of Kentucky Standards as shown below:
  - 1.6.1 Any label that belongs to equipment within the emergency power subsystem shall be RED with white lettering. All other labels shall be BLACK with white lettering. Additionally, all labels will have at least two lines—one designating the component name and the other designating the component's power source. In the case of a component with multiple feeds, there shall be separate line for each power source component name.
  - 1.6.2 UK PPDMC Equipment Naming Convention:



**Format:**

The components will be labeled using the following format:

ID: Building/Floor/Room/System/Subsystem/Component

Fed from: Building/Floor/Room/System/Subsystem/Component/

Each field has a specified number of characters and is defined as follows:

*Building* (4 numeric characters) => the building number, as defined by the university, in which the system is in.

*Floor* (2 characters) => the floor on which the component is located; use "0G" for the ground floor and "SB" for the sub-basement.

*Room* (up to 5 capitalized characters) => the room in which the component is located; if component is in a corridor use "CORR".

*System* (up to 3 capitalized characters) => the system to which the component belongs (in this case it will be EDS for electrical distribution system).

*Subsystem* (up to 3 capitalized characters) => the subsystem to which the component belongs (in this case it will be Normal (N) or Emergency (E)).

*Component* (up to 5 capitalized alpha and/or numeric characters) => the component sequence number given to the component to distinguish it from other components in the system.

**Examples:**

A typical distribution panel on the second floor of the main hospital in room H-201 might be labeled 0293/02/H201/EDS/N/P-1.

A motor control center in the penthouse of the Combs building might be labeled 0096/04/PH/EDS/N/MCC-1.

A breaker on the main switchboard in N-19 might be labeled as 0293/07/PH/EDS/N/MCC2 for the load designation and 0293/0G/N19/EDS/N/SWBD3/BKR-3 for the source designation.

NOTE: The component identification number, or sequence number, is just a simple numbering of similar equipment on the same floor numbered from left to right as seen on the electrical distribution riser diagram provided by the architects. Therefore, it is important to note the building and floor when referring to a component to determine its location. If the components to be labeled are existing equipment or new equipment in an existing building, the component sequence number should be obtained from the appropriate electrical systems supervisor. If the equipment is being installed as part of a new building construction project, then the contractor may determine the sequence numbers.

16.4.1

Equipment Description	Equipment Name
Air Conditioning Units	ACU-x
Air Handler Units	AHU-x
Backflow Preventor	BFP-x

Chilled Water Pump	CHW/PMP-x
Chillers	CHL-x
Compactor	CPT-x
Condensate Pump	CND/PMP-x
Control Air Compressor	CA/CMP-x
Conveyor	CNV-x
Critical Branch Automatic Transfer Switch	C/ATS-x
Critical Branch Distribution Panel	C/DP-x
Critical Branch Motor Control Ctr	C/MCC-x
Critical Branch Panel	C/P-x
Critical Branch Switchboard	C/SWBD-x
Critical Branch Switchgear	C/SWGR-x
Critical Branch Transformer	C/T-x
Domestic Cold Water Pump	DCW/PMP-x
Domestic Hot Water Pump	DHW/PMP-x
Dumb Waiters	DUM-x
Elevators	ELEV-x
Emergency Automatic Transfer Switch	E/ATS-x
Emergency Distribution Panel	E/DP-x
Emergency Generator	EG-x
Emergency Motor Control Ctr	E/MCC-x
Emergency Panel	E/P-x
Emergency Switchboard	E/SWBD-x
Emergency Switchgear	E/SWGR-x
Emergency Transformer	E/T-x
Exhaust Fans	EXF-x
Fan Coil Unit	FCU-x
Fire Pump	SPR/PMP-x
Heat Exchanger	HTX-x
Hot Water Heater	HWH-x
Laboratory Air Compressor	LA/CMP-x
Laboratory Vacuum Pump	LV/PMP-x
Life Safety Automatic Transfer Switch	LS/ATS-x
Life Safety Distribution Panel	LS/DP-x
Life Safety Panel	LS/P-x
Life Safety Switchboard	LS/SWBD-x
Life Safety Switchgear	LS/SWGR-x
Life Safety Transformer	LS/T-x
Medical Air Compressor	AIR/CMP-x
Medical Vacuum Pump	VAC/PMP-x
Normal Power Automatic Transfer Switch	N/ATS-x

Normal Power Distribution Panel	N/DP-x
Normal Power Motor Control Ctr	N/MCC-x
Normal Power Panel	N/P-x
Normal Power Switchboard	N/SWBD-x
Normal Power Switchgear	N/SWGR-x
Normal Power Transformer	N/T-x
Reheat Pump	RHT/PMP-x
Tube System Transfer Station	TUBE/STN-x
Variable Speed Drive	VSD-x

END OF SECTION

## SECTION 26 05 73

### ELETRICAL STUDIES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes computer-based, fault-current .arc flash and overcurrent protective device coordination studies. Protective devices shall be set based on results of the protective device coordination study.
- B. Product Data: For computer software program to be used for studies.
- C. Product Certificates: For coordination-study and fault-current-study computer software programs, certifying compliance with IEEE 399.
- D. Qualification Data: For coordination-study specialist.
- E. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals shall be in digital form.
  - 1. Coordination-study input data, including completed computer program input data sheets.
  - 2. Study and Equipment Evaluation Reports.
  - 3. Coordination-Study Report.
- F. Electrical Studies shall be performed by the Low-Voltage Switchboard manufacturer. All Electrical Studies required by this specification shall be completed within five (5) weeks from award of project. The Electrical Contractor shall provide all required data to Low-Voltage Switchboard manufacturer within one (1) week and the manufacturer will have four (4) weeks to complete the studies.
- G. A licensed professional engineer employee of the Low-Voltage Switchboard manufacturer shall provide electrical power system studies for the project using the latest version of one of the approved software packages. The software model files shall be submitted with the report. The analysis shall follow the latest IEEE 1584 guidelines. An example report will be provided by the university upon request.
- H. Studies specified herein must be submitted and approved prior to release of any affected equipment. Revisions to equipment or devices necessary to meet study recommendations shall be at the Manufacturer's expense.
- I. All adjustments and settings recommended by these studies shall be made prior to any testing.
- J. The analysis shall be submitted to the engineer of record prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing

##### 1.3 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.

- B. Coordination-Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
  - 1. Professional engineer, licensed in the state where Project is located, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of engineer.
- C. Comply with IEEE 242 for short-circuit currents and coordination time intervals.

#### 1.4 SUBMITTALS

##### 1.1 SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Product Certificates: For coordination-study and fault-current-study computer software programs, certifying compliance with IEEE 399.
- C. Qualification Data: For coordination-study specialist.
- D. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals shall be in digital form.
  - 1. Coordination-study input data, including completed computer program input data sheets.
  - 2. Study and Equipment Evaluation Reports.
  - 3. Coordination-Study Report.
- E. Owners Record Copy: The as-built software model and all electronic files are to be provided to the owner at project closeout. Electronic files are to be compatible with the latest version of SKM software. The owner shall receive rights to use and/or modify the electronic files and data for operations planning, maintenance and modification of their electrical system.

#### 1.5 COMMISSIONING

- A. This section specifies a system or a component of a system being commissioned as defined in Section 01 9100 Commissioning. Testing of these systems is required, in cooperation with the Owner and the Commissioning Authority. Refer to Section 01 9100 Commissioning for detailed commissioning requirements.

## PART 2 - PRODUCTS

### 2.1 COMPUTER SOFTWARE DEVELOPERS

- A. Computer Software Developers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CGI CYME.
  - 2. EDSA Micro Corporation.
  - 3. ESA Inc.
  - 4. Operation Technology, Inc.
  - 5. SKM Systems Analysis, Inc.

### 2.2 COMPUTER SOFTWARE PROGRAM REQUIREMENTS

- A. Comply with IEEE 399.
- B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

- C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance.

### **3.2 POWER SYSTEM DATA**

- A. Gather and tabulate the following input data to support coordination study:
  - 1. Product Data for overcurrent protective devices specified in other Division 26 Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
  - 2. Impedance of utility service entrance.
  - 3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:
    - a. Circuit-breaker and fuse-current ratings and types.
    - b. Relays and associated power and current transformer ratings and ratios.
    - c. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.
    - d. Generator kilovolt amperes, size, voltage, and source impedance.
    - e. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.
    - f. Busway ampacity and impedance.
    - g. Motor horsepower and code letter designation according to NEMA MG 1.
  - 4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
    - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    - d. Generator thermal-damage curve.
    - e. Ratings, types, and settings of utility company's overcurrent protective devices.
    - f. Special overcurrent protective device settings or types stipulated by utility company.
    - g. Time-current-characteristic curves of devices indicated to be coordinated.
    - h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    - i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    - j. Panelboards, switchboards, motor-control center ampacity, and interrupting rating in amperes rms symmetrical.

### 3.3 FAULT-CURRENT STUDY

- A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a current immediately after initiation and for a three-phase bolted short circuit at each of the following:
  - 1. Switchgear and switchboard bus
  - 2. Medium-voltage switch and transformers
  - 3. Distribution panelboard
  - 4. Branch circuit panelboard
- B. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Include studies of system-switching configurations and alternate operations that could result in maximum fault conditions.
- C. Calculate momentary and interrupting duties on the basis of maximum available fault current.
- D. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 241 and IEEE 242.
  - 1. Transformers:
    - a. ANSI C57.12.10
    - b. ANSI C57.12.22
    - c. ANSI C57.12.40
    - d. IEEE C57.12.00
    - e. IEEE C57.96
  - 2. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
  - 3. Low-Voltage Fuses: IEEE C37.46.
- E. Study Report:
  - 1. Show calculated X/R ratios and equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.
- F. Equipment Evaluation Report:
  - 1. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
  - 2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
  - 3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

### 3.4 COORDINATION STUDY

- A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.
  - 1. Calculate the maximum and minimum 1/2-cycle short-circuit currents.
  - 2. Calculate the maximum and minimum interrupting duty (5 cycles to 2 seconds) short-circuit currents.
  - 3. Calculate the maximum and minimum ground-fault currents.
- B. Comply with IEEE 242 recommendations for fault currents and time intervals.
- C. Transformer Primary Overcurrent Protective Devices:
  - 1. Device shall not operate in response to the following:
    - a. Inrush current when first energized.
    - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.

- c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.
    2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.
  - D. Motors served by voltages more than 600 V shall be protected according to IEEE 620.
  - E. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
  - F. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:
    1. Tabular Format of Settings Selected for Overcurrent Protective Devices:
      - a. Device tag.
      - b. Relay-current transformer ratios; and tap, time-dial, and instantaneous-pickup values.
      - c. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.
      - d. Fuse-current rating and type.
      - e. Ground-fault relay-pickup and time-delay settings.
    2. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:
      - a. Device tag.
      - b. Voltage and current ratio for curves.
      - c. Three-phase and single-phase damage points for each transformer.
      - d. No damage, melting, and clearing curves for fuses.
      - e. Cable damage curves.
      - f. Transformer inrush points.
      - g. Maximum fault-current cutoff point.
  - G. Completed data sheets for setting of overcurrent protective devices.
- 3.5 ARC FLASH HAZARD ANALYSIS
- A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2004, Annex D.
  - B. The flash protection boundary and the incident energy shall be calculated at all significant locations in the electrical distribution system. This includes all switchboards, switchgear, motor-control centers, panelboards, busway and splitters.
  - C. Safe working distances shall be based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm<sup>2</sup>.
  - D. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not taken into consideration when determining the clearing time when performing incident energy calculations.



- E. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment locations. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for all normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum and will assume a minimum motor contribution (all motors off). Conversely, the maximum calculation will assume a maximum contribution from the utility and will assume the maximum amount of motors to be operating. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable.
- F. The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators should be decremented as follows:
  - 1. Fault contribution from induction motors should not be considered beyond 3-5 cycles.
  - 2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g. contributions from permanent magnet generators will typically decay from 10 per unit to 3 per unit after 10 cycles).
- G. For each equipment location with a separately enclosed main device (where there is adequate separation between the line side terminals of the main protective device and the work location), calculations for incident energy and flash protection boundary shall include both the line and load side of the main breaker.
- H. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.
- I. Mis-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.
- J. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. Maximum clearing time will be capped at 2 seconds based on IEEE 1584-2002 section B.1.2. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.
- K. Incident energy and flash protection boundary calculations
  - 1. Arcing fault magnitude
  - 2. Protective device clearing time
  - 3. Duration of arc
  - 4. Arc flash boundary
  - 5. Working distance
  - 6. Incident energy
  - 7. Hazard Risk Category
  - 8. Recommendation for arc flash energy reduction

### 3.6 ARC FLASH WARNING LABELS

- A. The contractor of the Arc Flash Hazard Analysis shall provide a 3.5 in. x 5 in. thermal transfer type label of high adhesion polyester for each work location analyzed.
- B. After labels will be based on recommended overcurrent device settings and will be provided after the results of the analysis have been presented to the owner and after any system changes, upgrades or modifications have been incorporated in the system.
- C. The label shall include the following information, at a minimum:
  - 1. Location designation

2. Nominal voltage
3. Flash protection boundary
4. Hazard risk category
5. Incident energy
6. Working distance
7. Engineering report number, revision number and issue date.

D. Labels shall be machine printed, with no field markings.

E. Arc flash labels shall be provided in the following manner and all labels shall be based on recommended overcurrent device settings.

1. For each 600, 480 and applicable 208 volt panelboard, one arc flash label shall be provided.
2. For each motor control center, one arc flash label shall be provided.
3. For each low voltage switchboard, one arc flash label shall be provided.
4. For each switchgear, one flash label shall be provided.
5. For medium voltage switches, one arc flash label shall be provided.

### 3.7 FUNCTIONAL PERFORMANCE TESTS

A. System functional performance testing is part of the Commissioning Process as specified in Section 019100. Functional performance testing shall be performed by the contractor and witnessed and documented by the Commissioning Authority.

**END OF SECTION**

## SECTION 26 08 00

### COMMISSIONING OF ELECTRICAL SYSTEM

To be bid under separate contract. Commissioning Agent will work directly with Morgan County Public Schools.

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. General Commissioning Requirements specs in Mechanical Section.

##### 1.2 SUMMARY

- A. Section includes commissioning process requirements for Lighting Control systems, assemblies, and equipment.
- B. Related Sections:
  - 1. General Commissioning Requirements specs in the Mechanical section for general commissioning process requirements.
  - 2. Commissioning of HVAC specs in the Mechanical section.

##### 1.3 ELECTRICAL SYSTEMS COMMISSIONED

- A. Lighting controls ceiling mounted occupancy sensors, associated low voltage switching, and associated relays, etc., - 20% of group of devices
- B. Lighting controls combination switch/occupancy – 20% of all devices
- C. Lighting controls ceiling mounted daylight sensors and associated relays, etc., – 30% of group of devices
- D. Entire lighting control system for the following spaces: Exterior, High School Gym, Auxiliary Gym, Media Center, and Auditorium.
- E. Lighting control system software – 100%
- F. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.
- G. Emergency Generator system and components: generator, transfer switches, control panel.

#### 1.4 ELECTRICAL CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests at the direction of the Commissioning Agent.
- B. Attend construction phase controls coordination meeting.
- C. Attend testing, adjusting, and balancing review and coordination meeting.
- D. Participate in Electrical systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- E. Provide information requested by the CxA for final commissioning documentation.
- F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.
- G. Develop system specific pre-functional checklist based on preliminary checklist furnished by the CxA in conjunction with manufacturer start-up requirements.

#### 1.5 COMMISSIONING AGENTS RESPONSIBILITIES

- A. Provide Project-specific construction checklists and commissioning process test procedures for actual Lighting systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.
- B. Direct commissioning testing.
- C. Verify testing and adjusting of work are complete.
- D. Provide test data, inspection reports, and certificates in Systems Manual.

#### 1.6 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CxA for inclusion in the commissioning plan:
  - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
  - 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
  - 3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for Lighting systems, assemblies, equipment, and components to be verified and tested.
  - 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
  - 5. Certificate of readiness certifying that Lighting systems, subsystems, equipment, and associated controls are ready for testing.
  - 6. Test and inspection reports and certificates.
  - 7. Corrective action documents.
  - 8. Verification of testing, adjusting, and balancing reports.

## 1.7 SUBMITTALS

- A. Lighting Control Manufacturer start-up requirements.
- B. Lighting Controls point to point checklist for all specified operational sequences.
- C. Generator Manufacturer start-up requirements and point to point checklists for operation sequences.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 TESTING PREPARATION

- A. Certify in accordance with ASHRAE and ACG Commissioning Guidelines that Lighting Control systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify that Lighting Control instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points and schedules have been recorded.
- C. Certify that testing, adjusting procedures have been completed and that testing and adjusting reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

### 3.2 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of Lighting Controls testing shall include entire Lighting Controls installation, from central equipment to each illuminated space. Testing shall include measuring effectiveness of operational and control functions for 100% of the exterior lighting and for 35% of the interior occupied spaces. 35% sample shall include Media Center, Gymnasium and Different Classroom types. Submit proposed sample for Engineer's approval.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

- D. The CxA along with the Electrical Contractor and Controls Vendor shall prepare detailed testing plans, procedures, and checklists for Electrical Lighting systems, subsystems, equipment and submit to the Engineer for review.
- E. Tests will be performed using design conditions whenever possible.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- G. The CxA may direct that set points be altered when simulating conditions is not practical with the approval of the Engineer.
- H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- I. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule subsequent seasonal tests in conjunction with the Owner and Engineer.

**END OF SECTION**

## SECTION 26 24 00

### ELECTRICAL DISTRIBUTION EQUIPMENT

#### 1. GENERAL

- A. All electrical distribution equipment shall be dead front UL listed for the purpose and application. All equipment shall meet or exceed all applicable requirements of the National Electrical Code (N.E.C.). Any device or component, i.e., switchboard, panel, breaker, switch, etc., used as service entrance equipment, shall be listed for use at 100% of the rated capacity.

#### 2. EXISTING PANELS

- A. Existing power distribution switchboards and panel board are by Square D. Any device installed in an existing panel is to be by the same manufacturer.

#### 3. BRANCH PANELBOARDS

- A. This section covers lighting and power panelboards (refer to schedules, notes on Drawings and the Electrical One-Line Diagram, of the Contract Drawings).
- B. All panelboards shall be of the circuit breaker type, and shall be of one manufacturer.
- C. Branch panelboards shall be as indicated on the drawings and as specified herein. The lighting panelboards shall be of the dead-front, quick-make, quick-break, plug-in circuit breaker type, with trip indicating and trip free handles. All circuits shall be clearly and properly numbered and shall be provided with thermal magnetic protection. The panelboards shall be enclosed in code gauge, galvanized steel cabinets with smooth finished hinged doors without visible external fasteners and heavy chrome locks. Locks shall all be keyed alike. Each door shall have a directory card inside, covered with a plastic shield, filled in with black india ink or typewritten with circuit numbers and description indicated. Room numbers shall be coordinated with final room numbers as selected by Owner -- not numbers on Contract Documents.

Special Note: The room numbers used to fill out the panel directories shall match the actual final name and numbering scheme selected by the Owner. They shall not be filled out per the construction drawing numbering scheme, unless the Contractor is directed to do so by the Architect or Engineer.

Special Note: Panels are to have hinged trims in addition to hinged panel doors per UK Standards.

- D. Branch panelboards shall be surface or flush mounted as indicated on the Contract Drawings.
- E. Circuit breakers for 120/208 volt systems shall be of 10,000 A.I.C. RMS symmetrical rating unless otherwise indicated on the Contract Drawings.
- F. All main bus and connections thereto in branch panelboards shall be copper. All bus bars shall extend full length of panelboards.
- G. All circuit breakers used to switch lights shall be SWD (switching duty) rated and U.L. listed for the purpose.

- H. Where required by the National Electrical Code, provide branch arc-fault circuit interrupters (A.F.C.I.'s) in branch panelboards, whether indicated on the panel schedule or not. They shall be U.L. listed, latest edition.
- I. Where branch circuit breakers feed hermetically, sealed compressor for cooling or refrigeration equipment, provide U.L. listed H.A.C.R.-style circuit breakers.
- J. Where branch circuit breakers are indicated or required to be ground-fault circuit-interrupting type (G.F.C.I.), they shall have test and reset buttons and be U.L. listed, latest edition. Do not share neutrals with other circuits. Provide G.F.C.I. breakers or G.F.I. receptacles where device is located within 6' of plumbing or indicated by manufacturer's equipment device serves.
- K. Where branch circuit breakers are feeding H.I.D. (high-intensity-discharge) loads, they shall be rated and listed for such loads. Provide proper circuit breaker whether indicated on panel schedules or not.
- L. Arc Flash Hazard warning labels shall be affixed to all panelboards in accordance with Article 110.16 of the National Electrical Code.
- M. Panels shall be Square "D", G.E., Siemens, Eaton/Cutler-Hammer or approved equivalent. Existing Switchboard is by GE.
- N. Lockable breakers shall be provided for all breakers serving all HVAC equipment, Plumbing equipment, and kitchen appliances.
- O. Top fed panels are to be fed from the top and bottom fed panels are to be fed from the bottom. No feeders are to be routed in the side gutters.
- P. All new panels shall have a hinged cover.

#### 4. INSTALLATION INSTRUCTIONS

- A. Panelboards with circuit breakers installed before the building has been finished and cleaned shall be masked.
- B. All dust and debris shall be removed from the panels before they are energized and placed in service.
- C. All panelboard fronts shall be omitted until final punch list inspection is made. Directories for each panelboard shall be completed and available for review by the Engineer at that time.

#### 5. SAFETY SWITCHES

- A. Provide heavy duty safety switches as a final disconnecting means as required by NEC and/or as indicated on the Contract Drawings.
- B. All safety switches shall be NEMA Type 1, NEMA 3R, NEMA 4 stainless steel, NEMA 12, or as required by the operating environment, Heavy Duty Type HD, UL listed.
- C. All safety switches shall have switch blades that are fully visible in the "OFF" (open) position with the door open.



- D. All current carrying parts shall be plated by an electrolytic process to resist corrosion and to promote cooling.
- E. Switch mechanism shall be quick-make, quick-break, load break rated, such that during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing and opening action of the contacts has started. The handle and mechanism shall be an integral part of the box (not cover) with facilities for pad locking in the open or closed position with up to three padlocks. Switch doors shall be interlocked with switch handle so that the door can only be opened when the switch is in the "OFF" (open) position.
- F. Arc Flash Hazard warning labels shall be affixed to all switches in accordance with Article 110.16 of the National Electrical Code.
- G. Switches shall be as manufactured by Square D., G.E., Siemens, Eaton/Cutler-Hammer or approved equivalent.

**END OF SECTION**

**SECTION 26 27 26**

**WIRING DEVICES AND PLATES**

1. GENERAL

- A. This section of the specifications includes wiring devices, cover plates, weatherproof and dust-tight closures, communications devices and floor outlets.
- B. Wiring devices are listed by manufacturer and catalog numbers to establish the quality and type required. Equivalent devices of other manufacturers will be acceptable with prior approval of the Engineer. Submit cutsheets and/or samples of each type ten days prior to bid date for review and written approval to bid. Insofar as possible, standard application or special application devices shall be by one manufacturer.

2. MATERIALS

TYPE	RATING	CONFIGURATION	COLOR	VENDOR - CAT. #
RECEPTACLE - DUPLEX  COMMERCIAL GRADE	125V, 20A  125V, 15A	NEMA 5-20R  NEMA 5-15R	!  !	HUBBELL CR5362 * GE 5362 * LEVITON 5362 * HUBBELL CR5262 ** GE 5262 ** LEVITON 5262 **
* USE WHEN ON DEDICATED 20A CKT., OR CALLED OUT ** USE WHEN ON DEDICATED 15A CKT., OR WHEN MORE THAN ONE RECEPTACLE ON A CIRCUIT				
RECEPTACLE - DUPLEX  PREMIUM GRADE	125V, 20A  125V, 15A	NEMA 5-20R  NEMA 5-15R	!  !	HUBBELL 5352 * LEVITON 5362 * GE 5362, * HUBBELL 5252 ** LEVITON 5262 ** GE 5262 **
* USE WHERE ON DEDICATED 20A CKT., OR CALLED OUT ** USE WHERE ON DEDICATED 15A CKT., OR WHERE MORE THAN ONE RECEPTACLE ON A CIRCUIT				
RECEPTACLE - DUPLEX G.F.I. (SHALL MEET U.L. 943 STANDARD)	125V, 20A	NEMA 5-20R	!	HUBBELL GFR5352A

RECEPTACLE - SIMPLEX	125V, 20A	NEMA 5-20R	!	HUBBELL 5361
RECEPTACLE - DUPLEX, SAFETY TYPE (WITH TAMPER-RESISTANT SCREWS)	125V, 20A	NEMA 5-20R	!	HUBBELL HBL-8300-SG
RECEPTACLE - DUPLEX, SAFETY TYPE (WITH TAMPER-RESISTANT SCREWS)	125V, 15A	NEMA 5-15R	!	HUBBELL HBL-8200-SG
RECEPTACLE, DUPLEX NEON PILOT FACE-RED	125V, 15A	NEMA 5-15R	!	HUBBELL 5262-LHR GE 5362-LHR LEVITON 5362-LHR
RECEPTACLE, SIMPLEX WITH CLOCK HANGER TAB, STAINLESS STEEL PLATE	125V, 15A	NEMA 5-15R	METAL	HUBBELL 5235 LEVITON 658-BR ARROW-HART 5760
RECEPTACLE, DUPLEX ISOLATED GROUND (WITH ORANGE LEGEND PLATE)	125V, 20A	NEMA 5-20R	ORANGE	HUBBELL IG-5362 GE 5362-IG LEVITON 5362-IG
RECEPTACLE, DUPLEX HOSPITAL GRADE (TO BE USED IN ALL PATIENT CARE AREAS, PER N.E.C., ART. 517)	125V, 20A	NEMA 5-15R  NEMA 5-20R	!	HUBBELL 8200H GE 8200 LEVITON 8200 HUBBELL 8200H GE 8300 LEVITON 8300
RECEPTACLE, DUPLEX RED COLOR NYLON FACE (FOR EMERGENCY POWER OUTLETS)	125V, 20A	NEMA 5-20R	RED	HUBBELL 5352-RDB GE 5362-RDB LEVITON 5362-RDB
RECEPTACLE, DUPLEX ISOLATED GROUND WITH SURGE SUPPRESSION, INCLUDING INDICATOR LIGHT	125V, 15A	NEMA 5-15R	BLUE DEVICE	HUBBELL 5250S LEVITON 5380 ARROW-HART 5362
RECEPTACLE, SINGLE	250V, 20A	NEMA 10-20R	BLACK	HUBBELL 6810 GE 4124 LEVITON 5032

RECEPTACLE, SINGLE	250V, 30A	NEMA 6-30R	BLACK	HUBBELL 9330 GE 4139 LEVITON 5372
RECEPTACLE, SINGLE	250V, 50A	NEMA 6-50R	BLACK	HUBBELL 9367 GE 4141 LEVITON 5374
SWITCH, SINGLE POLE	120/277V, 20A	SPST	!	HUBBELL HBL-1221 GE 5951 LEVITON 1221
SWITCH, SINGLE POLE - RED TOGGLE (WITH RED COVER PLATE, FOR EMERGENCY LIGHTING CONTROL)	120/277V, 20A	SPST	RED	HUBBELL HBL-1221- RDB GE 5951-RDB LEVITON 1221-RDB
SWITCH, THREE-WAY	120/277V, 20A	3-WAY	!	HUBBELL HBL-1223 GE 5953 LEVITON 5953
SWITCH, FOUR-WAY	120/277V, 20A	4-WAY	!	HUBBELL HBL-1224 GE 5954 LEVITON 5954
SWITCH, KEYED	120/277V, 20A	SPST	N/A	HUBBELL HBL-1221- L GE 5951-L LEVITON 1221-L
SWITCH, KEYED	120/277V, 20A	3-WAY	N/A	HUBBELL HBL-1223- L GE 5953-L LEVITON 1223-L
SWITCH, KEYED	120/277V, 20A	4-WAY	N/A	HUBBELL HBL-1224- L GE 5954-L LEVITON 1224-L
<p><u>NOTE:</u></p> <p>SWITCH, KEYED TO <u>EACH</u> BE FURNISHED WITH ONE HUBBELL #1209 KEY. TURN OVER TO OWNER AT CLOSE OF PROJECT AND OBTAIN RECEIPT FOR VERIFICATION THAT KEYS HAVE BEEN DELIVERED.</p>				

SWITCH, MOMENTARY, 3-POSITION, CENTER OFF SWITCH, PILOT (TOGGLE LIT IN OFF POSITION)	120/277V, 20A (VERIFY VOLTAGE USED)	SPDT	!	HUBBELL HBL SERIES GE EQUIVALENT LEVITON EQUIVALENT
SWITCH, PILOT (TOGGLE LIT IN OFF POSITION)	120/277V, 20A (VERIFY VOLTAGE USED)	SPDT OR AS NOTED	CLEAR "LEXAN"	HUBBELL HBL SERIES GE EQUIVALENT LEVITON EQUIVALENT
SWITCH, PILOT (TOGGLE LIT IN ON POSITION)	120/277V, 20A (VERIFY VOLTAGE USED)	SPST OR AS NOTED	CLEAR "LEXAN"	HUBBELL HBL-PL7 SERIES GE EQUIVALENT LEVITON EQUIVALENT
TIMER SWITCH	120V	SPST, 15 MINUTE	!	NUTONE VS63 GE EQUIVALENT LEVITON EQUIVALENT
<p><u>NOTES:</u></p> <ol style="list-style-type: none"> <li>1. PROVIDE MATCHING CAP (PLUG) FOR ALL RECEPTACLES 30 AMP RATED AND ABOVE AS REQUIRED FOR EQUIPMENT.</li> <li>2. ALL RECEPTACLES SHALL BE BACK OR SIDE-WIRED, CLAMPING TYPE</li> <li>3. FOR DRYERS AND RANGES, PROVIDE 3-POLE GROUNDING TYPE AS REQUIRED BY DEVICE. LOCATE DEVICE SO THAT DRYER OR RANGE CAN BE PUSHED TIGHTLY AGAINST WALL.</li> <li>4. RECEPTACLES SHALL BE TAMPER RESISTANT AND WEATHER RESISTANT AND MARKED ACCORDINGLY AS REQUIRED BY N.E.C.</li> <li>5. ALL RECEPTACLES INSTALLED IN DAMP OR WET LOCATIONS SHALL BE UL LISTED WEATHER RESISTANT TYPE.</li> </ol> <p>! SEE ARTICLE 3, COLOR.</p>				

A. Small Motor Control Switches:

- (1) For small line-to-neutral motor loads of 3/4 HP or less, single phase, rated at 120 or 277 volts, provide snap-type, H.P. rated motor starter switch with thermal overloads. Overload heaters sized to match the motor nameplate amperes and the ambient temperature shall be provided. Provide with NEMA 1, NEMA 3R or other enclosure suitable for the location and atmosphere. All manual starters in finished areas shall be in flush-mounted enclosures.

3. COLOR

- A. Color of devices shall be as selected by the architect. Samples (devices, plates or both) may be required to be submitted with other architectural color items by the Contractor. The Contractor shall coordinate any such submission required with other trades, the Prime Contractor or as needed.
- B. Where devices are controlling or supplying emergency power from a standby source, the device color shall be red, as with switch toggles or receptacle fronts. Plate color shall match others on normal power in the building unless otherwise noted.
- C. Where surface finishes next to the devices vary in color or shade throughout the project, the Contractor may be required to provide lighter or darker plates and devices to more closely match wall finishes. These variations are considered to be included in the original contract for construction.

4. MANUAL DIMMERS

- A. Manual dimmers for incandescent, MR-lamp incandescent or fluorescent loads shall be matched to the type load intended to be controlled.
- B. Power rating shall be verified by examining the plans and suitable for the load, but in no case less than circuit load. Furnish dimmers in nominal power ranges of 600W, 1000W, 1500 watts, etc.
- C. Manual dimmers shall be provided with all solid state components, complete with choke coil and/or other R.F.I. suppression devices.
- D. Manual dimmers shall be suitable for mounting in single gang outlet box, ganging together in multi-section boxes where indicated, without derating being necessary.
- E. Manual dimmers shall be of the sliding-type, with detent stop at off position, full range control 0-100%. Lutron Company "Nova" Series or equivalent Lithonia, Lightolier.
- F. Manual dimmers for fluorescent lighting or low voltage transformer-fed incandescent fixtures shall be matched to suit the characteristics of the particular manufacturer's electronic ballast or transformer used in the dimming - type fixture. Submit shop drawings of dimmer in the same submittal as the lighting fixtures.

5. PLATES AND COVERS

- A. Unless otherwise specified or noted, all wiring device plates and covers shall be smooth thermoplastic, Hubbell "P" Series or equivalent G.E. or Leviton. Color shall match device unless otherwise indicated.

- B. All kitchen, gymnasium or food service area plates shall be bright finish 302 stainless steel.
- C. Cover plates shall be of one manufacturer insofar as possible.
- D. Weatherproof plates for G.F.C.I. receptacles shall be cast aluminum, self-closing, gasketed, suitable for standard box mounting, U.L. listed for wet location use, cover closed. Vertical mounting - Hubbell WP26M, horizontal mounting - Hubbell WP26MH (die-cast zinc) or equivalent Leviton or G.E.
- E. Weatherproof switch plates for toggle-handle switches shall be clear silicone rubber, for standard outlet boxes. Hubbell 1795 or equivalent G.E. or Leviton.

## 6. STANDARD SINGLE-SERVICE FLOOR BOXES

- A. In general, floor boxes to be used flush in concrete floors shall be of single-gang stamped steel construction, round, deep style, fully adjustable Hubbell B-2537 Series, Type 1 or equivalent.
- B. Where multiple gangs are indicated on the plans (or elsewhere), multi-gang (up to 3 yokes maximum) stamped steel, rectangular, deep style units shall be used. They shall be fully adjustable, Hubbell B-2432 Series, Type 1, or equivalent. Multiple-gang boxes shall be provided with removable partitions between each section in accord with N.E.C., where power and non-power circuits enter the same box.
- C. In general, all cover plates for floor boxes shall be flush, solid brass. Provide typical plates as listed:
  - Duplex Outlet        - Round, Duplex Flap - Hubbell S-3925  
                              - Rectangular, Duplex Flap - Hubbell S-3825
  - Telephone or Data   - Round, Combination 1" or 2 1/8" - Hubbell S-2725  
                              - Rectangular, Combination 1" or 2 1/8" - Hubbell S-2625
- D. Furnish floor boxes with threaded hubs as required to suit conduit routings, 3/4" minimum.
- E. Furnish carpet flanges for all boxes installed in carpeted areas. Flanges to be clear polycarbonate plastic, round - Hubbell S-3079 or rectangular, for gangs indicated - Hubbell S-308 Series or equivalent.
- F. Floor outlet boxes shall be installed dead level flush with wood, VCT, concrete or other hard surface type floor. Furnish special stop trims for terrazzo where required.
- G. Outlets within floor boxes shall be as specified elsewhere in these specifications.

## 7. SPECIAL MULTI-SERVICE FLOOR BOXES

- A. In general, floor boxes that are to contain multiple services such as power, data, voice, video, etc., shall be constructed of stamped steel and heavy thermoplastic with barriers or compartments to separate power from signal services per National Electrical Code.
- B. Provide multi-service floor boxes with proper trim for carpet, wood, terrazzo, tile or concrete floors, wiring slots, dust covers and proper device plates to hold outlets, jacks, etc. They shall be fully adjustable. Conduit rough-in shall be as required. All tops shall be capable of receiving an insert of the surrounding floor material.

- C. Outlets for multi-service floor boxes shall be as specified elsewhere in these specifications.
- D. Set boxes dead level with flooring and provide proper support by thickening concrete slab, welding angle iron across joists below or other approved means.
- E. Multi-service floor boxes shall be capable of containing a minimum of two duplex receptacles and two 4-position single gang modular plates for AMP voice, video or data jacks. If not installed on carpeted floors, provide flush brass trim.

## 8. INSTALLATION

- A. All wiring devices in dusty areas, exposed to weather and moisture shall be installed in Type "FS" or similar conduit fittings having mounting hubs, with appropriate cover plates.
- B. Devices that have been installed before painting shall be masked. No plates or covers shall be installed until all finishing and cleaning has been completed.
- C. Provide G.F.C.I. duplex feed-thru style receptacles in accordance with new U.L. Standard 943 where indicated or required by the National Electrical Code, whether specifically called out or not. When a G.F.C.I. receptacle is on a circuit with other non-G.F.C.I. receptacles, it shall always be placed at the homerun point of the circuit and shall be wired to ground-fault interrupt protect the downstream outlets on that circuit unless specifically indicated to the contrary. Provide a "G.F.C.I. protected" label on each downstream outlet.
- D. GFCI devices shall be installed in a "readily accessible" location per NEC requirements. GFCI protected outlets required by plans or code shall be fed by a GFCI breaker or upstream GFCI device if they are not readily accessible.
- E. Where surge suppression outlets are provided, they shall be ANSI Category "A" style. They shall be installed as dedicated-circuit outlets or where indicated with multiple outlets on a circuit, they shall be placed at the homerun point of that circuit and feed-thru wired to protect the downstream outlets on that circuit.
- F. All receptacles shall be installed with ground prong at top position.
- G. All outlets not provided with wiring devices shall be closed with a blank plate matching other plates in the area.

**END OF SECTION**



## SECTION 26 51 13

### LIGHTING FIXTURES

#### PART 1 - GENERAL

- 1.1 Furnish and install all lighting fixtures, as herein specified, complete with lamps and accessories for safe and effective operation. All fixtures shall be installed and left in an operable condition with no broken, damaged or soiled parts.
- 1.2 All items furnished shall comply with the latest standards applicable such as U.L., NEMA, etc., and shall bear labels accordingly. All fixtures shall be the color specified or as selected by the Architect. Wherever fixtures have evident damage, they shall be restored to new condition or shall be replaced. Likewise, fixtures showing dirt, dust or finger prints shall be restored to new condition or shall be replaced.
- 1.3 One copies of light fixture factory shop drawings and cuts, showing fixture dimensions, photometric data, installation data and, if applicable, air handling data, shall be submitted to the Engineer for written approval 30 days after bid date. (Verify shop drawing quantities with the Architect.)
- 1.4 Locate pendant, surface mounted or chain-hung industrial fixtures in mechanical rooms and similar spaces to avoid ductwork and piping. Locate around and between equipment to maximize the available light. Request a layout from the Engineer if uncertain about an installation.
- 1.5 Alternate fixtures may be substituted for types specified by name or catalog number. Proposed substitutions must be submitted to the Engineer ten working days prior to bid date for written approval to bid. This written approval will only be issued in addendum form.
- 1.6 All reflecting surfaces, glass or plastic lenses, ballast housings, parabolic louvers, downlighting Alzak cones and specular reflectors shall be handled with care during installation or lamping to avoid fingerprints or dirt deposits. It is preferred that louvers be shipped and installed with clear plastic bags to protect louvers. At close of project, and after construction air filters are changed, remove bags. Any louver or cone showing dirt or fingerprints shall be cleaned with solvent recommended by the manufacturer to a like-new condition, or replaced as necessary in order to turn over to the Owner new fixtures at beneficial occupancy.
- 1.7 Refer to architectural details as applicable for recessed soffit fluorescent fixtures or wherever fixture installations depend upon work of other trades. Coordinate all installations with other trades. Verify dimensions of spaces for fixtures, and if necessary, adjust lengths to assure proper fit and illumination of diffuser and/or area below.

#### PART 2 - VOLTAGE

- 2.1 All lighting fixtures will be rated 120 volts (or multi-volt), single phase as indicated or required.

#### PART 5 - LED

##### 5.1 LED Sources

- (1) LED's shall be manufactured by a manufacturer who has produced commercial LEDs for a minimum of five (5) years.

- (2) Lumen Output – minimum initial delivered lumen output of the luminaire shall be as follows for the lumens exiting the luminaire in the 0-360 degree zone - as measured by IESNA Standard LM-79-08 in an accredited lab. Exact tested lumen output shall be clearly noted on the shop drawings.
- (3) Lumen output shall not decrease by more than 20% over the minimum operational life of 50,000 hours at the rated ambient operating temperature.
- (4) Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire Luminaire.
- (5) LED Boards shall be suitable for field maintenance and have with plug-in connectors. LED boards shall be upgradable.

B. Light Color/Quality-

- (1) Correlated Color temperature (CCT) range as per specification, between 3000K, 3500K and 4000K shall be correlated to chromaticity as defined by the absolute (X,Y) coordinates on the 2-D CIE chromaticity chart.
- (2) Color shift over 6,000 hours shall be <0.007 change in u' v' as demonstrated in IES LM80 report.
- (3) The color rendition index (CRI) shall be 80 or greater.
- (4) LED boards to be tested for color consistency and shall be within a space of 2.5 MacAdam ellipses on the CIE chromaticity chart.

C. Power Supply and Drive

- (1) Driver: Acceptable manufacturer: eldoLED, Sylvania, or Philips that meet or exceed the criteria herein:
- (2) Ten-year expected life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
- (3) Driver should be UL Recognized under the component program and shall be modular for simple field replacement.
- (4) Electrical characteristics: 120 volt, UL Listed, CSA Certified, Sound Rated A+. Driver shall be > 80% efficient at full load across all input voltages. Input wires shall be 18AWG solid copper minimum.
- (5) Dimming: Driver shall be suitable for full-range dimming. The luminaire shall be capable of continuous dimming without perceivable flicker over a range of 100 percent to 0.1 percent of rated lumen output with a smooth shut off function.
- (6) Dimming shall be controlled by a 0-10V signal, or if require "DMX".
- (7) Driver shall include ability to provide no light output when the control signal drops below 0.5 V, and shall consume 0.5 watts or less in this standby.

- (8) Driver shall be capable of configuring a linear or logarithmic dimming curve.
- (9) Drivers shall track evenly across multiple fixtures at all light levels, and shall have an input signal to output light level that allows smooth adjustment over the entire dimming range regardless of the controller type.
- (10) Flicker: Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within the dimming range from 100-0.1 percent luminaire shall have:
  - a. Less than 1 percent flicker index at frequencies below 120 Hz.
  - b. Less than 12 percent flicker index at 120 Hz, and shall not increase at greater than 0.1 percent per Hz to a maximum of 80 percent flicker index at 800Hz.
- (11) Driver disconnect shall be provided where required to comply with codes.
- (12) The electronics/power supply enclosure shall be internal to the SSL luminaire and be accessible per UL requirements
- (13) The surge protection which resides within the driver shall protect the luminaire from damage and failure for transient voltages and currents as defined in ANSI/IEEE C64.41 2002 for Location Category A, where failure does not mean a momentary loss of light during the transient event.

D. Electrical

- (1) Power Consumption: Maximum power consumption, +/- 5% when operating between 120 – 277V (or 346V) shall be as follows:
  - a. A minimum of 110 lumens per watt.
  - b. Operation Voltage - The luminaire shall operate from at 60 HZ  $\pm$ 3 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage of plus or minus 10% shall have no visible effect on the luminous output.
  - c. Power Factor: The luminaire shall have a power factor of 90% or greater at all standard operating voltages and full luminaire output.
  - d. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent at any standard input voltage and meet ANSI C82.11 maximum allowable THD requirements.
  - e. Surge Suppression: The luminaire shall include surge protection to withstand high repetition noise and other interference. Withstand up to a 1,000 volt surge without impairment of performance as defined by ANSI C62.41 Category A. To reduce false circuit breaker tripping due to turn on inrush, the following statement ensures that electronic dimming driver will meet NEMA inrush recommendations.

- f. In Rush Current: Meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps load with a maximum of 370 Amps<sup>2</sup> – seconds.
- g. RF Interference: The luminaire and associated onboard circuitry must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions.
- h. Driver must support automatic adaptation, allowing for future luminaire upgrades and enhancements and deliver improved performance:
- i. Adjustment of forward LED voltage, supporting 3V through 60V.
- j. Adjustment of LED current from 200mA to 1.05A at the 100 percent control input point in increments of 1mA
- k. Adjustment for operating hours to maintain constant lumens (within 5 percent) over the 50,000 hour design life of the system, and deliver up to 20 percent energy savings early in the life cycle.
- l. Electrical connections between normal power and driver must be modular utilizing a snap fit connector. All electrical components must be easily accessible after installation and be replaceable without removing the fixture from the ceiling.
- m. All electrical components shall be RoHS compliant.

## PART 6 - LIGHT FIXTURE GENERAL REQUIREMENTS

### 6.1 Recessed Lighting Fixtures - General Requirements

- 6.1.1 The following are minimum requirements for recessed fluorescent fixtures for lay-in grid, gypsum board, plaster and concealed spline ceilings. Surface-mounted fluorescent fixture requirements shall be similar.
- 6.1.2 Housings shall be a minimum of 4" depth, premium grade, constructed of a minimum 22 gauge die embossed or stiffened cold rolled pre-treated rust-resistant steel.
- 6.1.3 All parts shall be finished with polyester powder or white baked enamel (85% minimum reflectance) painted after fabrication. All wiring shall be type TFN, or THWN and shall be covered by the steel ballast cover, wiring channel, or socket track. Exposed wiring is not acceptable. Connection wiring shall be accessible thru a hinged access plate above ballast channel in top of unit.
- 6.1.4 Ballasts shall be as specified. If a manufacturer and series number is listed, substitution by other manufacturers shall be of the exact same specification (sound rating, energy consumption, life expectancy, warranties, physical size, heat and temperature ratings), etc. All ballasts shall be cool operating, of the electronic energy-saving type, UL and CBM listed.
- 6.1.5 The complete light fixture unit shall be UL listed and labeled. Other agency listings may be acceptable with written approval from the Engineer.
- 6.1.6 Fixture lens doors shall be reversible, hinged, painted after fabrication, with spring-loaded or other mechanically stable positive action latches.

- 6.1.7 Lens shall be as specified for each fixture type. If a specific manufacturer and series number of lens is listed, the substitute shall be of the exact specification (thickness, prism configurations, transparency, efficiency, photometric distribution, hardness, vandal-resistance, etc.). Minimum average thickness of any prismatic lens shall be .125".
- 6.1.8 Fixture trim and/or flanges shall conform with ceiling constructions as required. Verify all types prior to submission of shop drawings and indicate any special types on submittals. Fixtures installed in drywall or plaster ceilings to be provided with flange, screed and swing gate anchoring system.
- 6.1.9 All fixtures shall be furnished with hold down clips to meet applicable seismic codes, four clips per fixture minimum or the equivalent thereof in the installation trim. Verify thickness of drywall or plaster ceilings prior to submission of shop drawings, to allow for proper trim adjustment.
- 6.1.10 Support fixtures with one hanger wire at each end. Hanger wires shall be installed within 15° of plumb, maximum or additional support shall be provided. Wires shall be attached to the fixture body and to the building structure - not to the supports of other work or equipment.
- 6.1.11 Each type of fluorescent (or other type) lay-in fixture shall be furnished with the proper housing flange or lip to suit the type of lay-in grid(s) being utilized on the project. The Contractor is to verify if narrow or standard grid members are being furnished and provide the proper type of light fixture trim. Indicate any special trims on shop drawing submittals.
- 6.1.12 Lamps shall be as specified in lamp section of these specifications, and suitable for use in the fixture intended. If the lighting fixture manufacturer requires a specific lamp for optimum performance, that lamp shall be furnished.
- 6.1.13 Do not provide pressure-lock or any other type of lampholder unless specifically indicated to the contrary or required by local codes. Fixtures may be shipped from the factory with lamps installed, at the Contractor's option.

#### PART 7 - LIGHTING FIXTURE SCHEDULE

- 7.1 Note: Each vendor proposing to bid the materials specified herein below is cautioned to review all requirements of the Contract Documents, as they may apply to the work involved, particularly The general materials requirements are to be met in their entirety by the contractors and vendors supplying these materials. Note: Unless otherwise noted, all 48" dimension fixtures shall be provided with 48" T8 28 watt 4100°K C.C.T. lamps, quantity as specified, with companion 2, 3 or 4 lamp electronic ballasts. Where fixtures with ballasts have switches that controls lamps individually or in groups, the proper number of separate ballasts shall be provided. Refer to the drawings for specific control information.

- 7.2 TYPE DESCRIPTION

Refer to drawings for schedule.

**END OF SECTION**

## SECTION 27 05 01

### GENERAL PROVISIONS - TELECOMMUNICATIONS

#### 1. GENERAL

- A. The Instructions to Bidders, General and Special Conditions, and all other contract documents shall apply to the Contractor's work as well as to each of his Sub Contractor's work. Each Contractor is directed to familiarize himself in detail with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.
- B. The Contractor shall be governed by any alternates, unit prices and Addenda or other contract documents insofar as they may affect his part of the work.
- C. All materials and installation shall comply with University construction standards. These standards are available at: <http://www.uky.edu/cpmd/design-standards>. Special attention shall be given to Divisions 26, and 27. The Contractor shall familiarize himself with the published standards. In the event of a conflict between these standards and the Contract Documents the most stringent requirement shall be met.
- D. The work included in this division consists of the furnishing of all labor, equipment, transportation, supplies, material and appurtenances and performing all operations necessary for the satisfactory installation of complete and operating electrical systems indicated on the drawings and/or specified herein.
- E. Any materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the electrical systems in a substantial manner, in compliance with the requirements stated, implied, or intended in the drawings and specifications, shall be included as part of this Contract. The Contractor shall give written notice of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted a minimum of ten days prior to bid. In the absence of such written notice and by the act of submitting his bid, it shall be understood that the Contractor has included the cost of all required items in his bid, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensations.
- F. It is not the intent of this section of the specifications (or the remainder of the contract documents) to make any specific Contractor, other than the Contractor holding the prime contract, responsible to the Owner, Architect and Engineer. All transactions such as submittal of shop drawings, claims for extra costs, requests for equipment or materials substitution, shall be done through the Contractor to the Architect (if applicable), then to the Engineer.
- G. This section of the Specifications or the arrangement of the contract documents shall not be construed as an attempt to arbitrarily assign responsibility for work, material, equipment or services to a particular trade Contractor or Sub-Contractor. Unless stated otherwise, the subdivision and assignment of work under the various sections shall be the responsibility of the Contractor holding the prime contract.
- H. It is the intent of this Contract to deliver to the Owner a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be responsibility of the

Contractors involved to remove and/or relocate or re-attach any existing or new systems which interfere with new equipment or materials to be installed by other trades without additional cost to the Owner.

- I. The Contractor shall provide interim life safety and fire protection measures as required by the Authority Having Jurisdiction, Division 1 specifications, NFPA, and applicable Codes. This includes temporary relocations of provision of communication circuits and equipment in existing buildings as applicable.
- J. In general, and to the extent possible, all work shall be accomplished without interruption of the existing facilities' operations. Each Contractor shall advise the Architect, Owner and Engineer (as applicable) in writing at least one week prior to the deliberate interruption of any services. The Owner shall be advised of the exact time that interruption will occur and the length of time the interruption will occur. Failure to comply with this requirement may result in complete work stoppage by the Contractors involved until a complete schedule of interruptions can be developed.
- K. Whenever utilities are interrupted, either deliberately or accidentally, the Contractor shall work continuously to restore said service. The Contractor shall provide tools, materials, skilled journeymen of his own and other trades as necessary, premium time as needed and coordination with all applicable utilities, including payment of utility company charges (if any), all without request for extra compensation to the Owner, except where otherwise provided for in the contract document.
- L. The Contractor shall be responsible for maintaining existing fire alarm, paging, access control, intrusion detection, CCTV, nurse call systems, etc., in occupied spaces in renovation and addition projects. The Contractor shall be required to disconnect and remove all existing devices in renovated areas (where directed as such) without affecting system operations. All costs associated with said work shall be borne by the Contractor.
- M. Definitions:
  - (1) Prime Contractor - The Contractor who has been engaged by the Owner in a contractual relationship to accomplish the work.
  - (2) Electrical Contractor - Any Contractor whether bidding or working independently or under the supervision of a General Contractor, that is: the one holding the Prime Contract and who installs any type of Electrical work or pathways, such as: power, lighting, intercom, fire detection and alarm, security, video, underground or overhead electrical, etc.
  - (3) Low Voltage Contractor - Any Contractor whether bidding or working independently or under the supervision of a General Contractor, that is: the one holding the Prime Contract and who installs any type of low voltage electrical work, such as: television, telecommunications, data, fiber optic, intercom, fire detection and alarm, security, video, underground or overhead communications, etc.

Note: Any reference within these specifications to a specific entity, i.e., "Electrical Contractor" is not to be construed as an attempt to limit or define the scope of work for that entity or assign work to a specific trade or contracting entity. Such assignments of responsibility are the responsibility of the Contractor or Construction Manager holding the prime contract, unless otherwise provided herein.

- (4) Sub-Contractor - Each or any Contractor contracted to, or employed by, the Electrical Contractor or Low Voltage Contractor for any work required by this Contract.
- (5) Engineer - The Consulting Mechanical-Electrical Engineers, either consulting to the Owner, Architect, other Engineers, etc.
- (6) Architect - The Architect of Record for the project, if any.
- (7) Furnish - Deliver to the site in good condition.
- (8) Provide - Furnish and install in complete working order.
- (9) Install - Install equipment furnished by others in complete working order.
- (10) Contract Documents - All documents pertinent to the quality and quantity of all work to be performed on the project. Includes, but not limited to: Plans, Specifications, Addenda, Instructions to Bidders, (both General and Sub-Contractors), Unit Prices, Shop Drawings, Field Orders, Change Orders, Cost Breakdowns, Construction Manager's Assignments, Architect's Supplemental Instructions, Periodical Payment Requests, etc.

## 2. INTENT

- A. It is the intent of these specifications and all associated drawings that the Contractor provide finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."
- B. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

## 3. DRAWINGS AND SPECIFICATIONS

- A. The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed insofar as possible. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted in writing to the Engineer for review before proceeding with the work. The Contract Drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Contractors shall, however, anticipate that additional offsets may be required and submit their bid accordingly.
- B. The drawings and specifications are intended to supplement each other. No Contractor or supplier shall take advantage of conflict between them, or between parts of either, but should this condition exist, the Contractor or supplier shall request a clarification of the condition at least ten days prior to the submission of bids so that the condition may be clarified by Addendum. In the event that such a condition arises after work is started, the interpretation of the Engineer shall be the determining factor. In all instances, unless modified in writing and agreed upon by all parties thereto, the Contract to accomplish the work shall be binding on the affected Contractor.
- C. The drawings and specifications shall be considered to be cooperative and complimentary and anything appearing in the specifications which may not be indicated on the drawings or conversely, shall be considered as part of the Contract and must be executed the same as though indicated by both.



- D. The Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.
  - E. The Engineer shall reserve the right to make minor adjustments in location of conduit, fixtures, outlets, switches, etc., where he considers such adjustments desirable in the interest of concealing work or presenting a better appearance.
  - F. The Contractor shall evaluate ceiling heights called for on Architectural Plans. Where the location of Electrical equipment may interfere with ceiling heights, the Contractor shall call this to the attention of the Engineer in writing prior to making the installation. Any such changes shall be anticipated and requested sufficiently in advance so as to not cause extra work on the part of the Contractor or unduly delay the work.
  - G. Special Note: Always check ceiling heights indicated on Drawings and Schedules and ensure that these heights may be maintained after all mechanical, electrical and low voltage equipment is installed. If a conflict is apparent, notify the Engineer in writing for instructions.
  - H. Should overlap of work between the various trades become evident, this shall be called to the attention of the Engineer. In such event neither trade shall assume that he is to be relieved of the work which is specified under his branch until instructions in writing are received from the Engineer.
  - I. The drawings are intended to show the approximate location of equipment, materials, etc. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions whether given in figures or scaled shall be verified in the field. In case of conflict between small- and large-scale drawings, the larger scale drawings shall take precedence.
  - J. The Low Voltage Contractor and his Sub Contractors shall review all drawings in detail as they may relate to his work (structural, architectural, site survey, mechanical, electrical, etc.). Review all drawings for general coordination of work, responsibilities, ceiling clearances, wall penetration points, chase access, device elevations, etc. Make any pertinent coordination or apparent conflict comments to the Engineers at least ten days prior to bids, for issuance of clarification by written addendum.
  - K. Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, or not indicated at all, the parts drawn out shall apply to all other like portions of the work. Where ornament or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts of the work, unless otherwise indicated.
4. EXAMINATION OF SITE AND CONDITIONS
- A. The Contractor shall inform himself of all of the conditions under which the work is to be performed, the site of the work, the structure of the ground, the obstacles that may be encountered, the availability and location of necessary facilities and all relevant matters concerning the work. All Contractors or suppliers shall carefully examine all Drawings and Specifications and contract documents to determine the kind and type of materials to be used throughout the project and which may, in any way, affect the execution of his work.

- B. The Contractor shall fully acquaint himself with all existing conditions as to ingress and egress, distance of haul from supply points, routes for transportation of materials, facilities and services, availability of temporary or permanent utilities, etc. The Contractor shall include in his work all expenses or disbursements in connection with such matters and conditions. The Contractor shall verify all work shown on the drawings and conditions at the site, and shall report in writing to the Engineer ten days prior to bid, any apparent omissions or discrepancies in order that clarifications may be issued by written addendum. No allowance is to be made for lack of knowledge concerning such conditions after bids are accepted.
- C. The Low Voltage Contractor is required to provide coordination drawings, data and collaboration for all aspects of his work in accordance with the general and special conditions – Divisions 20, 22, 23, 26 and 28 the Construction Manager’s procedures.
- D. The Low Voltage Contractor is responsible for coordinating all pathways, supports, power connections, etc. that may be necessary to complete work as required by this Contract. This coordination shall be done in a timely manner so as not to affect the progress of work or cause rework.

5. EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS

- A. When any Contractor requests review of substitute materials and/or equipment, and when under an approved formal alternate proposal, it shall be understood and agreed that such substitution, if approved, will be made without additional cost regardless of changes in connections, spacing, service, mounting, etc. In all cases where substitutions affect other trades, the Contractor offering such substitutions shall advise all such Contractors of the change and shall reimburse them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., required to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Special Note: Review of Shop Drawings by the Engineer does not absolve the Contractor of this responsibility
- B. References in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Each Contractor, in such cases, may, at his option, use any article, device, product, material, fixture, form, or type of construction which in the judgment of the Engineer is equivalent to that specified, provided the provisions of paragraph (A) immediately preceding are met. Substitutions shall be submitted to the Engineer a minimum of ten days prior to bid date for approval to bid in written form thru addenda or other method selected by the Engineer. If prevailing laws of cities, towns, states or countries are more stringent than these specifications regarding such substitutions, then those laws shall prevail over these requirements.
- C. Wherever any equipment or material is specified exclusively only such items shall be used unless substitution is accepted in writing by the engineers.
- D. The Contractor shall furnish along with his proposal a list of specified equipment and materials which he proposes to provide. Where several makes are mentioned in the Specifications and the Contractor fails to state which he proposes to furnish, the Engineer shall have the right to choose any of the makes mentioned without change in price.
- E. The Contractor shall review the contract documents and if a material substitution form is required for each proposed substitution, it shall be submitted per requirements.

6. SUPERVISION OF WORK

- A. Each Contractor and Sub-Contractors shall personally supervise the work or have a competent superintendent on the project site at all times during progress of the work, with full authority to act for him in matters related to the project.

7. CODES, RULES, PERMITS, FEES, REGULATIONS, ETC.

- A. The Contractor shall give all necessary notices, obtain and pay for all permits, government sales taxes, fees, and other costs including utility connections or extensions, in connection with his work. As necessary, he shall file all required plans, utility easement requests and drawings, survey information on line locations, load calculations, etc., prepare all documents and obtain all necessary approvals of all utility and governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Engineer before request for acceptance and final payment for the work.
- B. Ignorance of Codes, Rules, regulations, utility company requirements, laws, etc., shall not diminish or absolve Contractor's responsibilities to provide and complete all work in compliance with such.
- C. The Contractor shall include in the work, without extra cost, any labor, materials, services, apparatus or drawings required in order to comply with all applicable laws, ordinances rules and regulations, whether or not shown on drawings and/or specified.
- D. All materials furnished and all work installed shall comply with the current edition of the National Electrical Codes, National Fire Codes of the National Fire Protection Association, the requirements of local utility companies, the Owner's documented Construction Standards and with the requirements of all governmental agencies or departments having jurisdiction.
- E. All material and equipment for the low voltage systems shall bear the approval label, or shall be listed by the Underwriters' Laboratories, Incorporated. Listings by other testing agencies may be acceptable with written approval by the Engineer.
- F. All low voltage work is to be constructed and installed in accordance with plans and specifications which have been approved in their entirety and/or reflect any changes requested by the State Fire Marshal, as applicable or required. Electrical work shall not commence until such plans are in the hands of the Electrical Contractor.
- G. The Contractor shall insure that his work is accomplished in accord with OSHA Standards and any other applicable government requirements.
- H. Where conflict arises between any code and the plans and/or specifications, the code shall apply except in the instance where the plans and specifications exceed the requirements of the code. Any changes required as a result of these conflicts shall be brought to the attention of the Engineer at least ten working days prior to bid date, otherwise the Contractor shall make the required changes at his own expense. The provisions of the codes constitute minimum standards for wiring methods, materials, equipment and construction and compliance therewith will be required for all electrical work, except where the drawings and specifications require better materials, equipment, and construction than these minimum standards, in which case the drawings and specifications shall be the minimum standards.

8. COST BREAKDOWNS/SCHEDULE OF VALUES

- A. Within thirty days after acceptance of the Contract, the Contractor is required to furnish to the Engineer one copy of a detailed cost breakdown on each respective area of work. These cost breakdowns shall be made on forms provided or approved by the Engineer or Architect. Payments will not be made until satisfactory cost breakdowns are submitted. Refer to the end of this section for a sample of expected level and breakout being required.

9. GUARANTEES AND WARRANTIES

- A. All equipment, apparatus, materials, etc., shall be the best of its respective kind. The Contractor shall replace all materials at his own expense, which fail or are deemed defective within one year or as described in the General Conditions, whichever is longer. The effective date of completion of the work shall be the date each or any portion of the work is accepted by the Architect or Engineer as being substantially complete.
- B. Items of equipment which have longer guarantees, as called for in these specifications or as otherwise offered by the manufacturer, such as generators, engines, batteries, transformers, etc., shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Owner reserves the right to use equipment installed by the Contractor prior to date of final acceptance. Such use of equipment shall in no way invalidate the guarantee except that Owner shall be liable for any damage to equipment during this period due to negligence of his operator or other employee.

10. INSPECTION, APPROVALS AND TESTS

- A. Before requesting a final review of the installation from the Architect and/or Engineer, the Contractor shall thoroughly inspect his installation to assure that the work is complete in every detail and that all requirements of the Contract Documents have been fulfilled. Failure to accomplish this may result in charges from the Architect and/or Engineers for unnecessary and undue work on their part.
- B. The Contractor shall provide as part of this contract electrical inspection by a competent Electrical Inspection Agency, licensed to provide such services in the in the project jurisdiction. The name of this agency shall be included in the list of materials of the Form of Proposal by the Contractor. All costs incidental to the provision of electrical inspections shall be borne by the Electrical Contractor.
- C. The Contractor shall advise each Inspection Agency in writing (with an information copy of the correspondence to the Architect and/or Engineer) when he anticipates commencing work. Failure of the Inspection Agency to inspect the work in the stage following and submit the related reports may result in the Contractor's having to expose concealed work not so inspected. Such exposure will be at the expense of the responsible Contractor.
- D. Inspections shall be scheduled for rough as well as finished work. The rough inspections shall be divided into as many inspections as may be necessary to cover all roughing-in without fail. Report of each such inspection visit shall be submitted to the Architect, Engineer and the Contractor within three days of the inspection.
- E. Approval by an Inspector does not relieve the Contractor from the responsibilities of furnishing equipment having a quality of performance equivalent to the requirements set forth in these plans

and specifications. All work under this contract is subject to the review of the Architect and/or Engineer, whose decision is binding.

- F. Before final acceptance, the Contractor shall furnish three copies of the certificates of final approval by the Electrical Inspector (as well as all other inspection certificates) to the Engineer with one copy of each to the appropriate government agencies, as applicable. Final payment for the work shall be contingent upon completion of this requirement.
- G. The Contractor shall test all wiring and connections for performance, continuity and grounds before equipment and fixtures are connected. Where such tests indicate the possibility of faulty material, locate the point of such fault, replacing same with new and demonstrate by further test the elimination of such defect. The results of this test shall be turned over to the engineer for review and approval. Any conductor failing the test shall be replaced and any costs associated shall be borne by the contractor. Refer to the system specification sections for additional testing requirements.

#### 11. CHANGES IN ELECTRICAL WORK

REFER TO GENERAL AND SPECIAL CONDITIONS.

#### 12. CLAIMS FOR EXTRA COST

REFER TO GENERAL AND SPECIAL CONDITIONS.

#### 13. SURVEYS, MEASUREMENTS AND GRADES

- A. The Contractor shall lay out his work and be responsible for all necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so.
- B. The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.
- C. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Engineer thru normal channels of job communication and shall not proceed with his work until he has received instructions from the Engineer.

#### 14. TEMPORARY USE OF EQUIPMENT

- A. The permanent electrical equipment, when installed, may be used for temporary services, subject to an agreement among the Contractors involved, the Owner, and with the consent of the Engineer. Should the permanent systems be used for this purpose, each Contractor shall pay for all temporary connections required and any replacements required due to damage without cost, leaving the equipment and installation in "as new" condition. The Contractor may be required to bear utility costs, user fees, etc.
- B. Permission to use the permanent equipment does not relieve the Contractors who utilize this equipment from the responsibility for any damages to the building construction and/or equipment which might result because of its use.

#### 15. TEMPORARY SERVICES

- A. The Contractor shall arrange for temporary communication and other services which he may require to accomplish his work. In the absence of other provisions in the contract, the Contractor shall provide for his own temporary services of all types, including the cost of connections, utility company fees, construction, removal, etc., in his bid.

#### 16. RECORD DRAWINGS

- A. The Contractor shall insure that any deviations from the design are being recorded daily or as necessary on record drawings being maintained by the Contractor. Dimensions from fixed, visible permanent lines or landmarks shown in vertical and horizontal ways shall be utilized. Compliance shall be a requirement for final payment. Pay particular attention to the location of underfloor or underground exterior in-contract or utility-owned or leased service lines, main switches and other appurtenances important to the maintenance and safety of the Electrical System. Keep information in a set of drawings set aside at the job site especially for this purpose. Deliver these record drawings electronically to the Engineer in AutoCad 2000 format (or more recent version) along with the hand marked field set. Electronic bid drawings will be furnished to the Contractor for his use at the completion of the work.

#### 17. MATERIALS AND WORKMANSHIP

- A. All electrical equipment, materials and articles incorporated in the work shall be new and of comparable quality to that specified. All workmanship shall be first-class and shall be performed by technicians skilled and regularly employed in their respective trades. The Contractor shall determine that the equipment he proposes to furnish can be brought into the building(s) and installed within the space available. All equipment shall be installed so that all parts are readily accessible for inspection, maintenance, replacement, etc. Extra compensation will not be allowed for relocation of equipment for accessibility or for dismantling equipment to obtain entrance into the building(s).
- B. All conduit and/or conductors shall be concealed in or below walls, floors or above ceilings unless otherwise noted. All equipment, devices and wiring required shall be installed to make up complete systems as indicated on the drawings and specified herein.
- C. All materials, where applicable, shall bear Underwriters' Laboratories label or that of another Engineer-approved testing agency, where such a standard has been established.
- D. Each length of conduit, wireway, duct, conductor, cable, fitting and device used in the electrical systems shall be stamped or indelibly marked with the makers mark or name.
- E. All electrical equipment shall bear the manufacturer's name and address and shall indicate its electrical capacity and characteristics.

#### 18. QUALIFICATIONS OF WORKMEN

- A. All contractors bidding this project must have been a licensed company for a minimum of three years to qualify to bid this project. Individual employee experience does not supersede this requirement.

- B. All low voltage contractors bidding the electrical work must have completed one project of 70% this contract cost size and two projects of 50% this subcontract cost size.
- C. All work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. Untrained and incompetent workmen as evidenced by their workmanship shall be relieved of their responsibilities in those areas. The Engineer shall reserve the right to determine the quality of workmanship of any workman and unqualified or incompetent workmen shall refrain from work in areas not satisfactory to him. Requests for relief of a workman shall be made through the normal channels of responsibility established by the Architect or the contract document provisions.
- D. Special electrical systems, such as Fire Detection and Alarm Systems, Intercom or Sound Reinforcement Systems, Telecommunications or Data Systems, Video Systems, Special Electronic Systems, Control Systems, etc., shall be installed by workmen normally engaged or employed in these respective trades. As an exception to this, where small amounts of such work are required and are, in the opinion of the Engineer, within the competency of workmen directly employed by the Contractor involved, they may be provided by this Contractor.

#### 19. CONDUCT OF WORKMEN

- A. The Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workmen to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. The consumption or influence of alcoholic beverages, narcotics or illegally used controlled substances on the jobsite is strictly forbidden.

#### 20. COOPERATION AND COORDINATION BETWEEN TRADES

- A. The Contractor is expressly directed to read the General Conditions and all detailed sections of these specifications for all other trades and to study all drawings applicable to his work, including Electrical, Architectural, Mechanical, Structural and other pertinent Drawings, to the end that complete coordination between trades will be effected.
- B. Refer to Coordination Among Trades, Systems Interfacing and Connection of Equipment Furnished by Others section of these Specifications for further coordination requirements.

#### 21. PROTECTION OF EQUIPMENT

- A. The Contractor shall be entirely responsible for all material and equipment furnished by him in connection with his work and special care shall be taken to properly protect all parts thereof from damage during the construction period. Such protection shall be by a means acceptable to the Engineer. All rough-in conduit shall be properly plugged or capped during construction in a manner approved by the Engineer. Equipment damaged while stored on site either before or after installation shall be repaired or replaced (as determined by the Engineer) by the responsible Contractor.

#### 22. MAINTENANCE OF EXISTING UTILITIES AND LINES

- A. The locations of all piping, conduits, cables, utilities and manholes existing, or otherwise, that come within the contract construction site, shall be subject to continuous uninterrupted maintenance with no exception unless the Owner of the utilities grants permission to interrupt same temporarily, if need be. Provide one week's written notice to Engineer, Architect and Owner prior to interrupting any utility service or line. Also see Article 1. - General, this section.
- B. Known utilities and lines as available to the Engineer are shown on the drawings. However, it is additionally required that, prior to any excavation being performed, each Contractor ascertain that no utilities or lines, known or unknown, are endangered by the excavation.
- C. If the above-mentioned utilities or lines occur in the earth within the construction site, the Contractor shall first probe and make every effort to locate the lines prior to excavating in the respective area. Electromagnetic utility locators and acoustic pipe locators shall be utilized to determine where metallic and non-metallic piping is buried prior to any excavation.
- D. Cutting into existing utilities and services shall be done in coordination with and as designated by the Owner of the utility. The Contractor shall work continuously to restore service(s) upon deliberate or accidental interruption, providing premium time and materials as needed without extra claim to the Owner.
- E. The Contractor shall repair to the satisfaction of the Engineer any surface or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.
- F. Machine excavation shall not be permitted within ten feet of existing gas or fuel lines. Hand excavate only in these areas, in accord with utility company, agency or other applicable laws, standards or regulations.
- G. Protect all new or existing lines from damage by traffic, etc. during construction.
- H. Protect existing trees, indicated to remain with fencing or other approved method. Hold all new subsurface lines outside the drip line of trees, offsetting as necessary to protect root structures. Refer to planting or landscaping plans, or in their absence, consult with the Architect.

## 23. SMOKE AND FIRE PROOFING

- A. The Contractor shall not penetrate rated fire walls, ceilings or floors with conduit, cable, bus duct, wireway or other raceway system unless all penetrations are protected in a code compliant manner which maintains the rating of the assembly. Smoke and fire stop all openings made in walls, chases, ceiling and floors. Patch all openings around conduit, wireway, bus duct, etc., with appropriate type material to smoke stop walls and provide needed fire rating at fire walls, ceilings and floors. Smoke and fire proofing materials and method of application shall be approved by the local authority having jurisdiction.

## 24. QUIET OPERATION, SUPPORTS, VIBRATION AND OSCILLATION

- A. All work shall operate under all conditions of load without any objectionable sound or vibration, the performance of which shall be determined by the Engineer. Noise from moving machinery or vibration noticeable outside of room in which it is installed, or annoyingly noticeable noise or vibration inside such room, will be considered objectionable. Sound or vibration conditions



considered objectionable by the Engineer shall be corrected in an approved manner by the Contractor (or Contractors responsible) at his expense.

- B. All equipment subject to vibration and/or oscillation shall be mounted on vibration supports suitable for the purpose of minimizing noise and vibration transmission, and shall be isolated from external connections such as piping, ducts, etc., by means of flexible connectors, vibration absorbers or other approved means. Surface mounted equipment such as panels, switches, etc., shall be affixed tightly to their mounting surface.
- C. The Contractor shall provide supports for all equipment furnished by him using an approved vibration isolating type as needed. Supports shall be liberally sized and adequate to carry the load of the equipment and the loads of attached equipment, piping, etc. All equipment shall be securely fastened to the structure either directly or indirectly through supporting members by means of bolts or equally effective means. No work shall depend on the supports or work of unrelated trades unless specifically authorized in writing by the Architect or Engineer.

## 25. FINAL CONNECTIONS TO EQUIPMENT

- A. The roughing-in and final connections to all electrically operated equipment furnished under this and all other sections of the contract documents or by others, shall be included in the Contract and shall consist of furnishing all labor and materials for connection. The Contractor shall carefully coordinate with equipment suppliers, manufacturers representatives, the vendor or other trades to provide complete electrical and dimensional interface to all such equipment (kitchen, hoods, mechanical equipment, panels, refrigeration equipment, etc.).

## 26. WELDING

- A. The Contractor shall be responsible for quality of welding done by his organization and shall repair or replace any work not done in accordance with the Architect's or structural Engineer's specifications for such work. If required by the Engineer, the responsible Contractor shall cut at least three welds during the job for X-raying and testing. These welds are to be selected at random and shall be tested as a part of the responsible Contractor's work. Certification of these tests and X-rays shall be submitted, in triplicate, to the Engineer. In case a faulty weld is discovered, the Contractor shall be required to furnish additional tests and corrective measures until satisfactory results are obtained.

## 27. ACCESSIBILITY

- A. The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in partitions and above suspended ceilings for the proper installation of his work. He shall cooperate with the General Contractor (or Construction Manager) and all other Contractors whose work is in the same space, and shall advise each Contractor of his requirements. Such spaces and clearances shall be kept to the minimum size required to ensure adequate clearance and access.
- B. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to junction boxes, pull boxes, contactors, panels, disconnects, controllers, switchgear, etc. Minor deviations from drawings may be made to allow for better accessibility, and any change shall be approved where the equipment is concealed.

- C. Each Contractor shall provide (or arrange for the provision by other trades) the access panels for each concealed junction box, pull box, fixtures or electrical device requiring access or service as shown on Engineer's plans or as required. Locations of these panels shall be identified in sufficient time to be installed in the normal course of work. All access panels shall be installed in accord with the Architect's standards for such work.
- D. Access Doors; in Ceilings or Walls:
  - (1) In mechanical, electrical, or service spaces:
    - 14-gauge aluminum brushed satin finish, 1" border.
  - (2) In finished areas:
    - 14-gauge primed steel with 1" border to accept the architectural finishes specified for the space. Confirm these provisions with the Architect prior to obtaining materials or installing any such work.
  - (3) In fire or smoke rated partitions, access doors shall be provided that equal or exceed the required rating of the construction they are mounted in.

## 28. CUTTING AND PATCHING

- A. Unless otherwise indicated or specified, the Contractor shall provide cutting and patching necessary to install the work specified in this Division. Patching shall match adjacent surfaces to the satisfaction of the Engineer and shall be in accord with the Architect's standards for such work, as applicable.
- B. No structural members shall be cut without the approval of the Structural Engineer and all such cutting shall be done in a manner directed by him.
- C. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore, all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

## 29. ANCHORS

- A. Each Contractor shall provide and locate all inserts required for his work before the floors and walls are built, or shall be responsible for the cost of cutting and patching required where inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers. Drilling of anchor holes may be prohibited in post-tensioned concrete construction, in which case the Contractor shall request approved methods from the Architect and shall carefully coordinate setting of inserts, etc., with the Structural Engineer and/or Architect.

## 30. SLEEVES AND PLATES

- A. Sleeves shall be provided for all conduit passing thru concrete floor slabs and concrete, masonry, tile and gypsum wall construction. Sleeves shall not be provided for piping running embedded in concrete or insulating concrete slabs on grade, unless otherwise noted.
- B. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be packed with oakum and lead, mechanical waterstop or other approved material and made completely water tight by a method approved by the Engineer and/or Architect.
- C. Where conduit motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Check floor and wall construction finishes to determine proper length of sleeves for various locations; make actual lengths to suit the following:
- D. Terminate sleeves flush with walls, partitions and ceiling unless specifically noted on plans. Sleeves stubbed through floors shall terminate 2" above the finished floor unless specifically noted on plans.

### 31. WEATHERPROOFING

- A. Where any work pierces waterproofing, including waterproof concrete, the method of installation shall be as approved by the Architect and/or Engineer before work is done. The Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings absolutely watertight.
- B. Wherever work penetrates roofing, it shall be done in a manner that will not diminish or void the roofing guarantee or warranty in any way. Coordinate all such work with the roofing installer.

### 32. OPERATING INSTRUCTIONS

- A. Upon completion of all work and all tests, each Contractor shall furnish the necessary skilled labor and helpers for operating his systems and equipment for a period of three days of eight hours each, or as otherwise specified. During this period, instruct the Owner or his representative fully in the operations, adjustment, and maintenance of all equipment furnished. Give at least one week's written notice to the Owner, Architect and Engineer in advance of this period. The Engineer may attend any such training sessions or operational demonstrations. The Contractor shall certify in writing to the Engineer that such demonstrations have taken place, noting the date, time and names of the Owner's representative that were present.
- B. Each Contractor shall furnish three complete bound sets for approval to the Engineer of typewritten and/or blueprinted instructions for operating and maintaining all systems and equipment included in this contract. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.
- C. Each Contractor, in the above-mentioned instructions, shall include the maintenance schedule for the principal items of equipment furnished under this contract and a detailed, easy to read parts list and the name and address of the nearest source of supply.

### 33. SCAFFOLDING, RIGGING AND HOISTING

- A. The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

#### 34. CLEANING

- A. The Contractor shall, at all times, keep the area of his work presentable to the public and clean of rubbish caused by his operations; and at the completion of the work, shall remove all rubbish, all of his tools, equipment, temporary work and surplus materials, from and about the premises, and shall leave the work clean and ready for use. If the Contractor does not attend to such cleaning immediately upon request, the Engineer may cause cleaning to be done by others and charge the cost of same to the responsible Contractor. Each Contractor shall be responsible for all damage from fire which originates in, or is propagated by, accumulations of his rubbish or debris.
- B. After completion of all work and before final acceptance of the work, each Contractor shall thoroughly clean all equipment and materials and shall remove all foreign matter such as grease, dirt, plaster, labels, stickers, etc., from the exterior of materials, equipment and all associated fabrication. Pay particular attention to finished area surfaces such as lighting fixture lenses, lamps, reflectors, panels, etc.

#### 35. PAINTING

- A. Each fixture device, panel, junction box, etc., that is located in a finished area shall be provided with finish of color and type as selected or approved by the Architect or Engineer. If custom color is required, it shall be provided at no additional cost to the Owner. All other equipment, fixtures or devices located in finished or unfinished areas, that are not required to have or are provided with finish color or coating shall be provided in a prime painted condition, ready to receive finish paint or coating. All galvanized metal in finished areas shall be properly prepared with special processes to receive finish paint as directed and approved by the Architect.

#### 36. INDEMNIFICATION

- A. The Contractor shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expense and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, any subcontractor, any employee, agent or representative.

#### 37. HAZARDOUS MATERIALS

- A. The Contractor is hereby advised that it is possible that asbestos and/or other hazardous materials are or were present in this building(s). Any worker, occupant, visitor, inspector, etc., who encounters any material of whose content they are not certain shall promptly report the existence and location of that material to the Contractor and/or Owner. The Contractor shall, as a part of his work, ensure that his workers are aware of this potential and what they are to do in the event of suspicion. He shall also keep uninformed persons from the premises during construction. Furthermore, the Contractor shall insure that no one comes near to or in contact with any such material or fumes therefrom until its content can be ascertained to be non-hazardous.

- B. CMTA, Inc., Consulting Engineers, have no expertise in the determination of the presence of hazardous materials. Therefore, no attempt has been made by them to identify the existence or location of any such material. Furthermore, CMTA nor any affiliate thereof will neither offer nor make any recommendations relative to the removal, handling or disposal of such material.
- C. If the work interfaces, connects or relates in any way with or to existing components which contain or bear any hazardous material, asbestos being one, then, it shall be the Contractor's sole responsibility to contact the Owner and so advise him immediately.
- D. The Contractor by execution of the contract for any work and/or by the accomplishment of any work thereby agrees to bring no claim relative to hazardous materials for negligence, breach of contract, indemnity, or any other such item against CMTA, its principals, employees, agents or consultants. Also, the Contractor further agrees to defend, indemnify and hold CMTA, its principals, employees, agents and consultants, harmless from any such related claims which may be brought by any subcontractors, suppliers or any other third parties.

38. ABOVE-CEILING AND FINAL PUNCH LISTS

- A. The Contractor shall review each area and prepare a punch list for each of the subcontractors, as applicable, for at least two stages of the project:
  - (1) For review of above-ceiling work that will be concealed by tile or other materials well before substantial completion.
  - (2) For review of all other work as the project nears substantial completion.
- B. When all work from the Contractor's punch list is complete at each of these stages and prior to completing ceiling installations (or at the final punch list stage), the Contractor shall request that the Engineer develop a punch list. This request is to be made in writing seven days prior to the proposed date. After all corrections have been made from the Engineer's punch list, the Contractor shall review and initial off on each item. This signed-off punch list shall be submitted to the Engineer. The Engineer shall return to the site once to review each punch list and all work prior to the ceilings being installed and at the final punch list review.
- C. If additional visits are required by the Engineer to review work not completed by this review, the Engineer shall be reimbursed directly by the Contractor by check or money order (due net 10 days from date of each additional visit) at a rate of \$140.00 per hour for extra trips required to complete either of the above-ceiling or final punch lists.



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The following is CMTA's guide for required electrical information relative to the Schedule of Values. Please utilize all items that pertain to this project and add any specialized system as required. A thorough and detailed schedule of values will allow for fair and equitable Pay Application approval and minimize any discrepancies as to the status of the job.

**Electrical**

Description of Work	Scheduled Value	Labor	Material
Shop Drawings			
Mobilization/Permits			
Temporary Utilities			
Demolition			
Site Utilities			
Cabletray & Accessories			
Surge Suppression			
Voice/Data System Conduit			
Voice/Data System Wiring			
Voice/Data System Devices & Termination			
Audio/Video System Conduit			
Audio/Video System Wiring			
Audio/Video System Devices & Termination			
Electrical Inspection			
Owner Training			
Record Drawings			
O & M Manuals			
Punch List / Closeout			

END OF SECTION

## SECTION 27 06 10

### VOICE/DATA/CCTV SYSTEM

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The Contractor is directed to examine each and every section of these specifications, all drawings relating to the Contract Documents, any and all Addenda, etc., for work described elsewhere that may relate to the provision of the work described herein. Materials and performance requirements are specified elsewhere herein that relate to these systems.
- B. The Contractor shall familiarize himself with the published UK Communications and Network Systems design standards available at [www.uky.edu/evpfa/facilities/CPMD](http://www.uky.edu/evpfa/facilities/CPMD) and comply with requirements therein. A copy of the standards are attached in the appendix to these specifications. Where conflicts arise with any other contract requirement, the Contractor shall contact the Architect for resolution. The most restrictive requirement will apply. Standard is included as appendix to this document and is part of the construction documents.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Communication Wire.
  - 2. Communication Devices.
- B. The Contractor shall furnish all materials, labor, services, purchasing, etc., that are indicated or required to provide a complete telecommunications distribution system for the project.
- C. The active electronic hardware and software shall be installed by the Owner or his vendor, unless otherwise noted or specified. Telecommunication Contractor is responsible for raceways, wire, connector (i.e. RJ-45) terminations, devices, testing, and coordination of telecommunication system.
- D. Network Switches are by UK CNS.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Submittals shall also be accompanied by a detailed bill of material, including part numbers and quantities.
- B. Shop Drawings:
- C.
  - 1. Conduit layout, showing route to scale, with relationship between adjacent structural, electrical, and mechanical elements. Include the following:
    - a. Vertical and horizontal offsets and transitions.
    - b. Clearances for access above and to side of cable trays.
  - 2. Device Boxes

3. Network Cable
  4. Device Terminations
  5. Device Coverplates
- D. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector. Qualification Data:
1. The Installer shall have a Registered Communications Distribution Designer (RCDD) on permanent full-time staff.
  2. The Installer shall have 50% BICSI trained installers.
  3. Provide at least three references of projects of similar scope and size.
  4. The Owner reserves the right to reject any proposal based on failure to meet qualification requirements.
- E. The Contractor's layout of the Telecommunication Room (TR) is to be submitted for review. All proposed network, low voltage, and systems equipment included in the project are to be shown on the layout at their proposed locations. Include equipment dimensions and mounting heights.
- F. Source quality-control reports.
- G. Field quality-control reports.

#### 1.4 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. Telecommunications Pathways and Spaces: Comply with NFPA 70, TIA/EIA-569-A and UK Communications and Network Systems Standards.
- C. Grounding: Comply with NFPA 70, ANSI-J-STD-607-A and UK Communications and Network Systems Standards.

#### 1.5 COORDINATION

- A. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers.
  1. Meet jointly with telecommunications and LAN equipment suppliers, Engineer, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
  2. Record agreements reached in meetings and distribute them to other participants.
  3. Adjust arrangements and locations of racks, sleeves, cross-connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone and LAN equipment.
- B. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.



## PART 2 - PRODUCTS

### 2.1 PATHWAYS

- A. All communications pathways shall be installed by division 26.
- B. General Requirements: Comply with TIA/EIA-569-A.
- C. Conduit and Boxes: Comply with requirements in Division 26 Sections "Raceways and Fittings" and "Cabinets, Outlet Boxes, and Pull Boxes".
  - 1. Outlet boxes shall be no smaller than 5" x 5" x 2 7/8" with a double gang plaster ring and integral wire management. Randl 5-square series or equal unless otherwise noted on drawings.
  - 2. Minimum conduit size is 1". Interior conduit shall be EMT or RGS. Note: Two (2) 1" conduits or one (1) 1-1/4" are required at each telecommunication location.
  - 3. All conduits shall be attached directly to the cable tray at their termination. A bonding jumper or listed grounding clamp shall be used to ensure continuity.
  - 4. Provide all conduits with connector and plastic bushing at termination point.

2.2 Provide feeder conduit and pullboxes per BICSI recommendations. In no case shall conduit or boxes be smaller than indicated on drawing.

- A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches. Comply with requirements for plywood backing panels specified in Division 06 Section "Rough Carpentry."

2.3 A 4" deep inside depth cable tray will loop the entire perimeter inside all Telecommunications (MDF/IDF) rooms at no less than 8' AFF. Maintain a 4" clearance from each wall. Universal 12" cable ladder will be installed at the top of the communications racks spanning the width of the room. Radius drop outs will be installed on all cable trays where cables exit the tray to a lower elevation.

### 2.4 COMMUNICATIONS OUTLET/CONNECTORS

- A. Jacks: 100-ohm, shielded balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.2-10 up to 500 MHz.
- B. Workstation Outlets: Connector assemblies mounted in two gang faceplate. Provide number of ports as shown on the Drawings.
  - 1. Plastic Faceplate: High-impact plastic. Coordinate color with Division 16 Section "Wiring Devices and Plates."
  - 2. For use with snap-in jacks accommodating any combination of F/UTP, optical fiber, and coaxial work area cords.
    - a. Flush mounting jacks, positioning the cord at a 45-degree angle.
  - 3. Legend: Snap-in, clear-label covers and machine-printed paper inserts.

## 2.5 NETWORK CABLE

- A. Four pair, balanced twisted pair, Category 6A.
- B. Cable to be green in color.
- C. Cable to be by Amp.
  - 1. Patch cables to be provided by UK ITS.
- D. See Appendix A & B of CNS Standards for approved manufacturer information.

## 2.6 BACKBONE CABLE

- A. Backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.
- C. Backbone cabling system shall comply with transmission standards in ANSI/TIA-568-C.Z, when tested according to test procedures of this standard.

## 2.7 GROUNDING

- A. Comply with requirements in Division 26 Section "Grounding and Bonding" for grounding conductors and connectors.
- B. Comply with ANSI-J-STD-607-A and UK Standards.

## 2.8 LABELING

- A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. University of Kentucky IT will provide labeling scheme to follow existing facility standard.

## 2.9 COMMUNICATIONS DEVICES AND PLATES

- A. Cover plates for computer, telephone or other system outlets shall be as required to meet supplier or the owner's requirements, as applicable. Color to match other plates on project. Furnish telephone plates with wall-mounting studs if mounted at 48" or higher. See devices schedule.
- B. Communications devices and wall plates furnished for this project shall be by University of Kentucky CNS Standards. They shall consist of a wall plate bezel, capable of holding snap-in devices as indicated.
- C. Color of communications wall plates shall match the color of all other plates furnished on the project, matching switch, receptacles, etc. Verify all color selections with the Architect
- D. Communications wall plates and devices shall be as manufactured by AMP. See University of Kentucky Standards for additional information.

2.10 PRODUCTS

2.11 Cover MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- Horizontal Cabling
    - a. Amp/TE Connectivity
  - Horizontal Termination Hardware
    - b. Amp/TE Connectivity

2.12 PATHWAYS

- A. General Requirements: Comply with ANSI/TIA-569-C.
- B. Cable Trays:  
Comply with requirements in Division 26 Section "Raceways and Fittings".
- C. Conduit and Boxes: Comply with requirements in Division 26 Sections "Raceways and Fittings for Electrical Systems" and "Cabinets, Outlet Boxes, and Pull Boxes for Electrical Systems" except as noted below.  
All outlet boxes for communications shall be no smaller than 5" x 5" x 2-7/8" deep with a single or double gang plaster ring and integral wire management. Outlet plaster rings shall be as required for faceplates.  
Minimum conduit for communications outlet boxes shall be two (2) 1" conduits or one (1) 1 1/4". Interior conduit shall be EMT or RGS. Exterior conduits shall be Schedule 40 PVC encased in 3" of concrete per detail.  
A bonding jumper shall be used to ensure continuity to cable tray.  
Provide all conduits with connector and insulated bushing at their termination point.

2.13 BACKBOARDS

- A. Backboards: Plywood, fire-retardant treated, 3/4" x 96" inches tall. Comply with requirements for plywood backing panels specified in Division 06 Section "Rough Carpentry".

2.14 EQUIPMENT FRAMES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. Ortronics
- B. General Frame Requirements:  
Distribution Frames: Freestanding and wall-mounting, modular-steel units designed for telecommunications terminal support and coordinated with dimensions of units to be supported.  
Module Dimension: Width compatible with EIA 310 standard, 19-inch panel mounting.  
Finish: Manufacturer's standard, baked-polyester powder coat.
- C. Floor-Mounted Racks: Modular-type, steel construction.  
Heavy duty aluminum 7' tall, floor mount racks with cable management channels on both sides and mounting rails for 19" equipment.  
Vertical and horizontal cable management channels, top and bottom cable troughs, grounding lug.  
Baked-polyester powder coat finish.  
Racks shall be Ortronics Mighty Mo 6 with 16.25" channel depth or equal.
- D. Cable Management for Equipment Frames:  
Metal, with integral wire retaining fingers.  
Baked-polyester powder coat finish.  
Vertical cable management panels shall have front and rear channels, with covers. Provide vertical management on both sides of all racks.

Provide horizontal crossover cable manager at the top of each relay rack and between/below all patch panels, with a minimum height of two rack units each.

E. Rack Mounted Hardware

Rack elevation drawings showing termination hardware placement are required for approval prior to installation. Optical fiber distribution shelves shall be installed in the top positions of the rack. For MDF/IDF rooms with multiple racks, blank panels will be installed in the top positions to reserve the equivalent of seven (7) rack mount spaces in all racks that do not require fiber closures. Patch panels will be installed with horizontal wire management panels above, below and in between each panel.

F. Wall Mounted Hardware

Wall mounted voice blocks shall be properly secured to the plywood backboard. Location of the blocks within the MDF/IDF rooms shall be approved by CNS Design and Engineering. D rings shall be installed for wire management on the backboard. Standard 50 pair 66 blocks or 110 blocks shall be used for voice backbone cable terminations not requiring protection. Provide wall mounted protection blocks.

2.15 UTP HORIZONTAL CABLE

- A. Description: 100-ohm, 4-pair Unshielded UTP, covered with a thermoplastic jacket. Comply with ICEA S-90-661 for mechanical properties. Comply with ANSI/TIA-568-C.1 for performance specifications. Comply with ANSI/TIA-568-C.2 Category 6A up to 500 MHz. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
- a. Communications, General Purpose: Type CM or CMG.
  - b. Communications, Riser Rated: Type CMR or CMP.

2.16 UTP HORIZONTAL CABLE HARDWARE

- A. General Requirements for Cable Connecting Hardware: Comply with ANSI/EIA-568-C.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- B. Connecting Blocks: Shielded modular jack to be compatible with cabling system. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.
- C. Patch Panel: Modular panels housing 48 modular snap-in jack units. Patch panels shall be angled style. Number of Jacks per Field: One for each four-pair UTP cable indicated, plus spares and blank positions adequate to suit specified expansion criteria.
- D. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

PART 3 - EXECUTION

3.1 WIRING METHODS

- A. Wiring Method: Conceal raceway except in unfinished spaces.
1. Comply with requirements for raceways and boxes specified in Division 26 Sections "Raceway and Fittings" and "Cabinets, Outlet Boxes, and Pull Boxes".

### 3.2 INSTALLATION OF PATHWAYS

- A. Conduit and Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A. Comply with UK Communications and Network Systems standards
- B. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
- C. Install manufactured conduit sweeps and long-radius elbows whenever possible.
- D. Pathway Installation in Communications Equipment Rooms:
  - 1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
  - 2. Install cable trays complete around room as shown on drawings. Install cable ladder directly on top of racks and connect to perimeter tray.
  - 3. Secure conduits to backboard when entering room from overhead.
  - 4. Extend conduits 4 inches above finished floor and/or 18" below ceiling structure.
  - 5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding bar.
- E. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints. Provide on all walls.

### 3.3 FIRESTOPPING

- A. Comply with requirements in Division 07 Section "Penetration Firestopping."
- B. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.

### 3.4 GROUNDING

- A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. Comply with ANSI-J-STD-607-A.
- C. Comply with UK Communications and Networking Systems Telecommunication Systems.
- D. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- E. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
  - 1. Bond the shield of shielded cable to the grounding bus bar in communications rooms and spaces.

### 3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

B. Tests and Inspections:

1. Visually inspect cable tray connections and supports. Visually verify cable tray grounding and conduit bonds.

3.6 WARRANTIES

- A. **INSTALLATION WARRANTY.** The Contractor shall warrant the pathway system and hardware against defects in workmanship (parts and labor) for a period of two (2) years from the date of system acceptance. The warranty shall cover all labor and materials necessary to correct a failed portion of the system and to demonstrate performance within the original installation specifications after repairs are accomplished. This warranty shall be provided at no additional cost to the Owner.

**END OF SECTION**

## SECTION 28 31 00

### FIRE ALARM SYSTEM

#### PART 1 – GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications sections apply to work of this section.

#### PART 2 - DESCRIPTION OF WORK

- 2.1 Extent of fire alarm and detection system work is indicated by drawings and schedules. Work consists of an addition to the existing JCI/Simplex systems. Additional panels shall be added as needed to extend the system for this area to accommodate additional devices.
- 2.2 Types of fire alarm and detection systems in this section include the following:
- 2.2.1 Match Existing.

#### PART 3 - QUALITY ASSURANCE

- 3.1 Manufacturers: A firm regularly engaged in manufacture of fire alarm and detection systems, of types and sizes, and electrical characteristics required, whose products have been in satisfactory use in similar service for not less than 5 years.
- 3.2 Installer: Qualified with at least 5 years of successful installation experience on projects with fire alarm and detection system installation work similar to that required for project.
- 3.3 Code Compliance: Comply with all NFPA Requirements as applicable to construction and installation of fire alarm and detection components and accessories.
- 3.4 UL Compliance and Labeling: Provide fire alarm and detection system components which are UL listed and labeled.
- 3.5 FM Compliance: Provide fire alarm and detection systems and accessories which are factory mutual approved.

#### PART 4 - SUBMITTALS

- 4.1 Product Data: Submit manufacturer's data on fire alarm and detection systems including, but not limited to, rough-in diagrams and instructions for installation, operation and maintenance, suitable for inclusion in maintenance manuals.
- 4.2 Shop Drawings: Provide shop drawings showing equipment/device locations and connecting wiring of entire fire alarm and detection system. Include wiring diagrams, riser diagrams, and point to point drawings.

#### PART 5 - ACCEPTABLE MANUFACTURERS

- 5.1 Manufacturer: Simplex to match existing system.

#### PART 6 - FIRE ALARM AND DETECTION SYSTEMS

- 6.1 General: Provide fire alarm and detection system products of types, sizes and capacities indicated, which comply with manufacturer's standard design, materials, components; construct in accordance with published product information, and as required for complete installation. Provide fire detection systems for applications indicated, and with the following sequence of operations, components and function features:
- 6.2 Either manual activation of a fire alarm station or activation of an automatic initiating device shall sound a non-coded alarm and provide device identification on an annunciator.
- 6.3 Equip and wire system so that energizing the fire alarm audible visual signaling devices also activates the following:
- 6.4 System Operating Features:
  - 6.4.1 The system shall automatically transmit an alarm to the local fire department.
  - 6.4.2 Activation of any fire alarm device shall cause the associated device to indicate an alarm at the fire alarm control panel and annunciator panels, and a signal to be transmitted to the fire department.
  - 6.4.3 Activation of any manual pull station shall cause all A/V devices to operate and release magnetic hold open devices.
  - 6.4.4 Activation of any ceiling mounted smoke or heat detector shall cause all A/V devices to operate, release magnetic hold open devices, and transmit an alarm to the Fire Department.
  - 6.4.5 Activation of an AHU duct smoke detector shall cause the associated air handling unit to shut down and the operations described for ceiling mounted smoke and heat detectors. Otherwise, air handling units shall continue to operate.
  - 6.4.6 Activation of a fire protection system flow or tamper switch shall cause all A/V devices to operate and release magnetic hold open devices.
  - 6.4.7 Provide static pressure switch in main supply air duct at all air handling units with smoke dampers in the supply air duct systems. Connect switch to shut down A.H.U. on static pressure of 2.0" water gauge (+ 1.0" field adjustable).
  - 6.4.8 Provide all smoke damper closure and air handling unit shut-down similar to the existing system.

#### PART 7 - MATERIALS AND EQUIPMENT

- 7.1 Wiring System Materials: Provide basic wiring materials which comply with Division Basic Materials and Methods sections, "Raceways", "Wires and Cables", and "Electrical Boxes and Fittings"; types to be selected by Engineer.
- 7.2 All conductors shall be solid copper, stranded copper or bunch tinned stranded copper for A.W.G. sizes 16 and 18 (stranded), a maximum of 7 strands shall be permitted. In A.W.G. sizes 16 and 18 (stranded) a maximum of 9 strands shall be permitted if strands are bunch tinned. In A.W.G. size 14 (stranded) a maximum of 19 strands shall be permitted.



7.3 Conductors shall be as follows:

CIRCUITS (Unless Otherwise Specified)	WIRE SIZE-AWG	WIRE COLOR	EOL VALUE
ALARM CIRCUITS WIRES Stations Smoke Detectors	#18	ORANGE (pos.) BLUE (Negative)	3.3KOHM
TROUBLE CIRCUIT WIRING	#18	BROWN	
COMMON ANNUNCIATOR WIRES	#18	VIOLET	
POINT ANNUNCIATOR WIRES	#18	PINK W/ BRADY TAG	
120 VAC WIRING	#12	BLACK WHITE (Neutral)	
24 DC	#14	RED (Positive) BLACK (Negative)	
PARALLEL SIGNAL WIRES	#14	RED (Positive) BLACK (Negative)	15K OHM
SERIES SIGNAL WIRES	#14	YELLOW	NONE
DOOR HOLDER	#14	BLUE WHITE (neutral)	
FAN SHUT DOWN WIRES	#14	SELECTED BY CONTRACTOR	

7.4 Junction boxes and terminal panels shall be painted red and be provided with a suitable number of terminals and of proper size for their use.

7.5 All wiring shall be installed in strict compliance with all the provisions of NEC-Article 760, Power-Limited Protective Signaling circuits. Wiring color code shall be maintained throughout the installation.

7.6 Manual Fire Alarm Stations: Provide manufacturer's standard construction, red enclosure, manual fire alarm stations to be similar to and compatible with the existing system.

7.6.1 Semi-flush mounted (finished areas).

7.6.2 Addressable

7.7 Automatic Fire Detectors: Provide manufacturer's standard construction addressable automatic fire detectors similar to and compatible with the existing system.

7.8 Automatic Smoke (Combustion Products) Detectors: Provide manufacturer's standard construction True Alarm automatic smoke detectors to be similar to and compatible with the existing system.

7.9 Automatic Alarm Initiative Switches and Extinguishing Systems: Provide manufacturer's standard construction automatic switches for the following applications:

7.10 Chimes: Provide manufacturer's standard construction electronic fire alarm chimes to be similar to and compatible with the existing system.

7.11 Combination Alarm Unit: Provide manufacturer's standard construction combination bell and light unit or combination chime and light as indicated on the drawings to meet provisions of ADA.

- 7.12 Annunciators: Modify all existing annunciators as required to accommodate all work of this project.
- 7.13 Control Panels: Modify all existing control panels and/or install new control panels as required to accommodate all work of this project.

#### PART 8 - INSTALLATION OF FIRE ALARM AND DETECTION SYSTEMS

- 8.1 Install fire alarm and detection systems as indicated, in accordance with equipment manufacturer's written instructions and complying with applicable portions of NEC.

#### PART 9 - INSTALLATION OF BASIC IDENTIFICATION

- 9.1 Install electrical identification in accordance with Division 16 Basic Materials and Methods Section "Electrical Identification".
- 9.2 All conductors shall be marked at each termination and junction point. Markings shall be permanent. Markings shall be same as those which appear on "As Built Drawings".

#### PART 10 - INSTALLATION OF BASIC WIRING SYSTEM MATERIALS

- 10.1 Install wiring, raceways, and electrical boxes and fittings in accordance with Division 16 Basic Materials and Methods sections, "Raceways", "Wires and Cables", and Electrical Boxes and Fittings".

#### PART 11 - FIELD QUALITY CONTROL

- 11.1 Inspect relays and signals for malfunctioning, and where necessary, adjust units for proper operation to fulfill project requirements. Clean smoke detector chambers with gas to clear them of all foreign material.

#### PART 12 - TESTING

- 12.1 Upon completion of installation of fire alarm and detection systems, test to demonstrate capability and compliance with requirements. Where possible, field correct malfunctioning units, then retest to demonstrate compliance.

#### PART 13 - DEMONSTRATE AND INSTRUCTION

- 13.1 Demonstrate and instruct Owner's representative in operation, service, and maintenance of units. Obtain receipt that this has been accomplished.
- 13.2 Provide a minimum of 1 hour of detailed instruction to the Owner's Representative at completion of the project.

**END OF SECTION**