UNIVERSITY OF KENTUCKY

Purchasing Division

Request for Proposal
UK-2158-21
Proposal Due Date – 05/26/2021

Poultry Research Facility Relocation - Poultry Buildings

Project #2505.0

An Equal Opportunity University

UNIVERSITY OF KENTUCKY
Purchasing Division

REQUEST FOR PROPOSAL (RFP)

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

PROPOSAL NO.:	**UK-2158-21**	**RETURN ORIGINAL COPY OF PROPOSAL TO:**
Issue Date:	**04/26/2021**	**UNIVERSITY OF KENTUCKY**
	Poultry Research Facility Relocation - Poultry	**PURCHASING DIVISION**
Title:	**Buildings**	**411 S LIMESTONE**
Purchasing Officer:	**Matt Spalding**	**ROOM 322 PETERSON SERVICE BLDG.**
Phone:	**859-323-5405**	**LEXINGTON, KY 40506-0005**

IMPORTANT: PROPOSALS MUST BE RECEIVED BY: 05/26/2021 @ 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, 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, 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, and164.390;
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 KRS45A.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.

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

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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/offerors’ 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

This Request for Proposals (RFP) is issued to solicit proposals from qualified, experienced, financially sound, and responsible firms to provide turnkey design and construction services for two poultry buildings for the College of Agriculture at the new Poultry Research Facility located at 1171 Midway Road in Versailles, KY.

This RFP Consists of the design and construction of two buildings; a layer/breeder building, and a nutritional studies building

All work will be performed under contract with the Construction Manager, Congleton-Hacker Company

The following items are attached to this RFP and are to be considered as included in this scope of work.

Attachments

Attachment A - Congleton-Hacker Company Subcontract Agreement
Attachment B - Project Schedule
Attachment C - MEP Narrative
Attachment D - General Conditions
Attachment E - Special Conditions
Attachment F - Requirements Common to all Work Categories
Attachment G - Determination of Responsibility
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2.2 Background Information

The project will relocate the current program, on Coldstream Farm, to the C. Oran Little Research Center in Versailles, Kentucky. At completion, the area dedicated for research will exist in a new modern facility with new equipment. The existing program facility was constructed in the late 1980's and is on University property that is included in the land swap agreement between the University and Lexington-Fayette Urban County Government.

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.

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.

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

Release of RFP	04/26/2021
Pre-Proposal Conference (Optional)	10 a.m. Eastern Time on 05/07/2021
Deadline for Written Questions	3 p.m. Eastern Time on 05/13/2021
RFP Proposals Due	3 p.m. Eastern Time on 05/26/2021
Offeror Presentations*	Week of 05/31/2021
Contract Award*	Week of 06/07/2021

*projected dates

3.2 Offeror Communication

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:

Mr. Matt Spalding
Purchasing Division
University of Kentucky
322 Peterson Service Building
Lexington, KY 40506-0005
Phone: (859) 323-5405
Fax: (859) 257-1951
E-mail: matthew.spalding@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 on **Friday, May 7th, 2021 at 10:00 am at 1171 Midway Road, Versailles KY 40383** located on the C. Oran Little Research Center 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.
- 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:** Two (2) copies on electronic storage devices (USB) (1 copy per storage device) each clearly marked with the proposal number and name, firm name and what is included (Technical Proposal) and one (1) printed original copy

- **Financial Proposal:** Two (2) copies on electronic storage devices (USB) (1 copy per storage device) each clearly marked with the proposal number and name, firm name and what is included (Financial Proposal) and one (1) printed original copy

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.

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 additional, please indicate the diversity nature of your company as well as ownership race/ethnicity.

Check One Only	Diverse Business Description (If Diverse Business, determine the classification that is the best description)	Internal Code
	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

Race/Ethnicity	Check One
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.

a) Please provide a brief narrative describing the history of your company. Identify the ownership of your company, Include supplemental information if joint venturing and/or specialty tier vendors/contractor(s).
b) Please provide the Offerors qualifications for performing the work described in this RFP including specification requirements.
c) Describe your personnel and/or subcontractors for support of the present and in the future. Who will be the Project Manager and onsite foreman qualifications for performing the work described in this RFP? Please provide the Project Managers' qualifications for performing the work described in this RFP.
d) Provide resumes or a description of the design professionals who will be performing the project design & include portfolios of a minimum of five (5) projects which have been completed which demonstrates their design abilities.

4.6 Criteria 2 – Services Defined

a) The Contractor should provide documentation of their understanding of the services requested in the RFP and contract documents.
b) Your proposal should provide for the completion of all work necessary for completion of this RFP.
    i.) If, there is any section of the work described in this RFP that is excluded by the Offerer, it should be specifically called out as such. It is not the intent of this RFP to exclude a bidder that does not perform all scopes of work contained herin.
    ii.) Explain how your firm/team approaches the design/build process and will work with the University, end users, construction manager, and design team for a successful project.

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 examples of completed projects, including project cost, schedule, and completion date to demonstrate your firm's capabilities.

4.9 Criteria 5 – Other Additional Information

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

The offeror may present any creative approaches that might be appropriate. The offeror may also provide supporting documentation that would be pertinent to this RFP.

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.

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 from the date of award through final completion of the project. See Attachment E Special Conditions for further information.

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 minimum insurance coverages as defined in Attachment A – Congleton-Hacker Company subcontract agreement (Exhibit C).

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

The University, or its duly authorized representatives, shall also have access to any books, documents, papers, records or other evidence which are directly pertinent to this contract for the purpose of financial audit or program review.

In the event that successful Contractor(s) does not meet the reporting requirements based on the terms and conditions herein, the contract is subject to cancellation or termination.

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). 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 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.

6.26 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.

7.0 SCOPE OF SERVICES

7.1 Detailed Services Defined

a. The Poultry Buildings Subcontractor shall be responsible for design and construction of the poultry buildings complete, including, but not limited to all framing, siding, roofing, and concrete.
b. The poultry building subcontractor shall furnish and install all exterior concrete stoops and concrete paving adjacent to buildings.
c. The poultry building subcontractor shall furnish and install all interior construction including all architectural, interiors, plumbing, mechanical, electrical, and low voltage systems as specified.
d. The poultry building subcontractor shall be familiar with poultry building construction and specific items and systems integral to the poultry industry, including but not limited to adequate heating, cooling, and ventilation requirements for poultry. Architectural, plumbing and electrical systems suitable for the poultry environment.
e. Temporary heating and cooling, including equipment and fuel costs shall be by the poultry building subcontractor.
f. The poultry building subcontractor shall furnish and install wiring for the generator battery charger and terminate.
g. Daily and final cleaning of all buildings shall be by the poultry building subcontractor.
h. Sitework, including site demolition, grading & storm shall be by a sitework subcontractor under a separate contract and is not included in this RFP.
i. Grading shall be by the sitework subcontractor and shall include all grading and compaction of the building pad and furnishing and installing stone a stone base for the slab on grade, prior to excavation of footings. Any required footing excavation and backfill shall be by this subcontractor.
j. The sitework sub-contractor will furnish and install all gravel paving around buildings.
k. Site electrical raceways shall be installed as shown on U-100 by the site electrical subcontractor.
l. The site electrical subcontractor will provide a 60 amp temporary electrical service. All other temporary required shall be provided by the poultry building subcontractor.
m. Domestic water and sanitary sewer will be provided to within 5’ of the building. The poultry building subcontractor will be responsible for water & sanitary up to 5’ outside the building.
n. The site electrical subcontractor shall furnish and install all secondary wiring and conduit up to and including the CT cabinet and meter base. All conduit and wire downstream of the CT cabinet is by the poultry building subcontractor.
o. Site data & telephone services shall be provided by others to a single point of termination in each building. Distribution from that point shall be by the poultry building subcontractor.

8.0 FINANCIAL OFFER SUMMARY

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

8.1 Mandatory Services (Section 7.1)

The Offeror agrees to furnish all labor, materials, supplies, design and services required to complete the Work, for the above referenced Project, for the Capital Construction Procurement Section, University of Kentucky as described in the RFP including Attachments and as modified by Addenda.

FOR THE LUMP SUM OF _____
(USE WORDS)

_____DOLLARS AND_____CENTS.
(USE WORDS) (USE WORDS)

($_____)
(USE FIGURES)

Please provide breakout pricing below. This pricing is for bid evaluation purposes only.

Nutritional Studies Building Total Cost - $_____

Layer/Breeder Building Total Cost - $_____

8.2 Alternate Pricing

In addition to the above financial offer, the offeror may submit alternative financial proposals, however the information requested above must be supplied and will be used for proposal evaluation purposes.

Alternate No. 2: Walk-in Coolers:

1. Base Bid: Walk-in Coolers located in the Layer/Breeder Building to be Owner-Furnished, Owner Installed"
2. Alternate: Walk-in Coolers located in the Layer/Breeder Building to be provide and installed by the Metal Poultry Building Supplier/Installer.

ADD ALTERNATE #2 $_____

Additional Financial Commitment

In addition to the financial offers, please propose a financial commitment to assist the University. Options may include a signing bonus, scholarships, internships, commitment to hire University Graduates or a (%) percentage rebate.

{Logos.Logo}

{Date.Long Date}

{Company.Name}
{Addresses.DisplayAddress}

Please furnish us with the following:

1. Please print pages three (3) and nineteen (19) of the following contract, complete, execute and return two copies of each page to Congleton-Hacker Company via United States Postal Service. Congleton-Hacker Co. will countersign and return an original signature page for your files.

2. Have your insurance agent provide us with a copy of your Certificate of Liability Insurance for our files. This certificate must indicate coverages and the additional insured clause as specified on the attached subcontractors' minimum insurance requirements.

3. Request for Project Data Information (Exhibit D). The enclosed form must be completed, signed, and returned to Congleton-Hacker Co. By furnishing this information you are agreeing that we may contact the parties for the purpose of obtaining information relating to this project. The sole purpose for this request is the protection of our project from mechanics and similar type liens.

4. Information for Application for Payment (as Enclosed)

   a. Summary of Application for Payment Form. The completion of this summary form will assist us in processing your invoices.
   b. Payments Estimate Supplemental Information Form. This form must be completed and submitted along with your Application for Payment.
   c. Subcontractor, Supplier or Vendor Affidavit and Waiver of Lien. Your suppliers and subcontractors (as listed on the previous Payment Estimate Supplemental Information Form) must submit this release for your previous invoice payments.
   d. Subcontractor Affidavit and Waiver of Lien. You must submit this release for your previous invoice payments.
   e. **Invoices and all accompanying documentation are to be emailed to invoice@congleton-hacker.com.**

We ask that Items No. 1, 2 and 3 be furnished to us within ten (10) days of the date of this letter.

We are pleased to be working with you on this project and assure you our fullest cooperation.

Sincerely,

CONGLETON-HACKER COMPANY

{Projects.ProjectManager}
Project Manager

CONGLETON-HACKER COMPANY
872 Floyd Drive-Lexington, Kentucky 40505
www.congleton-hacker.com

Phone: 859.254.6481
Fax: 859.253.0442
Email: info@congleton-hacker.com

SUBCONTRACT

No. {Contracts.ContractNumber}	CODE NO. VENDOR ID: **{Contracts.CSICode}0/04 {Contracts.ToCompanyID}**

This Agreement (also referred to as "the Subcontract"), made this **({Contracts.ContractDate}** "Long Date"), by and between Congleton-Hacker Company, a Kentucky Corporation (hereinafter called the "Contractor"), with its principal place of business located at 872 Floyd Drive, Lexington, Kentucky, and **{ToCompany.Name}** (hereinafter called the "Subcontractor") a **{Company.TypeOfBusiness}** with its principal place of business at **{Contacts.DisplayAddress}.**

WHEREAS, Congleton-Hacker Company has contracted with **{LegalDocInfo.Owner}** (hereinafter "the Owner") to provide labor and materials for the construction of the **{Projects.Name}** (hereinafter "the Project") located at **{Projects.Address}**, and

WHEREAS, Subcontractor has proposed a price to perform a certain scope of Work identified in Article 1 (hereinafter "the Work") on the Project, and

NOW THEREFORE, in consideration of the following, the parties agree:

Article 1. SCOPE. The Subcontractor shall furnish all labor, materials, supervision, tools, equipment, transportation, tests, permits, taxes and insurance necessary to expedite and complete in place all Work in connection with the **{Contracts.ScopeOfWork}** as described under **Section(s) {Contracts.CSICode}** of the specifications and/or shown on the drawings as prepared by **{LegalDocInfo.ArchName}** and which drawings and specifications are available on Contractor's FTP site or other location or means designated by the Contractor. The Subcontractor shall perform the Work at the direction of Contractor and in accordance with this Agreement and the Contract Documents. Subcontractor shall perform all activities necessary or incidental to complete the Work set forth in Drawings and Specifications listed in Exhibit I to this Subcontract. Such performance shall be entirely acceptable to the Contractor and to the Owner and/or its duly authorized representative and in accordance with the Contract Documents.

1.1 Owner Purchased Items. If the Owner elects to furnish materials or equipment for the Project, then the scope of this Subcontract shall include any such Owner-furnished materials or equipment. ("Owner Furnished Items"). Owner Furnished Items, if any, are listed in Exhibit J to this Agreement and shall be used by the Subcontractor in completion of the Work. Subcontractor shall be responsible for proper handling, use and installation of Owner Furnished Items in accordance with the Contract Documents. Subcontractor shall maintain and preserve the quantity, quality, conformity and warranty of the Owner Furnished Items. Subcontractor shall prepare shop drawings, coordinate delivery, receive, unload, install, connect, start-up, commission, adjust and guarantee the Owner Furnished Items as part of Subcontractor's Work.

1.2 Contract Documents. The Contract Documents for this Project are defined as, and consist of the agreement between the Owner and the Contractor, together with the conditions of the contract between the Owner and the Contractor (general, supplementary, and other conditions) (collectively the "Prime Contract"), all drawings, specifications, and all addenda issued prior to the execution of the agreement between the Owner and the Contractor, and all modifications and change orders issued subsequent thereto. The Contract Documents are available for examination by the Subcontractor upon request. The Subcontract Documents (also referred to as "this Agreement" or "the Subcontract") shall include this Agreement and all exhibits incorporated herein together with "the Contract Documents."

Subcontractor represents and agrees that it has carefully examined and understands the Contract Documents and the Subcontract Documents.

Article 2. SUBCONTRACTOR'S OBLIGATIONS. This Agreement is subject to all the provisions of the Contract Documents between the Contractor and the Owner and the Contract Documents are incorporated herein by reference and made a part hereof as if fully set out herein. It is agreed that the Subcontractor shall comply with all the requirements of the Contract Documents, perform all of the obligations and assume all the liabilities and responsibilities required of the Contractor under its contract with the Owner. Subcontractor agrees that Contractor shall have the same rights and remedies as against the Subcontractor as the Owner under the Contract Documents has against the Contractor. In the case of an inconsistency between this Agreement and the Contract Documents, the provision imposing the greater or more stringent duty or obligation on the Subcontractor shall govern, unless Contractor in its sole discretion determines otherwise as to any specific inconsistency.

2.1 Sub-subcontractors and Material Suppliers. The Subcontractor shall not subcontract to third parties any part of its Work without the written consent of the Contractor, and such consent does not in any way relieve the Subcontractor from any provision of this Agreement or the Contract Documents. Such sub-subcontracted Work must be under terms and conditions that specifically incorporate the terms and conditions of this Agreement and the Contract Documents. Subcontractor shall provide a list of proposed sub-subcontractors and material and equipment suppliers and submit this information on the Project Information Form, (Exhibit "D" to this Subcontract) within ten calendar days of the date of the Letter of Intent or the date of this Agreement, whichever is earlier.

Because time is of the essence, the Subcontractor shall submit copies or electronic files of Shop Drawings, Catalogue Cuts, Brochures, Schedules and/or Samples as required in the Specifications on/or before (date) for materials and/or equipment it is furnishing. The Subcontractor shall be responsible for the accuracy of the submittals, as well as the conformance with the Contract Documents.

Subcontractor shall ensure that its sub-subcontractors and suppliers cooperate with Contractor and all other subcontractors whose work is dependent upon the progress of the Subcontractor's Work, and shall participate as needed in the preparation of coordination drawings and work schedules. Subcontractor and its sub-subcontractors shall follow Contractor's directives to keep the Project free from debris and unsafe conditions resulting from Subcontractor's Work, and daily cleanup of Subcontractor's Work areas.

2.2 Workmanship. Subcontractor's Work shall be performed in strict accordance with this Agreement and the Contract Documents in a workmanlike manner. The workmanship shall be the best of the kind performed by others in the same trade. All materials shall be new, conform to the Contract Drawings, and be furnished timely and in appropriate quantities.

2.3 Temporary Services. Unless otherwise provided in this Subcontract, Subcontractor shall provide all temporary services and facilities necessary to perform its Work, including but not limited to heat, electrical power, telephone, water and other utilities.

2.4 Progress Reports and Meetings. Subcontractor shall provide progress reports as required, including status of schedule and materials and equipment being manufactured for incorporation into the Work. An authorized representative of Subcontractor shall also attend all progress and/or coordination meetings held by Contractor.

2.5 Authorized Representative. The Subcontractor shall designate in writing the person(s) who shall serve as the Subcontractor's authorized representative on-site and off-site. This person or these persons shall bind the Subcontractor with respect to all Project documents, including but not limited to

Change Orders, and shall be the person to whom Contractor shall issue instructions and direction, except in the case of an emergency.

On-Site Representative: _____

_____

Off-Site Representative: _____

_____

Contractor may, in its discretion require Subcontractor to dismiss from the Work any personnel of Subcontractor or any of its subcontractors, including the Authorized Representative, for any reason, effective upon written notice from the Contractor of such dismissal request. Subcontractor agrees to ensure the continuity of personnel assigned to perform the Work. Any removal or reassignment of personnel assigned to perform the Work shall be with replacements who will have substantially equivalent or better qualifications than the persons replaced. There will be no charge to Contractor while the replacements acquire the necessary training and familiarity with the Work.

2.6 Compliance with All Laws. At all times, and at Subcontractor's own costs, Subcontractor shall comply with all federal, state and local laws, statutes, codes, rules, regulations, ordinances, executive orders and other laws relating to the Project and the Work. Subcontractor warrants and represents that it is authorized to transact business in the state and local jurisdictions where the Project is located, that it holds any and all licenses necessary to perform the Work and that is has not violated any statutes, codes, rules, regulations, ordinances, orders and/or other laws on other projects. Contractor shall have the right to request, and Subcontractor shall promptly provide, proof of Subcontractor's licensure. Subcontractor is solely responsible for all matters relating to compensation and benefits of all of Subcontractor's personnel who perform the Work. This responsibility includes but is not limited to: (1) timely payment of compensation and benefits, including overtime, medical, dental and any other benefit, and (2) all matters relating to compliance with all employer obligations to withhold employee taxes, pay employee and employer taxes and file payroll tax returns and information returns under local, state and federal income tax laws, unemployment compensation insurance and state disability insurance tax laws, social security and Medicare tax laws, and all other payroll tax laws or similar laws with respect to all Subcontractor personnel providing Work. Subcontractor shall, upon request, provide Contractor or Owner with proof of compliance. Subcontractor shall indemnify, defend and hold Owner and Contractor harmless from all liabilities, costs, expenses and claims related to Subcontractor's failure to comply with this Section.

2.7 Permits and Fees. The Subcontractor shall notify, secure and pay for all permits, fees, licenses, assessments, inspections and taxes necessary for the performance, completion or use of the Subcontractor's Work.

2.8 Use of Contractor's Equipment. The Subcontractor, its agents, employees, Subcontractors or suppliers shall provide all equipment necessary to perform the Work. Contractor is not responsible for, nor does it intend to provide equipment for Subcontractor's use.

2.8.1 If Contractor determines, in its sole discretion, that Subcontractor may make deminimus use only of Contractor's equipment, and only if Contractor's authorized representative has provided express written permission for Subcontractor to make deminimus use of Contractor's equipment, and only if Subcontractor has provided an executed Waiver, which is Exhibit F to this Subcontract, to Contractor, may Subcontractor make limited use of Contractor's equipment, solely for convenience and solely at the discretion of the Contractor. If the Subcontractor or any of its agents, employees, suppliers or lower tier Subcontractors utilize any machinery, equipment, tools, scaffolding, hoists, lifts or similar items

owned, leased, or under the control of Contractor, the Subcontractor shall be liable to Contractor (as provided in Article 5 herein) for any loss or damage (including personal injury or death) which may arise from such use, except where such loss or damage shall be found to have been due solely and exclusively to the negligence of Contractor's employees operating such equipment. Subcontractor agrees that it is using the equipment at its own risk, and uses the equipment as is, without any representations or warranties from Contractor.

2.8.2 Subcontractor shall indemnify, defend and hold Contractor harmless from any loss, claim, damage, or other costs, fees and/or expense (including personal injury, property damage or death), which may arise from Subcontractor's use of Contractor's equipment, including the use of Contractor's equipment by Subcontractor's employees, agents, sub-subcontractors or suppliers or any other party for whom Subcontractor may be liable, except where such loss or damage is determined to have been solely and exclusively the fault of Contractor.

2.8.3 Subcontractor shall provide only qualified, skilled and trained operators of Contractor's equipment. Contractor shall be entitled to request proof of training and skill at any time, and Subcontractor shall discontinue use of Contractor's equipment until it has provided such proof satisfactory to Contractor.

2.8.4 Subcontractor shall provide all maintenance, fuel and other items necessary for operation of Contractor's equipment during Subcontractor's use of the equipment.

2.8.5 Subcontractor shall return the equipment in the same or better condition than the condition of the equipment upon receipt, and Subcontractor shall repair any and all damage to the equipment.

2.8.6 Subcontractor shall not permit other subcontractors or other persons to use Contractor's equipment.

2.9 Clean Up. The Subcontractor shall follow Contractor's clean-up directives and those of the Contract Documents, and at all times keep the building and premises free from debris and unsafe conditions resulting from the Subcontractor's Work; and broom clean each Work area daily prior to discontinuing Work in the same.

Should Subcontractor fail, within 24 hours after notice from Contractor, to appropriately clean an area as required by this Section, Contractor shall assess the Subcontractor for the actual daily clean-up cost or a daily charge of $200.00, whichever is greater, for each day such condition is not remedied.

Article 3. SCHEDULE, DELAY AND LIQUIDATED DAMAGES. Time is of the essence, and Subcontractor agrees to furnish all materials and perform all Work at whatever pace necessary to complete the Project in accordance with the Contractor's schedule ("the Project Schedule") at no additional cost to Contractor. The Project Schedule is a document prepared by the Contractor, (available to Subcontractor on Contractor's FTP Site or other location or means designated by the Contractor), and updated from time to time by the Contractor. The Subcontract Work is critical to the timely completion of the Project. In order to ensure timely performance in accordance with Contractor's Project Schedule, as updated from time to time, Subcontractor shall commence its Work within five (5) business days after receipt of Contractor's written notification to proceed. The Subcontractor shall provide the manpower, materials and equipment necessary to begin and continue Work to achieve completion within the time set forth in the Project Schedule.

3.1 Sequence of Work. Subcontractor acknowledges and agrees that Contractor may revise the sequence of the Work as the Project progresses, but no extension of time will be valid without Contractor's written consent. Contractor may require, without additional cost to Contractor and/or Owner, Subcontractor to prosecute the Work at a sequence and timing as the progress of the Project dictates. It is

understood and agreed that the scheduling and sequencing of the Work is the exclusive right of Contractor and that Contractor may resequence Subcontractor's Work as the demands of the Project require without any additional cost or expense paid to Subcontractor. Contractor shall also have the right to decide on the time, order and priority in which portions of the Work shall be performed and all other matters relative to the timely and orderly conduct of the Subcontractor's Work.

3.2 Delays by Subcontractor. If, in the sole opinion of Contractor, Subcontractor falls behind in the progress of the Work, Contractor may direct Subcontractor to take such steps as Contractor deems necessary to improve the progress of the Work. Such direction may include, without limitation, requiring Subcontractor to increase the number of shifts, personnel overtime, days of Work, equipment, plant or other remedies. Subcontractor shall submit to Contractor for Contractor's approval a schedule demonstrating how the required rate of progress will be achieved without additional cost to Owner or Contractor.

3.3 Cooperation and Coordination. The Subcontractor shall cooperate with Contractor by scheduling and performing its Work so as to avoid conflict, delay or interference with the work of Contractor, other subcontractors or Owner's separate contractors. Subcontractor shall participate in any inspections relating to Substantial and Final Completion.

3.4 Schedule Impacts. If the progress of Subcontractor's Work is substantially delayed without the fault of or caused by Subcontractor, then the Subcontractor must provide written notice to Contractor within five (5) days of the event giving rise to the delay or the claim shall be waived. If Subcontractor provides timely written notice of the claim within five (5) days of the event, and the delay, hindrance or impact to Subcontractor's Work is not caused by the Subcontractor, then the time for Subcontractor's Work may be extended by Change Order to the extent obtained by Contractor under the Contract Documents.

Contractor shall not be liable to the Subcontractor for any damages or additional compensation as a consequence of delay, schedule impacts, hindrances, interferences, acceleration, compression or other time related claims (hereinafter referred to as "Schedule Impacts") caused by any person not a party to this Agreement, other than the Owner, unless Contractor has first recovered the same on behalf of Subcontractor from said person, and then only to the extent of such recovery after payment to Contractor of all attorneys' fees and other expenses it incurred relating thereto.

With respect to claims by Subcontractor for delay caused by Owner, Subcontractor agrees that it may only seek additional compensation for proven delay to the critical path, and only to the extent of documented and proven actual costs, and only if timely notice has been provided in accordance with this Subcontract.

Notwithstanding anything to the contrary herein, under no circumstance shall Subcontractor be entitled to seek from Contractor additional compensation or damages for actual or alleged loss of efficiency, constructive acceleration, lost productivity, stacking of trades, home office overhead, expectant underrun, season change premium, extended overhead, impact damages, quantum meruit, profit upon damages for delay or similar damages calculated by formula or trade data or studies.

3.5 Liquidated Damages. To the extent that Subcontractor's Work results in Liquidated Damages being assessed against Contractor by Owner, Subcontractor agrees to immediately pay to Contractor the proportionate share or all of the Liquidated Damages resulting from or caused by Subcontractor's performance, and/or to permit set-off by Contractor of such sums against sums otherwise due Subcontractor.

Article 4. INSURANCE. Upon execution of the Subcontract, and before commencing Work, the Subcontractor shall secure such insurance as required by Exhibit C to this Subcontract for at least those minimum specified limits, and shall furnish a certificate from its carrier to the Contractor, identifying

Contractor and Owner, and/or others as required by the Contract Documents, as additional insureds on the policies. All policies must be issued by insurance carriers acceptable to the Contractor, and shall remain in force through Final Completion of the Project.

Article 5. INDEMNIFICATION. Subcontractor agrees to hold harmless, indemnify and defend, the Contractor, its Surety, and the Owner from all loss as a result of Subcontractor's acts or failure to act, including reasonable attorneys' fees and court costs. Additionally, Subcontractor shall indemnify, hold harmless and defend the Contractor, the Owner, and other contractors and subcontractors from and against all claims, damages, losses and expenses, including but not limited to attorneys' and consultants' fees, arising out of or resulting from the performance of the Work, provided that:

5.1 Bodily Injury or Property Damage. Such claim, damage, loss or expense is attributable to bodily injury, personal injury, sickness, disease or death, or to damage to or destruction of tangible property (other than the Work itself) including the loss of use therefrom, to the extent caused or alleged to be caused by any act or omission of the Subcontractor or any person directly or indirectly employed by the Subcontractor or anyone for whose acts the Subcontractor may be liable (including sub-subcontractors and material suppliers).

5.2 Liens or Claims. Such claim is asserted against or through the Contractor, Owner or Owner's property, including but not limited to liens for labor performed or materials used or furnished through Subcontractor, its sub-subcontractors, and/or suppliers.

5.3 Compliance with Laws. Such liability is imposed upon Contractor or Owner as a result of Subcontractor's failure or the failure of any of its employees or sub-subcontractors or materials suppliers to comply with laws, ordinances, rules, regulations, policies or requirements, including but not limited to any Occupational Safety and Health Administration violations, Immigration violations, Owner policies and rules violations, confidentiality violations and any penalties, including enhancements, resulting from, in whole or in part, Subcontractor's acts or omissions.

5.4 No Limitation of Liability. In any claims against the Owner, Contractor and other contractors or Subcontractor, by any employee of the Subcontractor, anyone directly or indirectly employed by the Subcontractor or anyone for whose acts the Subcontractor may be liable, the indemnification obligation in this Article 5 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 Subcontractor under worker's compensation acts, disability benefit acts or other employee benefits acts.

Article 6. CHANGES TO THE WORK.

6.1 Changes. Contractor may, by Contractor's written directive or Subcontract Change Order, make changes in the Work within the scope of this Subcontract, and Subcontractor shall perform such changes. A Subcontract Change Order is a written document prepared by Contractor and signed by the Subcontractor, setting forth their agreement on a change in the scope of the Work, a change in the Subcontract Price, or a change in the Subcontract Schedule. Any adjustments to the Subcontract Price or Schedule relating to the changed Work must be set forth in the Subcontract Change Order, or the claim will be waived. A Contractor's written directive is a written document prepared by the Contractor's authorized representative directing a change in the Work, and stating a proposed adjustment, if any, in the Subcontract Price or Schedule. A Contractor's written directive will be used in the absence of agreement on the terms of a Subcontract Change Order, and Subcontractor shall perform the Work set forth therein. If ordered by Contractor's authorized representative to proceed by written directive, Subcontractor shall be responsible for tracking all costs incurred in the changed Work, including but not limited to signed time sheets, actual invoices and equipment rental or other documents requested by Contractor, and shall submit these documented records to Contractor within five (5) business days of performing the Work for Contractor's

consideration. The signing of extra work tickets by the Contractor's representative shall be for verification of hours worked and materials used only. Approval of additional cost or a change to the Subcontract is subject to the terms and scope of this Agreement. In no event will compensation be paid to Subcontractor for additional Work performed based upon estimates, unless agreed upon in a Subcontract Change Order signed by both parties. Extensions of time will be considered only upon proof that the Work affected was on the critical path. Failure to document its actual costs incurred in performing additional Work may result in waiver of Subcontractor's claim for additional compensation, as determined by Contractor.

No adjustments in the Subcontract Price or Subcontract Schedule for any Work performed by Subcontractor shall be effective unless the additional Work has been ordered by Contractor in writing. If Subcontractor proceeds with additional Work without the requisite Subcontract Change Order or written directive by Contractor, Subcontractor proceeds at its own risk and at its own cost.

6.2 Change Orders Final. Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including but not limited to, all direct and indirect costs associated with such change, any impact such change may have on the unchanged Work, and any and all adjustments to the Subcontract Price and the Project Schedule. In the event a Change Order increases the Subcontract Price, the Subcontractor shall include the Work covered by such Change Orders in Applications for Payment as if such Work were originally part of the Contract Documents. Any Change Order shall contain a breakdown of the adjustment between labor, equipment, and materials, together with substantiating data.

6.3 Method of Adjustment: If a change in the Work requires an adjustment in the Subcontract Price, the adjustment shall be established by one of the following methods:

a. mutual agreement on a lump sum with agreed markup of 10%, and sufficient substantiating data to permit evaluation;

b. unit prices already established in the Subcontract Documents or if not established by the Subcontract Documents, then established by mutual agreement for this adjustment; or

c. determined by Contractor on the basis of reasonable costs and savings attributable to the change, including itemized and substantiated accounting of the following items attributable to the change:

(i) labor costs, including Social Security, health, welfare, retirement and other fringe benefits as normally required, and state workers' compensation insurance;

(ii) costs of materials supplies and equipment, whether incorporated in the Work or consumed, including transportation costs;

(iii) costs of renting, either from Contractor or from others, of machinery and equipment other than hand tools;

(iv) costs of bond and insurance premiums, permit fees and taxes attributable to the change;

(v) costs of additional supervision and field office personnel services necessitated by the change; and

(vi) Markup (inclusive of overhead and profit) of sub-tier subcontractors, vendors or equipment suppliers not to exceed a rate of ten per cent.

6.4 Notification of Claims. Subcontractor shall notify Contractor in writing of all claims for which the Owner may be liable in the manner provided in the Contract Documents, and with sufficient time for Contractor to review the claim and timely assert the claim against the Owner. Subcontractor shall notify Contractor in writing of any other claims, whether relating to the Subcontract Price or the Subcontract Schedule, within five (5) business days of the beginning of the event giving rise to the claim. If the claim is not timely made, the Subcontractor's claim is waived. All unresolved claims and disputes shall be resolved in the manner provided in Article 14.

Article 7. SUBCONTRACT PRICE AND PAYMENT.

7.1 Price. Expressly contingent upon the performance by Subcontractor of the terms and conditions of this Agreement, the sum to be paid by the Contractor to the Subcontractor as its total compensation for the furnishing of materials and performing the services required of it under this Subcontract shall be:

({Contracts.OrigValue} "NumToText") Dollars ({Contracts.OrigValue})

7.2 Schedule of Values and Time of Application. Subcontractor shall provide a proposed Schedule of Values to Contractor at least seven (7) calendar days prior to Subcontractor's first application for payment, which may be revised if necessary for approval by Contractor. For Work performed during a payment period, Subcontractor shall apply for a progress payment using the form attached to this Agreement as Exhibit E. Applications for Payment shall be submitted by the twentieth (20th) day of the month. The application shall be for Work performed including the last day of the pay period, and showing Work completed, and to the extent permitted under the Contract Documents and approved for payment by the Owner, material suitably stored and protected.

7.3 Time of Payment and Nonpayment by Owner. The obligation of the Contractor or its Surety under any performance or payment bond to make a payment under this Subcontract, whether a progress or final payment (or for extras, delays to the Work or claims) is subject to the express condition precedent of payment therefore by the Owner to Contractor. Progress payments to the Subcontractor for satisfactory performance of the Subcontractor's Work shall be made within seven (7) business days after the related payment is received from the Owner. Subcontractor will be paid all undisputed invoiced progress payments due Subcontractor under the terms of this Subcontract, in a sum equal to **90%** of the approved value for labor and materials incorporated in the Work and **90%** of materials suitably stored up to the billing date, if any, less the aggregate of previous payments.

.1 Nonpayment by Owner; Assumption of Risk. The Subcontractor agrees that the Contractor has no obligation to pay Subcontractor for any Work performed on the Project until Contractor has been paid by the Owner, unless the Owner's express reason for withholding payment to Contractor is due solely to the default of Contractor, and is not caused, in whole or in part, by Subcontractor. The provisions of this Subcontract stating the time and amount of progress and final payments are subject to the condition that Contractor shall receive from the Owner progress payments, payments for change orders or final payments in at least the amounts payable to the Subcontractor on account of Work done by the Subcontractor on this Project. Except as specifically provided herein, the time when such payments shall be due the Subcontractor shall be postponed until Contractor has received payment from the Owner. The Subcontractor acknowledges that it relies solely on the Owner's credit and its ability to fund payments under this Subcontract and does not rely upon Contractor. The Subcontractor agrees that the liability of the surety on Contractor's performance or payment bond, if any, is subject to the same conditions precedent as are applicable to Contractor's liability to the Subcontractor under this Subcontract.

.2 Other Conditions Precedent to Partial Payment. Payments shall not be due until the following conditions have been satisfied:

.a This Agreement has been signed and returned to Subcontractor, and all exhibits executed, including but not limited to Exhibit D (Project Information Form) and,

.b Insurance Certificates have been properly completed and received,

.c Schedule of values has been received and approved,

.d Waivers of liens and claims from all sub-subcontractors and vendors demonstrating payment by Subcontractor for the prior months of the Project,

.e If requested, evidence demonstrating that payroll taxes and other contributions required by law have been paid by Subcontractor,

f. Consent of Surety, if applicable, and

g. Any other documentation requested by Contractor.

.3 Payment Not Acceptance. No payment to Subcontractor shall imply or demonstrate acceptance by Contractor or Owner of any portion of Subcontractor's Work.

.4 Stored Materials. Unless otherwise limited or restricted by the Contract Documents, applications for payment may include suitably stored and protected materials at the Project site or some other location upon approval in advance by the Owner. Approval of a payment application including stored materials shall be conditioned upon provision by Subcontractor of bills of sale and applicable insurance and other documents specified by the Owner or Contractor. Payment to Subcontractor for stored materials shall not relieve Subcontractor of responsibility for proper storage and responsibility for the materials.

7.4 Retainage. Upon completion of **50%** of the Project as adjusted by Change Orders, when approved by the Owner and/or Architect, and upon completion of **50%** of the Work under this Subcontract, retainage upon all remaining progress payments will be based upon 5% of the Subcontract Price as adjusted by Change Orders, providing the progress of the Work continues satisfactorily and the Owner accepts and continues to make progress payments to the Contractor on the basis of reduced retainage.

7.5 Final Payment: Application and Requirements. Final Payment will be paid within seven (7) business days after receipt of final payment from the Owner and receipt by the Contractor of all required releases, lien waivers and other documents. Before issuance of Final Payment to Subcontractor, and at such times as may be requested, the Subcontractor shall submit evidence satisfactory to the Contractor and to the Owner and/or its duly authorized representative that all payrolls, material bills, and other indebtedness connected with the Project have been paid. Before Final Payment shall be due under this Subcontract, the following must be provided to Contractor as express conditions precedent:

.1 Affidavit that all indebtedness, payrolls and invoices related to Subcontractor's Work, for which the Owner or Owner's property, or Contractor or Contractor's surety may be liable, have been paid or otherwise satisfied;

.2 Consent of surety to Final Payment, if applicable;

.3 Satisfaction of any required close-out procedures required by Owner or Contractor;

.4 Provision of other data required by Owner or Contractor;

.5 Written warranties, guarantees, product data and/or operations manuals relating to Subcontractor's Work;

.6 Record drawings or as-built relating to Subcontractor's Work.

.7 Any other documentation required by Contractor.

Final payment shall constitute a full waiver and release of all claims by Subcontractor, but shall not relieve Subcontractor of liability for defective Work appearing after payment, or for continuing obligations hereunder.

7.6 Subcontractor Failure to Make Payments. Subcontractor shall use payments received from Contractor solely to make payments for labor or materials furnished in performing the Subcontractor's Work on this Project, and shall not use payments to satisfy any indebtedness on other Projects. Contractor shall have the right to contact Subcontractor's sub-subcontractors and vendors to ensure that they are being paid by the Subcontractor for labor and materials furnished on this Project.

7.6.1 If Contractor has reason to believe that Subcontractor has not paid for labor, material or other obligations, Subcontractor shall supply evidence satisfactory to Contractor within 48 hours that its sub-subcontractors and suppliers have been paid, or

7.6.2 Subcontractor shall provide a bond in a form and with a surety satisfactory to Contractor, indemnifying Owner, Contractor and the Project from liens or claims.

7.6.3 Contractor shall also have the right to:

.a Retain monies due or becoming due to Subcontractor on this Project or any Project of Contractor's, a reasonable amount to protect Contractor from and against all loss, damage or expense including attorneys' fees arising out of or relating to a claim or lien of a sub-subcontractor or vendor of Subcontractor,

.b Issue joint checks payable to the Subcontractor and a claimant from sums otherwise due Subcontractor,

.c Make direct payments to the claimant from sums otherwise due Subcontractor, and/or

.d Bond off any lien at Subcontractor's cost,

.e And Contractor may backcharge all costs, attorneys' fees and other expense arising from or relating to Subcontractor's nonpayment.

7.7 Grounds for Withholding Payment. Contractor may withhold payment from Subcontractor for the following reasons:

.1 Defective Work not cured; materials not furnished or failure to clean up;

.2 Damage to the Project, the Subcontractor's Work or the Work of others caused by Subcontractor;

.3 Claims, penalties, attachments, levies, liens, stop notices or court orders filed or other reasonable evidence that such claims will be filed, including claims covered by insurance until such claims are accepted and paid by the carrier;

.4 Failure by Subcontractor to make payments properly to its subcontractors for labor, including fringe benefits, materials or equipment, transportation or shipping costs, taxes, fees or other claims arising out of the Subcontractor's Work;

.5 Reasonable evidence that the Work cannot be completed for the balance of the Subcontract Price;

.6 Reasonable doubt that the Work will be completed on schedule due to Subcontractor's acts or omissions;

.7 Subcontractor's failure to timely provide any deliverables set forth in this Agreement, including but not limited to insurance certificates, record drawings, warranties or guarantees or approvals;

.8 Any other material breach of this Agreement.

7.8 Right to Issue Joint Checks. Subcontractor agrees and expressly authorizes Contractor to issue joint checks to Subcontractor and its sub-subcontractors, vendors and/or suppliers. Subcontractor understands and agrees that Contractor shall only issue payments and/or joint checks if there are sums undisputedly due and owing Subcontractor pursuant to the terms of this Subcontract Agreement. Subcontractor shall cooperate with Contractor in the administration and delivery of the joint checks to Subcontractor's sub-subcontractors, suppliers and vendors. Refusal to cooperate with Contractor in the issuance and delivery of joint checks shall be a default of this Subcontract, and Contractor shall be entitled to exercise all rights and remedies it has under this Agreement in the event of default

Article 8. SITE INSPECTION. Subcontractor represents and warrants that it has been to the Project site, has become familiar with existing conditions and correlated the existing conditions with the requirements of the Contract Documents, and that it fully understands the facilities, restrictions and challenges involved with performing the Work. Subcontractor further represents and warrants that it has examined all of the Contract Documents, including but not limited to any policies and rules of the Owner, requirements of various governmental agencies and others having jurisdiction over the Project. Finally, Subcontractor has performed its own investigation as to the nature and location of the Work, the local conditions and all matters which affect the Work, and that it is not aware of any existing conditions, circumstances or requirements that will necessitate a change in the scope of the Work, the Price or the Schedule.

Article 9. WARRANTY AND CORRECTION OF WORK. Subcontractor warrants to the Owner and to Contractor that materials and equipment will be of good quality and new unless otherwise required or permitted by the Subcontract, that the Work will be performed in a good, workmanlike manner, be free from defects in materials and workmanship, and that the Work will conform with the requirements of the Subcontract and the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in the sole judgment of Contractor. This warranty shall be in addition to and not in limitation of any other warranty or remedy provided by law or the Subcontract. Subcontractor shall warrant its work for a period of one year following the Owner's defined commencement date for warranties as set forth in the Contract Documents. If the warranty period is not specifically designated, then the parties agree that the warranty period shall extend for the period set forth in the agreement between the Owner and the Contractor. This warranty shall be in addition to any special or additional equipment and material warranties required by the Contract

Documents. Subcontractor further agrees to execute and deliver any additional guarantees or warranties specified in the Contract Documents.

9.1 Correction of Work. Subcontractor shall promptly correct Work failing to conform to the Contract Documents or Work rejected by Contractor, Owner or Architect, whether observed before or after Substantial or Final Completion, and whether or not installed or completed. Subcontractor shall be obligated to correct Work that is not in accordance with the Contract Documents after Substantial Completion to the same extent that Contractor is bound to Owner for correction of Work. Upon notification, Subcontractor shall begin corrective Work immediately and shall diligently perform all corrections or replacements necessary to remediate all non-conforming or defective Work and render it acceptable to Contractor, Owner and Architect.. This obligation survives the acceptance of the Work and/or termination of the Subcontract. This obligation is in addition to, and not in limitation of the warranty obligations herein; it being the intent of this Subcontract that Subcontractor's obligations to correct defective Work are not restricted by Subcontractor's warranty obligations.

9.2 Satisfaction of Warranty and Corrective Work Obligations. As set forth herein, Subcontractor agrees to satisfy warranty and corrective Work obligations at no cost to the Owner or Contractor. If corrective action is not initiated or completed within a time reasonable under all of the circumstances, then Contractor shall commence investigation and correction at Subcontractor's expense. In the event that Subcontractor fails to satisfy these obligations timely, all costs for design, labor, management, supervision, materials, travel (including all mileage, meals, lodging), equipment and overhead (at 15% of costs) incurred by Contractor in the investigation and correction of any such issue shall be paid to Contractor by Subcontractor within seven (7) calendar days of receipt of invoice. Contractor's rights hereunder shall be in addition to all other rights and remedies of this Subcontract and at law, and in no way relieve the Subcontractor of its primary responsibility for performing and warranting the Work in accordance with the Subcontract documents.

Article 10. IMMIGRATION. Subcontractor shall comply with all requirements imposed upon employers under the Immigration Reform and Control Act of 1986 ("IRCA"), with regard to every Subcontractor employee ("Worker") who will perform services for Subcontractor related to this Subcontract. Subcontractor further agrees that Subcontractor is the "employer" as that term is defined in 8 C.F.R. Section 274a.1(g), and that Contractor is not the "employer" as so defined respecting Workers. In compliance with its duties under IRCA, Subcontractor shall:

10.1 I-9s. Have sole responsibility for completing Form I-9 for all Workers who provide services relating to this Subcontract, and it will further update such forms to the extent required by law. Subcontractor warrants that all of Subcontractors' employees who complete Form I-9 for Workers will be knowledgeable of all Form I-9 requirements, including but not limited to, knowledge of which documents do and do not satisfy the requirements of Form I-9, and that such employees will otherwise complete Form I-9 in full compliance with IRCA.

10.2 Warranty of Employment Authorization. Subcontractor warrants that no Worker will provide services relating to this Subcontract until Subcontractor has completed Form I-9 for such Worker in the manner required by IRCA. Subcontractor further warrants that it will not permit any Worker to perform services relating to this Subcontract who Subcontractor knows or has reason to believe is not authorized to work in the United States, regardless of whether such individual is able to produce documents which satisfy the requirements of Form I-9. Subcontractor understands that Contractor is acting in reliance upon Subcontractor's warranty.

10.3 Removal of Workers Not Authorized for Employment. If Subcontractor learns or has reason to believe that any Worker is not authorized to work in the United States, Subcontractor shall immediately so inform Contractor, and Subcontractor shall not assign Work to such Worker. If Contractor

learns or has reason to believe that any Worker is not authorized to work in the United States, upon notification by Contractor, Subcontractor shall immediately cease assigning Work to any such Worker. A failure of Subcontractor to take immediate action upon notice from Contractor shall be a material breach and grounds for default termination under this Subcontract.

10.4 Indemnification and Hold Harmless. In the event that a government agency, Owner or Contractor determines that any Worker hired by a Subcontractor is not authorized to work in the United States, Subcontractor shall indemnify and hold Contractor harmless, as well as any agents, employees, officers, directors, trustees or other persons acting on Contractor's behalf, from any liability incurred by Contractor as a result of such determination. Such indemnification shall include, but not be limited to, civil or criminal fines or penalties assessed, alleged and any costs incurred in responding to or participating in any government or Owner investigation, finding, recommendation, hearing, appeal or any other proceeding, including attorneys' fees and costs, as well as any costs, fees or damages assessed or incurred by Contractor or Owner.

10.5 Consequential Damages and Effect on Schedule. If Subcontractor is terminated due to noncompliance with this Article, or if Subcontractor's Work force is adversely impacted by the removal of Workers not authorized to work in the United States from the Project in compliance with this Section, Subcontractor shall be liable to Contractor for any and all damages, costs, fees, including but not limited to schedule recovery costs, re-procurement costs and all other costs recoverable under this Subcontract.

Article 11. HAZARDOUS SUBSTANCES. In order to comply with laws that require an employer to timely notify employee of the use of Hazardous Substances, Subcontractor shall timely provide a current copy of the Material Safety Data Sheet (MSDS) for any Hazardous Substance or Chemical that Subcontractor intends to bring to the Project site.

11.1 Removal of Hazardous Substances. Subcontractor shall be responsible for timely removal of any Hazardous Chemicals and/or Substances that are brought to the Project site, but are not consumed or used, as well as all waste generated from the Work. Such removal shall comply with all laws, regulations, codes, permits and ordinances.

11.2 Discharge. Subcontractor shall conduct the Work in a manner to avoid the discharge, dispersal, escape, release or saturation of any pollutant into the atmosphere or into any body of water or on, onto, upon in or into the surface or subsurface of land unless permitted by federal, state or local laws, regulations, ordinances or permits.

11.3 Existing Hazardous Conditions. If the Subcontractor encounters material reasonably believed to be asbestos, polychlorinated biphenyl ("PCB") or other Hazardous Substances at the Project site that have not been rendered harmless, the Subcontractor shall **immediately stop** Work in the area affected and immediately report the condition to Contractor in writing. The Work in the affected area shall resume in the absence of asbestos, PCB, or Hazardous Substances, or when it has been rendered harmless, or by being reduced to a safe level or concentration, or by written agreement of Contractor and Subcontractor, or by an award from the parties' dispute resolution as provided herein.

11.4 Indemnification. To the fullest extent permitted by law, the Subcontractor shall indemnify, defend and hold harmless Contractor, Owner and other subcontractors, and each of their employees and agents, from and against claims, damages, losses and expenses, including but not limited to attorneys' fees arising from or relating to performance of the Work in the affected area if the material is asbestos, PCB or other Hazardous Chemical or Substance that has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or damage to or destruction of tangible property (other than the Work itself), including loss of use therefrom, but only to the extent caused in whole or in part by failure to comply with Article 11 or by negligent acts or omissions of the

Subcontractor or anyone for whose acts it may be liable, regardless of whether the claim or damage is caused in part by a party indemnified hereunder.

11.5 Definitions of Hazardous Chemicals and Substances. As used herein, the term "Hazardous Chemical" shall mean any chemical defined as hazardous in the Hazardous Communication Standards, 29 C.F.R. § 1926.59 or 29 C.F.R. § 1910.1200, and "Hazardous Substance" shall mean any substance, including solid, liquid or gaseous material, which is listed or defined as a "hazardous substance" in the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 *et seq*, or regulations relating thereto, but does include petroleum, including crude oil or any fraction thereof, oil and oil waste as those terms are defined in the Clean Water Act, 33 U.S.C. 1251 *et seq*. or regulations relating thereto, and source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, 42 U.S.C. § 3011 *et seq.*, including regulations relating thereto, and includes any other substance defined by federal, state or local statute, regulation or ordinance as a hazardous, toxic or dangerous waste or substance where "state" means the State in which the Work is being performed and "local" means the local jurisdiction (i.e., county, parish, city, etc) in which the Work is being performed and "pollutant" shall mean any solid, liquid, gaseous or thermal irritant or contaminant, including, but not limited to smoke, vapor, soot, fumes, acids, alkalis, chemicals and waste and shall include any Hazardous Substance.

Article 12. DEFAULT.

12.1 Commencing Work. If the Subcontractor fails to begin the Work on the beginning date established pursuant to Article 3, the Contractor shall notify the Subcontractor in writing by mail, facsimile or e-mail, that its failure to timely commence the Work is jeopardizing the Project schedule and that Subcontractor must begin the Work within two (2) business days from the date of written notification. If the Subcontractor fails to begin the Work with appropriate manpower, materials and equipment within three (3) business days of the date of notification, then Subcontractor will be in default of this Agreement and the Contractor may, at its sole discretion pursue any or all remedies described in this Article..

12.2 Timely Performing Work. After commencing the Work, Subcontractor shall perform in a timely manner and in accordance with the Contractor's schedule as updated from time to time. If Subcontractor fails to perform in accordance with Contractor's schedule, Contractor may notify the Subcontractor in writing (via mail, facsimile or e-mail) and the Subcontractor shall, within two (2) business days from the notification date, reestablish its Work in compliance with the schedule and provide a plan for compliance with the schedule going forward. If the Subcontractor fails to reestablish its Work in compliance with the schedule and/or fails to follow the plan provided for compliance with the schedule going forward, then Subcontractor will be in default of this Agreement and the Contractor may, at its sole discretion, pursue all remedies described in this Article.

12.3 Defective or Non-Conforming Work. The Subcontractor shall, within twenty-four (24) hours after receiving written notice from the Contractor to that effect, proceed to take down all portions of the Work and remove from the Project site or any offsite premises where Subcontractor is performing Work or storing Work components, all Work, materials, or components, which the Contractor, Owner, or any of their design consultants determine to be unsound, defective, improper, or in any way failing to conform to this Subcontract, or the Contract Documents, and the Subcontractor, at its own cost and expense, shall replace the same with proper and satisfactory Work, materials and components that conform to the Contract Documents and repair (or bear the cost of repairing if Contractor so chooses) all Work of Subcontractor or others that was damaged or destroyed by or as a result of Subcontractor's unsound, defective, improper or nonconforming Work or materials or by the taking down, removal or replacement thereof. If the Subcontractor fails to perform the corrective work as described in this section within two (2) business days after receiving notice from Contractor, the Subcontractor will be in default of this Agreement and the Contractor may at its sole discretion pursue any or all remedies described in this Article.

12.4 Other Defaults. If Subcontractor fails to supply sufficient skilled workers, proper materials, fails to timely achieve Substantial or Final Completion, fails to make prompt payment to its workers and sub-subcontractors and suppliers, fails to observe laws, fails to indemnify Contractor as required under this Agreement, or is otherwise in breach of an obligation of this Subcontract, and if Subcontractor fails to cure any of these defaults within two (2) business days after the date of written notice to Subcontractor, then Subcontractor will be in default of this Agreement and the Contractor may at its sole discretion pursue all remedies described in this Article.

12.5 Remedies for Default. In the event Subcontractor is in default of the Agreement, Contractor shall have the right to send written declaration of default to Subcontractor and (without prejudice to any other rights and remedies it has), to begin pursuing any or all of the following remedies:

.1 Withhold further payments from Subcontractor pending corrective action or completion of the Subcontractor's Work to the satisfaction of Contractor; and

.2 Set-off Contractor's damages incurred due to Subcontractor's default against any monies due Subcontractor under this Subcontract or any other contract between Contractor and Subcontractor; and

.3 Supply workers, materials and equipment and other facilities Contractor deems necessary for the completion or supplementation of Subcontractor's Work, and the sole cost of Subcontractor charge or off-set the cost to Subcontractor;

.4 Contract with one or more additional subcontractors to perform part or all of Subcontractor's Work at the sole cost of Subcontractor;

.5 Terminate or suspend the Subcontract as set forth in Article 13, and perform or contract with another subcontractor to perform the balance of the Subcontractor's Work at the sole cost of Subcontractor; and/or

.6 Institute dispute resolution procedures as described in Article 14.

.7 Subcontractor shall be liable for all costs incurred by Contractor to pursue any or all of the above remedies, including without limitation, the cost of labor, materials, subcontractors, supervision, overhead, profit, other damages, in addition to any attorneys' fees, expert fees, and dispute resolution costs incurred by Contractor as a result of the default.

.8 In the event of an emergency or other exigent circumstatnces Contractor may proceed with any of the foregoing remedies without notice to Subcontractor.

Article 13. TERMINATION OR SUSPENSION BY CONTRACTOR OR OWNER.

13.1 Termination or Suspension by Contractor. If Subcontractor is in default as set forth in Article 12, then Contractor may terminate or suspend this Agreement by written notice to Subcontractor and its surety, if any, effective immediately, and use any materials, equipment and workers as Contractor deems appropriate. All of the costs incurred by Contractor from performing the Subcontractor's Work, including reasonable overhead, profit and attorneys' fees shall be deducted from any monies due or which may become due the Subcontractor for Work it correctly and timely performed. The Subcontractor shall be liable for any amount by which expenses incurred by Contractor to complete or correct Subcontractor's Work may exceed the unpaid balance of the Subcontract owed to Subcontractor for its correctly and timely performed Work. Contractor shall also be entitled to terminate or suspend this Subcontract in the event Contractor

suspends or terminates the Prime Contract, in which case Subcontractor shall only be entitled to payment for Work it correctly and timely performed prior to such termination or suspension, less prior payments made and shall not be entitled to recover any other costs, expense or damages of any type.

13.2 Termination or Suspension by Owner. If the Owner, for any reason, terminates or suspends the Prime Contract or any part that includes Subcontractor's Work, Contractor shall so notify Subcontractor in writing and upon receipt of the notice, this Agreement shall be terminated, suspended or assigned to the Owner, and Subcontractor shall immediately stop Work, pending further instructions. If Owner terminates Contractor for cause, Owner shall have the right to assignment of this Subcontract for completion of the Work. The assignment shall not operate as a release of any claims of Contractor against the Subcontractor. Further, in the event of Owner's suspension or termination of the Prime Contract, Contractor's obligation to the Subcontractor is limited to the extent of Contractor's recovery from Owner, on Subcontractor's behalf, pursuant to the Contract Documents. Contractor will cooperate with Subcontractor in the prosecution of any claim of Subcontractor against Owner relating to the suspension or termination; however, any and all costs of such prosecution, including attorneys' fees, shall be borne by the Subcontractor. This provision shall not be construed to create any obligation upon Contractor to pursue any claim or litigation on behalf of Subcontractor.

13.3 Force Majeure. If the Project is suspended or terminated or if Contractor is prevented from continuing the Prime Contract by conditions beyond Contractor's control, including Acts of God, labor disputes, fire, wind, pandemic, unusual delay in deliveries, extreme weather, war, terrorism, or governmental action, Contractor shall be permitted to terminate or suspend this Subcontract as Contractor deems appropriate and Subcontractor shall be entitled to payment only for Work it correctly and timely performed prior to such termination or suspension, less prior payments made and shall not be entitled to recover any other costs, expense or damages of any type.

13.4 Wrongful Default, Suspension or Termination. If Contractor wrongfully defaults, suspends or terminates this Subcontract, Contractor shall be liable to Subcontractor only for the contract balance for the Work correctly and timely performed by the Subcontractor prior to Contractor's default, suspension or termination, less prior payments made. In no event shall Subcontractor be entitled to recover any other incidental or consequential damages, which include but are not limited to profits attributable to unperformed Work, or punitive damages.

Article 14. DISPUTE RESOLUTION. All claims, disputes and matters in question arising out of, or relating to, this Agreement or the breach thereof, except for claims which have been waived by the issuance or acceptance of final payment and the claims excluded or limited by Sections 6.2 and 14.1, shall first be submitted to mediation conducted by a neutral mediator who is mutually acceptable to the parties. The parties each pledge to participate in good faith in mediation as a condition precedent to addressing the dispute in any other forum, unless the Contractor agrees in writing to waive this condition precedent. The site for mediation shall be in Lexington, Kentucky, unless required otherwise by Contractor's agreement with Owner, and Lexington, Kentucky shall also be the venue for any related litigation.

14.1 Time Within Which Claims May Be Brought. The parties agree that claims must be identified, and the party against whom the claim is made, must be notified in writing within five (5) business days of the event giving rise to the claim. However, in no event shall a claim be asserted by the Subcontractor against Contractor either (1) after the expiration of ten (10) calendar days following submission of Subcontractor's final application for payment or alternatively, (2) in no event later than thirty (30) calendar days after Substantial Completion of Subcontractor's Work on the Project, as determined by Contractor in its sole discretion. The parties agree that any claim asserted after the expiration of these deadlines shall be untimely, null, void and expressly waived.

14.2 Negotiation And Mediation. As an express condition precedent to commencing litigation against the other, the parties shall proceed as follows:

.1 The party asserting a claim shall do so in writing and within the notice period set forth above.

.2 The parties shall then attempt in good faith to negotiate a resolution of disputed claim(s) during the next twenty (20) calendar days before pursuing any other means of dispute resolution.

If claims remain unresolved after good faith negotiation, the parties shall endeavor to resolve disputes by proceeding, at the instance of either party, to non-binding mediation conducted under such rules as the parties may agree to employ or conducted by a mediator that the parties mutually select. If the parties cannot reach agreement respecting the rules under which mediation shall be conducted or agree to a mediator, the parties shall conduct mediation in accordance with the mediation rules of the American Arbitration Association. The parties shall divide the cost of the mediator evenly among them.

14.3 Resolution Of Disputes. If the dispute is not resolved by mediation, then such dispute shall be resolved in any of the following forums selected by Contractor in its sole discretion either (1) the forum to which disputes between the Owner and the Contractor are to be resolved under the terms of the Prime Contract, (2) binding Arbitration administered by the American Arbitration Association under its construction rules, or (3) litigation in the Lexington, Kentucky Fayette Circuit Court, or Federal Court in the Eastern District of Kentucky. Furthermore, the Subcontractor agrees that the Contractor shall have the exclusive right to join the Subcontractor as a party in any dispute resolution procedure (including without limitation ADR procedures, binding arbitration, or other judicial, or non-judicial proceeding) in which Contractor may be involved arising out of or in connection with the Project, together with such other subcontractors or parties as may be appropriate. Subcontractor waives its right to trial by jury in any dispute involving Contractor or Contractor's surety.

.1 Subcontractor agrees to submit to the jurisdiction and venue of the United States District Court for the Eastern District of Kentucky in Lexington, Kentucky and/or the Fayette Circuit Court.

.2 Subcontractor agrees that matters litigated in Court shall be determined by a judge and not by a jury.

14.4 Dispute Resolution Costs and Fees. In the event any dispute between the parties proceeds to arbitration or litigation, the prevailing party shall be entitled to recover from the non-prevailing party, all reasonable court costs, arbitration fees, arbitrator compensation, attorneys' fees , expert fees and other related expenses incurred by the prevailing party in connection with said dispute.

14.5 Claims Involving the Owner. Subcontractor agrees that if the dispute involves the Owner, the Subcontractor will be subject to the dispute resolution procedures set forth in the Prime Contract and submits to the jurisdication and venue of the dispute resolution forum set forth therein.

Article 15. MISCELLANEOUS.

15.1 Governing Law. This Subcontract shall be governed by and interpreted in accordance with the laws of the Commonwealth of Kentucky. All indemnification obligations contained herein, including indemnification obligations set forth in the exhibits to this Agreement, which are incorporated by reference, shall survive the completion of Subcontractor's Work and shall survive the termination of this Subcontract.

15.2 Severability and Waiver. The partial or complete invalidity of one or more provisions of this Subcontract shall not affect the validity of any other provision. The failure of either party to insist, in one or more instances, upon the performance or enforcement of any terms of this Subcontract, or to exercise any right herein shall not be construed as a waiver or relinquishment of any such term or condition respecting future performance.

15.3 Entire Agreement. This Agreement represents the entire and integrated agreement between the parties and supersedes all prior or contemporaneous negotiations, representations, understandings or agreements, either written or oral. This Subcontract shall not be modified except by a written instrument signed by both parties.

15.4 Assignment And Subcontracting. The Subcontractor shall not assign this Agreement, nor its proceeds or receipts, nor subcontract the whole or any part of the Subcontractor's Work, without the prior written approval of Contractor.

15.5 Subcontract Documents. The following documents, designated by Exhibit letter below, are identified as Subcontract Documents and incorporated by reference herein:

A. General Safety Work Requirements

B. Congleton-Hacker Co. Policy on Sexual and Other Unlawful Harassment

C. Minimum Insurance Requirements for Subcontractors

D. Project Information Form

E. Forms (Payment Application Form and Lien Waiver Forms to be used for this Project)

F. Release, Waiver and Indemnity for Use of Contractor Owned or Rented Equipment

G. Scope Document and Special Conditions

H. Payment and Performance Bonds

I. Contract Document List

J. Owner-furnished Materials and/or Equipment

In witness whereof, the parties hereto have executed this agreement the date written below, and the persons executing this agreement represent and warrant that they are authorized to act upon behalf of the respective parties:

CONTRACTOR:

WITNESS:

CONGLETON-HACKER COMPANY

_____

By:_____
Signature

_____
Printed Name

_____
Title

Dated:_____

SUBCONTRACTOR:

WITNESS:

({ToCompany.Name} ">")

_____

By:_____
Signature

_____
Printed Name

_____
Title

Dated:_____

CONTRACT NO. **{Contracts.ContractNumber}**

{Projects.Name}

Exhibit “A”

GENERAL SAFETY WORK REQUIREMENTS

The Subcontractor is solely responsible for a Safety Program for their employees. As a part of their Safety Program, the subcontractor represents and warrants that they require, among other things, that all such employees comply with the following rules and regulations:

1. Nothing in the following rules will relieve the subcontractor of their obligation to maintain a safe Work environment in accordance with all Federal, State and Local Safety Laws.

2. Accidents or injuries, regardless of their nature, shall be reported to the appropriate parties in accordance with applicable governmental laws and insurance requirements and to the project superintendent at the time of the accident and in writing within 24 hours of same.

3. This is a 100% hard hat project. Hard hats will be worn at all times.

4. All other personal protective equipment (PPE) will be worn, at a minimum, in compliance with the Kentucky Occupational Safety and Health Regulations.

5. Shoes shall be first grade, hard soled and ankle high. Tennis shoes are not permitted.

6. Never operate machinery unless all guards and safety devices are in place and in proper operating condition.

7. Place ladders on a substantial base and do not use ladders with broken, split, or missing rungs and rails. All ladders are to extend at least three feet (3’) above the landing platform and be securely fastened.

8. Gasoline must be stored and transported in authorized cans only. No smoking anywhere near flammable liquids.

9. Compressed gas cylinders must be secured in an upright position.

10. When burning or welding, a fire extinguisher must be close at hand at all times.

11. Electric tools shall either be double insulated or be properly grounded. Extension cords shall be the three-wire grounding type. Ground-fault interrupters shall be on all 120 volt power.

12. Temporary wiring will be in accordance with electric code and installed by competent personnel. All bulbs to be protected.

13. Fall protection shall be provided when working 6’ or more above lower levels. This is in accordance with safety standards for fall protection, 29CFR, Part 1926, Subpart M.

14. Any overhead lifting by means of crane, lifts, hoists, etc. shall not be done when the designated OSHA high voltage clearance cannot be maintained.

15. Scaffolding shall be erected on sound footing. Loose brick, block, boards, etc. are prohibited. Scaffolding shall have handrails and toe boards.

16. Rolling scaffolds will be equipped with wheel locks which will be locked in use. Personnel will not ride scaffold when being moved.

17. Conduct a minimum of monthly “tool box talks” with all employees and report the contents of these talks to the project superintendent in an acceptable format.

18. All trenching, excavating and shoring shall be performed in accordance with OSHA’s Construction Standard for Excavations, 29 CFR, Part 1926, Subpart P.

19. Sources of ignition shall be prohibited from areas where flammable liquids are stored or issued. Appropriate warning signs shall be posted at these locations.

20. All earthmoving equipment shall have seat belts, backup alarms and rollover protective structures (ROPS).

21. Hazardous material information is on file at the Congleton-Hacker Company job site office. All subcontractors shall comply with communication of this information to their employees in respect to Congleton-Hacker Co. Hazard Communication Program and report any hazardous material brought on site to the project superintendent.

22. The use of, or being under the influence of, intoxicating beverages or illegal drugs while on the job is prohibited.

23. Horseplay causes accidents and will not be tolerated.

24. Be alert and keep out from under overhead loads.

25. Security of tools, equipment and materials will be the responsibility of each individual subcontractor.

26. Employees of subcontractors required to enter into confined or enclosed spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and the use of protective and emergency equipment required. A confined or enclosed space is a space which has limited means of egress and is subject to the accumulation of toxic or flammable contaminants or have an oxygen deficient atmosphere.

27. No person shall ride a hook, hoist or other material handling equipment. The riding of such equipment is prohibited.

28. All posted safety rules must be obeyed and must not be removed.

29. All subcontractors shall supply a competent person, as defined by OSHA, for their work and notify the project superintendent of such person.

30. All fork lift operators must be certified. Congleton-Hacker Company equipment (rented or owned) may only be operated by trained Congleton-Hacker Co. employees and use is strictly prohibited by others.

31. All subcontractors must see that all their employees receive a copy of the above safety Work rules and monitor them to assure that all rules are complied with daily.

ALCOHOL AND DRUG FREE PROJECTS: Subcontractor acknowledges and agrees that it is essential to the safety of persons at the site that this be a drug and alcohol free Project. Subcontractor shall ensure that its employees shall not distribute, be under the influence of, or be in possession of any form of alcohol or unlawful drug while at the Project site or while performing Project related duties. The Subcontractor shall indemnify and hold the Owner and Contractor harmless from and against all claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or related to Subcontractor’s failure to comply with this provision.

Exhibit “B”

CONGLETON-HACKER COMPANY POLICY ON SEXUAL AND OTHER UNLAWFUL HARASSMENT

Congleton-Hacker Company is committed to providing a Work environment that is free of unlawful discrimination and harassment.

1. Actions, words, jokes, or comments based on an individual’s sex, race, ethnicity, age, religion, or any other legally protected characteristic will not be tolerated.

2. Such harassment - whether overt or subtle - is a form of employee misconduct that is demeaning to another person, undermines the integrity of the employment relationship, and is strictly prohibited.

3. Sexual harassment, in particular, includes unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature that is made a condition of employment, that unreasonably interferes with Work performance, or that creates an intimidating, hostile, or offensive Work environment.

Congleton-Hacker Company shall specifically ensure that all subcontractors are aware of and carry out its policy to maintain a Working environment free of harassment, intimidation and coercion, with specific attention to minority and female individuals.

We ask that you read this policy with care, abide by its provisions, and convey this information to all your employees working on Congleton-Hacker Company projects

Exhibit “C”

CONGLETON-HACKER COMPANY
872 FLOYD DRIVE
LEXINGTON, KY 40505
PHONE 859.254.6481/ FAX 859.253.0442

MINIMUM INSURANCE REQUIREMENTS FOR SUBCONTRACTORS

Subcontractor shall procure and keep in force and effect, insurance required by the Contract Documents, or as set forth below, whichever requires the more comprehensive and/or have higher coverage levels. Before commencing any Work, Subcontractor shall furnish Congleton-Hacker Co. (“Contractor”) with Certificates of Insurance attested by a duly authorized representative of the insurance carrier(s) acceptable to Contractor, and the Certificate of Insurance shall include the following statement: “In the event of modification or change or before the expiration date thereof, the issuing company will mail 30 days written notice to the Certificate Holder and Additional Insureds. These are the minimum insurance requirements only and do not limit Subcontractor’s liability, in any way, for incurred losses. Subcontractor’s insurance policies shall not contain any limitation or exclusionary endorsements for operations.

A. GENERAL LIABILITY INSURANCE : Commercial General Liability Insurance, including Blanket Contractual Liability, Completed Operations, Explosion Collapse and Underground Hazard, Products Liability, Broad Form Property Damage, Premises- Operations, Independent Contractors and Personal Injury, with limits of not less than $1,000,000 per occurrence/$2,000,000 aggregate for all liability arising out of injury to or death of one or more person, in any one occurrence, and for all liability arising out of damage to or destruction of property, including loss of use thereof and downtime, in any one occurrence. There shall be no endorsements or modification of the commercial general liability limiting the scope of coverage for liability arising from explosion, collapse, underground property damage, subsidence or damage to the Work done on Subcontractor’s behalf by a sub-subcontractor. In addition, no endorsement or exclusion will be added as respects contractual liability through the use of CG 2426 (07/04) or equivalent.

Subcontractor’s coverage will be primary and non-contributory to any coverage maintained by Congleton-Hacker Co. and/or the Owner.

The Products Liability and Completed Operations Coverage required at $1,000,000/ $2,000,000 limit hereunder shall be effective during the term of the subcontract and for a period of at least two years following Work completion or equivalent to the state statute of repose, if any, whichever is longer.

Subcontractor’s policy shall add Contractor and Owner, as an insured thereunder by Insurance Services Organization (ISO) additional insured endorsements CG 2010 (07/04) and CG 2037 (07/04) or equivalent.

B. AUTOMOBILE LIABILITY INSURANCE:
Automobile Liability Insurance on all motor vehicles owned, hired, or non-owned, with limits of not less than $1,000,000 combined single limit. This policy shall add Contractor and Owner, as an insured thereunder by ISO additional insured endorsement CA 2048 (02/99) or its equivalent.

If hazardous materials are to be hauled, pollution liability coverage equivalent to that provided under the ISO pollution liability-broadened coverage for covered automobiles endorsement (CA 99 410) shall be provided, and the Motor Carrier Act Endorsement (MCS-90) shall be attached.

C. EXCESS UMBRELLA LIABILITY - Subcontractor shall obtain and provide Excess or Umbrella Liability Insurance in an amount not less than $1,000,000 laying over the underlying Commercial General Liability, Auto Liability and Employers’ Liability coverage with the same coverage requirements as the underlying policies. Excess/Umbrella policy(s) must include as additional insured all entities that are required as additional insureds on the underlying policies herein required, and shall provide equivalent coverage to the underlying additional insured endorsements

D. STATUTORY WORKER’S COMPENSATION: Subcontractor shall procure Workers Compensation and Employer’s Liability coverage of not less than $1,000,000 each accident/$1,000,000 disease each employee/$1,000,000 disease policy limit and Broad Form All States Coverage, and Voluntary Compensation endorsement. Subcontractor shall also include coverage under the United States Longshoremen’s and Harbor Worker’s Compensation Act, if exposure exists, or if required by the Contract Documents.

Where a Professional Employer Organization (PEO) or “leased employees” are utilized, Subcontractor shall require its leasing company to provide Workers Compensation meeting the requirements of this workers compensation section for said workers and such policy shall be endorsed to provide an Alternate Employer Endorsement in favor of Subcontractor via WC 00 03 01A or its equivalent. If Subcontractor maintains any Workers Compensation policy(s) in addition to the coverage provided by the PEO, said policy(s) or its equivalent shall contain an Employee Leasing Client Exclusion Endorsement via WC 00 03 22 or its equivalent.

E. CERTIFICATE OF INSURANCE. Prior to commencement of the Work, and thereafter, upon renewal or replacement of each certificate of coverage, Subcontractor shall furnish Contractor with a certificate of insurance and policy endorsements (or certified copies of its insurance policies), which Subcontractor warrants and represents is a true and accurate representation of Subcontractor’s existing insurance coverage. This certificate shall indicate and include copies of all endorsements, including Contractor and Owner as additional insured. The coverage provided to the additional insured parties shall be as broad as the coverage provided to the named insured under said policy and the limits of insurance shall be the limit specified in this Subcontract or the Subcontractor’s policy, whichever is greatest.

F. BUILDER’S RISK OR ALL RISK POLICY: Contractor and Subcontractor waive all rights against each other and the Owner, separate contractors of Owner, and all other subcontractors for loss or damage to the extent covered by Builder’s Risk or other similar insurance covering improvements or materials at the Project site, except such rights as they may have to the proceeds of such insurance. The Subcontractor shall procure and maintain, at the Subcontractor’s own expense, an Installation Floater to protect Subcontractor’s interest. Subcontractor shall be responsible for payment of any its costs and expenses not covered by Builder’s Risk, including the Builder’s Risk deductible.

G. ENDORSEMENT. If the policies of insurance referred to in this Exhibit require an endorsement to provide for continued coverage where there is a waiver of subrogation, the owners of such policies will cause them to be so endorsed.

H. PUNITIVE DAMAGES. Subcontractor’s general liability, auto liability and umbrella/excess policies shall include punitive damage coverage (unless prohibited by applicable law).

I. ADDITIONAL INSURED LIMITATIONS. As respects any additional insured requirements contained herein, the coverage provided to the additional insured parties shall be as broad as the coverage provided to the named insured under said policy and the limits of insurance shall be limit specified in this contract or the Subcontractor’s policy, whichever is greatest.

J NO REPRESENTATION OF COVERAGE ADEQUACY. By requiring insurance herein, Contractor does not represent that coverage and limits will necessarily be adequate to protect Subcontractor and such coverage and limits shall not be deemed as a limitation on Subcontractor’s liability under the indemnities granted to Contractor in this Agreement.

K. CROSS-LIABILITY COVERAGE. Subcontractor’s liability policies shall contain the standard Insurance Services Organization (ISO) Separation of Insured’s clause or a substantially similar clause. There shall be no endorsements or modifications limiting the scope of coverage related to the Separation of Insured’s clause.

L. SELF-INSURED RETENTIONS. Subcontractor warrants it is financially capable and responsible for payment of all retentions on its policies regardless of fault.

M. SUB-SUBCONTRACTOR’S INSURANCE. Subcontractor shall cause each sub-subcontractor employed by Subcontractor to purchase and maintain insurance of the type specified in the requirements of this section, and will only vary from these requirements with the express written approval of Contractor. When requested by Contractor, Subcontractor shall furnish to Contractor copies of certificates of insurance evidencing coverage for each sub-subcontractor.

Exhibit “D”

CONGLETON-HACKER COMPANY
PROJECT INFORMATION FORM

Affidavits, Releases of Lien and Waivers, both Partial and Final, will be required from all Material Suppliers and Subcontractors furnishing materials or labor on this project.

C-H PROJECT #{Projects.Number}

SUBCONTRACTOR: {ToCompany.Name}

PROJECT: {Projects.Name}

I. LIST YOUR MATERIAL & EQUIPMENT SUPPLY SOURCES FOR THIS PROJECT *If additional space is needed, attach list

	STREET ADDRESS	CITY	STATE	ZIP	PHONE NO.	DESCRIPTION OF MATERIALS TO BE SUPPLIED

II. SUBCONTRACTORS YOU INTEND TO USE ON THIS PROJECT

FIRM NAME	STREET ADDRESS	CITY	STATE	ZIP	PHONE NO.	DESCRIPTION OF SUBCONTRACTED WORK

I certify that the foregoing is a complete list of all material suppliers and subcontractors from whom purchases in excess of $1,000.00 will be made for this particular Congleton-Hacker Co. project. In addition, I agree that you may contact any of the above listed parties for the purpose of obtaining information relating to this project.

Signature	Printed Name	Title	Date

Congleton-Hacker Co. Use Only	
Date	PM Initial

Exhibit “E”

CONGLETON-HACKER COMPANY
872 FLOYD DRIVE
LEXINGTON, KY 40522

SUMMARY OF APPLICATION FOR PAYMENT

DATE: _____ PROJECT: {Projects.Name}

FROM: {ToCompany.Name} PROJECT NO. {Contracts.ContractNumber}

_____ DATE OF CONTRACT: {Contracts.ContractDate}

_____ APPLICATION NO. _____

PHONE: _____ PERIOD FROM _____ TO _____

_____

STATEMENT OF CONTRACT

Original Contract Amount	$ {Contracts.OrigValue}
Approved Change Order #1 thru _____ *	$ _____
Revised Contract Amount to Date	$ _____

* Unapproved Changes are not to be billed unless and until a Change Order is fully executed by Congleton-Hacker.

_____

PROJECT TO DATE APPLICATION CALCULATIONS

Value of Work Completed (per attached breakdown as prescribed by Project Manager)	$ _____
Materials Stored (per attached breakdown as prescribed by Project Manager)	$ _____
Total Completed Work & Material Stored on Job Site	$ _____
Less _____% Retainage	$ _____
Total to Date Less Retainage	$ _____
Less Previous Applications	$ _____
Amount of This Application for Payment	$ _____

_____

IMPORTANT: The Payment Estimate Supplemental Information Data must be completed and submitted along with this form. The Progress Payment Waiver and Release of Lien form must be furnished for previous invoice payments to subcontractors and suppliers. Your Progress Payment Waiver of Lien must also be furnished for previous invoice payments.

Exhibit “E”

CONGLETON-HACKER COMPANY

PAYMENT ESTIMATE SUPPLEMENTAL INFORMATION

TO: CONGLETON-HACKER COMPANY RE: SUBCONTRACT NO. {Contracts.ContractNumber}

PROJECT: {Projects.Name}

PAYMENT ESTIMATE NO. _____ ESTIMATE DATE: _____

Listed below are all subcontractors and suppliers of materials for this project during the period covered by this Payment Estimate whose total amount due for the period exceeds $1,000.00 OR who have had lesser amounts due over multiple periods which in aggregate exceeds $1,000.00 and for which releases have not been furnished.

If additional space is needed attach list to this sheet. Send completed releases and waivers from all of the following along with your own with your next Payment Estimate.

NAME	ADDRESS	DESCRIPTION OF WORK OR MATERIALS

The undersigned certifies that the foregoing list, and any attached sheets, includes all subcontractors and material suppliers as described above having amounts due in excess of $1,000.00 in aggregate for the period covered by this or previous Payment Estimates for which releases and waivers of lien have not been furnished.

COMPANY NAME: {ToCompany.Name}

AUTHORIZED SIGNATURE:_____

TITLE: _____ DATE SIGNED: _____

Congleton-Hacker Co. Use Only
Project Manager Approval: _____

For Use By Subcontractor’s Material Suppliers and Subcontractor’s Subcontractors

Exhibit “E”

PROGRESS PAYMENT {CONTRACTS.CONTRACTNUMBER}

SUBCONTRACTOR, SUPPLIER OR VENDOR AFFIDAVIT AND WAIVER OF LIEN
ACKNOWLEDGEMENT OF PAYMENT

Project Name:{Projects.Name} (“the Project”)

Subcontractor, Supplier or Vendor Name: {ToCompany.Name} (“Subcontractor”)

Owner Name:{LegalDocInfo.Owner}(“Owner”)

Subcontractor has provided labor and/or materials, equipment, or machinery for the Project during the billing period of _____ through _____ (the Billing Period), and

Subcontractor has paid in full all bills, invoices or other obligations for labor, materials, payroll taxes, material, equipment, machinery, fuel or any other debts owed relating to this Project which are due or payable on or before the last day of the Billing Period.

Subcontractor certifies and warrants that it has complied with all federal, state and local tax and employment laws, including but not limited to Social Security, Unemployment, Immigration, and Workers Compensation laws relating to the Subcontract and Subcontractor’s work through the Billing Period.

Subcontractor waives and releases all rights to lien or claim against the Owner of the Project, the Owner’s Property, Congleton-Hacker Company and any surety for the performance of this Subcontract from inception of the Project through the Billing Period, except for (i) unpaid retention and (ii) work that has been performed which is not the subject of an approved change order and which is described and quantified in the attached document. The Subcontractor acknowledges and agrees that all claims that arose during this Billing Period, if any, are hereby expressly waived and released. The Subcontractor further states that no other person has any right to a lien or claim against the Owner or Owner’s property due to work performed or material, equipment, machinery or other supplies furnished to the Subcontractor through the Billing Period.

Subcontractor understands and agrees that Congleton-Hacker Company and others are relying on this waiver and release to induce Congleton-Hacker Company to make payments to the Subcontractor. This waiver and release shall become effective immediately upon receipt of the amount applied for in Payment Application Number __ for this Billing Period.

Subcontractor swears, affirms and certifies that its Application for Payment Number __ for the Billing Period is accurate and correct and properly describes the work performed, materials, equipment and machinery provided to the Project for the Billing Period specified. Subcontractor shall indemnify, defend and hold harmless Congleton-Hacker and the Owner, including any attorneys’ fees or costs incurred by them, from and against any claim or lien by any vendor, sub-subcontractor or other person or entity with respect to any material or labor placed upon, furnished or installed on or in the Project and/or on Owner’s property by the Subcontractor or Subcontractor’s vendors, sub-subcontractors or others for whom Subcontractor is directly or indirectly responsible.

{ToCompany.Name}
Subcontractor

_____
Signature and Title

_____
Printed name

COMMONWEALTH OF KENTUCKY)
COUNTY OF _____)

Subscribed and sworn to before me this _____ day of _____, 20__, by _____.

My commission expires: _____

_____
NOTARY PUBLIC

[SEAL]

Exhibit “E”

SUBCONTRACTOR AFFIDAVIT AND WAIVER OF LIEN –

ACKNOWLEDGMENT OF FULL AND FINAL PAYMENT {CONTRACTS.CONTRACTNUMBER}

_____, on behalf of {ToCompany.Name} (hereinafter "the Subcontractor"), being duly authorized by the company, and after first being duly sworn, states as follows:

Subcontractor, having a entered into a Subcontract with Congleton-Hacker Co. (“Contractor”) on the project owned by {LegalDocInfo.Owner} (“Owner”) and known as {Projects.Name}, located in{Projects.Address} (hereinafter "the Project"), has performed work and/or furnished materials, equipment, and/or machinery or has fabricated materials especially for the Project. Subcontractor certifies that it has paid in full all bills or obligations for labor, sub-subcontract Work, payroll taxes, material, (whether or not specifically fabricated for this Project), equipment, and/or machinery, and Subcontractor represents to Contractor that there are no bills or obligations unpaid on the Project.

The Subcontractor further certifies that it has complied with all federal, state and local tax and employment laws, including, but not limited to, Social Security, Unemployment and worker's compensation laws, applicable to its Work for the Project.

The Subcontractor hereby fully and finally waives and releases all rights to liens and claims against the Owner, the Contractor, the Project property, the Project or any funds relating thereto for the performance of its Contract from the inception of the Project. The Subcontractor further states that no other person has any right to a lien or claim against the Owner, the Contractor, the Project property or the Project funds on account of work performed or for material, equipment, and/or machinery, or for material especially fabricated for the Project, furnished by or through the Subcontractor.

Subcontractor understands and agrees that this waiver and release is given with the understanding that the Contractor and others will rely upon it, and it is provided to induce Contractor to make the final payment to the Subcontractor. The waiver and release is effective as of the date it is signed.

In consideration for full and final payment, Subcontractor shall indemnify, defend and hold the Contractor and the Owner harmless from any claims or liens asserted against the Contractor, the Owner, Owner's property, the Project or any funds relating thereto by Contractor's subcontractors, suppliers, governmental agencies or other third parties which arise from Work performed and/or materials provided, including all costs, attorneys' fees and other expenses incurred by the Contractor or Owner as a result of such liens or claims.

Subcontractor attaches hereto final waivers and releases for liens from all sub-subcontractors, vendors and/or material suppliers.

SUBCONTRACTOR

_____
Signature/Title

_____
Printed Name

State of: _____

County of: _____

Subscribed and sworn before me this _____ day of _____, 2012 by _____, the

_____ of _____, a _____ corporation (or partnership or sole proprietorship), on behalf of the Subcontractor.

_____
Notary Public

My commission expires:_____

Exhibit “F”

RELEASE, WAIVER AND INDEMNIFICATION

FOR USE OF CONGLETON-HACKER CO. OWNED OR RENTED EQUIPMENT

This ___ day of _____, 20___, {ToCompany.Name} (“Subcontractor”), agrees as follows:

WHEREAS, Subcontractor is performing work on the {Projects.Name} project (“Project”) under subcontract with Congleton-Hacker Company (“Contractor”); and

WHEREAS, Subcontractor desires to use equipment owned by Contractor in the performance of its work on the Project;

NOW THEREFORE, in consideration of Contractor’s permission to use Contractor’s equipment on the Project, Subcontractor agrees as follows:

1. Subcontractor agrees that it is using the equipment at its own risk, and uses the equipment as is, without any representations or warranties from Contractor.

2. Subcontractor shall indemnify, defend and hold Contractor harmless from any loss, claim, damage, or other costs, fees and/or expense (including personal injury, property damage or death), which may arise from Subcontractor’s use of Contractor’s equipment, including the use of Contractor’s equipment by Subcontractor’s employees, agents, sub-subcontractors or suppliers or any other party for whom Subcontractor, except where such loss or damage is determined to have been solely and exclusively the fault of Contractor.

3. Subcontractor releases Contractor from all liability relating to Subcontractor’s use of Contractor’s equipment.

4. Subcontractor shall provide only qualified, skilled and trained operators of Contractor’s equipment.

5. Subcontractor shall provide all maintenance, fuel and other items necessary for operation of Contractor’s equipment during Subcontractor’s use of the equipment.

6. Subcontractor shall return the equipment in the same or better condition than the condition of the equipment upon receipt, and Subcontractor shall repair any and all damage to the equipment.

7. Subcontractor shall not permit other subcontractors or other persons to use Contractor’s equipment.

SUBCONTRACTOR: {ToCompany.Name}

BY: _____

ITS: _____

CONTRACTOR: Congleton-Hacker Co.

BY: _____

ITS: _____

Exhibit “G”

SCOPE DOCUMENT AND SPECIAL CONDITIONS

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
AGC DOCUMENT NO. 606
SUBCONTRACT PERFORMANCE BOND

This document is endorsed by the American Subcontractors Association, Inc.

The Contractor, _____ (the "Contractor") has entered into a Contract with the Owner _____ (the "Owner") dated _____ for _____ (the "Project"); and
The Contractor and the Subcontractor _____, (the "Subcontractor") have entered into a Subcontract Agreement (the "Subcontract") dated _____ for certain portions of the work in connection with the Project consisting generally of: _____ (the "Subcontract Work").
The Subcontract is incorporated by reference into this Bond.

By virtue of this Performance Bond (the "Bond"), the Subcontractor as Principal and _____ as Surety ("Surety"), are bound to the Contractor as Obligee in the maximum amount of _____ Dollars ($ _____) (the "Bond Sum"). The Subcontractor and Surety hereby bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein.

1. **GENERAL CONDITIONS.** It is the condition of this Bond that if the Subcontractor provides all labor, materials, equipment and services necessary or incidental to complete the Subcontract Work in accordance with that which is indicated in the Subcontract, the Surety's obligations under this Bond are null and void. Otherwise the Surety's obligations shall remain in full force and effect. The Surety waives any requirement to be notified of any alteration or extension of time made by the Contractor in the Subcontract. The Contractor may not invoke the provisions of this Bond unless the Contractor has performed its obligations pursuant to the Subcontract. Upon making demand on this Bond, the Contractor shall make the Subcontract Balance (the total amount payable by the Contractor to the Subcontractor pursuant to the Subcontract less amounts properly paid by the Contractor to the Subcontractor) available to the Surety for completion of the Work.

2. **SURETY OBLIGATIONS.** If the Subcontractor is in default pursuant to the Subcontract and the Contractor has declared the Subcontractor in default in writing, the Surety promptly may remedy the default or shall:

   a. Complete the Subcontract Work, with the consent of the Contractor, through the Subcontractor or otherwise;

   b. Arrange for the completion of the Subcontract Work by a subcontractor acceptable to the Contractor and secured by performance and payment bonds equivalent to those for the Subcontract issued by a qualified surety. The Surety shall make available as the Subcontract Work progresses sufficient funds to pay the cost of completion of the Subcontract Work less the Subcontract Balance up to the Bond Sum; or

   c. Waive its right to complete the Subcontract Work and reimburse the Contractor the amount of its reasonable costs, not to exceed the Bond Sum, to complete the Subcontract Work less the Subcontract Balance.

3. **DISPUTE RESOLUTION.** Any dispute pursuant to this Bond shall be instituted in any court of competent jurisdiction in the location in which the Project is located and shall be commenced within two years after default of the Subcontractor or Substantial Completion of the Subcontract Work, whichever occurs first. If this provision is prohibited by law, the minimum period of limitation available to sureties in the jurisdiction shall be applicable.

This Bond is entered into as of _____

SURETY _____ (seal)	SUBCONTRACTOR _____ (seal)
By: _____	By: _____
Print Name: _____	Print Name: _____
Print Title: _____	Print Title: _____
(Attach Power of Attorney)	
Witness: _____	Witness: _____
(Additional signatures, if any, appear on attached page.)	*(Additional signatures, if any, appear on attached page.)*

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THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
AGC DOCUMENT NO. 607
SUBCONTRACT PAYMENT BOND

This document is endorsed by the American Subcontractors Association, Inc.

The Contractor, _____ (the "Contractor") has entered into a Contract with the Owner _____ (the "Owner") dated _____ for _____ (the "Project"); and The Contractor and the Subcontractor _____, (the "Subcontractor") have entered into a Subcontract Agreement (the "Subcontract") dated _____ for certain portions of the work in connection with the Project consisting generally of: _____.

The Subcontract is incorporated by reference into this Bond.

By virtue of this Performance Bond (the "Bond"), the Subcontractor as Principal and _____ as Surety ("Surety"), are bound to the Contractor as Obligee in the maximum amount of _____ Dollars ($ _____) (the "Bond Sum"). The Subcontractor and Surety hereby bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein.

1. GENERAL CONDITIONS. It is the condition of this Bond that if the Subcontractor promptly makes payment for all labor, materials, and equipment furnished for use in the performance of the work required by the Subcontract, the Surety's obligations pursuant to this Bond are null and void. Otherwise the Surety's obligations shall remain in full force and effect. The Surety waives any requirement to be notified of any alteration or extension of time made by the Contractor in the Subcontract.

2. SURETY OBLIGATIONS. Every Claimant who has not been paid in full before the expiration of a period of ninety (90) days after such Claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, may have a right of action on this Bond. The Surety's obligation to the Claimant(s) shall not exceed the Bond Sum.

3. LIMITATION OF ACTION. No suit or action shall be commenced on this Bond by any Claimant:

a. Unless Claimant, other than one having a direct contract with the Subcontractor, shall have given written notice to the Subcontractor, the Contractor and the Surety within ninety (90) days after the Claimant did or performed the last of the work or labor, or furnished the last of the materials for which the claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by any means which provides written third party verification to the Subcontractor, the Contractor and Surety at any place within the United States where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the Project is located.

b. After the expiration of one (1) year from the date on which the Claimant last performed labor or furnished materials or equipment on the Project. If this provision is prohibited by law, the minimum period of limitation available to sureties in the jurisdiction shall be applicable.

c. Other than in any court of competent jurisdiction in the location in which the Project is located.

4. CLAIMANT. A Claimant is defined as an individual or entity having a direct contract with the Subcontractor or having a contract with a subsubcontractor having a direct contract with the Subcontractor to furnish labor, materials or equipment for use in the performance of the Subcontract.

This Bond is entered into as of _____

SURETY _____ (seal)	SUBCONTRACTOR _____ (seal)
By: _____	By: _____
Print Name: _____	Print Name: _____
Print Title: _____	Print Title: _____
(Attach Power of Attorney)	
Witness: _____	Witness: _____
(Additional signatures, if any, appear on attached page.)	*(Additional signatures, if any, appear on attached page.)*

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GENERAL INSTRUCTIONS

Standard Form

These instructions are for the information and convenience of the users of AGC 607, 2004 Edition. They are not part of the Agreement nor a commentary on or interpretation of the contract form. It is the intent of the parties to a particular agreement that controls its meaning and not that of the writers and publishers of the standard form. As a standard form, this Agreement has been designed to establish the relationship of the parties in the standard situation. Recognizing that every situation is unique, modifications may be required. See the following recommendations for modifications.

Legal and Surety Counsel

THIS DOCUMENT HAS IMPORTANT LEGAL AND SURETY CONSEQUENCES, AND IT IS NOT INTENDED AS A SUBSTITUTE FOR COMPETENT PROFESSIONAL SERVICES AND ADVICE. CONSULTATION WITH AN ATTORNEY AND A SURETY ADVISOR IS ENCOURAGED WITH RESPECT TO ITS COMPLETION OR MODIFICATION. FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS MAY VARY WITH RESPECT TO THE APPLICABILITY AND/OR ENFORCEABILITY OF SPECIFIC PROVISIONS IN THIS DOCUMENT. AGC SPECIFICALLY DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. PURCHASERS ASSUME ALL LIABILITY WITH RESPECT TO THE USE OR MODIFICATION OF THIS DOCUMENT, AND AGC SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM SUCH USE OR MODIFICATION.

COMPLETING THE AGREEMENT

Completing Blanks

Diamonds (♦) in the margins indicate provisions requiring the parties to fill in blanks with information.

Modifications

Supplemental conditions, provisions added to the printed agreement, may be adopted by reference. It is always best for supplements to be attached to the agreement. Provisions in the printed document that are not to be included in the agreement may be deleted by striking through the word, sentence or paragraph to be omitted. It is recommended that unwanted provisions not be blocked out so that the deleted materials are illegible. The parties should be clearly aware of the material deleted from the standard form. It is a good practice for both parties to sign and date all modifications and supplements.

Photocopying the Completed Document

The purchaser of this copyrighted document may make up to nine (9) photocopies of a completed document, whether signed or unsigned, for distribution to appropriate parties in connection with a specific project. Any other reproduction of this document in any form is strictly prohibited, unless the purchaser has obtained the prior written permission of the Associated General Contractors of America.

OBTAINING ADDITIONAL INFORMATION

To obtain additional information about AGC documents, contact AGC at 333 John Carlyle Street, Suite 200, Alexandria, VA 22314; phone 1-(800) 242-1767 or (703) 548-3118; fax (703) 548-3119, or visit AGC's web site at www.agc.org.

SPECIAL INSTRUCTIONS

This document may be completed in the following manner:

- Fill in the legal names of the Contractor (Obligee) and Owner.
- Fill in the date of the Contract between the Owner and Contractor and the name of the Project.
- Fill in the legal name of the Subcontractor (Principal). Fill in the date of the Subcontract and the description of the work.
- Fill in the company name of the Surety as the "SURETY." Note that the name of the Surety is not the name of the surety agent.
- Provide the amount (the "Bond Sum"), stated in both Arabic numerals and words, for which the Subcontractor and the Surety will be obligated.
- Provide the date of the bond in the space provided after Article 4 and before the signatures.
- Fill in the company name of the Surety after "SURETY." Note that the name of the Surety is not the name of the surety agent. The corporate seal should be affixed. The signature of the person representing the firm should be placed on the line entitled "By." Below the signature line, the person's name who placed their signature on the signature line should be typed or printed in along with their business title. It is most important that the Surety's Power of Attorney be attached. The signature of the witness should be placed on the line entitled "Witness."
- Fill in the company name of the Subcontractor after "SUBCONTRACTOR." The corporate seal should be affixed. The signature of the person representing the firm should be placed on the line entitled "By." Below the signature line, the person's name who placed their signature on the signature line should be typed or printed in along with their business title. The signature of the witness to the signature for the "SUBCONTRACTOR" should be placed on the line entitled "Witness."
- Additional witness signatures, if any, should be included on an attached sheet and this fact should be noted in the space below or to the side of the line. (Additional signatures, if any, appear on attached page.)

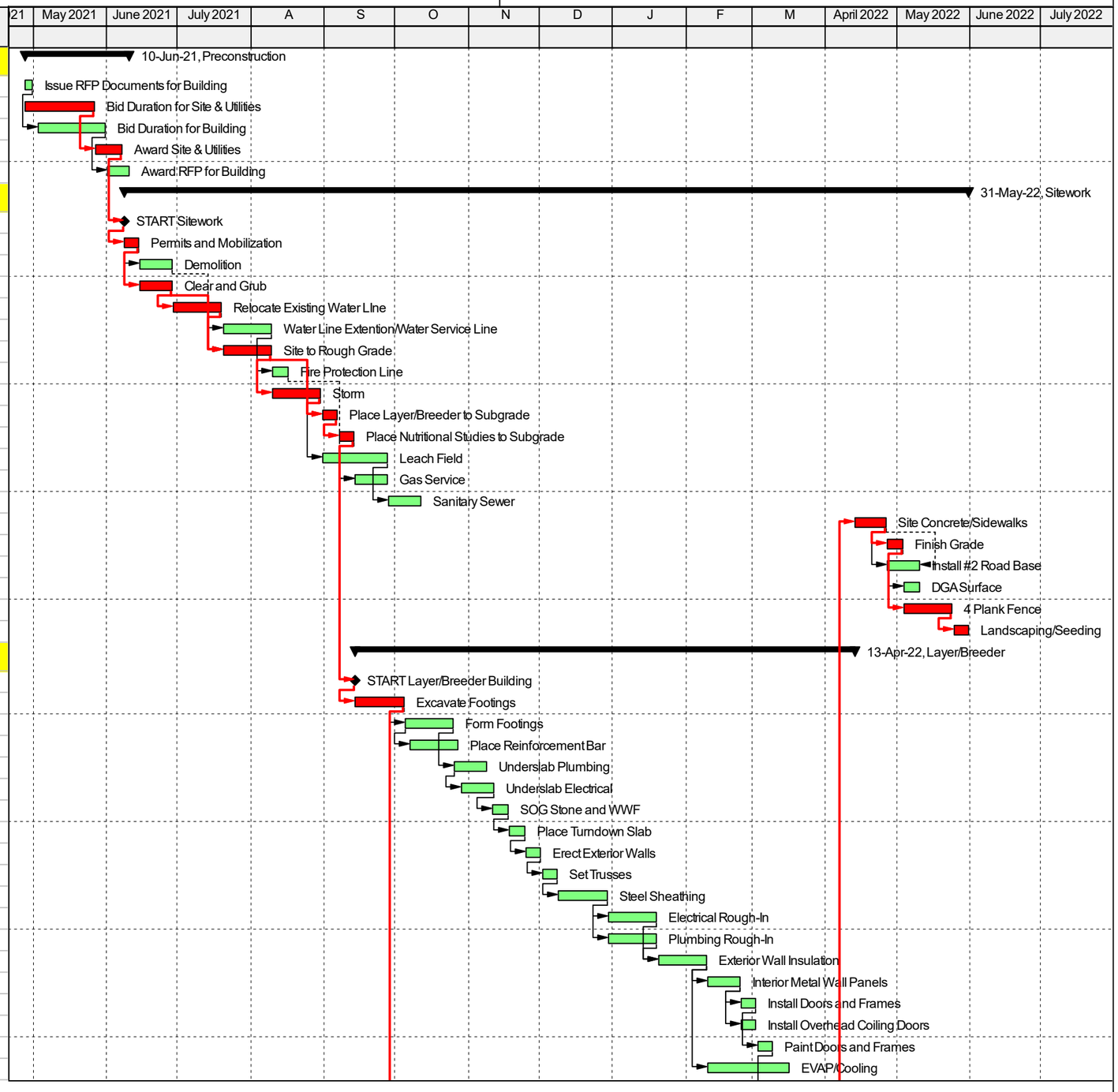
Exhibit “I”

CONTRACT DOCUMENT LIST

EXHIBIT “J”

OWNER-FURNISHED MATERIALS AND/OR EQUIPMENT

Activity ID	Area	Activity Name	Original Duration	Start	Finish
Preconstruction			33	27-Apr-21	10-Jun-21
A1000	PRE	Issue RFP Documents for Building	4	27-Apr-21*	30-Apr-21
A1040	PRE	Bid Duration for Site & Utilities	22	27-Apr-21*	26-May-21
A1010	PRE	Bid Duration for Building	21	03-May-21	31-May-21
A1050	PRE	Award Site & Utilities	8	27-May-21	07-Jun-21
A1020	PRE	Award RFP for Building	8	01-Jun-21	10-Jun-21
Sitework			256	08-Jun-21	31-May-22
A1060	SITE	START Sitework	0	08-Jun-21	
A1090	SITE	Permits and Mobilization	5	08-Jun-21	14-Jun-21
A1070	SITE	Demolition	10	15-Jun-21	28-Jun-21
A1080	SITE	Clear and Grub	10	15-Jun-21	28-Jun-21
A1170	SITE	Relocate Existing Water LIne	15	29-Jun-21	19-Jul-21
A1120	SITE	Water Line Extention/Water Service Line	15	20-Jul-21	09-Aug-21
A1330	SITE	Site to Rough Grade	15	20-Jul-21	09-Aug-21
A1140	SITE	Fire Protection Line	5	10-Aug-21	16-Aug-21
A1280	SITE	Storm	15	10-Aug-21	30-Aug-21
A1310	SITE	Place Layer/Breeder to Subgrade	5	31-Aug-21	06-Sep-21
A1260	SITE	Place Nutritional Studies to Subgrade	5	07-Sep-21	13-Sep-21
A1110	SITE	Leach Field	20	31-Aug-21	27-Sep-21
A1160	SITE	Gas Service	10	14-Sep-21	27-Sep-21
A1130	SITE	Sanitary Sewer	10	28-Sep-21	11-Oct-21
A1210	SITE	Site Concrete/Sidewalks	10	13-Apr-22	26-Apr-22
A1220	SITE	Finish Grade	5	27-Apr-22	03-May-22
A1180	SITE	Install #2 Road Base	10	27-Apr-22	10-May-22
A1190	SITE	DGA Surface	5	04-May-22	10-May-22
A1200	SITE	4 Plank Fence	15	04-May-22	24-May-22
A1230	SITE	Landscaping/Seeding	5	25-May-22	31-May-22
Layer/Breeder			152	14-Sep-21	13-Apr-22
A1410	LAYER	START Layer/Breeder Building	0	14-Sep-21	
A1240	LAYER	Excavate Footings	15	14-Sep-21	04-Oct-21
A1500	LAYER	Form Footings	15	05-Oct-21	25-Oct-21
A1250	LAYER	Place Reinforcement Bar	15	07-Oct-21	27-Oct-21
A1290	LAYER	Underslab Plumbing	10	26-Oct-21	08-Nov-21
A1270	LAYER	Underslab Electrical	10	29-Oct-21	11-Nov-21
A1300	LAYER	SOG Stone and WWF	5	11-Nov-21	17-Nov-21
A1320	LAYER	Place Turndown Slab	5	18-Nov-21	24-Nov-21
A1340	LAYER	Erect Exterior Walls	5	25-Nov-21	01-Dec-21
A1350	LAYER	Set Trusses	5	02-Dec-21	08-Dec-21
A1370	LAYER	Steel Sheathing	15	09-Dec-21	29-Dec-21
A1390	LAYER	Electrical Rough-In	15	30-Dec-21	19-Jan-22
A1760	LAYER	Plumbing Rough-In	15	30-Dec-21	19-Jan-22
A1380	LAYER	Exterior Wall Insulation	15	20-Jan-22	09-Feb-22
A1420	LAYER	Interior Metal Wall Panels	10	10-Feb-22	23-Feb-22
A1430	LAYER	Install Doors and Frames	5	24-Feb-22	02-Mar-22
A1750	LAYER	Install Overhead Coiling Doors	5	24-Feb-22	02-Mar-22
A1450	LAYER	Paint Doors and Frames	5	03-Mar-22	09-Mar-22
A1400	LAYER	EVAP/Cooling	25	10-Feb-22	16-Mar-22

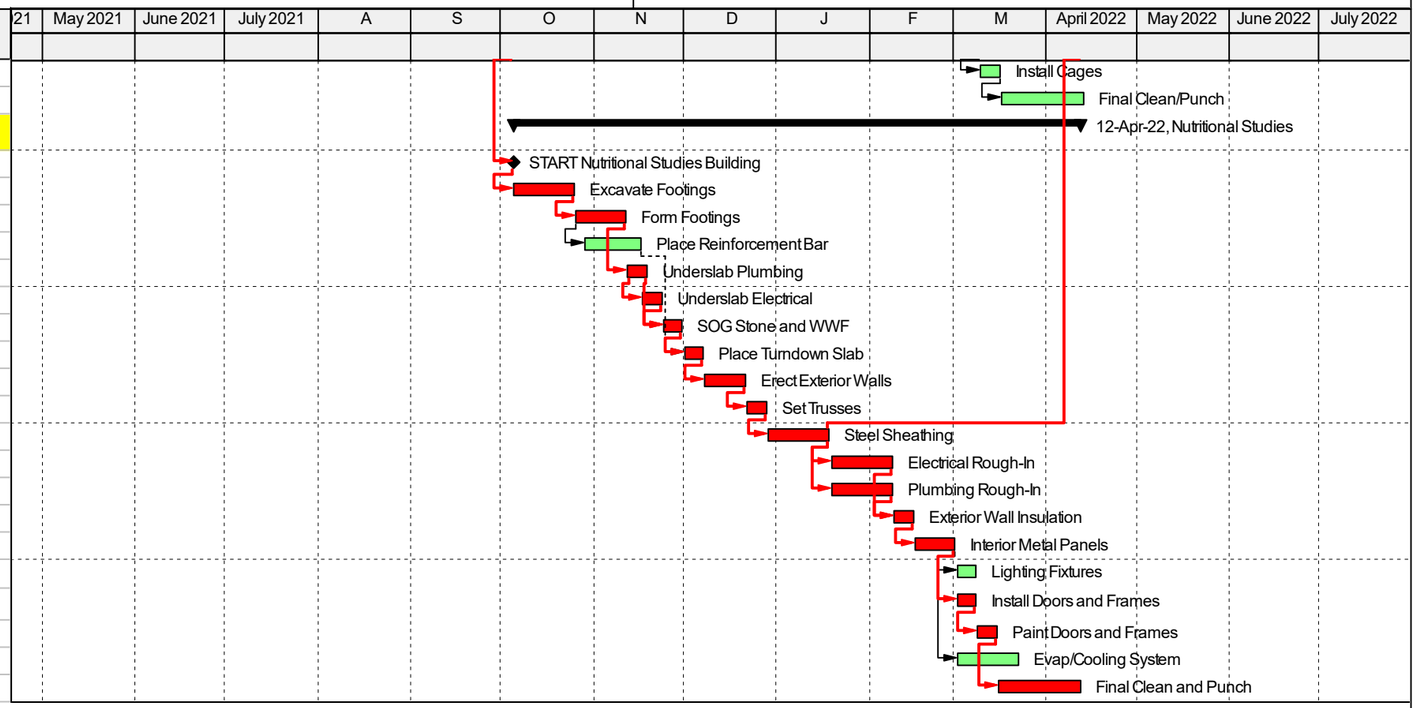


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

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Activity ID	Area	Activity Name	Original Duration	Start	Finish
A1540	LAYER	Install Cages	5	10-Mar-22	16-Mar-22
A1710	LAYER	Final Clean/Punch	20	17-Mar-22	13-Apr-22
Nutritional Studies			136	05-Oct-21	12-Apr-22
A1790	NUTRITI	START Nutritional Studies Building	0	05-Oct-21	
A1800	NUTRITI	Excavate Footings	15	05-Oct-21	25-Oct-21
A1820	NUTRITI	Form Footings	13	26-Oct-21	11-Nov-21
A1810	NUTRITI	Place Reinforcement Bar	13	29-Oct-21	16-Nov-21
A1920	NUTRITI	Underslab Plumbing	5	12-Nov-21	18-Nov-21
A1910	NUTRITI	Underslab Electrical	5	17-Nov-21	23-Nov-21
A1900	NUTRITI	SOG Stone and WWF	5	24-Nov-21	30-Nov-21
A1930	NUTRITI	Place Turndown Slab	5	01-Dec-21	07-Dec-21
A1850	NUTRITI	Erect Exterior Walls	10	08-Dec-21	21-Dec-21
A1860	NUTRITI	Set Trusses	5	22-Dec-21	28-Dec-21
A1940	NUTRITI	Steel Sheathing	15	29-Dec-21	18-Jan-22
A1870	NUTRITI	Electrical Rough-In	15	19-Jan-22	08-Feb-22
A1880	NUTRITI	Plumbing Rough-In	15	19-Jan-22	08-Feb-22
A1950	NUTRITI	Exterior Wall Insulation	5	09-Feb-22	15-Feb-22
A2030	NUTRITI	Interior Metal Panels	10	16-Feb-22	01-Mar-22
A1970	NUTRITI	Lighting Fixtures	5	02-Mar-22	08-Mar-22
A1980	NUTRITI	Install Doors and Frames	5	02-Mar-22	08-Mar-22
A1990	NUTRITI	Paint Doors and Frames	5	09-Mar-22	15-Mar-22
A1890	NUTRITI	Evap/Cooling System	15	02-Mar-22	22-Mar-22
A2040	NUTRITI	Final Clean and Punch	20	16-Mar-22	12-Apr-22



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

© Oracle Corporation

RFP for Poultry

POULTRY BUILDINGS:

PLUMBING

All work shall meet the requirements of the following:

The Kentucky Building Code (KBC)
ASHRAE 90.1 - 2010
Applicable Local Codes and Ordinances
National Electrical Code (NEC)
Occupational Safety and Health Administration (OSHA)
American National Standards Institute (ANSI)
American Society for Mechanical Engineers (ASME)
American Society for Testing and Materials (ASTM)
American Water Works Association (AWWA)
National Electrical Manufacturers Association (NEMA)

Coordinate with utility companies and size piping to meet individual building requirements. Utility materials and installation shall meet attached specifications.

Provide reduced pressure backflow preventer at water entrance and plumbing fixtures as shown on drawings. Floor drains shall be cast iron type as required. Flush mounted non-freeze wall hydrants shall be provided on each face of the buildings. Connect plumbing fixtures to utility piping as required. Install concealed freeze-proof hose bibb on each face of building. Sanitary piping shall be cast iron, Type L copper, or PVC. Domestic water piping shall be Type L copper.

Natural gas piping shall be Schedule 40 black.

Provide drinking line plumbing connection to the rooms. The drinking line will be part of the equipment package.

HVAC

All work shall meet the requirements of the following:

The Kentucky Building Code (KBC)
ASHRAE 90.1 - 2010
Applicable Local Codes and Ordinances
National Electrical Code (NEC)
Occupational Safety and Health Administration (OSHA)
Air Conditioning and Refrigeration Institute (ARI)
Air Diffusion Council (ADC)
Air Movement and Control Association, Inc. (AMCA)
American National Standards Institute (ANSI) Laboratory Ventilation
American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
American Society of Mechanical Engineers (ASME)
American Society for Testing and Materials (ASTM)

American Water Works Association (AWWA)
Institute of Boiler and Radiator Manufacturers (IBR)
National Electrical Manufacturers Association (NEMA)
National Fire Protection Association (NFPA)
Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
Underwriters' Laboratories (UL)

Gas equipment with DX air conditioning shall serve buildings as required. In general, rooms of similar occupancy types (such as break rooms and office) will be allowed as a single zone. Rooms of different occupancy types (such as offices and labs) shall be on separate zones. Systems shall be standalone. Code required outside air shall be conditioned thru a dedicated unit and distributed to required areas.

Nutrition 101, Nutrition 105 and Breeder Pens 100 will need to have in room heaters. Cage Rooms 105-109 required full HVAC. Feed Rooms 100 and 103 require full HVAC. Supplemental heating requirements and type are to be determined by poultry building manufacturers.

Nutrition 101, Nutrition 105 and Breeder Pens 100 are evaporative cooling and space heaters. Cage Rooms 105-109 must be designed to maintain 105 max degrees. Conditions in all other areas shall be according to guidelines referenced in RFP and poultry building manufacturer.

Do not provide any air recirculation in either of the poultry building.

Exhaust air shall be provided as required based on room usage.

Sheet metal ductwork shall be constructed for 2 inches low pressure and insulated with 1½" fiberglass.

Evaporative Cooling & Ventilation: Areas identified on the drawings to receive evaporative cooling and ventilation shall be designed to meet the American Society of Agricultural and Biological Engineers ASAE EP270.5 DEC1986 (R2017) "Design of Ventilation Systems for Poultry and Livestock Shelters" and ANSI/ASAE EP282.2 FEB1993 (R2018) "Design Values for Emergency Ventilation and Care of Livestock and Poultry"

Poultry buildings are stand alone. No alarms are require in the Poultry Buildings.

ELECTRICAL

All work shall meet the requirements of the Kentucky Building Code, the National Electric Code, and ASHRAE 90.1-2010, latest additions.

Provide to receive one electrical power service entrance per building. Provide sizing information of electrical service per the attached load data sheet. Provide to receive two separate emergency power feeds into building: one for life safety emergency distribution and one for equipment emergency distribution (these loads should be separated onto separate panels within each building).

Provide receptacles and power connections for all equipment. Provide convenience receptacles for flexibility. Provide explosion proof fixtures where required. Provide GFI receptacles within 6' of any

water source, in restrooms, and outside. Provide weather covers for receptacles on building exterior and on interior hose down areas.

All lighting is to be energy efficient LED. Where buildings/rooms/spaces are to be used 24 hours a day, provide light switches to control lighting. Where rooms will not be used 24 hours a day, provide control of lighting per ASHRAE 90.1-2010. Provide building mounted, exterior lighting for security and convenience around building exterior. Provide emergency egress lighting at all building entrances.

Provide data/voice receptacles to all equipment needing such connections. Provide room in a dry, conditioned space for floor standing data/voice equipment rack. Provide minimum of three 20A/1P circuits and one 30A/2P 208V receptacle at data rack for telecommunications system power.
The main distribution board in the Nutrition Studies Building is assumed to be a 1200 amp, 120/208V/3PH/4W board. Note this normal service is connected through the transfer switches to emergency loads in both buildings. In addition to branch breakers needed for building panels, provide one 150 amp and one 600 amp, 120/208V/3PH/4W branch breakers to provide normal power to the transfer switches. In the Nutrition Studies Building, provide in a panelboard one 20 amp, 120V circuit breaker for connection to a 500 watt generator battery charging circuit and one 30 amp, 208V/2P circuit breaker for connection to a 2400 watt generator jacket heater. The main distribution board in the Layer/Breeder Building is assumed to be a 600 amp, 120/208V/3PH/4W board.

Environmental conditions in the chicken buildings to be determined by the poultry building vendor based on a chart provided below:

Building/room	Housing type	Bird type	Maximum birds/room	Maximum Weight/bird lbs	Maximum Total Weight /room lbs
Nutrition Building/ 105	Floor Pens with shavings	Broilers	1920	6.5	12480
Nutrition Building/ 101	Grow Cages	Broilers (28 d)*	3717	2.9	10779
		Layer pullets*	4248	2.2	9345.5
Breeder/Layer Floor Pens/100	Floor Pens with shavings	Broiler Breeders	1200	5.3	6360
Breeder/ Layer Small cage room 105,106,107,108,109	Breeder Cages	Broiler Breeders	24 Males 140 Hens	8/male 5.3/hen	934

* the grow cages will be dual purpose to raise either layer pullets or 28 day broilers.

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FOR CONSTRUCTION BY A CONSTRUCTION MANAGER AT RISK
University of Kentucky
Capital Construction Division

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION BY A CONSTRUCTION MANAGER AT RISK
University of Kentucky
Capital Construction Division

These General Conditions are binding upon the Construction Manager 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 ARCHITECT'S 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 Construction Manager, 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 Construction Manager 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 CONSTRUCTION MANAGER or CONSTRUCTION MANAGER AT RISK (CM) - The term "Construction Manager" or "Construction Manager at Risk" (CM) 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 construction manager, and who will provide consultation and collaboration regarding the construction during and after design of the Project. The CM shall execute and hold all construction Trade Contracts and Purchase Orders for the Project.

1.1.7 CONTRACT - The term "Contract" means the Contract between Owner and Construction Manager and consists of all Contract Documents as defined in Article 1.1.10 of these General Conditions.

1.1.8 CONTRACT AMOUNT - The term "Contract Amount" means the sum stated in the Agreement which represents the total amount payable by the Owner to the Construction Manager 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.

1.1.9 CONTRACT DOCUMENTS - The "Contract Documents" include the Agreement of Contract between the Owner and the Construction Manager (the "Agreement"); the Request for Proposal; the General Conditions; the Special Conditions; the Construction Manager's Form of Proposal; the Construction Manager's Bonds; the Specifications, Drawings and Addenda for the construction of the Project which are to be used for bidding of the bid pack/Trade Contracts; 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 Construction Manager. 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 Construction Manager 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 Construction Manager to certain responsibilities or require the Construction Manager to perform certain actions, the Construction Manager 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 Construction Manager of its obligation to the University under this contract.–

1.1.10 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 Construction Manager shall complete the Work required by the Contract and shall achieve certification of substantial and final completion.

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 “CM Project Manager” means the individual employed by the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager to perform and complete the Construction Manager'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 Construction Manager authorizing the Construction Manager 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 Construction Manager may be forwarded through the Consultant.

2.2 The Consultant will regularly, but no less frequently that 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 Construction Manager on all applications for progress payments.

2.2.1 If applicable for the Work, the Consultant will verify to the Owner that the Construction Manager 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 Construction Manager. 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 Construction Manager'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 Construction Manager 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 Architect's Supplemental Instructions (ASI).

2.8 When requested by the Construction Manager, the Consultant will conduct inspections to determine if the Project is at the level of completion required by and is 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.

2.9 The Construction Manager 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 Construction Manager shall be directed to the Consultant.

ARTICLE 3 - CORRELATION AND INTENT OF CONTRACT DOCUMENTS

3.1 Execution of the Contract by the Construction Manager is a representation that the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager shall carefully study and compare the Contract Documents with each other and with other information provided to the Construction Manager 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 Construction Manager. Any failure to properly familiarize itself with the proposed Work shall not relieve the Construction Manager 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 Construction Manager. All 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 Construction Manager 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 Construction

Manager 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 Construction Manager 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 Construction Manager at Construction Manager's last known address. Such notice may also, at the Owner's election, be hand-delivered to the Construction Manager or the Construction Manager'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, Construction Manager, 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager'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 Construction Manager's construction schedule and shall allow for adequate and reasonable time for review of the samples and submittals by the Consultant. The Construction Manager 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 Construction Manager 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 Construction Manager'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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager for corrections as may be required. The Construction Manager 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

Construction Manager 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 Construction Manager 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 Construction Manager from the responsibility for any deviations from the requirements of the Contract Documents unless the Construction Manager 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 Construction Manager from responsibility for errors or omissions in the Shop Drawings.

ARTICLE 6 - LAYING OUT WORK

6.1 The Construction Manager 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 Construction Manager 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 Construction Manager's Contract amount or stipulated time for completion shall be allowed when due to failure by the Construction Manager to do so.

6.2 The Construction Manager shall be responsible for all lines, levels and measurements of all Work executed under the Contract. The Construction Manager shall verify all dimensions 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 Construction Manager 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 Construction Manager 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 Construction Manager shall advise Sub-contractors and trades persons performing Work of marked lines and levels provided for their use in layout work. The Construction Manager shall verify layout information shown on drawings as required for the Work.

6.3 The Construction Manager 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 Construction Manager for performance of the Work.

6.4 If any encroachments are made by the Construction Manager or any Sub-contractor on any adjacent property, the Construction Manager shall, at the Construction Manager'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 Construction Manager 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 Construction Manager free of charge one electronic or reproducible copy of the Drawings and Specifications for execution of the Work. The Construction Manager 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 Construction Manager 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 Construction Manager shall keep one copy of all Contract Documents, including Drawings, Specifications and Shop Drawings on the site and in good order. A qualified representative of the Construction Manager 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 Construction Manager 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, Construction Manager, or any Sub-contractor or Supplier on any other Project.

ARTICLE 8 - TEMPORARY UTILITIES

8.1 The Construction Manager 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 Construction Manager, 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Trade Contracts, the Construction Manager shall determine the source of supply for all materials required under that Trade Contract 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 Construction Manager 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 Construction Manager will not be excused for delays in securing materials specified.

9.4 The Construction Manager 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 Construction Manager that are related to this Project must use the name of the Construction Manager 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 Construction Manager. Any invoices received at the University that are related to this Project will be immediately forwarded to the Construction Manager. Copies of these invoices will be made and placed in the Construction Manager'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 Construction Manager 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 Construction Manager, if required, shall furnish satisfactory evidence as to the kind and quality of materials.

9.7 The Construction Manager 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 Construction Manager. 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 Construction Manager, the Consultant or the Owner. Improper conduct of any kind will not be permitted and may result in the offending individual, Sub-contractor or Construction Manager being barred from the Owner's premises. The Construction Manager 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 Construction Manager 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 Construction Manager is responsible for payment of all associated royalties. The Construction Manager 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 Construction Manager’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 Construction Manager, or included in a Trade 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 Construction Manager, but no fee shall be charged to or paid by the Construction Manager 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 Construction Manager.

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 contactor 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 (permitee 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 permitee 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 Construction Manager shall furnish a final occupancy permit from the proper agency or agencies as required.

11.6 The Construction Manager shall, by provision within each applicable subcontract 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 Construction Manager 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 Construction Manager shall pay for any 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 Construction Manager 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 Construction Manager, 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 Construction Manager shall maintain fire protection as required by the Kentucky Building Code. Access to the Project site and surrounding buildings for local fire truck access during construction must be maintained. The Construction Manager 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 Construction Manager utilizes the Owner's fire protection equipment, the Construction Manager shall replace any such materials lost, consumed or misplaced during the Contract period. The Construction Manager 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 Construction Manager 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 Construction Manager and Sub-contractors are responsible for the security of their own materials, tools and equipment at the Project site.

12.5 The Construction Manager shall provide to the Owner's Project Manager a key to Construction Manager'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 Construction Manager shall provide safety controls for protection of the life and health of employees and visitors. The Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager shall require all Sub-contractors to have an effective written safety program or be required to follow the Construction Manager's written safety program.

14.3 The Construction Manager 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, or occupational disease. The Construction Manager shall maintain an accurate record of and shall report to the Owner's Project Manager, any damage to property, materials, supplies, or equipment incident to Work under this Contract.

14.4 The Kentucky Labor Cabinet's Division of Occupational Safety and Health may notify the Construction Manager of any noncompliance with the foregoing provisions. The Construction Manager shall, upon receipt of such notice, immediately correct the cited conditions. Notice delivered to the Construction Manager or the Construction Manager's representative at the site of the Work shall be deemed sufficient for this purpose. If the Construction Manager fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the Work until satisfactory 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 Construction Manager. 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 Construction Manager.

14.5 The Construction Manager 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 Construction Manager.

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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager can continue Work in the affected area.

15.1.3 The Construction Manager shall not be required to perform any Work related to asbestos, lead, polychlorinated biphenyls, or other hazardous material. The Construction Manager 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 Construction Manager, and Sub-contractors will be under the requirements of the OSHA Hazard Communication Standard (29) CFR 1910.1200. The Construction Manager 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 Construction Manager's employees may be exposed; (2) Statement of the measures that Construction Manager'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 Material Safety Data Sheets (MSDS's) related to the hazardous chemicals located in the Work area; (4) Procedures that the Construction Manager'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 may be reviewed upon request by the Construction Manager or any Sub-contractor as they pertain to the Work areas of the Project. Photocopies of the MSDS's may be made by Construction Manager at its expense.

15.3 The Construction Manager and Sub-contractors shall provide the Owner with a list of any hazardous materials that will be used on the job site. The Construction Manager and Sub-contractors shall provide the Owner with copies of Material Data Sheets for all such materials to be used.

15.4 It is the policy of the Owner that PCB containing equipment will be treated by the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager should have a question as to the location of a PCB transformer, it should contact the Owner's Project Manager.

15.5 The Construction Manager shall ensure that NO asbestos-containing materials (including but not limited to: drywall, joint compound, roof mastic or 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 Construction Manager 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 Construction Manager 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 Construction Manager from performing the Work in full compliance with the Contract Documents, nor relieve the Construction Manager 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 Construction Manager 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 Construction Manager with a list of construction milestones that require inspection, the Construction Manager 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 Construction Manager 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 the Specifications, the Consultant's instructions, laws, ordinances, or any public authority require any Work to be specially inspected, tested or approved, the Construction Manager 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 Construction Manager'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 Construction Manager. 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 Construction Manager shall pay all costs for uncovering and replacement of such Work.

ARTICLE 17 - SUPERINTENDENT - SUPERVISION

17.1 The Construction Manager shall completely and thoroughly direct and superintend the Work in accordance with the highest standard of care for the Construction Manager'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 Construction Manager shall be solely responsible for and have control over all construction means, methods, techniques, sequences and procedures. The Construction Manager shall be responsible for the acts and omissions of all Sub-contractors and persons directly or indirectly employed by the Construction Manager in the completion of the Work. The Construction Manager shall be responsible for coordinating and scheduling all portions of the Work unless the Contract Documents give other specific instructions. The Construction Manager 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 Construction Manager.

17.2 The Construction Manager 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 Construction Manager'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 Construction Manager 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 Construction Manager. Immediately after the award of Contract, the Construction Manager shall submit to the Consultant a list of Construction Manager'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 Construction Manager, in which case the Construction Manager 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 Construction Manager of the grounds. In either case, the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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. 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.

18.3.1 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 CM. 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 Sub-contractor an amount agreed upon, but not to exceed ten percent (10%) of the actual cost, for overhead and profit.

18.3.2 The CM is entitled to a mark-up for bonds and insurance on all change orders. For change orders coded "End User Requested Changes" or "Other Owner Requested Changes" the CM may add overhead & profit in addition to the bonds and insurance referenced above. The mark-ups shall not exceed the combined percentage for overhead and profit, bonds, and insurance stated in the CM's "Financial Proposal Summary". These mark-ups will not be added to the individual change orders but will be reconciled by amendment at the completion of the project and/or on an annual basis for those projects exceeding 12 months in duration.

18.4 If none of the above methods are mutually agreed upon or if the Construction Manager 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 Construction Manager shall promptly proceed with the Work involved in the change upon receipt of a written order signed by the Owner. In such case, the Construction Manager 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 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.

18.6 The Construction Manager 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 Construction Manager 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.

18.7 The Construction Manager 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 Construction Manager 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 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 Construction Manager 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 Construction Manager. The Construction Manager shall carry out such orders promptly. If the Construction Manager should claim that an ASI involves additional cost or delay to the completion of the Work, the Construction Manager 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 Construction Manager 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 Construction Manager claims that any instructions by the Consultant involve additional cost or time extension, the Construction Manager 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 Construction Manager regards as a Change Order. Unless the Construction Manager acts in accordance with this procedure, any oral order shall not be treated as a change and the Construction Manager 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.

18.12 Prior to final payment, the Construction Manager shall provide to the Owner a full accounting of executed change orders by and between the Construction Manager and the Trade Contracts. The Construction Manager shall also provide a reconciliation of that accounting against the executed change orders by and between the Owner and the Construction Manager.

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 Construction Manager 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 Construction Manager 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 Construction Manager shall contact and cooperate with the Consultant to make the required adjustments. Any request for change in the Contract Amount by the Construction Manager 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 Construction Manager or the Construction Manager's Sub-contractor(s) for any reason, the Construction Manager 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 Construction Manager, is interrupted by activities of the Construction Manager or the Construction Manager's Sub-contractor(s) for any reason, the entire cost to restore service to the satisfaction of the Owner shall be paid by the Construction Manager. Should the Construction Manager 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 Construction Manager pursuant to Article 22 of the General Conditions.

20.3 The Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager, 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 Construction Manager'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 Construction Manager 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 Construction Manager 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 Construction Manager shall continue performance of the Contract as directed by the Consultant. No claim by the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager shall anticipate this normal seasonal weather in the development of the Project baseline schedule.

Mean Number of Days When	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager and/or the Construction Manager'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 Construction Manager and extensions of the time fixed for completion of the Contract shall be the Construction Manager'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 and 18.3.1 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 Construction Manager 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 Construction Manager'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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager or, if no additional payments are due, Construction Manager or the Construction Manager'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 Construction Manager of responsibility for materials and equipment incorporated into the Work that fails to meet specification requirements, or for the 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 Construction Manager shall correct it promptly after receipt of written notice from the Owner to do so. The Construction Manager 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 Construction Manager under the Contract including, but not limited to, warranties. The obligation of the Construction Manager under this section shall be in addition to and not in limitation of any obligations imposed by special guarantees or warranties required by the Contract, given by the Construction Manager, 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 Construction Manager 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 Construction Manager 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 Construction Manager, the Owner shall be entitled to recover all amounts for such corrections, including costs and attorney's fees, from Construction Manager or surety.

ARTICLE 24 - TERMINATION OF CONTRACT FOR CONVENIENCE OF OWNER

24.1 The Owner, by written notice to the Construction Manager, 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 Construction Manager 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 Construction Manager shall not be entitled to profit and overhead on Work not performed.

ARTICLE 25- OWNER'S RIGHT TO STOP WORK

25.1 If the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager or others.

ARTICLE 26 -TERMINATION OF CONTRACT FOR DEFAULT ACTION OF CONSTRUCTION MANAGER

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 Construction Manager 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 Construction Manager fails to complete the Work within such time;

26.1.2 If the Construction Manager is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of creditors, or if the Construction Manager 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 Construction Manager, or if a trustee or receiver is appointed for the Construction Manager or for any of the Construction Manager's property on account of the Construction Manager's insolvency, and the Construction Manager or its successor in interest does not provide adequate assurance of future performance in accordance with the Contract within ten (10) days of receipt of a request for assurance from the Owner;

26.1.3 If the Construction Manager 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 Construction Manager 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 Construction Manager disregards laws, ordinances, rules, codes, regulations, orders or similar requirements of any public entity having jurisdiction;

26.1.6 If the Construction Manager disregards the authority of the Consultant or the Owner;

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

26.1.8 If the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager's Surety take over and complete the Work on the Contract. The Owner may require that in so doing, the Construction Manager's Surety not utilize the Construction Manager in performing the Work. Upon the failure or refusal of the Construction Manager'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 Construction Manager'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 Construction Manager from the site. The Owner may take possession of the Work and of all of the Construction Manager'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 Construction Manager, without liability to the Construction Manager. 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 Construction Manager but which are stored elsewhere, and finish the Work as the Owner deems expedient. In such case, the Construction Manager 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 Construction Manager for the cost of the Work it performed and a reasonable allowance for overhead and profit. If such costs exceed the unpaid balance, the Construction Manager or the Construction Manager'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 Construction Manager shall not be eligible for the award of such Contract.

26.3.3 The Construction Manager shall be liable for any damage to the Owner resulting from the termination or the Construction Manager'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 Construction Manager 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 Construction Manager 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 Construction Manager. 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 Construction Manager by the Owner will not release the Construction Manager from liability.

26.3.6 In the event the Contract is terminated under this Article, and it is determined for any reason that the Construction Manager 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 Construction Manager in writing or cause the Construction Manager 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 Construction Manager 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 actual 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 Construction Manager 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 Construction Manager shall notify the Consultant in writing and request an inspection. The declaration and request shall be accompanied by a list prepared by the Construction Manager of those items of Work still to be completed or corrected. The failure of the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager in writing

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 Construction Manager 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 Construction Manager 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 not less than three percent (5%) of the current Contract Amount. In the event the Construction Manager 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 Construction Manager considers that all Work required by the Contract is 100% complete, including correction of any remaining punch list work or deficiencies, the Construction Manager shall notify the Consultant in writing and request a final inspection. The Consultant, upon receipt of written notice from the Construction Manager that the Work is complete and is ready for final inspection and acceptance, will promptly make such inspection and if the Consultant finds the Work completed and acceptable under the Contract Documents and the Contract fully performed, the Consultant will notify the Construction Manager in writing to submit, and will certify to the Owner a final Certificate for Payment in accordance with Articles 30.9 and 30.9.1 of these General Conditions. If the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager agree on the amounts stated as liquidated damages in the Agreement. The Owner and Construction Manager agree that the amount stated as liquidated damages are not intended to be penalties.

29.2 Should the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager from further obligations and liabilities to complete the entire Contract. Permitting the Construction Manager 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 CONSTRUCTION MANAGER

30.1 Payments on account of this Contract shall be made monthly as Work progresses. The Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager must 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 Construction Manager shall not relieve either the Construction Manager 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 Construction Manager's place of storage and checked all items listed on the Construction Manager'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 Construction Manager'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 Construction Manager's obligations reflected in prior applications for payment.

30.6 Each payment made to the Construction Manager shall be on account of the total amount payable to the Construction Manager and the Construction Manager 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 Construction Manager 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 Within thirty (30) Calendar Days of the award of any Trade Contracts, and prior to submitting the next application for payment, the Construction Manager shall submit to the Consultant and the Owner for approval a detailed breakdown of the Contract Amount including all trade contracts that have been awarded as of the date of that application for payment 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 Construction Manager'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 Construction Manager.

30.8 Retainage – The Owner will retain ten percent (10%) of the Construction Manager's progress payments, including amounts claimed for construction management fee 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 Construction Manager 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 Construction Manager has failed or refused to correct or complete, or

30.8.1.3 Failure of the Construction Manager to perform any of its obligations under the Contract, or

30.8.1.4 Failure of the Construction Manager 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 Construction Manager 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 Construction Manager 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. Final change order reconciliation as per Article 18.12 must be provided prior to final payment.

30.9.1 Upon issuance of the Certificate of Final Completion by the Owner and submittal by the Construction Manager of all required documents and releases, all retained amounts shall be paid to the Construction Manager as part of the Final Payment. By accepting such payment, the Construction Manager certifies that all amounts due or that may become due to any Sub-contractor, any Consultant of the Construction Manager, 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 Construction Manager 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 Construction Manager on account of such Sub-contractor's

work. The Construction Manager 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.

The Consultant may, on request, furnish to any Sub-contractor or material supplier information regarding the percentages of completion applied for by the Construction Manager 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 Construction Manager'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 Construction Manager'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 Construction Manager or contractor records which may have a bearing on matters of interest to the Owner in connection with the Construction Manager'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 Construction Manager representations regarding pricing of invoices; and
Accuracy of Construction Manager representations related to claims submitted by the Construction Manager or its payees.

31.3 The Construction Manager 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 Construction Manager 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 Construction Manager will cooperate fully and will cause all related parties and all of the Construction Manager'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 Construction Manager'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 Construction Manager 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 Construction Manager 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 Construction Manager. Any adjustments and/or payments that must be made as a result of any such audit or inspection of the Construction Manager's invoices and/or records shall be made within Ninety (90) Calendar Days from presentation of the Owner's findings to the Construction Manager.

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 Construction manager, 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 Construction Manager, its sureties, contractors, subcontractors, vendors and their respective employees and agents

ARTICLE 32 - PROGRESS & SCHEDULING

32.1 If requested by the Owner during the Design Phase of the Project, and working in cooperation with the Owner and the Consultant(s), the Construction Manager shall prepare a Critical Path Method (CPM) type Design Phase schedule incorporating design phase and review activities through completion of the design and bidding of the Trade Contracts, shall include in this Design Phase schedule the broad categories of Work to be accomplished in the subsequent implementation of the design and construction of the Project, and shall modify and update this Design Phase schedule as necessary to reflect the actual status and then current plan for the Project.

32.2 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.

32.2.1 Prior to bidding Trade Contracts, the Construction Manager shall prepare and submit to the Owner and the Consultant a preliminary CPM construction schedule for the Work that will be included in the Project bidding documents.

3.2.2.2 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.

32.2.3 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 Construction Manager and shall not be the basis of any claim for delay or extension of time.

32.2.4 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.

32.2.5 The Construction Manager 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.

32.2.6 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 Construction Manager.

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

32.4 The Construction Manager 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, Construction Manager, 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 Construction Manager 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 Construction Manager, 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 Construction Manager 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 Construction Manager, 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 Construction Manager or any Sub-contractor under Worker's Compensation acts, disability benefit acts or other employee benefit acts.

34.4 The obligations of the Construction Manager 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 Construction Manager 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 Construction Manager at the Construction Manager’s expense.

35.2 The Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager.

35.4. The Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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, Construction Manager, and all Sub-contractors and of their subcontractors. It shall insure against perils of fire, extended coverage, vandalism and malicious mischief. Construction Manager'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 Construction Manager or Construction Manager'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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction manager 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 Construction Manager 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 Construction Manager'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 Construction Manager’s own forces, Sub-contractors, or by material suppliers, and whether occurring in a new or existing building, shall be repaired by the Construction Manager at the Construction Manager’s expense, and any materials damaged inside the building, including personal property, shall be repaired or replaced at the full replacement cost by the Construction Manager at the Construction Manager’s expense.

37.3 For existing buildings, the Construction Manager, 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 Construction Manager 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 Construction Manager. 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 Construction Manager'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 to the Owner’s Project Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager unless the Construction Manager submits to the Consultant and the Owner's Project Manager a written notice of appeal within fifteen (15) Calendar Days of the Consultant's decision. The Construction Manager must present within fifteen (15) Calendar Days of such 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 Construction Manager 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 Construction Manager 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 Construction Manager, the Project Manager shall notify the Construction Manager and the Consultant and direct the Construction Manager to perform the Work about which the claim was made and the Construction Manager shall proceed with such Work in accordance with the Project Manager's instruction. If the Construction Manager disagrees with a decision of the Project Manager concerning a Construction Manager's claim, the Construction Manager shall proceed with the Work as indicated by the Project Manager's decision.

38.4 The Construction Manager 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 if other controversy should arise 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. 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 Construction Manager. The Director, or designee, shall promptly issue a decision in writing. A copy of the decision shall be mailed or otherwise furnished to the Construction Manager. The decision rendered shall be final and conclusive unless the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 (5).

40.3 The lien shall attach only to any unpaid balance due the Construction Manager 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 Construction Manager shall not assign any amount or part of the Contract or any of the funds to be received under the Contract unless the Construction Manager 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 Construction Manager'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 Construction Manager and shall contain the same terms and conditions as the contracts between the Construction Manager and the Sub-contractors. The Construction Manager will be entitled to a maximum of three percent (3%) overhead and profit on the value of such assigned contracts. The Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager in which case fees and expenses will be the responsibility of the separate contractor and if any judgment against the Owner arises therefrom, the Construction Manager 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 Construction Manager's Work depends upon the work of any other separate contractor, the Construction Manager 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 - CONSTRUCTION MANAGER/SUB-CONTRACTOR RELATIONSHIP

43.1 The Construction Manager 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 Construction Manager is responsible for the acts and omissions of persons employed directly by the Construction Manager 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 Construction Manager 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 Construction Manager shall provide copies of any subcontracts and purchase orders to the Owner or Consultant.

43.3 The Construction Manager 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 Construction Manager shall not employ any Sub-contractor or supplier against whom the Owner or the Consultant has made reasonable and timely objection. The Construction Manager (CM) will not be allowed to self-perform work or bid on any of the proposed work categories unless a subcontractor fails to perform and upon prior approval by the Universities authorized representatives."

43.4 Nothing contained in the Contract Documents shall create any contractual relationship between the Owner and any Sub-contractor or supplier. The Construction Manager is hereby notified that it is the Construction Manager's contractual obligation to settle disputes between Sub-contractors and/or suppliers. Neither the Owner nor the Consultant will settle disputes between the Construction Manager and the Sub-contractors or suppliers, or between Sub-contractors 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 Construction Manager's contracts with such entities shall indicate otherwise.

43.4.3 The Construction Manager 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 Construction Manager's Sub-contractors or suppliers, or between their sub-contractors or suppliers.

ARTICLE 44 - CASH ALLOWANCE

44.1 The Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager shall remove all remaining waste materials, rubbish, Construction Manager'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 Construction Manager fails to clean up as provided in the Contract Documents, the Owner may perform the cleaning tasks and charge the cost to the Construction Manager.

ARTICLE 47 - POINTS OF REFERENCE

47.1 The Construction Manager shall carefully preserve bench marks, reference points and stakes, and in case of willful or careless destruction, the Construction Manager 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 Construction Manager 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 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 Construction Manager 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 Construction Manager 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 Construction Manager. The Consultant shall be reimbursed by the Construction Manager 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 Construction Manager'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 Construction Manager.

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 Construction Manager 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 Construction Manager 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 Construction Manager. Unless otherwise provided in the Contract Documents, the cost of all such testing shall be the responsibility of the Construction Manager. 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 Construction Manager.

ARTICLE 50 - WARRANTY

50.1 The Construction Manager 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 Construction Manager shall furnish satisfactory evidence as to the kind and quality of materials and equipment. If the Construction Manager requests approval of a substitution of material or equipment, the Construction Manager warrants that such installation, construction, material, or equipment will equally perform the function for which the original material or equipment was specified. The Construction Manager explicitly warrants the merchantability, the fitness for a particular purpose, and quality of all substituted items in addition 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 Construction Manager shall deliver to the Consultant all warranties and operating instructions required under the Contract or to which the Construction Manager 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 Construction Manager to replace defective material and equipment and re-execute defective Work which is disclosed to the Construction Manager 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 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 Construction Manager or its Sureties of liability with respect to any warranties or responsibilities for faulty materials and workmanship. The Construction Manager or its sureties shall remedy any defects in Work and any resulting damage to Work at the Construction Manager’s own expense. The Construction Manager shall be liable for correction of all damage resulting from defective Work. If the Construction Manager 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 Construction Manager or the surety. The Owner will give notice of observed defects with reasonable promptness.

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

50.5 In addition to the foregoing, the Construction Manager 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 Construction Manager shall, immediately upon notification by or on behalf of the Owner of water penetration, determine the source of water penetration and, at the Construction Manager's expense, (a) do any work necessary to make such buildings or improvements watertight and (b) repair and replace any other damaged material, finishes and furnishings damaged as a result of such water penetration and return the buildings or other improvements to their original condition.

50.6 The Construction Manager 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 Construction Manager pursuant to this Article 50 shall be warranted by the Construction Manager, 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 Construction Manager's failure to honor any warranty for the Work shall be paid by or recoverable from the Construction Manager.

ARTICLE 51 - PREVAILING WAGE LAW REQUIREMENTS (NO LONGER USED AS OF 1/9/17)

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 Construction Manager agrees as follows:

54.1.1 The Construction Manager will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, national origin, or disability in employment. The Construction

Manager 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 Construction Manager 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 Construction Manager will, in all solicitations or advertisements for employees placed by or on behalf of the Construction Manager; 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 Construction Manager 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 Construction Manager'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 Construction Manager 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 Trade Contract awarded is in the amount of two hundred and fifty thousand dollars ($250,000.00) or less, and the amount of the Trade Contract is not a subterfuge to avoid compliance with the provisions of the Act;

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

55.1.3 The Construction Manager or Sub-contractor employs only family members or relatives;

55.1.4 The Construction Manager 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 Construction Manager and any Sub-contractor, not otherwise exempted, shall:

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

55.2.2 The equal employment provisions of The Act may be met in part by the Construction Manager contracting to a minority contractor or Sub-contractor. A minority contractor, Sub-contractor or subcontractor shall mean a business that is owned and controlled by one or more persons disadvantaged by racial or ethnic circumstances.

55.2.3 The Construction Manager 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 by the contracting agency and the department to all books and records pertaining to its employment practices and Work sites for purposes of investigation to ascertain compliance with The Act and such rules, regulations and orders issued pursuant thereto.

55.3 If the Construction Manager is found to have committed an unlawful practice against a provision of The Act during the course of performing under this Contract, a Trade Contract or 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 Construction Manager ineligible to submit proposals on further contracts until such time as the Construction Manager complies in full with the requirements of The Act.

55.4 Any provisions of The Act notwithstanding, the Construction Manager shall not be required to terminate an existing employee, upon proof that employee was employed prior to the date of the Contract, nor to hire anyone who fails to demonstrate the minimum skills required to perform a particular job.

010000S01- Special Conditions – Construction Manager at Risk

UNIVERSITY OF KENTUCKY
SPECIAL CONDITIONS OF THE CONTRACT
FOR CONSTRUCTION BY A CONSTRUCTION MANAGER AT RISK

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010000S01- Special Conditions – Construction Manager at Risk

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 PERMITS AND Any required permits will be included in trade contracts issued at the time of bidding.

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 To be JRA Architects or their duly authorized representatives. (See Article 2 of the General Conditions.)

ARTICLE 05 GEOTECHNICAL REPORT

5.1 No subsurface or geotechnical survey information is available at this time.

ARTICLE 06 TIME FOR COMPLETION

6.1 The time for Substantial Completion as further defined in Article 1 of the General Conditions shall be June 7, 2022, and Final Completion shall be 30 days thereafter.

ARTICLE 07 LIQUIDATED DAMAGES

7.1 Should the Construction Manager 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 Six Hundred Thirty Seven Dollars $637.00 for each consecutive calendar day that Substantial Completion has not been met. See Article 3 of the Agreement.

7.2 Should the Construction Manager 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 Five Hundred Fifteen Dollars ($515.00). See Article 3 of the Agreement.

ARTICLE 08 SUBMITTALS AND SHOP DRAWINGS

8.1 SUBMITTALS - GENERAL

8.1.1 The Construction Manager shall submit each set of Shop Drawings, product data, samples, and test and/or certification reports and samples as a separate item in UK E-Communication®. Projects not utilizing UK E-Communication® must submit all items electronically to the Consultant and the UK Project Manager and Administrative Coordinator.

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 Construction Manager for compliance with the Contract Documents before submission for approval. All submittals are to be initiated by the Construction Manager. 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 Construction Manager shall be made to any changes other than those made 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. Construction Manager 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

8.3.1 In making a submittal, the Construction Manager shall be deemed to be making the following representations:

8.3.1.1 The Construction Manager understands and agrees that he shall bear full responsibility for the products furnished. The Construction Manager 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 Construction Manager 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 Construction Manager acknowledges that the Owner will rely on the skill, judgment, and integrity of the Construction Manager as to conformance requirements and subsequent usability.

8.4 SHOP DRAWING AND PROCUREMENT SUBMITTAL LOG

8.4.1 The Construction Manager, within ten (10) days after the Pre-Construction meeting, shall begin uploading submittals using UK E-Communication®, 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® 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 Construction Manager 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®, as herein detailed. By approving and submitting Shop Drawings, the Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 Construction Manager's stamp of approval on any shop drawing or sample shall constitute a representation to Owner and Design Consultant that the Construction Manager 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.

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 Construction Manager 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 Construction Manager from his responsibility for any deviations from the requirements of the Contract Documents unless the Construction Manager 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 Construction Manager 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 to be retained by the University;
b) One to be returned to the Design Consultant;
c) An additional sample or samples may be submitted, at the Construction Manager'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) bound copies and 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. The Closeout Log must contain individual line items for each physical copy submitted with corresponding PDF attachments. 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.

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 All manuals shall be as follows: Bound in hard cover three(3) ring (D-type) binder, 1", 1.5" or 2" maximum, indexed and in CSI format, tabbed (4,5,8 or 16th cut), no more than 80% binder fill, white vinyl, presentation type with clear vinyl view cover on front, back and spine and with pockets on front and back. Maximum drawing size in binder shall be folded 11"x17" and shall be hole punched and reinforcements added. Do not put drawings in pockets. Top of all drawings shall be at top or spine side of the manual. Complete drawings must be viewed without opening rings. Provide binders as manufactured by Universal Office Products, Des Plaines, IL. 1"(S# B2-20742), 1.5"(B2-20744), or 2"(B2-20746) or equal.

8.7.2.11 If the binder includes 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.

8.8 SUBMISSIONS – AS - BUILT SET OF DRAWINGS

8.8.1 The Construction Manager 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 Construction Manager as well as all Sub-contractors. The Construction Manager shall provide a qualified representative to update the As - Built set of drawings as construction progresses. As-Builts 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 Construction Manager shall provide and utilize a camera to photograph the installation of buried utilities and concealed items. The Construction Manager shall provide standard 3 1/2" x 5" photographs with negatives, or digital images (.jpeg 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 Construction Manager'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 Uniformat format with the information being provided for individual locations as noted in Attachment A – Uniformat Component List. Information is to be provided as follows (MCPPD 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 CM At Risk.

ARTICLE 8.9 Attachment A – Uniformat Component List

SAP Object Type No.	Component Name
D5030.0232	Access Control Panel
D3050.0110	Air Conditioning Comp Rm Unit
D3030.0610	Air Conditioning Compressor
D3030.0620	Air Conditioning Condensing Unit
D3050.0120	Air Conditioning Pkg Rooftop Unit
D3050.0130	Air Conditioning Pkg Terminal Unt
D3030.0630	Air Conditioning Split System
D3050.0140	Air Conditioning Unit Package
D3050.0150	Air Conditioning Unit Window
D3050.0710	Air Curtain / Heater
D2090.0120	Air Dryer
D3010.0443	Air Eliminator
D3040.0110	Air Handling Unit
D5090.0220	Auto Transfer Switch - Electrical
	Automatic Door Operator
D2020.0330	Backflow Preventers
D3020.0110	Boiler, Steam System
D5030.0241	Camera
D5030.0231	Card Access System
D3030.0300	Chiller, Reciprocate
E1090.0250	Chutes & Collectors
D5010.0510	Circuit Breaker Panel
F1020.0230	Clean Rooms
F1020.0240	Cold Storage Rooms
D2090.0110	Compressor, Air
D3060.0250	Controls, Building System
E1090.0317	Cooler, Commercial
D3030.0510	Cooling Tower, Packaged
D2010.1300	Copper Silver Ion Equipment
D4090.0510	Dampers Fire
D4090.0500	Dampers Fire/Smoke
D4090.0520	Dampers Smoke
D3050.0400	Dehumidifiers
D2090.0200	Deionized Water System
E1090.0391	Dishwasher, Commercial
B2030.0160	Door, Auto Entrance
B2030.0100	Door, Exterior Entrance

C1020.0330	Door, Fire Separate
C1020.0320	Door, Smoke Partition
D2010.0800	Drinking Fountain
D5010.0350	Electric Switchboard
E1030.0310	Elevator, Dock Leveler
D1090.0120	Elevator, Dumbwait Electric
D1090.0130	Elevator, Dumbwait Hydraulic
D1010.0140	Elevator, Hydraulic Freight
D1010.0120	Elevator, Hydraulic Passenger
D1010.0230	Elevator, Platform Lift
D1010.0240	Elevator, Sidewalk Lift
D1010.0130	Elevator, Traction Freight
D1010.0110	Elevator, Traction Passenger
D1010.0220	Elevator, Wheelchair Lift
D2010.1100	Emergency Eyewash
D2010.1000	Emergency Eyewash/Shower
D5090.0810	Emergency Generator
D2010.1200	Emergency Shower
D3050.0600	Energy Recovery Unit
F1020.0260	Environmental Unit
D3040.0120	Fan
D3050.0520	Fan Coil Unit
D3040.0122	Fan, Axial
D3040.0121	Fan, Centrifugal
D3040.0410	Fan, Exhaust
D5030.0141	Fire Alarm Annunciator
D5030.0134	Fire Alarm AV Devices
D5030.0139	Fire Alarm Door Holder
D5030.0144	Fire Alarm Duct Detector
D5030.0133	Fire Alarm Heat Detectors
D5030.0136	Fire Alarm Horns
D5030.0131	Fire Alarm Panel
D5030.0135	Fire Alarm Pull Station
D5030.0137	Fire Alarm Signal Speaker
D5030.0132	Fire Alarm Smoke Detectors
D5030.0130	Fire Alarm System
D5030.0138	Fire Alarm Visual Signal Dev
D4030.0200	Fire Blanket & Cabinet
D4030.0100	Fire Extinguisher Cabinet
D4030.0300	Fire Extinguisher Wheeled
D4090.0300	Fire Extinguishing System, Clean

D4090.0200	Fire Extinguishing System, CO2
D4090.0400	Fire Extinguishing System, Dry Chemical
D4090.0100	Fire Extinguishing System, Foam
D4090.0000	Fire Extinguishing System, Other
G3010.0310	Fire Hydrant
E1090.0330	Food Cooking Equipment
E1090.0310	Food Stor/Prep Equipment
D2090.0400	Fuel Oil System
D3040.0460	Fume Hood System
D3020.0310	Furnaces
D2030.0260	Grease Trap
D3050.0580	Heat Exchanger
D2020.0260	Heater Domestic Water
D3050.0521	Heater, Cabinet Unit
D3050.0581	Heater, Cast Iron Radiator
D3050.0530	Heater, Fin Tube Radation
D3050.0540	Heater, Induction Unit
D3050.0560	Heater, Unit
D3050.0570	Heater, Unit Vent
F1040.0700	Heliport System
E1090.0340	Hood/Vent Equip
D3050.0300	Humidifier
E1090.0380	Ice Machines
D5020.0330	Light, Emergency Exterior
D5020.0230	Light, Emergency Interior
D5020.0231	Light, Exit
E1020.0831	Medical Air Compressor
E1020.0900	Medical Gas Alarm
E1020.1000	Medical Gas Area Alarm
E1020.0840	Medical Gas Auto Pressure Switch
E1020.0834	Medical Gas Manifold
E1020.0835	Medical Gas N2O
E1020.0839	Medical Gas Outlet
E1020.0837	Medical Gas Shut-off Valve
E1020.0830	Medical Gas System
E1020.0838	Medical Nitrogen
E1020.0810	Medical Sterilizer Equipment
E1020.0832	Medical Vacuum Pump
D5010.0711	Motor Control Center
D5010.0720	Motor, Electric
D5030.0431	Nurse Call System

E1090.0210	Packaged Incinerator
D3010.0550	Packaged Solar Equipment
D5030.0420	Paging Systems
C1010.0180	Partition Fire Rated
C1010.0190	Partition, Smoke
D1090.0141	Pneumatic Tube Blower
D1090.0142	Pneumatic Tube Station
D1090.0140	Pneumatic Tube System
D1090.0143	Pneumatic Tube Transfer Unit
D3010.0430	Pump
D3030.0710	Pump, Air Source Heat
D3010.0432	Pump, Chilled Water
D2020.0222	Pump, Domestic Hot Water Recirculation
D2020.0221	Pump, Domestic Water Booster
D4010.0111	Pump, Fire
D3010.0431	Pump, Heating Water
D4010.0112	Pump, Jockey Fire
D3030.0720	Pump, Rooftop Heat
D3010.0433	Pump, Steam
D2040.0270	Pump, Sump
D2030.0330	Pump, Waste
D2020.0220	Pump, Water Booster
D3030.0730	Pump, Water Heat
E1090.0315	Refrigerator/Freezer, Commercial
D3040.0123	Return Air Fan
D2090.1200	Reverse Osmosis System
D3030.0420	Scroll Chiller
D4010.0300	Sprinkler, Combo System
D4010.0400	Sprinkler, Deluge System
D4010.0200	Sprinkler, Dry-Pipe
D4020.0100	Sprinkler, Standpipe
D4010.0100	Sprinkler, Wet-Pipe
D3050.0310	Steam Generator
D5010.0840	Switchgear, Medium Voltage
D3010.0441	Tank, Expansion Compressor
D2020.0310	Tank, Expansion Domestic
D2020.0320	Tank, Expansion Reheat
D2090.0410	Tank, Fuel Oil
D3010.0444	Tank, Steam Flash
D5010.0210	Transformer, Low-Volt 2nd
D5010.0410	Transformer, Low-Volt Inter

D5010.0110	Transformer, Main
D3020.0150	Trap, Steam
D5090.0110	UPS - Computer
D5090.0120	UPS - Other
D2090.1310	Vacuum Pump
D3010.0435	VFD - Pump
D3040.0190	VFD HVAC
D5010.0850	VFD/VSD
E1090.0316	Walk-in-Refrigerator
D2090.0210	Water Softener Equipment
D3010.0490	Water Treatment Equipment

ARTICLE 8.7.3 Attachment B – Equipment List Spreadsheet Data Categories

Uniformat	
Component ID	
Component Name	
Description	
Name	
Equipment No.	MCPPD or CPPD will enter this data
Model No.	
Room Location	
Functional Location	MCPPD or CPPD will enter this data
Manufacturer	
Supplier	
Installing Contractor	
Serial No.	
Main Work Center	MCPPD or CPPD will enter this data
Comments(30 char's)	MCPPD or CPPD will enter this data
Critical	MCPPD or CPPD will enter this data
JCAH Code	MCPPD or CPPD will enter this data
Patient Room?	MCPPD or CPPD will enter this data
Vendor ID	MCPPD or CPPD will enter this data
Vendor Type	MCPPD or CPPD will enter this data
Vendor - Other Info	MCPPD or CPPD will enter this data
Equipment Life	MCPPD or CPPD will enter this data
Area Serviced	
Contains Lead?	
Contains Asbestos?	
Contains PCBs?	
Motor Frame	
Motor Style	
Motor HP	
Motor Phase	
Motor Volts	
Motor RPM	
Fan CFM	

Fan RPM	
Fan Static	
Fan Type	
Fan RPM 2	
Pump Head	
Pump Inlet	
Pump GPM	
Pump Outlet	
Motor Oper Amps	
Condition	MCPPD or CPPD will enter this data
Disconnect Location	
Motor FLA	
Belts	
Filters	

ARTICLE 8.7.3 Attachment C - Example Preventative Maintenance Procedures

Description	Name	Equipment No.	Frequency	Maintenance Procedure	Maintenance Parts & Items
Air Handling Unit	AHU-1	M-12345	Monthly	Check Belts	
Air Handling Unit	AHU-1	M-12345	Quarterly	Grease bearings	Grease type xyz
Air Handling Unit	AHU-1	M-12345	Annually	Replace Belts	Belt model abc-123
Air Handling Unit	AHU-2	M-98765	Monthly	Check Belts	

The blue highlighted column will be filled in by MCPPD or CPPD.

ARTICLE 09 PLANS, DRAWINGS, AND SPECIFICATIONS

9.1 The successful Construction Manager can purchase any number of sets of plans and specifications from Lynn Imaging, Lexington, Kentucky (http://www.ukplanroom.com/ or Phone Lynn Imaging @1.800.888.0693 or 859.255.1021). The Construction Manager will be required to pay Lynn Imaging for the cost of duplication for all sets required.

9.2 The University will provide ywo (2) sets of the 'Official Contract Documents' books and one electronic copy to the successful Construction Manager. One set is to be for his office and the other set is for the jobsite.

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, CM'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 Construction Manager 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) Construction Manager.
(4) Subcontractors.
(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 Construction Manager 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.

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 Construction Manager, 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 Construction Manager'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.

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 Construction Manager 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 Construction Manager 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 Up-dated 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 Construction Manager 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.

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 Construction Manager. 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 Construction Manager 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 Construction Manager to schedule the walk-through with the Owner’s Project Manager, the Consultant, and other interested parties.

12.2 During the walk-through, Construction Manager 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 Construction Manager and the Consultant

12.4 Written documentation of the walk-through is to be provided by the Consultant with copies distributed to all parties. Polaroid type color photographs are to be provided

and labeled by Construction Manager and one (1) copy of such photographs are to be given to Consultant. (Digital photos in a .jpg format are acceptable if submitted on digital media storage) All parties attending the walk-through agree on the list of damages.

ARTICLE 13 OWNER'S CONSTRUCTION REPRESENTATIVE –NOT APPLICABLE

13.2 RESIDENT INSPECTOR-NOT APPLICABLE

ARTICLE 14 FIELD OFFICE

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

14.2 A field office shall not be required for this Project.

ARTICLE 15 TELEPHONE SERVICE

15.1 Construction Manager 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 Construction Manager. (Cell phone/Nextel service in lieu of UKIT Communications and Network Systems phone service may be utilized at Construction Manager's option.)

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. Construction Manager 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 Construction Manager'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 Construction Manager'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 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 section of fencing where blind corners occur or at pedestrian/vehicle intersections.

16.1.5 The Construction Manager shall be responsible for removing and replacing any fence sections and/or posts necessary for access to the site on a daily basis. The Construction Manager 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 Construction Manager fails to comply with the requirements of this Article 16, the Owner may proceed to have the work done and the Construction Manager 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.

ARTICLE 17 PROJECT SIGN

17.1 The Construction Manager shall furnish, install and maintain a Project sign during this Project. This sign shall be 4' x 8' x 3/4" exterior grade plywood mounted on 4" x 4" posts. Design shall be as provided by the Owner at a later date and shall include the name of the Owner, Project, Consultant, and Construction Manager.

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 Construction Manager 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.

ARTICLE 19 SANITARY FACILITIES

19.1 At the beginning of the Project, before any Work is started, the Construction Manager shall furnish, install and maintain ample sanitary facilities for the workforce. Permanent toilets in the existing building shall not be used during construction of the Project. Drinking water shall be provided from an approved safe source, 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 Construction Manager and be adjusted as before mentioned.

20.2 The Construction Manager 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.

ARTICLE 21 ALLOWANCES

21.1 As stated in the General Conditions to the Contract, the Construction Manager 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. No allowances shall have been included in the calculation of the Construction Manager’s fixed fee quotation in par. 8.0 of the RFP.

21.2 Costs based on allowances may be included in Subcontract bid packages only with the prior written approval of the Owner, and only for objectively quantifiable material items.

21.3 Any allowance amounts included in a Subcontract bid package, but not expended for the approved task during the course of the work of that Subcontract, shall be deducted from the Construction Manager's contract by Change Order. Any additional amounts necessary to pay for additional cost of an allowance in a Subcontract bid package shall be funded from the Construction Contingency Fund.

21.4 The University of Kentucky has entered into a price contract agreement with SimplexGrinnell for procurement of fire alarm and security systems. SimplexGrinnell 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 SimplexGrinnell supplied devices and panels. SimplexGrinnell will be a sub-contractor under a trade contract.

21.4.1 The Construction Manager shall include an allowance of (TO BE DETERMINED) for the work by SimplexGrinnell in the appropriate trade contractor's scope of work.

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

ARTICLE 22 CONSTRUCTION CONTINGENCY FUNDS

22.1 The Owner shall include an amount in the Project construction budget not to exceed one percent (1%) of the total cost of the construction, including the Construction Manager's fixed fee, as a Construction Contingency Fund. The following are general / typical categories of changes to the Work that may, with the Owner's prior written specific approval, be funded from this source:

22.1.1 Reasonable errors & omissions in the Construction Manager's bidding and scoping processes;

22.1.2 Reasonable costs associated with schedule recovery that is not a direct result of the construction managers or a trade contractor's failure to perform;

22.1.3.Any costs or expenses incurred by the Construction Manager, for provision of management services necessary to complete the Project in an expeditious and economical manner consistent with the Contract for Construction and the best interests of Owner, that were not included in the Construction Manager's General Conditions Cost as submitted in the original fee proposal

22.1.4 Amounts necessary to fund cost overruns in approved allowance items within Subcontract bid packages, as described in Article 21.3, above.

ARTICLE 23 SEQUENCE OF CONSTRUCTION

23.1 **To be Determined.**

23.2 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.

23.2.1 The Construction Manager 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.

23.3 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 Construction Manager 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 Construction Manager is to insure that all exits provide for free and unobstructed egress. If exits must be blocked, then prior arrangements must be made with the Owner's Project Manager.

23.4 The Construction Manager shall cooperate with the Owner in minimizing inconvenience to, or interference with normal use of existing buildings and grounds by staff, students, other Contractors, or the public. Construction Manager 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.

23.5 Special effort shall be made by the Construction Manager 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.

ARTICLE 24 CRANE & MATERIAL HOIST OPERATIONS

24.1 Construction Manager 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 Construction Manager shall be utilized to prevent pedestrian and vehicular traffic from crossing pathway of crane lift. Construction Manager's flag men shall coordinate these activities with the appropriate security personnel.

24.2 Crane and material hoist shall be safely secured and inaccessible during non-operating hours. Construction Manager 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).

24.3 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 25 UTILITIES

NOTE: CONSULTANT TO USE ONLY ONE OF THE PARAGRAPHS BELOW AND DELETE THE OTHER AFTER DISCUSSIONS WITH THE OWNER'S PROJECT MANAGER.

ON SMALL PROJECTS WHERE THE UNIVERSITY PROVIDES ELECTRIC.

25.1 This Article modifies Article 8 of the General Conditions. The Owner will provide water and electricity for this Project. The Construction Manager 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 or for welding. In the event that the Construction Manager is wasteful with these utilities, the Owner shall charge the Construction Manager accordingly.

ON LARGE PROJECTS THE FOLLOWING NEEDS TO BE USED IN LIEU OF THE ABOVE. VERIFY CURRENT RATE FOR EACH UTILITY WITH PPD MANAGER OF UTILITIES.

25.1 When the various building systems are energized and connected to Owner's utility systems, but prior to turnover to and occupancy by the Owner, the Construction Manager is responsible to reimburse the Owner for Owner furnished utilities. These utilities include but not limited to steam, chilled water, domestic water, and electricity, provided by the Owner up to the date of Substantial Completion. Reimbursement will be payable monthly via a deductive change order to the contract. Unit costs for campus are as follows:

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

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

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

25.1.4 Water is supplied by Kentucky American Water Company (KAWC). Construction Manager shall pay KAWC directly until the Owner's beneficial occupancy date. The Construction Manager shall pay KAWC directly for fire service.

25.1.5 Construction Manager shall furnish gas meter and Columbia Gas Company directly for service until the until the Owner's beneficial occupancy date.

25.1.6 Construction Manager shall obtain from and pay UKIT Communications and Network Systems for the use of telephone services.

25.2 UTILITY OUTAGES

25.2.1 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.

25.2.1.1 ENTIRE BUILDING OUTAGE. The Owner's Project Manager is the Construction Manager'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.

25.2.1.2 SECTION OF A BUILDING OUTAGE. The Owner's Project Manager is the Construction Manager'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 26 CLEANING AND TRASH REMOVAL

26.1 The Construction Manager 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.

26.2 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.

26.3 Upon completion of the Work, Construction Manager shall thoroughly clean and re-sod grass areas damaged to match existing areas.

26.4 The Construction Manager 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.

26.5 Dumpsters will be provided and maintained by the Construction Manager.

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

26.7 The Construction Manager shall be responsible for daily cleaning of spillage's and debris resulting from his and his Subcontractor'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 Construction Manager 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 the Owner’s waste and trash receptacles is strictly prohibited, except as otherwise provided by the Project specifications.

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

ARTICLE 27 BLASTING

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

ARTICLE 28 CUTTING AND PATCHING - NEW AND EXISTING WORK

28.1 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.

28.2 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 completed. 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 Construction Manager's expense.

ARTICLE 29 UNRELATED PROJECTS

29.1 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 Construction Manager for this Project must coordinate with any other contractors regarding overlapping areas. See Article 42 - Separate Contracts of the General Conditions.

ARTICLE 30 OWNER SUPPLIED MATERIALS - NOT USED

30.1 Owner, in an effort to expedite this Project, has pre-ordered certain long lead time items. The following is the list of material that has been pre-ordered:

ARTICLE 31 REMOVED ITEMS - NOT USED

31.1 The following is a list of items to be turned over to the Owner by the Construction Manager after removal by the Construction Manager. 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.

ARTICLE 32 INTERIOR ENCLOSURE AND DUST ENCAPSULATION

32.1 Areas under construction or renovation shall be separated from occupied areas by suitable temporary enclosures furnished, erected and maintained by the Construction Manager. 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. Construction Manager to review with Consultant ways to provide ventilation for dust generated by demolition and fumes/vapors produced during installation of new materials.

32.2 Construction Manager is responsible for coordinating with the Owner’s Project Manager any equipment to be turned off prior to erecting temporary enclosures.

32.3 Construction Manager 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.

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

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

32.6 Construction Manager shall provide additional devices and materials as required to contain dust within Work area and protect personnel during course of Work.

32.7 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.

32.8 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.

32.9 The Construction Manager may assume existing walls which extend full height of floor shall be deemed appropriate to contain air borne dust. Cover any voids or penetrations.

32.10 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.

32.11 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.

32.12 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.

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

ARTICLE 33 UKIT COMMUNICATIONS AND NETWORK SYSTEMS

33.1 The communications wiring is to be provided, installed and terminated by the Construction Manager 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.

ARTICLE 34 EMERGENCY VEHICLE ACCESS

34.1 Emergency Vehicle Access must be maintained during construction. The Construction Manager 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 35 SMOKE DETECTORS / FIRE ALARM SYSTEMS- EXISTING AND/OR NEW FACILITIES

35.1 Construction Manager shall protect all smoke detectors in Work areas to prevent false alarms. The Construction Manager 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 Construction Manager 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 Construction Manager. 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 Construction Manager, all protected smoke detectors will be uncovered and tested.

35.2.1 When any fire alarm, detection or suppression system is impaired, a temporary system shall be provided. Construction Manager 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 Construction Manager is responsible for inspecting and testing any temporary systems on a monthly basis.

ARTICLE 36 SURVEYS, RECORDS, and REPORTS

36.1 General: Working from lines and levels established by property survey, and as shown in relation to the Work, the Construction Manager 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 Construction Manager 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. Construction Manager shall advise Sub-contractors performing Work of marked lines and levels provided for their use in layout of Work.

36.2 Survey Procedures: The Construction Manager 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 Construction Manager or Design Consultant's reference at reasonable times. Surveyor shall record deviations from required lines and levels, and advise Design Consultant or Construction Manager promptly upon detection of deviations exceeding indicated or recognized tolerances. The Construction Manager shall record deviations which are accepted (not corrected) on Record Drawings.

ARTICLE 37 SMOKING IS PROHIBITED

37.1 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. “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.

37.2 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.

37.3 Construction Manager's employees violating this prohibition will be subject to dismissal from the Project.

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

ARTICLE 38 ALTERNATES

38.1 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.

38.2 Schedule of Alternates:

ARTICLE 39 FIELD CONSTRUCTED MOCK UPS

39.1 Exterior Finishes

39.1.1 After sample selection but prior to ordering exterior finish materials, Construction Manager shall accumulate enough material samples to erect sample wall panels to further verify selection made for color and textural characteristics, and to represent completed Work for qualities of appearance, materials and construction including sample masonry units (face and back-up wythes, plus accessories), window units, roofing finish, etc. to provide a complete representation of the exterior facade for approval by the Consultant; build mock-ups to comply with the following requirements:

39.1.2 Build mock-ups well in advance of the time the finish materials will be needed for inclusion in the Work.

39.1.3 Locate mock-ups at location as reviewed and approved by the Architect and University's Project Manager, generally within 10 feet of existing building, parallel to existing face of building, and exposed to sunlight during daylight hours. Mock-Up to be reviewed twice, one in direct sunlight and one in shade to confirm color characteristics of samples.

39.1.4 Mock-ups Size(s) for the following types shall be approximately 6' long by 4' high by full thickness.

Each type of exposed Work.

39.1.5 Protect mock-ups from the elements with weather resistant membrane.

39.1.6 Retain mock-ups during construction as a standard for judging completed Work. When directed by the University's Project Manager or by the Consultant, demolish mock-ups and remove from the site.

39.2 Interior Finishes

39.2.1 After sample selection but prior to ordering interior finish materials, Construction Manager shall accumulate enough material samples to erect sample to further verify selection made for color and textural characteristics, and to represent completed Work for qualities of appearance, materials and construction; include samples of interior finishes, including paint, wood stain, vinyl wallcovering, flooring and ceiling materials to provide a complete representation for approval by the Consultant; build mock-ups to comply with the following requirements:

39.2.2 Build mock-ups well in advance of the time the finish materials will be needed for inclusion in the Work. Mock-ups may be on newly installed wall surfaces.

39.2.3 Locate mock-ups with adequate illumination for observation under intended light levels.

39.2.4 Retain mock-ups during construction as a standard for judging completed Work. When directed by the University's Project Manager or by the Consultant, remove mock-ups from site or incorporate into the completed work.

ARTICLE 40 PROJECT COORDINATION VIA COMPUTER

40.1 The Construction Manager and Subcontractors are required to have an active email account to facilitate coordination of the project during construction and warranty.

40.2 To facilitate project construction coordination between the Consultant, the Construction Manager, 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.

40.2.1 Owner shall provide the Construction Manager and Subcontractors with user accounts and appropriate training for the web-based project management tool.

40.2.2 Utilization of, and training in the use of, the WPMS will be arranged for and supervised by Owner.

40.2.3 Participation of Construction Manager is mandatory; others as determined by Owner. Participation of Subcontractors and/or Trade Contractors is not mandatory but will be offered at their discretion.

40.2.4 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.

40.2.5 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.

40.2.6 Site camera monitors may be included at Owner's discretion.

40.2.7 Utilization of the WPMS shall be implemented by the Owner's representative.

40.2.8 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.

40.2.9 The Construction Manager and Consultant shall submit complete close-out and submittal logs in E-Communication, or WPMS, including description of all deliverables to be submitted by the construction manager or trade contractors during Phase 3, Construction Documents Phase.

ARTICLE 41 HOT WORK PERMITS

41.1 All work involving open flames or producing heat and or sparks in occupied buildings on the University of Kentucky campus will require the Construction Manager 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 Cad welding. A copy of the Hot Work Permit and the Hot Work Permit Procedure will be passed out at the Preconstruction Conference for the Construction Manager's use.

ARTICLE 42 INSURANCE

42.1 Employers' Liability Insurance. The Construction Manager 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.

42.2.1 Commercial General Liability Insurance. If the work involved requires the use of helicopters, a separate aviation liability policy with limits of liability of $50,000,000 will be required. If cranes and rigging are involved, a separate inland marine policy with liability limits of $5,000,000 will be required.

42.2.1.1 The limits of liability shall not be less than $5,000,000 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.

42.2.2 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.

42.2.3 Excess or Umbrella Liability Insurance. This policy shall have a minimum of $5,000,000 combined single limits for bodily injury and property damage for each occurrence in excess of the applicable limits in the primary policies.

42.2.4 Workers' Compensation- Statutory Requirements (Kentucky)

ARTICLE 43 KEY ACCESS

43.1 If Construction Cores are NOT utilized, then one set of keys for access to the renovation project area will be provided to the Construction Manager/Vendor's Project Manager/Superintendent by the University's Project Manager. The Construction Manager/Vendor's holder of the key(s) assumes responsibility for the safekeeping of the key(s) and its use. When leaving the renovation area all doors must be secured.

43.2 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.

43.3 All lost or stolen keys must be reported immediately to the University's Project Manager.

ARTICLE 44 CEILING CLEARANCE

44.1 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.

44.2 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 45 METAL ANCHORS

45.1 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 46 LOADING DOCK – NOT USED

ARTICLE 47 CONSTRUCTION PATH – NOT USED

ARTICLE 48 HOSPITAL PROJECT PROCEDURE – NOT USED

ARTICLE 49 WORKING HOURS/ACCESS: FOR MEDICAL CENTER/HOSPITAL – NOT USED

ARTICLE 50 SECURITY BADGES AND MEDICAL CENTER SECURITY – NOT USED

ARTICLE 51 HOSPITAL CONSTRUCTION CERTIFICATION – NOT USED

ARTICLE 52 APPEARANCE – NOT USED

ARTICLE 53 HIPAA (The Health Insurance Portability and Accountably Act) - NOT USED

ARTICLE 54 SAFETY & FIRE PROCEDURES – NOT USED

ARTICLE 55 INTERIM LIFE SAFETY MEASURES (ILSM) – NOT USED

ARTICLE 56 TREE PROTECTION STANDARDS

Contractor will adhere to all provisions outlined in 010000S02 Tree Protection Standards.

ARTICLE 57 CONTRACTOR/SUPERINTENDENT EXPERIENCE – NOT USED

REQUIREMENTS COMMON TO ALL WORK CATEGORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 GENERAL REQUIREMENTS

A. Contract and Bid

1. These General Requirements form a part of each Work Category work description, and they apply to each bidder's scope of work.

2. It is understood that the use of the terms Bidder, Contractor, Prime Contractor, Trade Contractor and Subcontractor within this description shall refer to the same entity, and it is the entity that enters into a contract with the Construction Manager (CM) as a successful Work Category Bidder.

3. If conflicts regarding the assignment of work exist between the drawing notes and/or other specification sections and this Work Category Description, this Work Category Description shall take precedence.

4. The Bidder, having become thoroughly familiar with the requirements, conditions and intent of the Contract Documents, and with all conditions affecting the performance and cost of the Work at the place where the Work is to be completed, and having fully inspected the site in all particulars, hereby proposes and agrees to fully perform and work within the time stated and in strict accordance with the Contract Documents, without claims for additional time or compensation.

5. Each subcontractor is responsible for knowing what Work has been assigned to any preceding or succeeding separate Contracts, as well as to other subcontracts within this Bid Package. No additional reimbursement or extensions of time will be allowed a subcontractor due to its lack of knowledge or understanding of the Work assigned to its subcontract or to any separate subcontract which may affect its Work. If applicable, documents for other Bid Packages are available for review in the CM's site office.

6. Except as may be specifically noted to the contrary in the Contract Documents, each subcontractor shall provide or cause to be provided, and shall pay for all labor, materials, equipment, tools, construction equipment and machinery, temporary utilities, transportation, testing, and all other facilities and services necessary for proper execution and completion of the Work of its Subcontract, whether temporary or permanent.

7. The Bidder's Lump Sum proposal INCLUDES all applicable sales and/or use taxes.

8. The Bidder agrees that upon written notice of the acceptance of its bid, the Bidder will arrange to meet with the CM within five (5) business days to review its bid and to execute the Subcontract. Executed Performance and Payment Bonds, if required, and all appropriate Insurance Certificates shall be delivered to the CM at the time of execution of the Subcontract. Failure to execute the Subcontract within ten (10) working days after receipt of the Subcontract may be considered a default under the obligation of the Bid Bond.

9. The Bidder shall include all costs for permits, fees, bonds, tap-in fees, assessments and inspections.

10. The General and Special Conditions included in the bid manual are the General and Special Conditions for the contract between the construction manager and the University of Kentucky. All successful bidders will be bound to all of those conditions the same as the construction manager.

11. Trade contractors will be limited to **10% total mark-up** on all extra work proposals.

B. Scheduling

1. Each subcontractor shall include any premium time required to meet the project schedule, as well as for any work which impacts Owner operations (i.e. utility tie-ins, shutdowns, or blocking deliveries).

2. Saturday and Sunday shall be used as make-up days for weather delays at no additional cost.

3. Subcontractors will be provided the durations as shown on the project schedule for completion of each particular work item, however, sequencing and timing for each work item may be adjusted as needed by the CM.

4. Durations shown on the project schedule are intended to include time for commissioning. Subcontractors will need to complete work to allow commissioning to occur within the timeframe allotted for each activity.

5. In the event that the work by this subcontractor falls behind the accepted schedule, the CM shall issue a notice in writing that the subcontractor is behind. If, within 3 days the subcontractor has not provided sufficient labor and/or materials to get back on schedule, the CM reserves the right to have this work completed by others at the subcontractor's expense.

C. Supervision

1. Each subcontractor shall provide a full-time Superintendent, on site, throughout the duration of their scope of work. This Superintendent shall be authorized to make all decisions relative to the work on site, shall attend daily foreman check-in meetings and shall be the primary contact for all correspondence. Any change of superintendent shall be pre-approved by the Construction Manager.

2. The Construction Manager reserves the right to have the subcontractor's superintendent or project manager replaced for any reason.

D. Administration

1. Each subcontractor is required to submit documents in PDF format if 11" X 17" or smaller and not bound. Any documents or drawings larger than 11" X 17" will require one PDF copy and one hard copy. If samples are required four (4) physical samples will be submitted at the time of review. All submittals shall be prepared and submitted in accordance with the submittal requirements outlined in the General and Special Conditions. One electronic copy of the submittals will be returned to the Subcontractor.

2. All Operation and Maintenance (O&M) specified in the documents to be provided shall be submitted to the CM on or before the expiration of 75% of the contract performance time.

3. Record drawings shall be updated on a weekly basis at the Construction Manager's jobsite office.

4. Each subcontractor shall have the capability of utilizing "ecommunication". This is an Internet based project collaboration and management software. This will include any training necessary to use ecommunication.

5. Drawings and revisions will be distributed electronically. The Subcontractor shall provide its superintendent with access to an ipad or other portable table device for access to internet based software from the jobsite.

6. Each subcontractor shall have an active e-mail account for the receipt of CM correspondence to the subcontractor.

7. Subcontractor Superintendents shall attend a daily 10-15 minute planning meeting every morning prior to beginning work.

8. Every Friday, each subcontractor will be required to submit to the CM Superintendent, a three week lookahead planning schedule. This form will be provided by the CM.

9. All construction contracting companies doing work in Fayette County must obtain a Contractor Registration Certificate as well as a Business License. CM may request proof that subcontractor holds a current certificate and license prior to payment.

10. All subcontractors are required to meet the University of Kentucky's Design Standards for all work items. These standards are available for review on the UK website.

11. Any work done by field ticket shall be reviewed with, and signed by Congleton-Hacker Company's Superintendent withing 24 hours, and pricing submitted within 30 days. Failure to follow either of these requirements shall void any monies due to the subcontractor for the added work.

E. Safety

1. Provide and maintain an effective safety program and conform to all Federal and Local safety codes.

2. All employees of all contractors, subcontractors or other entities who require access to the site are required to attend a pre-construction safety orientation meeting prior to starting work on site.

3. Hard hats, work boots, and long pants shall be worn by all employees at all times while on site.

4. All equipment operators and truck drivers on the site are required to wear hard hats, work boots, and long pants at all times, including in the cab while running equipment.

5. Any barricade or safety device removed by a subcontractor's employees in order to perform the work shall be immediately re-erected as soon as that work activity is complete. Temporary barricades and/or a controlled access zone must be established while the barricade is down. If the subcontractor fails to comply with this requirement, the CM or designee will cause the necessary work to be completed, and all associated costs will be deducted from costs due the subcontractor.

6. If any personnel are required to leave the site due to safety violations, it will be the responsibility of the subcontractor to provide additional manpower or work premium time to make up any lost time due to the safety violation.

F. Site Utilization

1. Each subcontractor shall confine its operations to the defined site limits and/or approved site lay down and storage areas. Any work activities that require work outside of the site limits shall be coordinated in advance with the Construction Manager.

2. Each subcontractor is responsible for its own hoisting, unloading, storage and subsequent moving of materials as required to complete its work. On-site storage locations of all materials, equipment, and operations must be coordinated with, and approved by, the Construction Manager in advance. Staging areas will be designated to each subcontractor. Any materials, equipment, or operations found to be outside approved staging areas are subject to relocation by the Subcontractor at the Construction Manager's discretion.

3. All costs associated with material delivery in small quantities, relocation of materials that impede work progress, and off site material storage and handling shall be included in the bid.

4. Each subcontractor is responsible for receiving all deliveries, unloading, hoisting, and transporting to staging areas approved by the Construction Manager

5. Each subcontractor shall provide temporary protection as required against rain, wind, storms and theft. Damages to existing facilities due to the Subcontractor's failure to provide temporary protection as required will be corrected at the Subcontractor's expense.

6. Fuel storage on-site is restricted and fueling procedures must comply with applicable regulations and receive the CM's approval.

7. Where new work connects with existing, provide all necessary cutting and fitting required to make a satisfactory connection with the work in a finished and workmanlike condition. Furnish all labor and material necessary, whether or not shown or specified. All measurements must be verified.

8. Each subcontractor shall be responsible for the proper protection of adjacent structures, public right-of-ways and emergency egresses while performing its scope of work.

9. Each subcontractor shall be responsible for the protection of its own materials, tools, equipment, and finished work until substantial completion is granted. Damage to stored or finished work and/or theft of any materials, tools or equipment prior to substantial completion shall be repaired or replaced at the Subcontractor's expense.

10. Each subcontractor is responsible for maintaining drainage and grades of the site, affected by their work, during and after their work.

11. Each subcontractor shall be responsible for furnishing, installing, maintaining, and removing weather protection required for their work.

12. Each subcontractor shall be responsible for cleaning their tires, and the tires of any of their delivery trucks prior to leaving the site.

13. Tobacco use on the site is prohibited.

14. Failure to clean up the site daily will result in the performance of this activity by the CM or a designated Trade Contractor at a unit rate of $75.00 per hour and associated costs shall be

back charged to the appropriate Trade Contractor. Cleanliness during construction is of utmost importance.

15. Temporary electric prior to establishing temporary electric inside the building shall be provided by each trade contractor for their own work.

16. In addition to any items listed in the specific or general scopes of work, each trade contractor shall provide, for the duration that they are working onsite, one person for one day each week to perform general clean up at the direction of the Construction Manager, or whoever the Construction Manager appoints to manage clean up.

17. All utility shutdowns shall be limited to 24 hours & shall be scheduled two weeks in advance.

G. Coordination

1. Each trade contractor shall be responsible for coordinating with and scheduling the Owner's testing agency and the Owner's commissioning agent for testing & start-up activities, and shall notify the CM when these activities are scheduled.

2. Beginning work shall be deemed acceptance of the existing or preceding conditions.

3. Normal working hours will be from 7:00 A.M. to 3:30 P.M., Monday through Friday unless the Construction Manager approves alternate arrangements. Off-hours work must be scheduled in advance with the CM. This does not alleviate the Trade Contractor's responsibility to work overtime as required to maintain the schedule. Delays due to normal weather conditions are to be taken into consideration and anticipated when bidding this project. Saturdays are considered workdays as required to make up any weekdays lost due to weather.

4. Unless specifically indicated otherwise, each Trade Contractor is responsible for all detailed layout and grade from established benchmark and control lines

5. Each trade contractor shall be responsible for providing any temporary electric required.

6. The Trade Contractor shall provide and continually maintain OSHA compliant guardrails around the top of all open excavations, including shored excavations, with the required number and spacing of ladders for accessing the excavation.

7. Each Trade Contractor shall provide any and all information pertinent to their work required by other trade contractors to properly coordinate their work, and will be responsible for requesting the same as needed from other trade contractors.

8. All work required for mock-ups as specified shall be included in all trade bid packages.

UNIVERSITY OF KENTUCKY
CAPITAL CONSTRUCTION PROCUREMENT SECTION

CONTRACTOR/BIDDER DETERMINATION OF RESPONSIBILITY

1. Purpose

The Commonwealth of Kentucky Model Procurement Code (KRS 45A.080) requires that a contract be awarded to the lowest responsive and responsible bidder whose bid offers the best value. KRS 45A.070(6) defines "Responsible bidder or offeror "as" a person who has the capability in all respects to perform fully the contract requirements and the integrity and reliability which will assure good faith performance," and "Best value" as "a Procurement in which the decision is based on the primary objective of meeting the specific business requirements and best interests of the Commonwealth." The information requested in this document is to be used to evaluate the "responsibility" by verifying the apparent low bidder:

(a) Has adequate financial resources (in working capital and bonding capacity) in relation to the scope and dollar amount of the project or the ability to secure such resources.

(b) Has the experience, organization, technical qualification, available personnel resources, and has or can acquire the equipment necessary to perform the scope of work bid.

(c) Is able to comply with the required performance schedule or completion date, taking into account existing commitments (i.e., capacity); and

(d) Has a satisfactory record of performance, integrity, judgment, and skills to complete the project bid.

The information provided must verify that the bidding firm has a sufficient level of expertise, experience, financial stability, and personnel resources to qualify the firm as being "responsible" prior to proceeding with an award of Contract. The determination of the firm's capability and responsibility will be made as fairly and honestly as possible using a reasonable exercise of sound judgment and discretion in the review of information provided or otherwise secured through references or other sources.

2. Application Submittal

The low responsive Bidder must complete the information requested by typing or clearly printing responses in ink. All information requested must be provided. If a question does not apply, insert "NA" for not applicable. The University of Kentucky reserves the right to request supplemental information to fully determine responsibility of the Bidder. The Bidder agrees to provide supplemental information, if requested by the University.

3. Insurance Requirements

The Successful Bidder will be required to provide proof of insurance indicating current liability coverages, including workers compensation, with limits equal to or exceeding the amounts required by the bid documents. Additionally, builders risk coverage equal to the Contract amount will be required of the successful contractor.

*NOTE: Pursuant to KRS 45A. 110, except as otherwise provided under the Open Records Act and any other applicable law, the Bidder has the right of nondisclosure to the public of certain information required by this submittal. If the Bidder wishes nondisclosure of certain information, he/she shall enclose the confidential information in a separate envelope marked CONFIDENTIAL and forward it with the information and other submittals required by this document. If this is not done, he/she waives the right of nondisclosure of this information and the signing of the Bid Proposal shall constitute written waiver of that right.

Revised 04/07/2021

***Note: The contractor offering the apparent low bid will be required to either have on file with the University or supply the information required by Part I of this submittal by twelve o'clock (12) noon of the first working day following the bid opening. If the information required by Part I is on file with the University and is current and accurate, only the information requested by Part II will be completed and submitted by the apparent low bidder. All bidders must update and keep current all previously submitted "on file" Part I information.**

Part I
Contractor/Bidder Responsibility
Determination Information Submittal

1. Name of Firm _____
   Street Address _____
   City, State, Zip _____
   County _____
   Business Phone (___)_____ Fax (___) _____

2. Mailing Address _____
   City, State, Zip _____

3. Contact Person _____

4. Type of Firm
   ( ) Corporation ( ) Partnership
   ( ) Sole Proprietorship ( ) Individual
   ( ) Joint Venture ( ) Other (Explain)

5. If your firm is a corporation, provide the following:

6. Date of Incorporation _____ State of Incorporation_____

   States where corporation is authorized to conduct business _____

   Attach proof that corporation is in good standing with the Kentucky Secretary of State.

6. If your firm is an individual or partnership, provide the following:

   Date of organization _____

   If a partnership, is it limited or general?_____

   Name and address of all partners and specify their respective partnership participation, i.e., limited, general, managing.

   _____

   _____

7. If your firm is other than a corporation, individual or partnership, describe organization and identify principals.

_____

_____

_____

8. In the space provided below, describe the type(s) of construction and project management expertise offered by your company.

_____

_____

_____

_____

*(use additional pages if required)*_____

9. List key persons (partners, owners, officers and directors). Include any other persons who have duties, responsibilities or authority typically delegated to partners, owners, officers or directors. Provide organization chart of the key individuals in the firm.

Name of Person	Position/title	% Ownership

10. In the past five years, has the firm ever been fined for violating state or federal safety or environmental laws? _____Yes, _____No If yes, attach an explanation.

11. Has any key person with the firm ever been convicted of any state or federal crime (excluding traffic violations), including but not limited to embezzlement, theft, bribery, falsification or destruction of records, receipt of stolen property, criminal anti-trust violations or bid-rigging? ____Yes, ____No If yes, attach an explanation.

12. Has a civil court issued a judgment of $10,000 or more against the firm in the past five years? _____Yes, _____No If yes, attach an explanation.

13. Is the firm currently a party to a pending lawsuit with a potential damage alleged of $10,000 or more?
_____Yes, _____No If yes, attach an explanation.

14. In the past five years, has the firm been terminated from or failed to complete any contract?
_____Yes, _____No If yes, attach an explanation.

15. How many years has the firm been in business? _____years _____months

16. Performance and Payment Bonds

Surety Company Name_____
Street Address_____
City, State, Zip
Phone Number ( )_____Fax ( )_____

Local Bond Agency_____
Kentucky Licensed Agent_____
Street Address_____
City, State, Zip_____
Phone Number ( )_____Fax ( )_____

17. Current level of bonding capacity authorized by the surety.
Single Limit $ _____Aggregate Limit $_____

18. Bank Reference

Bank Name_____
Street Address_____
City, State, Zip_____
Phone Number ( )_____Fax ( )_____
Contact Person_____

NOTE: The apparent low bidder will be required to complete and submit to the University the following information by twelve (12) noon of the second working day following the bid opening or other time as may be established during the post bid review of the bid submittal. The information requested in this submittal is required to assist the University in determining contractor responsibility to complete the project being bid.

PART II

Contractor/Bidder Responsibility
Determination Information Submittal

1. Name of Firm_____
Street Address_____
City, State, Zip_____
County _____
Business Phone ( )_____Telefax ( ) _____

2. Mailing Address_____
City, State, Zip_____

3. Contact Person _____

4. The information previously submitted under Part I of this document is current and accurate and no changes to Part I are necessary at this time. _True_____False If False, the bidder shall submit with the Part II submittal corrections as required to update the Part I information.

5. In the space provided below, describe the type(s) of construction and project management expertise offered by your company to substantiate the company's experience in the type of project, type of construction, or the management of the type of construction required for this project. You should indicate a detailed plan to execute and manage this project, as well as any technological planning systems employed.

_____

_____

*(use additional pages if required)*_____

6 List the name and title of the home office administrative project manager who will be assigned and responsible for this project. A current resume of this individual shall be attached to this submittal. The resume should include a list of projects for which this project manager has been responsible within the past five (5) years.

Name of Manager _____Title_____

7. List the name and title of the on-site manager that will be assigned and responsible for this project. A current resume of this individual shall be attached to this submittal. This resume should include a list of projects for which this manager has been responsible within the past five (5) years.

Name of Project Manager _____Title _____

8. List the name and title of the on-site project superintendent who will be assigned and responsible for this project. A current resume of this individual shall be attached to this submittal. This resume should include a list of projects for which this superintendent has been responsible within the past five (5) years.

Name of Project Superintendent _____Title _____

9. How many full-time, non-labor employees does the firm currently have?_____

10. How many full-time, labor/trade employees does the firm currently have?_____

11. What is your firm's average annual dollar volume of work for the past five (5) years? $_____

12. List below, by specification section, the work you plan to complete with your own work force or with subcontractors. In the blanks provided please indicate the specification section and "O" for own forces and "S" for subcontracted work.

Spec. Section	"O" or" S"	Spec. Section	"O" or "S"	Spec. Section	"O" or" S"

13. What percentage of the total work do you estimate will be performed with your own work force? _____%

14. How long has the firm been engaged in the type contracting required by this project? _____years_____ months

15. List below five of your most recently <u>completed</u> projects that demonstrate your ability to complete the type work required by the project being bid. (NOTE: The inability to list five such projects will not necessarily prevent a determination of responsibility.)

A. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( )_____ Fax ( )_____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( )_____

Brief description of your firm's work and responsibility in this project.

_____

_____

B. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( ) _____ Fax ( ) _____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( ) _____

Brief description of your firm's work and responsibility in this project.

C. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( ) _____ Fax ( ) _____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( ) _____

Brief description of your firm's work and responsibility in this project.

D. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( ) _____ Fax ( ) _____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( ) _____

Brief description of your firm's work and responsibility in this project.

_____

_____

_____

_____

E. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( ) _____ Fax ( ) _____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( ) _____

Brief description of your firm's work and responsibility in this project.

_____

_____

_____

_____

16. List below all projects that are <u>currently under construction</u> that demonstrate your ability to complete the type work required by the project being bid.

A. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( ) _____ Fax ( ) _____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( ) _____

Brief description of your firm's work and responsibility in this project.

_____

_____

_____

B. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( )_____ Fax ( )_____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( )_____

Brief description of your firm's work and responsibility in this project.

_____

_____

_____

C. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( )_____ Fax ( )_____

Name of Owner Contact_____

Architect/Engineer _____ Phone No.( )_____

Brief description of your firm's work and responsibility in this project.

_____

_____

_____

_____

D. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( )_____ Fax ( )_____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( )_____

Brief description of your firm's work and responsibility in this project.

_____

_____

_____

_____

E. Project Title _____ Owner _____

Contract Amount _____ Completion date _____

Owner Phone Number ( ) _____ Fax ( ) _____

Name of Owner Contact _____

Architect/Engineer _____ Phone No.( ) _____

Brief description of your firm's work and responsibility in this project.

_____

_____

_____

_____

Attach additional pages as required.

17. **Participation of Diverse Business Enterprises owned contractors and businesses.**

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, Disable Veterans and Disabled make up Diverse Business Enterprises, DBE

It is the goal of the University of Kentucky that at least 10% of the contract dollar amount be completed by DBE owned contractors and businesses.

The University requests that all DBE Suppliers be documented according to ethnic origin as categorized below or if they are woman owned:

- **Asian**
- **Black/African American**
- **Hispanic or Latino**
- **Native American**

- **Native Hawaiian/Pacific Islander**
- **White**
- **Other**

Provide in the spaces below those contracts that will be issued to DBE contractors and material suppliers upon award of a contract. Under "Contractor/Vendor Classification" use the above list for ethnic origin or if a woman owned business, list as such.

A. Name Subcontractor/Material Supplier _____

Contractor/Vendor Classification _____Contract Amount _____

Contractor/ Supplier Address _____

Owner Phone Number (____) _____ Fax (____) _____

Name of Owner Contact _____

Brief description of the Subcontractor/Material supplier work or responsibility on this project.

_____

_____

_____

B. Name Subcontractor/Material Supplier _____

Contractor/Vendor Classification _____Contract Amount _____

Contractor/ Supplier Address _____

Owner Phone Number (____) _____ Fax (____) _____

Name of Owner Contact _____

Brief description of the Subcontractor/Material supplier work or responsibility on this project.

_____

_____

_____

C. Name Subcontractor/Material Supplier _____

Contractor/Vendor Classification _____Contract Amount _____

Contractor/ Supplier Address _____

Owner Phone Number (____) _____ Fax (____) _____

Name of Owner Contact _____

Brief description of the Subcontractor/Material supplier work or responsibility on this project.

_____

_____

_____

D. Name Subcontractor/Material Supplier _____

Contractor/Vendor Classification _____ Contract Amount _____

Contractor/ Supplier Address _____

Owner Phone Number (____) _____ Fax (____) _____

Name of Owner Contact _____

Brief description of the Subcontractor/Material supplier work or responsibility on this project.

_____

_____

_____

E. Name Subcontractor/Material Supplier _____

Contractor/Vendor Classification _____ Contract Amount _____

Contractor/ Supplier Address _____

Owner Phone Number (____) _____ Fax (____) _____

Name of Owner Contact _____

Brief description of the Subcontractor/Material supplier work or responsibility on this project.

_____

_____

_____

Attach additional pages as required.

17A Calculation of Total Participation by Contractor/Supplier Classification from this DBE (Ethnic Minority) list and list women owned businesses separately:

- **Asian**
- **Black/African American**
- **Hispanic or Latino**

- **Native American**
- **Native Hawaiian/Pacific Islander**
- **White**
- **Other**

DBE (Ethnic) Contract	Amount	DBE (Women) Contract	Amount
1._____	$_____	1._____	$_____
2._____	$_____	2._____	$_____
3._____	$_____	3._____	$_____
4._____	$_____	4._____	$_____
5._____	$_____	5._____	$_____
6._____	$_____	6._____	$_____
7._____	$_____	7._____	$_____
8._____	$_____	8._____	$_____
9._____	$_____	9._____	$_____
10._____	$_____	10._____	$_____
TOTAL	$_____	TOTAL	$_____

17B Total DBE (Minority) Owned Percentage

Total DBE (Minority) Owned Amount from above $_____ divided by the Total Contract Amount bid $_____ Equals_____%.

17C. Total DBE (Women) Owned Percentage

Total DBE (Women) Owned Amount from above $_____ divided by the Total Contract Amount bid $_____ Equals_____%.

17D. If the total dollar amount of these contracts do not exceed 10.9% for minority owned and 6.9% for women owned contractors and suppliers you must provide documentation of your efforts to meet the established goal of participation.

We made the following efforts to involve Diverse Business Enterprise Owned Contractors and material suppliers on this project. (List efforts made and attach proof of these efforts)

_____

_____

_____

_____

Certification and Signature:

I hereby certify that I am an authorized principal of the firm and I:

1. Have read and understand the reason for submitting this information.
2. Agree, upon request, to provide any additional information that may be necessary for determination of contractor responsibility.
3. Will, upon request, provide complete financial statements within five business days.

4. Swear or affirm that all information provided on this submittal is true.
5. Understand that if any of the responses are found to be materially untrue, the firm will be ineligible to be awarded a contract

Your signature on this document is a sworn statement to the University of Kentucky. This document must be signed by the firm's CEO, president, vice-president, partner, or sole owner.

Under penalties of perjury, I hereby swear or affirm, warrant, and represent that the above answers and information have been personally provided by me, and that I have the authority to execute this document on behalf of this firm.

Signature_____
Name_____
Title_____

State of_____)
County of_____)

Subscribed and sworn to before me on this_____day of_____, 199__, by

_____ , _____acting for and on behalf of
(name) (office held)

_____.
(firm)

_____

Notary Public , Kentucky
My Commission expires_____

UNIVERSITY OF KENTUCKY

DBE Participation Goals

PART 1 - GENERAL

1.1 The University of Kentucky requests all potential contractors to make a concerted effort to include Diverse Business Enterprises (DBE's) as subcontractors or suppliers in their bids.

1.2 Toward that end, the University of Kentucky has established 10% of total procurement costs as a Goal for participation of Diverse Business Enterprises on this contract.

1.3 **It is therefore a request of each Bidder to include in its bid, 10% for DBE participation and other requirements as outlined in this section.**

PART 2 - PROCEDURES

2.1 The successful bidder will be required to report to the University of Kentucky, the dollar amounts of all purchase orders submitted to DBE subcontractors and suppliers for work done or materials purchased for this contract.

2.2 Replacement of a DBE subcontractor or supplier listed in the original submittal must be requested in writing and must be accompanied by documentation of Good Faith Efforts to replace the subcontractor / supplier with another DBE Firm; subject to approval by the University of Kentucky.

2.3 For assistance in identifying qualified, certified businesses to solicit for potential contracting opportunities, bidders may contact:

A. The University of Kentucky, Facilities Management Contractor/Supply chain Coordinator (859-257-3204)

B. Tri-State Minority Supplier Development Council in Louisville, KY (502-625-0135)

C. The Kentucky Cabinet for Economic Development, Small & Minority Business Division in Frankfort, KY (502-564-2064)

D. The Office of Equal Employment Opportunity, Contract Compliance Division in Frankfort, KY (502-564-2874)

2.4 The University of Kentucky will make every effort to notify interested DBE subcontractors and suppliers of each Bid Package, including information on the scope of work, the pre-bid meeting time and location, the bid date, and all other pertinent information regarding the project.

PART 3 - DEFINITIONS

3.1 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, Disable Veterans and Disabled make up Diverse Business Enterprises (DBE).

PART 4 - OBLIGATION OF BIDDER

4.1 **The bidder shall make a Good Faith Effort to achieve the Participation Goal for DBE subcontractors/suppliers. The failure to meet the goal shall not necessarily be cause for disqualification of the bidder; however, bidders not meeting the goal are required to furnish with their bids written documentation of their Good Faith Efforts to do so.**

4.2 Award of Contract shall be conditioned upon satisfaction of the requirements set forth herein.

4.3 The Form of Proposal includes a section entitled "Identification of Diverse Business Enterprise Subcontractors and Material Suppliers". The Advertisement for Bid includes a section entitled "Diverse Business Enterprise Participation". The Determination of Responsibility includes a section entitled "Participation of Diverse Business Enterprise owned contractors and businesses". The applicable information must be completed and submitted as outlined.

4.4 **Failure to submit this information as requested may be cause for rejection of the bid.**

PART 5 - DOCUMENTATION REQUIRED

5.1 The prime contractor must provide the University of Kentucky with a "DBE percent of contract report "detailing subcontracting activity within 90 days of prime contract award. Projects containing multiple bid packs will update reports within 90 days of contract award throughout project duration. The report shall reflect the total dollar amount awarded to all DBE subcontractors (including suppliers) utilized under this contract.

a. Prime Contractors will report the following items individually to satisfy reporting requirements
    i. Project Name, UK Project Number, and UK CPMD Project Manager assigned to the project
    ii. Total dollar value of the prime contract with the University of Kentucky
    iii. Total dollar value of all contracts assigned to DBE firms

5.2 Bidders not reaching the Goal must submit both the "DBE percent of contract report "and a written statement documenting their Good Faith Effort to do so (If bid includes no DBE participation, bidder shall enter "None" on the subcontractor / supplier form). In addition, the bidder may submit the following as proof of Good Faith Efforts to meet the Participation Goal:

A. Advertisement by the bidder of DBE Contracting opportunities associated with this bid in at least two (2) of the following:

   1. A periodical in general circulation throughout the region
   2. A Minority-Focused periodical in general circulation throughout the region
   3. A Trade periodical aimed at the DBE community in general circulation throughout the region
   4. Bidder shall include copies of dated advertisement with his submittal

B. Evidence of written notice of contracting opportunities to at least five (5) DBE firms serving the construction industry at least seven (7) days prior to the bid opening date.

C. Copies of quotations submitted by DBE firms which were not used due to uncompetitive pricing or other factors and/or copies of responses from firms that were contacted indicating that they would not be submitting a bid.

D. Documentation of Bidder's utilization of the agencies identified to help locate potential DBE firms for inclusion on the contract including responses from agencies.

E. Failure to submit any of the documentation requested in this section may be cause for rejection of bid. Bidders may include any other documentation deemed relevant to this requirement. "Record of DBE Solicitation" and other required documentation of Good Faith Efforts are to be submitted with the bid, if participation Goal is not met.

University of Kentucky – Capital Project Management
DBE Percent of Contract Report

1) Identification of Participating DBEs
Project Name / Number: _____
UK Project Manager: _____
Total Contract Value: _____

DBE Name, Address & Phone	Work to be Performed	Dollar Value of Work	% Value of Total Contract
1.		$	%
2.		$	%
3.		$	%
4.		$	%

The undersigned submits the above list of DBE firms to be used in accomplishing the work contained in this Bid.

Company: _____ By: _____

Date: _____ Title: _____

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Additional Leach Field:

1. Base Bid: Do not install the additional leach field for the future Office Building, as shown on the Drawings.
2. Alternate: Install the additional leach field for the future Office Building, as shown on the Drawings.

B. Alternate No. 2: Walk-in Coolers.

1. Base Bid: Walk-in Coolers located in the Layer/Breeder Building to be Owner-Furnished, Owner Installed"

2. Alternate: Walk-in Coolers located in the Layer/Breeder Building to be provide and installed by the Metal Poultry Building Supplier/Installer.

END OF SECTION 012300

SECTION 014110 – STRUCTURAL SPECIAL INSPECTION, CONTRACTOR RESPONSIBILITY

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

B. General Conditions of the Construction Contract Inspection of Work / Defective or Incomplete Work / Special Inspections shall apply in its entirety to this project. Where any conflict exists between this Specification Section and the General Conditions, the General Conditions provisions shall supersede in all aspects.

1.2 SUMMARY

A. Special Inspections as defined in Section 1704 of The Kentucky Building Code are required.

B. The Risk Category, Seismic Design Category, and Basic Wind Speed for the structure are shown in the General Notes section of the structural drawings.

C. Special inspections per Kentucky Building Code Sections 1704 and 1705 are required for the following materials and work:

1. Inspection of Fabricators per Section 1704.2.5 of the Kentucky Building Code.
2. Steel Construction per Section 1705.2 of the Kentucky Building Code.
3. Concrete Construction per Section 1705.3 of the Kentucky Building Code.

1.3 SCOPE

A. The scope of the construction work to be inspected / tested / observed is that structural and foundation work shown on the structural construction drawings (S- sheets) as well as the following:

1. Geotechnical fill immediately below and within the footprint of the building.

B. All inspections and tests performed shall be documented by report including, but not limited to, inspections for grout and concrete placement, reinforcing inspection, curing, fabricators, etc.

1.4 DEFINITIONS

A. In accordance with the intent of the Building Code, inspection work specified to be “continuous” shall be inspected the full, uninterrupted time that the Contractor is performing said construction work. Work specified to be “periodic” may be inspected as convenient to the Inspector, except that all work must be inspected prior to being covered by other work, during the working hours of the Contractor, and in a fashion that does not delay the Contractor. Regardless as to whether inspections are performed in “continuous” or “periodic” fashion, 100% of the construction work shall be inspected, unless noted otherwise.

1.5 SELECTION AND PAYMENT

A. The Inspection Agency shall be retained by the Owner. Costs for reinspection and retesting, should discrepancies be found, will be paid for by the Owner, except where rework is due to negligence or omission deemed excessive by the Owner.

1. In case of excessive rework, such retesting and reinspection shall be paid for by the Owner as an additional service of the Inspection Agency, but will be backcharged by deductive change order to the Contractor's contract.
2. In case of excessive waste/lost time of the Special Inspector due to inadequate scheduling by the Construction Manager, such time shall be paid for by the Owner as an additional service of the Inspection Agency but will be backcharged by deductive change order to the Contractor's contract.

B. Special Inspections are additional to testing and inspection requirements shown elsewhere in the specifications and on the drawings, which is to be paid for by the Contractor. The Contractor shall also pay for additional structural testing and inspection required for his convenience. Inspection work not part of the Structural Special Inspections may be performed by an Inspection Agency of the Contractor's choosing, unless noted otherwise.

1.6 INFORMATIONAL SUBMITTALS

A. General: Furnish submittals in quantity, format, and other Conditions of the Contract and as specified in Division 1 of the Project Manual.

B. Fabricator certificate of current good standing with Qualified Certification Program.

C. Fabricators exempt from special inspection shall submit a *Certificate of Compliance* to the structural engineer of record at the completion of fabrication stating that all work was completed in accordance with the approved construction documents.

1.7 QUALITY ASSURANCE

A. Qualified Certification Authorities: Subject to compliance with Kentucky Building Code Requirements, Qualified Certification Authorities providing certification which may be applicable to Project include:

1. American Concrete Institute (ACI).
2. American Society of Nondestructive Testing (ASNT).
3. American Welding Society (AWS).
4. Cold Formed Steel Engineers Institute (CFSEI).
5. International Accreditation Service (IAS).
6. International Code Council (ICC).
7. National Institute of Certified Engineering Technology (NICET).

PART 2 – EXECUTION

2.1 PROGRESS MEETINGS

A. The Special Inspector’s designated Project Manager is to attend any pre-construction meetings which may be conducted at the construction site by the Structural Engineer to discuss quality issues.

B. The Special Inspector’s designated Project Manager is to attend construction progress meetings which will be held at the construction site by the Architect, Engineer, and Construction Manager.

2.2 CONTRACTOR’S RESPONSIBILITIES

A. Provide a complete copy all structural shop drawings to the Structural Testing/Inspection Agency.

B. Arrange the preconstruction meeting to discuss quality issues.

C. Notify the Structural Testing/Inspection Agency sufficiently in advance of operations to allow assignment of personnel and scheduling of tests.

D. Cooperate with Structural Testing/Inspection Agency and provide access, including equipment with operator, to work. Access equipment includes, but is not limited to, man lifts, excavation equipment, etc.

E. Provide samples of materials to be tested in required quantities.

F. Provide storage space for Structural Testing/Inspection Agency's exclusive use, such as for storing and curing concrete testing samples. If required by Special Inspector, Construction Manager shall provide cure box with electricity, water, and blankets for curing concrete specimens.

G. Provide labor to assist the Structural Testing/Inspection Agency in performing tests/inspections.

H. Construction and work for which Special Inspection is required shall remain accessible and exposed for special inspection purposes until the completion of the inspections and tests.

I. All parties who are to receive inspection and testing reports shall maintain an active email account to receive reports by.

J. Construction Manager shall create and maintain a discrepancy log on site. Log shall list each discrepancy documented by the Special Inspector; state the date of discovery and Special Inspector’s report number; and provide room for the Special Inspector to sign and date when said discrepancy is corrected. No work containing discrepancy shall be covered prior to having reinspection and approval by the Special Inspector.

K. Neither the observation of the Architect/Structural Engineer in the administration of the contract, nor tests/inspections by the Testing/Inspection Agency, nor approvals by any other

person(s) shall relieve the Contractor from his obligation to perform the work in accordance with the Contract Documents.

2.3 SPECIAL INSPECTOR'S RESPONSIBILITIES

A. Cooperate with the Contractor and provide timely service.

B. Notify Contractor of minimum advance notice for each type of inspection/test.

C. Upon arriving at the construction site, sign in and notify the Contractor of presence.

D. Select the representative samples that are to be tested/inspected.

E. Perform tests/inspections as outlined in Contract Documents, the applicable codes, and as directed by the Structural Engineer.

F. Keep records of all inspections.

G. Furnish inspection reports to the Architect, Structural Engineer, and Construction Manager weekly as construction progresses.

1. Each report shall include photographs of the project status and the typical work inspected and documented in that subject report. These general photographs are in addition to the required photograph at discrepancies.

H. Inform Construction Manager and / or Fabricator of all discrepancies immediately for correction.

1. Document in writing correction of discrepancies.
2. Highlight discrepancies within the report.

a. The report shall include a text description of each discrepancy. Description shall convey the discrepancy location on the project and the issue.
b. The report shall include a photograph of each discrepancy observed in the field and/or in the shop. Photograph shall be labeled to convey location on project and the issue shown. (Photographs of material strength tests for concrete and/or masonry are not required, unless otherwise instructed.)
c. The report shall document the date that each discrepancy was initially discovered.
d. Inspection related discrepancies shall be reinspected by the Special Inspector along the course of the project and prior to concealment by other work. Subsequent reports shall document date that prior discrepancy was confirmed to be corrected.

3. If discrepancies are not corrected, the discrepancies shall be brought to the attention of the Code Official and the Structural Engineer prior to the completion of that phase of the work.

I. Leave copies of field notes with the Contractor prior to leaving the construction site. Field notes shall include the message given to the Contractor, date, time of message, name of Contractor's representative informed, type and location of work or materials tested/inspected, whether the work or materials complies with Contract Documents and name of the Structural Testing/Inspection Agency's representative.

J. Immediately notify Construction Manager, Architect, and Structural Engineer by separate letter if work yet to be inspected is found on site that is either being covered by other work or was to receive continuous inspection.

K. Structural Testing/Inspection Agency shall not alter requirements of Contract Documents, approve or reject any portion of the work, or perform duties of the Contractor.

L. Submit a final report of inspections documenting completion of **all** required Special Inspections and correction of any discrepancies noted in inspections to the Structural Engineer. Final report shall be prepared by, sealed, and signed by the Special Inspector and shall include a complete list of materials and work inspected during the course of the project. One copy of said report is to be provided to the Contractor for his records.

2.4 INSPECTION OF FABRICATORS

A. Inspect the fabrication of structural load-bearing members where such work is being performed on the premises of the Fabricator's shop.

1. Fabricators shall be exempt from special inspection when a Qualified Certification Authority has periodically reviewed and approved Fabricator's written procedural and quality control manuals and fabrication practices. Subject to compliance with Kentucky Building Code requirements, Qualified Certification Authorities providing certification which may be applicable to Project include, but are not limited to, the following:
   a. Pre-engineered Metal Building System Fabricators - IAS Inspection Programs for Manufacturers of Metal Building Systems, AC472.
   b. Shop-Fabricated Cold-Formed Metal Trusses – CFSEI certified.

B. Verify that the Fabricator maintains and review for completeness Fabricator's detailed fabrication and quality control procedures which provide a basis for control of the workmanship and ability to conform to the approved construction documents and reference standards. Review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.

C. Perform special inspections at Fabricator's shop as outlined in this specification for each type of construction.

2.5 INSPECTION OF COLD-FORMED STEEL (STRUCTURAL) CONSTRUCTION

A. Cold-formed steel construction is a delegated design; therefore, cold-formed steel information is not shown on structural drawings. Special inspector is to verify compliance with the approved cold-formed steel shop drawings.

B. Provide special inspection of the fabrication of light-gauge, cold-formed metal structural elements and assemblies in accordance with the *Inspection of Fabricators*.

C. Verify use of proper metal gauge and yield strength of cold-formed metal products. Verify proper screw size and penetration.

D. Perform periodic inspection of light-gauge, cold-formed metal construction to verify installation of blocking, fasteners, and fastening with the contract document provisions.

E. Perform periodic inspection of shear wall, sheet diaphragms, and strap bracing.

1. Verify grade and thickness of shear panels.
2. Verify the size and quantity of framing members at panel edges.
3. Verify screw diameter, length, and spacing.
4. Verify installation of shear wall hold-down anchors.

F. Verify the installation of all permanent bracing of light-gauge, cold-formed metal truss assemblies in accordance with the approved truss shop drawings and structural drawings.

1. Verify placement of all compression web member bracing, laps, fastening, and intermittent cross bracing.
2. Verify placement of all chord bracing, laps, fastening, and intermittent cross bracing.
3. Verify connection of all truss to truss girder connections.
4. Verify installation of all perimeter uplift connections to supporting structure.

2.6 INSPECTION OF STRUCTURAL ANCHORS

A. Where Periodic anchor inspection is permitted, the Special Inspector shall verify the initial installations of each type and size of anchor by construction personnel on site. Subsequent installations of the same anchor type and size by the same construction personnel are permitted to be performed in the absence of the Special Inspector. For ongoing installations over an extended period, greater than three months, the Special Inspector must make regular inspections to confirm correct handling and installation of the anchors.

B. Continuously inspect installation of all adhesive anchors that resist sustained tension loads in horizontal or upwardly-inclined orientations.

C. Additional to requirements listed below, Periodically inspect all post-installed anchors as follows: Verify anchor type, anchor dimensions, hole cleaning procedure, embedment depth, substrate type (material), substrate thickness, drill bit type and size, hole dimensions, anchor spacing, minimum edge distance, anchor plumbness (relative to horizontal or vertical as applicable), and adherence to the Anchor Manufacturer’s published installation instructions.

D. Periodically inspect drilled-in adhesive type anchors as follows: Verify adhesive product and expiration date, proof load 25% of each type and size of anchor in accordance with recommendations of the Anchor Manufacturer. Adhesive anchors and capsule anchors shall not be torque tested unless otherwise directed by the Engineer. If more than 10% of the tested anchors fail to achieve the specified torque or proof load within the limits as defined in the Specifications, all anchors of the same diameter and type as the failed anchor shall be tested, unless otherwise instructed by the Engineer.

1. Proof loads shall be applied with a calibrated hydraulic ram. Displacement of adhesive and capsule anchors at proof load shall not exceed D/10, where D is the nominal anchor diameter.

E. Periodically inspect 100% of expansion type mechanical anchors as follows: Verify installed torque of anchors with a calibrated torque wrench. Coordinate minimum installed torque with manufacturer of anchors installed.

F. Periodically inspect 100% of concrete screw type anchors as follows: Verify installation torque (do not exceed Anchor Manufacturer published maximum installation torque), maximum impact wrench torque rating, and anchor tightness to supported component.

2.7 INSPECTION OF CONCRETE CONSTRUCTION

A. Provide special inspection of the fabrication of concrete structural elements and assemblies in accordance with the *Inspection of Fabricators*.

B. Inspect formwork for shape, location, and dimensions of the concrete member being formed.

C. Periodically verify the use of the proper design mix.

D. Verify use of proper grade and ASTM designation of reinforcing steel

E. Perform periodic inspection on placement, spacing, clear cover, number, and splice lap lengths of reinforcing steel.

F. Perform continuous inspection according to AWS D1.4-1998 on all welding of reinforcing steel.

G. Monitor concrete quality by means of site and laboratory tests. The Inspection Agency is authorized to reject plastic concrete not conforming to specifications. Immediately inform the Contractor, the Architect and the Structural Engineer of inadequacies in concrete quality. Sampling and testing for quality control during concrete placement shall include the following:

1. Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

    a. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
    b. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
    c. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    d. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each set of composite sample.
    e. Compression Test Specimen: ASTM C 31; one set of four standard 6” diameter by 12” or five standard 4” diameter by 8”cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
    f. Compressive-Strength Tests: ASTM C 39; test one specimen at 7 days, two 6”x12” or three 4”x8” specimens tested at 28 days, and one specimen retained in reserve for later testing if required. Additional cylinder tests (such as at 14 days) for contractor convenience and scheduling shall be paid for by the Contractor. A compressive-strength test shall be the average compressive strength from a set of specified number specimens obtained from same composite sample and tested at age indicated.
    g. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

h. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing the in-place concrete.
i. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

2. Test results shall be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

H. Perform continuous inspection of concrete placement for all turn down slabs to verify proper application techniques. Perform periodic inspection of concrete placement for slab on grade to verify proper application.

I. Perform periodic inspection of concrete curing procedures to verify maintenance of specified curing temperature, protection, and techniques.

J. Provide periodic inspection of the erection of all structural precast concrete members.

K. Test the F-number tolerances of concrete slabs in accordance with the provisions set forth by ASTM Committee E6.21.10. All tests shall be performed within three working days after concrete placement and prior to any form removal.

1. All slab areas shall be tested for F-number tolerances for the first 10,000 square feet placed. Thereafter, test an additional 1,000 square feet per 10,000 square feet of slab area. Quantity of test readings for each area shall be per ASTM E1155.

L. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

M. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

1. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

2.8 INSPECTION OF SOILS

A. Inspect the existing site soil conditions, fill placement, and load-bearing requirements for compliance with the recommendations of the approved geotechnical investigation report.

B. See Specification 031200 for lime stabilization requirements.

C. Where the site is specified to be undercut by the geotechnical investigation report, verify all unsuitable soils, debris, rock and other materials have been removed from below building footprint.

1. Verify that topsoil has been stripped and removed from building footprint.
2. Verify all existing uncontrolled fills, soft and unsuitable soils have been removed from below applicable foundation elements. Test native material at base of cut to ensure that unsuitable material has been completely removed; notify Architect if unacceptable material remains after completion of specified undercut.
3. For soil bearing foundations, verify that expansive clays and bedrock have been lime stabilized allow sufficient soil cushion depth as specified.

D. Foundation Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 6938, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of building slab, but in no case fewer than 3 tests.

END OF SECTION 014110

SECTION 033000 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes. This section applies to concrete work shown on the structural drawings. See Division 32 for site concrete.

B. Cast-in-place concrete includes the following:
   1. Slabs-on-grade and foundations.

C. Related Sections: The following Sections contain requirements that relate to this Section:

   1. Division 1 Section “Structural Special Inspection.”
   2. Division 7 Section “Joint Sealants”

D. Coordination: Unless other satisfactory agreements are specifically entered into by contractors concerned, all miscellaneous iron and steel, sleeves, anchors, etc., required by work of other contractors, will be furnished and installed by such other contractors with the cooperation of this contractor.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. General: Furnish submittals in quantity, format, and other Conditions of the Contract and as specified in Division 1 of the Project Manual.

B. Design Mixtures: For each concrete mixture with laboratory test reports for the following data. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

   1. Method used to determine the proposed mix design (per ACI 301, Section 4).
   2. Gradation and quantity of fine and coarse aggregates.
   3. Proportions of all ingredients including all admixtures added either at the time of batching or at the job site. Indicate amounts of mixing water to be withheld for later addition at Project site.
   4. Water/cement ratio and water/cementitious ratio.

5. Slump – ASTM C143.
6. Certification and test results of the total water soluble chloride ion content of the design mix – FHWA RD-77 or AASHTO T 260-84.
7. Air content of freshly mixed concrete by the pressure method, ASTM C231, or the volumetric method, ASTM C173.
8. Unit weight of concrete – ASTM C138.
9. Strength at 7- and 28-days for structural concrete– ASTM C39. Document strength on basis of previous field experience or trial mixtures, per ACI 301 Section 4. Submit strength test records, mix design materials, conditions, and proportions for concrete used for record of tests, standard calculation, and determination of required average compressive strength.
10. Complete and include Structural Engineer's standard mix design submittal form for each mix. A blank copy is included at the end of this section.

C. Steel Reinforcement Shop Drawings: Fabrication and placing drawings for reinforcement detailing, fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, and supports for concrete reinforcement. Include special reinforcing required for openings through concrete structures.

1. Computer generated electronic structural construction document files (Revit) will be made available to the Contractor.
2. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.

D. Product Data: For proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, vapor retarder/barrier, construction joint slip dowels, joint systems, dry-shake finish materials, and others if requested by Architect.

E. Samples of materials as requested by Architect, including names, sources, and descriptions, as follows:

1. Vapor retarder.

F. Drawings showing proposed construction and/or contraction joint locations.

1.5 INFORMATIONAL SUBMITTALS

A. General: Furnish submittals in quantity, format, and other Conditions of the Contract and as specified in Division 1 of the Project Manual.

B. Laboratory test reports for concrete materials or material certificates in lieu of material laboratory test reports. Material certificates shall be signed by Manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.6 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified. Each contractor having reference to ACI Documents shall maintain copies of same on project site.

AMERICAN CONCRETE INSTITUTE

1. ACI 117-10 – Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 211.1-91 – Standard Practice for Selecting Proportions Normal, Heavyweight and Mass Concrete (Reapproved 2009).
3. ACI 301-10 – Specification for Structural Concrete.
4. ACI 302.1R-04 – Guide for Concrete Floor and Slab Construction.
5. ACI 304.2R-96 – Placing Concrete by Pumping Methods (Reapproved 2008).
6. ACI 305R-10 – Guide to Hot Weather Concreting.
7. ACI 306R-10 – Guide to Cold Weather Concreting.
8. ACI 308R-01 – Guide to Curing Concrete (Reapproved 2008).
9. ACI 309R-05 – Guide for Consolidation of Concrete.
10. ACI 311.1R-07 – ACI Manual of Concrete Inspection.
11. ACI 318-14 – Building Code Requirements for Structural Concrete and Commentary.
12. ACI 347-04 – Guide to Formwork for Concrete.
13. SP-66 – ACI Detailing Manual.

CONCRETE REINFORCING STEEL INSTITUTE (CRSI):

1. CRSI – Manual of Standard Practice.
2. CRSI 63 – Recommended Practice for Placing Reinforcing Bars.
3. CRSI 65 – Recommended Practice for Placing Bar Nomenclature.

B. Qualifications of Workers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper execution of the work required by this Division.

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver steel reinforcement and concrete to Project site in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Keep steel reinforcement off ground by using pallets, platforms, dunnage, or other supports and spacers.

C. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

D. Store packaged materials in sealed containers with manufacturer's labels intact. Place under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed (Smooth) Finish Concrete: Exterior-grade high-density overlay (Class 1 or better), medium-density overlay (Class 1 or better with mill-release agent treated and edge sealed), or Structural1 or Class 1 (B-B or better, mill oiled and edge sealed) plywood

panels complying with DOC PS1; or new metal-framed and metal faced panels; or other acceptable panel-type materials to provide continuous, straight, and smooth exposed surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Forms for Unexposed, Rough-Formed Finish Concrete: Plywood, lumber, metal or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form-Release Agent: Commercially formulated form-release agent with a maximum volatile organic compounds (VOCs) not to exceed those allowable by jurisdictional regulations that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

D. Form Ties (Standard): Factory-fabricated, adjustable-length, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of plastic concrete on forms, prevent form deflection, and to prevent spalling of concrete upon removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

E. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA800, “Specification 810.1, Expanded Cellular Glazing Tape”; minimum ¼ inch thick.

F. Form Joint Sealant: Elastomeric sealant complying with ASTM C920, Type M or S, Grade NS, that adheres to form joint substrates.

G. Sealer: Penetrating, clear, polyurethane wood form sealer formulated to reduce absorption of bleed water and prevent migration of set-retarding chemicals from wood.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Welded Wire Fabric: ASTM A 1064, plain, fabricated from as-drawn steel wire into flat sheets.

C. Smooth Joint Dowel Bars: ASTM A36, plain-steel bars, cut true to length with ends square and free of burrs.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

E. Fabric Supports: Chairs for spacing, supporting welded wire fabric in place. Use continuous wire chairs complying with CRSI specifications.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:
1. Portland Cement: ASTM C 150, Type I. High early strength (when specified), ASTM C150, Type III. One brand of cement shall be used throughout Project duration unless otherwise acceptable to Engineer.
2. Fly Ash: ASTM C 618, Class F or C, except maximum loss on ignition: 3%.

C. Normal-Weight Aggregates: ASTM C 33 Class 3S coarse aggregate or better, graded, and as specified. Provide aggregates from a single source for exposed concrete.
1. Fine Aggregate to be free of materials with deleterious reactivity to alkali in cement.

D. Water: ASTM C 1602 and potable.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494, Type A.
2. Retarding Admixture: ASTM C 494, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
4. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
5. Air-Entraining Admixture: ASTM C 260.

2.4 RELATED MATERIALS

A. Construction joint slip dowels: steel rod or plate in a plastic insert to allow contraction of the concrete while preventing vertical differential displacement.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

a. #4x1’-6” long, Speed Dowel by Sika Greenstreak.
b. ¼” plate, Diamond Dowel by PNA, Inc.
c. ¼” plate, Speed Plate by Sika Greenstreak.

B. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or non-impregnated, flexible, synthetic foam with standard bonding agent to hold in place.

C. Sheet Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:

1. Polyolefin/Resin or multi-ply extrusion coated polyethylene sheet not less than 10 mils thick conforming to ASTM E 1745 Class A. Maximum water vapor permeance when tested in accordance with Test Method ASTM E154, Sections 7, 8, 11, 12, and 13 (based on ASTM E96) or ASTM F1249 of 0.038 perms. Minimum tensile strength when tested to ASTM D154 of 45 lbs-force/inch.

2. Accessories: All must be from the same manufacturer of the vapor barrier material used, or must be approved by the vapor barrier manufacturer in writing and submitted to the Architect for record.

    a. Seams: Manufacturer approved seam tape.
    b. Sealing Permanent penetrations of vapor retarder: Manufacturer approved vaporproofing mastic or tape.
    c. Perimeter edge/seal: Manufacturer approved tape with a textured surface that creates a mechanical seal to freshly-placed concrete, termination bar, or double-sided sealant tape.
    d. Non-permanent penetration prevention: Manufacturer approved peel and stick stake base/foot and film safe screed system.

3. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

    a. Perminator Vapor-Mat with Perminator Tape Seal. W.R. Meadows, Inc.
    b. Stego Wrap with Stego Tape Seal. Stego Industries, LLC.
    c. Viper Vaporcheck II with manufacturer's recommended tape seal. Insulation Solutions, Inc.
    d. Vaporblock VB10 with Vapor Bond Plus Tape Seal. Raven Industries, Engineered Films Division.
    e. Xtreme with Xtreme Tape Seal. Tex-Trude, LP.

D. Joint Filler: See specification division 7.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.6 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field data methods, or both, according to ACI 301. Mix proportions shall be established so that the concrete can be placed readily without segregation into forms and around reinforcement under anticipated placement conditions. Use an independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures. Trial batch and field experience tests shall have been performed within 24 months of submittal date. Use mix design submittal form included at the end of this section.

1. Do not use the same testing agency for field quality control testing.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect. The approved mix designs shall be used throughout this project unless changes are approved by the Architect/Engineer prior to use.

C. Cementitious Materials: Supplier shall coordinate surface treatment compatibility with cementitious materials. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 20 percent for Type F or 25% for Type C. Use of fly ash in concrete for use in colored concrete, polished concrete floor systems, or where incompatible with admixtures or other treatments is prohibited.
   2. Combined Fly Ash and Pozzolan: 25 percent.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use accelerating and retarding admixtures at Contractor's discretion to control set time when required by extreme temperatures or humidity, or other adverse placement conditions. Use accelerating admixture in concrete slabs placed at ambient temperatures below 35 deg F.
   2. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. The minimum compressive strength measured 28 days after placement (f'_c), minimum cementitious content, slump, maximum water/cementitious content ratio (W/C), and air content of the concrete for each portion of the structure shall be as follows:

   1. Class **1**. Interior Slab on Grade for non-polished surfaces. Normal-weight concrete.

      a. Minimum Design Compressive Strength: 4,000 psi.
      b. Minimum Cementitious Material: 505 lbs/cy.
      c. Maximum W/C Ratio: 0.48.
      d. Water Reducing Admixture: Mandatory.
      e. Slump Limit: Maximum 8 inches after adding water reducing admixture to 2-to-3-inch slump concrete, plus or minus 1 inch.
      f. Air Content: Maximum 3 percent.

   2. Class **2**. Exterior horizontal concrete exposed to weather or deicer chemicals, horizontal concrete under roof but in open structures, and exterior equipment bases. Normal-weight concrete.

      a. Minimum Compressive Strength: 5,000 psi.
      b. Minimum Cementitious Material: 564 lbs/cy.
      c. Maximum W/C Ratio: 0.40.
      d. Water Reducing Admixture: Optional.
      e. Slump Limit: 4 inches or not more than 8 inches after adding admixture to 2-to-3-inch slump concrete, plus or minus 1 inch.
      f. Air Content: 5.5 percent for 1 ½-inch maximum aggregate.
         6.0 percent for 1-inch maximum aggregate.
         6.0 percent for ¾-inch maximum aggregate.
         7.0 percent for ½-inch maximum aggregate.

F. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.7 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of correct size, shape, lines, alignment, elevation, position, level, plumb, and dimension and indicated. Maintain formwork construction tolerances and surface irregularities within limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch tolerances for smooth-formed concrete surfaces exposed to view.
2. Class D tolerances for earth formed foundation elements. Tolerance applies as a variation inward towards reinforcing only. No tolerance limit away from reinforcing applies.
3. Class C, ½ inch tolerances for other concrete surfaces.

D. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspections where interior area of formwork is inaccessible before and during concrete placement. Close openings with panels tightly fitted

to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Form openings, chases, , recesses, moldings, chamfers, and other features required in the Work. Chamfer exposed corners and edges at exterior corners and edges of permanently exposed concrete and as indicated, to produce uniform smooth, straight lines and tight edge joints.

I. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

J. Earthen forms may be used for foundation elements when ground is stable and capable of resisting erosion and fluid pressure of wet concrete without sloughing. All tolerances and clear covers shall be maintained. Excavation shall be clean of all loose soil and mud along bottom and sides.

K. Use selected materials to obtain required finishes.

L. Coordinate pattern of tie holes to remain expressed in finished appearance of concrete surfaces exposed to view with Architect.

M. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

N. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

1. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed.
2. Do not spray reinforcing with form oil.
3. Coat steel forms with a nonstaining, rust-preventative material. Do not use rust-stained steel form-facing material.

3.3 INSTALLING EMBEDDED ITEMS

A. Place and secure anchorage devices, anchor rods, and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, templates, instructions, and directions furnished with items to be embedded from building supplier.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303. Column anchor rods shall be set in a rigid template and securely braced to formwork or ground prior to placing concrete. Anchor rods shall not be “wet set” in plastic concrete.
2. Install dovetail anchor slots in concrete structures as indicated.
3. Aluminum conduit shall not be installed in concrete.

3.4 REMOVING AND REUSING FORMS

A. Formwork not supporting weight of concrete, such as sides of turn down slab and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete must first be sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations shall be maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent as specified for new formwork.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets.

1. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.
2. For Architectural Exposed formed surfaces, tie holes may not be plugged. Reuse tie holes or use new form for each pour.

3.5 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with Concrete Reinforcing Steel Institute's (CRSI) "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Deliver reinforcement to job site bundled, tagged and marked. Use waterproof tags indicating bar size, length, and mark corresponding to placing drawings.

C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

D. When permitted, field bend bars cold, except during cold weather when moderate heating is necessary to avoid brittle failures.

E. Install reinforcing to mechanical splices in accordance with the manufacturer's requirements.

F. Accurately position, support, and secure all bar reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum coverages as indicated for concrete protection.

1. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations.

G. Install welded- wire fabric reinforcement in longest practicable lengths on fabric supports spaced to minimize sagging. Lap edges and ends of adjoining pieces at least one full mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace outermost cross wires of lace splices with wire to prevent lifting of the ends during concrete placement.

1. Chair welded wire fabric slab reinforcement with continuous chairs spaced a maximum of 32 inches on center. Provide additional chairs as required. Lift welded wire fabric back into position between chairs where depressed during concrete placement. Lifting welded wire fabric into position during concrete placement without the use of chairs is not permitted.

H. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

I. Construction tolerances shall be in accordance with ACI 117.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints in Slab on Grade: Provide slip dowels (as shown on drawings) for construction joints in field of slabs on grade less than 6” thickness.

1. Bulkheads designed and accepted for this purpose shall be used for doweled joints. Use manufactured plastic sleeves as indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint for non-sleeved dowels.
2. Prefabricated pourstop with keyway may be used for simultaneous placement of adjacent slab panel at Contractor’s option, where approved by Architect. Use leave-in-place joint system that is compatible with floor finish or treatment system.
3. Where construction joints at doorways that align with both faces of bearing wall are specified, utilize preformed pourstop with keyway in lieu of slip dowels.
4. Where joints will be exposed to view in public spaces or warehousing areas, joints shall be straight, crisp, and with sharp edges. Slabs shall be flush across joint.

C. Contraction (Control) Joints in Slabs-on-Grade: Construct weakened-plane contraction joints, sectioning concrete into areas as indicated, and to a depth equal to at least one-fourth depth of concrete thickness as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
2. Contraction joints may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
3. Joint fillers and sealants are specified in Division 7 Section “Joint Sealants.”

3.7 VAPOR RETARDER INSTALLATION

A. Sheet vapor retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions. Place sheeting in position with longest dimension parallel with direction of pour.

1. Extend film fully over slab area to the full perimeter of the slab.

a. At the point of termination, seal vapor retarder to the slab itself. Where obstructed by impediments (such as dowels, or any other site condition requiring early termination of the vapor retarder), use manufacturer’s recommended accessories for such non-standard terminations.

2. Lap joints 6 inches and seal with manufacturer’s recommended mastic or pressure-sensitive tape.
3. Apply seam tape to a clean and dry film only.

B. Seal around all penetrations (including all conduit and pipes) through film with manufacturer’s recommended mastic or pressure-sensitive tape. Cut slit around penetrations to place initial layer of film.

1. For small penetrations, tape film directly to the penetrating element.
2. For penetrations larger than 2”, create collar for penetration of 12” wide by 1 ½ times the penetration’s circumference with fingers cut half the width of the film. Wrap the collar around the penetration, tape the collar onto the strip of film, and tape the fingers at each edge/slit to the initial layer of film.

C. Avoid the use of non-permanent stakes driven through film. If non-permanent stakes are driven through film, repair and seal as recommended by film manufacturer.

D. Repair damaged areas of film material of similar (or better) permeance, puncture resistance, and tensile strength.

3.8 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. General: Comply with ACI 304, “Guide for Measuring, Mixing, Transporting, and Placing Concrete,” and as specified. Concrete delivery tickets shall show:

1. Batch number.
2. Mix by number with cement content in pounds and maximum size aggregate.
3. Admixtures.
4. Air content.
5. Slump.
6. Time dispatched and discharged.
7. Date.
8. Contractor.
9. Ready Mix Supplier.
10. Project Name and Address.
11. Volume of Concrete.

C. Do not add water to the concrete mix during delivery, at Project site, or during placement unless approved by the Construction Manager’s representative, noted on the delivery ticket with the amount of water, and signed by the Construction Manager’s representative. The maximum water/cement ratio of an approved mix design shall not be exceeded.

1. When the ambient air temperature is between 80 and 90 degrees Fahrenheit, one (1) gallon of water per cubic yard of concrete may be added at the job site to compensate for water evaporation during transit.
2. When the ambient air temperature exceeds 90 degrees Fahrenheit, two (2) gallons of water per cubic yard of concrete may be added at the job site to compensate for water evaporation during transit.
3. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Discharge concrete within 1 ½ hours after water has been added to the cement, unless a longer time has been authorized by the Architect/Engineer. During hot weather or other conditions contributing to a quick stiffening of the concrete, the Architect/Engineer may require discharge in less than 1 ½ hours.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation. Do not allow concrete to drop more than 5 feet or from a height which allows concrete to fall against reinforcing.

1. Deposit concrete in forms in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Do not subject concrete to any procedure that will cause

segregation. Deposit concrete as near as possible to the final position to avoid segregation.

2. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

F. Deposit and consolidate concrete for slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in proper position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

G. Cold-Weather Placement: When air temperature is expected to fall below 40 degrees Fahrenheit (4 deg C) within the first 72 hours after concrete placement, comply with provisions of ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When mean daily air temperature is expected to fall below 40 deg F (4 deg C) for more than three successive days after concrete placement, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature at point of placement as follows:

    a. Not less than 55 deg F (13 deg C) or more than 75 deg F (24 deg C) for concrete sections less than 12 inches in the least dimension (width or thickness).
    b. Not less than 50 deg F (10 deg C) or more than 70 deg F (21 deg C) for concrete sections 12 inches or greater in the least dimension (width or thickness).

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305.1 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor’s option.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

I. Pumping Concrete: Grout used to prime a pump shall not be placed in the forms of any concrete exposed to view in the final structure. Concrete shall not be pumped through pipe made of aluminum or aluminum alloys.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is an as-cast concrete surface having texture imparted by form-facing material used. Repair and patch tie holes, honeycombing over ½ inch in depth, and other defective areas. Remove fins and other projections exceeding ¼ inch in height by rubbing down, chipping, or grinding off.

B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes, honeycombing over ¼" in depth, and other defective areas. Remove fins and other projections exceeding 1/8" in height by rubbing down or grinding off until completely removed and smoothed.

3.10 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units.
2. Allow moisture film or sheen to disappear from the floated surface and allow the concrete to harden enough to prevent fine material and water from being worked into the concrete surface. Then begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks and uniform in texture and appearance.
3. Finish surface to specified tolerances for floor flatness and floor levelness measured according to ASTM E 1155. Minimum local values shall be 2/3 of the specified composite F-number. Unless otherwise shown or noted on the drawings, comply with the following table:
4.

Slabs on Grade		
Composite Flatness F(F)	Composite Levelness F(L)	Typical Use
25	20	All slabs on grade.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Coordinate sizes and locations of concrete bases with actual equipment to be provided.

1. Construct concrete bases 3 1/2 inches high unless otherwise indicated, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
3. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.
5. Finish all mechanical housekeeping pads to a finished tolerance of 1/8” in 10 feet.

3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. For cold-weather protection during curing, comply with ACI 306.1 and the following:

1. All freshly placed concrete shall be kept from freezing for the following periods:

   a. 3 days for all concrete with an air entraining admixture.
   b. 4 days for all concrete without an air entraining admixture.

2. A cumulative curing time of seven days at a minimum surface temperature of 50 degrees F (10 degrees C) shall be provided or until concrete has attained 75% of its design strength. This shall be followed by cooling of concrete in a gradual transition to surrounding conditions. The temperature drop during this period shall not be at a rate exceeding 2 degrees F per hour until the outside or surrounding temperature is reached.
3. When concrete is placed under conditions of cold weather concreting (defined as a period when the mean daily temperature drops below 40 degrees F for more than three successive days), take additional precautions as specified in “Cold Weather Concreting” by the American Concrete Institute (ACI Report 306) when placing, curing, monitoring and protecting the fresh concrete.

C. For hot-weather protection during curing, comply with ACI 301 and the following:

1. When concrete is placed under conditions of hot weather concreting, provide extra protection of the concrete against excessive placement temperatures and excessive drying throughout the placing and curing operations. Hot weather is defined as air temperature which exceeds 80 degrees F or any combination of high temperature, low humidity and/or high wind velocity that causes a rate of evaporation in excess of 0.2

pounds per square foot per hour as determined by Figure 2.1.5 of ACI Report 305. Hot weather curing is required if these conditions occur within a 24 hour period after completion of concrete placement.

2. Forms, reinforcing and the air shall be cooled by water fog spraying immediately before placing concrete.
3. Immediately following screeding, protect concrete by applying the specified evaporation retarder in accordance with the recommendations of the manufacturer.

D. Formed Surfaces: Cure formed concrete surfaces by moisture curing with forms in place for 7 days or until forms are removed. If forms are removed within the first 7 days, continue moisture curing without forms for the balance of the 7 day curing period.

E. Unformed Surfaces: Begin curing immediately after finishing concrete.

F. Cure concrete according to ACI 308.1 by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

B. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.

C. Remove dirt, debris, saw cuttings, and sealers from joints; leave contact faces of joints clean and dry.

D. Install joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval. Architectural exposed formed and exposed slab surfaces only with specific prior approval by Architect (cutting, grinding, and patching of these surfaces will generally be prohibited).

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water. Use only enough liquid as required for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried.
2. Cut tie rods and bolts flush with the surface and drill out to minimum depth of 1 inch below the surface.
3. Fill through wall tie holes with nonmetallic, shrinkage-resistant grout to within 1 ½" of wall face using a grout bag or other similar means to completely fill the void. Fill any remaining tie hole, including holes from snap-off type form ties, with patching mortar or cone plugs secured in place with bonding agent.
4. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
5. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
3. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
4. Repair defective areas, except random cracks to be covered with covering capable of bridging and concealing crack and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair methods not specified above may be used, subject to acceptance of Architect.

3.15 QUALITY CONTROL

A. The Owner will employ an independent testing and inspection agency that meets the requirements of ASTM E329 to perform inspections and tests and to prepare test reports.

The agency will monitor concrete quality by means of site and laboratory tests. They will be authorized to reject plastic concrete not conforming to specifications. Failure to detect any defective materials shall not prevent later rejection when such defect is discovered, or obligate the Architect or Owner for final acceptance.

1. See Section 014110 – Structural Special Inspections for testing and inspection to be performed.
2. Test results will be reported in writing to the Architect, Engineer, ready-mix producer and General Contractor within 24 hours after tests.
3. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect.

B. The Special Inspector will provide testing of the floor slab F-number tolerances conducted in accordance with the provisions set forth by ASTM E 1155. All tests shall be performed within three working days after concrete placement and prior to any form removal. If in-place floor slabs do not comply with the minimum values shown, the Contractor shall propose remedial measures to bring the surfaces of the floors into compliance. These measures might include grinding, planing, surface repair, retopping, or removal and replacement. Remedial measures shall be approved by the Architect/Engineer prior to the Contractor's commencement of the work.

C. Commissioning of Vapor Retarder/Barrier System: Comply with requirements in Section "Commissioning of Vapor Barrier System."

D. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 033000

BROWN + KUBICAN, PSC
STRUCTURAL ENGINEERS

CONCRETE MIX DESIGN SUBMITTAL FORM

Project: _____

City, State: _____

General Contractor: _____

Concrete Contractor: _____

Mix Design Number: _____

Concrete Strength (Class): _____

Use (describe): _____

Design Mix Information

	Check one
Based on Standard Deviation Analysis	
Based on Trial Mix Laboratory Test Data	

Design Characteristics

Density		pcf
Strength		psi (28 days)
Air		%
Slump		inches

If trial mixes are used, the Mix Design is proportioned to achieve f'cr = f'c + 1200 psi
(1400 psi for strength higher than 5000 psi at 28 days)

Materials

	Type	Source	Specific Gravity	Weight (lb.)	Absolute Vol. (cu. ft.)
cement					
flyash					
silica fume					
coarse aggregate					
fine aggregate					
water					
other ( )					
			Total		27.0 cu. ft.

Water/Cementitious Ratio (W/C) = _____% (lbs. water /lbs. cementitious)

Admixtures

	Manufacturer	Dosage (oz./cwt)
water reducer		
air entraining agent		
high range water reducer		
non-corrosive accelerator		
other ( )		

Slump before high range water reducer = _____inches
Slump after high range water reducer = _____inches

Standard Deviation Analysis (field experience records)

Number of test cylinders evaluated: _____ Standard deviation (s): _____
k-factor:

Number of Tests	k
15	1.16
20	1.08
25	1.03
≥30	1.00

Required avg. compressive strength (≤5000 psi: Max [f'c + 1.34ks, f'c + 2.33 ks – 500])
(>5000 psi: Max [f'c + 1.34ks, 0.9f'c + 2.33ks]): _____
Actual avg. compressive strength:_____
(refer to ACI 301 for standard deviation calculation – attach copies of laboratory test reports)

Trial Mix Laboratory Test Data

	Mix #1 (w/c=)		Mix #2 (w/c=)		Mix #3 (w/c=)	
Age	Date	Compressive Strength	Date	Compressive Strength	Date	Compressive Strength
7 days		psi		psi		psi
7 days		psi		psi		psi
28 days		psi		psi		psi
28 days		psi		psi		psi
28 days average	NA	psi	NA	psi	NA	psi

(refer to ACI 301 for trial mix procedure – attach copies of laboratory test reports)

Required Attachments

	Please check
Coarse aggregate gradation report	
Fine aggregate gradation report	
Laboratory test reports (strength tests)	
Admixture compatibility certification letters	

Ready Mix Supplier
Name and Address:
_____
_____
Phone: _____ Miles from project: _____ Date:
_____

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood blocking, fascia boards, nailers, and other wood carpentry items as indicated on the Drawings.
2. Plywood backing panels.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
3. Other items as indicated on the Drawings.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
3. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664, and design value adjustment factors shall be calculated according to ASTM D6841.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat items indicated on Drawings, and the following:

1. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Other items as indicated on the Drawings.

B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of the following species:

1. Mixed southern pine or southern pine; SPIB.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1,Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

1. Provide plywood backing panel in MDF and IDF rooms as indicated on the electrical documents.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Screws for Fastening to Metal Framing: ASTM C954, length as recommended by screw manufacturer for material being fastened.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58 , ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.

2.7 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking,and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

E. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

G. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
2. ICC-ES evaluation report for fastener.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 PROTECTION

A. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Mineral-wool blanket.
3. Insulation for miscellaneous voids.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Extruded polystyrene boards in this article are also called "XPS boards." Roman numeral designators in ASTM C578 are assigned in a fixed random sequence, and their numeric order does not reflect increasing strength or other characteristics.

B. Extruded Polystyrene Board, Type IV: ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E84.

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

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Owens Corning.

2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.2 MINERAL-WOOL BLANKETS

A. Mineral-Wool Blanket, Unfaced: ASTM C665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84; passing ASTM E136 for combustion characteristics.

2.3 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 24 inches in from exterior walls.

3.4 INSTALLATION OF OTHER INSULATION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Nonstaining silicone joint sealants.
2. Urethane joint sealants.
3. Mildew-resistant joint sealants.
4. Butyl joint sealants.
5. Latex joint sealants.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.

C. Field-Adhesion-Test Reports: For each sealant application tested.

D. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.

C. Mockups: Apply mockups of each joint sealant system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 8 linear ft.

1) In addition, include in place mockups for the following:

a) Brick control/expansion joints
b) CMU control joints.
c) Exterior window/curtainwall-to-masonry joints.

b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; DOW CORNING® 756 SMS BUILDING SEALANT.
b. GE Construction Sealants; Momentive Performance Materials Inc.; Silpruf NB.
c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 295 FPS NB.
d. Pecora Corporation; Pecora 864NST.
e. Sika Corporation; Joint Sealants; Sikasil WS-295.
f. Tremco Incorporated; Spectrem 2 or Spectrem 3.

2.3 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Corp. - Construction Chemicals; MasterSeal NP 1 (Pre-2014: Sonolastic NP1).
b. Pecora Corporation; Dynatrol I-XL.
c. Sherwin Williams; Loxon S1
d. Tremco Incorporated; Dymonic.

B. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. BASF Corp. - Construction Chemicals; MasterSeal SL 1 (Pre-2014: Sonolastic SL1).
b. Pecora Corporation; NR-201.
c. Sherwin Williams; Loxon SL1

C. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 50, Uses T and NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. LymTal International Inc; Iso-Flex 888QC.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. Dow Corning Corporation; DOW CORNING® 786 SILICONE SEALANT -.
b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 100 WF.
d. Pecora Corporation; Pecora 860.
e. Tremco Incorporated; Tremsil 200.

2.5 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C1311.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. Bostik, Inc; Chem-Calk 300.
b. Pecora Corporation; BC-158.

2.6 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. Everkem Diversified Products, Inc.; SilTex 40 Siliconized Acryllic Latex Caulk.
b. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex 600.
c. Pecora Corporation; AC-20.
d. Tremco Incorporated; Tremflex 834.

2.7 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Adfast; Adseal BR 2600.
b. Alcot Plastics Ltd.; ALCOT Soft Type Backer Rod.
c. BASF Corp. - Construction Chemicals; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).
d. Construction Foam Products; a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.

a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

a. Whether sealants filled joint cavities and are free of voids.
b. Whether sealant dimensions and configurations comply with specified requirements.

c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation and contraction joints in cast-in-place concrete slabs.
b. Joints between different materials listed above.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, M, P, 50, T, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Control and expansion joints in unit masonry.

c. Joints between metal panels.
d. Joints between different materials listed above.
e. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
f. Control and expansion joints in ceilings and other overhead surfaces.
g. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.
b. Control and expansion joints in tile flooring.
c. Tile joints at interior wall corners.
d. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, P, 25, T, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Control and expansion joints on exposed interior surfaces of exterior walls.
b. Tile control and expansion joints.
c. Tile joints at interior wall corners.
d. Vertical joints on exposed surfaces of unit masonry and concrete walls and partitions.
e. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:

a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.

b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

G. Joint-Sealant Application: Concealed mastics.

1. Joint Locations:

a. Aluminum thresholds.
b. Sill plates.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Butyl-rubber based.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Exterior standard steel doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of thermally rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.
3. Custom Metal Products.
4. DCI Hollow Metal.
5. Karpen Steel Custom Doors & Frames.
6. MPI Group, LLC (The).
7. National Custom Hollow Metal Doors & Frames.
8. Security Metal Products; a brand of ASSA ABLOY.
9. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

A. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.40 deg Btu/F x h x sq. ft. when tested according to ASTM C518.

2.3 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A..

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: 1-3/4 inches.
c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
d. Edge Construction: Model 2, Seamless.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
h. Core: Polyurethane.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
b. Construction: Full profile welded, thermally broken.

1) Thermally broken, manufacturer’s standard configuration

3. Exposed Finish: Prime.

2.4 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.5 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.

E. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

2.6 FABRICATION

A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

2.7 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

    a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    b. Install frames with removable stops located on secure side of opening.

2. Floor Anchors: Secure with postinstalled expansion anchors.
3. Solidly pack mineral-fiber insulation inside frames.
4. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.

3.3 CLEANING AND TOUCHUP

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Insulated service doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
3. Include description of automatic-closing device and testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
5. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
6. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

B. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: As indicated on Drawings.
2. Testing: According to ASTM E330/E330M.
3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.

2.3 DOOR ASSEMBLY - INSULATED

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

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

    a. Clopay Building Products.
    b. Cookson Company.
    c. Cornell.
    d. McKeon Rolling Steel Door Company, Inc.
    e. Overhead Door Corporation.
    f. Raynor.

B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

C. Air Infiltration: Maximum rate of 0.46 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E283.

D. Curtain R-Value: 8.0 deg F x h x sq. ft./Btu.

E. Door Curtain Material: Galvanized steel.

F. Door Curtain Slats: Flat profile slats of 3 to 3 1/4-inch center-to-center height.

1. Insulated-Slat Interior Facing: Metal.
2. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

G. Insulated Bottom Bar: Reinforced extruded aluminum interior face with full depth insulation and exterior skin slat to match curtain material and gauge. Minimum 4” tall x 1-1/16” thickness.

H. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

1. Provide manufacturer’s standard thermal break.

I. Hood: Match curtain material and finish.

1. Shape: Round or square as standard with manufacturer.
2. Mounting: As indicated on Drawings.

J. Locking Devices: Equip door with locking device assembly.

1. Locking Device Assembly: Cremone-type, both jamb sides locking bars, operable from inside and outside with cylinders.

K. Electric Door Operator:

1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.
2. Operator Location: Top of hood or Front of hood.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Exterior, wet, and humid.
5. Motor Electrical Characteristics:

    a. Horsepower:: 1/2 hp.

b. Voltage: 115-V ac, single phase, 60 Hz.

6. Emergency Manual Operation:: Push-up type.
7. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar.
8. Control Station(s): Interior mounted and exterior mounted where indicated on Drawings.

L. Curtain Accessories: Equip door with weatherseals and push/pull handles.

M. Door Finish:

1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 MATERIALS, GENERAL

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.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A653/A653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84 or UL 723. Enclose insulation completely within slat faces.
3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.6 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Galvanized Steel: Nominal 0.028-inch- thick, hot-dip galvanized-steel sheet with G90 zinc coating, complying with ASTM A653/A653M.

2.7 LOCKING DEVICES

A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

2.8 CURTAIN ACCESSORIES

A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.

1. At door head, use 1/8-inch- thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene.

B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.9 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.10 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door Operator Location(s): Operator location indicated for each door.

1. Top-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Headroom is required for this type of mounting.

2. Front-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on coil side of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Front clearance is required for this type of mounting.

D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.

1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door at an opening speed not less than 80 in./sec. and closing speed not less than 20 in./sec. , without exceeding nameplate ratings or service factor.
2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening.

1. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.

G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."

1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure, key operated.

2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount

mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.11 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

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

3.2 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.

D. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. After electrical circuitry has been energized, operate doors to confirm proper motor rotation and door performance.
3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

1. Adjust exterior doors and components to be weather resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Steel and iron.
2. Galvanized metal.

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.

3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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

B. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide products by PPG Paints, or comparable products by one of the following

1. Benjamin Moore & Co.
2. Sherwin-Williams Company (The).

B. Products: Subject to compliance with requirements, provide one of the products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.

1. Refer to Drawings for areas to be painted with deep tones.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7/NACE No. 4.
4. SSPC-SP 11.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. Metal door frames are to be sprayed or rolled. Brush application is not acceptable.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Steel and Iron Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.1C:

a. Prime Coat: PPG 90-712 PITT-TECH Interior/Exterior Primer/Finish DTM Industrial Enamel. MPI #107
b. Intermediate Coat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151
c. Topcoat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151

B. Galvanized-Metal Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.3J:

a. Prime Coat: Prime Coat: PPG 90-712 PITT-TECH Interior/Exterior Primer/Finish DTM Industrial Enamel. MPI #107
b. Intermediate Coat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151
c. Topcoat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Steel and iron.
2. Galvanized metal.
3. Aluminum (not anodized or otherwise coated).
4. Concrete floor sealer

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide products by PPG Paints, or comparable products by one of the following

1. Benjamin Moore & Co.
2. Sherwin-Williams Company (The).

B. Products: Subject to compliance with requirements, provide one of the products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range, and as indicated on the Drawings.

1. Refer to Drawings for areas to be painted with deep tones.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7/NACE No. 4.
4. SSPC-SP 11.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

G. Aluminum Substrates: Remove loose surface oxidation.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. Metal door frames are to be sprayed or rolled. Brush application is not acceptable.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. Steel Substrates:

1. Water-Based Light Industrial Coating System MPI INT 5.1B:

a. Prime Coat: PPG 90-712 PITT-TECH Interior/Exterior Primer/Finish DTM Industrial Enamel. MPI #107
b. Intermediate Coat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151
c. Topcoat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151

2. Water-Based Dry-Fall System MPI INT 5.1C:

a. Prime Coat: PPG 90-712 PITT-TECH Interior/Exterior Primer/Finish DTM Industrial Enamel. MPI #107
b. Intermediate Coat: PPG 6-727XI SPEEDHIDE Super Tech WB Interior Dry-Fog Flat Latex. MPI #226
c. Topcoat: PPG 6-727XI SPEEDHIDE Super Tech WB Interior Dry-Fog Flat Latex. MPI #226

B. Galvanized-Metal Substrates:

1. Water-Based Light Industrial Coating System MPI INT 5.3B:

a. Prime Coat: PPG 90-712 PITT-TECH Interior/Exterior Primer/Finish DTM Industrial Enamel. MPI #107
b. Intermediate Coat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151
c. Topcoat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151

C. Aluminum (Not Anodized or Otherwise Coated) Substrates:

1. Water-Based Light Industrial Coating System MPI INT 5.4E:

a. Prime Coat: PPG 90-712 PITT-TECH Interior/Exterior Primer/Finish DTM Industrial Enamel. MPI #107
b. Intermediate Coat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151
c. Topcoat: PPG 90-1110 PITT-TECH PLUS Interior/Exterior Satin Industrial Enamel. MPI #151

D. Concrete Floor Sealer:

1. Basis-of-Design shall be equal to Sikafloor-959 SC.

a. Color to be selected by Owner.
b. All coatings to be installed per the manufacturer's instructions and recommendations.

END OF SECTION 099123

SECTION 133500 - METAL POULTRY BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural-steel framing.
2. Metal roof panels.
3. Metal wall panels.
4. Thermal insulation.
5. Openings including doors and overhead doors.
6. Joint sealants.
7. Painting of unfinished or primed metal.
8. Accessories.

B. Related Requirements:

1. Section 033000 "Cast in Place Concrete" for concrete foundations and slab-on-grade.
2. Section 072100 "Thermal Insulation" for insulation used within metal poultry building system and foundation installation.
3. Section 079200 “Joint Sealants” for sealants used within metal poultry building system.
4. Section 081113 “Hollow Metal Doors and Frames” for doors used within metal poultry building system.
5. Section 083323 Overhead Coiling Doors” for overhead doors used within metal poultry building system.
6. Section 099113 “Exterior Painting” and 099123 “Interior Painting” for painting of exposed metal products.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of metal poultry building system component.

B. Shop Drawings: For metal poultry building system components. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For metal poultry building systems indicated to comply with performance requirements and design criteria, including analysis data and calculations signed and sealed by the Kentucky licensed professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Metal Poultry Building System Certificates: For each type of metal poultry building system, from manufacturer.

1. Letter of Design Certification: Signed and sealed by a Kentucky licensed professional engineer. Include the following:

    a. Name and location of Project.
    b. Order number.
    c. Name of manufacturer.
    d. Name of Contractor.
    e. Building dimensions including width, length, height, and roof slope.
    f. Governing building code and year of edition.
    g. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
    h. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
    i. Building-Use Category: Indicate category of building use and its effect on load importance factors.

C. Material test reports.

D. Source quality-control reports.

E. Field quality-control reports.

F. Warranties: Sample of special warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of poultry-industry specific buildings.

B. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a Kentucky licensed professional engineer.

C. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

E. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings," for design requirements and allowable stresses.

F. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

G. Preinstallation Conference: Conduct conference at Project site.

1.6 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 10 years from date of Substantial Completion.

B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Agricon
2. Arco
3. Sentinel Poultry Buildings, AGI

2.2 METAL POULTRY BUILDING SYSTEM PERFORMANCE

A. Delegated Design: Design metal poultry building system, including comprehensive engineering analysis by a Kentucky licensed professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Metal poultry building systems shall be designed as follows:

1. Design Loads: As indicated on Drawings.
2. Deflection Limits: Design metal poultry building system assemblies to withstand design loads, except blast loads, with deflections no greater than the following:

a. Purlins and Rafters: Vertical deflection of 1/240 of the span.
b. Girts: Horizontal deflection of 1/240 Insert limit of the span.
c. Metal Roof Panels: Vertical deflection of 1/240 of the span.
d. Metal Wall Panels: Horizontal deflection of 1/240 of the span.
e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.

3. Drift Limits: Engineer building structure to withstand design loads, except blast loads, with drift limits no greater than the following:

a. Lateral Drift: Maximum of 1/400 of the building height.

4. Metal panel assemblies shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated according to ASTM E 1592.

C. Thermal Movements: Allow for thermal movements resulting from the change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

D. Air Infiltration for Metal Roof Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of roof area when tested according to ASTM E 1680 at negative test-pressure difference of 1.57 lbf/sq. ft.

E. Air Infiltration for Metal Wall Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of wall area when tested according to ASTM E 283 at static-air-pressure difference of 1.57 lbf/sq. ft.

F. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 at test-pressure difference of 2.86 lbf/sq. ft.

G. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E 331 at a wind-load design pressure of not less than 2.86 lbf/sq. ft.

H. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

I. Solar Reflectance Index: Not less than 29 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.

2.3 STRUCTURAL-STEEL FRAMING

A. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly.

B. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly.

C. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating.

D. Bolts: Provide plain-finish bolts for structural-framing components that are primed or finish painted. Provide zinc-plated or hot-dip galvanized bolts for structural-framing components that are galvanized.

E. Finish: Factory primed, galvanized, G90 coating on cold-formed and sheet metal materials.

2.4 METAL ROOF PANELS

A. Metal Roof Panels: Formed with ribs at panel edges and flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports.

1. Material: G90 Zinc-coated (galvanized), 50 KSI minimum steel sheet.

    a. Sheet thickness: as designed to adequately resist the design loads specified on the drawings.
    b. Exterior Finish: Two-coat fluoropolymer.
    c. Color: As selected by Architect from manufacturer's full range.

2. Clips: Manufacturer's standard, fixed type; fabricated from zinc-coated (galvanized) steel or stainless-steel sheet.
3. Joint Type: Mechanically seamed, double folded or as standard to manufacturer.
4. Fasteners: Exposed as standard to manufacturer.
5. Panel Coverage: 16 inches or as standard to manufacturer.
6. Panel Height: 2 inches or as standard to manufacturer.
7. Uplift Rating: UL 90.

2.5 METAL WALL PANELS

A. Metal Wall Panels: Formed with ribs at panel edges and flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports. Panels may be secured to the structure from outside the building with exposed fasteners, or from inside the building with an expansion fastener.

B. Material: G90 Zinc-coated (galvanized), 80 KSI minimum steel sheet.

    a. Sheet thickness: as designed to adequately resist the design loads specified on the drawings, but no less than 24 ga.
    b. Exterior Finish: Two-coat fluoropolymer.
    c. Color: As selected by Architect from manufacturer's full range.

2. Panel Width: 16 inches or as standard to manufacturer.
3. Panel Lengths: As Standard to manufacturer.
4. Panel Height: 2 inches or as standard to manufacturer.

2.6 THERMAL INSULATION

A. Faced Metal Poultry Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.

1. Vapor-Retarder Facing: ASTM C 1136, with permeance not greater than 0.02 perm when tested according to ASTM E 96/E 96M, Desiccant Method.

B. Provide an R-Value of 38 at roofs.

C. Provide an R-Value of 33 at walls.

D. Refer to Section 072100 "Thermal Insulation" for other insulation used within metal poultry building system and foundation installation.

2.7 ACCESSORIES

A. General: Provide accessories as standard with metal poultry building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.

D. Flashing and Trim: Formed from 0.028-inch nominal-thickness, metallic-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.

E. Gutters: Not required.

F. Downspouts: Not required.

G. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to evaluate product.

B. Special Inspector and Testing: Refer to Section 014110 “Structural Special Inspection.”

1. Product will be considered defective if it does not pass tests and inspections.

2.9 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.

1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with manufacturer’s standard for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

D. Secondary Framing: Shop fabricate framing components to size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

2.10 OPENINGS

A. Refer to Section 081113 “Hollow Metal Doors and Frames” for doors and Section 083323 “Overhead Coiling Doors” for overhead doors used within metal poultry building system.

2.11 SEALANTS AND PAINTING

A. Refer to Section 079200 “Joint Sealants” for sealants used within metal poultry building system.

B. Refer to Sections 099113 “Exterior Painting” and 099123 “Interior Painting” for painting of exposed metal products.

PART 3 - EXECUTION

3.1 ERECTION OF STRUCTURAL FRAMING

A. Erect metal poultry building system according to manufacturer's written erection instructions and erection drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal poultry building system manufacturer's professional engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.

E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.

G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.

1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
2. Locate and space wall girts to suit openings such as doors and windows.
3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.

1. Tighten rod and cable bracing to avoid sag.
2. Locate interior end-bay bracing only where indicated.

I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.2 METAL PANEL INSTALLATION, GENERAL

A. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.

a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.

2. Install metal panels perpendicular to structural supports unless otherwise indicated.
3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Locate metal panel splices over, but not attached to, structural supports with end laps in alignment.
6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

B. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants recommended by metal panel manufacturer.

1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.3 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

1. Install ridge caps as metal roof panel work proceeds.
2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.

1. Install clips to supports with self-drilling or self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.
5. Provide metal closures at peaks, rake edges and each side of ridge caps.

3.4 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
2. Shim or otherwise plumb substrates receiving metal wall panels.
3. When two rows of metal panels are required, lap panels 4 inches minimum.
4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
5. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
6. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
7. Install screw fasteners in predrilled holes.
8. Install flashing and trim as metal wall panel work proceeds.
9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated; or, if not indicated, as necessary for waterproofing.
10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

3.5 THERMAL INSULATION INSTALLATION (Refer to Alternates)

A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.

1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
2. Tape joints and ruptures in vapor retarder and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.

B. Blanket Roof Insulation: Comply with the following installation method:

1. Over-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Install layer of filler insulation over first layer to fill space formed by metal roof panel standoffs. Hold in place by panels fastened to standoffs.

a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.

2. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.

1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

3.6 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.7 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections. Refer to Section 014110 “Structural Special Inspection.”

B. Product will be considered defective if it does not pass tests and inspections.

END OF SECTION 133500

SECTION 221113 – FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for water service and fire-service mains.

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

B. DIP: Ductile Iron Pipe

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components. Retain subparagraph below if equipment includes wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
4. Comply with Ten States Standards, Latest Edition for Potable Water Distribution.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

D. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

F. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.9 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Architect no fewer than 10 days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Architect written permission.

1.10 COORDINATION

A. Coordinate connection to water main with utility owner and operator.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Soft Copper Tube: ASTM B 88, Type K, water tube, annealed temper.

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Copper, Pressure-Seal Fittings:

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Viega; Plumbing & Heating Systems.

b. NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
c. NPS 2-1/2 to NPS 4 : Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.

B. Hard Copper Tube: ASTM B 88, Type K, water tube, drawn temper.

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Copper, Pressure-Seal Fittings:

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Viega; Plumbing & Heating Systems.

b. NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
c. NPS 2-1/2 to NPS 4 Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.

C. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.

D. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated. Pipe shall be coated with a bituminous coating in accordance with ANSI/AWWA C151/A21.51. Interior shall be cement mortar lines and seal coated in compliance with the latest Rev. of ANSI/AWWA C104/A21.4. The cement mortar lining shall be double thickness.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Anvil International, Inc.
2) Victaulic Company of America.

B. Flanges: ASME 16.1, Class 250, cast iron.

2.3 PVC PIPE AND FITTINGS

A. PVC (ASTM) pipe shall be furnished as SDR 26, 21, and 17 for Class 160-psi, 200-psi and 250-psi respectively.

B. PVC (ASTM) pipe shall be furnished as SDR 26, 21, and 17 for Class 160-psi, 200-psi and 250-psi respectively.

C. PVC, AWWA Pipe: AWWA C900,Class 200, with bell end with gasket, and with spigot end.

1. Comply with UL 1285 for fire-service mains if indicated.
2. PVC Fabricated Fittings: AWWA C900,Class 200, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
3. PVC Molded Fittings: AWWA C907, Class 200, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
4. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

a. Gaskets: AWWA C111, rubber.

5. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

b. All mechanical joint fittings where thrust blocking is required will also be secure by joint restrain glands.

6. The use of solvent Cement connections is not allowed.

2.4 SPECIAL PIPE FITTINGS

A. Ductile-Iron Rigid Expansion Joints:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. EBAA Iron, Inc.
   b. U.S. Pipe and Foundry Company.

3. Description: Three-piece, ductile-iron assembly consisting of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

   a. Pressure Rating: 250 psig minimum.

B. Ductile-Iron Flexible Expansion Joints:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. EBAA Iron, Inc.
   b. Hays Fluid Controls; a division of ROMAC Industries Inc.
   c. Star Pipe Products.

2. Description: Compound, ductile-iron fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections. Assemble components for offset and expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

   a. Pressure Rating: 250 psig minimum.

C. Ductile-Iron Deflection Fittings:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. EBAA Iron, Inc.

2. Description: Compound, ductile-iron coupling fitting with sleeve and 1 or 2 flexing sections for up to 15-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

a. Pressure Rating: 250 psig minimum.

2.5 JOINING MATERIALS

A. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.6 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Tubular-Sleeve Pipe Couplings:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Cascade Waterworks Manufacturing.
b. Dresser, Inc.; Dresser Piping Specialties.
c. Ford Meter Box Company, Inc. (The); Pipe Products Div.
d. Hays Fluid Controls; a division of ROMAC Industries Inc.
e. JCM Industries.
f. Smith-Blair, Inc.
g. Viking Johnson.

2. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.

a. Standard: AWWA C219.
b. Center-Sleeve Material: Stainless steel
c. Gasket Material: Natural or synthetic rubber.
d. Pressure Rating: 200 psig minimum.
e. Metal Component Finish: Corrosion-resistant coating or material.

C. Split-Sleeve Pipe Couplings:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Victaulic Depend-O-Lok.

2. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.

a. Standard: AWWA C219.
b. Sleeve Material: Stainless steel.
c. Sleeve Dimensions: Of thickness and width required to provide pressure rating.
d. Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.
e. Pressure Rating: 200 psig minimum.
f. Metal Component Finish: Corrosion-resistant coating or material.

2.7 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasement for Underground Metal Piping:

1. Standards: ASTM A 674 or AWWA C105.
2. Form: Sheet
3. Material: High-density, crosslaminated PE film of 0.004-inch (0.10-mm) minimum thickness.
4. Color: Natural

2.8 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American AVK Co.; Valves & Fittings Div.
b. American Cast Iron Pipe Co.; American Flow Control Div.
c. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
d. Crane Co.; Crane Valve Group; Stockham Div.
e. East Jordan Iron Works, Inc.
f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
g. McWane, Inc.; Kennedy Valve Div.
h. McWane, Inc.; M & H Valve Company Div.
i. McWane, Inc.; Tyler Pipe Div.; Utilities Div.
j. Mueller Co.; Water Products Div.
k. NIBCO INC.
l. U.S. Pipe and Foundry Company.

2. Nonrising-Stem, Resilient-Seated Gate Valves:

a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.

1) Standard: AWWA C509.
2) Minimum Pressure Rating: 250 psig .
3) End Connections: Mechanical joint.
4) Interior Coating: Complying with AWWA C550.

3. OS&Y, Rising-Stem, Resilient-Seated Gate Valves:

a. Description: Cast- or ductile-iron body and bonnet, with bronze or gray- or ductile-iron gate, resilient seats, and bronze stem.

1) Standard: AWWA C509.
2) Minimum Pressure Rating: 250 psig .
3) End Connections: Flanged.

B. UL/FMG, Cast-Iron Gate Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Cast Iron Pipe Co.; American Flow Control Div.
    b. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
    c. Crane Co.; Crane Valve Group; Stockham Div.
    d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
    e. McWane, Inc.; Kennedy Valve Div.
    f. McWane, Inc.; M & H Valve Company Div.
    g. Mueller Co.; Water Products Div.
    h. NIBCO INC.
    i. U.S. Pipe and Foundry Company.

2. UL/FMG, Nonrising-Stem Gate Valves:

    a. Description: Iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.

        1) Standards: UL 262 and FMG approved.
        2) Minimum Pressure Rating: 250 psig.
        3) End Connections: Flanged.

3. OS&Y, Rising-Stem Gate Valves:

    a. Description: Iron body and bonnet and bronze seating material.

        1) Standards: UL 262 and FMG approved.
        2) Minimum Pressure Rating: 250 psig.
        3) End Connections: Flanged.

C. Bronze Gate Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Crane Co.; Crane Valve Group; Crane Valves.
    b. Crane Co.; Crane Valve Group; Jenkins Valves.
    c. Crane Co.; Crane Valve Group; Stockham Div.
    d. Hammond Valve.
    e. Milwaukee Valve Company.
    f. NIBCO INC.
    g. Red-White Valve Corporation.

2.9 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.

b. East Jordan Iron Works, Inc.
c. Flowserve.
d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
e. McWane, Inc.; Kennedy Valve Div.
f. McWane, Inc.; M & H Valve Company Div.
g. Mueller Co.; Water Products Div.
h. U.S. Pipe and Foundry Company.

2. Description: Sleeve and valve compatible with drilling machine.

a. Standard: MSS SP-60.
b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter. Valve Box shall comply with KAW requirements.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.10 CHECK VALVES

A. AWWA Check Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American AVK Co.; Valves & Fittings Div.
b. American Cast Iron Pipe Co.; American Flow Control Div.
c. APCO Williamette; Valve and Primer Corporation.
d. Crane Co.; Crane Valve Group; Crane Valves.
e. Crane Co.; Crane Valve Group; Stockham Div.
f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
g. McWane, Inc.; Kennedy Valve Div.
h. McWane, Inc.; M & H Valve Company Div.
i. Mueller Co.; Water Products Div.
j. NIBCO INC.
k. Watts Water Technologies, Inc.

2. Description: Swing-check type with resilient seat. Include interior coating according to AWWA C550 and ends to match piping.

a. Standard: AWWA C508.
b. Pressure Rating: 250 psig

B. UL/FMG, Check Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
b. Crane Co.; Crane Valve Group; Stockham Div.
c. Globe Fire Sprinkler Corporation.
d. Kidde Fire Fighting.
e. MATCO-NORCA, Inc.
f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
g. McWane, Inc.; Kennedy Valve Div.
h. Mueller Co.; Water Products Div.
i. NIBCO INC.
j. Reliable Automatic Sprinkler Co., Inc.
k. Tyco Fire & Building Products.
l. United Brass Works, Inc.
m. Victaulic Company of America.
n. Viking Corporation.
o. Watts Water Technologies, Inc.

2. Description: Swing-check type with pressure rating; rubber-face checks, unless otherwise indicated; and ends matching piping.

a. Standards: UL 312 and FMG approved.
b. Pressure Rating: 250 psig

2.11 DETECTOR CHECK VALVES

A. Detector Check Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ames Fire & Waterworks; a division of Watts Regulator Co.
b. Badger Meter, Inc.
c. FEBCO; SPX Valves & Controls.
d. Globe Fire Sprinkler Corporation.
e. McWane, Inc.; Kennedy Valve Div.
f. Mueller Co.; Hersey Meters.
g. Victaulic Company of America.
h. Viking Corporation.
i. Watts Water Technologies, Inc.

2. Description: Galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.

a. Standards: UL 312 and FMG approved.
b. Pressure Rating: 250 psig

c. Water Meter: AWWA C700, disc type, at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.

3. Description: Iron body, corrosion-resistant clapper ring and seat ring material, flanged ends, with connections for bypass and installation of water meter.

a. Standards: UL 312 and FMG approved.
b. Pressure Rating: 250 psig.

2.12 CORPORATION VALVES

2.13 Manufacturers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Amcast Industrial Corporation; Lee Brass Co.
b. Ford Meter Box Company, Inc. (The); Pipe Products Div.
c. Jones, James Company.
d. Master Meter, Inc.
e. McDonald, A. Y. Mfg. Co.
f. Mueller Co.; Water Products Div.
g. Red Hed Manufacturing & Supply.

B. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.

1. Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.
2. Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.
3. Manifold: Copper fitting with two to four inlets as required, with ends matching corporation valves and outlet matching service piping material.

C. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.

D. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over curb valve and with a barrel approximately 3 inches in diameter.

1. Shutoff Rods: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.

2.14 WATER METERS

A. Water meters will be furnished by utility company, unless noted otherwise.

2.15 BACKFLOW PREVENTERS

A. Double-Check, Backflow-Prevention Assemblies:

1. Refer to MEP Plan P3.0.

2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.16 WATER METER BOXES

A. Description: Cast-iron body and cover for disc-type water meter, with lettering "WATER METER" in cover; and with slotted, open-bottom base section of length to fit over service piping.

2.17 CONCRETE VAULTS

A. Description: Precast, reinforced-concrete vault, designed for A-16 load designation according to ASTM C 857 and made according to ASTM C 858.

1. Ladder: ASTM A 36/A 36M, steel or polyethylene-encased steel steps.
2. Manhole: ASTM A 48/A 48M Class No. 35A minimum tensile strength, gray-iron traffic frame and cover.

a. Dimension: 24-inch minimum diameter, unless otherwise indicated.

2.18 FIRE HYDRANTS

A. Dry-Barrel Fire Hydrants:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

a. American AVK Co.; Valves & Fittings Div.
b. American Cast Iron Pipe Co.; American Flow Control Div.
c. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
d. American Foundry Group, Inc.
e. East Jordan Iron Works, Inc.
f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
g. McWane, Inc.; Kennedy Valve Div.
h. McWane, Inc.; M & H Valve Company Div.
i. Mueller Co.; Water Products Div.
j. Troy Valve; a division of Penn-Troy Manufacturing, Inc.
k. U.S. Pipe and Foundry Company.

4. Description: Freestanding, with two 4 ½" outlets National Standard Hose Thread, 5-1/4-inch main valve, drain valve, and NPS 8 mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve

opening against pressure and closing with pressure. Nut type cap 15/16” square with chains. 18” center of outlet to ground.

a. Standard: AWWA C502.
b. Pressure Rating: 250 psig
c. Color: red, and according to LFUCG guidelines.

5. Certify and Service: The following companies have stated that they certify and service privately owned fire hydrants according to NFPA guidelines:
   a. Brown Sprinkler Corporation
   b. C&C Fire Sprinkler Systems and Inspections
   c. Central Kentucky sprinkler, Inc.
   d. Koorsen
   e. Landmark Sprinkler Corp.
   f. Simplex/Grinnell
   g. Kenny Buehler/Private Contractor
   h. American Fire & Security

2.19 FIRE DEPARTMENT CONNECTIONS

A. Fire Department Connections:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Elkhart Brass Mfg. Co., Inc.
   b. Fire End & Croker Corporation.
   c. Guardian Fire Equipment, Inc.
   d. Kidde Fire Fighting.
   e. Potter Roemer.
   f. Reliable Automatic Sprinkler Co., Inc.

2. Description: Freestanding, with cast-bronze body, thread inlets according to NFPA 1963 and matching local fire department hose threads, and threaded bottom outlet. Include lugged caps, gaskets, and chains; lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch- high brass sleeve; and round escutcheon plate.

   a. Standard: UL 405.
   b. Connections: Two NPS 2-1/2 inlets and one NPS 6 outlet.
   c. Finish Including Sleeve: Polished bronze.
   d. Escutcheon Plate Marking: "AUTO SPKR."

3. Lexington Fire Water Control Office Standards
   a. Fire Department must be a standalone, 4 ½” male with National Standard Threads.
   b. Connection must have strainer and cap.
   c. The height of the connection should be 17”-19” from the center of the connection to the finished grade.

2.20 ALARM DEVICES

A. Alarm Devices, General: UL 753 and FMG approved, of types and sizes to mate and match piping and equipment.

B. Water-Flow Indicators: Vane-type water-flow detector, rated for 250-psig working pressure; designed for horizontal or vertical installation; with 2 single-pole, double-throw circuit switches to provide isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal when cover is removed.

C. Supervisory Switches: Single pole, double throw; designed to signal valve in other than fully open position.

D. Pressure Switches: Single pole, double throw; designed to signal increase in pressure.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section 02300 "Earth moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.

E. Underground water-service piping NPS 3/4 to NPS 3 shall be any of the following:

1. Soft copper tube, ASTM B 88, Type K copper, pressure-seal fittings; and pressure-sealed joints.
2. PVC, Schedule 40 pipe; PVC, Schedule 80 socket fittings; and solvent-cemented joints.
3. Soft copper tube, [ASTM B 88, Type K (ASTM B 88M,Type A)] [ASTM B 88, Type L (ASTM B 88M, Type B)]; wrought-copper, solder-joint fittings; and brazed joints.
4. Ductile-iron, [push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed] [mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical] [grooved-end pipe; ductile-iron-pipe appurtenances; and grooved] joints.
5. PE, AWWA pipe; PE, AWWA fittings; and heat-fusion joints.
6. PVC, Schedule [40 pipe; PVC, Schedule 40] [80 pipe; PVC, Schedule 80] socket fittings; and solvent-cemented joints.

F. Aboveground and Vault Water-Service Piping NPS 3/4 to NPS 3 shall be any of the following:

1. Hard copper tube, ASTM B 88, Type K wrought-copper, solder-joint fittings; and brazed joints.

G. Aboveground and vault water-service piping NPS 4 to NPS 8 shall be any of the following:

1. Hard copper tube, [ASTM B 88, Type K; wrought-copper, solder-joint fittings; and brazed joints.
2. Ductile-iron, grooved-end pipe; ductile-iron, grooved-end appurtenances; and grooved joints.

H. Underground Fire-Service-Main Piping NPS 4 to NPS 12 shall be any of the following:

1. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed mechanical-joint pipe; ductile-iron, mechanical-joint grooved joints.
2. PVC, AWWA Class 200 pipe listed for fire-protection service; PVC Class 200 fabricated fittings; and gasketed joints.
3. Fire service connections and fire hydrants shall have diameters and thread matching KAWC standards.
4. Fire service connections shall be installed with a metal sign, with one inch raised letters.

I. Aboveground and Vault Fire-Service-Main Piping NPS 4 to NPS 12 shall be ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

3.3 VALVE APPLICATIONS

A. General Application: Use mechanical-joint-end valves for NPS 3 (DN 80) and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 (DN 50) and smaller installation.

B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, metal resilient-seated gate valves with valve box.
2. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.
3. Use the following for valves in vaults and aboveground:

a. Gate Valves, NPS 2 and Smaller: Bronze, nonrising rising stem.
b. Check Valves: AWWA C508 UL/FMG, swing type.

3.4 PIPING INSTALLATION

A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main. All fittings may not be shown for clarity. It is the contractor’s responsibility to include all necessary fittings in their bid. Unless otherwise noted. Bends shall be 45 degrees.

1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
2. Install copper tube and fittings according to CDA's "Copper Tube Handbook."

B. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.

1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.

C. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.

D. Bury piping with depth of cover over top at least 30 inches , with top at least 12 inches below level of maximum frost penetration, and according to the following:

1. Under Driveways: With at least 36 inches cover over top.
2. In Loose Gravelly Soil and Rock: With at least 12 inches additional bedding.

E. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.

F. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.

1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.

G. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

H. See Section 15140 "Domestic Water Piping" for potable-water piping inside the building.

3.5 JOINT CONSTRUCTION

A. Make pipe joints according to the following:

1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
2. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
3. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
4. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

3.6 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:

1. Concrete thrust blocks.
2. Locking mechanical joints.
3. Set-screw mechanical retainer glands.
4. Bolted flanged joints.
5. Heat-fused joints.
6. Pipe clamps and tie rods.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:

1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
3. Fire-Service-Main Piping: According to NFPA 24.

C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.7 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.

D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.

E. MSS Valves: Install as component of connected piping system.

F. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

3.8 DETECTOR-CHECK VALVE INSTALLATION

A. Install in vault.

B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.

C. Support detector check valves, meters, shutoff valves, and piping per plans and in accordance with KAW requirements.

3.9 WATER METER INSTALLATION

A. Install water meters, piping, and specialties according to utility company's written instructions.

3.10 ROUGHING-IN FOR WATER METERS

A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.11 VACUUM BREAKER ASSEMBLY INSTALLATION

A. Install pressure vacuum breaker assemblies of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

3.12 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Refer to MEP plans. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

B. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.13 WATER METER BOX INSTALLATION

A. Install water meter boxes in paved areas flush with surface.

B. Install water meter boxes in grass or earth areas with top 1/2 inches above surface.

3.14 CONCRETE VAULT INSTALLATION

A. Install precast concrete vaults according to ASTM C 891.

3.15 PROTECTIVE ENCLOSURE INSTALLATION

A. Install concrete base level and with top approximately 2 inches above grade.

B. Install protective enclosure over valves and equipment.

C. Anchor protective enclosure to concrete base.

3.16 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.

B. Dry-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.

C. AWWA Fire Hydrants: Comply with AWWA M17.

D. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.17 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install ball drip valves at each check valve for fire department connection to mains.

3.18 ALARM DEVICE INSTALLATION

A. General: Comply with NFPA 24 for devices and methods of valve supervision. Underground valves with valve box do not require supervision.

B. Supervisory Switches: Supervise valves in open position.

1. Valves: Grind away portion of exposed valve stem. Bolt switch, with plunger in stem depression, to OS&Y gate-valve yoke.
2. Indicator Posts: Drill and thread hole in upper-barrel section at target plate. Install switch, with toggle against target plate, on barrel of indicator post.

C. Locking and Sealing: Secure unsupervised valves as follows:

1. Valves: Install chain and padlock on open OS&Y gate valve.
2. Post Indicators: Install padlock on wrench on indicator post.

D. Pressure Switches: Drill and thread hole in exposed barrel of fire hydrant. Install switch.

E. Water-Flow Indicators: Install in water-service piping in vault. Select indicator with saddle and vane matching pipe size. Drill hole in pipe, insert vane, and bolt saddle to pipe.

F. Connect alarm devices to building fire alarm system. Wiring and fire-alarm devices are specified in Section 13852 "Digital, Addressable Fire-Alarm System" and Section 13853 "Zoned (DC Loop) Fire-Alarm System."

3.19 CONNECTIONS

A. Connect water-distribution piping to interior [domestic water and fire-suppression piping.

3.20 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

C. Prepare reports of testing activities.

3.21 IDENTIFICATION

A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Section 312000 "Earth Moving."

3.22 CLEANING

A. Clean and disinfect water-distribution piping as follows:
1. Use purging and disinfecting procedure prescribed by Kentucky American Water.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION 221113

SECTION 22 1313 - EXTERIOR FACILITY SANITARY SEWERS

PART 1 - GENERAL

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. Section Includes:

1. Pipe and fittings.
2. Nonpressure couplings.
3. Expansion joints and deflection fittings.
4. Cleanouts.
5. Manholes.

1.3 DEFINITIONS

A. PVC: Polyvinyl Chloride Pipe.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Expansion joints and deflection fittings.

2. Pipe and fittings

B. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.

C. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewer system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

D. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

E. Field quality-control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage. In particular, the load shall be supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or stored as close to the final point of placement as is practical.

C. Handle manholes according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

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

1. Notify Engineer or Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Engineer's or Owner's written permission.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS FOR GRAVITY SEWER

A. PVC Sewer Piping:

1. Pipe: ASTM D 3034, SDR 35, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.
4. Pipe shall be homogenous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform as commercially practical in color. The workmanship, pipe dimensions and tolerances, outside diameters, wall thickness, eccentricity, sustained pressures, marking and all other requirements of the Commercial Standards CS 256-63 shall be conformed within all respects.

2.2 PVC PIPE AND FITTINGS FOR FORCE MAIN SEWER

1. Pipe: ASTM D 2241, SDR 21 (220 PSI), PVC Type pressure rated pipe with bell and spigot ends for sealed joints. Cell class 12454 per ASTM D 1784.
2. Fittings: Pipe and fittings shall be manufactured as a system and be the product of one manufacturers.
3. Pipe and fittings shall conform to NSF International Standard 61 or the health effects portion of NSF Standard 14.
4. Gaskets: ASTM F477

5. Standard lengths shall be 20 feet and 12.5 feet plus/minus 1 inch. All pipe shall be marked with the manufacturer's name, production lot number, ASTM designation, PVC and nominal diameter.

2.3 DUCTILE-IRON, GRAVITY SEWER PIPE AND FITTINGS

A. Pipe: ASTM A 746, for push-on joints.

B. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.

C. Gaskets: AWWA C111, rubber.

D. Ductile iron pipe shall conform to the latest AWWA Specifications C151 (ANSI A21-51) with standard thickness as designated in AWWA C150. Thickness class shall be as follows:

DIAMETER	PRESSURE CLASS
8" - 12"	350
14" - 30"	250

2.4 NONPRESSURE-TYPE TRANSITION COUPLINGS

A. Mechanical Joint Fittings:

1. Mechanical joints shall be bolted and of the stuffing box type and shall consist of a bell with exterior flange and interior recess for the sealing gasket, a pipe or fitting plain end, a sealing gasket, a follower gland, tee-head bolts and hexagon nuts.

2. Joints for all bends and fittings for buried service shall be mechanical joint type only (AWWA C111). Flanged joint pipe shall be used in vaults, pits and above ground service installation. Flanged joint pipe may not be used for buried service.

B. Nonpressure-Type, Rigid Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ANACO-Husky.

2. Description: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling, molded from ASTM C 1440, TPE material; with corrosion-resistant-metal tension band and tightening mechanism on each end.

2.5 CLEANOUTS

A. Cast-Iron Cleanouts:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Josam Company.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.
   d. Tyler Pipe.
   e. Watts Water Technologies, Inc.
   f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

2. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

2.6 MANHOLES

A. Standard Precast Concrete Manholes:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.
5. Riser Sections: 4-inch minimum thickness, of length to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated; with top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into

sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.

10. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.
11. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.
12. Waterproof seal coating shall be applied to the exterior of all manholes.
13. Manholes over 12 feet deep shall utilize Class III concrete.

B. Manhole Frames and Covers:

1. Material: ASTM A 48/A 48M, Class 35 gray iron unless otherwise indicated.

C. Manhole Types:

1. Type "A" Manholes: The Type "A" manhole shall be a four foot diameter manhole five feet or more in depth, measured from the base of the cover frame to the lowest flowline elevation and shall be of eccentric cone top construction.

2. Type "AA" Manholes: The Type "AA" manhole shall be a five foot diameter manhole five feet or more in depth, measured from the base of the cover frame to the lowest flowline elevation and shall be of eccentric cone top construction.

3. Type "AAA" Manholes: The Type "AAA" manhole shall be a six foot diameter manhole five feet or more in depth, measured from the base of the cover frame to the lowest flowline elevation and shall be of eccentric cone top construction.

4. Type "B" Manholes: Type "B" manholes shall be a four foot diameter manhole five feet or less in depth, measured from the base of the cover frame to the lowest flowline elevation and shall be of flat slab top construction.

5. Type "D" Manholes: A drop pipe shall be provided for a sewer entering a manhole at an elevation of 25 inches or more above the manhole invert and shall be built as a part of the standard manhole. The pipe shall be laid as shown on the Drawings and encased with 3500 psi concrete from the drop stack to the reinforced base of the manhole.

2.7 CONCRETE

A. General: Cast-in-place concrete complying with ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

a. Invert Slope: 1 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

a. Slope: 4 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

E. Concrete Cradle, Anchors or Encasement:

1. Concrete cradle or encasement of sewer lines and/or fittings shall be placed where shown on the plans. Sewers on 19 percent slopes or greater shall be anchored securely with concrete anchors, spaced as follows:

A) Not over 36 feet center to center on grades 19 percent and up to 35 percent.

B) Not over 24 feet center to center on grades 35 percent and up to 50 percent

C) Not over 16 feet center to center on grades 50 percent and over

2. Concrete shall be KYDOH Class "B" and shall be mixed sufficiently wet to permit it to flow under the pipe to form a continuous bed. In tamping concrete, care shall be taken not to disturb the grade or line of pipe or injure the joints.

3. For this contract, concrete for pipe encasement and anchors is considered an incidental item included in the linear foot price of pipe.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 310 Section "Earth Moving."

3.2 PIPING INSTALLATION

A. Contractor shall provide necessary leveling equipment to check the elevation of the flow line of the pipe as follows:

GRADE	FLOW LINE ELEVATION CHECK	ALLOWABLE ERROR
.004 - .008	Every 100 feet	± .03
.008 - .012	Every 150 feet	± .05
Above .012	Every 190 feet	± .07

B. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

D. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

E. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

F. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

G. Install gravity-flow, nonpressure, drainage piping according to the following:

1. Install piping pitched down in direction of flow, at minimum slope of 1 percent unless otherwise indicated.

2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
3. Install piping with 36-inch minimum cover.
4. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

H. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure, drainage piping according to the following:

1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
2. Join dissimilar pipe materials with nonpressure-type, rigid couplings.

B. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.

a. Shielded flexible or rigidcouplings for pipes of same or slightly different OD.
b. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.4 MANHOLE INSTALLATION

A. General: Install manholes complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Form continuous concrete channels and benches between inlets and outlet.

D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

E. Pipe entering and leaving manholes shall be installed a link seal compression device in accordance with ASTM d-2240, D412, s-395, d-297

F. Visual Inspection/Test: The ENGINEER shall visually inspect the manhole barrel, in the presence of the CONTRACTOR, after CONTRACTOR completes the preparatory cleaning activities. If the Engineer's visual inspection reveals obvious defects such as a poorly formed invert, misaligned frame and lid, cracks, leakage, or if the inspection reveals that the CONTRACTOR has not constructed the manhole plumb, the

ENGINEER shall notify the CONTRACTOR and OWNER in writing of the manhole's failing the visual inspection. The CONTRACTOR shall subsequently repair or replace all defective materials and/or workmanship, necessary to meet the visual test requirements, at no additional cost to the OWNER.

G. Leakage: The ENGINEER will direct the CONTRACTOR to conduct leakage tests if the manhole is located in an area of unusually high ground water, if the manhole is located within the limits of a stream course, or if, in the ENGINEER's opinion the manhole has not been constructed well. The CONTRACTOR shall subsequently conduct a leakage test in the presence of the ENGINEER. The leakage test shall be an exfiltration test conducted in accordance with ASTM C 969, Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines. The maximum allowable exfiltration rate shall be 0.1 gallon per foot of diameter, per foot of head, per hour. If the exfiltration rate exceeds this value, the CONTRACTOR shall make the necessary repairs, at no additional cost to the OWNER.

3.5 INSTALLATION OF FORCE MAINS

A. General. Before any length of pipe is placed in the trench, make a careful inspection to see that no foreign material is in the pipe. In order to properly remove any foreign materials, a swab of necessary length is to be available at all times. All pipe shall be lowered carefully into the trench, properly aligned and properly jointed by use of suitable tools and equipment, in such manner as to prevent damage to protective coatings and linings. Excessive scratching of the exterior surface of the pipe will be cause for rejection of the pipe.

Under no circumstances shall pipeline materials be dropped or dumped into the trench. The pipe and fittings shall also be inspected for the purpose of determining if they are sound and free from cracks. Laying of pipe shall be commenced immediately after excavation is started. Pipe shall be laid with bell ends facing in the direction of laying.

When pipe laying is not in progress, the open ends of pipe shall be closed to prevent entrance of trench water into the line. Whenever water is excluded from the interior of the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and installed properly. No pipe shall be laid in water or on frozen trench bottom or whenever the trench conditions or the weather are unsuitable for such work.

If any defective pipe and fittings shall be discovered after the pipeline is laid, they shall be removed and replaced with a satisfactory pipe or fitting without additional charge to the Owner. Open ends of unfinished pipelines shall be securely plugged or closed at the end of each day's work or when the line is left temporarily at any other time.

B. Thrust Blocking and Anchorage. All angles or bends in the pipeline, either vertical or horizontal, shall be braced or anchored against the tendency of movement with concrete thrust blocking. Where joint harness is used, all component parts shall be stainless steel. Cost of installing concrete thrust blocking or joint harness materials shall be considered incidental to installing the line. Thrust blocks for plastic pipe will not be attached to couplings.

C. Pipe Bedding. Standard Pipe Bedding. The standard pipe bedding shall be evenly spread fine granular earth material or bank run sand and gravel or dense graded aggregate as shown on the PLANS.

D. Special Pipe Foundation. When ordered by the Engineer, yielding and mucking material in subgrade shall be removed below ordinary trench depth in order to prepare a proper bed for the pipe. In such locations, a special pipe foundation shall be constructed utilizing encasement class concrete.

E. Standard Concrete Encasement. Concrete encasement of pipe shall be placed as directed by the Engineer. Concrete shall form a continuous bed under pipe. In tamping concrete, care should be taken not to disturb the grade or line of the pipe or injure the joints.

F. Parallel Water and Sewer Lines. Water lines must, if possible, be located a minimum lateral distance of 10 feet from any existing or future sewer lines measured from outside diameters. Where water lines and sewer lines must be placed in the same trench, the water line must be located above the sewer line such that there is a minimum of 18” vertical distance between the outside of the water line and the outside of the sewer line.

G. Crossing Water and Sewer Lines. Wherever sewer lines and water lines cross, it is desirable, if practical, that the sewer line be at least 24 inches below the water line. Where it is not practical to provide such a separation, care shall be taken to ascertain that the existing water line or existing sewer line is in good sound condition and that no evidence of joint leakage is known in that vicinity. If any such evidence does exist, expose the existing line at least 10 feet on each side of the water line crossing. The Owner will arrange for examining and correcting any defects in the existing lines. When the water line must be below or less than two feet above the sewer line, encase the water line five feet in each direction from the crossing.

3.6 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.7 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

1. Use Heavy-Duty, top-loading classification cleanouts in all areas.

B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 12 by 12 by 12 inches deep. Set with tops 1 inch above surrounding grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.8 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping to building's sanitary building drains specified in Division 220 Section "Sanitary Waste and Vent Piping."

B. Make connections to existing piping and underground manholes.

1. Make branch connections to underground manholes by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe or manhole wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

    a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

2. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.9 IDENTIFICATION

A. Materials and their installation are specified in Division 312 Section "Earth Moving." Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.

1. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.10 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate report for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Prior to owner acceptance, piping systems shall be tested according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:

    a. Fill sewer piping with water. Test with pressure of at least 10-foot head of water, and maintain such pressure without leakage for at least 15 minutes.
    b. Close openings in system and fill with water.
    c. Purge air and refill with water.
    d. Disconnect water supply.
    e. Test and inspect joints for leaks.

6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

    a. Option: Test plastic gravity sewer piping according to ASTM F 1417.
    b. Option: Test concrete gravity sewer piping according to ASTM C 924.

7. Manholes: Perform hydraulic test according to ASTM C 1244.

8. Force Mains: The Contractor will be required to test all pipelines and appurtenances with water at pressure class of pipe installed. The pipe shall be slowly filled with water, care being taken to expel all air from the pipes. If necessary, the pipe shall be tapped at high points to vent the air. Pressure at least equal to 150 PSI (or the operating pressure if higher) as measured at the point of lowest elevation shall be applied for not less than one hour and all pipes, fittings, valves, hydrants and joints shall be carefully examined for defects or leakage. Any observed leakage shall be corrected.

    a. The pipe pressure must be held at 150 PSI for one hour before beginning the test for leakage. No pipe shall be accepted unless or until the leakage, determined by this test, is less than 10 U.S. gallons over 24 hours, per mile, per inch nominal diameter of pipe. The leakage test shall be applied to the pipe for a period of not less than 4 hours.
    b. The test shall be made between valves as far as practical in sections of pipe and shall, in general, be made within twelve working days of the completion of each section of line.

c. Furnish a suitable pump, pressure gauge and water meter or other appliance for measuring the amount of water pumped. The instrument used to measure leakage shall be tested for accuracy. Furnish all necessary labor and materials to make the test and to perform any work incidental thereto. Where it is impractical to test between the valves, temporarily place caps and plugs on the lines and test sections of the new line.
d. Wherever practicable, corporation stops and service lines shall be installed before testing. If these items are installed after the main is tested, then a visual inspection of the tap and service line must be permitted while under pressure before backfilling service line.
e. Where any section of the main is provided with concrete thrust blocking, the hydrostatic pressure test shall not be made until at least five days have elapsed after the concrete reaction blocking was installed. If high early strength cement is used in the reaction blocking, the hydrostatic pressure test shall not be made until at least two days have elapsed.
f. Should there be leakage over the allowable amount, the Contractor will be required to locate and repair the leaks and retest the section. It is suggested, but not required, that the Contractor have a geophone (underground listening device) on the job at the time of testing.
g. If the leakage of the section of pipeline being tested is below the allowable amount, but leakage is obvious due to water at the surface of the ground, or by listening the leak can be heard underground with a geophone, or any other means of determining a leak, the Contractor will be required to repair these leaks.
h. The Contractor shall furnish a meter or suction tank, pipe test plugs and by-pass piping and make all connections for conducting the above tests. The pumping equipment used shall be centrifugal pump, or other pumping equipment which will not place shock pressures on the pipeline. Power plunger or positive displacement pumps will not be permitted for use on closed systems for any purpose.
i. Inspection of pipe laying shall in no way relieve the Contractor of the responsibility for stopping leakage or correcting poor workmanship.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

A. Clean dirt and superfluous material from interior of piping. Flush with potable water.

END OF SECTION 221313

SECTION 231123 - FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipes, tubes, and fittings.
2. Piping specialties.
3. Joining materials.
4. Manual gas shutoff valves.
5. Pressure regulators.
6. Service meters.
7. Dielectric fittings.

1.2 GAS MAIN CONNECTION

A. Arrange and pay for tap in gas main, of size and in location indicated, by Local Gas Utility Company. Pay all costs pertaining to this work, including materials, labor, piping, excavation, backfill, tap-on fees, meter charges, etc.

1.3 COORDINATION WITH LOCAL GAS UTILITY CO.

A. Coordinate with the Local Gas Utility Co. and determine the extent of the work required to be done by them. Provide the work required by the Contract Documents that the Gas Co. does not provide. If the Gas Co. does not install the gas service piping then furnish the labor and materials necessary to install the gas service pipe. If the Gas Co. does not furnish the gas meter then provide the gas meter in accordance with the Gas Co.'s requirements and the requirements of this section. If the Gas Co. furnishes the gas meter then provide the materials, accessories and labor necessary to install it.

1.4 DEFINITIONS

A. CWP: Cold working pressure.

B. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. An example includes rooftop locations.

C. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

1.5 ACTION SUBMITTALS

A. Product Data:

1. Piping specialties.
2. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
3. Pressure regulators. Indicate pressure ratings and capacities.
4. Service meters. Indicate pressure ratings and capacities. Include bypass fittings and meter bars.
5. Dielectric fittings.

B. Shop Drawings: For facility natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.

1. Shop Drawing Scale: 1/4 inch per foot (1:50).
2. Detail mounting, supports, and valve arrangements for service-meter assembly and pressure regulator assembly.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans and details, drawn to scale, on which natural-gas piping is shown and coordinated with other installations, using input from installers of the items involved.

B. Certificates:

1. Welding certificates.

C. Site Survey: Plans, drawn to scale, on which natural-gas piping is shown and coordinated with other services and utilities.

D. Field Quality-Control Submittals:

1. Field quality-control reports.

E. Qualification Statements: For professional engineer.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For pressure regulators and service meters to include in emergency, operation, and maintenance manuals.

1.8 QUALITY ASSURANCE

A. Qualifications:

1. Steel Support Welding: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. Pipe Welding: Qualify procedures and operators in accordance with the ASME Boiler and Pressure Vessel Code.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping in accordance with requirements of authorities having jurisdiction.

B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.

D. Protect stored PE pipes and valves from direct sunlight.

1.10 PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.

B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions, and then only after arranging to provide purging and startup of natural-gas supply in accordance with requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of natural-gas service.
2. Do not proceed with interruption of natural-gas service without Owner's written permission.

1.11 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

B. Coordinate requirements for access panels and doors for valves installed and concealed behind finished surfaces.

C. Coordinate requirements for piping identification for natural-gas piping..

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each product type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 54.

B. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 100 psig (690 kPa) minimum unless otherwise indicated.

2. Service Regulators: 65 psig (450 kPa) minimum unless otherwise indicated.
3. Minimum Operating Pressure of Service Meter: 5 psig (34.5 kPa).

C. Natural-Gas System Pressure within Buildings:

1. Single Pressure: 0.5 psig (3.45 kPa) or less.

2.3 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
2. Wrought-Steel Welding Fittings: ASTM A234/A234M for butt welding and socket welding.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

    a. Material Group: 1.1.
    b. End Connections: Threaded or butt welding to match pipe.
    c. Lapped Face: Not permitted underground.
    d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum O-rings, and spiral-wound metal gaskets.
    e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.

5. Mechanical Couplings:

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

        1) Baker Hughes Company.
        2) Smith-Blair, a Xylem brand.
        3) Viega LLC.

    b. Steel flanges and tube with epoxy finish.
    c. NBR seals.
    d. Stainless steel bolts, washers, and nuts.
    e. Coupling is to be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
    f. Steel body couplings installed underground on plastic pipe are to be factory equipped with anode.

B. PE Pipe: ASTM D2513, SDR 11.

1. PE Fittings: ASTM D2683, socket-fusion type or ASTM D3261, butt-fusion type with dimensions matching PE pipe.
2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D2513, SDR 11; and steel pipe complying with ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B.
3. Anodeless Service-Line Risers: Factory fabricated and leak tested.

    a. Underground Portion: PE pipe complying with ASTM D2513, SDR 11 inlet.

b. Casing: Steel pipe complying with ASTM A53/A53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering. Vent casing aboveground.
c. Aboveground Portion: PE transition fitting.
d. Outlet is threaded or flanged or suitable for welded connection.
e. Tracer wire connection.
f. UV shield.
g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

4. Transition Service-Line Risers: Factory fabricated and leak tested.

a. Underground Portion: PE pipe complying with ASTM D2513, SDR 11 inlet connected to steel pipe complying with ASTM A53/A53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
b. Outlet is threaded or flanged or suitable for welded connection.
c. Bridging sleeve over mechanical coupling.
d. Factory-connected anode.
e. Tracer wire connection.
f. UV shield.
g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

5. Plastic Mechanical Couplings, NPS 1-1/2 (DN 40) and Smaller: Suitable for joining PE pipe to PE pipe.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1) Mueller Co.
2) Perfection Corporation.
3) R.W. Lyall; brand of Hubbell Utility Solutions; Hubbell Incorporated.

b. PE body with molded-in, stainless steel support ring.
c. Seals: NBR.
d. Acetal collets.
e. Electro-zinc-plated steel stiffener.

6. Plastic Mechanical Couplings, NPS 2 (DN 50) and Larger: Suitable for joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1) Mueller Co.
2) Perfection Corporation.
3) R.W. Lyall; brand of Hubbell Utility Solutions; Hubbell Incorporated.

b. Fiber-reinforced plastic body.
c. PE body tube.
d. Seals: NBR.
e. Acetal collets.
f. Stainless steel bolts, nuts, and washers.

7. Steel Mechanical Couplings: Suitable for joining plain-end PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1) Baker Hughes Company.
2) Smith-Blair, a Xylem brand.

b. Steel flanges and tube with epoxy finish.
c. Seals: NBR.
d. Stainless steel bolts, washers, and nuts.
e. Factory-installed anode for steel-body couplings installed underground.

2.4 PIPING SPECIALTIES

A. Y-Pattern Strainers:

1. Body: ASTM A126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 (DN 50) and smaller; flanged ends for NPS 2-1/2 (DN 65) and larger.
3. Strainer Screen: 40-mesh startup strainer, and perforated stainless steel basket with 50 percent free area.
4. CWP Rating: 125 psig (862 kPa).

B. Weatherproof Vent Cap:

1. Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.5 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F (540 deg C) complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.6 MANUAL GAS SHUTOFF VALVES

A. See "Underground, Manual Gas Shutoff Valve Schedule" and "Aboveground, Manual Gas Shutoff Valve Schedule" articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, NPS 2 (DN 50) and Smaller: Comply with ASME B16.33.

1. CWP Rating: 125 psig (862 kPa).
2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves indicated in "Underground, Manual Gas Shutoff Valve Schedule" and "Aboveground, Manual Gas Shutoff Valve Schedule" articles.
5. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch (25 mm) and smaller.

6. Service Mark: Valves NPS 1-1/4 to NPS 2 (DN 32 to DN 50) having initials "WOG" permanently marked on valve body.

C. General Requirements for Metallic Valves, NPS 2-1/2 (DN 65) and Larger: Comply with ASME B16.38.

1. CWP Rating: 125 psig (862 kPa).
2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Tamperproof Feature: Locking feature for valves indicated in "Underground, Manual Gas Shutoff Valve Schedule" and "Aboveground, Manual Gas Shutoff Valve Schedule" articles.
4. Service Mark: Initials "WOG" permanently marked on valve body.

D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. A.Y. McDonald Mfg. Co.
   b. Apollo Valves; a part of Aalberts Integrated Piping Systems.
   c. BrassCraft Manufacturing Co.; a Masco company.
2. Body: Bronze, complying with ASTM B584.
3. Ball: Chrome-plated bronze.
4. Stem: Bronze; blowout proof.
5. Seats: Reinforced TFE; blowout proof.
6. Packing: Threaded-body packnut design with adjustable-stem packing.
7. Ends: Threaded, flared, or socket as indicated in "Underground, Manual Gas Shutoff Valve Schedule" and "Aboveground, Manual Gas Shutoff Valve Schedule" articles.
8. CWP Rating: 600 psig (4140 kPa).
9. Listing: Valves NPS 1 (DN 25) and smaller are to be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. Cast-Iron, Nonlubricated Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. A.Y. McDonald Mfg. Co.
   b. Mueller Co.
   c. Xomox Corporation.
2. Body: Cast iron, complying with ASTM A126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground, Manual Gas Shutoff Valve Schedule" and "Aboveground, Manual Gas Shutoff Valve Schedule" articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig (862 kPa).
9. Listing: Valves NPS 1 (DN 25) and smaller are to be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

F. Valve Boxes:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Kerotest Manufacturing Corp.
    b. Perfection Corporation.
    c. R.W. Lyall; brand of Hubbell Utility Solutions; Hubbell Incorporated.
2. Cast-iron, two-section box.
3. Top section with cover with "GAS" lettering.
4. Bottom section with base to fit over valve and barrel a minimum of 5 inches (125 mm) in diameter.
5. Adjustable cast-iron extensions of length required for depth of bury.
6. Include tee-handle, steel operating wrench with socket end fitting valve nut or flat head, and with stem of length required to operate valve.

2.7 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 (DN 50) and smaller; flanged for regulators NPS 2-1/2 (DN 65) and larger.

B. Service Pressure Regulators: Comply with ANSI Z21.80A.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Actaris; a brand of ITT Controls.
    b. Elster-American Meter; a Honeywell Company.
    c. Fischer; Emerson Electric Co., Automation Solutions.
2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: NBR; resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: UV-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to regulator.
9. Pressure regulator is to maintain discharge pressure setting downstream and is to not exceed 150 percent of design discharge pressure at shutoff.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory- or field-installed, stainless steel screen in opening if not connected to vent piping.
12. Maximum Inlet Pressure: 100 psig (690 kPa).

C. Line Pressure Regulators: Comply with ANSI Z21.80A.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Actaris; a brand of ITT Controls.
    b. Dormont; a WATTS brand.

c. Elster-American Meter; a Honeywell Company.
d. Fischer; Emerson Electric Co., Automation Solutions.
e. Maxitrol Company.

2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: NBR; resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: UV-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to regulator.
9. Pressure regulator is to maintain discharge pressure setting downstream and is to not exceed 150 percent of design discharge pressure at shutoff.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory- or field-installed, stainless steel screen in opening if not connected to vent piping.
12. Maximum Inlet Pressure: 2 psig (13.8 kPa).

2.8 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. A.Y. McDonald Mfg. Co.
b. WATTS.
c. Wilkins.
d. Zurn Industries, LLC.

2. Description:

a. Standard: ASSE 1079.
b. Pressure Rating: 150 psig (1035 kPa).
c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Capitol Manufacturing Company.
b. WATTS.
c. Wilkins.

2. Description:

a. Standard: ASSE 1079.
b. Factory-fabricated, bolted, companion-flange assembly.
c. Pressure Rating: 150 psig (1035 kPa).
d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. GPT; a division of EnPRO Industries.

2. Description:

a. Nonconducting materials for field assembly of companion flanges.
b. Pressure Rating: 150 psig (1035 kPa).
c. Gasket: Neoprene or phenolic.
d. Bolt Sleeves: Phenolic or polyethylene.
e. Washers: Phenolic with steel backing washers.

2.9 LABELING AND IDENTIFYING

A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description and rated pressure of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.

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

3.2 PREPARATION

A. Close equipment shutoff valves before turning off natural gas to premises or piping section.

B. Inspect natural-gas piping in accordance with NFPA 54 to determine that natural-gas utilization devices are turned off in piping section affected.

C. Comply with NFPA 54 requirements for preventing accidental ignition.

3.3 INSTALLATION OF OUTDOOR PIPING

A. Comply with NFPA 54 for installation and purging of natural-gas piping.

B. Install underground, natural-gas piping buried at least 36 inches (900 mm) below finished grade. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

1. If natural-gas piping is installed less than 36 inches (900 mm) below finished grade, install it in containment conduit.

C. Install underground, PE, natural-gas piping in accordance with ASTM D2774.

D. Steel Piping with Protective Coating:

1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.

E. Install fittings for changes in direction and branch connections.

F. Install pressure gauge upstream and downstream from each service regulator. Pressure gauges are specified in Section 230519 "Meters and Gauges for HVAC Piping."

3.4 INSTALLATION OF SERVICE-METER ASSEMBLIES

A. Install service-meter assemblies aboveground, on concrete bases.

B. Install metal shutoff valves upstream from service regulators. Shutoff valves are not required at second regulators if two regulators are installed in series.

C. Install strainer on inlet of service-pressure regulator and meter set.

D. Install service regulators mounted outside with vent outlet horizontal or facing down. Install screen in vent outlet if not integral with service regulator.

E. Install metal shutoff valves upstream from service meters. Install dielectric fittings downstream from service meters.

F. Install service meters downstream from pressure regulators.

G. Install metal bollards to protect meter assemblies.

3.5 INSTALLATION OF VALVES

A. Install underground valves with valve boxes.

B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

C. Install anode for metallic valves in underground PE piping.

3.6 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean using sharp dies.
3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:

1. Construct joints in accordance with AWS D10.12/D10.12M, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.
3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Brazed Joints: Construct joints in accordance with AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

F. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.

G. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join in accordance with ASTM D2657.

1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.7 PIPING CONNECTIONS

A. Connect to utility's gas main according to utility's procedures and requirements.

3.8 LABELING AND IDENTIFICATION

A. Install detectable warning tape directly above gas piping, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.9 PAINTING

A. Comply with requirements in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for painting interior and exterior natural-gas piping.

B. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.

1. Alkyd System: MPI EXT 5.1D.

a. Prime Coat: Alkyd anticorrosive metal primer.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Exterior alkyd enamel (flat).
d. Color: Gray.

C. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.10 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Use 3000 psig (20.7 MPa), 28-day, compressive-strength concrete and reinforcement.

3.11 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Test, inspect, and purge natural gas in accordance with NFPA 54 and authorities having jurisdiction.
2. Natural-gas piping will be considered defective if it does not pass tests and inspections.

B. Prepare test and inspection reports.

3.12 OUTDOOR PIPING SCHEDULE

A. Underground natural-gas piping is to be the following:

1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.
2. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

B. Aboveground natural-gas piping is to be one of the following:

1. Steel pipe with malleable-iron fittings and threaded joints.
2. Steel pipe with wrought-steel fittings and welded joints.

3.13 UNDERGROUND, MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Connections to Existing Gas Piping: Use valve and fitting assemblies made for tapping utility's gas mains and listed by an NRTL.

B. Underground:
1. NPS 2 (DN 50) and Smaller: Bronze plug valves.
2. NPS 2-1/2 (DN 65) and Larger: Cast-iron, nonlubricated plug valves.

3.14 ABOVEGROUND, MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Valves for pipe sizes NPS 2 (DN 50) and smaller at service meter are to be one of the following:
   1. Two-piece, full-port, bronze ball valves with bronze trim.
   2. Bronze plug valve.

B. Valves for pipe sizes NPS 2-1/2 (DN 65) and larger at service meter are to be one of the following:

   1. Two-piece, full-port, bronze ball valves with bronze trim.
   2. Bronze plug valve.
   3. Cast-iron, nonlubricated plug valve.

C. Distribution piping valves for pipe sizes NPS 2 (DN 50) and smaller are to be one of the following:
   1. Two-piece, full-port, bronze ball valves with bronze trim.
   2. Bronze plug valve.

D. Distribution piping valves for pipe sizes NPS 2-1/2 (DN 65) and larger are to be one of the following:

   1. Two-piece, full-port, bronze ball valves with bronze trim.
   2. Bronze plug valve.
   3. Cast-iron, nonlubricated plug valve.

END OF SECTION 231123

DIVISION 26 – ELECTRICAL

SECTION 260000 – GENERAL ELECTRICAL PROVISIONS

PART 1 - GENERAL

1.1 REVIT

A. The plans, sections and risers were made with REVIT. This program has some limitations on the types of devices, equipment and accessories... that can be show. The contractor should review the specifications and details for the proper type of devices, equipment and accessories... because what is shown on the plans may be the "closest" available within the limitations of REVIT and not exactly what is required by the contract specifications and details.

B. Mounting heights may have been modified to show elements on the correct floor plan for bidding. Coordinate with the architect and engineer if it is not clear.

C. Components may be orientated for clarity. Actual components shall be orientated as required by specifications, service requirements or manufacturers recommendations.

1.2 GENERAL

A. The General Conditions, Special Conditions, Supplemental Conditions, Instructions to Bidders, and other Contract Documents apply to this branch of the work as well as to the other branches.

B. The Contractor shall familiarize himself with the work of all other trades, general type construction, and the relationship of his work to other sections. He shall examine all working drawings, specifications and conditions affecting his work. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, verify all dimensions in the field and advise the Engineer of any discrepancy before fabricating or performing any work.

C. The work shall include complete testing of all equipment, conduit and wiring at the completion of the work and making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment.

D. Perform any necessary temporary work during construction.

E. Work under this section shall conform to governing codes, ordinances and regulations of the City, County and State.

F. The Contractor shall be responsible for any errors in fabrication, for the correct fitting, installation and erection of the various electrical systems.

1.3 SCOPE

A. Furnish and install all wiring devices and equipment, etc., unless otherwise indicated, for the complete electrical systems. It is the intent that the entire electrical work and all electrical systems shall be complete in every respect and that all outlets, receptacles, fixtures, motors, equipment,

devices, etc., shown, noted, or required shall be completely connected from source of power to final connection, ready for satisfactory operation.

1.4 ELECTRICAL MATERIALS

A. It is the intent of these specifications that the conductive materials used in the manufacture of, but not limited to, the following types of equipment be of copper construction:
   1. Electrical Power Conductors and Cables (all voltages)
   2. Transfer Switches

1.5 CONCRETE FOUNDATION PADS

A. The Contractor under this Division will provide all concrete curbs, bases and pads for all electrical equipment shown on the Drawings.

B. The Contractor for this Division shall verify the sizes and locations of all supports, curbs, bases and pads prior to the pouring of same to be certain that the installed units will fit.

C. The Contractor for this Division shall set anchor bolts in exact position prior to pouring of concrete. Sizes and locations of bolts shall be determined by the manufacturer's recommendations for the equipment served.

D. All concrete pads shall be installed prior to setting equipment in place.

1.6 PROTECTION

A. All work, equipment and materials shall be protected at all times. All conduit openings shall be closed with caps or plugs during construction. All equipment and accessories shall be tightly covered and protected against dirt, water or other injury during the period of construction.

1.7 EQUIPMENT FURNISHED BY OTHERS

A. It shall be the responsibility of this Contractor to check voltage and current ratings of motors, relays, starters, switches, etc., of equipment furnished by others not connected under this section of the specifications. Nominal motor voltage ratings should be as follows:

   1. For connection to 480V system – NEMA 460 volts
   2. For connection to 208V system - NEMA 200 volts.
   3. For connection to 110V system - NEMA 115 volt.

B. Motors not conforming to these ratings shall be called to the attention of the related subcontractor and the Owner/Architect.

1.8 EQUIPMENT INSTALLATION INSTRUCTIONS

A. Install electrical conduit, wiring and equipment in strict accordance with manufacturer's recommendations. Provide equipment accessories necessary for proper operation or recommended by the manufacturer, even if such accessories are not shown on the drawings or mentioned in the specifications.

1.9 INSTALLATION OF EQUIPMENT

A. All appliances, materials and equipment shall be installed and connected in accordance with the best engineering practice and in accordance with manufacturers' instructions and recommendations. All electrical connections, etc., recommended by the manufacturer or required for proper operation shall be furnished and installed complete.

1.10 EQUIPMENT CONNECTIONS

A. Make connections to equipment furnished by others whenever such equipment is shown on any part of the drawings or mentioned in any section of the specifications.

B. Verify equipment locations and the sizes, number, locations, and types of connections to be made before installation of any such equipment.

1.11 BELT AND MACHINERY GUARDS

A. Belt Guards

1. Each belt drive shall be equipped with a guard, constructed of 12-gauge sheet steel, and designed to enclose all moving parts. Tops and bottoms of guards shall be of 18-gauge sheet steel.
2. Guards shall be designed with adequate provision for motor adjustments. Means shall also be provided to permit oiling, use of speed counters, and other maintenance and testing operations with the guard in place.

B. Machinery Guards

1. Each rotating shaft flexible coupling shall be provided with a removable protective guard constructed of a U-shaped 16-gauge sheet steel plate with securing flange to floor or base. Length of guards shall be sufficient to overhang rotating couplings a minimum of 1" on each side.
2. Guards shall be secured to the foundations or floors by heavy angle supports and anchor bolts. Braces or supports secured to motors will not be permitted and braces or supports must not "bridge" the sound and vibration isolators.

1.12 OPENINGS

A. The Contractor under this Division shall be responsible for the openings he may require in floors, walls or ceilings of any type construction whether or not shown on the Architectural and/or Structural Drawings.

B. Openings that have been shown on the Architectural and/or Structural Drawings will be provided under other Divisions; however, the responsibility for the correct size and location of such openings shall be that of the Contractor under this Division.

C. Openings that have <u>not</u> been shown on the Architectural and/or Structural Drawings shall be provided by the Contractor under this Division as directed by the Architect.

1.13 FIRE BARRIER PENETRATION SEALS:

A. Provide seals for any opening through any walls, floors, or ceilings used as passage for electrical components such as conduit, cabling, etc.

B. General: Provide manufacturer's standard fire-stopping sealant, with accessory materials, having fire-resistance ratings as established by testing identical assemblies per ASTM E 8l4 by Underwriters' Laboratories, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction. Sealant shall provide protection equal or exceeding the fire resistance rating of fire rated walls, partitions, ceilings or floors. Use two-part or one-part sealants as required to meet required fire resistance ratings.

C. Foamed-In-Place Fire-Stopping Sealant: Two-part, foamed-in-place, silicone sealant formulated for use in a through-penetration fire-stop system for filling openings around cables, conduit, pipes and similar penetrations through walls and floors.

D. One-Part Fire-Stopping Sealant: One-part elastomeric sealant formulated for use in a through-penetration fire-stop system for sealing openings around cables, conduit, pipes and similar penetrations through walls and floors.

E. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:

F. Products: Subject to compliance with requirements, provide one of the following:

1. Foamed-in-Place Fire-Stopping Sealant:

   a. "Dow Corning Fire Stop Foam"; Dow Corning Corp.
   b. "Pensil 85l"; General Electric Co.

2. One-Part Fire-Stopping Sealant:
   a. "Dow Corning Fire Stop Sealant"; Dow Corning Corp.
   b. "3M Fire Barrier Caulk CP-25"; Electrical Products Div./3M.
   c. "RTV 7403"; General Electric Co.
   d. "Fyre Putty"; Standard Oil Engineered Materials Co.

G. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing, and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

1.14 SINGULAR NUMBER

A. In all cases where a device or piece of equipment is referred to in the singular number (such as a light fixture, etc.), it is intended that such reference shall apply to as many such items as are required to complete the installation.

1.15 CONNECTION TO EXISTING ELECTRICAL SYSTEMS

A. The Contractor under this Division shall make all necessary electrical connections to all undisturbed existing electrical systems, as shown on the Drawings and/or required for their proper operation with the new system.

1.16 UTILITY SERVICE MARKERS

A. The Contractor under this Division shall furnish and install markers for underground electrical utility services at the locations shown on the Drawings. The exact location of services shall be determined at the time of installation by triangulation.

B. Markers shall consist of bronze plates, ground and polished, marked to identify the service. Markers shall also be stamped with arrows indicating the direction the service extends. A typical marker detail is shown on the Drawings.

C. Markers locating services at the building shall be installed in masonry or concrete walls two feet (2') above grade. Markers locating services elsewhere on the site shall be installed in concrete walks or curbs, or in 6" x 6" steel reinforced concrete posts as detailed.

D. One marker may be used for a maximum of two (2) common services such as primary and secondary duct banks. Where one marker is used, it shall be labeled with both services.

1.17 SPECIAL NOTE

A. All openings in electrical equipment, enclosures, cabinets, outlet and junction boxes shall be by means of standard knockouts or shall be sawed or drilled. The use of a cutting torch is prohibited.

1.18 EQUIPMENT IDENTIFICATION

A. The Contractor for this Division shall furnish and install on all electrical equipment such as switches, starters, panelboards, etc., a nameplate giving its name and function.

B. Nameplates shall be engraved bakelite (white letters on black background) and shall be equal to Seton Nameplate, C. H. Hanson or Identifications.

1.19 MOTOR PROTECTION INFORMATION

A. The Contractor for this Division shall provide the following information for each motor installed on this project, regardless of the supplying Contractor:

1. Motor full load current
2. Motor starter heater size - where applicable
3. Fuse size

B. This information shall be provided in tabulation form before final payment will be made to the Contractor.

1.20 EQUIVALENT MATERIAL AND EQUIPMENT

A. The material and equipment described herein have been specified according to particular trade names or makes; however, the Contractor may offer substitute material and equipment in lieu of that specified, provided such material and equipment meet all the requirements of those specified and are approved by the Architect. /Engineer. The manufacturer's warranty covering each item of substituted material or equipment shall be equal to the warranty covering the material or equipment specified.

B. Where equipment is approved which requires different arrangement of connections from those shown, it shall be the responsibility of the Contractor to install the equipment to operate properly and in harmony with the intent of the Drawings and Specifications, and to make all changes in the work required by the different arrangement of connections.

1.21 PERMITS, CODES AND APPROVALS

A. Permits

1. All permits necessary for the complete Electrical systems shall be obtained by the Contractor for Division 26 from the authorities governing such work. The cost of all permits shall be borne by this Contractor.

B. Codes and Rules and Regulations

1. The minimum standard for all electrical work shall be the latest revision of the National Electrical Code. Whenever and wherever state and/or local laws and/or regulations require a higher standard than the current National Electrical Code, then these laws and/or regulations shall be followed.

C. Approvals

1. All work must be approved by the Architect /Engineer and the Owner before final payment will be made.

1.22 INSPECTIONS

A. Electrical inspections will be performed throughout the course of construction by an electrical inspector from the State Fire Marshal's office. Upon project completion, and when wiring, equipment and fixtures have been installed, inspected and found to be in compliance with the National Electrical Code, the inspector will issue a certificate of compliance to the Owner. All costs incidental to the electrical inspection shall be borne by the Contractor for Division 26.

B. The inspection shall be scheduled for rough as well as finished work. The rough inspection shall be divided into as many inspections as may become necessary to cover all roughing-in. A punch list inspection shall be scheduled with a representative of the Architect /Engineer present. The punch list inspection shall be made with panelboard and junction box covers removed.

C. Before final acceptance, the Contractor for Division 26 shall furnish a Certificate of Final Approval by the Electrical Inspector to the Architect /Engineer and the Owner.

1.23 UL LISTINGS

A. Materials and appliances for the type for which there are Underwriters' Laboratories standard requirements listings and labels, shall have listing of Underwriters' Laboratories and shall be so labeled, or shall conform to their requirements, in which case certified statements to that effect shall be furnished by the manufacturer with a copy of an examination report by a recognized testing laboratory acceptable to the Engineer.

1.24 WORKMANSHIP

A. Competent workmen shall be employed on all phases of the work. Poor workmanship will be rejected and will constitute cause for removal of the individual performing the work.

1.25 COOPERATION WITH OTHER CONTRACTORS

A. Each Contractor shall demand and examine all Drawings and Specifications pertaining to the construction before installing the work described and shown under these Drawings and Specifications. Each Contractor shall cooperate with all other Contractors in locating piping, conduit, openings, chases and equipment in order to avoid conflict with any other Contractor's work. All work installed above a lay-in ceiling must be coordinated and installed so there is a minimum of 4 inches between the top of the ceiling grid and the bottom of the installation.

B. If any discrepancies occur between the accompanying Drawings and these Specifications and Drawings and Specifications covering other Contracts, each Contractor shall report such discrepancies to the Architect/Engineer 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 interferes with work and equipment of other Contractors.

1.26 COORDINATION OF WORK ABOVE LAY-IN CEILING

A. All work installed above a lay-in ceiling must be coordinated and installed so there is a minimum of 4 inches between the top of the ceiling grid and the bottom of the installation. Installation shall not obstruct equipment access space or equipment removal space.

1.27 MAINTAINING EXISTING FACILITIES

A. The existing services to and within the building shall be maintained during the construction without interruption, except for short periods of time that may be required to make changeover connections. The Architect /Engineer shall be notified in advance and an agreement reached as to when the connections are to be made and the length of time the particular facility will be out of service.

B. All temporary connections that may be necessary to continue these services shall be properly made and maintained in a safe and substantial manner until the permanent facilities are activated. Upon completion, remove all temporary work, and completely restore all areas that may be affected.

C. At any time the existing building facilities are interrupted, the Contractor shall work continuously until the permanent services are restored. The Contractor shall pay for all premium time necessary to comply with these requirements.

1.28 GUARANTY CERTIFICATES

A. Certificates of guaranty accompanying those items of mechanical and electrical equipment on which manufacturer's guarantees have been specified, or are normally provided, shall be completely executed by the Contractor and delivered to the Architect before completion of the work.

1.29 CLEANING

A. After the Architect /Engineer has completed examination, the Contractor shall remove all stickers, tags, etc., and shall thoroughly clean all equipment, fixtures and materials installed under his section of the work.

B. Surplus material, rubbish and equipment resulting from the work shall be removed from the building and premises by the respective Contractors upon completion of the work in accordance with the General Conditions.

1.30 PAINTING

A. All exposed conduit and equipment installed under this Division, where required, shall be thoroughly cleaned and readied for painting.

B. Painting in new areas and in existing building areas shown to be remodeled on the Architectural Drawings will be done by the Contractor under Division 9.

C. Painting in all other areas of the existing building which have been cut and patched under this Division shall be painted to match exactly the existing adjacent surfaces. Where a match cannot be made, the entire surface shall be repainted. All painting shall be performed in strict accordance with the Specifications in Division 9. All exposed electrical work in these areas shall also be painted to match adjacent surfaces.

D. Do not paint Cables or Wires.

1.31 WORKMANSHIP

A. Work shall be performed by mechanics skilled in their respective trades and shall present appearance typical of best trade practice. Work not installed in this manner shall be repaired, removed or replaced, or otherwise remedied as directed by the Architect/Engineer.

1.32 SUPERVISION

A. The Contractor shall personally supervise the work or have a competent superintendent, satisfactory to the Architect/Engineer and Owner on the work at all times during progress with full authority to act.

B. The Contractor shall lay out his work and be responsible for any 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. Work at the site of the project shall be observed by the Architect/Engineer or his representative.

C. Final Inspection: At the time of final inspection of the work performed under this Contract, systems shall be complete in every respect and in perfect operating condition. Surplus materials of every character resulting from work of this section shall have been removed. Sanitary sewers shall be free from sand, silt or other obstructions. Any defect discovered in the utilities subsequent to this inspection shall have been corrected.

1.33 INTERPRETATIONS

A. Wherever in these Specifications, the term "General Contractor" is used, it shall be understood to mean the Contractor engaged in the general construction portion of the work. Similarly, wherever the "Heating and Air Conditioning Contractor," "Plumbing Contractor," "Sprinkler Contractor," or "Contractor for Division 26" is mentioned as such, it shall be understood to refer to the Contractor engaged in that particular branch of the work.

1. It shall also be clearly understood that all Contractors for all branches of the work shall cooperate with each other in the coordination of the construction.
2. It shall also be clearly understood that the entire construction is one responsibility and all Contractors for all branches of the work shall cooperate with each other in the coordination of the construction.

1.34 WORKING DRAWINGS

A. Scale of drawings is approximate. Do not scale the drawings to determine locations of electrical work. Exact locations, dimensions and elevations shall be governed by field conditions. Make field measurements of building before fabricating or installing equipment or materials.

B. Drawings are based on physical dimensions of one or more manufacturer's equipment. Other approved equipment shall be of such dimensions that it can be readily installed in available space, leaving ample clearance for proper maintenance.

C. Intent of drawings is to show systems and sizes. Drawings do not necessarily show all required offsets. Work shall be installed to conform with space limitations. Offsets, transitions, fittings, etc., shall be provided as part of the Contract where required to attain this objective.

1.35 ELECTRICAL DRAWINGS AND SPECIFICATIONS

A. The Drawings and Specifications are intended to cover all work enumerated under the respective headings. The Drawings are diagrammatic only. The Contractor shall not take advantage of conflict or error between the Drawings and Specifications but shall request a clarification of such before making his proposal.

1.36 ARCHITECTURAL DRAWINGS AND SPECIFICATIONS

A. The Contractor shall refer to the Architectural and Structural Drawings and Specifications for the general construction of the building, for floor and ceiling heights, for location of walls, partitions, beams, etc., and shall be guided accordingly for the setting of all sleeves, inserts and equipment.

B. Under no circumstances shall a Contractor scale the Drawings for the location of equipment and work.

1.37 DISCREPANCIES

A. If any discrepancies occur between the accompanying Drawings and these Specifications and Drawings and Specifications covering other Contracts, report such discrepancies to the Architect/Engineer 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 interferes with work and equipment of other Contractors.

1.38 RESTORATION OF SURFACES

A. The Contractor shall restore to their original conditions all paving, curbing, sidewalks, surfaces, drainage ditches, and structures, fences, shrubs, and other items damaged or removed by his

operations. Replacement and repairs shall be in accordance with good construction practice and shall match material employed in the original construction of the item to be replaced.

B. Unless otherwise noted in the Architectural specifications, this contractor shall seal, repair, and/or patch all openings and disturbances to the building surfaces resulting from the demolition and installation of equipment. Repairs and patching shall match the existing surfaces and be in accordance with the Architectural specifications, where applicable. See paragraph above concerning painting for additional requirements.

1.39 EXCAVATION, TRENCHING AND BACKFILLING

A. Photographs: The contractor shall photograph all underground utilities before backfilling. Photographs shall be oriented and labeled so that the locations, all crossings and depths of the utilities can be determined from the photographs

B. General: Excavate in accordance with requirements of Division Section “EARTHWORK” and requirements of this Section. Lay the conduit in open trench except when the Architect/Engineer gives written permission for tunneling. Open the trench sufficiently ahead of pipe laying to reveal obstructions. Maintain easy access to fire hydrants by fire fighting apparatus.

C. Provide trench crossing as necessary to accommodate public travel.

D. Separate Trenches: Unless otherwise shown or requested, provide separate trenches for communication and power feeders, respectively, with a minimum of 3' of undisturbed earth between trenches. Always place gas lines in a separate trench from electrical lines.

E. Width of Trench: Excavate trenches of sufficient width for proper installation of work. When the depth of backfill over sewer pipe exceeds 10', keep the trench at the level of the top of the pipe as narrow as possible.

F. Sheeting and Bracing: Sheet and brace trenches as necessary to protect workmen and adjacent structures. Comply with local regulations or, in the absence thereof, with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc. Do not remove sheeting until trench is backfilled sufficiently to protect pipe and prevent injurious caving. When ordered in writing by the Architect/ Engineer, leave sheeting in place and the Contract will be adjusted (See General Conditions): cut off such sheeting not to be removed at least 3' below finished grade.

G. Water Removal: Keep trenches free from water while construction therein is in progress. Under no circumstances lay pipe or appurtenances in water. Pump or bail water from bell holes to permit proper jointing of pipes. Conduct the discharge from trench dewatering to drains or natural discharge channels.

H. Disposition of Utilities: Observe rules and regulations governing the respective utilities in executing work under this heading. Protect active utilities from damage or remove in accordance with written instructions of the Architect/Engineer (See General Conditions). Plug, cap or remove inactive and abandoned utilities encountered in trenching operations. In absence of specific requirements, plug or cap such utility line at least 3' from utility line to be installed or as required by local regulations.

I. Rock Excavation: Materials to be excavated shall include earth and any other material including rock encountered within the limits of trench excavation for the utilities to the depth and extent indicated on the drawings and herein specified. In case of any change ordered by the Owner or Architect/Engineer in the quantity of excavation, the contract price will be adjusted by unit price

or as described under Excavation, Filling and Grading of Division Site Work of these specifications. The term "rock" as used is defined to be hard material in nature that cannot be dislodged from its bed and removed therefrom without blasting or drilling. Any other is "earth" insofar as removal of the material to be excavated is concerned.

J. Blasting: See Division Section “EARTHWORK” to see if blasting is allowed. If blasting is allowed, obtain written approval of method from Architect/Engineer before proceeding with rock excavation.

K. Trench Bottoms: Lay all conduit, unless otherwise noted or detailed, in undisturbed earth. Bedding shall be in place and graded before pipe is installed.

L. Special Supports: Whenever, in the option of the Architect/Engineer, the soil at or below the requisite pipe grade is unsuitable for supporting duct banks or other utilities and appurtenances specified in this section, provide special support as the Architect/Engineer may direct and the Contract Price will be adjusted. (See General Conditions).

M. Tree Protection: Exercise care to protect the roots of trees to remain. Within the branch spread of such trees, perform trenching by hand. Open the trench only when the utility can be installed immediately; prune injured roots cleanly and backfill as soon as possible. Perform this work under the direction of the Architect/Engineer.

N. Backfilling: Inspect and test piping and record locations of pipe lines and appurtenances before backfilling.

O. Trenches Under Floor Slabs: Backfill under floor slab on grade to a point 5’-0” outside of perimeter building wall with [flowable] fill as specified in Division Section “EARTHWORK”. Remove excess excavation materials from the site daily unless otherwise instructed.

P. Trenches in Other Areas: Backfill with materials in accordance with Division Section “EARTHWORK”. Compact backfill thoroughly with a heavy tamper.

Q. The Contractor, at his option, may backfill the remaining depth of the trench from 12" above top of piping to 12" below finished grade with sand, wash gravel, or fine rock chat. The remaining depth of the trench would then be backfilled as specified in the preceding specification.

1.40 SOIL MATERIALS

A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.

B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

D. Backfill and Fill Materials: Satisfactory soil materials.

1.41 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

1.42 SHOP DRAWINGS

A. Equipment and material shop drawings, catalog sheets and descriptive data shall be submitted, each with a cover sheet first listing the project name, the Contractors, Architect and Engineer, and date of submittal. Next the section of the Specifications shall be listed stating the section for which the equipment is being proposed. Next, outline equipment showing compliances to the specification requirements, such as capacities, special accessories, options, model, sizes, etc. Reverse side of cover sheet shall be left for Contractors' stamps showing review and space for Engineers' review stamp. Catalog sheets shall be marked showing equipment proposed.

B. Materials submitted without cover sheet or Contractor review stamp and without required information will be returned to the Contractor.

C. No roughing-in, connections, etc., shall be done until acceptable shop drawings are in the hands of the Contractors. It shall be the responsibility of the Contractor to obtain acceptable shop drawings and to make connections, etc., in the neatest and most workmanlike manner possible.

D. Submittal data must be complete for each piece of equipment. Partial or incomplete data will not be processed.

1.43 PHASING OF WORK

A. The Contractor under this Division shall refer to Division 1, Section 01100, for a complete description of the schedule for phasing of work on this project.

1.44 STRUCTURAL RESPONSIBILITY

A. 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. No structural member shall be cut or otherwise weakened in any manner without the written consent of the Architect/Engineer.

B. 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 Owner or Architect/Engineer, without cost to either the Owner or the Architect/ Engineer.

1.45 ASBESTOS

A. If during the course of his work the Contractor observes the existence of asbestos, or asbestos-bearing materials, the Contractor shall immediately terminate further work on the project and notify the Owner of the condition. The Owner will, after consultation with the Engineer, determine a further course of action.

1.46 OWNER INSTRUCTION

A. Conduct a full-day walk-through instruction seminar for the Owner's personnel to be involved in the continued operation and maintenance of mechanical equipment and systems. Explain the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.

B. Engage factory-authorized service representatives for the following equipment to train Owner's maintenance personnel:

1. Generator and Transfer Switches

C. All training shall be video recorded for future use by the Owner in training new personnel.

1.47 ACCESS UNITS

A. General: The work of this article is limited to the provisions for access through other work for access to electrical work and does not include internal access provisions (within the electrical work). In general, and where possible, furnish or furnish-and-mount required access units in other trades' work prior to their work, so that cutting and patching for the subsequent installation of such access units will not be required. In occupied spaces, provide finished access units of the maximum concealment type, including locks where appropriate, and matching access units provided in the same expanse of finish (for non-mechanical access, if any).

B. The scope of access units to be furnished or provided as electrical work includes those units indicated on the electrical drawings or specified in Division 26 sections, and those additional units required for adequate access to electrical work and not shown or specified individually.

C. Access Doors: Standard welded-steel construction, 16-gage frames and 14 gage door panels, 175 degree concealed spring hinges, rust-inhibitive prime coat, flush cam lock (for screw-driver operation where keyed lock is not required), recessed to receive applied finish where applicable (such as in concealed spline ceilings).

D. Removable Access Plates: Where only hand access is sufficient, provide removable plate-type access unit, or minimum size which will facilitate the required access. Provide units of the type, style, design, material and finish appropriate for the location and exposure in each instance. In exposed surfaces of occupied spaces provide round plate units, flush floor units and frameless low-profile wall units, primed-for-paint in painted surfaces and polished chrome or stainless-steel finish in other surfaces.

E. Access Thru Fire Rated Walls or Ceilings: Where access doors or plates are required in fire rated partitions or ceilings, provide U.L. listed "B" Label doors or plates rated for 1-1/2 hours. Furnish doors with automatic closers and key operated latches that latch automatically when door closes.

1.48 OWNER OCCUPANCY

A. Full Owner Occupancy: The Owner will occupy the site and buildings surrounding construction area during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work to minimize interference with the Owner's operations. Perform portions of work on premium time if required to do so by the Owner.

1.49 PROVIDING AIRTIGHT SPACES

A. In rooms where room walls extend above ceiling to the floor or roof above, caulk around all new and existing penetrations through walls, ceilings, floors and/or roofs to make completely airtight rooms. Seal penetrations both above and below suspended ceilings. Seal any openings left by removal of any existing or new work. Caulking used shall be the same type as specified in the Architectural Specifications.

B. Patch around rough openings of penetrations to form a tight fit before caulking.

1.50 LINTELS:

A. General: Provide lintels for penetration of electrical systems through masonry walls if not provided elsewhere in these specifications. Lintels shall be type and size required to span the required openings.

B. Lintels will not be required for openings 16 inches length or less.

1.51 ELECTRICAL WORK IN EXISTING (RENOVATED) AREAS

A. In existing areas where new work is shown, remove all existing exposed conduits, wiremold, surface and flush outlet boxes, wiring devices, fixtures, panels, etc., not required for new arrangement.

B. Maintain and restore, if interrupted by removals or in path of new construction, all circuits, conduits and feeders passing through and serving undisturbed areas (shown or not shown).

C. Install all new work as indicated. Flush outlet boxes may be reused if at proper height, location and in good condition. Existing concealed conduits may be reused if in good condition, circuitry shown on plans shall govern. All other materials removed shall be removed from the job site or turned over to the Owner.

D. Where any existing outlet (electric, telephone, nurse call, TV, etc.) is noted or required to be removed, the Contractor under this Division shall connect conduit, pull in new conductors and reconnect as required for feed-thru of circuits to ensure all circuits downstream from removed outlets will remain operational.

E. Before start of work, the Contractor shall check all existing devices, light fixtures and equipment that is noted or required to be reused, to satisfy himself that they are operating properly. Should any of the items not be operating, the Contractor shall report same to the Architect/Engineer and await his directions. Contractors not complying with the above will be responsible for providing operational items as his expense.

F. Contractor shall make a complete survey of the existing building before bidding the project. Any conflicts between the plans and/or notes and existing conditions must be brought to the attention of the Architect/Engineer before bidding. If no questions and/or conflicts are brought to the attention of the Architect/Engineer, it will be assumed that the Contractor has completed the survey.

PART 2 - PRODUCTS

2.1 Not Applicable

PART 3 - EXECUTION

3.1 Not Applicable

END OF SECTION 260000

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.5 CONDUITS IN EXPOSED CEILING AREAS

A. Where overhead conduits will be exposed in areas with no ceilings, conduits shall be installed parallel/perpendicular to the building structure. Conduits shall be concealed from view as much as practical behind structural members while maintaining accessibility. Conduits shall be grouped together in an organized fashion to minimize space occupied by conduits. Conduits shall be held tight to bottom of slab above to maximize vertical space below conduits. Conduits shall be concealed above adjacent soffits or accessible ceilings, where possible.

END OF SECTION 260500

SECTION 260519 – LOW-VOLTAGE ELECTRIAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire.
2. Connectors and splices.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

D. Conductor Insulation:
1. Type THHN and Type THWN-2: Comply with UL 83.

E. Shield:

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: One hole with standard barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders:

1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits:

1. Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.

B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION, GENERAL

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

G. Complete cable tray systems installation according to Section 260536 "Cable Trays for Electrical Systems" prior to installing conductors and cables.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inch (300 mm) of slack.

3.5 IDENTIFICATION

A. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

END OF SECTION 260519

SECTION 260526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes grounding and bonding systems and equipment.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

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. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B3.
2. Stranded Conductors: ASTM B8.
3. Tinned Conductors: ASTM B33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.3 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

C. Mechanical-Type Bus-Bar Connectors: Cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

D. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

E. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

F. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.

G. Conduit Hubs: Mechanical type, terminal with threaded hub.

H. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

I. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.

J. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.

K. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.

L. Straps: Solid copper, copper lugs. Rated for 600 A.

M. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

N. Water Pipe Clamps:

1. Mechanical type, two pieces with zinc-plated bolts.

a. Material: Die-cast zinc alloy.
b. Listed for direct burial.

2. U-bolt type with malleable-iron clamp and copper ground connector.

2.4 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 ft. (19 mm by 3 m).

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install barecopper conductor, No. 2/0 AWG minimum.

1. Bury at least 30 inch (750 mm) below grade.

C. Grounding Conductors: Green-colored insulation with continuous yellow stripe.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors must be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

A. Generator: Install grounding electrode(s) at the generator location. The electrode must be connected to the equipment grounding conductor and to the frame of the generator.

B. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inch (150 mm) from the foundation.

3.4 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

3.5 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inch (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. Use exothermic welds for all below-grade connections.
3. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

F. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 ft. (18 m) apart.

G. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

END OF SECTION 260526

SECTION 260529 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Support, anchorage, and attachment components.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch (10 mm) diameter holes at a maximum of 8 inch (200 mm) on center in at least one surface.
1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
2. Material for Channel, Fittings, and Accessories: Galvanized steel.
3. Channel Width: Selected for applicable load criteria.
4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs must have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body must be made of malleable iron.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325 (Grade A325M).
5. Toggle Bolts: All steel springhead type.
6. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 SELECTION

A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA NEIS 101

B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."

C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and ERMC as required by NFPA 70. Minimum rod size must be 1/4 inch (6 mm) in diameter.

D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slottedsupport system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps.

E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2 inch (38 mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 INSTALLATION OF SUPPORTS

A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA NEIS 1, EMT may be supported by openings through structure members, in accordance with NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination must be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M. Submit welding certificates.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated, but not less than 4 inch (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000 psi (20.7 MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."

C. Anchor equipment to concrete base as follows:

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup:

1. Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

    a. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Type EMT-S raceways and elbows.
2. Type ERMC-S raceways, elbows, couplings, and nipples.
3. Type LFMC raceways.
4. Type PVC raceways and fittings.
5. Fittings for conduit, tubing, and cable.
6. Threaded metal joint compound.
7. Solvent cements.

PART 2 - PRODUCTS

2.1 TYPE EMT-S RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 797 and UL Category Control Number FJMX.

B. Steel Electrical Metal Tubing (EMT-S) and Elbows:
1. Material: Steel.
2. Options:

a. Exterior Coating: Zinc.
b. Interior Coating: Zinc.
c. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.2 TYPE ERMC-S RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 6 and UL Category Control Number DYIX.

B. Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:
1. Exterior Coating: Zinc.
2. Options:

a. Interior Coating: Zinc.
b. Minimum Trade Size: Metric designator 21 (trade size 3/4).
c. Colors: As indicated on Drawings.

2.3 TYPE LFMC RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 360 and UL Category Control Number DXHR.

B. Steel Liquidtight Flexible Metal Conduit (LFMC-S):
1. Material: Steel.
2. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
b. Colors: As indicated on Drawings.

2.4 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651 and UL Category Control Number DZYR.

B. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:
1. Dimensional Specifications: Schedule 40.
2. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
b. Markings: For use with maximum 90 deg C wire.

C. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:
1. Dimensional Specifications: Schedule 80.
2. Options:

a. Minimum Trade Size: Metric designator 16 (trade size 1/2).
b. Markings: For use with maximum 90 deg C wire.

2.5 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Fittings for Type ERMC, Type PVC Raceways:
1. General Characteristics: UL 514B and UL Category Control Number DWTT.
2. Options:

a. Material: Steel.
b. Coupling Method: **Compression type for Conduit sizes 2-1/2” and smaller, set-screw or compression type for conduit sizes larger than 2-1/2”.**
c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

C. Fittings for Type EMT Raceways:
   1. General Characteristics: UL 514B and UL Category Control Number FKAV.
   2. Options:

      a. Material: Steel.
      b. Coupling Method: **Compression type for Conduit sizes 2-1/2" and smaller, set-screw or compression type for conduit sizes larger than 2-1/2".**
      c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
      d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

D. Fittings for Type LFMC and Type LFNC Raceways:
   1. General Characteristics: UL 514B and UL Category Control Number DXAS.

2.6 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

   1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
   2. General Characteristics: UL 514A and UL Category Control Number QCIT.

B. Metallic Outlet Boxes:

   1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
   2. Options:

      a. Material: Sheet steel.
      b. Sheet Metal Depth: Minimum 2.5 inch (65 mm).
      c. Luminaire Outlet Boxes and Covers: Nonadjustable, listed and labeled for attachment of luminaire weighing up to 50 lb (23 kg).
      d. Paddle Fan Outlet Boxes and Covers: Nonadjustable, designed for attachment of paddle fan weighing up to 70 lb (32 kg).

C. Metallic Device Boxes:

   1. Description: Box with provisions for mounting wiring device directly to box.
   2. Options:

      a. Material: Sheet steel.
      b. Sheet Metal Depth: minimum 2.5 inch (65 mm).

D. Metallic Extension Rings:

   1. Description: Ring intended to extend sides of outlet box or device box to increase box depth, volume, or both.

2.7 CABINETS, CUTOUT BOXES, JUNCTION BOXES, PULL BOXES, AND MISCELLANEOUS ENCLOSURES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:

    a. Non-Environmental Characteristics: UL 50.
    b. Environmental Characteristics: UL 50E.

B. Indoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.
3. Options:

2.8 COVER PLATES FOR DEVICES BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:

    a. Reference Standards: UL 514D and UL Category Control Numbers QCIT and QCMZ.
    b. Wallplate-Securing Screws: Metal with head color to match wallplate finish.

PART 3 - EXECUTION

3.1 SELECTION OF RACEWAYS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Architect for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Severe Physical Damage: ERMC.
2. Exposed and Subject to Physical Damage: ERMC.

    a. Locations less than 2.5 m (8 ft) above finished floor.

3. Exposed and Not Subject to Physical Damage: ERMC.
4. Concealed Aboveground: ERMC.
5. Direct Buried: PVC-40.
6. Concrete Encased Not in Trench: PVC-40.
7. Concrete Encased in Trench: PVC-40.
8. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

C. Indoors:

1. Exposed and Subject to Physical Damage: EMT. Subject to physical damage includes the following locations:

    a. Locations less than 2.5 m (8 ft) above finished floor.
    b. Stub-ups to above suspended ceilings.

2. Exposed and Not Subject to Physical Damage: PVC-40.
3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC: Provide threaded type fittings unless otherwise indicated.

3.2 SELECTION OF BOXES AND ENCLOSURES

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:

    a. Type 3R unless otherwise indicated.

2. Indoors:

    a. Type 1 unless otherwise indicated.

C. Exposed Boxes Installed Less Than 2.5 m (8 ft) Above Floor:
1. Provide exposed cover. Flat covers with angled mounting slots or knockouts are prohibited.

3.3 INSTALLATION OF RACEWAYS

A. Installation Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways. Consult Architect for resolution of conflicting requirements.
2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
3. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
4. Comply with NECA NEIS 101 for installation of steel raceways.
5. Comply with NECA NEIS 102 for installation of aluminum raceways.
6. Comply with NECA NEIS 111 for installation of nonmetallic raceways.
7. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
8. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-

1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

9. Raceway Terminations at Locations Subject to Moisture or Vibration:

    a. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG. Install insulated throat metal grounding bushings on service conduits.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.
2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft (0.6 m) above finished floor.
3. Install no more than equivalent of three 90-degree bends in conduit run. Support within 12 inch (300 mm) of changes in direction.
4. Make bends in raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
5. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
6. Support conduit within 12 inch (300 mm) of enclosures to which attached.
7. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.
8. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of raceways at the following points:

    a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
    b. Where an underground service raceway enters a building or structure.
    c. Conduit extending from interior to exterior of building.
    d. Conduit extending into pressurized duct and equipment.
    e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
    f. Where otherwise required by NFPA 70.

9. Do not install raceways or electrical items on "explosion-relief" walls or rotating equipment.
10. Do not install conduits within 2 inch (50 mm) of the bottom side of a metal deck roof.
11. Keep raceways at least 6 inch (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
12. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
13. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inch (300 mm) of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Types ERMC:

a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

2. Types FMC, LFMC, and LFNC:

a. Comply with NEMA RV 3. Provide a maximum of 36 inch (915 mm) of flexible conduit forequipment subject to vibration, noise transmission, or movement; and for transformers and motors.

3. Types PVC and EPEC:

a. Do not install Type PVC or Type EPEC conduit where ambient temperature exceeds 122 deg F (50 deg C). Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.
b. Comply with manufacturer's written instructions for solvent welding and fittings.

D. Stub-ups to Above Recessed Ceilings:

1. Provide EMT for raceways.
2. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

E. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC-S-PVC: Provide only fittings listed for use with this type of conduit. Patch and seal joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Provide sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
2. EMT: Use **Compression type for Conduit sizes 2-1/2" and smaller, set-screw or compression type for conduit sizes larger than 2-1/2".** Comply with NEMA FB 2.10.
3. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

F. Expansion-Joint Fittings:

1. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F (17 deg C) and that have straight-run length that exceeds 25 ft (7.6 m). Install in runs of aboveground ERMC and EMT conduit that are located where environmental temperature change may exceed 100 deg F (55 deg C) and that have straight-run length that exceeds 100 ft (30 m).
2. Install type and quantity of fittings that accommodate temperature change listed for the following locations:

a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
d. Attics: 135 deg F (75 deg C) temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
4. Install expansion fittings at locations where conduits cross building or structure expansion joints.
5. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

G. Raceways Penetrating Rooms or Walls with Acoustical Requirements:

1. Seal raceway openings on both sides of rooms or walls with acoustically rated putty or firestopping.

3.4 INSTALLATION OF SURFACE RACEWAYS

A. Install surface raceways only where indicated on Drawings.

B. Install surface raceway with a minimum 2 inch (50 mm) radius control at bend points.

C. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inch (1200) mm) and with no less than two supports per straight raceway section. Support surface raceway in accordance with manufacturer's written instructions. Tape and glue are unacceptable support methods.

3.5 INSTALLATION OF BOXES AND ENCLOSURES

A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.

B. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box, whether installed indoors or outdoors.

C. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

D. Locate boxes so that cover or plate will not span different building finishes.

E. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.

F. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.

G. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

H. Set metal floor boxes level and flush with finished floor surface.

I. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

J. Do not install aluminum boxes, enclosures, or fittings in contact with concrete or earth.

K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

L. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:

1. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.
2. Provide gaskets for wallplates and covers.

3.6 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

3.7 CLEANING

A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wallplates, covers, and hoods.

END OF SECTION 260533

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Rigid nonmetallic duct.
   2. Polymer concrete handholes and boxes with polymer concrete cover.

PART 2 - PRODUCTS

2.1 RIGID NONMETALLIC DUCT

A. Underground Plastic Utilities Duct: Type EPC-80-PVC and Type EPC-40-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.

B. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

C. Solvents and Adhesives: As recommended by conduit manufacturer.

2.2 POLYMER CONCRETE HANDHOLES AND BOXES WITH POLYMER CONCRETE COVER

A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.

B. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.

C. Color: Green.

D. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.

E. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.

F. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

G. Cover Legend: Molded lettering, "ELECTRIC” or “COMMUNICATIONS.”

H. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.

2.3 SOURCE QUALITY CONTROL

A. Test and inspect precast concrete utility structures according to ASTM C 1037.

B. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of manholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by an independent testing agency.
2. Strength tests of complete boxes and covers shall be by an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification, complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.

B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Architect.

C. Clear and grub vegetation to be removed, and protect vegetation to remain according to Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication according to Section 311000 "Site Clearing."

3.2 UNDERGROUND DUCT APPLICATION

A. Duct for Electrical Feeders 600 V and Less: Type EPC-80-PVC or Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.

B. Duct for Electrical Branch Circuits: Type EPC-80-PVC or Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.

3.3 UNDERGROUND ENCLOSURE APPLICATION

A. Handholes and Boxes for 600 V and Less:

1. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
2. Units in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer concrete units, SCTE 77, Tier 8 structural load rating.
3. Cover design load shall not exceed the design load of the handhole or box.

3.4 DUCT AND DUCT-BANK INSTALLATION

A. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.

B. Install duct according to NEMA TCB 2.

C. Slope: Pitch duct a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope duct from a high point between two manholes, to drain in both directions.

D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches (1200 mm), both horizontally and vertically, at other locations unless otherwise indicated.

1. Duct shall have maximum of two 90 degree bends or the total of all bends shall be no more 180 degrees between pull points.

E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.

F. Installation Adjacent to High-Temperature Steam Lines: Where duct is installed parallel to underground steam lines, perform calculations showing the duct will not be subject to environmental temperatures above 40 deg C. Where environmental temperatures are calculated to rise above 40 deg C, and anywhere the duct crosses above an underground steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.

G. End Bell Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches (250 mm) o.c. for 5-inch (125-mm) duct, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet (3 m) from the end bell, without reducing duct slope and without forming a trap in the line.
2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight line direct-buried duct with calculated expansion of more than 3/4 inch (19 mm).
3. Grout end bells into structure walls from both sides to provide watertight entrances.

H. Terminator Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use manufactured, cast-in-place duct terminators, with entrances into structure spaced approximately 6 inches (150 mm) o.c. for 4-inch (100-mm) duct, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to terminator spacing 10 feet (3 m) from the terminator, without reducing duct line slope and without forming a trap in the line.

2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight line duct with calculated expansion of more than 3/4 inch (19 mm).

I. Building Wall Penetrations: Make a transition from underground duct to GRC at least 10 feet (3 m) outside the building wall, without reducing duct line slope away from the building and without forming a trap in the line. Use fittings manufactured for RNC-to-GRC transition. Install GRC penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

J. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig (1.03-MPa) hydrostatic pressure.

K. Pulling Cord: Install 200-lbf- (1000-N-) test nylon cord in empty ducts.

L. Direct-Buried Duct and Duct Bank:

1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches (150 mm) in nominal diameter.
2. Width: Excavate trench 12 inches (300 mm) wider than duct on each side.
3. Set elevation of bottom of duct bank below frost line.
4. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
5. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than four spacers per 20 feet (6 m) of duct. Place spacers within 24 inches (600 mm) of duct ends. Stagger spacers approximately 6 inches (150 mm) between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
6. Install duct with a minimum of 3 inches (75 mm) between ducts for like services and 6 inches (150 mm) between power and communications duct.
7. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
8. Install manufactured GRC elbows for stub-ups, at building entrances, and at changes of direction in duct.

    a. Couple RNC duct to GRC with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches (1500 mm) from edge of base. Install insulated grounding bushings on terminations at equipment.

        1) Stub-ups shall be minimum 4 inches (100 mm)abovefinished floor and minimum 3 inches (75 mm)from conduit side to edge of slab.

    c. Stub-ups to Indoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches (1500 mm) from edge of wall. Install insulated grounding bushings on terminations at equipment.

        1) Stub-ups shall be minimum 4 inches (100 mm)abovefinished floor and no less than 3 inches (75 mm)from conduit side to edge of slab.

9. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches (100 mm) over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.

    a. Place minimum 3 inches (75 mm) of sand as a bed for duct. Place sand to a minimum of 6 inches (150 mm) above top level of duct.
    b. Place minimum 6 inches (150 mm) of engineered fill above concrete encasement of duct.

M. Underground-Line Warning Tape: Bury conducting underground line specified in Section 260553 "Identification for Electrical Systems" no less than 12 inches (300 mm) above all concrete-encased duct and duct banks. Align tape parallel to and within 3 inches (75 mm) of centerline of duct bank. Provide an additional warning tape for each 12-inch (300-mm) increment of duct-bank width over a nominal 18 inches (450 mm). Space additional tapes 12 inches (300 mm) apart, horizontally.

3.5 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct, and seal joint between box and extension as recommended by manufacturer.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.

D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.

E. Field cut openings for duct according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.6 GROUNDING

A. Ground underground ducts and utility structures according to Section 260526 "Grounding and Bonding for Electrical Systems."

END OF SECTION 260543

SECTION 263213.13 - DIESEL EMERGENCY ENGINE GENERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes packaged diesel engine generators for emergency use with the following features:

1. Diesel engine.
2. Diesel fuel-oil system.
3. Control and monitoring.
4. Generator overcurrent and fault protection.
5. Generator, exciter, and voltage regulator.
6. Outdoor engine generator enclosure.
7. Finishes.

1.3 MAINTENANCE MATERIAL SUBMITTALS

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

1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.
4. Tools: Each tool listed by part number in operations and maintenance manual.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Caterpillar, Inc.; Electric Power Division.
2. Cummins Power Generation.
3. Kohler Power Systems.

B. Source Limitations: Obtain packaged engine generators and auxiliary components from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. B11 Compliance: Comply with B11.19.

B. NFPA Compliance:

1. Comply with NFPA 37.
2. Comply with NFPA 70.
3. Comply with NFPA 99.
4. Comply with NFPA 110 requirements for Level [**1**] [**2**] EPSS.

C. UL Compliance: Comply with UL 2200.

D. Engine Exhaust Emissions: Comply with EPA Tier requirements and applicable state and local government requirements.

E. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by engine generator, including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

F. Environmental Conditions: Engine generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: 5 to 104 deg F (Minus 15 to plus 40 deg C).
2. Relative Humidity: Zero to 95 percent.
3. Altitude: Sea level to 1000 feet (300 m).

2.3 ENGINE GENERATOR ASSEMBLY DESCRIPTION

A. Factory-assembled and -tested, water-cooled engine, with brushless generator and accessories.

B. 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.

C. Power Factor: [**0.8**] <**Insert number**>, lagging.

D. Frequency: 60 Hz

E. Voltage: 208 V ac.

F. Phase: Three-phase, four-wire wye.

G. Governor: Adjustable isochronous, with speed sensing.

H. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and engine generator center of gravity.

I. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated at 0.8 power factor excluding power required for the continued and repeated operation of the unit and auxiliaries, with capacity as required to operate as a unit as evidenced by records of prototype testing.
2. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

J. Engine Generator Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage, from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency, from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110.

2.4 DIESEL ENGINE

A. Fuel: ASTM D 975 diesel fuel oil, Grade 2-D S15.

B. Rated Engine Speed: 1800 rpm.

C. Lubrication System: Engine or skid mounted.

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

D. Jacket Coolant Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity and with UL 499.

E. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.

2. Size of Radiator: Adequate to contain expansion of total system coolant, from cold start to 110 percent load condition.
3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant-system pressure for engine used. Equip with gage glass and petcock.
4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, UV-, and abrasion-resistant fabric.

    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

F. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.
2. Sound level measured at a distance of 25 feet (8 m) from exhaust discharge after installation is complete shall be 78 dBA or less.

G. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

H. Starting System: 12 V electric, with negative ground.

1. Components: Sized so they are not damaged during a full engine-cranking cycle, with ambient temperature at maximum specified in "Performance Requirements" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least three times without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 50 deg F (10 deg C) regardless of external ambient temperature within range specified in "Performance Requirements" Article. Include accessories required to support and fasten batteries in place. Provide ventilation to exhaust battery gases.
7. Battery Stand: Factory-fabricated, two-tier metal with acid-resistant finish designed to hold the quantity of battery cells required and to maintain the arrangement to minimize lengths of battery interconnections.
8. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
9. Battery Charger: Current-limiting, automatic-equalizing, and float-charging type designed for lead-acid batteries. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg F (minus 40 deg C) to 140

deg F (plus 60 deg C) to prevent overcharging at high temperatures and undercharging at low temperatures.

c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.

d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.

e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.

f. Enclosure and Mounting: NEMA 250, Type 1 wall-mounted cabinet.

2.5 DIESEL FUEL-OIL SYSTEM

A. Comply with NFPA 30.

B. Piping: Fuel-oil piping shall be Schedule 40 black steel, complying with requirements in Section 231113 "Facility Fuel-Oil Piping." Cast iron, aluminum, copper, and galvanized steel shall not be used in the fuel-oil system.

C. Main Fuel Pump: Mounted on engine to provide primary fuel flow under starting and load conditions.

D. Fuel Filtering: Remove water and contaminants larger than 1 micron.

E. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

F. Subbase-Mounted, Double-Wall, Fuel-Oil Tank: Factory installed and piped, complying with UL 142 fuel-oil tank. Features include the following:

1. Tank level indicator.
2. Fuel-Tank Capacity: Minimum 48 hours of run time at full generator load.
3. Leak detection in interstitial space.
4. Vandal-resistant fill cap.
5. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.6 CONTROL AND MONITORING

A. Automatic-Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of engine generator. When mode-selector switch is switched to the on position, engine generator starts. The off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.

B. Manual-Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts engine generator. The off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.

C. Provide minimum run time control set for 15 minutes, with override only by operation of a remote emergency-stop switch.

D. Comply with UL 508A.

E. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the engine generator. Mounting method shall isolate the control panel from engine generator vibration. Panel shall be powered from the engine generator battery.

F. Control and Monitoring Panel:

1. Digital controller with integrated LCD display, controls, and microprocessor, capable of local and remote control, monitoring, and programming, with battery backup.
2. Analog control panel with dedicated gages and indicator lights for the instruments and alarms indicated below.
3. Instruments: Located on the control and monitoring panel and viewable during operation.

    a. Engine lubricating-oil pressure gage.
    b. Engine-coolant temperature gage.
    c. DC voltmeter (alternator battery charging).
    d. Running-time meter.
    e. AC voltmeter, for each phase.
    f. AC ammeter, for each phase.
    g. AC frequency meter.
    h. Generator-voltage-adjusting rheostat.

4. Controls and Protective Devices: Controls, shutdown devices, and common visual alarm indication as required by NFPA 110 system, including the following:

    a. Cranking control equipment.
    b. Run-Off-Auto switch.
    c. Control switch not in automatic position alarm.
    d. Overcrank alarm.
    e. Overcrank shutdown device.
    f. Low water temperature alarm.
    g. High engine temperature pre-alarm.
    h. High engine temperature.
    i. High engine temperature shutdown device.
    j. Overspeed alarm.
    k. Overspeed shutdown device.
    l. Low-fuel main tank.

        1) Low-fuel-level alarm shall be initiated when the level falls below that required for operation for the duration required for the indicated EPSS class.

    m. Coolant low-level alarm.
    n. Coolant low-level shutdown device.
    o. Coolant high-temperature prealarm.
    p. Coolant high-temperature alarm.
    q. Coolant low-temperature alarm.
    r. Coolant high-temperature shutdown device.
    s. EPS load indicator.
    t. Battery high-voltage alarm.

u. Low-cranking voltage alarm.
v. Battery-charger malfunction alarm.
w. Battery low-voltage alarm.
x. Lamp test.
y. Contacts for local and remote common alarm.
z. Low-starting air pressure alarm.
aa. Low-starting hydraulic pressure alarm.
bb. Remote manual-stop shutdown device.
cc. Air shutdown damper alarm when used.
dd. Air shutdown damper shutdown device when used.
ee. Generator overcurrent-protective-device not-closed alarm.

G. Connection to Datalink:

1. A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication.
2. Provide connections for datalink transmission of indications to remote data terminals via BACNet. Data system connections to terminals are covered in Section 260913 "Electrical Power Monitoring and Control."

H. Remote Alarm Annunciator: Comply with NFPA 99. An LED indicator light labeled with proper alarm conditions shall identify each alarm event, and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

1. Overcrank alarm.
2. Coolant low-temperature alarm.
3. High engine temperature prealarm.
4. High engine temperature alarm.
5. Low lube oil pressure alarm.
6. Overspeed alarm.
7. Low-fuel main tank alarm.
8. Low coolant level alarm.
9. Low-cranking voltage alarm.
10. Contacts for local and remote common alarm.
11. Audible-alarm silencing switch.
12. Air shutdown damper when used.
13. Run-Off-Auto switch.
14. Control switch not in automatic position alarm.
15. Fuel tank derangement alarm.
16. Fuel tank high-level shutdown of fuel-supply alarm.
17. Lamp test.
18. Low-cranking voltage alarm.
19. Generator overcurrent protective device not closed.

I. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator unless otherwise indicated.

J. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.7 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Overcurrent protective devices for the entire EPSS shall be coordinated to optimize selective tripping when a short circuit occurs. Coordination of protective devices shall consider both utility and EPSS as the voltage source.

1. Overcurrent protective devices for the EPSS shall be accessible only to authorized personnel.

B. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator output rating.
3. Shunt Trip: Connected to trip breaker when engine generator is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

2.8 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required. Provide 12-lead alternator.

E. Range: Provide broad range of output voltage by adjusting the excitation level.

F. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

G. Enclosure: Dripproof.

H. Instrument Transformers: Mounted within generator enclosure.

I. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified and as required by NFPA 110.

1. Adjusting Rheostat on Control and Monitoring Panel: Provide plus or minus 5 percent adjustment of output-voltage operating band.
2. Maintain voltage within 15 percent on one step, full load.
3. Provide anti-hunt provision to stabilize voltage.
4. Maintain frequency within 5 percent and stabilize at rated frequency within five seconds.

J. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

K. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

L. Subtransient Reactance: 12 percent, maximum.

2.9 OUTDOOR ENGINE GENERATOR ENCLOSURE

A. Description: Vandal-resistant, sound-attenuating, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

B. Hinged Doors: With padlocking provisions.

C. Muffler Location: Within enclosure.

D. Engine-Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for two hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.
3. Ventilation: Provide temperature-controlled exhaust fan interlocked to prevent operation when engine is running.

E. Convenience Outlets: Factory-wired GFCI. Arrange for external electrical connection.

2.10 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: Standard neoprene separated by steel shims.
2. Shore A Scale Durometer Rating: 50.
3. Number of Layers: Two.
4. Minimum Deflection: 1 inch (25 mm).

B. Vibration isolation devices shall not be used to accommodate misalignments or to make bends.

2.11 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.12 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine generator using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.

B. Examine roughing-in for piping systems and electrical connections. Verify actual locations of connections before packaged engine generator installation.

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

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 404.

B. Comply with packaged engine generator manufacturers' written installation and alignment instructions and with NFPA 110.

C. Equipment Mounting:

1. Install packaged engine generators on cast-in-place concrete equipment bases.
2. Coordinate size and location of concrete bases for packaged engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
3. Install packaged engine generator with elastomeric isolator pads having a minimum deflection of 1 inch (25 mm) on 6-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases.

D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

E. Fuel Piping:

1. Diesel storage tanks, tank accessories, piping, valves, and specialties for fuel systems are specified in Section 231113 "Facility Fuel-Oil Piping."
2. Copper and galvanized steel shall not be used in the fuel-oil piping system.

F. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow space for service and maintenance.

C. Connect cooling-system water piping to engine generator with flexible connectors.

D. Connect engine exhaust pipe to engine with flexible connector.

E. Connect fuel piping to engines with a gate valve and union and flexible connector.

1. Additional requirements for diesel storage tanks, tank accessories, piping, valves, and specialties for fuel systems are specified in Section 231113 "Facility Fuel-Oil Piping."

F. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

G. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Provide a minimum of one 90-degree bend in flexible conduit routed to the engine generator from a stationary element.

H. Balance single-phase loads to obtain a maximum of 10 percent unbalance between any two phases.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

END OF SECTION 263213.13

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes automatic transfer switches rated 600 V and less.

1. Bypass/isolation switches.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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. Comply with NEMA ICS 1.

C. Comply with NFPA 99.

D. Comply with NFPA 110.

E. Comply with UL 1008 unless requirements of these Specifications are stricter.

F. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

G. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
2. Short-time withstand capability for three cycles.

H. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

I. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

J. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.

K. Neutral Terminal: Solid and fully rated unless otherwise indicated.

L. Battery Charger: For generator starting batteries.

1. Float type, rated 10 A.
2. Ammeter to display charging current.
3. Fused ac inputs and dc outputs.

M. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
4. Accessible via front access.

N. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.2 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Caterpillar, Inc.; Electric Power Division.
2. Cummins Power Generation.
3. Russelectric, Inc.

B. Comply with Level 1 equipment according to NFPA 110.

C. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
2. Switch Action: Double throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
4. Conductor Connectors: Suitable for use with conductor material and sizes.
5. Material: Hard-drawn copper, 98 percent conductivity.
6. Main and Neutral Lugs: Mechanical type.
7. Ground Lugs and Bus-Configured Terminators: Mechanical type.
8. Ground bar.
9. Connectors shall be marked for conductor size and type according to UL 1008.

D. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.

1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

E. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.

F. Automatic Transfer-Switch Controller Features:

1. Controller operates through a period of loss of control power.
2. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.

    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
12. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.

c. Integral battery operation of time switch when normal control power is unavailable.

2.3 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

B. Comply with NECA 1.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets,control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.

B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.

1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

F. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches (457 mm) in length.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

END OF SECTION 263600

SECTION 270500 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Communications equipment coordination and installation.
2. Sleeves for pathways and cables.
3. Sleeve seals.
4. Grout.
5. Common communications installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of communications equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting pathways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has a registered communications distribution designer (RCDD) as permanent staff, certified by the Building Industry Consulting Service International (BICSI). At least 50% of the employees installing the low voltage structured cabling system must have current BICSI certification. This includes terminating the components as well.

B. Manufacturer Qualifications: Engage firms experienced in manufacturing components listed and labeled under EIA/TIA-568B.1, B.2 and B.3and who comply with these Specifications.
   1. Comply with NFPA 70.
   2. Comply with ANSI American National Standards Institute
   3. Comply with BICSI Building Industry Consulting Service International
   4. Comply with Telecommunications Distribution Methods Manual (current edition)
   5. Comply with Building Officials and Code BOCA Administrators (Standard Building Code)
   6. Comply with EIA Electronic Industries Association
   7. Comply with FCC Federal Communications Commission
   8. Comply with International Conference of ICBO Building Officials (Uniform Building Code)
   9. Comply with IEEE Institute of Electrical and Electronic Engineers, Inc.
   10. Comply with NBC National Building Code
   11. Comply with NFPA National Fire Protection Association
   12. Comply with TIA Telecommunications Industry Association
   13. Comply with University of Kentucky CNS Standards

C. Work Coordination: Coordinate Work of this Section with the University’s Communications & Network Systems (UK CNS) department. Coordinate the service entrance arrangement with the Owner or it’s designee.

D. Meet jointly with representatives of the above organizations and Owner's representatives to exchange information and agree on details of equipment arrangements and installation interfaces.

E. Record agreements reached in meetings and distribute record to other participants.

F. Adjust the arrangements and locations of distribution frames, patch panels, and cross connects in equipment rooms and wiring closets to accommodate and optimize the arrangement and space requirements of the telephone, and data equipment.

PART 2 - PRODUCTS

2.1 SLEEVES FOR PATHWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

    a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
    b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Advance Products & Systems, Inc.
    b. Calpico, Inc.
    c. Metraflex Co.
    d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 MANUFACTURERS

A. Manufacturers for communications products shall be limited to those indicated in the Appendix in this specification section. The manufacturers listed in the Appendix shall override any manufacturer listings in other Div. 27 specification sections.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

K. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly.

APPENDIX

Parts Listing

Horizontal Cabling

U/UTP 4/23 Category 6 PVC Cable (Green)	Commscope Uniprise CS37R	884026214/10
F/UTP 4/23 Category 6A PVC Cable (Green)	Commscope Uniprise CS44R	CM-00423CS44-6AF-04

Horizontal Termination Hardware

6 Port Faceplate	Commscope	2111012-X
4 Port Faceplate	Commscope	2111011-X
2 Port Faceplate	Commscope	2111009-X
Cat 6 Modular Outlet	Commscope	7602376XX
Cat 6A XG Shielded Modular Jack	Commscope	760237683
Blank Inserts	Commscope	1116412-X
Green Data Icons	Commscope	558198-3
Back Box for Cat 6A Outlets 5” x5”x2 7/8”	Randl	
24 Port Category 6 Patch Panel	Commscope	1375014-1
48 Port Cat 6A XG Angled Patch Panel	Commscope	1933322-2
Cat 6 Patch Cable	Commscope	TCPC-6RUVB-XXXXF
Cat 6A Patch Cable	Commscope	TCPC-6ARFVB-XXXXF
Horizontal Cable Mngmnt Panels 1 RMS	Panduit	CMPH1
7" Blank Panel Kit	Commscope	556965-4
300 pr 110 Block Kit w/ legs	Commscope	569446-1
100 pr 110 Block Kit w/legs	Commscope	569440-1
Rack Mount 100 Pr 110 Block	Commscope	558635-1

X = coordinate color of faceplates, modular outlets, and blanks (all same color) with the end user and electrical faceplates (if not stainless steel).

Copper Backbone Cabling		
300 pr UTP Riser Cable	General Cable	2133373
200 pr UTP Riser Cable	General Cable	2133323
100 pr UTP Riser Cable	General Cable	2133144
25 pr UTP Riser Cable	General Cable	2133033
900 pr OSP Armored 24 AWG	General Cable	7525876
600 pr OSP Armored 24 AWG	General Cable	7525868
300 pr OSP Armored 24 AWG	General Cable	7525843
25 pr OSP Armored 24 AWG	General Cable	7525785
Optical Fiber Cabling and Termination Hardware		
24 Strand OFNR Fiber Cable SM	Corning Cable Systems	024E81-33131-24
24 Strand OFNR Fiber Cable 62.5 MM	Corning Cable Systems	024K81-33130-24
24 Strand OFNR Fiber Cable OM4 MM	Corning Cable Systems	024T81-33190-24
12 Strand OFNR Fiber Cable SM	Corning Cable Systems	012E81-33131-24
12 Strand OFNR Fiber Cable 62.5 MM	Corning Cable Systems	012K81-33130-24
12 Strand OFNR Fiber Cable OM3 MM	Corning Cable Systems	012T81-33190-24
6 Strand OFNR Cable MM	Corning Cable Systems	006K81-31130-24
Outdoor Hybrid Fiber 48MM/48SM	Corning Cable Systems	096XU4-XXXXXD20
Outdoor Hybrid Fiber 24MM/24SM	Corning Cable Systems	048XU4-XXXXXD20
Outdoor Hybrid Fiber 12MM/12SM	Corning Cable Systems	024XU4-XXXXXD20
Outdoor Hybrid Fiber 6MM/6SM	Corning Cable Systems	012XU4-XXXXXD20
1” Innerduct (orange) Fiber Connector Housing	Corning Cable Systems	CCH-04U
Fiber Connector Housing	Corning Cable Systems	CCH-02U
Fiber Connector Housing	Corning Cable Systems	CCH-01U
Pigtailed Splice Cassette SM LC	Corning Cable Systems	CCH-CSXX-A9-P00RE
Pigtailed Splice Cassette OM1 LC	Corning Cable Systems	CCH-CSXX-A8-P00KE
Pigtailed Splice Cassette OM4 LC	Corning Cable Systems	CCH-CSXX-E4-P00QE

Telecommunications Room Racks		
7' floor rack	Legrand	OR-MM20716-B
Vertical Wire Manager 6.5”	Legrand	OR-MM20VMD706-B
Vertical Wire Manager 10.5”	Legrand	OR-MM20VMD710-B
Telecommunications Room Ladder Runway		
Black 12”	CPI	10250-712
Black 18”	CPI	10250-718

Cable Tray

4” Deep Aluminum Ladder Style Cable Tray (6” rung spacing) Horizontal Elbows, Vertical Risers, Tees

Radius Drop Out Connection components

Surface Raceway – Metal Only Minim 2” Depth

Protection Terminal Protection Block	CircaMax	1880ECA1-XX
Solid State Protector Modules	CircaMax	4B1S-300
Copper Infrastructure Splice Components		
Splice Closure 9.5” x 38”	Preformed	8000635
Splice Closure 6.5” x 28”	Preformed	8000626
Splice Closure 9.5” End Plate Kits	Preformed	800081098
Splice Closure 6.5” End Plate Kits	Preformed	8000361
MS ∠ Splicing Module (Dry)	3M	4000-D/TR
MS ∠ Splicing Module (Filled)	3M	4000-D
PICABOND Connectors (Dry)	Commscope	406587-1
PICABOND Connectors (Filled)	Commscope	406585-1
Coaxial Cable Horizontal RG-6	Belden	1189A
Riser 540	Commscope	QR 540 JCAR
Outside 540 Aerial	Commscope	QR 540 JCA
Outside 540 Buried	Commscope	QR 540 JCASS

END OF SECTION 270500

SECTION 271300 - COMMUNICATIONS BACKBONE CABLING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
1. UTP cable for intrabuilding backbone connection.
2. Fiber optic cabling for intrabuilding backbone connection and cable connecting hardware.
3. Cabling identification products.

1.03 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each component specified, including detailed manufacturer's specifications. Include data on features, ratings, and performance. Include dimensioned plan and elevation views of components.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engage firms experienced in manufacturing components listed and labeled under EIA/TIA-568B.1, B.2 and B.3and who comply with these Specifications.

1. Installer must have a registered communications distribution designer (RCDD) as permanent staff, certified by the Building Industry Consulting Service International (BICSI). At least 50% of the employees installing the low voltage structured cabling system must have current BICSI certification.
2. Comply with NFPA 70.
3. Comply with ANSI American National Standards Institute
4. Comply with BICSI Building Industry Consulting Service International
5. Comply with Telecommunications Distribution Methods Manual (current edition)
6. Comply with Building Officials and Code BOCA Administrators (Standard Building Code)
7. Comply with EIA Electronic Industries Association
8. Comply with FCC Federal Communications Commission
9. Comply with International Conference of ICBO Building Officials (Uniform Building Code)
10. Comply with IEEE Institute of Electrical and Electronic Engineers, Inc.
11. Comply with NBC National Building Code
12. Comply with NFPA National Fire Protection Association
13. Comply with TIA Telecommunications Industry Association
14. Comply with University of Kentucky Design Standards

B. Work Coordination: Coordinate Work of this Section with the University’s Communications & Network Systems (UK CNS) department. Coordinate the service entrance arrangement with the Owner or it’s designee.

C. Meet jointly with representatives of the above organizations and Owner's representatives to exchange information and agree on details of equipment arrangements and installation interfaces.

D. Record agreements reached in meetings and distribute record to other participants.

E. Adjust the arrangements and locations of distribution frames, patch panels, and cross connects in equipment rooms and wiring closets to accommodate and optimize the arrangement and space requirements of the telephone, and data equipment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. All products must be reviewed and approved by UK CNS prior to ordering/installation.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
   1. Cable:
      a. General Cable.
      b. Corning Cable Systems (optical fiber cable)

2.02 SYSTEM REQUIREMENTS

A. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

2.03 TWISTED PAIR CABLES, CONNECTORS, AND TERMINAL EQUIPMENT

A. Conductors: Solid copper.

B. Voice cable shall be type 24 AWG UTP, plenum-rated, Category 3 minimum.

C. UTP Cable Connecting Hardware: Comply with ANSI/TIA/EIA-568-B.1,B.2: . Insulation displacement connector (IDC) type, using modules designed for use with punch-down caps or tools
   1. IDC Terminal Block Modules: Integral with connector bodies, including plugs and jacks where indicated.
   2. IDC Connecting Hardware: Consistent throughout Project.
   3. Cross-Connect Panel: Voice riser cables will be terminated onto rack mounted 110 blocks within each Telecommunications Room. Riser 110 blocks shall utilize C5 connectcor blocks.
   4. Number of Terminals per Field: One for each conductor in assigned cables.

2.04 FIBER-OPTIC CABLES, CONNECTORS, AND TERMINAL EQUIPMENT

A. Fiber optic cable shall consist of cables with multi-mode and cables with single mode fiber strands. Refer to drawings for number. Fiber riser shall be installed in riser-rated inner-duct (1" I.D. min). Multi-mode and single-mode fiber shall be terminated on separate panels within the same fiber closure. For cabling routed outside the stacked IDF closets, use plenum rated innerduct and plenum rated cabling.

   a. Cables: Factory-fabricated, jacketed, low-loss, glass-type, fiber-optic, multimode (OM4).
   b. Cables: Factory-fabricated, jacketed, low-loss, glass-type, fiber-optic, singlemode (OM1 62.5).
   c. Factory-fabricated, jacketed, low-loss, glass-type, fiber-optic, singlemode, graded index, operating at 850 and 1300 nanometers (nm).

d. Outdoor/indoor cable to be equivalent to Corning FREEDM cable.
e. Hybrid MM/SM cables are acceptable.

B. Minimum Modal Bandwidth: 160 MHz/km at 850 nm; 500 MHz/km at 1300 nm.

C. Operating Temperature Range: Minus 20 to 70 deg C.

D. Maximum End-to-end attenuation:
a. Multimode fiber
i. 3.75 db @ 160 Mhz @ 1310 Nm per kilometer
ii. 1.50 db @ 500 Mhz @ 1300 Nm per kilometer
b. Singlemode fiber
i. .5 db @ 1310 Nm per kilometer
ii. .4 db @ 1550 Nm per kilometer

E. Cable Connectors: Pigtailed splice cassettes to be Corning CCH-CSXX series (see material listing).

F. Patch Panel: FIber closures will be Corning Cable Systems (see material listing).

G. Permanent Connection: One end of each connector module is permanently connected to an installed cable fiber.

H. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to satisfy specified expansion criteria.

I. Mounting: Rack.

2.05 COAXIAL CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Alpha Wire Company.
2. Belden CDT Inc.; Electronics Division.
3. Coleman Cable, Inc..
4. CommScope, Inc.
5. Draka USA.

B. General Coaxial Cable Requirements: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.

1. Intrabuilding Backbone:
a. 540 and 860 hardline cable, as indicated on drawings.
b. ½” jacketed hardline equivalent to Commscope 5506302/QR 540 JCA
c. Rated for use in below grade conduit.
d. BNC connectors.

2. Interbuilding Backbone:
a. 1/2" unjacketed hardline.
b. BNC connectors.

2.06 GROUNDING

A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems." for grounding conductors and connectors.
B. Comply with ANSI-J-STD-607-A.

2.07 IDENTIFICATION PRODUCTS

A. Cable Labels: Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations. Both ends of all cabling. Faceplates, panel ports and block positions will be labeled. UK CNS to supply labeling format.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine pathway elements to receive cable. Check raceways, cable trays, innerducts and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 APPLICATION OF MEDIA

A. See telecommunciations riser on the drawings for additional cabling information including size.

B. Install multimode 50-micrometer, laser optimized, optical fiber and singlemode 50-micrometer cabling for intrabuilding cables between the MDF and IDF's.

C. Install a ½" hardline Coax cable between IDF's. Leave 12 feet of slack in each IDF to facilitate cabling termination.

D. Plant Cable for Data Service: Use fiber-optic cable as noted on the drawings for plant cables.

E. Plant Cable for Voice Service: Use unshielded twisted pair cable conforming to Category 3 of EIA/TIA-568 as for the plant cables noted on the drawings.

3.03 INSTALLATION

A. Wiring Method: Install wiring in raceway, cable tray, and conduits except within consoles. Always leave a pull string in all raceways, conduits and cable trays.

B. Install components as indicated, according to manufacturers' written instructions. Use techniques, practices, and methods that are consistent with the backbone system components and that assure specified performance of completed and linked signal paths, end-to-end.

C. Install cable without damaging conductors, shield, or jacket.

D. Do not bend cable in handling or installation to smaller radii than minimums recommended by manufacturers.

E. Pull cables without exceeding cable manufacturer's recommended pulling tensions.
   a. Pull cables simultaneously where more than one is being installed in the same raceway.
   b. Use pulling compound or lubricant where necessary. Use compounds that will not damage conductor or insulation.
   c. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage media or raceway.

G. Wiring within Wiring Closets and Enclosures: Fiber backbone riser cables will have 30' of cable looped and neatly secured to the plywood backboard for slack. Voice backbone cables are secured on the backboard and routed directly to the termination blocks. Use Velcro to secure cables. Do not use tie wraps.

H. Separation of Wires: Comply with EIA/TIA-569 rules for separation of unshielded copper voice and data system cables from potential EMI sources, including electrical feeder and branch circuits and equipment.

I. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.

J. Panel labels shall match the jack labels Each 24 port panel section shall be labeled with the floor code letter.

K. The right most rack is reserved for mounting network electronics and support equipment.

L. Provide and install protection panels for the building entrance UTP cable termination on both ends. AT&T panels with 110 in and 110 out are preferred.

M. Install 50-pair copper riser cables from wall field in MDF to each IDF. Terminate each riser onto 100 pair rackmounted 110 blocks in each IDF.

N. Cabling run at building exterior shall be outdoor rated. Where outdoor rated cable enters the building, it shall be transitioned to indoor rated cabling. Provide and install protector modules for all cabling run from building exterior.

3.04 IDENTIFICATION

A. Each end of all cables will be labeled at their termination locations.

B. Label all fiber cable and all fiber strands at termination locations. Information Technology Communication Services will provide fiber cable nomenclature.

C. All jack modules Upon project completion, the installing contractor or designee of UKCNS shall provide to UKCNS a list of jack identification numbers used, their corresponding room numbers, location within the room, and punch block or data panel termination points. Jack identification numbers, at the jack locations, shall also be placed on the as built drawings provided by the contractor.

D. Distribution Racks and Frames: Label each unit and field within that unit.

E. Cables, Generally: Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.

F. Cable Schedule: Post at a prominent location in each wiring closet and equipment room. List incoming and outgoing cables and their designations, origins, and destinations. Protect with a rigid frame and clear plastic cover. Provide a hard copy of final comprehensive schedules for the project.

G. Cable records during installation and complete sets of cable records are required at project completion. Labeling of all termination hardware and cabinets with information provided by UK. A complete set of as-built drawings upon completion of the project, both on marked up blueprints. OTDR test results to manufacturer’s specifications and UKCNS standards for all fiber optic cable installed. Results shall be furnished in hard copy. The documentation must include OTDR readings, fiber route diagrams and end-to-end attenuation results for multimode and single mode fiber cable. All fiber OTDR readings shall be made bi-directional on all fiber cable. Power meter testing is suitable where distances are too short for OTDR. Also, all horizontal workstations cables will be 100% tested with approved Category 6 tester. All voice

backbone pairs will be 100% tested for continuity, opens, and shorts. Horizontal test results will be provided in hard copy and on diskette.

3.05 FIELD QUALITY CONTROL

A. Testing: Upon installation of cable and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance. Remove temporary connections when tests have been satisfactorily completed.

B. Station cable tests shall be performed to manufacturer's specifications and UK CNS standards. Test results shall be provided in hard copy. Riser cable tests shall be performed to manufacturer's specifications and UK CNS standards. Test results shall be provided in hard copy. Trunk cable tests shall be performed to manufacturer's specifications and UK CNS standards. Test results shall be provided in hard copy.

C. Test all strands using an optical time domain reflectometer (OTDR) and optical loss test sets (OLTS). Fiber cable runs less than 150 meters in length shall be tested with an approved light meter. Provide computer readable test results of each fiber strand to Information Technology Communication Services.

D. The contractor shall submit, a detailed test procedure to be used.

E. Upon completion, test results shall be submitted for final approval and acceptance and made part of the document. The contractor shall guarantee 100 percent continuity on all strands on all cables.

F. The owner will perform verification testing it deems necessary before accepting a job. Failure during testing will result in re-pulling cables at the contractor expense.

G. Correct malfunctioning units at site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

H. Grounding: All shields shall be bonded to a common ground.

3.06 CLEANING

A. On completion of system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION 271300

SECTION 311000 – SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Protecting existing trees and grass to remain.
2. Removing existing trees, shrubs, groundcovers plants and grass.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing and removal of storm drainage utilities.
7. Temporary erosion and sedimentation control measures.

B. Related Sections include the following:

1. Division 01 Section "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities.
2. Division 01 Section "Temporary Tree and Plant Protection" for protecting trees remaining on-site that are affected by site operations.
3. Division 01 Section "Execution" for verifying utility locations and for recording field measurements.
4. Division 02 Section "Structure Demoition" for demolition and removal of existing buildings and structures.
5. Division 31 Section "Earth Moving" for soil materials, excavating, backfilling, and site grading.
6. Division 23 Section "Turf and Grasses” and “Plants" for finish grading including preparing and placing planting soil mixes and testing of topsoil material.
7. Division 21, Division 22, Division 23, Division 26, Division 27, and Division 28 Sections for removal of site utilities except storm sewers.

1.3 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.4 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Record drawings, according to Division 01 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

C. Storm Water Pollution Prevention Plan: Submit prior to beginning construction and maintain on-site, and available for regular review by the Architect the following:

1. Copy of the Notice of Intent (NOI).
2. Copy of the Site Grading Permit.
3. Copy of the SWPP along with related written documents.
4. Maintenance Log Book in conformance with the requirements indicated.

1.6 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 31 Section "Earth Moving."

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and the Storm Water Pollution Prevention Drawings (SWPP).

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE PROTECTION

A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within fenced area.
2. Do not permit vehicles, equipment, or foot traffic within fenced area.
3. Maintain fenced area free of weeds and trash.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Backfill with soil as soon as possible.

D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Architect.

3.4 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

C. Removal of underground utilities is included in Division 21, Division 22, Division 23, Division 26, Division 27, and Division 28 Sections covering site utilities.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
4. Use only hand methods for grubbing within tree protection zone.
5. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within tree protection zones.
3. Dispose of excess topsoil as specified for waste material disposal.
4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.8 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 311000

SECTION 312000 – EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

a. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses and exterior plants.
b. Excavating and backfilling for buildings and structures.
c. Drainage course for slabs-on-grade.
d. Subbase course for concrete walks and pavements.
e. Subbase and base course for asphalt paving.
f. Subsurface drainage backfill for walls and trenches.
g. Excavating and backfilling for storm drainage and subdrainage utility trenches.
h. Excavating and backfilling pits for buried storm drainage and subdrainage utility structures.

B. Related Sections include the following:

a. Division 01 Section "Structural Special Inspections" for testing and inspections associated with all earthwork specified in this section.
b. Division 01 Section "Allowances" for quantity allowance provisions related to unit-price rock excavation and authorized additional excavation.
c. Division 01 Section "Unit Prices" for unit-price rock excavation and authorized additional excavation provisions.
d. Division 01 Section "Construction Progress Documentation and Photographic Documentation" for recording preexcavation and earthwork progress.
e. Division 01 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities.
f. Division 03 Section "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
g. Divisions 21, 22, 23, 26, 27, and 28 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.
h. Division 31 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
i. Division 31 Section "Drilled Concrete Piers and Shafts" for excavation of shafts and disposal of surplus excavated material.
j. Division 32 Section "Turf and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.
k. Division 32 Section "Plants" for planting bed establishment and tree and shrub pit excavation and planting.
l. Division 33 Section "Subdrainage" for drainage of foundations and walls.

1.3 UNIT PRICES

A. Unit prices for earthwork are included in Division 01 Section "Unit Prices."

B. Rules of Measurement: Volume of material actually removed, measured in original position, but not to exceed the following. Unit prices for rock excavation include replacement with approved materials.

a. 24 inches outside of concrete forms other than at footings.
b. 12 inches outside of concrete forms at footings.
c. 6 inches outside of minimum required dimensions of concrete cast against grade.
d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
e. 6 inches beneath bottom of concrete slabs-on-grade.
f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

1.4 DEFINITIONS

A. Backfill:

1. Soil material or controlled low-strength material used to fill an excavation:
a. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
b. Final Backfill: Backfill placed over initial backfill to fill a trench.

2. Granular backfill
a. Granular material placed against below grade walls.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

a. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
b. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
c. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of

100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.

I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

A. Product Data: For the following:

a. Each type of plastic warning tape.
b. Geotextile.
c. Controlled low-strength material, including design mixture.

B. Samples: 12-by-12-inch Sample of subdrainage and separation geotextile.

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

a. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
b. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.

D. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.6 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

B. Preexcavation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

a. Notify Architect not less than two days in advance of proposed utility interruptions.
b. Do not proceed with utility interruptions without Architect's written permission.
c. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

C. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner and Architect will not be responsible for interpretations or conclusions drawn from this data.

a. Make additional test borings and conduct other exploratory operations necessary for dewatering.
b. The geotechnical report is included elsewhere in the Project Manual for information only.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups CL, GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

a. Subject to meeting project requirements, existing on-site excavated soils may be utilized as fill material.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

a. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Dense Graded Aggregate consisting of a naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; KYDOH Section 805; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Dense Graded Aggregate consisting of a naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; KYDOH Section 805; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Dense Graded Aggregate consisting of a naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; KYDOH Section 805; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; KYDOH Section 805; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

L. Granular Backfill: KTC No. 57 crushed building stone.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with KYDOH Section 843 for Type II Fabric.

B. Separation / Reinforcement Geotextile:

a. Type 1: Tensar Biaxial Geogrid BX1200 or approved equal product.
b. Type 2: Tensar Biaxial Geogrid BX1100 or approved equal product.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

a. Red: Electric.
b. Yellow: Gas, oil, steam, and dangerous materials.
c. Orange: Telephone and other communications.
d. Blue: Water systems.
e. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing," during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

a. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
b. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

a. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
b. Unless otherwise indicated, remove rock and other unsuitable material to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 24 inches outside of concrete forms other than at footings.
b. 12 inches outside of concrete forms at footings.

c. 6 inches outside of minimum required dimensions of concrete cast against grade.
d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
e. 6 inches beneath bottom of concrete slabs on grade.
f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

a. Excavations for Footings, Foundations, Retaining Walls or Within 10 Feet of Building Elements: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work. Refer to Drawings for additional requirements.

b. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

B. Where pavement subgrades are bearing on rock, overexcavate to a depth of 4 inches and backfill to subgrade elevations with compacted #57 Drainage Fill.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

a. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

a. Clearance: 12 inches each side of pipe or conduit unless otherwise indicated.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

a. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

b. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
c. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 SUBGRADE INSPECTION

3.9 SUBGRADE INSPECTION

A. Notify Architect and Special Inspector / Geotechnical Testing Agency when excavations have reached required subgrade.

B. If Architect in consultation with the Geotechnical Testing Agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed

C. Proof-roll subgrade below all building slabs with a pneumatic tired and loaded 10 wheel tandem-axel dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. A loaded scraper is also permitted. Do not proof-roll wet or saturated subgrades.
1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Special Inspector / Geotechnical Testing Agency, and replace with compacted backfill or fill as directed.
3. See Division 1 for provisions for overexcavation and backfill allowances and unit prices.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

a. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

a. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.12 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

   a. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
   b. Surveying locations of underground utilities for Record Documents.
   c. Testing and inspecting underground utilities.
   d. Removing concrete formwork.
   e. Removing trash and debris.
   f. Removing temporary shoring and bracing, and sheeting.
   g. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.13 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."

D. Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.

E. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.

   a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

G. Place and compact final backfill of satisfactory soil to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.14 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

   a. Under grass and planted areas, use satisfactory soil material.

b. Under walks and pavements, use satisfactory soil material.
c. Under steps and ramps, use satisfactory soil material.
d. Under building slabs, use satisfactory soil material.
e. Under footings and foundations, use satisfactory soil material.
f. Under parking and driveway pavement use satisfactory soil material.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.15 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

a. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
b. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.16 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Unless otherwise indicated, compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

a. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 100 percent.

b. Under parking and driveway pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 98 percent.
c. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 98 percent.
d. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
e. For storm and subdrainage trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.17 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

a. Provide a smooth transition between adjacent existing grades and new grades.
b. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

a. Lawn or Unpaved Areas: Plus or minus 1 inch.
b. Walks: Plus or minus 1 inch.
c. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.18 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: Specified in Division 33 Section "Subdrainage."

B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

a. Compact each filter material layer with a minimum of two passes of a plate-type vibratory compactor.

C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with 1 layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

a. Compact each filter material layer with a minimum of two passes of a plate-type vibratory compactor.
b. Place and compact impervious fill over drainage backfill in 6-inch- thick compacted layers to final subgrade.

3.19 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
a. Place base course material over subbase course under hot-mix asphalt pavement.
b. Shape subbase and base course to required crown elevations and cross-slope grades.
c. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
d. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
e. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.20 DRAINAGE COURSE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

a. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
b. Place drainage course 6 inches or less in compacted thickness in a single layer.
c. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
d. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.21 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage and pay for a qualified independent geotechnical engineering testing agency to perform field quality-control testing. The Contractor will be responsible for understanding the requirements and frequency of testing and coordinating with the testing agency.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test with a Dynamic Cone Penetrometer (DCP) of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

a. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
b. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
c. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained at no additional cost.

3.22 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

a. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

a. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.23 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property. Provide written documentation of disposal location(s) for all material hauled off site.

3.23 GRANULAR BACKFILL

A. Backfill against all below grade walls, walls with compacted granular fill.

B. Place granular backfill starting from 6” below finish grade and extending downward at a 45 degree angle to the top of footing elevation.

END OF SECTION 312000

SECTION 321313 – CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:
   1. Walkways.

B. Related Sections include the following:

   1. Division 03 Section "Cast-in-Place Concrete" for general building applications of concrete.
   2. Division 31 Section "Earth Moving" for subgrade preparation, grading, and subbase course.
   3. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants of joints in concrete pavement and at isolation joints of concrete pavement with adjacent construction.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Qualification Data: For manufacturer and testing agency.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:

   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Admixtures.

4. Curing compounds.
5. Applied finish materials.
6. Bonding agent or epoxy adhesive.
7. Joint fillers.

F. Field quality-control test reports.

G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

C. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

D. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Architect.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:

a. Contractor's superintendent.
b. Concrete pavement subcontractor.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

C. Plain Steel Wire: ASTM A 82, galvanized.

D. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

E. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

F. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type I, gray. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate, uniformly graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar pavement applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

1. Available Products:

a. Axim Concrete Technologies; Cimfilm.
b. Burke by Edeco; BurkeFilm.
c. ChemMasters; Spray-Film.
d. Conspec Marketing & Manufacturing Co., Inc.; Aquafilm.
e. Dayton Superior Corporation; Sure Film.
f. Euclid Chemical Company (The); Eucobar.
g. Kaufman Products, Inc.; Vapor Aid.
h. Lambert Corporation; Lambco Skin.

i. L&M Construction Chemicals, Inc.; E-Con.
j. MBT Protection and Repair, ChemRex Inc.; Confilm.
k. Meadows, W. R., Inc.; Sealtight Evapre.
l. Metalcrete Industries; Waterhold.
m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
n. Sika Corporation, Inc.; SikaFilm.
o. Symons Corporation; Finishing Aid.
p. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.

E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

1. Available Products:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. Burke by Edoko; Aqua Resin Cure.
c. ChemMasters; Safe-Cure Clear.
d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
f. Euclid Chemical Company (The); Kurez DR VOX.
g. Kaufman Products, Inc.; Thinfilm 420.
h. Lambert Corporation; Aqua Kure-Clear.
i. L&M Construction Chemicals, Inc.; L&M Cure R.
j. Meadows, W. R., Inc.; 1100 Clear.
k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
l. Symons Corporation; Resi-Chem Clear.
m. Tamms Industries Inc.; Horncure WB 30.
n. Unitex; Hydro Cure 309.
o. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

1. If an asphaltic fiber joint filler is utilized, provide an acceptable polyethylene bond breaker tape where joint sealant is indicated.

B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to requirements, and as follows:

1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

C. Chemical Surface Retarder: Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

1. Available Products:

a. Burke by Edeco; True Etch Surface Retarder.
b. ChemMasters; Exposee.
c. Conspec Marketing & Manufacturing Co., Inc.; Delay S.
d. Euclid Chemical Company (The); Surface Retarder S.

e. Kaufman Products, Inc.; Expose.
f. Metalcrete Industries; Surftard.
g. Nox-Crete Products Group, Kinsman Corporation; Crete-Nox TA.
h. Scofield, L. M. Company; Lithotex.
i. Sika Corporation, Inc.; Rugasol-S.
j. Vexcon Chemicals, Inc.; Certi-Vex Envioset.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 4000 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 6 percent plus or minus 1.5 percent for 1-1/2-inch nominal maximum aggregate size.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use high-range, high-range, water-reducing and retarding admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.

1. Fly Ash or Pozzolan: 15 percent.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Division 31 Section "Earth Moving."

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
2. Provide tie bars at sides of pavement strips where indicated.
3. Butt Joints: Use epoxy bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet, unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows to match jointing of existing adjacent concrete pavement:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site.

F. Do not add water to fresh concrete after testing.

G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.

J. Screed pavement surfaces with a straightedge and strike off.

K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

L. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.

2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage and pay for a qualified independent geotechnical engineering testing agency to perform field quality-control testing. The Contractor will be responsible for understanding the requirements and frequency of testing and coordinating with the testing agency.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.
a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
    a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 321373 – CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General, Supplementary and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within cement concrete pavement.

B. Related Sections include the following:

1. Division 07 Section "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.
2. Division 32 Section "Concrete Paving" for constructing joints in concrete pavement.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

D. Qualification Data: For Installer.

E. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing of current sealant products within a 36-month period preceding the Notice to Proceed with the Work.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 for testing indicated, as documented according to ASTM E 548.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
3. When joint substrates are wet or covered with frost.
4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 COLD-APPLIED JOINT SEALANTS

A. Multicomponent Jet-Fuel-Resistant Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:

1. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.

a. Available Products:

1) Pecora Corporation; Urexpan, Dynatred.
2) Sonneborn, Div. of ChemRex, Inc.; Sonolastic SL 2.

B. Single-Component Jet-Fuel-Resistant Urethane Sealant for Concrete: Single-component, pourable, coal-tar-modified, urethane formulation complying with ASTM C 920 for Type S; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

1. Available Products:

a. Sonneborn, Div. of ChemRex, Inc.; Sonolastic SL 1.
b. Tremco Sealant/Waterproofing Division; Vulkem 45SSL.

2.4 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.5 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of backer materials.
2. Do not stretch, twist, puncture, or tear backer materials.
3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.

2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.

G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 321373

SECTION 32 92 00 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General, Supplementary and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Hydroseeding
2. Lawn renovation.
3. Erosion-control material(s).

B. Related Sections:

1. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling.
2. Division 31 Section "Earth Moving" for excavation, filling and backfilling, and rough grading.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

C. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

D. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass sod, identifying source, including name and telephone number of supplier.

C. Qualification Data: For qualified landscape Installer.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

E. Material Test Reports: For existing surface soil.

F. Samples for Verification: For each of the following:

1. Erosion Control Blanket: 12 by 12 inches.

G. Planting Schedule: Indicating anticipated planting dates for each type of planting.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn and meadow establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
2. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for lawn growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

D. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

1.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: March 15 – May1

2. Fall Planting: October 15 – December 1

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.8 MAINTENANCE SERVICE

A. Initial Lawn Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

1. Seeded Lawns: 60 days from date of Project Substantial Completion.

a. When initial maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.

PART 2 - PRODUCTS

2.1 SEED FOR HYDROSEEDING

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

1. Sun to Partial Shade: Proportioned by weight as follows:

a. 85 percent blend three species of Turf Type Tall Fescues. Cultivars shall be specifically tolerant for summer season seeding.
b. 15 percent perennial ryegrass.
2. Seed Grade: Certified Turf Quality.
3. Application Rate: 2.5 lbs/1000 sf
4. Seed shall be weed free, fresh, re-cleaned, Grade A, new crop.

C. Hydro-Mulch:
1. Cellulose wood fiber with no growth or germination inhibiting factors, dyed green. Material shall have equilibrium air-dry moisture content of twelve (12) percent, plus or minus two (2) percent, at time of manufacture.
2. Fiber shall disperse rapidly in water forming homogeneous slurry and remaining in such state when agitated in hydro-mulching equipment.

D. Binders:
1. Tackifier to bind soil and mulch together to prevent erosion.

E. Fungicide for use with Hydroseeding application.

F. Fertilizer: 16-20-0.

2.2 MIXES FOR HYDROSEEDING

A. General:
1. Amount of hydro-mulch shall be 1800 lbs per acre.
2. Add water as necessary to provide suitable slurry mixture.
3. Add fungicide at rates recommended by Manufacturer on installations made between 1st of June and 30 September.

2.3 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 2 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

a. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

2.4 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

2.5 PLANTING ACCESSORIES

A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

2.6 FERTILIZER

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.7 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.8 EROSION-CONTROL MATERIALS

A. Erosion Control Blankets: For slopes exceeding 6:1 and not indicated to be sodded. Short term, 100% biodegradable double net straw fiber erosion control blanket designed for use on moderate slopes for up to 1 year. Blanket shall be sewn together on 1.5” centers, FHWA FP-

03, Type 2D erosion control blanket for slopes up to 2:1. 100% agricultural straw fiber matrix, straw applied at a rate of .5lbs/SY, top and bottom leno woven biodegradable nets with a mesh size of .5x1 inches, 100% biodegradable leno woven net, thread and matrix. Erosion Control Blanket S32BD or an equivalent product.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance.

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

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 FIELD QUALITY CONTROL

A. Field Inspections:
1. Seeded areas will be accepted at final inspection if:
a. Seeded areas are properly established.
b. Lawn is free of bare and dead spots and is without weeds.
c. No surface soil is visible when grass has been cut to height of 2 inches.
d. Seeded areas have been mowed a minimum of twice.

3.4 LAWN PREPARATION

A. Limit lawn subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
b. Mix lime with dry soil before mixing fertilizer.

2. Spread planting soil mix to a depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Spread approximately 1/2 the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil mix.
    b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.

    a. Apply fertilizer directly to surface soil before loosening.

3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.5 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Lawn Preparation" Article.

B. For erosion-control blanket and turf reinforcement mat, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

C. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.6 HYDROSEEDING

A. Interface With Other Work:
    1. Do not commence work of this Section until work of section 312000 Earth Moving has been completed and approved.

B. Tolerances:

1. Final grade of soil after seeding of lawn areas is complete shall be one inch below top of adjacent pavement of any kind.

C. After lawn areas are graded, apply specified slurry mix with machine capable of continuously mixing slurry and providing an application meeting Contract Document requirements. Hydro-mulch shall form an absorptive mat, but not a plant inhibiting membrane, which will allow water to percolate into underlying soil.

D. Post Application Watering:
1. Allow slurry mixture to 'set.'
2. Water hydro-seeded areas sufficiently to insure proper seed germination, but not cause erosion or slope failure. Repeat watering at regular intervals to keep seed germinating and growing until plantings are established. Note hydroseeding will take place in summer months and Contractor shall water accordingly to provide establishment in hot, dry conditions.
3. After plantings are established, decrease frequency and increase amount of water per application as necessary to meet plant water requirements.

E. If fungicide has been applied with slurry mix, make a second application of fungicide fourteen (14) days after initial application.

3.7 LAWN RENOVATION

A. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish lawn where settlement or washouts occur or where minor regrading is required.
2. Provide new topsoil as required.
3. Lawn renovation shall be done by hydroseeding.

B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.

C. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

D. Mow, dethatch, core aerate, and rake existing lawn.

E. Remove weeds before hydroseeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

G. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

H. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 4 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.

I. Apply seed and protect with straw mulch as required for new lawns.

J. Water newly planted areas and keep moist until new lawn is established.

3.8 LAWN MAINTENANCE

A. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.

1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

B. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water lawn with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow grass to a height of 2 to 3 inches.

D. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to lawn area.

3.9 SATISFACTORY LAWNS

A. Lawn installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
2. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, well-rooted, even-colored, viable lawn has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.10 LAWN WARRANTY

A. Warranty for all seeded and sodded lawns shall be for one (1) year past the date of project Final Completion.

3.11 CLEANUP AND PROTECTION

A. Promptly remove soil and debris, created by lawn work, from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200

SECTION 334100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Nonpressure transition couplings.
3. Cleanouts.
4. Stormwater inlets
5. Pipe outlets.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Manholes: Include plans, elevations, sections, details, frames, and covers.
2. Stormwater inlets, junction boxes, pipe outlets and cleanouts. Include plans, elevations, sections, details, frames, covers, and grates.

C. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

D. Field quality-control reports.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic drainage structures, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

D. Handle stormwater inlets according to manufacturer's written rigging instructions.

PART 2 - PRODUCTS

2.1 PE PIPE AND FITTINGS

A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10: AASHTO M 252M, Type S, with smooth waterway for coupling joints.

1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.

B. Corrugated PE Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294M, Type S, with smooth waterway for coupling joints.

1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.

2.2 CONCRETE PIPE AND FITTINGS

A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76.

1. Bell-and-spigot or tongue-and-groove ends and gasketed joints with ASTM C 443, rubber gaskets
2. Class III, Wall B.

2.3 NONPRESSURE TRANSITION COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1. For Concrete Pipes: ASTM C 443, rubber.
2. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
3. For Fiberglass Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
4. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
5. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Shielded, Flexible Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Cascade Waterworks Mfg.
b. Dallas Specialty & Mfg. Co.
c. Mission Rubber Company; a division of MCP Industries, Inc.

2. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

2.4 CLEANOUTS

A. Cast-Iron Cleanouts:

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

   a. Josam Company.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.
   d. Tyler Pipe.
   e. Watts Water Technologies, Inc.
   f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

2. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, polished bronze cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
3. Top-Loading Classification(s): Heavy Duty.
4. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

2.5 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

2.6 STORMWATER INLETS

A. Catch Basin: Precast or cast-in-place basin and heavy duty grate and frame, size as indicated.

2.7 PIPE OUTLETS

A. Head Walls: KYDOH Sloped and Flared, size as indicated with precast or cast-in-place basin conforming with KYDOH Standard Drawing or RDH-020-03.

B. Class II Channel Lining at outlets, dimensions as indicated on drawings, but not less than equal to the width of the outlet apron x 6’ in length.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched down in direction of flow.
2. Install piping with minimum cover as indicated.
3. Install PE corrugated sewer piping according to ASTM D 2321.
4. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
2. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
3. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

1. Use Heavy-Duty, top-loading classification cleanouts in all areas.

B. Set cleanout frames and covers in earth in cast-in-place concrete block, 12 by 12 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 DRAIN INSTALLATION

A. Install type of drains in locations indicated.

1. Use Heavy-Duty, top-loading classification drains in all areas.
2. Provide 12” concrete collar around drain basin

B. Embed drains in 4-inch minimum concrete around bottom and sides.

C. Fasten grates to drains if indicated.

D. Set drain frames and covers with tops flush with pavement surface.

3.6 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.7 STORMWATER INLET AND OUTLET INSTALLATION

A. Construct inlets, head walls, aprons, and sides of reinforced concrete, as indicated.

B. Set frames and grates to elevations indicated.

C. Place turf reinforcement mat as indicated.

D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

3.8 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.9 IDENTIFICATION

A. Materials and their installation are specified in Division 2 Section "Earthwork." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.10 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

    a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
    b. Option: Test plastic piping according to ASTM F 1417.
    c. Option: Test concrete piping according to ASTM C 924.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION 334100

SECTION 334600 - SUBDRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes subdrainage systems for the following:
   1. Subdrains in stone paved areas

B. Related Sections include the following:

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. HDPE: High-density polyethylene plastic.

C. PE: Polyethylene plastic.

D. PP: Polypropylene plastic.

E. PS: Polystyrene plastic.

F. PVC: Polyvinyl chloride plastic.

G. Subdrainage: Drainage system that collects and removes subsurface or seepage water.

1.4 SUBMITTALS

A. Product Data: For the following:

   1. Perforated-wall pipe and fittings.
   2. Solid-wall pipe and fittings.
   3. Drainage conduits.
   4. Geotextile filter fabrics.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to the "Piping Applications" Article in Part 3 for applications of pipe, tube, fitting, and joining materials.

2.3 PERFORATED-WALL PIPES AND FITTINGS

A. Perforated PE Pipe and Fittings:

1. NPS 6 and Smaller: ASTM F 405 or AASHTO M 252, Type CP; corrugated, for coupled joints.

2. NPS 8 and Larger: ASTM F 667; AASHTO M 252, Type CP; or AASHTO M 294, Type CP; corrugated; for coupled joints.

3. Couplings: Manufacturer's standard, band type.

2.4 FITTINGS & COUPLINGS

A. Provide manufacturer’s standard fittings and couplings for strip drain.

1. Install per manufacturer’s written requirements for similar site conditions.

2.5 SOLID-WALL PIPES AND FITTINGS

A. PE Pipe and Fittings: AASHTO M 294, Type S, corrugated, with smooth waterway, for coupled joints.

1. Couplings: AASHTO M 294, corrugated, band type, matching tubing and fittings.

2.6 SPECIAL PIPE COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant metal tension band and tightening mechanism on each end.

1. Sleeve Materials:

a. For Concrete Pipes: ASTM C 443, rubber.
b. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
c. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
d. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

2. Shielded Flexible Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant metal tension band and tightening mechanism on each end.

2.7 CLEANOUTS

A. Cast-Iron Cleanouts: ASME A112.36.2M; with round-flanged, cast-iron housing; and secured, scoriated, Medium-Duty Loading class, cast-iron cover. Include cast-iron ferrule and countersunk, brass cleanout plug.

2.8 SOIL MATERIALS

A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving."

2.9 GEOTEXTILE FILTER FABRICS

A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491.

1. Structure Type: Nonwoven, needle-punched continuous filament.
2. Style(s): Flat and/or sock style as indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.

B. If subdrainage is required for landscaping, locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.

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

3.2 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.3 PIPING APPLICATIONS

A. Underground Subdrainage Piping:

1. Perforated PE pipe and fittings, couplings, and coupled joints.

3.4 CLEANOUT APPLICATIONS

A. In Underground Subdrainage Piping:

1. At Grade in Earth: Cast-iron cleanouts.
2. At Grade in Paved Areas: Cast-iron cleanouts with brass cover and plug.

3.5 PIPING INSTALLATION

A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
1. Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 36 inches, unless otherwise indicated.
2. Lay perforated pipe with perforations down.
3. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

C. Install PE piping according to ASTM D 2321.

3.6 PIPE JOINT CONSTRUCTION

A. Join perforated, PE pipe and fittings with couplings for soil-tight joints according to AASHTO's "Standard Specifications for Highway Bridges," Division II, Section 26.4.2.4, "Joint Properties"; or according to ASTM D 2321.

B. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.7 CLEANOUT INSTALLATION

A. Cleanouts for Subdrainage:

1. Install cleanouts from piping to grade. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.
2. In vehicular-traffic areas, use NPS 4 cast-iron soil pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, 18 by 18 by 12 inches in depth. Set top of cleanout flush with grade. Cast-iron pipe may also be used for cleanouts in nonvehicular-traffic areas.
3. In nonvehicular-traffic areas, use NPS 4 cast-iron pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, 12 by 12 by 4 inches in depth. Set top of cleanout plug 1 inch above grade.

3.8 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect low elevations of subdrainage system to solid-wall-piping storm drainage system.

3.9 IDENTIFICATION

A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tapes directly over piping.

1. Install PE warning tape or detectable warning tape over ferrous piping.
2. Install detectable warning tape over nonferrous piping and over edges of underground structures.

3.10 FIELD QUALITY CONTROL

A. Testing: After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

3.11 CLEANING

A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

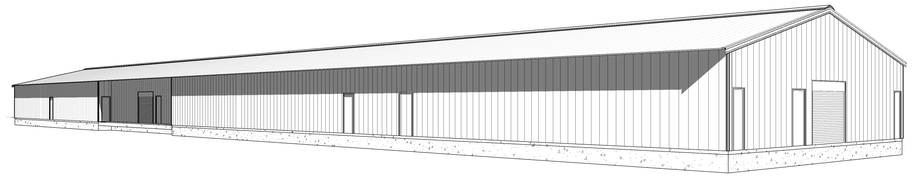
END OF SECTION 334600

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UK POULTRY RESEARCH FACILITY

1171 MIDWAY ROAD

VERSAILLES, KENTUCKY



NUTRITIONAL STUDIES BUILDING



LAYER/BREEDER BUILDING

PACKAGE

CONSTRUCTION DOCUMENTS 4-16-21

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Capital Project Management Division
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Lexington, KY 40508
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CONSTRUCTION MANAGER
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Lexington, KY 40505
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DRAWING INDEX

GENERAL
G-001 COVER SHEET
G-101 INFORMATION DRAWING
G-102 LOCATIONS AND LAYOUT RULES
G-103 LIFE SAFETY PLANS

SURVEY
SU-001 SITE SURVEY
SU-002 SITE SURVEY

CIVIL
C1.0 CIVIL SITE UTILITIES PLAN
C2.0 CIVIL SANITARY PROFILES
C3.0 CIVIL UTILITY DETAILS
C3.1 CIVIL UTILITY DETAILS
C3.2 CIVIL UTILITY DETAILS
L0.0 SITE LOGISTICS
L1.0 EROSION PREVENTION SEDIMENT CONTROL PLAN
L2.0 SITE CLEARING
L3.0 SITE GRADING & DRAINAGE
L4.0 SITE LAYOUT & MATERIALS
L6.0 SITE DETAILS

STRUCTURAL
S1.1 GENERAL NOTES
S2.1 FOUNDATION PLANS
S3.1 FOUNDATION DETAILS & SECTIONS

ARCHITECTURAL
A-100 CALLOUT FLOOR PLANS
A-101 DIMENSION FLOOR PLANS
A-102 REFLECTED CEILING PLANS
A-103 FINISH FLOOR PLAN
A-104 ROOF PLANS
A-200 NUTRITIONAL STUDIES BUILDING EXTERIOR ELEVATIONS
A-201 LAYER/BREEDER BUILDING EXTERIOR ELEVATIONS
A-301 BUILDING SECTIONS
A-302 BUILDING SECTIONS
A-351 WALL SECTIONS
A-601 DOOR SCHEDULE AND DETAILS
A-701 PARTITION TYPE SCHEDULE AND DETAILS

SITE UTILITES
U-100 SITE UTILITIES PLAN
U-200 SITE UTILITIES DETAILS & LEGENDS

ELECTRICAL
E-400 ELECTRICAL DISTRIBUTION SYSTEM RISER DIAGRAM

JRA architects
3225 Summit Square Place, Suite 200
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JRA, INC. REGISTERED NO. 5984-6448 COMMONWEALTH OF KENTUCKY ARCHITECTS

RESERVED FOR AHJ STAMP

CONSTRUCTION DOCUMENTS

UK POULTRY RESEARCH FACILITY
1171 MIDWAY ROAD
VERSAILLES, KENTUCKY

University of Kentucky

GENERAL

PROJECT	201918
DATE	4-16-21

REVISIONS

No.	Description	Date

JRA ARCHITECTS HAS RETAINED AN ELECTRONIC VERSION OF THESE DRAWINGS. THE CLIENT AGREES NOT TO REUSE THESE DRAWINGS - IN ELECTRONIC OR ANY OTHER FORMAT - IN WHOLE, OR IN PART, FOR ANY PURPOSE OTHER THAN FOR THE PROJECT. THE CLIENT AGREES NOT TO TRANSFER THESE ELECTRONIC FILES TO OTHERS WITHOUT THE PRIOR WRITTEN CONSENT OF THE ARCHITECT. THE CLIENT FURTHER AGREES TO WAIVE ALL CLAIMS AGAINST THE ARCHITECT RESULTING IN ANY WAY FROM ANY UNAUTHORIZED CHANGES TO OR REUSE OF THE ELECTRONIC FILES FOR ANY OTHER PROJECT BY ANYONE OTHER THAN THE ARCHITECT.

COVER SHEET

G-001

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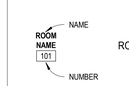
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ABBREVIATIONS

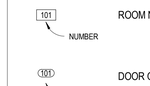
#	POUND OR NUMBER	EHD	ELECTRIC HAND DRYER	LAM	LAMINATE	RCP	REINFORCED CONCRETE PIPE
&	AND	EJ	EXPANSION JOINT	LAV	LAVATORY	RD	ROOF DRAIN
⎓	CENTERLINE	EL	ELEVATION	LBL	LABEL	REF	REFERENCE
@	AT	ELEC	ELECTRICAL	LG	LONG	REFRIG	REFRIGERATOR
		ELEV	ELEVATOR	LH	LEFT HAND	REINF	REINFORCED
A/C	AIR CONDITIONING	EMER	EMERGENCY	LKR	LOCKER	REQD	REQUIRED
AB	ANCHOR BOLT	ENCL	ENCLOSURE	LL	LIVE LOAD	RESIL	RESILIENT
AC	ACRE	ENL	ENLARGED	LOC	LOCATION	REV	REVISION
ACOUS	ACOUSTICAL	ENTR	ENTRANCE	LP	LOW POINT	RGSTR	REGISTER
AD	AREA DRAIN	EP	ELECTRICAL PANEL	LT	LIGHT	RH	RIGHT HAND
ADD	ADDENDUM	EQ	EQUAL	LTL	LINTEL	RL	RAIN LEADER
ADJ	ADJUSTABLE	EQPT	EQUIPMENT	LWT	LIGHT WEIGHT	RM	ROOM
ADJAC	ADJACENT	EST	ESTIMATE			RND	ROUND
AESS	ARCHITECTURALLY EXPOSED STRUCTURAL STEEL	EWC	ELECTRIC WATER COOLER	MACH	MACHINE	RO	ROUGH OPENING
		EXIST	EXISTING	MAINT	MAINTENANCE	ROW	RIGHT OF WAY
AFF	ABOVE FINISHED FLOOR	EXP	EXPANSION	MAS	MASONRY		
AGGR	AGGREGATE	EXT	EXTERIOR	MATL	MATERIAL	S	SOUTH
ALT	ALTERNATIVE			MAX	MAXIMUM	SAB	SOUND ATTENUATION BLANKET
ALUM	ALUMINUM	FA	FIRE ALARM	MB	MARKER BOARD	SAC	SUSPENDED ACOUSTICAL CEILING
ANOD	ANODIZED	FB	FLAT BAR	MECH	MECHANICAL		
AP	ACCESS PANEL	FCO	FLOOR CLEAN OUT	MEMB	MEMBRANE	SAT	SUSPENDED ACOUSTICAL TILE
APPROX	APPROXIMATE	FD	FLOOR DRAIN	MET	METAL	SC	SOLID CORE
ARCH	ARCHITECTURAL	FDN	FOUNDATION	MFR	MANUFACTURER	SCH	SCHEDULE
ASB	ASBESTOS	FE	FIRE EXTINGUISHER	MH	MANHOLE	SD	STORM DRAIN
ASPH	ASPHALT	FEC	FIRE EXTINGUISHER CABINET	MIN	MINIMUM	SECT	SECTION
ATTEN	ATTENUATION	FF	FINISHED FLOOR	MIR	MIRROR	SF	SQUARE FOOT
		FFE	FINISHED FLOOR ELEVATION	MISC	MISCELLANEOUS	SHLF	SHELF
BC	BACK OF CURB	FFL	FINISHED FLOOR LINE	MO	MASONRY OPENING	SHT	SHEET
BD	BOARD	FHC	FIRE HOSE CABINET	MOD	MODULAR	SHWR	SHOWER
BITUM	BITUMINOUS	FIN	FINISH	MOV	MOVING	SIM	SIMILAR
BLDG	BUILDING	FL	FLOOR	MT	MOUNT	SOG	SLAB ON GRADE
BLK	BLOCK	FLASH	FLASHING	MTD	MOUNTED	SP	SOUND PROOF
BLKG	BLOCKING	FLUOR	FLUORESCENT	MUL	MULLION	SPEC	SPECIFICATION
BLKT	BLANKET	FND	FEMININE NAPKIN DISPOSAL			SPKR	SPEAKER
BM	BEAM	FOC	FACE OF CONCRETE	N	NORTH	SS	SANITARY SEWER
BOT	BOTTOM	FOF	FACE OF FINISH	N/A	NOT APPLICABLE	SST	STAINLESS STEEL
BPL	BEARING PLATE	FOM	FACE OF MASONRY	NIC	NOT IN CONTRACT	STA	STATION
BRG	BEARING	FOS	FACE OF STUD	NO	NUMBER	STC	SOUND TRANSMISSION COEFFICIENT
BRK	BRICK	FRPF	FIREPROOF	NOM	NOMINAL		
BSMT	BASEMENT	FS	FULL SIZE	NTS	NOT TO SCALE	STD	STANDARD
BUR	BUILT UP ROOFING	FT	FOOT OR FEET			STL	STEEL
		FTG	FOOTING	OA	OVERALL	STOR	STORAGE
CAB	CABINET	FV	FIELD VERIFY	OBS	OBSCURE	STR	STAIR
CB	CATCH BASIN			OC	ON CENTER	STRUCT	STRUCTURAL
CEM	CEMENT	GA	GAUGE	OD	OUTSIDE DIAMETER (DIM)	SUSP	SUSPENDED
CER	CERAMIC	GALV	GALVANIZED	OF	OWNER FURNISHED	SY	SQUARE YARD
CFM	CUBIC FEET PER MINUTE	GB	GRAB BAR	OFCI	OWNER FURNISHED / CONTRACTOR INSTALLED	SYM	SYMMETRICAL
CG	CORNER GUARD	GFI	GROUND FAULT INTERRUPTER			SYS	SYSTEM
CHB	CHALK BOARD	GI	GALVANIZED IRON	OFOI	OWNER FURNISHED / OWNER INSTALLED	T	TREAD
CJ	CONTROL JOINT	GL	GLASS	OH	OPPOSITE HAND	T&G	TONGUE AND GROOVE
CLG	CEILING	GND	GROUND	OPNG	OPENING	TB	TACK BOARD
CLKG	CAULKING	GR	GRADE	OPP	OPPOSITE	TC	TOP OF CURB
CLO	CLOSET	GRTG	GRATING	OZ	OUNCE	TEL	TELEPHONE
CLR	CLEAR	GWB	GYPSUM WALL BOARD			TEMP	TEMPORARY
CMU	CONCRETE MASONRY UNIT	GYP	GYPSUM	PA	PUBLIC ADDRESS	TER	TERRAZZO
CMW	CASEWORK / MILLWORK			PAR	PARALLEL	THK	THICK
CNTR	COUNTER	HB	HOSE BIBB	PC	PRECAST	THR	THRESHOLD
CO	CLEAN OUT	HBD	HARDBOARD	PCF	POUNDS PER CUBIC FOOT	TOP	TOP OF PAVEMENT
COL	COLUMN	HC	HOLLOW CORE	PED	PEDESTAL	TOS	TOP OF STEEL
CONC	CONCRETE	HDWD	HARDWOOD	PERF	PERFORATED	TOW	TOP OF WALL
CONSTR	CONSTRUCTION	HDWR	HARDWARE	PFM	PREFINISHED METAL	TP	TOILET PARTITION
CONT	CONTINUOUS	HGT	HEIGHT	PL	PLATE	TPH	TOILET PAPER HOLDER
CONV	CONVENTIONAL	HM	HOLLOW METAL	PLAM	PLASTIC LAMINATE	TSTAT	THERMOSTAT
CORR	CORRIDOR	HNDRL	HANDRAIL	PLAS	PLASTER	TYP	TYPICAL
CPT	CARPET	HORIZ	HORIZONTAL	PLMG	PLUMBING		
CR	CARD READER	HP	HIGH POINT	PNL	PANEL	UL	UNDERWRITERS LABORATORIES
CSMT	CASEMENT	HTG	HEATING	PNTD	PAINTED		
CT	CERAMIC TILE	HTR	HEATER	POL	POLISHED	UNO	UNLESS NOTED OTHERWISE
CTR	CENTER	HVAC	HEATING/VENTILATION/AIR CONDITIONING	PR	PAIR	UR	URINAL
CTSK	COUNTERSUNK	HW	HOT WATER	PREFAB	PREFABRICATED		
				PREFIN	PREFINISHED	VB	VAPOR BARRIER
DBL	DOUBLE			PROP	PROPERTY	VCT	VINYL COMPOSITION TILE
DEPT	DEPARTMENT	ID	INSIDE DIAMETER (DIM)	PRPL	PROPERTY LINE	VERT	VERTICAL
DET	DETAIL	IF	INSIDE FACE	PSF	POUNDS PER SQUARE FOOT	VEST	VESTIBULE
DF	DRINKING FOUNTAIN	IN	INCH	PSI	POUNDS PER SQUARE INCH	VNB	VINYL BASE
DH	DOUBLE HUNG	INCIN	INCINERATOR	PT	POINT	VT	VINYL TILE
DIA	DIAMETER	INCL	INCLUDE	PTD	PAPER TOWEL DISPENSER	VTR	VENT THROUGH ROOF
DIAG	DIAGONAL	INSUL	INSULATION	PTN	PARTITION	VWC	VINYL WALL COVERING
DIM	DIMENSION	INT	INTERIOR	PVC	POLYVINYL CHLORIDE		
DISP	DISPENSER	INV	INVERT	PVMT	PAVEMENT	W	WEST
DL	DEAD LOAD			PWD	PLYWOOD	W/	WITH
DN	DOWN	JAN	JANITOR			W/O	WITHOUT
DR	DOOR	JST	JOIST	QT	QUARRY TILE	WC	WATER CLOSET
DS	DOWNSPOUT	JT	JOINT	QTR	QUARTER	WD	WOOD
DSP	DRY STANDPIPE					WH	WATER HEATER
DWG	DRAWING	KIT	KITCHEN	R	RISER	WP	WATERPROOF
DWR	DRAWER	KO	KNOCK OUT	RA	RETURN AIR	WR	WATER RESISTANT
		KP	KEY PAD	RAD	RADIUS	WSCT	WAINSCOT
E	EAST			RB	RUBBER BASE	WT	WEIGHT
EA	EACH	L	LENGTH			WWF	WOVEN WIRE FABRIC
EB	EXPANSION BOLT	LAB	LABORATORY				

SYMBOLS LEGEND

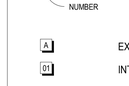
- ACOUSTICAL CEILING PANEL
- ALUMINUM
- BATT INSULATION
- BRICK
- CERAMIC OR QUARRY TILE
- CMU
- CONCRETE (SECTION)
- CONCRETE OR PRECAST CONCRETE (PLAN / ELEVATION)
- CRUSHED STONE
- EARTH
- E.I.F.S. (ELEVATION)
- E.I.F.S. (SECTION)
- GYPSUM BOARD (TYPE AS NOTED)
- LIMESTONE
- PLYWOOD
- PRECAST CONCRETE (SECTION)
- RIGID INSULATION
- SOLID SURFACE
- STEEL
- SOLID WOOD (TREATMENT AS NOTED)
- WOOD (FINISH)



ROOM NAME & ROOM NUMBER



ROOM NUMBER (RCP PLANS)

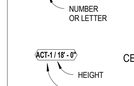


DOOR OPENING INDICATOR



EXTERIOR WINDOW OPENING INDICATOR

INTERIOR WINDOW OPENING INDICATOR



PARTITION TYPE INDICATOR



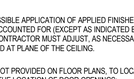
EQUIPMENT INDICATOR



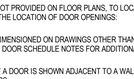
CEILING INDICATOR



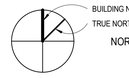
DEMOLITION PLAN NOTE



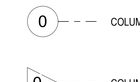
PLAN NOTE



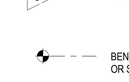
ACCENT WALL INDICATOR



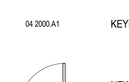
NORTH ARROW



COLUMN GRID (NEW)



COLUMN GRID (EXIST)


BENCHMARK, LEVEL, OR SPOT ELEVATION



KEYNOTE (SPEC REFERENCE)


NEW DOOR AND FRAME

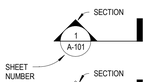

ITEM TO BE REMOVED


ITEM TO REMAIN



MATERIAL INDICATOR

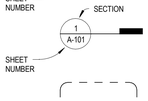
CONTROL JOINT



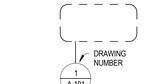
BUILDING SECTION



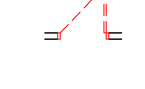
WALL SECTION

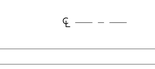


DETAIL SECTION



DETAIL CALLOUT OR ENLARGED PLAN


EXISTING DOOR AND FRAME TO REMAIN


REMOVE DOOR AND FRAME

CENTER LINE

VICINITY MAP



APPLICABLE CODES/STANDARDS

ACCORDING TO THE 2018 KENTUCKY BUILDING CODE, SECTION 101.2 EXCEPTION 2, THE KBC DOES NOT APPLY TO BUILDINGS IN THIS SET

GENERAL NOTES

GENERAL NOTES - ARCHITECTURAL

A. WORK SHOWN ON THE DRAWINGS SHALL BE BASE BID UNLESS SPECIFICALLY NOTED TO BE BY ALTERNATE BID.

B. DIMENSIONS TO EXISTING CONSTRUCTION ARE TO FINISHED SURFACE. DIMENSIONS TO NEW CONSTRUCTION ARE TO STRUCTURAL CENTERLINE, FACE OF CONCRETE OR MASONRY CONSTRUCTION, OR TO FINISH FACE OF FRAMED MEMBERS UNLESS NOTED OTHERWISE. FIELD VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO STARTING WORK AND NOTIFY ARCHITECT IMMEDIATELY IF DISCREPANCIES ARE FOUND BETWEEN CONTRACT DOCUMENTS AND ACTUAL FIELD CONDITIONS.

C. WHERE A FIXED DIMENSION IS SHOWN ON AN ACCESSIBLE FIXTURE OR ACCESSORY, THAT ITEM SHALL BE INSTALLED EXACTLY AS DIMENSIONED. REFER TO THE ACCESSORY MOUNTING LEGEND FOR MOUNTING HEIGHTS.

D. DO NOT SCALE DRAWINGS. REFER DIMENSION QUESTIONS TO ARCHITECT FOR INTERPRETATION.

E. DOOR AND FRAME NUMBERS CORRESPOND TO RESPECTIVE ROOM NUMBERS. IN ROOMS WITH MULTIPLE OPENINGS, A SUFFIX HAS BEEN ADDED TO DOOR NUMBERS, I.E., A101-B.

F. LOCATE INSIDE FACE OF DOOR FRAME JAMBS 6 INCHES FROM FINISH FACE OF ADJACENT WALLS UNLESS NOTED OTHERWISE.

G. COORDINATE EQUIPMENT WORK WITH MANUFACTURERS AND SUPPLIERS TO INSURE PROPER ROUGH-IN CLEARANCES FOR INSTALLATION, USE AND MAINTENANCE.

H. REFER TO CIVIL DRAWINGS FOR FINISH FLOOR ELEVATIONS RELATIVE TO SITE GRADING.

I. PROVIDE CONTROL JOINTS (C.J.) IN GYPSUM BOARD WALL CONSTRUCTION AS INDICATED. WHERE NOT SHOWN, PROVIDE MAXIMUM SPACING BETWEEN JOINTS OF 30'-0." VERIFY FINAL CONTROL JOINT LOCATIONS WHETHER OR NOT INDICATED ON THE DRAWINGS WITH ARCHITECT PRIOR TO STARTING WORK.

J. INTERIOR STUD SPACING SHALL BE MAXIMUM 16" ON CENTER UNLESS NOTED OTHERWISE.

K. PROVIDE MOLD AND MOISTURE RESISTANT GYPSUM BOARD ON ALL INTERIOR FACE OF EXTERIOR WALLS. WALLS WITH OPERABLE PLUMBING FIXTURES, AND WALLS WITHIN 4'-0" OF DRINKING FOUNTAINS OR WATER COOLERS.

L. PROVIDE FINISHED END PANELS, FILLERS, SUPPORTS, ETC. REQUIRED FOR A COMPLETE CABINETRY INSTALLATION. PROVIDE CUTOUTS, ACCESS PANELS AND REMOVABLE COMPONENTS AS REQUIRED BY NEW OR EXISTING CONDITIONS SUCH AS ELECTRICAL OUTLETS, JUNCTION BOXES, CLEANOUTS, ETC.

M. VERIFY MOUNTING HEIGHTS OF ACCESSORIES, EQUIPMENT, DOOR HARDWARE, CASEWORK, ETC., AND PROVIDE SOLID 2X SUPPORT WOOD BLOCKING FASTENED TO FRAMING MEMBERS AS REQUIRED TO SUPPORT WEIGHT AND USE OF ITEMS. WHERE MOUNTING HEIGHTS ARE NOT INDICATED, MOUNT ITEMS IN ACCORDANCE WITH RECOGNIZED INDUSTRY STANDARDS, COORDINATE LOCATIONS WITH MANUFACTURER OR SUPPLIER AND REFER MOUNTING HEIGHT QUESTIONS TO ARCHITECT FOR INTERPRETATION.

N. AT ALL EXTERIOR ENVELOPE CONDITIONS, SOLID WOOD BLOCKING INDICATED SHALL BE CONTINUOUS, U.N.O.

O. PROVIDE SEALANT BETWEEN HOLLOW METAL FRAME PERIMETERS AND SURROUNDING WALL CONSTRUCTION UNLESS OTHERWISE INDICATED.

P. PROVIDE SEALANT BETWEEN INTERIOR AND EXTERIOR WINDOWS AND STOREFRONT FRAME PERIMETERS AND SURROUNDING CONSTRUCTION UNLESS OTHERWISE INDICATED.

Q. PROVIDE SEALANT BETWEEN DISSIMILAR MATERIALS SUCH AS GYPSUM BOARD AND, COUNTERTOPS AND WALLS, ETC.

R. DO NOT BEGIN WORK THAT MAY REQUIRE COORDINATION, SUCH AS CEILING INSTALLATION, PRIOR TO FINAL SUBMITTAL OF MECHANICAL AND ELECTRICAL COORDINATION DRAWINGS TO ARCHITECT NOR PRIOR TO RESOLUTION AND APPROVAL OF COORDINATION ISSUES.

S. REFER TO LANDSCAPE AND CIVIL DRAWINGS FOR SITE ELEMENTS AND IMPROVEMENTS ADJACENT TO BUILDING EXTERIOR.

T. REFER TO LIFE SAFETY DRAWINGS FOR FIRE-RATED FLOOR, WALL, CEILING AND ROOF LOCATIONS. INSTALL FIRESTOPPING AT PENETRATIONS IN RATED CONSTRUCTION AND AT TOPS OF RATED WALLS.

U. REFER TO STRUCTURAL DRAWINGS FOR FOOTING, UNDERSLAB DRAINAGE AND BACKFILL REQUIREMENTS.

V. REFER TO CIVIL DRAWINGS FOR FOUNDATION DRAINS AND STORM DRAINAGE REQUIREMENTS.

GENERAL NOTES - DOORS AND FRAMES

A. REFER TO WALL SECTIONS AND INTERIOR PARTITION TYPES FOR ADDITIONAL NOTES REGARDING TYPICAL WALL CONSTRUCTION.

B. MOUNT ANY INTERIOR SIGNAGE ON LATCH SIDE OF DOOR.

C. ALL FIRE RATED DOORS SHALL BE CATEGORY "A" POSITIVE PRESSURE RATED COMPLYING WITH THE REQUIREMENTS OF UL 10C TESTING. ADDITIONAL INTUMESCENT SEALS SHALL NOT ACCEPTABLE.

D. PROVIDE CYLINDERS AND CORES FOR ALL DOOR HARDWARE CAPABLE OF BEING CHANGED AND KEYED TO THE OWNER'S MASTER KEYING SYSTEM.

E. PROVIDE SEALANT BETWEEN HOLLOW METAL FRAME PERIMETERS AND SURROUNDING WALL CONSTRUCTION UNLESS OTHERWISE INDICATED.

F. GROUT FULL NEW HOLLOW METAL DOOR FRAMES IN MASONRY WALL CONSTRUCTION.

G. SPOT GROUT NEW HOLLOW METAL DOOR FRAMES IN GYPSUM BOARD WALL CONSTRUCTION.

H. WHERE A FIRE RATING IS INDICATED ON THE DOOR SCHEDULE, HARDWARE AND DOOR ASSEMBLY COMPONENTS SHALL MEET THE REQUIREMENTS OF THAT LABEL.

I. DOOR AND FRAME NUMBERS CORRESPOND TO RESPECTIVE ROOM NUMBERS. IN ROOMS WITH MULTIPLE OPENINGS, A SUFFIX HAS BEEN ADDED TO DOOR NUMBERS, I.E., A101-B.

J. LOCATE INSIDE FACE OF DOOR FRAME JAMBS 6 INCHES FROM FINISH FACE OF ADJACENT WALLS UNLESS NOTED OTHERWISE.

K. AT DOORS SHOWN WITH GLASS LITES, BOTTOM OF GLASS MUST BE NO HIGHER THAN 43" WHEN INSTALLED.

GENERAL NOTES - FINISHES

A. REFER TO FINISH PLANS, REFLECTED CEILING PLANS, INTERIOR ELEVATIONS, ROOM FINISH SCHEDULE, & FINISH MATERIAL SCHEDULE FOR FINISH MATERIAL LOCATIONS & INFORMATION.

B. PAINT HOLLOW METAL DOORS, DOOR FRAMES AND LINTELS EXPOSED TO VIEW IN FINISHED AREAS AND AT EXTERIOR LOCATIONS UNLESS OTHERWISE INDICATED.

C. PAINT GRILLES TO MATCH COLOR OF THE WALLS IN WHICH THEY ARE LOCATED, UNLESS NOTED OTHERWISE.

D. FINISH SOFFITS, BULKHEADS, AND SIMILAR CONDITIONS TO MATCH SURROUNDING SURFACES UNLESS OTHERWISE INDICATED.

GENERAL NOTES - PARTITION TYPES

A. INTERIOR STUD SPACING SHALL BE MAXIMUM 16" ON CENTER UNLESS NOTED OTHERWISE.

B. GAUGE, SPACING, AND PERFORMANCE REQUIREMENTS OF METAL STUDS SHALL BE DETERMINED BY SPECIFICATION, UNO.

GENERAL NOTES - ROOFING

A. VERIFY SIZE, LOCATION AND NUMBER OF ROOF PENETRATIONS INCLUDING VENTS, PIPES, CURBS, ROOF DRAINS, CONDUITS, ETC. PROVIDE NEW FLASHING AND SEAL PENETRATIONS WHETHER OR NOT INDICATED ON THE DRAWINGS.

B. VERIFY AND MAINTAIN ROOF SLOPES AND DRAINAGE PATTERNS. TEST FOR AND CORRECT ANY PONDING CONDITIONS.

C. REPAIR AND REPLACE ROOFING SYSTEM OR STRUCTURE DAMAGED BY IMPROPER STORAGE, CONSTRUCTION ACTIVITIES, OR LACK OF ADEQUATE TEMPORARY PROTECTION. THIS ALSO INCLUDES INTERIOR DAMAGE TO FINISHES, EQUIPMENT, FURNISHINGS, ETC., RESULTING FROM LEAKS.

D. CAP FASTENERS THAT PENETRATE ROOF DECK IN AREAS NOT CONCEALED BY CEILINGS WITH WIRE NUTS OR OTHER MEANS ACCEPTABLE TO ARCHITECT UNLESS OTHERWISE INDICATED. AREAS SUCH AS JANITOR CLOSETS, STORAGE ROOMS, MECHANICAL AND ELECTRICAL EQUIPMENT ROOMS, ETC., ARE EXEMPT FROM THIS REQUIREMENT UNLESS OTHERWISE INDICATED.

E. PAINT EXTERIOR LADDERS, BRACKETS, ETC., U.N.O.

ARCHITECTURAL DIMENSIONING

1. EXCEPT WHERE DIRECTED TO PLACE ITEMS OF THE WORK AT THE "APPROXIMATE LOCATION SHOWN," DO NOT SCALE DRAWINGS FOR DIMENSIONAL INFORMATION.

2. ALL ELEMENTS OF THE DRAWINGS MAY NOT BE DRAWN TO EXACT SCALE. ALL DIMENSIONS REQUIRED ARE SHOWN (OR MAY BE DERIVED FROM THOSE SHOWN OR NOTED) ON THE FLOOR PLANS, DETAIL PLANS, ELEVATIONS, SECTIONS, SCHEDULES, CONFIGURATION DETAILS, AND SPECIFICATIONS. SEE THE NOTES BELOW AND SYMBOLS ON SHEET G-101 FOR DIMENSIONING CONVENTIONS USED ON THIS PROJECT.

3. EXCEPT WHERE SPECIFICALLY NOTED TO THE CONTRARY, ALL DIMENSIONS SHOWN ON THE ARCHITECTURAL DRAWINGS CONFORM TO THE FOLLOWING CONVENTIONS:

A. DIMENSIONS UTILIZING THE "CENTERLINE" SYMBOL ARE MEASURED TO:

- STRUCTURAL OR DIMENSIONAL GRID LINES.
- CENTERLINE OF CONCRETE OR CONCRETE MASONRY UNIT WALLS (EXCLUSIVE OF FURRING OR APPLIED FINISHES HAVING THICKNESS). REFER TO THE ARCH PLANS AND SECTIONS, THE STRUCTURAL DRAWINGS, OR PARTITION SCHEDULE TO DETERMINE THE THICKNESS OF CONCRETE OR CONCRETE MASONRY UNIT WALLS.
- CENTERLINE OF PARTITION ASSEMBLY (EXCLUSIVE OF ANY APPLIED FINISHES HAVING THICKNESS WHICH MAY BE ADDED TO SUCH WALLS) AT PARTITIONS FRAMED WITH METAL STUDS. REFER TO "PARTITION SCHEDULE" TO DETERMINE THICKNESS OF EACH PARTITION TYPE.
- CENTERLINE OF DOOR, WINDOW, OR LOUVER OPENING.
- CENTERLINE OF EQUIPMENT OR FURNISHING.
- CENTERLINE OF OTHER FEATURES AS INDICATED.

B. REFER TO SHEET G-101 FOR SYMBOL USED TO INDICATE CENTERLINE DIMENSION.

C. DIMENSIONS UTILIZING THE "CLEAR" DESIGNATION ARE MEASURED TO:

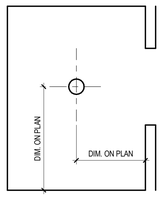
- FACE OF CONCRETE OR CONCRETE MASONRY UNIT WALL (EXCLUSIVE OF APPLIED FINISHES HAVING THICKNESS OR FURRING WHICH MAY BE ADDED TO THE FACE OF SUCH WALLS).
- FACE OF PARTITION ASSEMBLY (EXCLUSIVE OF ANY APPLIED FINISHES HAVING THICKNESS WHICH MAY BE ADDED TO SUCH WALL) AS DEFINED BY THE PARTITION SCHEDULE. UNLESS NOTED AS A "FACE OF FINISH" OR "CLEAR" DIMENSION (SEE NOTE 'E' BELOW), DIMENSIONS ARE NOT MEASURED TO THE FACE OF APPLIED FINISH. REFER TO THE "PARTITION SCHEDULE" TO DETERMINE THE THICKNESS OF EACH PARTITION TYPE.
- INSIDE EDGE OF FINISHED DOOR OPENING. REFER TO THE "DOOR SCHEDULE" FOR ADDITIONAL DIMENSION

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TYPICAL RULES FOR DETERMINING REFLECTED CEILING PLAN ELEMENT LOCATIONS AND LAYOUT

LOCATE ITEM AS INDICATED WHEN SHOWN DIMENSIONED BY REFLECTED CEILING PLAN, ENLARGED REFLECTED CEILING PLAN, OR DETAIL

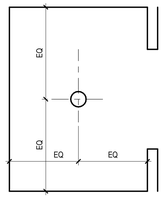
SPECIFIC DIMENSIONS SHOWN BY REFLECTED CEILING PLANS, ELEVATIONS, OR DETAILS TAKE PRECEDENCE OVER TYPICAL LOCATION RULES



RULE 1

WHEN ELEMENT IS COMPLETELY DIMENSIONED ON REFLECTED CEILING PLAN

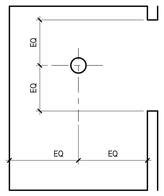
LOCATE ITEM CENTERED IN SPACE (OR CEILING PLANE) WHEN SHOWN (BUT NOT DIMENSIONED) GRAPHICALLY AT APPROXIMATE CENTER OF SPACE



RULE 2

WHEN NOT DIMENSIONED, BUT SHOWN CENTERED

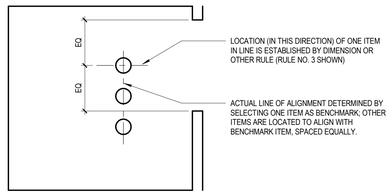
LOCATE ITEMS CENTERED ON ADJACENT OPENING, ELEMENT, OR FEATURE WHEN SHOWN (BUT NOT DIMENSIONED) OFF-CENTER IN OVERALL SPACE BUT CENTERED AGAINST ADJACENT ELEMENT



RULE 3

WHEN OFF CENTER IN SPACE BUT CENTERED ON ADJACENT ELEMENT

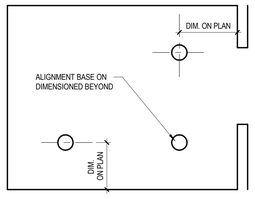
LOCATE ITEMS (LIGHT FIXTURES, SPRINKLER HEADS, DEVICES, ETC.) ALIGNED WITH ADJACENT ITEMS FOR WHICH DIMENSIONS OR RULES ARE PROVIDED. VISUAL ALIGNMENT IS CRITICAL. THE CONTRACTOR SHALL SELECT ONE ITEM IN EACH LINE (ON BASIS OF TOLERANCE, SEQUENCE OF CONSTRUCTION, TRADE, OR OTHER CRITERIA) TO SERVE AS THE ALIGNMENT BENCHMARK.



RULE 4

WHEN ALIGNED WITH OTHER FEATURES

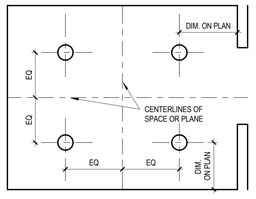
LOCATE ITEMS ALIGNED WITH OTHER ITEMS SHOWN DIMENSIONED ELSEWHERE IN SPACE (OR CEILING PLANE)



RULE 5

ALIGN WITH FEATURES SHOWN DIMENSIONED ELSEWHERE IN SPACE

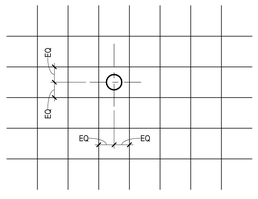
LOCATE ITEMS ALIGNED WITH OTHER ITEMS SHOWN DIMENSIONED ELSEWHERE IN SPACE (OR CEILING PLANE)



RULE 6

LOCATE ELEMENTS SYMMETRICALLY

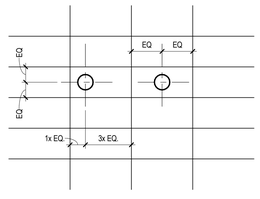
LOCATE ITEMS (LIGHT FIXTURES, SPRINKLER HEADS, DEVICES, ETC.) AT CENTER OF PANEL ON SQUARE GRID CEILINGS



RULE 7

WHEN NOT DIMENSIONED BUT OCCURS IN SQUARE PANEL

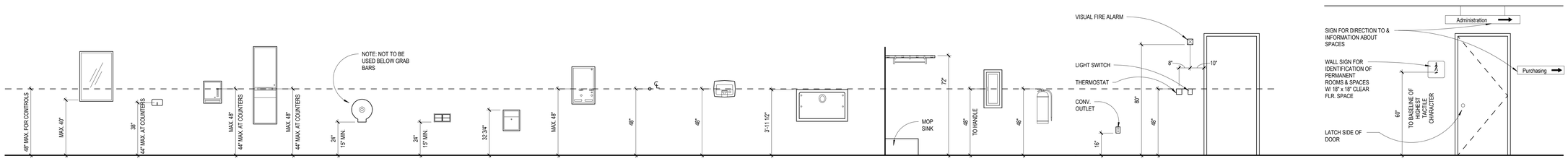
LOCATE ITEMS (LIGHT FIXTURES, SPRINKLER HEADS, DEVICES, ETC.) AT CENTER OF SHORT PANEL DIRECTION AND 1/4, 1/2, OR 3/4 POINT OF LONG PANEL DIRECTION



RULE 8

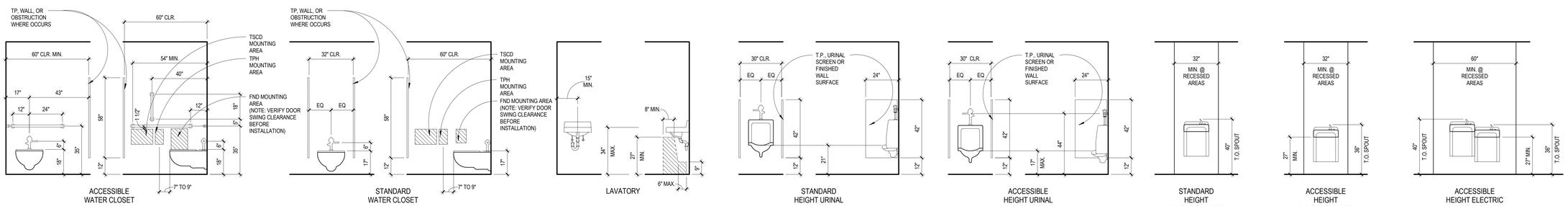
WHEN NOT DIMENSIONED BUT OCCURS IN RECTANGULAR PANEL

FIXTURE, DEVICE, AND ACCESSORY MOUNTING HEIGHTS



TOILET ACCESSORIES, DEVICE, AND EQUIPMENT MOUNTING HEIGHTS

(NOTE: SOME ITEMS SHOWN MAY NOT BE APPLICABLE TO THE PROJECT)



PLUMBING FIXTURES AND ACCESSORIES MOUNTING HEIGHTS

(NOTE: SOME ITEMS SHOWN MAY NOT BE APPLICABLE TO THE PROJECT)

GENERAL NOTES - LAYOUT

A THE G-SERIES OF DRAWINGS ESTABLISH AND COORDINATE THE FINISHED APPEARANCE AND LOCATION OF ALL EXPOSED ELEMENTS. THE G-SERIES DRAWINGS TAKE PRECEDENCE FOR THE FINISHED APPEARANCE AND LOCATION OF ALL PARTS OF THE WORK.

EXCEPTION: DIMENSIONED LOCATIONS SHOWN ON DRAWINGS OF OTHER DISCIPLINES SHALL GOVERN ONLY WHERE THE FOLLOWING CONDITIONS OCCUR:

A. SPECIFICALLY AND INDIVIDUALLY INDICATED BY SYMBOL, KEYED NOTE, OR NOTATION ON THE ARCHITECTURAL DRAWINGS.

B. OCCURRING WITHIN A ROOM OR OTHER IDENTIFIABLE SPACE FOR WHICH ARCHITECTURAL SHEET OF SCHEDULE NOTES INDICATE THAT DIMENSIONS PROVIDED ELSEWHERE SHALL GOVERN.

B THE PURPOSE OF THIS SHEET IS TO ILLUSTRATE THE TYPICAL RULES WHICH GOVERN THE LOCATION, CONFIGURATION IN RELATIONSHIP TO OTHER ELEMENTS OF THE WORK, AND FINISHED ALIGNMENT OF ALL ITEMS OCCURRING ON PLANS AND REFLECTED CEILING PLANS OF THE PROJECT.

C THE A-SERIES FLOOR PLANS, REFLECTED CEILING PLANS, SECTIONS, ELEVATIONS, AND DETAILS ILLUSTRATE DIMENSIONED LOCATION OF MANY, BUT NOT ALL, EXPOSED PARTS OF THE WORK. APPLY THE LAYOUT RULES SHOWN ON THIS SHEET – IN ORDER – TO DETERMINE THE LOCATION OF THE EXPOSED PART OF THE WORK.

A. WHEN UNIQUELY AND SPECIFICALLY DIMENSIONED ON THE A-SERIES PLANS, SECTIONS, OR ELEVATIONS (OR COMBINATION THEREOF), LOCATE AS DIMENSIONED.

B. IF NOT SHOWN, OR SHOWN BUT NOT DIMENSIONED, BY THE A-SERIES PLANS OR ELEVATIONS, LOCATE AS INDICATED BY THE APPLICABLE RULE.

D REFER TO THE "GENERAL NOTES" FOR ADDITIONAL NOTES WHICH APPLY TO THE ENTIRE PROJECT.

GENERAL NOTES - ACCESSORY MOUNTING HEIGHTS

A IT IS THE INTENT OF THE DESIGN THAT ALL ITEMS SHOWN MOUNTED AT TYPICAL HEIGHTS BE ACCESSIBLE TO PERSONS WITH DISABILITIES.

B THE PURPOSE OF THIS SHEET IS TO ILLUSTRATE TYPICAL MOUNTING HEIGHTS AND – WHERE APPLICABLE – TYPICAL MINIMUM OR MAXIMUM CLEARANCES AND/OR TYPICAL MOUNTING CONFIGURATIONS FOR A VARIETY OF ITEMS. CAUTION: THIS SHEET MAY ILLUSTRATE ITEMS OR CONFIGURATIONS WHICH DO NOT OCCUR AS PART OF THE WORK OF THIS PROJECT. REFER TO THE PLANS, ELEVATIONS, SECTIONS, DETAILS AND SCHEDULES TO DETERMINE WHICH ITEMS AND CONFIGURATIONS APPLY TO THE WORK OF THIS PROJECT.

C THE MOUNTING HEIGHTS, CLEARANCES, AND CONFIGURATIONS SHOWN ON THIS SHEET ARE TYPICAL AND SHALL APPLY TO ALL INSTANCES OF THE ITEM (OR GROUP OF ITEMS) SHOWN UNLESS SPECIFICALLY NOTED OR DIMENSIONED OTHERWISE.

D SPECIAL OR NON-TYPICAL MOUNTING HEIGHTS OCCUR ONLY WHERE INDICATED BY ANNOTATED SYMBOLS, BY KEY NOTES; BY NOTES ON PLANS, ELEVATIONS, OR DETAILS; OR BY UNIQUE DIMENSIONS ON ELEVATIONS OR DETAILS.

E MOUNTING HEIGHTS, DIMENSIONS, CLEARANCES, AND ACCESS REQUIREMENTS FOR TOILET ACCESSORIES SHOWN ON THIS SHEET ARE BASED UPON SPECIFIC MANUFACTURERS AND MODELS AS INDICATED BY THE "EQUIPMENT SCHEDULE". WHEN SIMILAR ACCESSORIES OF OTHER SPECIFIED ACCEPTABLE MANUFACTURES (IF ANY) ARE UTILIZED, MOUNTING HEIGHTS, CLEARANCES, AND ACCESS REQUIREMENTS OF THE SIMILAR ACCESSORIES MAY VARY FROM THOSE SHOWN. WHEN SIMILAR ACCESSORIES ARE UTILIZED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COORDINATION REQUIRED TO ACHIEVE THE SAME AESTHETIC AND FUNCTIONAL DESIGN INTENT ILLUSTRATED BY THAT SHOWN ON THE DRAWINGS.

F TACTILE EXIT SIGNS. A TACTILE EXIT SIGN STATING "EXIT" AND COMPLYING WITH ANSI A117.1 SHALL BE PROVIDED ADJACENT TO EACH DOOR TO AN EGRESS STAIRWAY, AN EXIT PASSAGEWAY AND EXIT DISCHARGE.

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RESERVED FOR AHJ STAMP

CONSTRUCTION DOCUMENTS

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1171 MIDWAY ROAD
VERSAILLES, KENTUCKY

University of Kentucky

GENERAL	
PROJECT	201918
DATE	4-16-21

REVISIONS

No.	Description	Date

JRA ARCHITECTS HAS RETAINED AN ELECTRONIC VERSION OF THESE DRAWINGS. THE CLIENT AGREES NOT TO REUSE THESE DRAWINGS, IN ELECTRONIC OR ANY OTHER FORMAT - IN WHOLE, OR IN PART, FOR ANY PURPOSE OTHER THAN FOR THE PROJECT. THE CLIENT AGREES NOT TO TRANSFER THESE ELECTRONIC FILES TO OTHERS WITHOUT THE PRIOR WRITTEN CONSENT OF THE ARCHITECT. THE CLIENT FURTHER AGREES TO WAIVE ALL CLAIMS AGAINST THE ARCHITECT RESULTING IN ANY WAY FROM ANY UNAUTHORIZED CHANGES TO OR REUSE OF THE ELECTRONIC FILES FOR ANY OTHER PROJECT BY ANYONE OTHER THAN THE ARCHITECT.

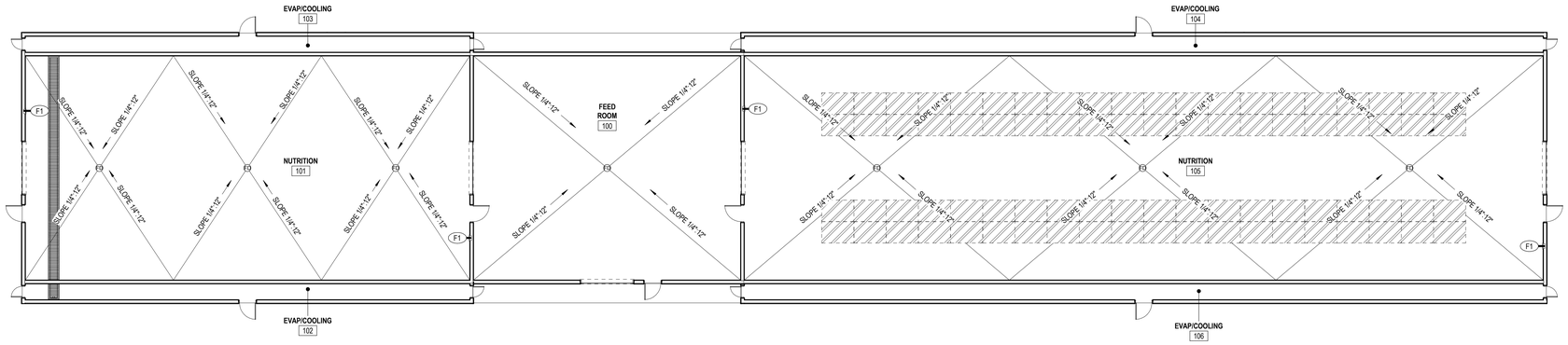
LOCATIONS AND LAYOUT RULES

G-102

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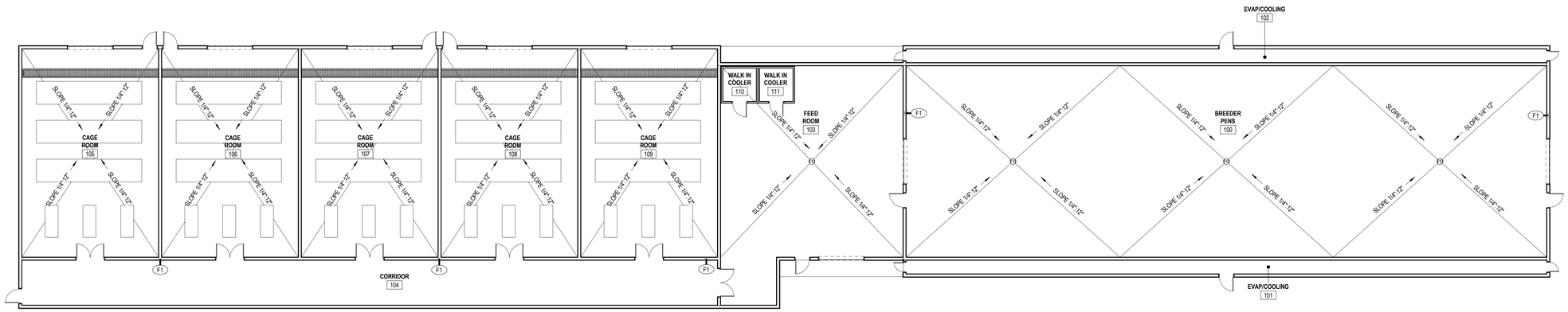
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A NUTRITIONAL STUDIES BUILDING LIFE SAFETY PLAN

3/32" = 1'-0"

BUILDING STATISTICS - NUTRITIONAL STUDIES BUILDING	
USE:	U (Agricultural)
BUILDING HEIGHT:	18.5 FT. / 1 Story
BUILDING AREA:	13,906 S.F.
CONSTRUCTION TYPE:	IIB
FIRE PROTECTION:	Not Required
OCCUPANT LOAD:	46 Occupants
SINGLE EXIT SPACES:	Max 49 Occupants, Max 75' travel
TRAVEL DISTANCE:	300 Ft.



B LAYER/BREEDER BUILDING LIFE SAFETY PLAN

3/32" = 1'-0"

BUILDING STATISTICS - LAYER BREEDER BUILDING	
USE GROUP:	U (Agricultural)
BUILDING HEIGHT:	+/- 19 FT. / 1 Story
BUILDING AREA:	17,974 S.F.
CONSTRUCTION TYPE:	IIB
FIRE PROTECTION:	Not Required
OCCUPANT LOAD:	60 Occupants
SINGLE EXIT SPACES:	Max 49 Occupants, Max 75' travel
TRAVEL DISTANCE:	300 ft.

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VERSAILLES, KENTUCKY

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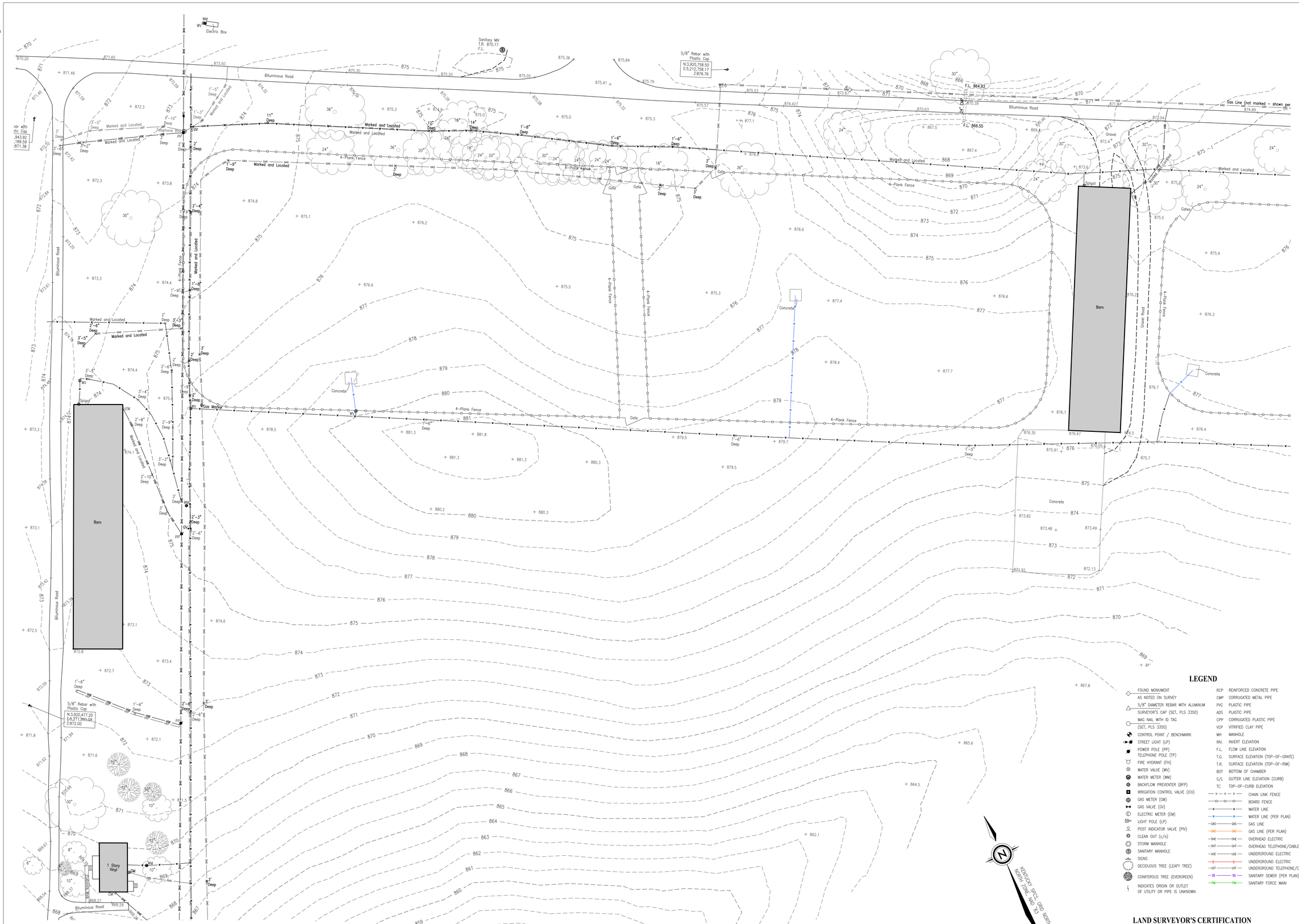
LIFE SAFETY PLANS

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FEMA FLOOD HAZARD AREA

BASED ON AN INSPECTION OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S MAP NUMBER 21239C0080D WITH A DATE OF IDENTIFICATION OF DECEMBER 21, 2017 FOR COMMUNITY NUMBER 210230 IN WOODFORD COUNTY, KENTUCKY, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP (FIRM) FOR THE COMMUNITY IN WHICH THE SUBJECT PROPERTY LIES, THE PROPERTY LIES IN ZONE "X", AN AREA WHICH HAS BEEN DETERMINED TO BE OUTSIDE THE 0.2% CHANCE OF ANNUAL FLOOD.

METHOD OF SURVEY

THIS GROUND SURVEY WAS PREPARED USING A CARLSON CR-1 ROBOTIC TOTAL STATION. THE STATE PLANE COORDINATES SHOWN WERE DERIVED FROM A REAL-TIME (VIA CELLULAR COMMUNICATION) OBSERVATION UTILIZING A TRIMBLE R6 GNSS RECEIVER AND THE KYTC VRS SYSTEM.

ORIGIN OF BEARINGS AND COORDINATES

THE BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON KENTUCKY STATE PLANE GRID NORTH, KENTUCKY STATE PLANE SINGLE ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83). PARTICULARLY, THE BEARINGS AND COORDINATES ARE BASED ON A GNSS SURVEY UTILIZING A TRIMBLE R6 GNSS RECEIVER AND THE KYTC VRS SYSTEM.

ORIGIN OF ELEVATIONS

THE ELEVATIONS SHOWN HEREON ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. PARTICULARLY, THE ELEVATIONS ARE BASED ON A GNSS SURVEY UTILIZING A TRIMBLE R6 GNSS RECEIVER AND THE KYTC VRS SYSTEM.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)

1 inch = 30 ft.

LEGEND

FOUND MONUMENT AS NOTED ON SURVEY	RCP REINFORCED CONCRETE PIPE
5/8" DIAMETER REBAR WITH ALUMINUM SURVEYOR'S CAP (SET, PLS 3350)	CMP CORRUGATED METAL PIPE
MAG NAIL WITH ID TAG (SET, PLS 3350)	PVC PLASTIC PIPE
CONTROL POINT / BENCHMARK	ADS PLASTIC PIPE
STREET LIGHT (LP)	CPP CORRUGATED PLASTIC PIPE
POWER POLE (PP) TELEPHONE POLE (TP)	VCP VITRIFIED CLAY PIPE
FIRE HYDRANT (FH)	MH MANHOLE
WATER VALVE (WV)	INV. INVERT ELEVATION
WATER METER (WM)	F.L. FLOW LINE ELEVATION
BACKFLOW PREVENTER (BFP)	T.G. SURFACE ELEVATION (TOP-OF-GRATE)
IRRIGATION CONTROL VALVE (ICV)	T.R. SURFACE ELEVATION (TOP-OF-RIM)
GAS METER (GM)	BOT BOTTOM OF CHAMBER
GAS VALVE (GV)	G/L GUTTER LINE ELEVATION (CURB)
ELECTRIC METER (EM)	TC TOP-OF-CURB ELEVATION
LIGHT POLE (LP)	CHAIN LINK FENCE
POST INDICATOR VALVE (PIV)	BOARD FENCE
CLEAN OUT (c/o)	WATER LINE
STORM MANHOLE	WATER LINE (PER PLAN)
SANITARY MANHOLE	GAS LINE
SIGNS	GAS LINE (PER PLAN)
DECIDUOUS TREE (LEAFY TREE)	OVERHEAD ELECTRIC
CONIFEROUS TREE (EVERGREEN)	OVERHEAD TELEPHONE/CABLE
INDICATES ORIGIN OR OUTLET OF UTILITY OR PIPE IS UNKNOWN	UNDERGROUND ELECTRIC
	UNDERGROUND TELEPHONE/CABLE
	SANITARY SEWER (PER PLAN)
	SANITARY FORCE MAIN

UNDERGROUND UTILITIES

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY OF OBSERVED EVIDENCE ONLY. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

THE UNDERGROUND UTILIES SHOWN HEREON ARE BASED SOLELY ON THE SURVEYOR'S OBSERVATIONS OF SURFACE INDICATIONS AND FROM EXISTING UTILITY PLANS. UTILITIES WERE MARKED BY UTILITY OWNERS AND BY UNDERGROUND DETECTIVE (9192 COLERAIN AVENUE, CINCINNATI, OH 45251; 513-681-1222).

LAND SURVEYOR'S CERTIFICATION

I HEREBY DO CERTIFY THAT THIS SURVEY WAS PREPARED BY ME OR UNDER MY DIRECTION; AND THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE LOCATIONS AND ELEVATIONS SHOWN ARE TRUE AND ACCURATE. THE GROUND SURVEY UPON WHICH THIS MAP IS BASED WAS CONCLUDED ON MAY 2, 2019. THIS IS NOT A BOUNDARY SURVEY.

STATE OF KENTUCKY
KEVIN W. PHILLIPS
3350
LICENSED PROFESSIONAL LAND SURVEYOR

KEVIN W. PHILLIPS, PLS # 3350 — 05-17-2019 DATE

JRA architects
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NOT FOR CONSTRUCTION

RESERVED FOR AHJ STAMP

SCHEMATIC DESIGN

UK POULTRY RESEARCH FACILITY

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LEXINGTON, KENTUCKY

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CIVIL

PROJECT	201918
DATE	5-16-19

REVISIONS

No.	Description	Date

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Site Survey

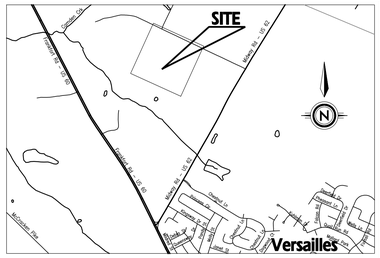
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VICINITY MAP
1" = 2000'

ORIGIN OF BEARINGS AND COORDINATES

THE BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON KENTUCKY STATE PLANE GRID NORTH, KENTUCKY STATE PLANE SINGLE ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83). PARTICULARLY, THE BEARINGS AND COORDINATES ARE BASED ON A GNSS SURVEY UTILIZING A TRIMBLE R6 GNSS RECEIVER AND THE KYTC VRS SYSTEM.

ORIGIN OF ELEVATIONS

THE ELEVATIONS SHOWN HEREON ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. PARTICULARLY, THE ELEVATIONS ARE BASED ON A GNSS SURVEY UTILIZING A TRIMBLE R6 GNSS RECEIVER AND THE KYTC VRS SYSTEM.

METHOD OF SURVEY

THIS GROUND SURVEY WAS PREPARED USING A CARLSON CR-1 ROBOTIC TOTAL STATION. THE STATE PLANE COORDINATES SHOWN WERE DERIVED FROM A REAL-TIME (VIA CELLULAR COMMUNICATION) OBSERVATION UTILIZING A TRIMBLE R6 GNSS RECEIVER AND THE KYTC VRS SYSTEM.

FEMA FLOOD HAZARD AREA

BASED ON AN INSPECTION OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S MAP NUMBER 21239C0080D WITH A DATE OF IDENTIFICATION OF DECEMBER 21, 2017 FOR COMMUNITY NUMBER 210230 IN WOODFORD COUNTY, KENTUCKY, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP (FIRM) FOR THE COMMUNITY IN WHICH THE SUBJECT PROPERTY LIES, THE PROPERTY LIES IN ZONE "X", AN AREA WHICH HAS BEEN DETERMINED TO BE OUTSIDE THE 0.2% CHANCE OF ANNUAL FLOOD.

UNDERGROUND UTILITIES

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GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

UTILITY OWNERS

NATURAL GAS
COLUMBIA GAS COMPANY
2001 MERCER ROAD
LEXINGTON, KENTUCKY
BRYAN SLONE
(859) 288-0253

WATER
CITY OF VERSAILLES PUBLIC WORKS
196 S. MAIN STREET
VERSAILLES, KENTUCKY
MITZI DELIUS
(859) 873-5436

WASTE WATER
CITY OF VERSAILLES PUBLIC WORKS
196 S. MAIN STREET
VERSAILLES, KENTUCKY
MITZI DELIUS
(859) 873-2245

CABLE
SPECTRUM
1575 WINCHESTER ROAD
SUITE 140
LEXINGTON, KY
RALPH MCDONNIE
(859) 514-2417

ELECTRIC
KENTUCKY UTILITIES
500 STONE ROAD
LEXINGTON, KY
RICHARD COMPTON
(859) 367-4309

TELEPHONE
WINDSTREAM
130 WEST NEW CIRCLE ROAD
LEXINGTON, KY
GRIFF REED
(859) 357-6288

STATE ROADS
TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS
DISTRICT OFFICE NO. 7
763 NEW CIRCLE ROAD NW
LEXINGTON, KENTUCKY
(859) 246-2305

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KENTUCKY SPCS, GRID, NORTH
NORTH ZONE, NAD 83

LEGEND

◇	FOUND MONUMENT AS NOTED ON SURVEY
△	5/8" DIAMETER REBAR WITH ALUMINUM SURVEYOR'S CAP (SET, PLS 3350)
○	MAG NAIL WITH ID TAG (SET, PLS 3350)
	CONTROL POINT / BENCHMARK
	STREET LIGHT (LP)
	POWER POLE (PP)
	TELEPHONE POLE (TP)
	FIRE HYDRANT (FH)
	WATER VALVE (WV)
	WATER METER (WM)
	BACKFLOW PREVENTER (BFP)
	IRRIGATION CONTROL VALVE (ICV)
	GAS METER (GM)
	GAS VALVE (GV)
	ELECTRIC METER (EM)
	LIGHT POLE (LP)
	POST INDICATOR VALVE (PIV)
	CLEAN OUT (c/o)
	STORM MANHOLE
	SANITARY MANHOLE
	SIGNS
	DECIDUOUS TREE (LEAFY TREE)
	CONIFEROUS TREE (EVERGREEN)
	INDICATES ORIGIN OR OUTLET OF UTILITY OR PIPE IS UNKNOWN

RCP	REINFORCED CONCRETE PIPE
CMP	CORRUGATED METAL PIPE
PVC	PLASTIC PIPE
ADS	PLASTIC PIPE
CPP	CORRUGATED PLASTIC PIPE
VCP	VITRIFIED CLAY PIPE
MH	MANHOLE
INV.	INVERT ELEVATION
F.L.	FLOW LINE ELEVATION
T.G.	SURFACE ELEVATION (TOP-OF-GRATE)
T.R.	SURFACE ELEVATION (TOP-OF-RIM)
BOT	BOTTOM OF CHAMBER
G/L	GUTTER LINE ELEVATION (CURB)
TC	TOP-OF-CURB ELEVATION
— X — X — X —	CHAIN LINK FENCE
—o—o—o—	BOARD FENCE
—W—W—	WATER LINE
—W—W—	WATER LINE (PER PLAN)
—GAS—GAS—	GAS LINE
—GAS—GAS—	GAS LINE (PER PLAN)
—OHE—OHE—	OVERHEAD ELECTRIC
—OHT—OHT—	OVERHEAD TELEPHONE/CABLE
—UGE—UGE—	UNDERGROUND ELECTRIC
—E—E—	UNDERGROUND ELECTRIC
—UGT—UGT—	UNDERGROUND TELEPHONE/CABLE
—SS—SS—	SANITARY SEWER (PER PLAN)
—fw—fw—	SANITARY FORCE MAIN

LAND SURVEYOR'S CERTIFICATION

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STATE OF KENTUCKY
KEVIN M. PHILLIPS
3350
LICENSED PROFESSIONAL LAND SURVEYOR

KEVIN M. PHILLIPS, PLS # 3350 — 05-17-2019 DATE

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NOT FOR CONSTRUCTION

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SCHEMATIC DESIGN

UK POULTRY RESEARCH FACILITY
UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY

ENDRIS engineering
Land Survey/ Construction Layout
771 Enterprise Drive
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CIVIL

PROJECT	201918
DATE	5-16-19

REVISIONS

No.	Description	Date

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Site Survey

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SITE LOGISTICS PLAN

SCALE 1" = 50'-0"

0 50 100 150

SITE LOGISTICS NOTES

A. THE EXISTING TOPOGRAPHIC AND SITE INFORMATION SHOWN HAS BEEN PROVIDED BY A SURVEY BY ENDRIS ENGINEERING. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION SHOWN THEREON. CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.

B. THE CONTRACT DRAWINGS SHOW THE APPROXIMATE LOCATION OF EXISTING AND PROPOSED UTILITY LINES. THESE LINES HAVE BEEN IDENTIFIED AND LOCATED AS ACCURATELY AS POSSIBLE USING AVAILABLE INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL ACTUAL UTILITY LOCATIONS.

C. LIMIT CONSTRUCTION ACCESS TO THE SITE TO THE LOCATION INDICATED AS AN ACCESS DRIVEWAY(S). TEMPORARY ACCESS DRIVEWAYS FOR CONSTRUCTION VEHICLES SHALL BE GRAVELED A MINIMUM OF 6" DEPTH WITH FILTER FABRIC PLACED BETWEEN SOIL AND STONE FOR A DISTANCE OF 100 FEET INTO THE SITE AND MAINTAINED IN GOOD CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. THE ACCESS DRIVE TO THE SITE SHALL BE MAINTAINED BY THE CONTRACTOR TO MINIMIZE THE ACCUMULATION OF MUD, DIRT, DUST AND OTHER DEBRIS CAUSED BY THE CONTRACTOR'S OPERATIONS. THE DRIVE SHALL BE CHECKED DAILY AND CLEANED BY THE CONTRACTOR AS REQUIRED TO MAINTAIN THIS CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.

D. THE CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACTIVITIES AND AVAILABILITY OF SITES WITH THE OWNER PRIOR TO BEGINNING WORK AT ANY GIVEN SITE.

E. REFER TO L1.0 (SWPP PLAN) AND L2.0 (SITE DEMOLITION PLAN) FOR ADDITIONAL CONSTRUCTION PHASING NOTES AND REQUIREMENTS.

F. ALL MAJOR EQUIPMENT AND MATERIAL DELIVERIES SHALL BE SCHEDULED WITH UK FARM STAFF IN ADVANCE. PROVIDE MINIMUM 48 HOURS NOTICE.

G. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

SITE LOGISTICS LEGEND

LIMITS OF CONSTRUCTION, SEE KEYNOTE 3

CONSTRUCTION ACCESS

STAGING & LAYDOWN AREA

SITE LOGISTICS KEYNOTES (1)

1. STAGING AND LAYDOWN AREA, RESTORE TO TURF AT CONCLUSION OF USE.
2. ACCESS TO SITE VIA MIDWAY ROAD / US62. CONTRACTOR SHALL DOCUMENT EXISTING CONDITION OF ROADWAYS PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES.
3. SITE CONSTRUCTION ACCESS DRIVE, SEE L1.0 / SWPP PLAN.
4. ROUTE FOR ELECTRICAL AND DATA TO SITE, REFER TO MEP PLANS FOR REQUIREMENTS. ROUTE NEW UNDERGROUND TO AVOID DISTURBING ROOT ZONE OF EXISTING TREES.

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landscape architecture+civil engineering+planning
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lexington, ky 40508
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1018 east jefferson
louisville, ky 40206
p. 502.489.4221

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859.252.6781

STATE OF KENTUCKY
RAMONA
REGISTERED
LANDSCAPE ARCHITECT

RESERVED FOR AHJ STAMP

CONSTRUCTION DOCUMENTS

UK POULTRY RESEARCH FACILITY
1171 MIDWAY ROAD
VERSAILLES, KENTUCKY

University of Kentucky

ARCHITECTURAL

PROJECT	201918
DATE	4-16-21

REVISIONS

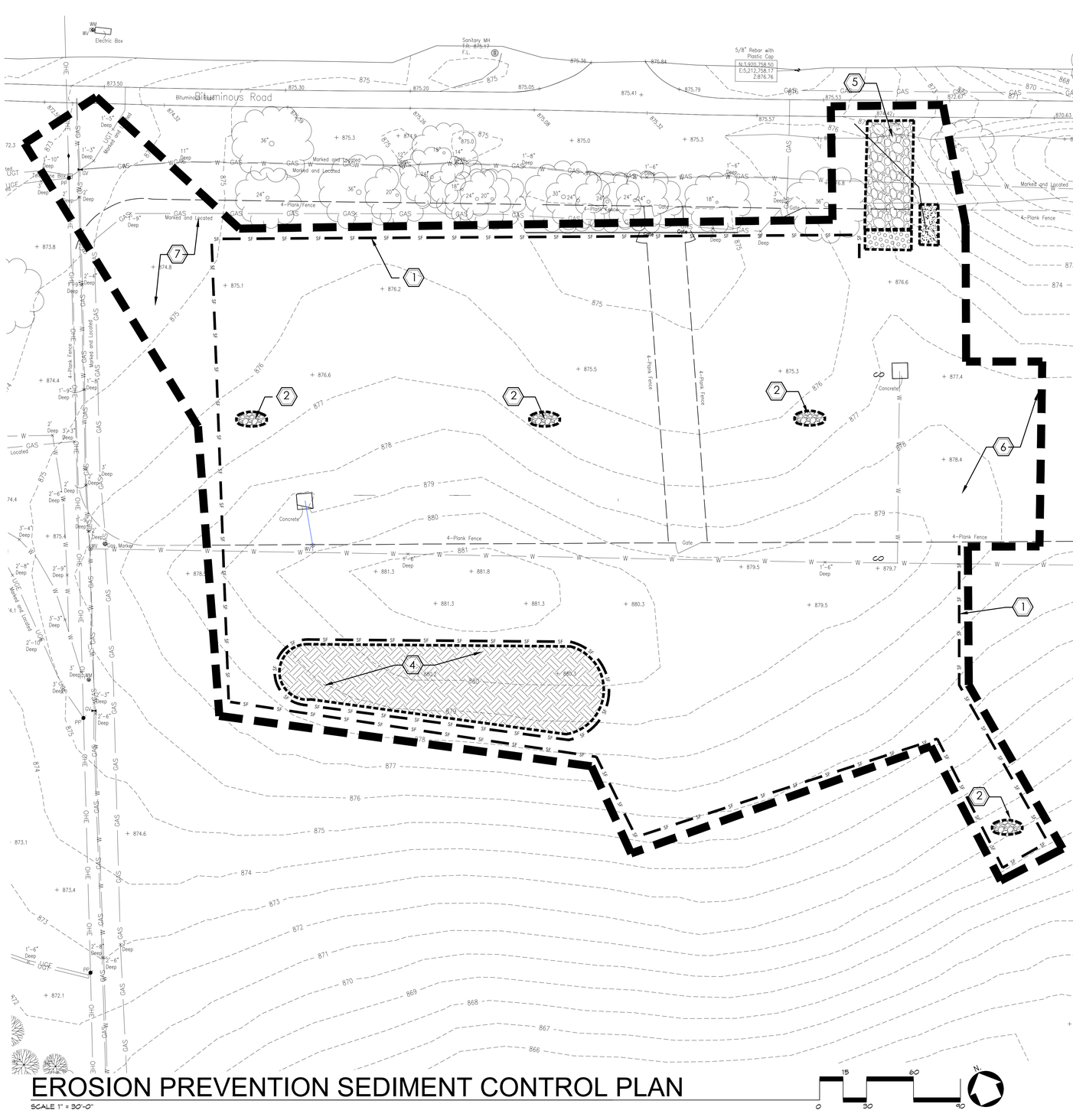
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SITE LOGISTICS

L0.0

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EROSION PREVENTION SEDIMENT CONTROL PLAN

SCALE 1" = 30'-0"

0 30 60 90

EPSC NOTES:

A. THE EXISTING TOPOGRAPHIC AND SITE INFORMATION SHOWN HAS BEEN PROVIDED FROM A SURVEY BY ENDRIS ENGINEERING. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION SHOWN THEREON. CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.

B. THE CONTRACT DRAWINGS SHOW THE APPROXIMATE LOCATION OF EXISTING AND PROPOSED UTILITY LINES. THESE LINES HAVE BEEN IDENTIFIED AND LOCATED AS ACCURATELY AS POSSIBLE USING AVAILABLE INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL ACTUAL UTILITY LOCATIONS.

C. THE DESIGNATED CONCRETE WASH OUT PIT SHALL BE CLEANED AND ALL CONCRETE AND ASSOCIATED DEBRIS SHALL BE REMOVED AND HAULED OFF SITE AND THE CONCLUSION OF ALL CONCRETE CONSTRUCTION WORK. CONCRETE WASH OUT PIT SHALL BE AT A MINIMUM A STRAW BALE ENCLOSURE WITH PLASTIC LINER, TO BE REMOVED AT THE END OF CONCRETE CONSTRUCTION OPERATIONS AND SITE AREA AT WASH OUT PIT TO BE RESTORED, GRADED AND SEEDED.

D. LIMIT CONSTRUCTION ACCESS TO THE SITE TO THE LOCATION INDICATED AS AN ACCESS DRIVEWAY. TEMPORARY ACCESS DRIVEWAYS FOR CONSTRUCTION VEHICLES SHALL BE GRAVELED A MINIMUM OF 6" DEPTH WITH FILTER FABRIC PLACED BETWEEN SOIL AND STONE FOR A DISTANCE OF 50 FEET INTO THE SITE AND MAINTAINED IN GOOD CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. THE ACCESS DRIVE TO THE SITE SHALL BE MAINTAINED BY THE CONTRACTOR TO MINIMIZE THE ACCUMULATION OF MUD, DIRT, DUST AND OTHER DEBRIS CAUSED BY THE CONTRACTOR'S OPERATIONS. THE DRIVE SHALL BE CHECKED DAILY AND CLEANED BY THE CONTRACTOR AS REQUIRED TO MAINTAIN THIS CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.

E. PRIOR TO BEGINNING GRADING OPERATIONS, SURROUND ALL DRAINAGE INLET STRUCTURES WITH ROCK BAGS, STONE, OR TEMPORARY SILT FENCE FOR SILT CONTROL, SEE DETAIL A/L6.0 AND B/L6.0 AND PROVIDE CHECK DAMS AT ALL DRAINAGE SWALES. MAINTAIN IN GOOD OPERATING CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. REMOVE AFTER SURROUNDING PERMANENT VEGETATION IS ESTABLISHED OR SURROUNDING PAVEMENT IS INSTALLED. THE CONTRACTOR SHALL MAINTAIN ALL STORM DRAINAGE SYSTEMS TO FUNCTION THROUGHOUT THE CONSTRUCTION PERIOD.

F. SILT FENCING SHALL BE INSTALLED PRIOR TO THE BEGINNING OF GRADING OPERATIONS AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD UNTIL PERMANENT VEGETATION IS ESTABLISHED. SEE SILT FENCING DETAIL. REFER TO PLAN FOR APPROXIMATE LOCATIONS. MAINTENANCE INCLUDES INSPECTION ONCE PER WEEK, IMMEDIATELY AFTER EACH RAINFALL OF 1/2" OR MORE, AND AT LEAST DAILY DURING PROLONGED PERIODS OF RAIN. REPAIR ANY UNDERCUTTING OR END RUNS. REPLACE DAMAGED FABRIC SECTIONS PROMPTLY. REMOVE SEDIMENT DEPOSITS WHEN DEPOSITS REACH APPROXIMATELY 1/2 THE HEIGHT OF THE BARRIER. UPON FINAL REMOVAL OF BARRIER, GRADE OUT ANY DEPOSITS TO CONFORM TO EXISTING SURROUNDING GRADE, AND SOD THE AREA.

G. TO REDUCE EROSION, MUD AND DUST FROM EXPOSED SOIL AREAS, TEMPORARY SEEDING SHALL BE DONE ON EXPOSED SOIL SURFACES IN LAWN AND LANDSCAPE AREAS WHERE ADDITIONAL GRADING WORK IS NOT SCHEDULED FOR A PERIOD OF 2 WEEKS OR MORE. MAINTAIN AND RE-SEED AS NEEDED THROUGHOUT CONSTRUCTION PERIOD UNTIL FINISH GRADES ARE ESTABLISHED.

H. STOCKPILED TOPSOIL SHALL BE PROTECTED FROM WIND AND WATER EROSION BY TEMPORARY VEGETATIVE SEEDING. IN ADDITION, PROVIDE SILT FENCING AT THE PERIMETER OF STOCKPILES TO PREVENT SEDIMENT RUNOFF. MAINTAIN VEGETATIVE COVER AND SILT FENCING UNTIL TOPSOIL STOCKPILES ARE REMOVED. BARE AREAS THAT ARE ACTIVELY UNDER WORK AND NOT SEEDED SHALL BE WATERED AS NEEDED TO PREVENT WIND EROSION / DUST.

I. THE CONTRACTOR SHALL OBTAIN A STORM WATER PERMIT / SUBMITTING A NOTICE OF INTENT (KYR10) TO THE KENTUCKY DIVISION OF WATER AND ANY APPLICABLE PERMITS FROM STATE AND LOCAL GOVERNING AGENCIES. IN ADDITION, THE CONTRACTOR SHALL PROVIDE ALL CONSTRUCTION AND MAINTENANCE SHOWN ON THIS PLAN AS PART OF THE CONTRACT SCOPE OF WORK.

J. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING AN ON SITE MAINTENANCE LOG OF ALL EROSION CONTROL FEATURES AND BMP'S. DURING THE ENTIRE CONSTRUCTION PERIOD, THE CONTRACTOR'S SUPERINTENDENT OR OTHER DULY AUTHORIZED FIELD REPRESENTATIVE SHALL INSPECT ALL BMP'S AS LISTED IN THE LOG BOOK, NOTE THE CONDITION AND PERFORMANCE OF EACH BMP AND TAKE CORRECTIVE ACTION FOR EACH BMP AS REQUIRED.

K. BEST MANAGEMENT PRACTICES (BMP) MANUAL
IN ADDITION TO THIS PLAN, THE CONTRACTOR SHALL COMPLY WITH THE MANUAL ENTITLED 'KENTUCKY BEST MANAGEMENT PRACTICES FOR CONSTRUCTION ACTIVITIES,' CURRENT ADDITION, PREPARED BY THE KENTUCKY DIVISION OF CONVERSATION AND OF WATER. THE CONTRACTOR SHALL ALSO COMPLY WITH THE KENTUCKY EROSION PREVENTION AND SEDIMENT CONTROL FIELD GUIDE, CURRENT EDITION. THE CONTRACTOR SHALL MAKE APPROPRIATE MODIFICATIONS TO THIS PLAN AS NECESSARY TO ACHIEVE THE PLAN GOAL OF MINIMIZING EROSION AND SEDIMENTATION. ANY SUCH CHANGES ARE SUBJECT TO REVIEW BY THE LANDSCAPE ARCHITECT.

L. DURING THE CONSTRUCTION PERIOD THE CONTRACTOR WILL PROMPTLY REPAIR, REBUILD, REPLACE, CLEAN OUT OR OTHERWISE MODIFY ANY BMP'S THAT REQUIRE ATTENTION OR THAT DO NOT PERFORM AS REQUIRED. THE CONTRACTOR WILL NOTE IN THE MAINTENANCE LOG WHAT MAINTENANCE OR RECONSTRUCTION WAS REQUIRED AND ANY ACTION TAKEN.

M. TO REDUCE EROSION, MUD AND DUST FROM EXPOSED SOIL AREAS, TEMPORARY SEEDING SHALL BE DONE ON EXPOSED SOILS. FOR ANY BMP'S THAT DO NOT APPEAR TO PERFORM AS DESIGNED, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER (A/E) FOR REVIEW. IF THE A/E AND OR STATE AND LOCAL GOVERNING AGENCY DETERMINE THAT A BMP NEEDS TO BE REDESIGNED OR REPLACED WITH ANOTHER MORE APPROPRIATE BMP BECAUSE OF ACTUAL FIELD PERFORMANCE OR OTHERWISE, UPON APPROVAL OF THE OWNER, THE A/E WILL MAKE THOSE DESIGN CHANGES AND PROVIDE TO THE CONTRACTOR FOR CONSTRUCTION. IF THIS REQUIRES MEASURABLE ADDITIONAL WORK ABOVE THE SPECIFIED SCOPE OF WORK, THE CONTRACTOR MAY REQUEST A CHANGE ORDER FOR THE WORK.

N. UPON COMPLETION OF THE PROJECT, AND ONCE FINAL VEGETATIVE COVER HAS BEEN ESTABLISHED TO THE SATISFACTION OF THE A/E THE CONTRACTOR WILL REMOVE ALL BMP'S AND SUBMIT A NOTICE OF TERMINATION (NOT) TO THE DIVISION OF WATER & APPLICABLE STATE AND LOCAL GOVERNING AGENCIES.

O. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING INLET PROTECTION FOR ALL EXISTING AND PROPOSED STORM STRUCTURES WITHIN THE LIMIT OF CONSTRUCTION.

P. THE CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACTIVITIES AND AVAILABILITY OF SITES WITH THE OWNER PRIOR TO BEGINNING WORK AT ANY GIVEN SITE.

Q. ALL ROADS AND DRIVES USED TO ACCESS THE SITE SHALL BE KEPT CLEAN AND FREE OF MUD & SILT DURING THE CONSTRUCTION PERIOD. PERIODIC INSPECTION BY GOVERNING OFFICIALS WILL OCCUR. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING THE VEHICLE WASH DOWN AREAS INDICATED ON THIS PLAN.

EROSION CONTROL SEQUENCE SCHEDULE:

A. CONTACT MSD INSPECTOR FOR A PRECONSTRUCTION MEETING BEFORE INSTALLING ANY BMP'S
B. INSTALL PERIMETER SILT FENCE AND EXISTING INLET BMPS.
C. INSTALL CONSTRUCTION ENTRANCES AND VEHICLE WASH DOWN AREAS.
D. COMMENCE SITE DEMOLITION.
E. MASS GRADE SITE.
F. INSTALL PROPOSED STORM SYSTEM INLETS & BMPS.
G. COMMENCE SITE CONSTRUCTION OF UTILITIES.
H. PREPARE SITE FOR CONSTRUCTION OF BUILDING & PAVING.
I. CONSTRUCT BUILDINGS & PAVE SITE.
J. FINAL GRADING. INSTALL HYDROSEED AS REQUIRED TO STABILIZE SITE.
K. REMOVE ALL TEMPORARY BMP'S UPON FINAL INSPECTION AND APPROVAL BY GOVERNING AUTHORITIES.

EPSC LEGEND

- SF — SILT FENCING SEE NOTES AND DETAIL A/L6.0
- SILT PROTECTION AT STORM STRUCTURE SEE NOTES AND DETAIL B/L6.0
- CONCRETE WASH OUT PIT SEE NOTES
- CONSTRUCTION ACCESS DRIVE SEE NOTES AND DETAIL C/L6.0
- VEHICLE WASH DOWN AREA SEE NOTES FOR REQUIREMENTS
- TOPSOIL STOCKPILE SITE SEE KEYNOTES

EPSC SCHEDULE

BMP SCHEDULE	
ELEMENT	TIMING / DURATION
Silt Fencing	Install at beginning of grading operations.
	Maintain until permanent vegetation is established.
Temporary Seeding	Immed. after rough grading, lawn & landcape areas.
	Maintain until permanent vegetation is established.
Temporary Topsoil Stockpile Seeding	Immed. after topsoil is stripped and stockpiled.
	Maintain until stockpiles are removed.
Silt Fencing at Stockpile Perimeters	Immed. after topsoil is stripped and stockpiled.
	Maintain until stockpiles are removed.
Drainage Swales	Create at beginning of grading operations.
	Permanent feature.
Check Dams in Swales	As soon as swales are created.
	Maintain until permanent vegetation is established.
Construction Access Drives	Install at beginning of grading operations.
	Maintain throughout construction period
Rock/Silt Fence Exist. Inlet Protection	Install at beginning of grading operations.
	Maintain until permanent vegetation is established.
Rock/Silt Fence New Inlet Protection	As soon as drainage inlets are installed.
	Maintain until permanent vegetation is established.
Sod/Seed	Immediately after finish grading.
	Permanent feature.

EPSC KEYNOTES (1)

1. SILT FENCING, SEE DETAIL A/L6.0.
2. NEW STORM STRUCTURE, PROTECT PER DETAIL B/L6.0.
3. EXISTING BASIN AND CULVERT TO REMAIN, PROTECT THROUGHOUT CONSTRUCTION.
4. TOPSOIL STOCKPILE SITE, SURROUND WITH SILT FENCE AND PROTECT FROM EROSION.
5. CONSTRUCTION ACCESS DRIVE. SEE DETAIL C/L6.0 FOR GENERAL REQUIREMENTS. EXISTING GRAVEL DRIVE MAY BE USED AS ACCESS, CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING DRIVE THROUGHOUT USE AS ACCESS, AS REQUIRED TO MINIMIZE EROSION AND DEBRIS EXITING THE SITE.
6. CONSTRUCTION STAGING / LAYOUT SPACE, PLACE TOPSOIL AND RESTORE TURF AREAS TO LIKE OR BETTER CONDITION THAN EXISTING.
7. UNDERGROUND ELECTRICAL TRENCHING, SEE MEP PLANS.

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STATE OF KENTUCKY — RAMONA — REGISTERED LANDSCAPE ARCHITECT

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CONSTRUCTION DOCUMENTS

UK POULTRY RESEARCH FACILITY
1171 MIDWAY ROAD
VERSAILLES, KENTUCKY

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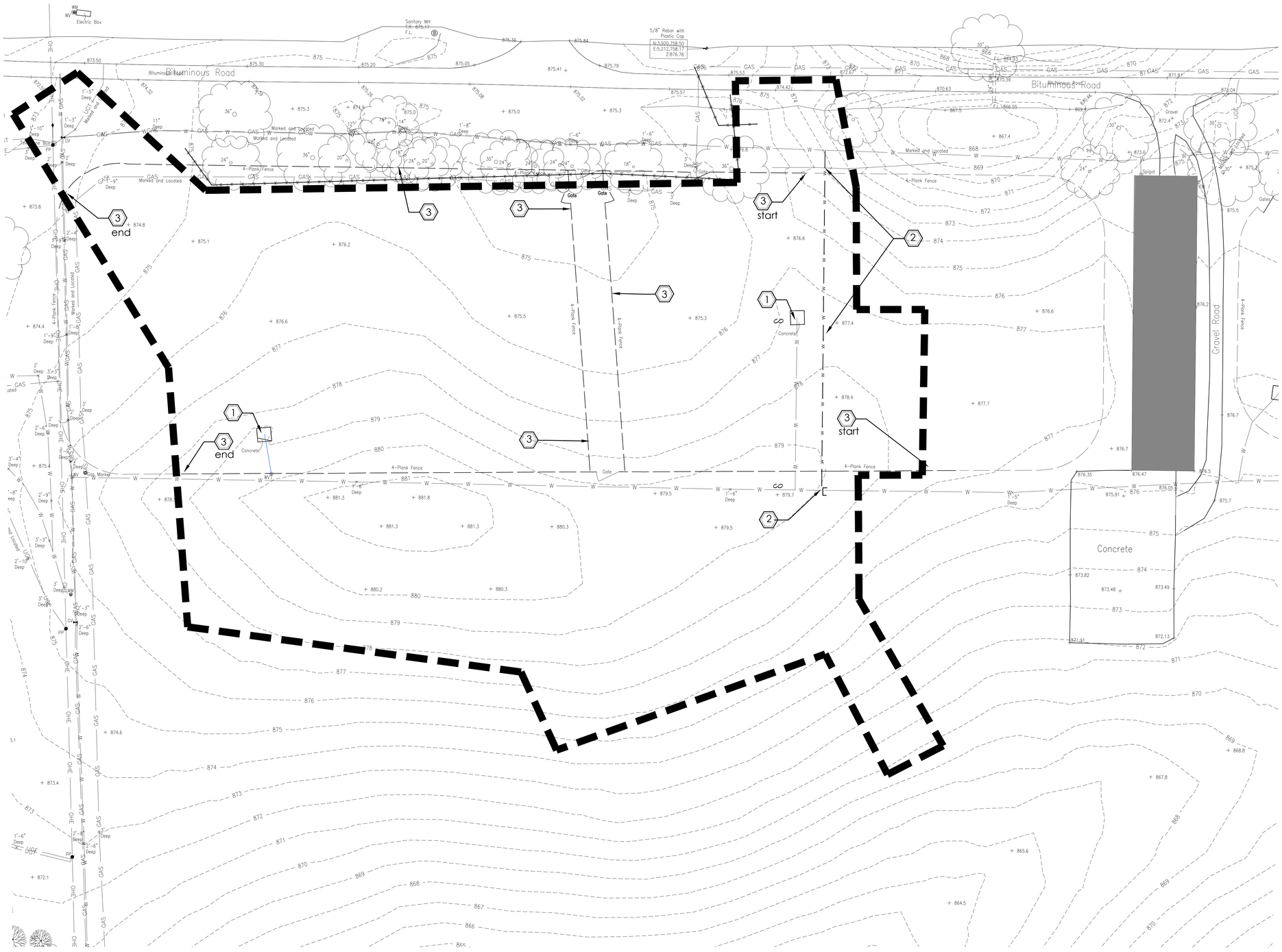
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EROSION PREVENTION SEDIMENT CONTROL PLAN

L1.0

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SITE CLEARING PLAN

SCALE 1" = 30'-0"

0 30 60 90

SITE CLEARING NOTES:

A. THE EXISTING TOPOGRAPHIC AND SITE INFORMATION SHOWN HAS BEEN PROVIDED BY A SURVEY BY ENDRIS ENGINEERING. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION SHOWN THEREON. CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.

B. THE CONTRACT DRAWINGS SHOW THE APPROXIMATE LOCATION OF EXISTING AND PROPOSED UTILITY LINES. THESE LINES HAVE BEEN IDENTIFIED AND LOCATED AS ACCURATELY AS POSSIBLE USING AVAILABLE INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL ACTUAL UTILITY LOCATIONS.

C. SAWCUT EDGES OF EXISTING PAVEMENT WHERE NEW PAVEMENT ABUTS AND / OR EXISTING PAVEMENT IS INDICATED TO BE REMOVED.

D. CONTRACTOR TO PROTECT ALL EXISTING TREES TO REMAIN- ALL TREES WITHIN THE LIMITS OF WORK SHALL BE PROTECTED. CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT IF ANY TREES ARE DAMAGED ON OR OFF SITE. NO MATERIALS ARE TO BE STORED UNDER A TREE IN ANY CIRCUMSTANCE. THE CONTRACTOR SHALL MAINTAIN TREE PROTECTION FENCING WHERE INDICATED AND FOR ALL EXISTING TREES WITHIN THE LIMITS OF THE CONSTRUCTION FENCING. TREE PROTECTION FENCING SHALL BE CONSTRUCTED OF SAFETY FENCE WITH STEEL T SECTION FENCE POSTS SPACED AT 6' MAXIMUM; LIMIT OF FENCE TO ALIGN WITH CANOPY / DRIP EDGE OF TREES TO AVOID DAMAGE TO EXISTING TREES DURING CONSTRUCTION. IF WORK APPEARS TO IMPACT A TREE NOT INDICATED FOR REMOVAL, CONTACT LANDSCAPE ARCHITECT AND OWNER FOR RESOLUTION.

E. CONTRACTOR SHALL PROTECT ALL SURROUNDING AREAS. CONTRACTOR SHALL REPAIR ANY DAMAGES TO OFF OR ON SITE PROPERTY THAT IS NOT LISTED TO BE REMOVED AT NO ADDITIONAL COST TO OWNER.

F. SEE SPECIFICATIONS FOR OTHER DEMOLITION AND SITE CLEARING REQUIREMENTS.

G. CONTRACTOR SHALL PROTECT ALL UTILITY STRUCTURES. ANY DAMAGES TO UTILITIES ON OR OFF SITE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR FOR REPAIR AT NO ADDITIONAL COST TO OWNER. THE CONTRACTOR SHALL SALVAGE AND REINSTALL ALL EXISTING UTILITY MARKERS IN NEW PAVEMENT.

H. PROTECT ALL EXISTING VEGETATION AND TREE LINES THROUGHOUT CONSTRUCTION; CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY EXISTING PLANTINGS DAMAGED BY CONSTRUCTION ACTIVITIES.

I. CONTRACTOR SHALL COORDINATE WITH ADJACENT CONSTRUCTION AND IMPROVEMENT PROJECTS AND SHALL NOT DAMAGE ANY NEW CONSTRUCTION BY OTHERS.

SITE CLEARING LEGEND

EXISTING TREE TO BE REMOVED- REFER TO SPECIFICATIONS ' SITE CLEARING' FOR ADDITIONAL REQUIREMENTS
SEE C1.0 AND SITE ELECTRICAL DRAWINGS FOR UTILITY LOCATIONS / TREE CONFLICTS, IDENTIFY ALL TREES TO BE REMOVED IN THE FIELD AND VERIFY WITH OWNER AND LANDSCAPE ARCHITECT

TREE PROTECTION FENCING, EXTEND TO DRIP LINE OF TREE. SEE DETAIL ON L6.0

LIMITS OF DISTURBANCE

SITE CLEARING KEYNOTES (1)

1. EXISTING CONCRETE PAD, HYDRANT AND WATER LINE TO BE REMOVED. CUT AND CAP WATER SUPPLY BACK TO MAIN SUPPLY LINE, SEE KEYNOTE 5 FOR LINE.

2. EXISTING SHALLOW WATER LINE TO BE CUT AND CAPPED. PROVIDE NEW 2" WATERLINE SERVICE FROM EXISTING 8" WATER MAIN TO FEED EXISTING LINE.

3. EXISTING WOOD PLANK FENCE TO BE REMOVED. FULLY REMOVE PLANKS AND POSTS WHERE THEY OCCUR WITHIN THE LIMITS OF DISTURBANCE. BACKILL POST HOLES WITH #4 STONE TO SUBGRADE.

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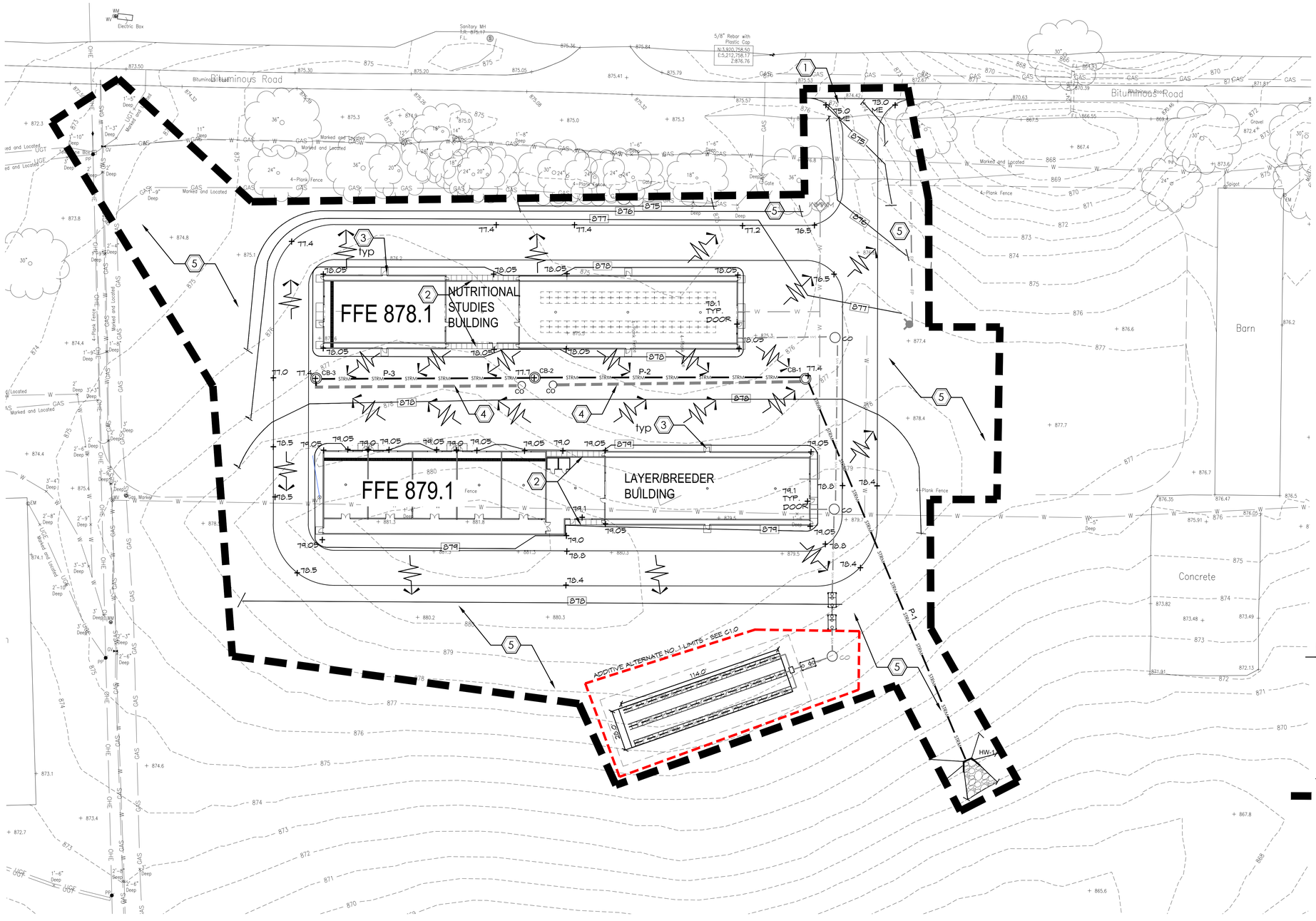
SITE CLEARING

L2.0

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SITE GRADING & DRAINAGE PLAN

SCALE 1" = 30'-0"

0 30 60 90

GRADING & DRAINAGE NOTES:

A. THE EXISTING TOPOGRAPHIC AND SITE INFORMATION SHOWN IS FROM A SURVEY PERFORMED BY ENDRIS ENGINEERING. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION SHOWN THEREON. CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.

B. THE DRAWINGS SHON THE APPROXIMATE LOCATION OF EXISTING AND PROPOSED UTILITY LINES. THESE LINES HAVE BEEN IDENTIFIED AND LOCATED AS ACCURATELY AS POSSIBLE USING AVAILABLE INFORMATION; THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL ACTUAL LOCATIONS.

C. PROTECT EXISTING TREES FROM POTENTIAL DAMAGE OF CONSTRUCTION OPERATIONS. STEEPEN GRADES UPHILL FROM EXISTING TREES TO A MAX. OF 2:1 TO AVOID FILLING SOILS ONTO TRUNKS.

D. UNLESS OTHERWISE INDICATED TO BE REMOVED, ALL ITEMS REMAINING WITHIN THE LIMIT OF CONTRACT ARE TO REMAIN AND BE PROTECTED FROM DAMAGE DURING CONSTRUCTION.

E. THE CONTRACTOR SHALL MAINTAIN STORM DRAINAGE SYSTEMS TO FUNCTION THROUGHOUT THE CONSTRUCTION PERIOD.

F. PROPOSED GRADES SHOWN ARE FINISHED GRADES. ELEVATIONS SHOWN AT CURBS ARE BOTTOM OF CURB UNLESS NOTED TC.

G. LIMIT OF GRADING EXTENTS TO INCLUDE ALL AREAS DISTURBED BY ALL SITE UTILITY WORK, REFER TO SITE UTILITY DRAWINGS FOR LOCATIONS OF PROPOSED SITE UTILITIES.

H. REFER TO SPECIFICATION / PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS.

I. ADJUST RIM ELEVATIONS OF ALL EXISTING STRUCTURES TO MATCH PROPOSED FINISHED GRADES.

J. GRADE ALL NEW PAVEMENTS TO DRAIN. GRADE ALL NEW WALKS AT MAX. 2% CROSS SLOPE. GRADE ALL NEW WALKS TO MAX. 5% LONGITUDINAL SLOPE UNLESS OTHERWISE SPECIFICALLY INDICATED ON PLANS TO BE A RAMP.

GRADING & DRAINAGE LEGEND

- 991 — PROPOSED CONTOUR
- +93.0 — PROPOSED SPOT ELEVATION
- FV — FIELD VERIFY
- ME — MATCH EXISTING
- DRAINAGE DIRECTION
- 5% STRM — NEW STORM LINE, SEE DETAIL F/L6.0
- NEW 6" SUBDRAIN IN SOCK, SEE KEYNOTE 4
- CO — CLEANOUT, SEE DETAIL H/L6.0
- CB — NEW CATCH BASIN, SEE DETAIL G/L6.0
- HW — NEW HEADWALL, SEE DETAIL I/L6.0

GRADING & DRAINAGE KEY NOTES: (1)

1. MATCH EXISTING GRADES AT PAVEMENT EDGES.
2. NEW WALKWAY SLOPES AND ADA PARKING SPACE SLOPES SHALL BE MINIMUM 1%, MAXIMUM 2% CROSS SLOPE.
3. ALL CONCRETE STOOPS TO MEET FFE AT BUILDING, AND SLOPE MIN. 1%, MAX. 2% AWAY FROM BUILDING, TYP.
4. 6" HDPE PERFORATED SUBDRAIN IN 12" #57 STONE, WRAPPED IN FILTER FABRIC TO RUN CONTINUOUS IN GRAVEL AREA BETWEEN BUILDINGS. SLOPE 1/8" / FOOT TO DRAIN, CONNECT TO STORM INLETS CB-2 AND CB-4 AT LOW ENDS. SEE DETAIL O/L6.0.
5. HYDROSEED ALL LAWN AREAS DISTURBED BY CONSTRUCTION.

HYDRO SEEDING & RESTORATION GENERAL NOTES

A. THE EXISTING TOPOGRAPHIC AND SITE INFORMATION SHOWN HAS BEEN PROVIDED BY A SURVEY BY ENDRIS ENGINEERING. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION SHOWN THEREON. CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.

B. PLACE STRIPPED TOPSOIL OVER LAWN AREAS, MIN. 2" DEEP.

C. ALL SEEDED AREAS SHALL BE HYDROSEEDED, SEE SPECIFICATIONS 'TURF AND GRASSES' FOR ADDITIONAL REQUIREMENTS.

HYDROSEEDING & RESTORATION LEGEND

- LIMITS OF DISTURBANCE - HYDROSEED ALL LAWN AREAS DISTURBED BY CONSTRUCTION, EXTEND TO INCLUDE ANY UTILITY WORK OUTSIDE OF THE LIMITS OF DISTURBANCE

STORM STRUCTURE CHART

STRUCTURE #	RIM:	INVERT IN:	INVERT OUT:	SIZE / NOTES
HW-1	-	-	869.5	18" PIPE, VELOCITY DISSIPATORS
CB-1	877.4	872.6	872.5	24" MIN. 15" IN, 15" OUT, 6" SUBDRAIN
CB-2	877.7	872.5	872.4	24" MIN. 12" IN, 15" OUT
CB-3	877.4	-	873.4	24" MIN. 12" OUT, 6" SUBDRAIN

STORM PIPE CHART

PIPE #	APPROX. LENGTH (L.F.)	MATERIAL
P-1	280	18" PIPE
P-2	178	15" PIPE
P-3	143	12" PIPE

NOTE: ALL PIPE LENGTHS ARE APPROXIMATE AND ARE PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. CONTRACTOR TO FIELD VERIFY LENGTHS AND SLOPES. NEED TO MEET THE REQUIREMENTS OF THE STORM SYSTEM AS INDICATED.

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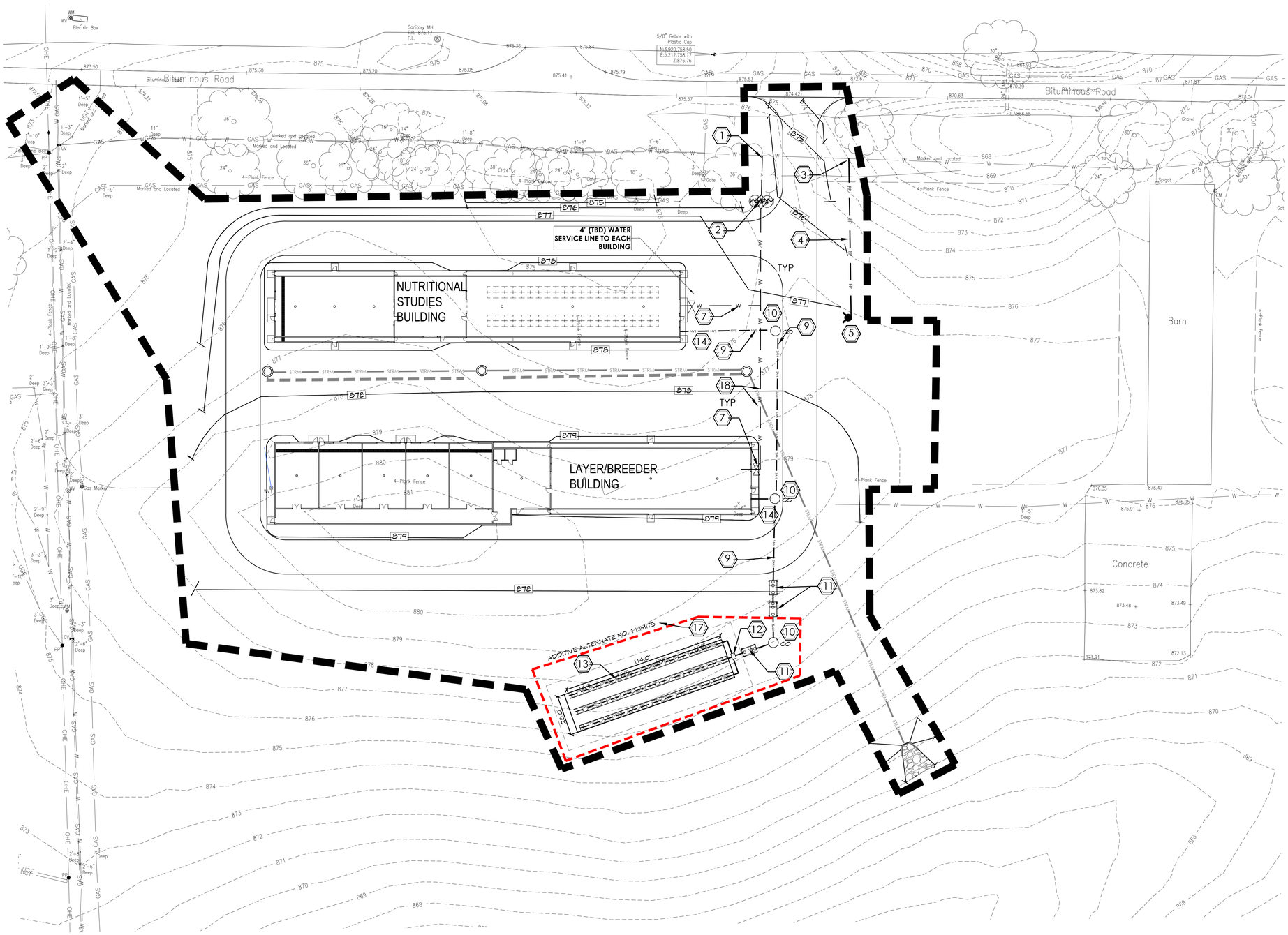
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SITE GRADING & DRAINAGE

L3.0

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CIVIL SITE UTILITIES PLAN

SCALE 1" = 30'-0"

0 30 60 90 N.

CIVIL UTILITY NOTES:

A. THE EXISTING TOPOGRAPHIC AND SITE INFORMATION SHOWN HAS BEEN PROVIDED BY ENDRIS ENGINEERING. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION SHOWN THEREON. CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.

B. THE DRAWINGS SHOW THE APPROXIMATE LOCATION OF EXISTING AND PROPOSED UTILITY LINES. THESE LINES HAVE BEEN IDENTIFIED AND LOCATED AS ACCURATELY AS POSSIBLE USING AVAILABLE INFORMATION; THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL ACTUAL LOCATIONS.

C. UNLESS OTHERWISE INDICATED TO BE REMOVED, ALL ITEMS REMAINING WITHIN THE LIMIT OF CONTRACT ARE TO REMAIN AND BE PROTECTED FROM DAMAGE DURING CONSTRUCTION.

D. THE CONTRACTOR SHALL MAINTAIN UTILITY SYSTEMS TO FUNCTION THROUGHOUT THE CONSTRUCTION PERIOD.

E. REFER TO SPECIFICATION / PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS.

F. ADJUST RIM ELEVATIONS OF ALL EXISTING STRUCTURES TO MATCH PROPOSED FINISHED GRADES.

G. FOR PROPOSED UTILITY STRUCTURES, INVERT ELEVATIONS ARE APPROXIMATE AND BASED ON INFORMATION PROVIDED FOR EXISTING STRUCTURES. FIELD VERIFY ELEVATIONS PRIOR TO INSTALLATION OF UTILITY STRUCTURES.

H. FOR PROPOSED UTILITY PIPE, PIPE LENGTHS & SLOPES ARE APPROXIMATE & SHOULD BE FIELD VERIFIED.

I. PROVIDE THRUST BLOCKS AT ALL BENDS AND TEES IN WATER LINE. REFER TO DETAIL D/C3.0

J. REFER TO MEP PLANS TO COORDINATE SPECIFIC UTILITY TIE-IN LOCATIONS WITHIN 5' OF BUILDING FOOTPRINT.

K. EXPLORATION TO CONFIRM EXISTING UTILITY LOCATIONS IS CONSIDERED INCIDENTAL.

L. BUILDING SPRINKLER CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVALS RELATING TO FIRE PROTECTION AND FIRE VAULT.

M. ALL ITEMS ON THIS SHEET REQUIRING POWER SHALL BE SUPPLIED POWER BY THE CONTRACTOR REGARDLESS OF THEIR INCLUSION IN MEP PORTION OF THE PLANS.

N. CONTRACTOR SHALL COORDINATE ALL UTILITY CROSSING AND IDENTIFY POTENTIAL CONFLICTS PRIOR TO BEGINNING INSTALLATION OF UTILITIES.

O. ANY EXISTING BRICK SANITARY OR STORM MANHOLES THAT ARE TO BE CONNECTED TO SHALL BE REPLACED WITH A NEW CONCRETE MANHOLE

P. ANY POINT WHERE POTABLE WATER LINES AND SANITARY SEWER LINES ARE WITHIN 10 FEET HORIZONTALLY AND LESS THAN 18 INCHES OF VERTICAL SEPARATION EXIST, BOTH THE WATER AND SANITARY SEWER SHALL BE CONCRETE ENCASED 6 INCHES AROUND THE OUTSIDE OF THE PIPE.

CIVIL UTILITY LEGEND

- PROPOSED SANITARY SEWER MANHOLE, SEE DETAIL A/C3.1
- CO — PROPOSED SANITARY SEWER CLEANOUT, SEE DETAIL C/C3.1
- SAN — PROPOSED SANITARY SEWER PIPE, SEE DETAILS E & F / C3.1
- W — PROPOSED POTABLE WATER LINE, SEE DETAIL B/C3.0
- FP — PROPOSED FIRE SERVICE LINE TO SERVE PROPOSED FIRE HYDRANTS, SEE DETAIL B/C3.0
- PROPOSED FIRE HYDRANT SEE DETAIL A/C3.0
- PROPOSED WATER METER
- PROPOSED WATER VALVE, SEE DETAIL C/C3.0
- GAS — PROPOSED NATURAL GAS
- STRM — PROPOSED STORM LINE- SEE L3.0 FOR REQUIREMENTS
- PROPOSED STORM SUBDRAIN- SEE L3.0 FOR REQUIREMENTS
- ADDITIVE ALTERNATE NO. 1 LIMITS
  ALL WORK SHOWN WITHIN ALTERNATE LIMITS TO BE INCLUDED IN ADDITIVE ALTERNATE NO. 1 PRICING INCLUDING SANITARY CLEANOUT, SANITARY SEWER LINE, TANK, DISTRIBUTION TANK AND LEACH FIELD

CIVIL UTILITY KEYNOTES: (1)

1. EXTEND NEW 2" PVC WATER LINE FROM EXISTING WATER MAIN. TAP EXISTING WATER MAIN IN ACCORDANCE WITH LOCAL UTILITY REGULATIONS.
2. PROPOSED 5/8"WATER METER AND BOX BATTERY SETTING.
3. PROPOSED NEW TAP TO EXISTING WATER LINE TO SERVE NEW FIRE HYDRANT.
4. PROPOSED NEW 8" PVC WATER LINE TO SERVE NEW FIRE HYDRANT.
5. PROPOSED NEW FIRE HYDRANT, SEE DETAIL XXX.
6. NOT USED.
7. PROPOSED 2 1/2" DOMESTIC WATER SERVICE TO BUILDING. VERIFY SERVICE REQUIREMENTS PRIOR TO INSTALLATION.
8. NOT USED.
9. PROPOSED 6" PVC SANITARY SEWER LINE, SEE DETAIL E/C3.1'
10. PROPOSED SANITARY SEWER CLEANOUT, SEE DETAIL C/C3.1
11. PROPOSED PRECAST CONCRETE SEPTIC TANK, SEE DETAIL A/C3.2.
12. PROPOSED PRECAST CONCRETE DISTRIBUTION BOX FOR LEACH FIELD, SEE DETAIL B/C3.2.
13. PROPOSED ROCK TRENCHES AT SANITARY LEACH FIELD, SEE DETAIL C/C3.2.
14. PROPOSED CLEANOUT WHERE WASH WASTE EXISTS PEM BUILDING. SEE MEP PLANS FOR EXIT, SEE DETAIL C/C3.1.
15. PROPOSED 6" PVC SANITARY WASTE LINE @ 1% SLOPE, GRAVITY TO PROPOSED STORAGE TANK.
16. ~~PROPOSED STORAGE TANK FOR POULTRY WASTE, SEE DETAIL B/C3.2.~~
17. AT ADDITIVE ALTERNATE NO. 1 LEACH FIELD, IF ACCEPTED, CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING CONSTRUCTION PERMIT FOR LEACH FIELD FROM THE WOODFORD COUNTY HEALTH DEPARTMENT.
18. AT UTILITY CROSSINGS, ENCASE CROSSING WITH MIN. 18" LEAN CONCRETE IN EACH DIRECTION.

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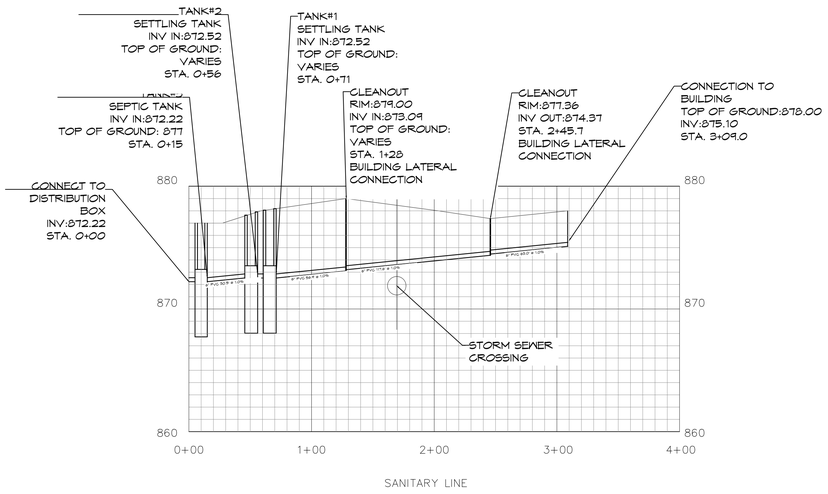
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CIVIL SITE UTILITIES PLAN

C1.0

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SANITARY LINE

SANITARY SEWER PROFILE

SCALE 1" = 50'-0" HORIZONTAL 1" = 5' VERTICAL

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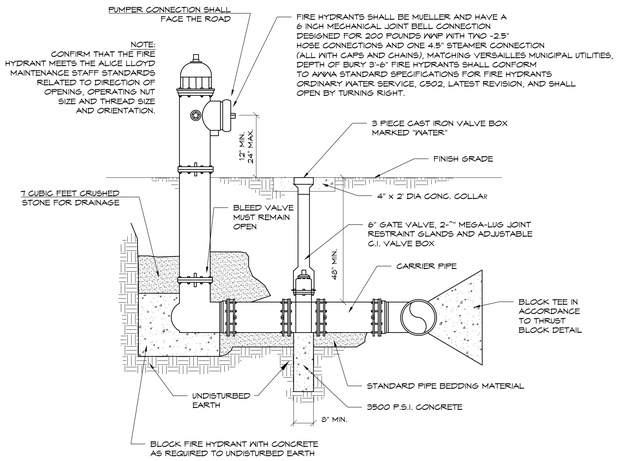
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CIVIL SANITARY PROFILES

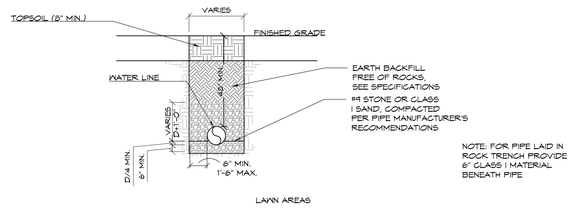
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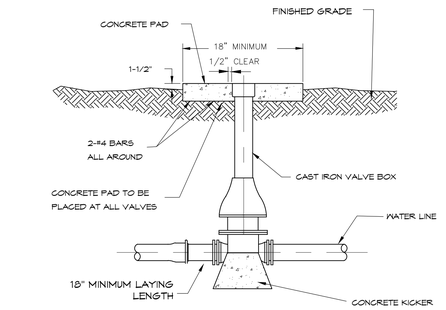


NOTE: ALL MECHANICAL JOINT FITTINGS ARE TO BE ASSEMBLED WITH "MEGA-LUG" JOINT RESTRAINT GLANDS.

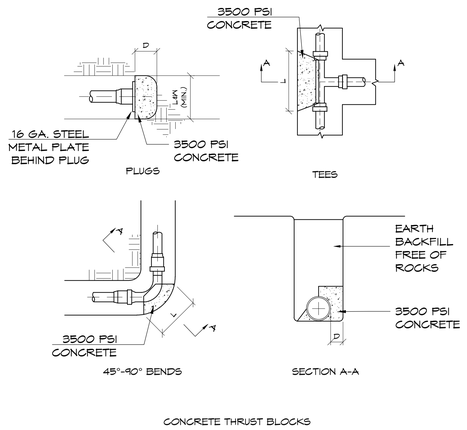
FIRE HYDRANT ASSEMBLY
N.T.S. — A



POTABLE WATER PIPE BEDDING
N.T.S. — B



TYPICAL VALVE SETTING DETAIL
N.T.S. — C



PLUGS

SIZE	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
D	6"	6"	6"	8"	10"	10"	12"	14"	16"	18"	20"
L	4"	6"	8"	10"	21"	30"	36"	42"	48"	54"	60"

PLUGS

SIZE	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
D	6"	6"	6"	6"	6"	6"	6"	12"	24"	28"	32"
L&W	14"	16"	18"	20"	22"	24"	24"	24"	30"	30"	36"

THIRTY-SECOND BENDS (11-1/4°))

SIZE	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
D	6"	6"	6"	8"	10"	10"	12"	14"	16"	18"	20"
L	15"	18"	21"	24"	27"	30"	34"	34"	36"	39"	42"
T	10"	12"	14"	16"	18"	20"	22"	25"	29"	30"	36"

QUARTER BENDS (90°)

SIZE	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
D	6"	6"	6"	8"	10"	12"	12"	12"	16"	18"	20"
L	15"	18"	21"	24"	27"	30"	34"	34"	36"	39"	42"
T	10"	12"	14"	16"	18"	20"	22"	25"	24"	30"	36"

EIGHTH BENDS (45°)

SIZE	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
D	6"	6"	6"	8"	10"	12"	12"	12"	16"	18"	20"
L	15"	18"	21"	24"	27"	30"	34"	34"	36"	39"	42"
T	10"	12"	14"	16"	18"	20"	22"	25"	24"	30"	36"

QUARTER BENDS (90°)

SIZE	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
D	6"	6"	6"	8"	10"	12"	12"	14"	16"	18"	20"
L	15"	18"	21"	24"	27"	30"	34"	38"	44"	45"	53"
T	10"	12"	14"	16"	18"	20"	22"	25"	24"	30"	36"

THRUST BLOCK SCHEDULE

TYPICAL THRUST BLOCKING DETAIL
N.T.S. — D

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VERSAILLES, KENTUCKY

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ARCHITECTURAL

PROJECT	201918
DATE	4-16-21

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No.	Description	Date

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CIVIL UTILITY DETAILS

C3.0

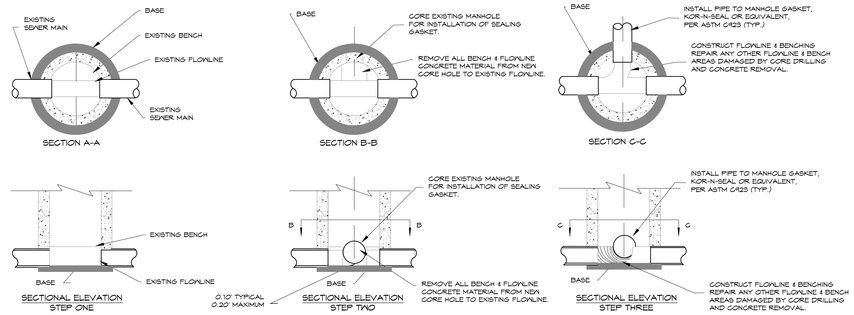
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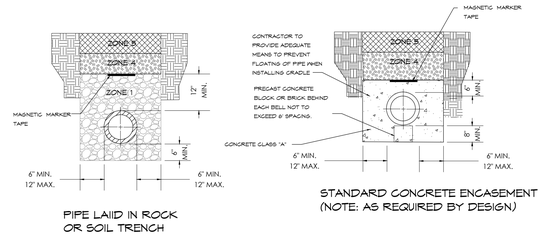
A



CONNECTION TO EXISTING MANHOLE DETAIL

N.T.S.

D



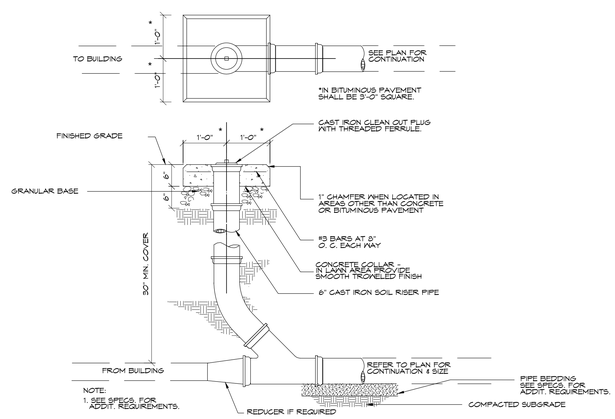
PIPE BACKFILL DESCRIPTIONS	
ZONE 1	NO. 9 STONE
ZONE 2	NO. 9 OR NO. 57 STONE
ZONE 3	COMPACTED DGA
ZONE 4	CONSOLIDATED SOIL, (NO ROCK GREATER THAN 6" DIAMETER), NO. 9, OR NO. 57 STONE
ZONE 5	12" MAX TOPSOIL. NO ROCK ALLOWED.

NOTES:
1. COVER, UP TO AND INCLUDING ZONE 4 SHALL BE ESTABLISHED BEFORE TRENCH EXCAVATION.
2. ALL SANITARY SEWER LINES CONSTRUCTED FROM NON-METALLIC MATERIALS SHALL HAVE MAGNETIC MARKER TAPE INSTALLED IN THE TRENCH ABOVE THE SANITARY SEWER LINE.
3. MAGNETIC MARKER TAPE FOR SANITARY SEWER ONLY.

NOT USED

N.T.S.

B



SANITARY SEWER CLEANOUT DETAIL

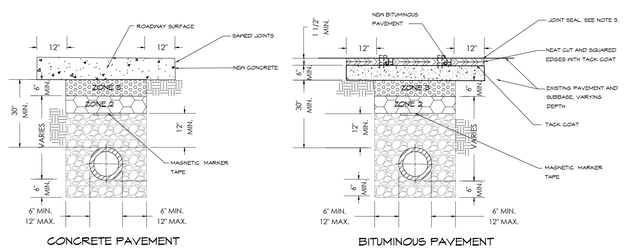
N.T.S.

C

SANITARY SEWER PIPE BEDDING IN ROCK OR SOIL

N.T.S.

E



PIPE BACKFILL DESCRIPTIONS	
ZONE 1	NO. 9 STONE
ZONE 2	NO. 9 OR NO. 57 STONE
ZONE 3	COMPACTED DGA
ZONE 4	CONSOLIDATED SOIL, (NO ROCK GREATER THAN 6" DIAMETER), NO. 9, OR NO. 57 STONE
ZONE 5	12" MAX TOPSOIL. NO ROCK ALLOWED.

NOTES:
1. REPLACE CONCRETE PAVEMENT WITH NEW CONCRETE PAVEMENT 6" MINIMUM OR EXISTING THICKNESS, WHICHEVER IS GREATER.
2. JOINT SEAL PERIMETER OF CUT PAVEMENT WITH PLEXIMASTER, FOURABLE CRACK SEALANT 110® OR APPROVED EQUAL.

TRENCHING, LAYING, BACKFILLING UNDER STREET PAVEMENT

N.T.S.

F

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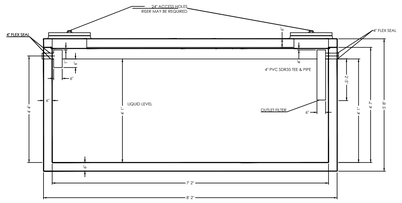
CIVIL UTILITY DETAILS

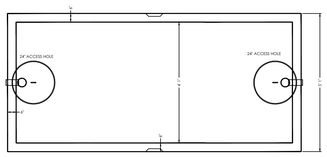
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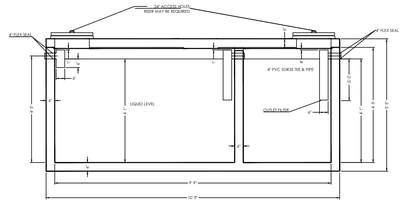
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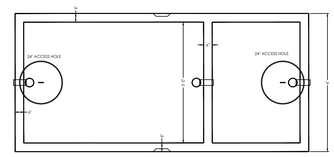
SEPTIC TANK 1





SEPTIC TANK 2 AND 3

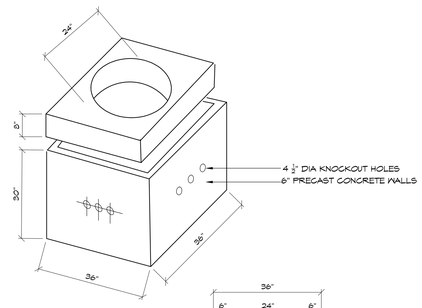


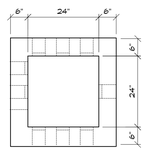


NOTES:
1. SEPTIC TANK AND OUTLET FILTER SHALL BE PROVIDED BY VENDOR APPROVED BY KENTUCKY DEPARTMENT OF PUBLIC HEALTH. THE SEPTIC TANK SHALL BE MANUFACTURED BY DEPARTMENT OF PUBLIC HEALTH APPROVED MANUFACTURER.
2. SEPTIC TANK 3 IS PART OF ADDITIVE ALTERNATE NO. 1

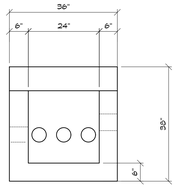
SEPTIC TANK — A

N.T.S.





TOP VIEW



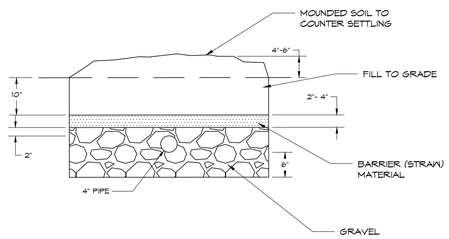
CROSS SECTION VIEW

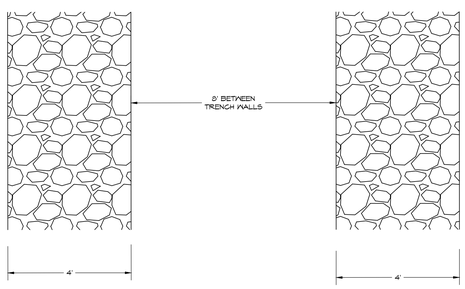
NOTE: DISTRIBUTION BOX SHALL BE PROVIDED BY VENDOR APPROVED BY KENTUCKY DEPARTMENT OF PUBLIC HEALTH

ACCESS LID SHALL BE PROVIDED. RISER MAY BE REQUIRED

ADDITIVE ALTERNATE NO. 1 DISTRIBUTION BOX — B

N.T.S.





ADDITIVE ALTERNATE NO. 1 ROCK TRENCH AT LATERAL FIELD — C

N.T.S.

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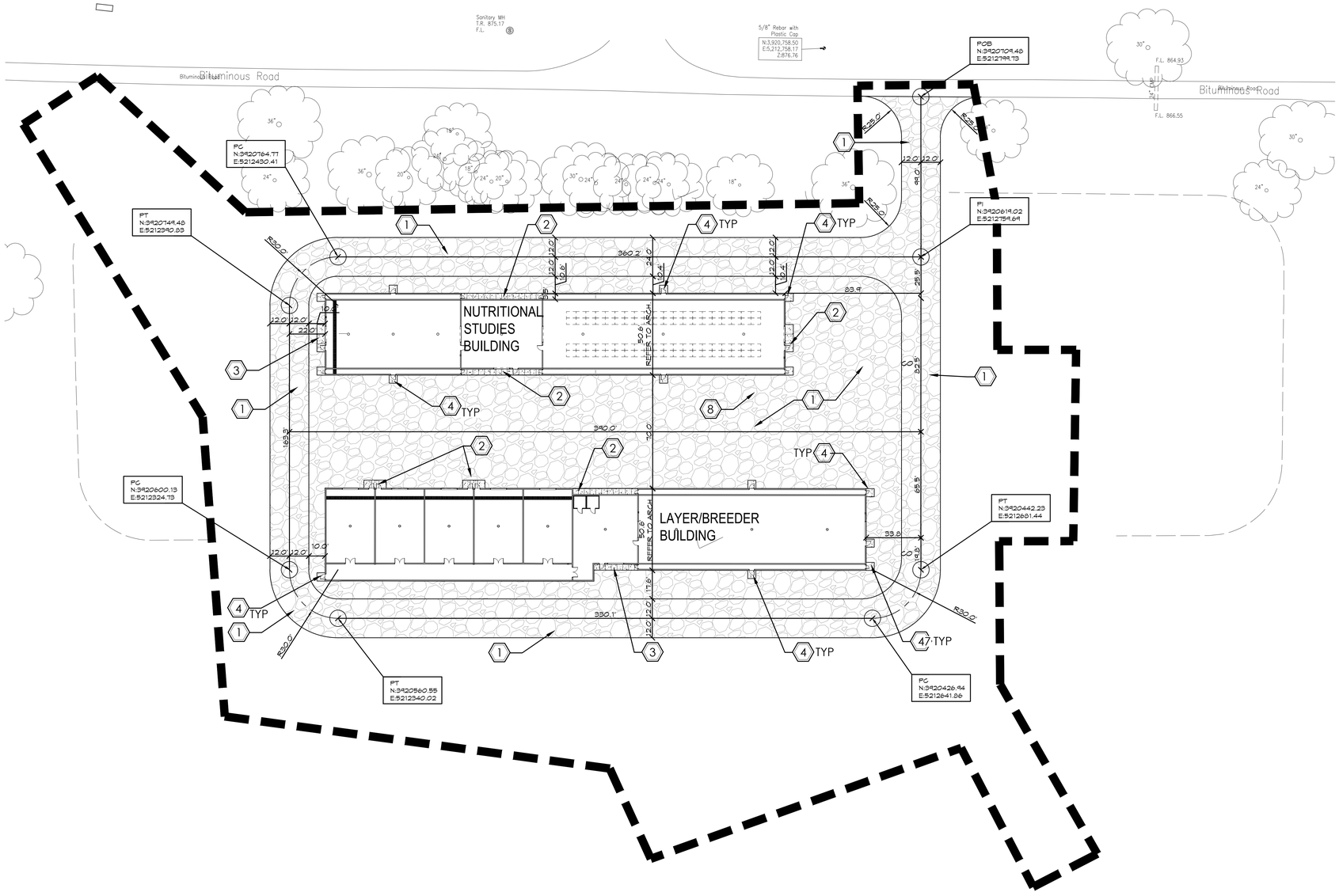
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CIVIL UTILITY DETAILS

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SITE LAYOUT & MATERIALS PLAN

SCALE 1" = 30'-0"

15 0 30 60 90 N

LAYOUT & MATERIALS NOTES:

A. THE EXISTING TOPOGRAPHIC AND SITE INFORMATION SHOWN IS FROM A SURVEY PERFORMED BY ENDRIS ENGINEERING. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION SHOWN THEREON. CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.

B. DIMENSIONS GIVEN IN RELATIONSHIP TO BUILDINGS OR OTHER SITE ELEMENTS ARE MEASURED PERPENDICULAR FROM THE OUTSIDE FACE OF BRICK, STONE OR CONCRETE UNLESS OTHERWISE INDICATED. DIMENSIONS GIVEN AT ROADWAYS ARE FROM FACE OF CURB TO FACE OF CURB UNLESS OTHERWISE NOTED.

C. DIMENSIONS ARE REFERENCED AT 90 DEGREE ANGLES UNLESS OTHERWISE INDICATED. RADII ARE 5' UNLESS OTHERWISE INDICATED.

D. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL INVOLVED UTILITY COMPANIES AND COORDINATING WITH THEM ALL CONSTRUCTION ACTIVITIES AND VERIFYING ALL SITE UTILITIES PRIOR TO CONSTRUCTION ACTIVITY.

E. PROVIDE EXPANSION JOINTS WHERE CONCRETE PAVEMENT ABUTS ALL WALL AND BUILDING FACES, TYPICAL.

F. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

LAYOUT & MATERIALS LEGEND

- GENTERLINE
- GL GENTERLINE
- ME MATCH EXISTING DIMENSION
- EQ SPACE EQUALLY
- +/- DIMENSION MAY VARY DUE TO EXISTING FIELD CONDITIONS
- PI GENTERLINE POINT OF INTERSECTION
- PC GENTERLINE POINT OF CURVATURE
- PT GENTERLINE POINT OF TANGENCY
- PT N:xxxx E:xxxx POINT COORDINATES
- SURVEY BENCHMARK- REFER TO SITE SURVEY
- NEW CONCRETE PAVEMENT AT PEMB DOORS W/ SAWN CTRL JOINTS AS INDICATED, SEE KEYNOTES 2 & 4
- NEW HEAVY DUTY CONCRETE PAD AT PEMB OVERHEAD DOORS / APRONS, SEE KEYNOTE 3
- GRAVEL ROADWAY SURFACING, SEE KEYNOTE 1
- LIMITS OF DISTURBANCE

MATERIALS KEY NOTES: (1)

1. GRAVEL ROADWAY SURFACING, SEE DETAIL J/L6.0.

2. LIGHT DUTY CONCRETE PAVEMENT / SIDEWALKS, SEE DETAIL K/L6.0. PROVIDE EXPANSION JOINTS EVERY 40' O.C. MAX AND AT ALL BUILDING AND WALL FACES.

3. HEAVY DUTY CONCRETE APRON AT PEMB OVERHEAD DOOR, SEE DETAIL L/L6.1. AT BUILDING FACE, PROVIDE EXPANSION JOINT AND TURN DOWN SLAB 6" TO CREATE 12"X12" TURN DOWN.

4. CONCRETE DOOR STOOP AT PEMB MAN DOORS, TYPICAL ALL EXTERIOR DOORS. 5'X5' SQUARE, TYPICAL, SEE DETAIL K/L6.0. PROVIDE EXPANSION JOINT AT BUILDING FACE.

5. STEEL PIPE SECURITY BOLLARD AT UTILITY STRUCTURE, SEE DETAIL O/L6.0.

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STATE OF KENTUCKY RAMONA REGISTERED LANDSCAPE ARCHITECT

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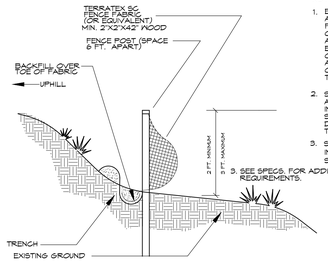
SITE LAYOUT & MATERIALS

L4.0

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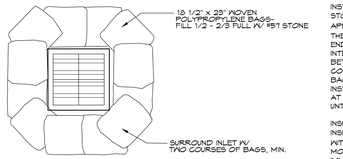


NOTE:

1. EXCAVATE SMALL TRENCH. ATTACH WIRE FENCING AND FILTER FABRIC SO BOTTOM OF FABRIC CAN BE BURIED AT LEAST 6" IN THE GROUND. BACKFILL EXCAVATED SOIL OVER FABRIC & COMPACT. ALL EARTHWORK SHALL BE ON THE UPSTREAM SIDE OF THE FENCE.
2. STEEL SILT FENCE POSTS AT 5'-0 c. MAY BE USED INSTEAD OF THE 2x2 POSTS. STEEL POSTS ARE TO BE DRIVEN AT LEAST 2' INTO THE GROUND.
3. SILT FENCE SHALL BE CONSTRUCTED IN ACCORDANCE WITH LFUCG STORMWATER MANUAL FIGURE 11-21
3. SEE SPECS. FOR ADDITIONAL REQUIREMENTS.

TEMPORARY SILT FENCE (A)

N.T.S.



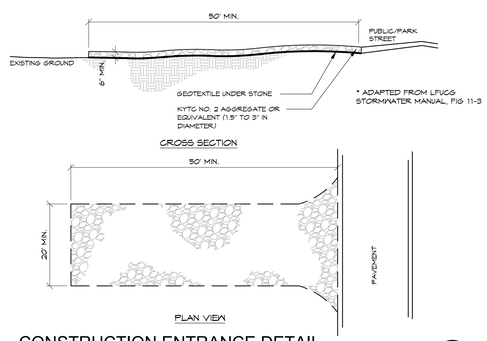
NOTES:

INSTALLATION:
STONE FILL BAGS SHALL BE WOVEN POLYPROPYLENE BAGS WITH APPROXIMATE DIMENSION 50" (8)" BY 20".
THE BAGS SHALL BE FILLED ½ TO ⅔ FULL WITH KTC #57 STONE. TIE THE ENDS OF FILLED BAGS USING EITHER DRAW STRINGS OR WIRE TIES.
INTERWEAVE THE LOOSE ENDS OF THE BAGS SO THAT THE GAPS BETWEEN BAGS ARE FILLED AND THE ENDS OF THE BAGS ARE SEALED.
COMPLETELY SURROUND THE INLET WITH A MINIMUM OF TWO (2) ROWS OF BAGS TO A MINIMUM OF 12" IN HEIGHT.
INSTALL AT ALL EXISTING STORM INLETS AND OUTLET STRUCTURES AND AT ALL NEWLY CONSTRUCTED STORM INLETS AND OUTLET STRUCTURES UNTIL PERMANENT STABILIZATION HAS BEEN ESTABLISHED.

INSPECTION & MAINTENANCE:
INSPECTIONS SHOULD BE MADE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS AFTER EACH RAINFALL EVENT THAT PRODUCES ½" OR MORE OF PRECIPITATION. ANY NEEDED REPAIRS SHOULD BE HANDLED IMMEDIATELY.
IF SEDIMENT ACCUMULATES, REMOVE IT FROM THE FACE OF THE BAGS BEFORE IT ACCUMULATES TO A HEIGHT EQUAL TO ½ THE STRUCTURE HEIGHT. ANY NEEDED REPAIRS SHOULD BE HANDLED IMMEDIATELY. TAKE CARE NOT TO DAMAGE OR UNDERCUT THE BAGS WHEN REMOVING SEDIMENT.
REMOVE AND REPLACE ANY DAMAGED BAGS AND DISPOSE OF THEM PROPERLY.
STORM DRAIN INLET PROTECTION STRUCTURES SHOULD BE REMOVED ONLY AFTER THE DISTURBED AREAS ARE PERMANENTLY STABLIZED. REMOVE ALL CONSTRUCTION MATERIAL AND SEDIMENT AND DISPOSE OF THEM PROPERLY. GRADE THE DISTURBED AREA TO THE ELEVATION OF THE DROP INLET STRUCTURE CREST. USE APPROPRIATE PERMANENT STABILIZATION METHODS TO STABILIZE BARE AREA AROUND THE INLET.

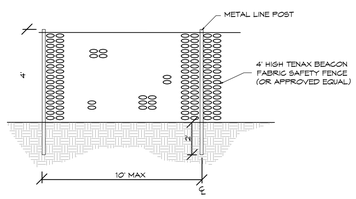
TEMPORARY INLET PROTECTION (B)

N.T.S.



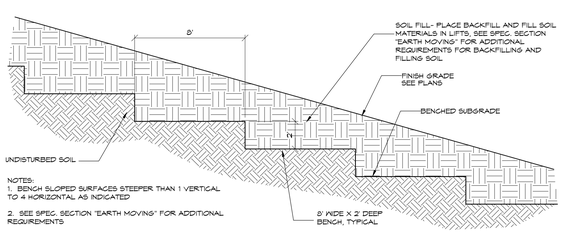
CONSTRUCTION ENTRANCE DETAIL (C)

N.T.S.



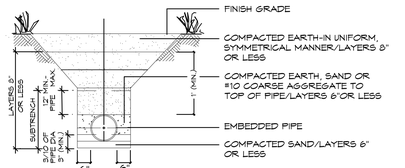
TREE PROTECTION / 'SNOW' FENCE (D)

N.T.S.



BENCHED FILL @ STEEP SLOPES, TYPICAL (E)

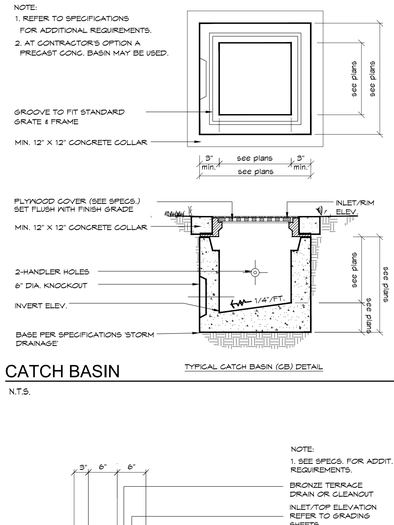
N.T.S.



NOTES:
1. TRENCH WALLS MAY BE CONSTRUCTED SLOPED (AS SHOWN) OR VERTICAL. IN BOTH CASES, TRENCH WALLS SHALL REMAIN SYMMETRICAL ABOUT PIPE CENTERLINE.
2. TO BED PIPE IN SAND, EXCAVATE A GROOVE IN THE COMPACTED SAND TO CONFORM TO THE OUTSIDE OF THE PIPE. AFTER THE EXCAVATION, APPROX. 3" OF SAND SHOULD REMAIN BELOW THE OUTSIDE OF THE PIPE INVERT. THE CRADLE SHALL BE SHAPED FOR SHAPE AND SLOPE BY STRIKING OR DRAWING A TEMPLATE THROUGH THE GROOVE BEFORE PLACING EACH SECTION OF PIPE.
3. RECOMPACT ANY LOOSE SAND DISTURBED DURING INSTALLATION.
4. IF ROCK FOUNDATION IS ENCOUNTERED, EXCAVATE SUBTRENCH ADDITIONAL DEPTH USING THE FOLLOWING FORMULA: ADDITIONAL DEPTH = .045 H - .025 H = HT OF FILL OVER PIPE TO (TO FINISH GRADE) IN FEET. THIS ADDITIONAL DEPTH SHALL ALWAYS BE AT LEAST 0.75' & WILL NOT BE REQUIRED TO BE MORE THAN 0.75 x PIPE DIA + .25'. 5. BACKFILL ADDITIONAL EXCAVATION AREA WITH EARTH CUSHION OF FIRMLY COMPACTED EARTH IN LAYERS OF 6" OR LESS.
5. SEE SPECIFICATIONS FOR ADDITIONAL PIPE AND PIPE BEDDING REQUIREMENTS.
6. INSTALL ALL PIPE PER PIPE MANUFACTURER'S REQUIREMENTS.

TYPICAL BEDDING FOR STORM PIPE (F)

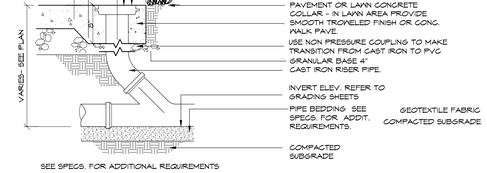
N.T.S.



CATCH BASIN (G)

TYPICAL CATCH BASIN (CB) DETAIL

N.T.S.



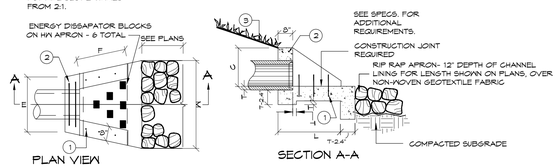
SEE SPECS. FOR ADDITIONAL REQUIREMENTS

CLEANOUT (H)

NOT TO SCALE

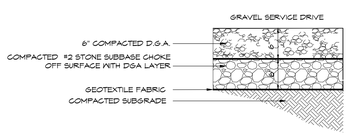
	PIPE		DIMENSIONS					
	DIA OR EQUIV. DIA	SHAPE	C	E	F	L	W	T
1	(ft./in.) 12"	○	1'-4"	2'-6"	2'-3"	3'-6"	4'-0"	2"
	(ft./in.) 15"	○	2'-0"	2'-4"	2'-4"	4'-0"	4'-4"	26"
	(ft./in.) 18"	○	2'-3"	3'-0"	3'-6"	4'-6"	5'-3"	31"
	(ft./in.) 21"	○	2'-6"	3'-3"	4'-0"	5'-0"	6'-0"	35"
2	(ft./in.) 24"	○	2'-9"	3'-6"	4'-6"	5'-6"	6'-6"	5"

1 8-#4 x 1'-0" DOWEL BARS MINIMUM GRADE 40, SPACED EVENLY.
2 2-#4 x (E DIMENSION MINUS 4") MINIMUM GRADE 40, SPACED EVENLY.
3 SLOPES SHALL BE WARPED TO FIT HEADWALL WHEN PIPES ARE SKEWED 1/OR NORMAL SLOPE VARIES FROM 2:1.



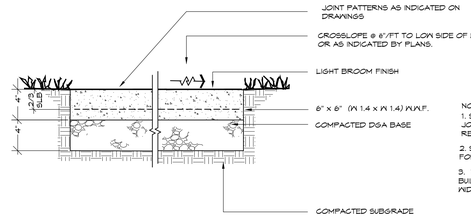
HEADWALL TYPE 1 (I)

N.T.S.



GRAVEL ROADWAY (J)

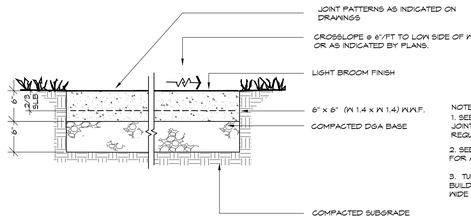
N.T.S.



NOTES:
1. SEE EXPANSION AND CONTROL JOINT DETAILS FOR ADDITIONAL REQUIREMENTS.
2. SEE SPECS. SECTION 'CONCRETE PAVING' FOR ADDITIONAL REQUIREMENTS.
3. TURN DOWN SLAB WHERE PAVEMENT ABUTS BUILDING, TURN DOWN 4" TO CREATE 8"D X 12" WIDE TURNDOWN

LIGHT DUTY CONCRETE PAVEMENT (K)

N.T.S.



NOTES:
1. SEE EXPANSION AND CONTROL JOINT DETAILS FOR ADDITIONAL REQUIREMENTS.
2. SEE SPECS. SECTION 'CONCRETE PAVING' FOR ADDITIONAL REQUIREMENTS.
3. TURN DOWN SLAB WHERE PAVEMENT ABUTS BUILDING, TURN DOWN 6" TO CREATE 12"D X 18" WIDE TURNDOWN

HEAVY DUTY CONCRETE PAVEMENT (L)

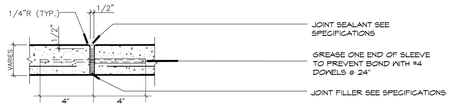
N.T.S.



SEE SPECIFICATIONS CONCRETE PAVING FOR ADDITIONAL REQUIREMENTS

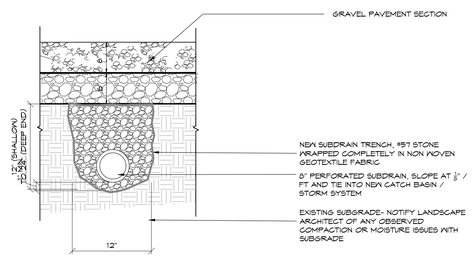
TOOLED CONTROL JOINT (M)

N.T.S.



EXPANSION JOINT AT CONC. PAVEMENT (N)

N.T.S.



SUBDRAIN (O)

N.T.S.

JRA architects
3225 Summit Square Place, Suite 200
Lexington, Kentucky 40509
859.252.6781

STATE OF KENTUCKY
R. DEREK MOTSCH
26439
PROFESSIONAL ENGINEER

STATE OF KENTUCKY
RAMONA
REGISTERED
LANDSCAPE ARCHITECT

RESERVED FOR AHJ STAMP

CONSTRUCTION DOCUMENTS

UK POULTRY RESEARCH FACILITY
1171 MIDWAY ROAD
VERSAILLES, KENTUCKY

University of Kentucky

ARCHITECTURAL

PROJECT	201918
DATE	4-16-21

REVISIONS

No.	Description	Date

JRA ARCHITECTS HAS RETAINED AN ELECTRONIC VERSION OF THESE DRAWINGS. THE CLIENT AGREES NOT TO REUSE THESE DRAWINGS - IN ELECTRONIC OR ANY OTHER FORMAT - IN WHOLE, OR IN PART, FOR ANY PURPOSE OTHER THAN FOR THE PROJECT. THE CLIENT AGREES NOT TO TRANSFER THESE ELECTRONIC FILES TO OTHERS WITHOUT THE PRIOR WRITTEN CONSENT OF THE ARCHITECT. THE CLIENT FURTHER AGREES TO WAIVE ALL CLAIMS AGAINST THE ARCHITECT RESULTING IN ANY WAY FROM ANY UNAUTHORIZED CHANGES TO OR REUSE OF THE ELECTRONIC FILES FOR ANY OTHER PROJECT BY ANYONE OTHER THAN THE ARCHITECT.

SITE DETAILS

L6.0

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GENERAL NOTES

DESIGN LOADS

STRUCTURAL RISK CATEGORY ..... CATEGORY II

FLOOR LIVE LOAD
ALL SLABS ON GRADE ..... 100 PSF

ROOF LIVE LOAD ..... 20 PSF MIN

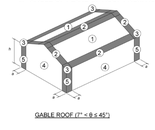
ROOF SNOW LOAD (PER ASCE 7-10)
GROUND SNOW LOAD ..... P_g = 15 PSF
IMPORTANCE FACTOR ..... Is = 1.0
SNOW EXPOSURE FACTOR ..... Ce = 0.9
THERMAL FACTOR (BUILDING) ..... Ct = 1.1
FLAT-ROOF SNOW LOAD* ($Pf = 0.7CeCtIsPg$) (BUILDING) ..... Pf = 10.4 PSF
MINIMUM-ROOF SNOW LOAD (I Pg) ..... Pm = 15 PSF
SLOPED-ROOF SNOW LOAD* ($Ps = Cs\ Pf$) (BUILDING) ..... Ps = 9.4 PSF
*(INCREASE FOR DRIFTING PER ASCE 7-10, SECTIONS 7.7 & 7.8)

WIND LOAD (PER ASCE 7-10)
ULTIMATE DESIGN WIND SPEED ..... V_{ULT}= 115 MPH
NOMINAL DESIGN WIND SPEED ..... V_{ASD}= 89 MPH
WIND EXPOSURE ..... EXPOSURE C
ENCLOSURE ..... FULLY ENCLOSED
INTERNAL PRESSURE COEFFICIENT ..... GC_{pi} = ± 0.18
END ZONE WIDTH ..... a = 5 FT

COMPONENTS & CLADDING EXTERNAL PRESSURE ULTIMATE (LRFD) LOADS (PSF)

EFFECTIVE WIND AREA (SQ FT.)	LOCATION PER ASCE 7-10: (1)	(2)	(3)	(4)	(5)
≤10	16.6 -26.4	16.6 -46.0	16.6 -68.0	28.9 -31.3	28.9 -38.6
20	15.2 -25.7	15.2 -42.3	15.2 -63.6	27.6 -30.0	27.6 -36.0
50	13.2 -24.7	13.2 -37.4	13.2 -57.7	25.8 -28.3	25.8 -32.6
100	11.7 -24.0	11.7 -33.8	11.7 -53.3	24.5 -27.0	24.5 -30.0
500	↓	↓	↓	21.5 -24.0	21.5 -24.0

NOTES:
1. WIND LOADING PROVIDED ARE ULTIMATE (LRFD) LOADING. FOR ALLOWABLE STRESS DESIGN MULTIPLY LOADS PROVIDED BY 0.6.
2. LOADING PROVIDED IS FOR WORST CASE ROOF HEIGHT. DELEGATED DESIGNERS MAY RECALCULATE LOADS FOR SPECIFIC COMPONENT HEIGHTS USING PARAMETERS SPECIFIED.
3. PRESSURES SHOWN ARE APPLIED NORMAL TO THE SURFACE.
4. PLUS AND MINUS SIGNS SIGNIFY PRESSURES ACTING TOWARD AND AWAY FROM THE SURFACES, RESPECTIVELY.
5. FOR HIP ROOFS WITH $\theta \leq 25°$, ZONE 3 SHALL BE TREATED AS ZONE 2.
6. EACH COMPONENT MUST BE DESIGNED FOR MAXIMUM POSITIVE AND NEGATIVE FORCES.
7. FOR COMPONENTS HAVING EFFECTIVE AREAS IN BETWEEN TABULATED VALUES, DESIGN LOADS MAY BE INTERPOLATED. OTHERWISE DESIGN LOAD MUST BE TAKEN FROM THE NEXT LOWEST EFFECTIVE AREA.
8. INTERNAL PRESSURE FOR ENCLOSED BUILDING IS INCLUDED IN ABOVE VALUES.
9. THE NET C&C PRESSURE (INCLUDING INTERNAL PRESSURE) FOR ANY COMPONENT SHALL NOT BE TAKEN LESS THAN 16 PSF ACTING IN EITHER DIRECTION NORMAL TO THE SURFACE
10. NOTATION:
   a: 10 PERCENT OF LEAST HORIZONTAL DIMENSION OR 0.4h, WHICHEVER IS SMALLER, BUT NOT LESS THAN EITHER 4% OF LEAST HORIZONTAL DIMENSION OR 3 FT.
   h: MEAN ROOF HEIGHT, IN FEET, EXCEPT THAT EAVE HEIGHT SHALL BE USED FOR ROOF ANGLES $\leq \theta$ < 10°.
   θ: ANGLE OF PLANE OF ROOF FROM HORIZONTAL, IN DEGREES.



GABLE ROOF ($\theta° < \theta \leq 45°$)

EARTHQUAKE DESIGN DATA
COUNTY / STATE ..... WOODFORD / KENTUCKY
IMPORTANCE FACTOR ..... Ie = 1.0
MAPPED SHORT PERIOD RESPONSE ACCELERATION ..... Ss = 0.181
MAPPED 1 SECOND PERIOD RESPONSE ACCELERATION ..... S1 = 0.092
SITE CLASS ..... CLASS C
DESIGN SHORT PERIOD SPECTRAL RESPONSE COEFFICIENT ..... Sds = 0.145
DESIGN 1 SECOND PERIOD SPECTRAL RESPONSE COEFFICIENT ..... Sd1 = 0.105
SEISMIC DESIGN CATEGORY ..... CATEGORY B

DESIGN STRESSES

CONCRETE (STRENGTH DESIGN) MINIMUM COMPRESSIVE STRENGTH IN 28 DAYS:
INTERIOR SLABS ON GRADE ..... f'c = 4,000 PSI
CONCRETE EXPOSED TO FREEZE/THAW ..... f'c = 5,000 PSI
REINFORCING BARS (ASTM A615 GRADE 60) ..... fy = 60,000 PSI
WELDED WIRE FABRIC (ASTM A1064) ..... fy = 65,000 PSI
SOIL BEARING PRESSURE FOR FOUNDATIONS ..... 1,500 PSF

DESIGN CRITERIA

1. STRUCTURE IS DESIGNED IN ACCORDANCE WITH THE 2018 KENTUCKY BUILDING CODE, 2ND EDITION (2015 IBC).
2. NO PROVISION HAS BEEN MADE FOR FUTURE HORIZONTAL OR VERTICAL EXPANSION.

GENERAL

1. THE REQUIREMENTS OF THESE GENERAL NOTES APPLY UNLESS OTHERWISE NOTED ON PLANS OR IN SPECIFICATIONS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL CONTRACT DOCUMENTS, ADDENDA, AND SUPPLEMENTARY INFORMATION AND DISTRIBUTING SUCH TO ALL SUBCONTRACTORS AND MATERIAL SUPPLIERS PRIOR TO THE PREPARATION AND SUBMITTAL OF SHOP DRAWINGS, FABRICATION, AND INSTALLATION OF ANY STRUCTURAL MEMBERS.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO COMMENCING WORK. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES THAT MAY EXIST.
4. ANY DISCREPANCIES BETWEEN STRUCTURAL AND ARCHITECTURAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND STRUCTURAL ENGINEER.
5. DO NOT SCALE DRAWINGS.
6. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MEANS AND METHODS TO CONSTRUCT THE STRUCTURE, INCLUDING VERIFICATION OF LOAD CAPACITY OF THE STRUCTURETO SUPPORT CONSTRUCTION ACTIVITIES, EQUIPMENT, ETC. AND FOR LIMITING THE AMOUNT OF CONSTRUCTION LOAD IMPOSED ON THE STRUCTURAL FRAMING. CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN CAPACITY OF THE FRAMING AT THE TIME THE LOADS ARE IMPOSED. DAMAGE TO THE STRUCTURE CAUSED BY CONSTRUCTION ACTIVITIES SHALL BE CORRECTED BY THE RESPONSIBLE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
7. SHOP DRAWINGS MUST BE CHECKED AND STAMPED BY THE CONTRACTOR PRIOR TO SUBMISSION.
8. NON-STRUCTURAL ELEMENTS OF THE BUILDING (ARCHITECTURAL FINISHES, INSULATION, SHEATHING, DUCTWORK, PIPING, FOUNDATION/FLOOR/ROOF DRAINS, ETC.) ARE TYPICALLY NOT SHOWN ON THE STRUCTURAL DRAWINGS. WHERE NON-STRUCTURAL ELEMENTS ARE SHOWN ON THE STRUCTURAL DRAWINGS, THEY ARE SHOWN FOR REFERENCE AND DESIGN INTENT ONLY. NON-STRUCTURAL ELEMENTS SHALL BE CONSTRUCTED AS SHOWN ON THE ARCHITECTURAL, ELECTRICAL, MECHANICAL AND PLUMBING DRAWINGS.
9. WALL OPENINGS AND TERMINATIONS SHOWN ON THE STRUCTURAL DRAWINGS ARE DIAGRAMMATIC ONLY. WALL TERMINATIONS AND OPENINGSSHALL BE CONSTRUCTED AS SHOWN ON THE ARCHITECTURAL DRAWINGS. IF THE ARCHITECTURAL DRAWINGS DO NOT INCLUDE DETAILS FOR ANY OF THESE CONDITIONS, CONSULT WITH ARCHITECT FOR DIRECTION.
10. DETAILS LABELED TYPICAL ON THESE DRAWINGS SHALL APPLY TO ALL SITUATIONS OCCURRING ON THE PROJECT THAT ARE THE SAME OR SIMILAR AND SHALL APPLY REGARDLESS OF WHETHER THEY ARE KEYED ON THE PLANS. CONSTRUCTION NOT SPECIFICALLY INDICATED BY DETAIL OR SECTION SHALL BE SIMILAR TO DETAILS SHOWN FOR SIMILAR CONDITIONS.

FOUNDATION CONSTRUCTION

1. FOUNDATIONS ON THIS PROJECT ARE DESIGNED IN ACCORDANCE WITH RECOMMENDATIONS MADE BY CONSULTING SERVICES INCORPORATED, GEOTECHNICAL ENGINEERS, IN THEIR REPORT DATED MAY 17,2019. THE GEOTECHNICAL REPORT IS PROVIDED AS REFERENCE INFORMATION AVAILABLE TO BIDDERS, BUT IS NOT PART OF THE CONTRACT DOCUMENTS. THE STRUCTURAL ENGINEER IS NOT RESPONSIBLE OR LIABLE FOR THE ACCURACY OF THE INFORMATION PRESENTED IN THE GEOTECHNICAL REPORT.
1. ALL FOOTINGS MUST BE SUPPORTED ON UNDISTURBED SOIL CAPABLE OF SUPPORTING DESIGN LOADS WITHOUT APPRECIABLE SETTLEMENT. CONTRACTOR SHALL PROBE BEARING STRATA WITH DRIVEN RODS, REMOVE SHALLOW BEDROCK (AND OVERLYING SOIL) WITHIN ONE FOOTING WIDTH BELOW BOTTOM OF FOOTING, AND REPLACE WITH ENGINEERED SOIL BACKFILL.
3. LOCATE EXISTING UNDERGROUND UTILITIES IN AREAS OF CONSTRUCTION. COORDINATE WITH UTILITY COMPANIES FOR ANY SHUT-OFF REQUIREMENTS OF STILL-ACTIVE LINES.
4. WHEN EXCAVATIONS APPROACH THE GROUND WATER LEVEL, THE WATER LEVEL SHALL BE LOWERED BY AN ACCEPTABLE DEWATERING SYSTEM SO THAT THE WATER LEVEL IS MAINTAINED CONTINUOUSLY A MINIMUM OF 2'-0" BELOW THE EXCAVATION.
8. FOR PLACEMENT AND COMPACTION OF FILL UNDER SLABS ON GRADE, SEE SPECIFICATIONS. IF NOT OTHERWISE NOTED, COMPACT ALL FILL TO 95% OF OPTIMUM LABORATORY DENSITY IN ACCORDANCE WITH ASTM D698 STANDARD PROCTOR METHOD. PLACE FILL IN 6" TO 8" LAYERS AND COMPACT WITH VIBRATORY TAMPING EQUIPMENT.
9. WHERE ELECTRICAL CONDUIT CONGREGATES BELOW ELECTRICAL ROOMS AND PANELS, CONTRACTOR SHALL HOLD DOWN SUBGRADE APPROPRIATELY FOR CONDUIT TO BE BELOW SLAB. COVER CONDUIT WITH FLOWABLE FILL (LEAN CONCRETE) TO BOTTOM OF SLAB ELEVATION.
10. SEE ARCHITECTURAL AND SITE DRAWINGS FOR CONTOUR AND LAYOUT OF SITE WALKS. SLOPE EXTERIOR CONCRETE 1/8"/ FT AWAY FROM BUILDING, UNLESS NOTED OTHERWISE.
11. HIGH PLASTICITY ("CH") SOILS WITH A PLASTICITY INDEX OF 30 OR MORE WHICH ARE PRESENT WITHIN 2 FEET OF FINAL SUBGRADE ELEVATION FOR THE ENTIRE FOOTPRINT OF ALL THREE BUILDINGS SHALL BE LIME STABILIZED. SEE SPECIFICATIONS.
12. FOUNDATION CONCRETE SHALL BE PLACED IMMEDIATELY FOLLOWING EXCAVATION. A LEAN CONCRETE (1,500 PSI) MUD MAT SHALL BE PLACED OVER THE PREPARED BEARING MATERIALS IF EXCAVATION MUST REMAIN OPEN DURING INCLEMENT WEATHER OR FOR MORE THAN 72 HOURS.
13. CONTRACTOR SHALL EXERCISE CAUTION THAT CRUSHED STONE BLANKET BELOW FLOOR SLAB DOES NOT BECOME SATURATED DURING CONSTRUCTION. CONTRACTOR SHALL CAST FLOOR SLAB OR PROVIDE TEMPORARY PROTECTION FOR SUBGRADE UNTIL SLAB IS CAST TO PREVENT WATER INFILTRATION INTO SUBGRADE.
14. SURFACE RUNOFF SHALL BE DIRECTED AWAY FROM FOUNDATION EXCAVATIONS AND NOT BE PERMITTED TO POND WITHIN THE BUILDING FOOTPRINT. PROVIDE DRAINAGE TRENCHES FROM FOUNDATION EXCAVATIONS TO DIRECT RAINWATER OUT OF EXCAVATIONS.

CONCRETE CONSTRUCTION

1. ALL CONCRETE CONSTRUCTION TO BE IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE ACI 301-10, ACI 318-14 AND ACI DETAILING MANUAL, EXCEPT THAT CONSTRUCTION AND REMOVAL OF FORMS SHALL BE INSPECTED BY THE CONTRACTOR'S ENGINEER.
2. FURNISH BAR SUPPORTS WHERE NECESSARY DURING CONSTRUCTION.
3. PROVIDE PLASTIC, PLASTIC-COATED (NOT PLASTIC-TIPPED) OR STAINLESS STEEL CHAIRS IN ALL CONCRETE EXPOSED TO VIEW IN COMPLETED STRUCTURE.
4. PROVIDE PIPE SLEEVES AND INSERTS IN CONCRETE WORK WHERE REQUIRED. SEE ARCHITECTURAL AND MECHANICAL DRAWINGS.
5. CONSTRUCTION JOINTS SHALL BE POSITIONED SO AS NOT TO CHANGE THE STRUCTURAL DESIGN REQUIREMENTS. RATIO OF LENGTH TO WIDTH OF POUR SHALL NOT EXCEED 2. LOCATION OF ALL CONSTRUCTION JOINTS SHALL BE APPROVED BY THE ENGINEER.
6. WELDING OF REINFORCING BARS (INCLUDING TACK WELDING) IS NOT PERMITTED.
7. ALL EXPOSED CORNERS OF CONCRETE SHALL BE CHAMFERED 45 DEGREES. MINIMUM CHAMFER TO BE 1/2".
8. ALL EXPOSED CONCRETE SUBJECTED TO FREEZING AND THAWING TO HAVE A MAXIMUM WATER/CEMENT RATIO OF 0.40 AND 6% +/- 1% OF ENTRAINED AIR.
9. REINFORCING FOR SLABS ON GROUND (IN FLAT SHEETS) SHALL BE IN THE MIDDLE OF THE SLAB EXCEPT AS OTHERWISE NOTED AND SHALL BE POSITIVELY SUPPORTED AND MAINTAINED IN THIS POSITION DURING PLACEMENT OF CONCRETE.
10. BEND ALL HORIZONTAL FOUNDATIONBARS 1'-0" AROUND CORNERS OR PROVIDE CORNER BARS WITH 2'-0" LAP.
11. SPLICES: ALL REINFORCING SPLICES SHALL BE AS TENSION LAP, U.N.O.
   A. LAP ALL TENSION SPLICES IN ACCORDANCE WITH THE FOLLOWING TABLE. MODIFY LENGTHS AS NOTED:

BAR SIZE	CONCRETE COMPRESSIVE STRENGTH 3,000 PSI	4,000 PSI	5,000 PSI	
#4	29"	25"	22"	
#5	36"	31"	28"	
#6	43"	37"	33"	

12. CONCRETE PROTECTION FOR REINFORCEMENT: COVER
   A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH ..... 3"
   B. CONCRETE EXPOSED TO EARTH OR WEATHER
      NO. 6 THROUGH NO. 18 BARS ..... 2"
      NO. 5 BAR, W31 OR D31 WIRE AND SMALLER ..... 1 ½"

STEEL BUILDING CONSTRUCTION

1. BUILDING CONTRACTOR IS SOLELY RESPONSIBLE FOR THE DESIGN, FABRICATION, AND INSTALLATION OF THE BUILDING STRUCTURE.
2. CONTRACTOR SHALL SUBMIT DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF KENTUCKY FOR REVIEW BY THE ARCHITECT AND ENGINEER.
3. STRUCTURE SHALL BE DESIGNED FOR:
   A. STRUCTURE SELFWEIGHT (INCLUDING ROOF SYSTEM).
   B. COLLATERAL DEAD LOAD OF 5 PSF.
   C. SNOW, WIND, EARTHQUAKE AND ROOF LIVE LOAD AS SHOWN IN "DESIGN LIVE LOADS" SECTION.
4. LIMIT BUILDING DRIFT TO H/100 UNDER LOAD COMBINATIONS THAT INCLUDE WIND. DRIFT LIMITATIONS FOR SEISMIC LOADING ARE DEFINED IN THE KENTUCKY BUILDING CODE.
5. IN ADDITION TO THE BUILDING FRAME, THE BUILDING CONTRACTOR SHALL DESIGN, PROVIDE, AND INSTALL:
   A. ANCHOR BOLTS (DIAMETER SELECTION FOR SHEAR AND TENSION)
   B. FRAMING FOR WALL OPENINGS
   C. FRAMING FOR ROOF OPENINGS
6. THE COMPLETE FOUNDATION SYSTEM MUST BE INSTALLED PRIOR TO ERECTING THE STEEL STRUCTURE.
7. METAL ROOFING SHALL BE ASSUMED TO HAVE ZERO CAPACITY FOR DIAPHRAGM ACTION.

SPECIAL INSPECTION

1. SPECIAL INSPECTIONS AS DEFINED IN SECTIONS 1704 AND 1705 OF THE KENTUCKY BUILDING CODE ARE REQUIRED.
2. SPECIAL INSPECTIONS SHALL BE PERFORMED BY A QUALIFIED TESTING AGENCY APPROVED BY THE ARCHITECT AND THE STRUCTURAL ENGINEER AND PAID FOR BY THE OWNER.
3. THE INSPECTOR SHALL OBSERVE WORK FOR CONFORMANCE WITH THE APPROVED STRUCTURAL DRAWINGS AND SPECIFICATIONS AND PREPARE INSPECTION REPORTS STATING HIS/HER OBSERVATIONS. COPIES OF THE INSPECTION REPORTS SHALL BE SUBMITTED TO THE CONTRACTOR, THE ARCHITECT AND THE STRUCTURAL ENGINEER.
4. ALL DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE WORK BEING PERFORMED SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THE DISCREPANCIES ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF ARCHITECT AND THE STRUCTURAL ENGINEER PRIOR TO THE COMPLETION OF THAT PHASE OF THE WORK.
5. THE SPECIAL INSPECTOR SHALL SUBMIT A FINAL REPORT OF INSPECTIONS DOCUMENTING COMPLETION OF ALL REQUIRED SPECIAL INSPECTIONS AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS.
6. SPECIAL INSPECTIONS ARE REQUIRED FOR THE FOLLOWING WORK:

   INSPECTION OF FABRICATORS
   PERFORM SPECIAL INSPECTIONS PER SECTION 1704.2.5 OF THE KENTUCKY BUILDING CODE.

   STEEL CONSTRUCTION
   PERFORM SPECIAL INSPECTIONS PER SECTION 1705.2 OF THE KENTUCKY BUILDING CODE.

   CONCRETE CONSTRUCTION
   PERFORM SPECIAL INSPECTIONS PER SECTION 1705.3 OF THE KENTUCKY BUILDING CODE.

SITE OBSERVATION BY THE STRUCTURAL ENGINEER

1. THE ENGINEER HAS NO CONTROL OR CHARGE OF, AND SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES; FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK; FOR THE ACTS OR OMISSION OF THE CONTRACTOR, SUBCONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK; OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY ACTS OR OMISSIONS OF THE CONTRACTOR, ANY SUBCONTRACTOR, MATERIAL SUPPLIER, OR AGENTS THEREOF. THE ENGINEER DOES NOT GUARANTEE THE PERFORMANCE OF THE CONTRACTOR AND SHALL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S FAILURE TO PERFORM ITS WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS OR APPLICABLE LAWS, CODES, RULES, OR REGULATIONS. THE CONTRACTOR SHALL MAINTAIN SOLE RESPONSIBILITY FOR DEFECTS AND DEFICIENCIES, INCLUDING PROVIDING TESTING AND INSPECTION ONCE SUCH ARE DISCOVERED, AND FOR PROVIDING ENGINEERED CORRECTIVE ACTION FOR DESIGN TEAM REVIEW.
3. PERIODIC SITE OBSERVATION BY FIELD REPRESENTATIVES OF BROWN+KUBICAN, PSC IS SOLELY FOR THE PURPOSE OF DETERMINING IF THE WORK OF THE CONTRACTOR IS PROCEEDING IN GENERAL ACCORDANCE WITH THE STRUCTURAL CONTRACT DOCUMENTS. THIS LIMITED SITE OBSERVATION SHALL NOT BE CONSTRUED AS EXHAUSTIVE OR CONTINUOUS TO CHECK THE QUALITY, QUANTITY, OR ACCURACY OF THE CONSTRUCTION WORK, BUT RATHER PERIODIC IN EFFORT TO INFORM THE CLIENT ABOUT GENERAL PROGRESS AND TO ADVISE THE CLIENT ABOUT OBSERVED DEFECTS AND DEFICIENCIES IN THE WORK OF THE CONTRACTOR.

MAINTENANCE STATEMENT AND STRUCTURE LIFESPAN

1. THE ENGINEER MAKES NO CLAIM OR AGREEMENT AS TO THE LIFESPAN OF THE BUILDING STRUCTURE. THE CLIENT AND OWNER SHALL UNDERSTAND THAT STRUCTURAL TYPES DO HAVE LIFESPAN RELATIVE TO INITIAL COST AND MAINTENANCE AND THAT BY REQUESTING OR ACCEPTING A STRUCTURAL SYSTEM OF LOWER INITIAL COST THAT THE USEABLE LIFESPAN WILL DECREASE AND MAINTENANCE INCREASE.
2. ALL STRUCTURES REQUIRE PERIODIC MAINTENANCE TO EXTEND LIFESPAN AND TO ENSURE STRUCTURAL INTEGRITY FROM EXPOSURE TO THE ENVIRONMENT. THE ENGINEER SHALL NOT BE HELD LIABLE FOR MAINTENANCE REQUIREMENTS OR DETERIORATION RESULTING FROM LACK OF BUILDING MAINTENANCE.
3. A PLANNED PROGRAM OF MAINTENANCE SHALL INCLUDE ITEMS SUCH AS, BUT NOT LIMITED TO: PROTECTIVE COATING FOR CONCRETE, CAULKED JOINTS, EXPANSION JOINTS, CONTROL JOINTS, TIMELY REPAIR OF SPALLS AND CRACKS IN CONCRETE, AND PRESSURE WASHING OF STRUCTURAL ELEMENTS EXPOSED TO A SALT ENVIRONMENT OR OTHER HARSH CHEMICALS.

STRUCTURAL SYSTEM SUBSTITUTIONS

1. THE BASIS OF DESIGN FOR THE FOUNDATION OF THIS PROPOSED STRUCTURE IS BASED ON USING A LOAD BEARING WALL SYSTEM AND SHEAR WALL LATERAL SYSTEM. DEVIATIONS FROM THE PROPOSED STRUCTURE IS A DEVIATION FROM THE FOUNDATION DESIGN HEREIN; THEREFORE, IF THE STRUCTURE VARIES FROM THE ASSUMED SYSTEM, IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO ENGINEER THE ENTIRE STRUCTURE, TOP TO BOTTOM (INCLUDING FOUNDATION DESIGN), BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF KENTUCKY. IF AN ALTERNATE SYSTEM IS UTILIZED, THEN THE DESIGN INTENT FOR STRENGTH AND DURABILITY SHALL BE MET OR EXCEEDED. EXAMPLES INCLUDE, BUT ARE NOT LIMITED TO: MINIMUM SLAB THICKNESS, SLAB TREATMENTS, DEPTH OF FOUNDATION BELOW FROST DEPTH, ETC. SEE DELEGATED DESIGN NOTES ON S2.1 FOR ADDITIONAL INFORMATION.

STRUCTURAL ABBREVIATIONS

ARCH	ARCHITECTURAL	GALV	GALVANIZED
BOT	BOTTOM	GA	GAUGE
BTWN	BETWEEN	HORIZ	HORIZONTAL
CLR	CLEAR	LBS	POUNDS
CANT	CANTILEVER BEAM	L.D.H.	LONG DIMENSION HORIZONTAL
C.F.S.	COLD-FORMED STEEL	L.D.V.	LONG DIMENSION VERTICAL
COL	COLUMN	MAX	MAXIMUM
CONC	CONCRETE	MECH	MECHANICAL
CONT	CONTINUOUS	M.E.P.	MECHANICAL/ELECTRICAL/PLUMBING
D	DEEP	MIN	MINIMUM
DET	DETAIL	N.S.	NEAR SIDE
DWGS	DRAWINGS	N.T.S.	NOT TO SCALE
EA	EACH	O.C.	ON CENTER
E.F.	EACH FACE	O.P.H.	OPPOSITE HAND
ELEV	ELEVATION	P.A.F.	POWDER ACTUATED FASTENER
EMBED	MINIMUM EMBEDMENT DEPTH INTO SUBSTRATE	P.E.M.B.	PRE-ENGINEERED METAL BUILDING
E.O.S.	EDGE OF SLAB	PL	PLATE
E.W.	EACH WAY	R	RADIUS
EX	EXISTING	REINF	REINFORCEMENT
EXP	EXPANSION	R.T.U.	ROOF TOP UNIT (MECHANICAL)
F.F.E.	FINISHED FLOOR ELEVATION	SIM	SIMILAR
F.S.	FAR SIDE	S.O.G.	SLAB ON GRADE
FTG	FOOTING	TYP	TYPICAL
F.V.	FIELD VERIFY	U.N.O.	UNLESS NOTED OTHERWISE
		VERT	VERTICAL
		W	WIDE
		W.W.F.	WELDED WIRE FABRIC

MATERIAL LEGEND

RECESSED FLOOR

CRUSHED STONE

NATIVE EARTH / ENGINEERED FILL

CONCRETE

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STATE OF KENTUCKY — STEPHEN C. APHINSON — 19755 — LICENSED PROFESSIONAL ENGINEER

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VERSAILLES, KENTUCKY

University of Kentucky

STRUCTURAL

PROJECT	201918
DATE	4-16-21

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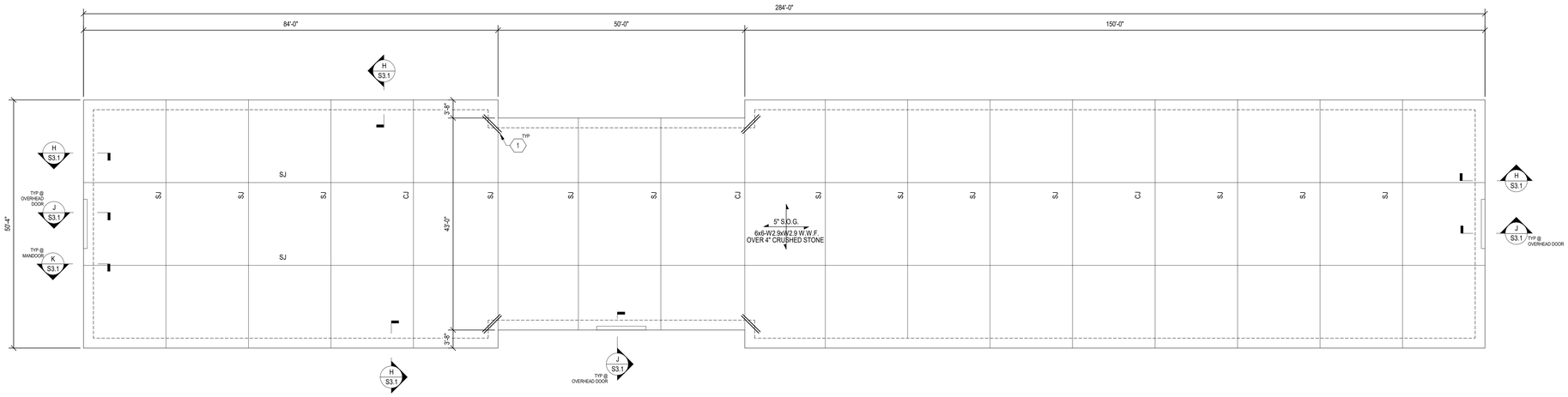
GENERAL NOTES

S1.1

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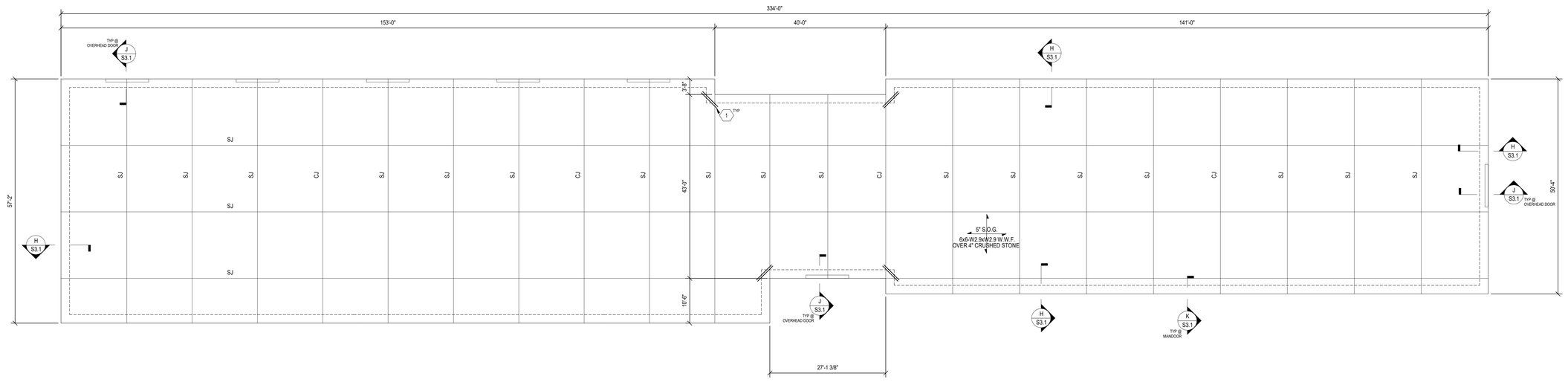
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A S2.1 NUTRITIONAL STUDIES BUILDING FOUNDATION PLAN

3/32" = 1'-0"



B S2.1 LAYER/BREEDER BUILDING FOUNDATION PLAN

3/32" = 1'-0"

FOUNDATION PLAN NOTES

1. SEE DWG S1.1 FOR GENERAL NOTES.
2. SEE DWGS S3.1 FOR TYPICAL FOUNDATION DETAILS.
3. SLAB ON GRADE SHALL BE PLACED ON VAPOR RETARDER (SEE SPECIFICATIONS) OVER 4" MINIMUM CONSOLIDATED CRUSHED STONE.
4. REINFORCE SLABS ON GRADE AT RE-ENTRANT CORNERS PER DETAIL C/S3.1. REINFORCING BARS MAY NOT BE SHOWN GRAPHICALLY ON PLAN IN ALL LOCATIONS.
5. ALL TURN DOWN SLABS MUST BE SUPPORTED ON UNDISTURBED SOIL CAPABLE OF SUPPORTING DESIGN LOADS WITHOUT APPRECIABLE SETTLEMENT. CONTRACTOR SHALL PROBE BEARING STRATA WITH DRIVEN RODS, REMOVE SHALLOW BEDROCK (AND OVERLYING SOIL) WITHIN ONE FOOT BELOW BOTTOM OF TURN DOWN SLAB, AND REPLACE WITH COMPACTED LEAN CLAY OR DGA.
6. THE SITE CONSISTS OF FAT CLAYS WHICH ARE UNSUITABLE FOR CONSTRUCTION. THEREFORE, LIME STABILIZATION IS REQUIRED WITHIN THE BUILDING FOOTPRINTS. SEE SPECIFICATIONS.
7. ALL SJ AND CJ TO RECEIVE JOINT FILLER/SEALANT. SEE SPECIFICATIONS.
8. THE SLAB SHALL BE WET CURED. SEE SPECIFICATIONS.
9. BUILDING SUPPLIER IS RESPONSIBLE FOR ALL COMPONENTS OF MEP SYSTEMS INCLUDING STRUCTURAL SUPPORT AND FOUNDATIONS DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF KENTUCKY.
10. SLAB ON GRADE SHALL BE SLOPED FOR DRAINAGE. SEE ARCHITECTURAL DRAWINGS FOR ELEVATIONS, SLOPES, DRAIN LOCATIONS, ETC. REINFORCE SLABS AROUND DRAINS PER DETAIL G/S3.1.

FOUNDATION LEGEND

SJ = SAWN CONTRACTION JOINT. SEE DETAIL D/S3.1.

CJ = CONSTRUCTION JOINT. SEE DETAIL D/S3.1.

TAG NOTES

1 RE-ENTRANT BARS. SEE DETAIL C/S3.1.

IMPORTANT BUILDING DELEGATED DESIGN NOTES:

1. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL ELEMENTS REQUIRED FOR A COMPLETE BUILDING STRUCTURE SHALL BE DESIGNED, SUPPLIED, AND INSTALLED BY THE BUILDING DESIGN CONTRACTOR.
2. CONCRETE CONTRACTOR SHALL SUPPLY HARDWARE FOR BUILDING ATTACHMENT TO THE FOUNDATION. CONCRETE FOUNDATION INSTALLER SHALL INSTALL HARDWARE FOR BUILDING ATTACHMENT TO THE FOUNDATION. HARDWARE SHALL BE DESIGNED BY THE BUILDING MANUFACTURER AND COORDINATED BY THE CONSTRUCTION MANAGER.
3. SEE ARCH DWGS FOR BUILDING ELEMENT ELEVATIONS AND LOCATIONS THAT ARE NOT SHOWN ON STRUCTURAL DWGS.
4. SEE ARCH DWGS AND SPECIFICATIONS FOR INFORMATION ABOUT ROOF DECK AND METAL WALL PANELS.
5. PURLINS AND WIND GIRT SPACING AND QUANTITY ARE NOT SHOWN ON STRUCTURAL DWG AND SHALL BE PER BUILDING DESIGN.
6. ROOFING SHALL BE DESIGNED AND SUPPLIED BY BUILDING MANUFACTURER. ROOFING SHALL BE INSTALLED BY BUILDING INSTALLER.
7. ROOF DIAPHRAGM BRACING IS REQUIRED AS DESIGNED BY BUILDING SUPPLIER.
8. SEE GENERAL NOTES FOR STRUCTURAL SYSTEM SUBSTITUTION REQUIREMENTS.

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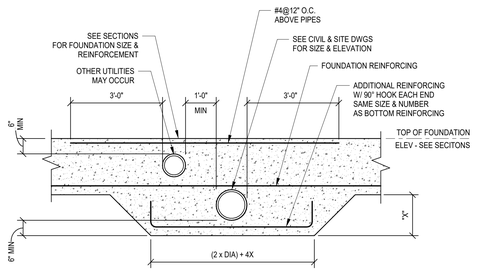
FOUNDATION PLANS

S2.1

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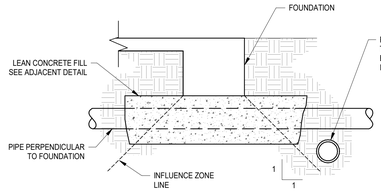
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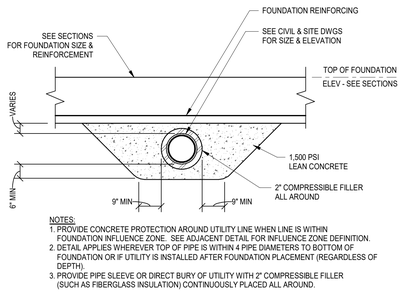


NOTE:
1. PROVIDE PIPE SLEEVE OR DIRECT BURY OF UTILITY WITH 2" COMPRESSIBLE FILLER (SUCH AS FIBERGLASS INSULATION) CONTINUOUSLY PLACED ALL AROUND.

A S3.1 TYPICAL FOUNDATION PENETRATION/SLEEVE DETAIL
NOT TO SCALE

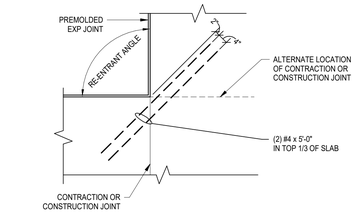


INFLUENCE ZONE



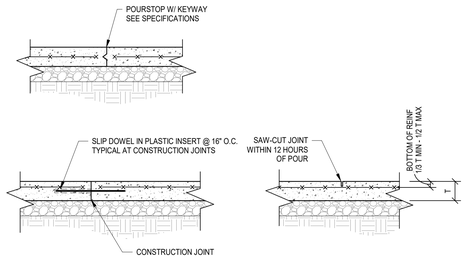
NOTES:
1. PROVIDE CONCRETE PROTECTION AROUND UTILITY LINE WHEN LINE IS WITHIN FOUNDATION INFLUENCE ZONE. SEE ADJACENT DETAIL FOR INFLUENCE ZONE DEFINITION.
2. DETAIL APPLIES WHEREVER TOP OF PIPE IS WITHIN 4 PIPE DIAMETERS TO BOTTOM OF FOUNDATION OR IF UTILITY IS INSTALLED AFTER FOUNDATION PLACEMENT (REGARDLESS OF DEPTH).
3. PROVIDE PIPE SLEEVE OR DIRECT BURY OF UTILITY WITH 2" COMPRESSIBLE FILLER (SUCH AS FIBERGLASS INSULATION) CONTINUOUSLY PLACED ALL AROUND.

B S3.1 TYPICAL UTILITY LINE BELOW FOUNDATION DETAIL
NOT TO SCALE



C S3.1 TYPICAL SLAB ON GRADE JOINT AT RE-ENTRANT CORNER
NOT TO SCALE

NOTE:
STAY-IN-PLACE POURSTOP W/ KEYWAY
MAY BE USED FOR SIMULTANEOUS CONCRETE
POURS OF MAXIMUM 30,000 SQ FT AREA
OR 200 FT LENGTH.

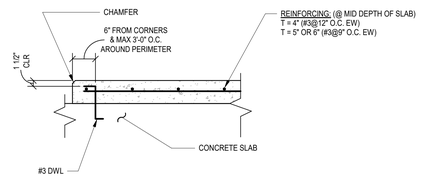


CONSTRUCTION JOINT

SAWN CONTRACTION JOINT

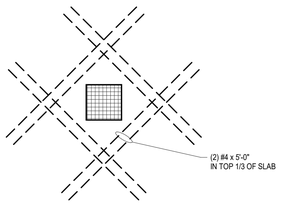
NOTES:
1. JOINTS SHALL BE INSTALLED IN SLABS ON GROUND AT A MAXIMUM SPACING IN FEET OF 3 TIMES THE SLAB THICKNESS IN INCHES IN EACH DIRECTION BY EITHER OF THE ABOVE METHODS. MAXIMUM LENGTH OF ANY SLAB ON GROUND POUR TO BE 100'-0" BETWEEN CONSTRUCTION JOINTS. RATIO OF LENGTH TO WIDTH SHALL NOT EXCEED 2. THIS SPACING OF JOINTS SHALL APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE.
2. REINFORCING SHALL BE DISCONTINUOUS THROUGH CONSTRUCTION JOINTS.

D S3.1 SLAB ON GROUND JOINT DETAIL
NOT TO SCALE

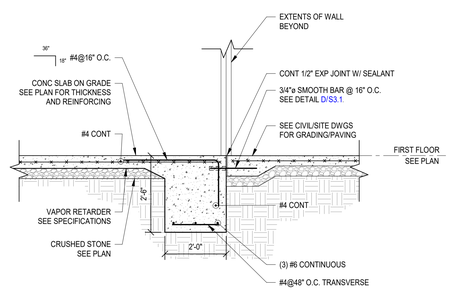


NOTES:
1. BASE SLAB PREPARATION NEW CONSTRUCTION: CLEAN SLAB & WET DOWN PRIOR TO POURING PAD.
2. SEE MECH DWGS FOR HOUSEKEEPING PAD LOCATIONS AND DIMENSIONS.

F S3.1 MECHANICAL HOUSEKEEPING PAD DETAIL
NOT TO SCALE

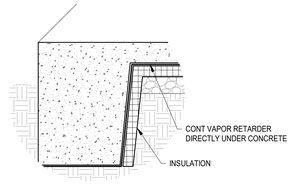


G S3.1 TYPICAL SLAB REINFORCEMENT AT FLOOR BOXES, TRENCH DRAINS, ETC DETAIL
NOT TO SCALE

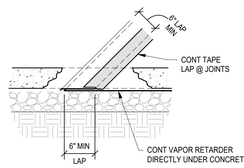


K S3.1 SECTION @ MANDOOR
1/2" = 1'-0"

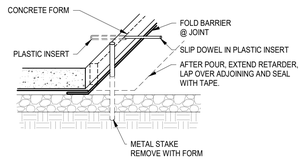
NOTES:
1. PROVIDE VAPOR RETARDER THAT IS RESISTANT TO DETERIORATION WHEN TESTED ACCORDING TO ASTM E 154. SEE SPECIFICATION SECTION 033000.
2. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION.
3. SEAL ALL PENETRATIONS AND REPAIR ALL DAMAGED SURFACES WITH APPROVED JOINT TAPE OR MASTIC.
4. PREPARE ALL SURFACES FOR PROPER ADHESION WITH APPROVED TAPE. ALL SURFACES SHALL BE CLEAN, DRY, AND FROST FREE.
5. TURN UP BARRIER AT ALL EXTERIOR OR INTERIOR WALL SURFACES AND SEAL WITH APPROVED TAPE.



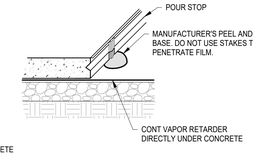
TYPICAL @ TURNED DOWN SLAB



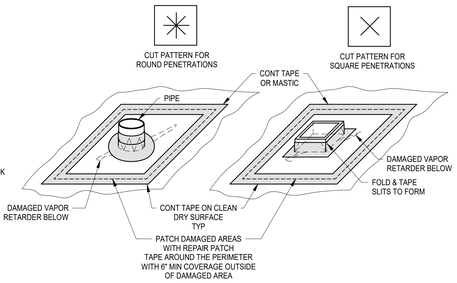
TYPICAL @ SEAM



TYPICAL DIVIDED POUR
@ CONSTRUCTION JOINT

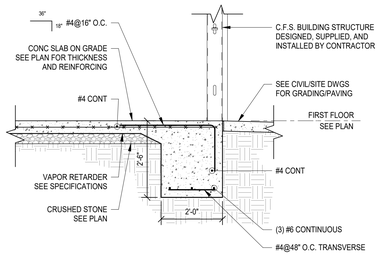


OPTIONAL SIMULTANEOUS POUR
@ CONSTRUCTION JOINT

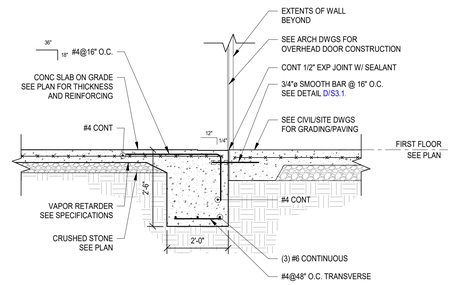


TYPICAL PIPE REPAIR TYPICAL RECTANGULAR REPAIR

E S3.1 TYPICAL VAPOR RETARDER DETAILS
NOT TO SCALE



H S3.1 SECTION
1/2" = 1'-0"



J S3.1 SECTION @ OVERHEAD DOOR
1/2" = 1'-0"

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FOUNDATION DETAILS & SECTIONS

S3.1

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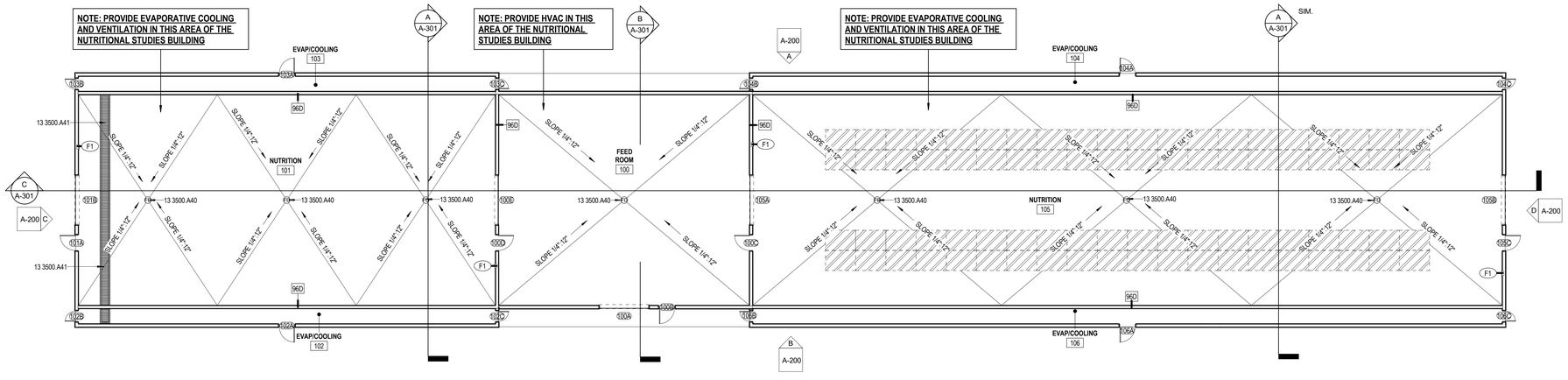
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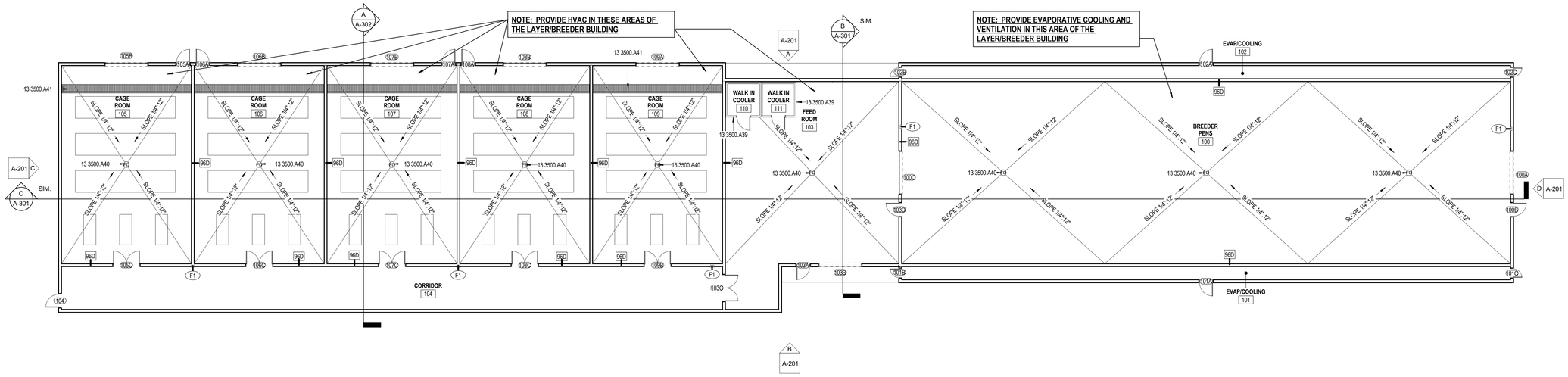
KEYNOTE LEGEND	
KEY VALUE	**KEYNOTE DESCRIPTION**
13 3500.A39	PRE-FABRICATED COOLER BY COOLER MFR (N.I.C.)
13 3500.A40	SLOPE FLOOR 1/4"-12" TO FLOOR DRAINS, TYP. - REFER TO PLUMBING
13 3500.A41	FLOOR AUGER SYSTEM BY MTL. BLDG. MFR.

GENERAL NOTES - FLOOR PLANS

1. REFER TO PARTITION TYPE DETAILS FOR WALL TYPES INDICATED.
2. REFER TO FINISH PLANS FOR FLOOR FINISH AND WALL FINISH.
3. REFER TO REFLECTED CEILING PLANS FOR CEILING TYPES AND CEILING HEIGHTS.
4. REFER TO FRAME TYPES FOR WINDOW & DOOR FRAME TYPES SHOWN.
5. REFER TO ENLARGED PLANS FOR ADDITIONAL PARTITION TYPE TAGS AND EQUIPMENT TAGS NOT SHOWN ON 3/32" SCALE PLANS.



A NUTRITIONAL STUDIES BUILDING - CALLOUTS
3/32" = 1'-0"



B LAYER/BREEDER BUILDING FLOOR PLAN - CALLOUTS
3/32" = 1'-0"

JRA architects
3225 Summit Square Place, Suite 200
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VERSAILLES, KENTUCKY

University of Kentucky

ARCHITECTURAL

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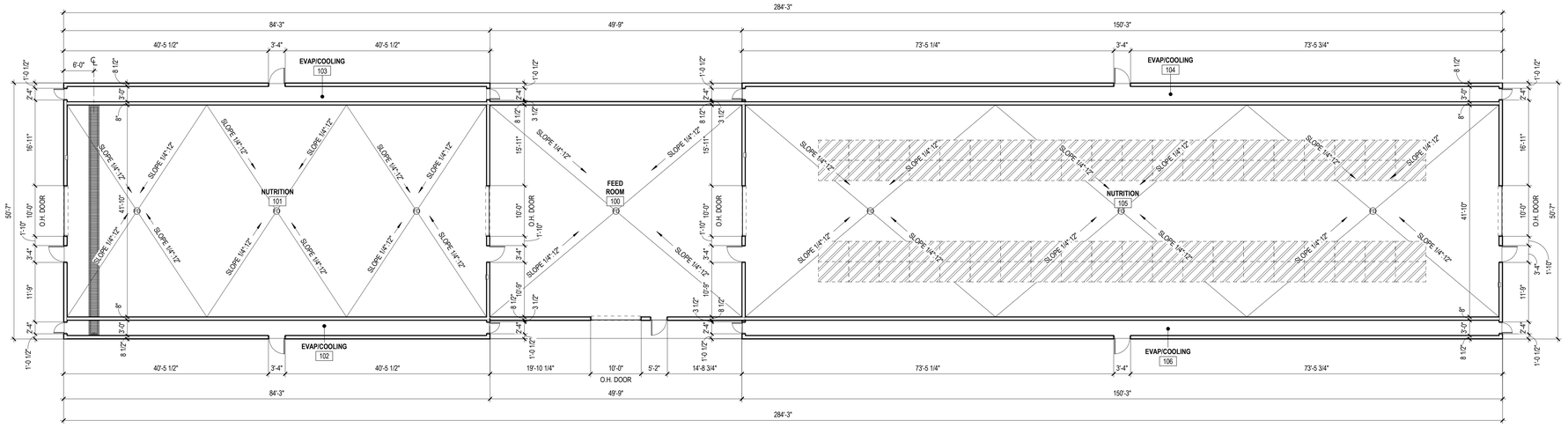
CALLOUT FLOOR PLANS

A-100

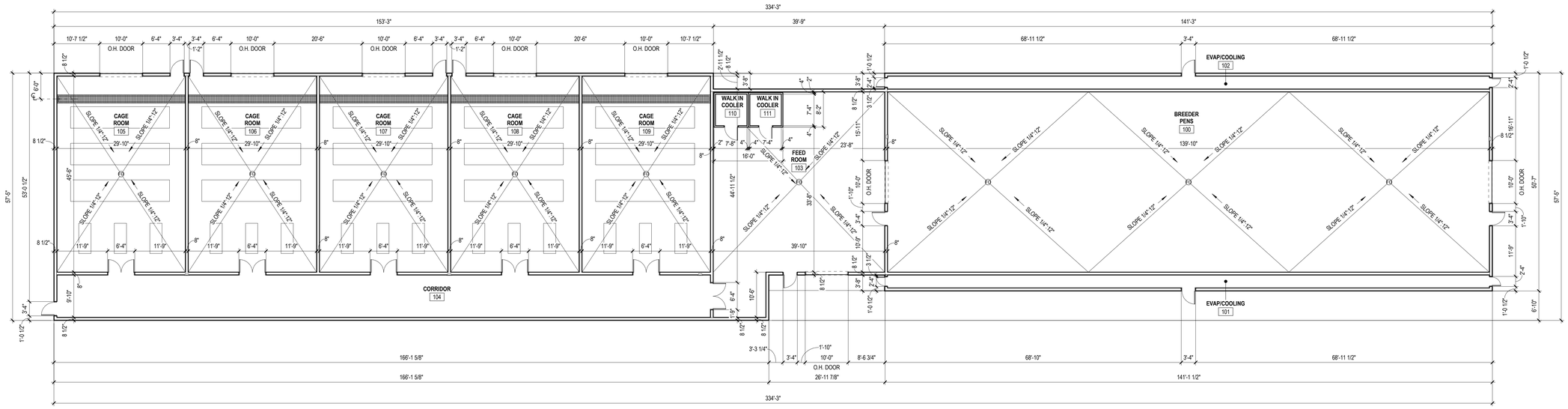
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A NUTRITIONAL STUDIES BUILDING DIMENSION PLAN
3/32" = 1'-0"



B LAYER/BREEDER BUILDING DIMENSION PLAN
3/32" = 1'-0"

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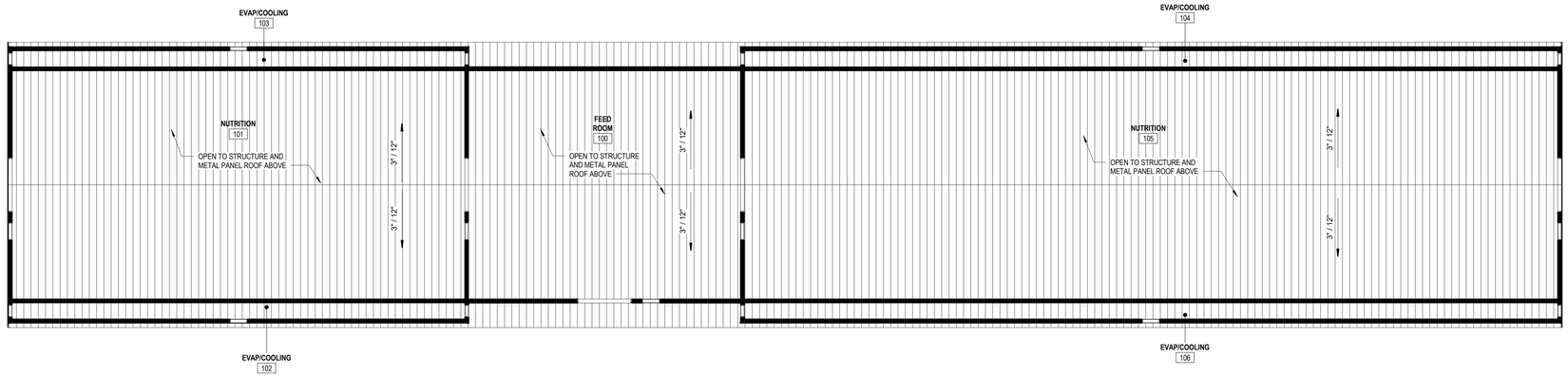
DIMENSION FLOOR PLANS

A-101

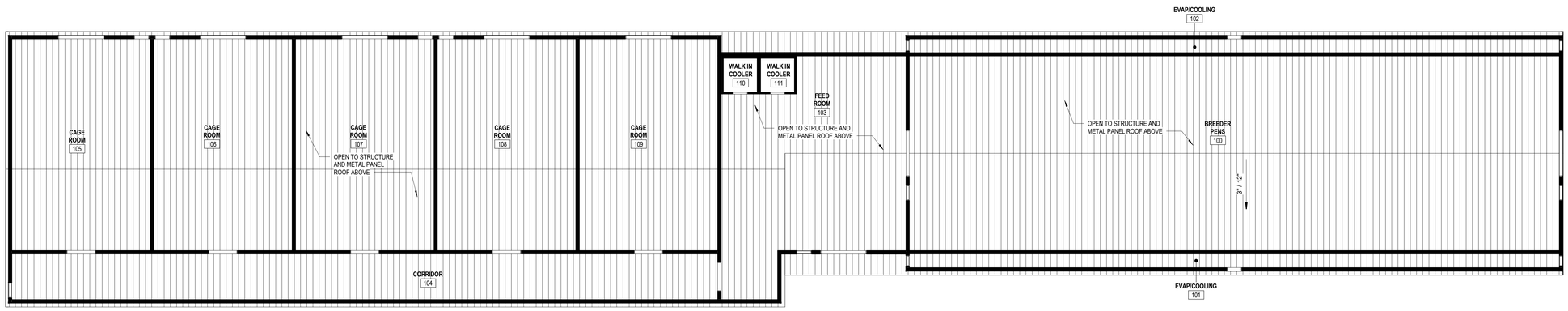
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A NUTRITIONAL STUDIES BUILDING REFLECTTED CEILING PLAN
3/32" = 1'-0"



B LAYER/BREEDER BUILDING REFLECTED CEILING PLAN
3/32" = 1'-0"

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REFLECTED CEILING PLANS

A-102

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ROOM FINISH SCHEDULE

NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	CEILING FINISH	Comments
LAYER / BREEDER BUILDING						
100	BREEDER PENS	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
101	EVAP/COOLING	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
102	EVAP/COOLING	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
103	FEED ROOM	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
104	CORRIDOR	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
105	CAGE ROOM	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
106	CAGE ROOM	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
107	CAGE ROOM	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
108	CAGE ROOM	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
109	CAGE ROOM	S.C.		METAL PANEL	METAL PANEL	LAYER / BREEDER BUILDING
110	WALK IN COOLER	S.C.		PRE-FAB COOLER WALLS	PRE-FAB	LAYER / BREEDER BUILDING
111	WALK IN COOLER	S.C.		PRE-FAB COOLER WALLS	PRE-FAB	LAYER / BREEDER BUILDING
NUTRITIONAL STUDIES BUILDING						
100	FEED ROOM	S.C.		METAL PANEL	METAL PANEL	NUTRITIONAL STUDIES BUILDING
101	NUTRITION	S.C.		METAL PANEL	METAL PANEL	NUTRITIONAL STUDIES BUILDING
102	EVAP/COOLING	S.C.		METAL PANEL	METAL PANEL	NUTRITIONAL STUDIES BUILDING
103	EVAP/COOLING	S.C.		METAL PANEL	METAL PANEL	NUTRITIONAL STUDIES BUILDING
104	EVAP/COOLING	S.C.		METAL PANEL	METAL PANEL	NUTRITIONAL STUDIES BUILDING
105	NUTRITION	S.C.		METAL PANEL	METAL PANEL	NUTRITIONAL STUDIES BUILDING
106	EVAP/COOLING	S.C.		METAL PANEL	METAL PANEL	NUTRITIONAL STUDIES BUILDING

INTERIOR FLOOR FINISH LEGEND

S.C.	SEALED CONCRETE

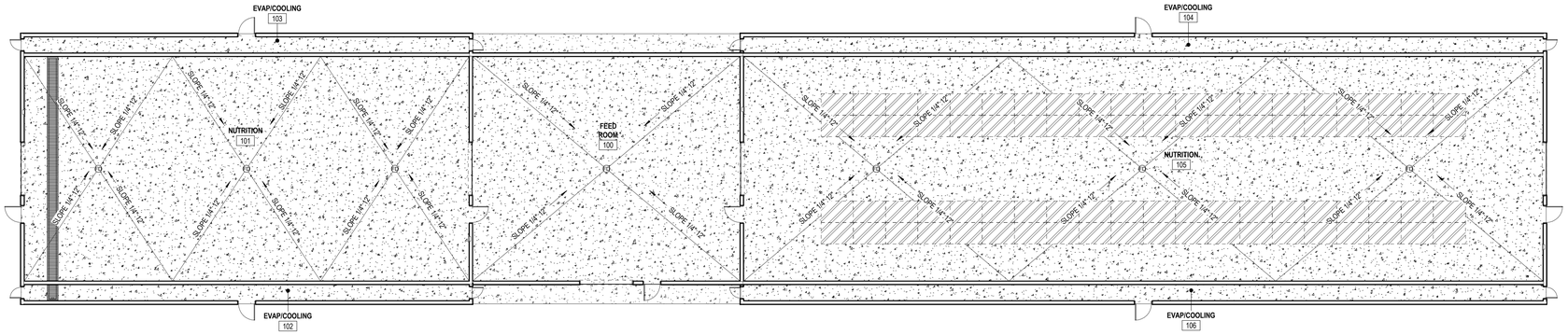
GENERAL NOTES - FINISHES

A REFER TO FINISH PLANS, REFLECTED CEILING PLANS, INTERIOR ELEVATIONS, ROOM FINISH SCHEDULE, & FINISH MATERIAL SCHEDULE FOR FINISH MATERIAL LOCATIONS & INFORMATION.

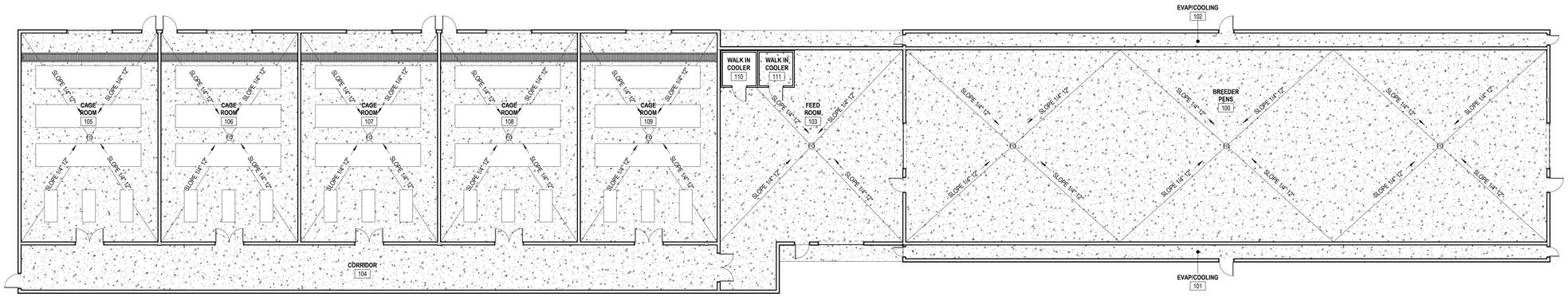
B PAINT HOLLOW METAL DOORS, DOOR FRAMES AND LINTELS EXPOSED TO VIEW IN FINISHED AREAS AND AT EXTERIOR LOCATIONS UNLESS OTHERWISE INDICATED.

C PAINT GRILLES TO MATCH COLOR OF THE WALLS IN WHICH THEY ARE LOCATED, UNLESS NOTED OTHERWISE.

D FINISH SOFFITS, BULKHEADS, AND SIMILAR CONDITIONS TO MATCH SURROUNDING SURFACES UNLESS OTHERWISE INDICATED.



A NUTRITIONAL STUDIES BUILDING - FINISH PLAN
3/32" = 1'-0"



B LAYER/BREEDER BUILDING FLOOR PLAN - FINISH PLAN
3/32" = 1'-0"

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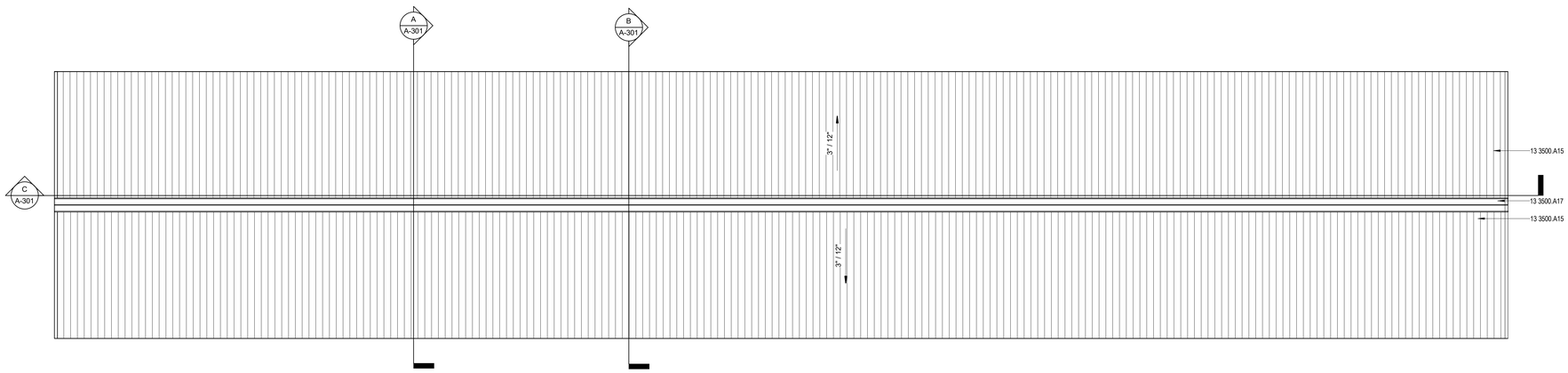
FINISH FLOOR PLAN

A-103

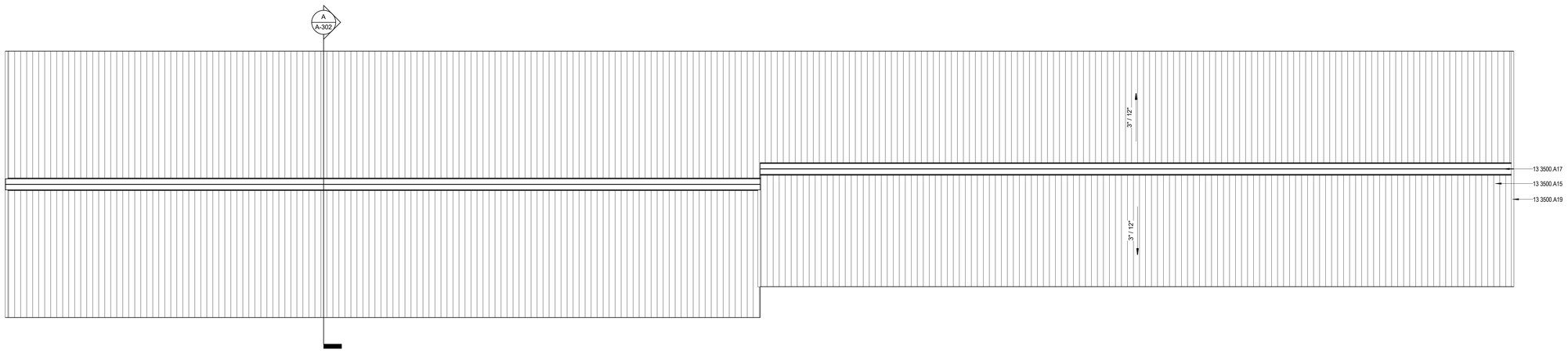
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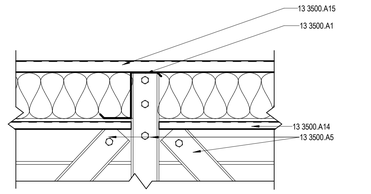


A NUTRITIONAL STUDIES BUILDING
3/32" = 1'-0"

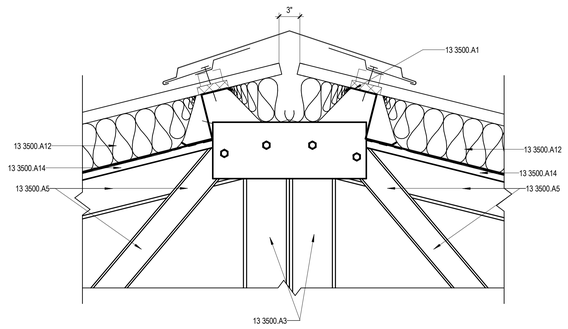


B LAYER/BREEDER BUILDING
3/32" = 1'-0"

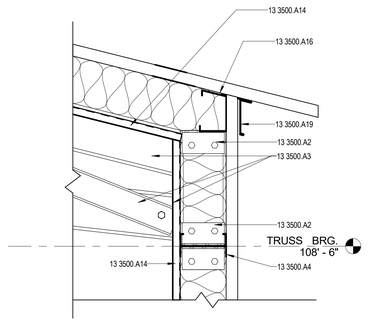
KEYNOTE LEGEND	
KEY VALUE	**KEYNOTE DESCRIPTION**
13 3500.A1	COLD-FORMED METAL Z PURLIN, PROVIDED BY MTL. BLDG. MFR.
13 3500.A2	COLD-FORMED METAL CLIP ANGLE BY MTL. BLDG. MFR.
13 3500.A3	COLD FORMED MTL. STUD @ 16" O.C. , GIRT, AND FIBERGLASS LAMINATED INSULATION PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A4	COLD FORMED METAL STUD RUNNER CHANNEL @ 16" O.C., PROVIDED BY MTL. BLDG. MFR.
13 3500.A5	COLD FORMED MTL. SCISSOR TRUSS @ 24" O.C. PROVIDED BY MTL. BLDG. MFR.
13 3500.A12	BLANKET INSULATION
13 3500.A14	CORRUGATED GALVANIZED STEEL METAL BUILDING WALL PANELS EXTERIOR & INTERIOR, PROVIDED BY MTL. BLDG MFR.
13 3500.A15	CORRUGATED GALVANIZED MTL. BUILDING ROOF PANELS EXTERIOR & INTERIOR, PROVIDED BY MTL. BLDG. MFR.
13 3500.A16	COLD FORMED MTL. EAVE STRUT PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A17	PRE-FINISHED MTL. RIDGE VENT, PROVIDED BY MTL. BLDG. MFR.
13 3500.A19	PRE-FINISHED MTL. RAKE TRIM W/ DRIP EDGE PROVIDED BY POULTRY MTL. BLDG. MFR.



C ROOF DETAIL - TYP.
1 1/2" = 1'-0"



D RIDGE VENT DETAIL - TYP.
1 1/2" = 1'-0"



E ROOF DETAIL - TYP.
1 1/2" = 1'-0"

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ROOF PLANS

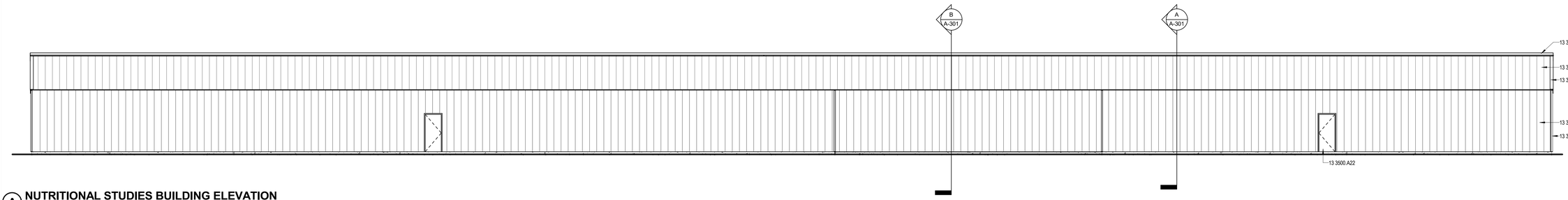
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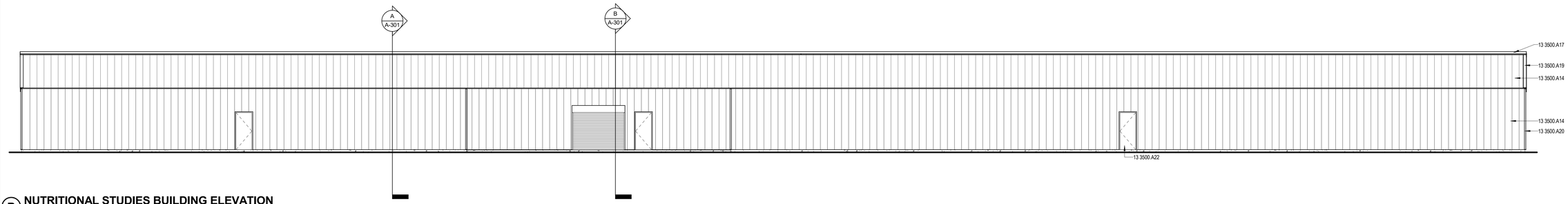
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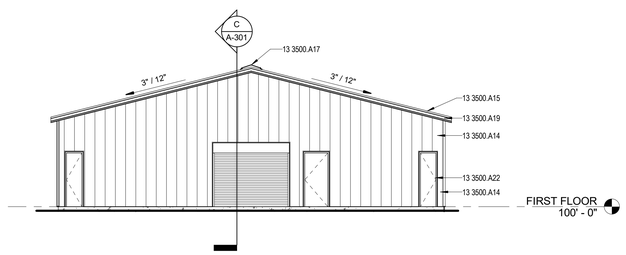
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KEY VALUE	**KEYNOTE DESCRIPTION**
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13 3500.A15	CORRUGATED GALVANIZED MTL. BUILDING ROOF PANELS EXTERIOR & INTERIOR, PROVIDED BY MTL. BLDG. MFR.
13 3500.A17	PRE-FINISHED MTL. RIDGE VENT, PROVIDED BY MTL. BLDG. MFR.
13 3500.A19	PRE-FINISHED MTL. RAKE TRIM W/ DRIP EDGE PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A20	PRE-FINISHED MTL. OUTSIDE CORNER TRIM, PROVIDED BY BLDG. MFR.
13 3500.A22	DOOR AND FRAME, PROVIDED BY MTL. BLDG. MFR. - REFER TO DOOR SCHEDULE



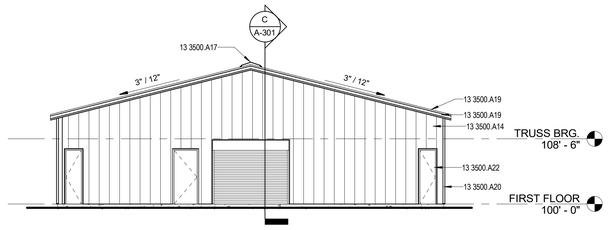
A NUTRITIONAL STUDIES BUILDING ELEVATION
1/8" = 1'-0"



B NUTRITIONAL STUDIES BUILDING ELEVATION
1/8" = 1'-0"



C NUTRITIONAL STUDIES BUILDING ELEVATION
1/8" = 1'-0"



D NUTRITIONAL STUDIES BUILDING ELEVATION
1/8" = 1'-0"

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13 3500.A14
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NUTRITIONAL STUDIES BUILDING EXTERIOR ELEVATIONS

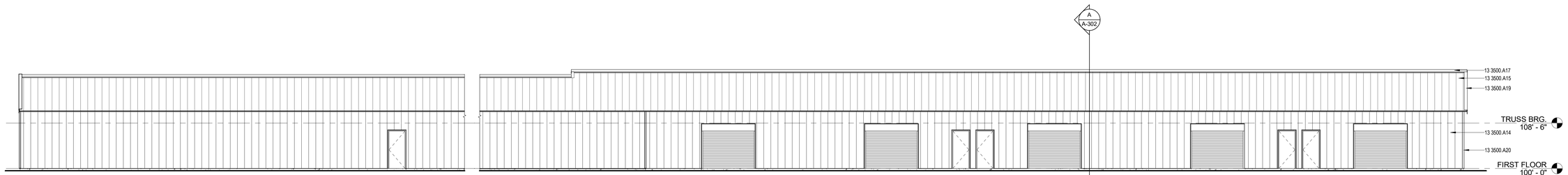
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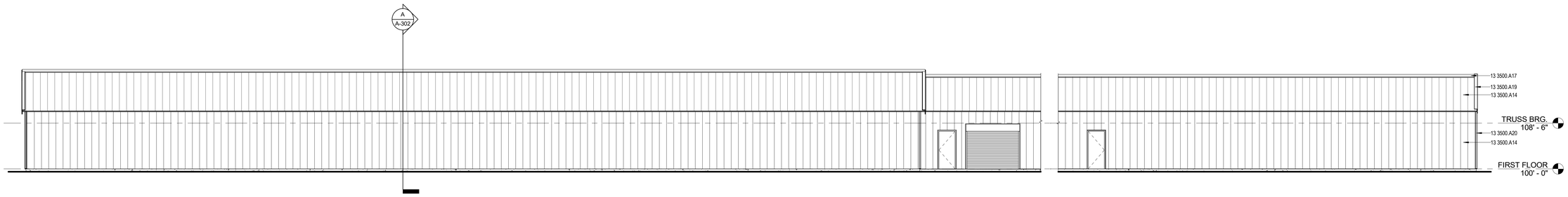
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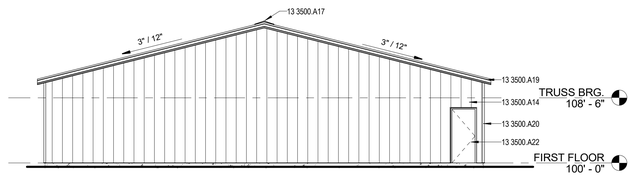
KEYNOTE LEGEND	
KEY VALUE	**KEYNOTE DESCRIPTION**
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13 3500.A20	PRE-FINISHED MTL. OUTSIDE CORNER TRIM, PROVIDED BY BLDG. MFR.
13 3500.A22	DOOR AND FRAME, PROVIDED BY MTL. BLDG. MFR. - REFER TO DOOR SCHEDULE



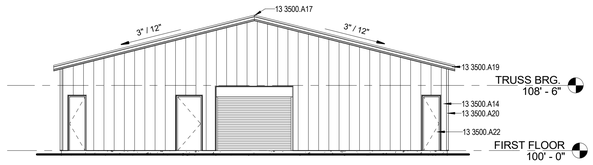
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1/8" = 1'-0"



B LAYER/BREEDER BUILDING ELEVATION
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C LAYER/BREEDER BUILDING ELEVATION
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JRA, INC. REGISTERED NO. 5994-6448 COMMONWEALTH OF KENTUCKY ARCHITECTS

RESERVED FOR AHJ STAMP

CONSTRUCTION DOCUMENTS

UK POULTRY RESEARCH FACILITY
1171 MIDWAY ROAD
VERSAILLES, KENTUCKY

University of Kentucky

ARCHITECTURAL

PROJECT	201918
DATE	4-16-21

REVISIONS

No.	Description	Date

JRA ARCHITECTS HAS RETAINED AN ELECTRONIC VERSION OF THESE DRAWINGS. THE CLIENT AGREES NOT TO REUSE THESE DRAWINGS, IN ELECTRONIC OR ANY OTHER FORMAT - IN WHOLE, OR IN PART, FOR ANY PURPOSE OTHER THAN FOR THE PROJECT. THE CLIENT AGREES NOT TO TRANSFER THESE ELECTRONIC FILES TO OTHERS WITHOUT THE PRIOR WRITTEN CONSENT OF THE ARCHITECT. THE CLIENT FURTHER AGREES TO WAIVE ALL CLAIMS AGAINST THE ARCHITECT RESULTING IN ANY WAY FROM ANY UNAUTHORIZED CHANGES TO OR REUSE OF THE ELECTRONIC FILES FOR ANY OTHER PROJECT BY ANYONE OTHER THAN THE ARCHITECT.

LAYER/BREEDER BUILDING EXTERIOR ELEVATIONS

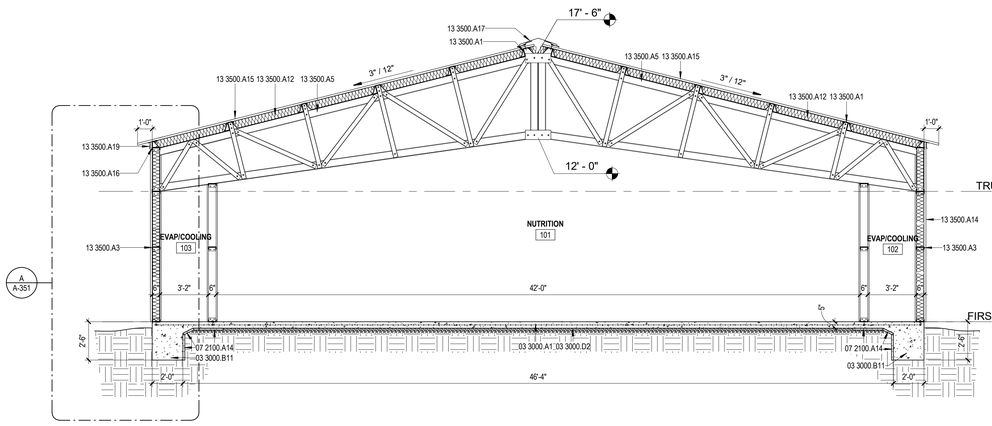
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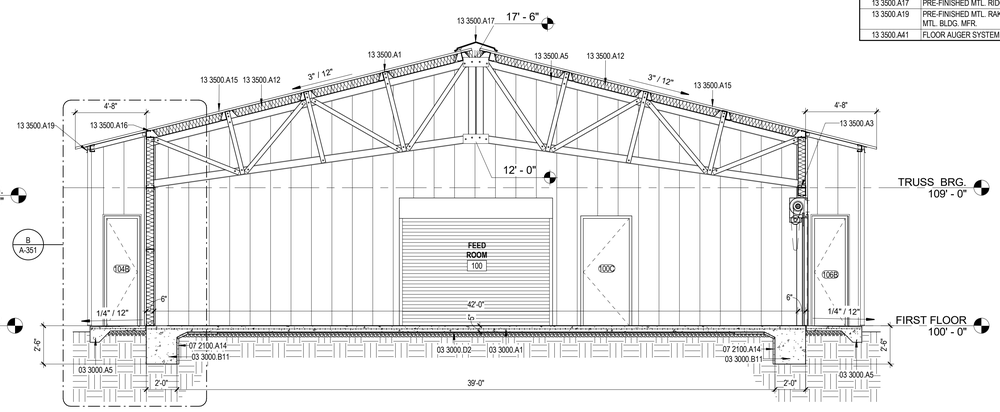
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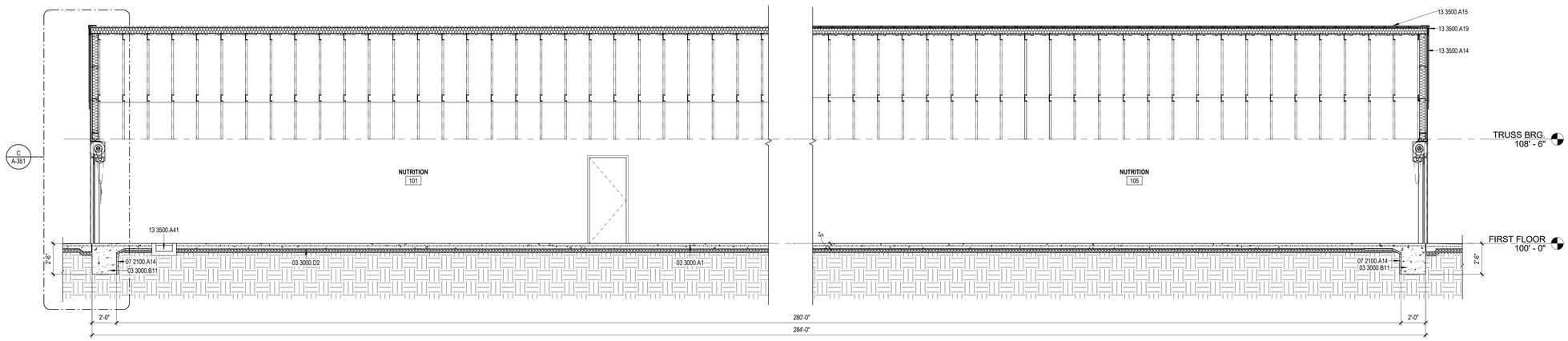
KEYNOTE LEGEND	
KEY VALUE	**KEYNOTE DESCRIPTION**
03 3000.A1	5" SLAB ON GRADE W/ WELDED WIRE FABRIC ON A MIN. 10 MIL POLYOLEFIN/RESIN VAPOR RETARDER OVER A MIN OF 4" CRUSHED STONE BASE - REFER TO STRUCT. DRAWINGS
03 3000.A5	SLOPED CONCRETE SLAB WITH TURN DOWN FOUNDATION OVER CRUSHED STONE - REFER TO STRUCTURAL
03 3000.B11	CONCRETE FOOTING - TURN DOWN SLAB, REFER TO STRUCT.
03 3000.D2	VAPOR BARRIER
07 2100.A14	2" RIGID INSULATION CONT. AT PERIMETER OF FOUNDATION, EXTEND 24" MIN. HORIZONTAL
13 3500.A1	COLD-FORMED METAL Z PURLIN, PROVIDED BY MTL. BLDG. MFR.
13 3500.A3	COLD FORMED MTL. STUD @ 16" O.C. , GIRT, AND FIBERGLASS LAMINATED INSULATION PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A5	COLD FORMED MTL. SCISSOR TRUSS @ 24" O.C. PROVIDED BY MTL. BLDG. MFR.
13 3500.A12	BLANKET INSULATION
13 3500.A14	CORRUGATED GALVANIZED STEEL METAL BUILDING WALL PANELS EXTERIOR & INTERIOR. PROVIDED BY MTL. BLDG MFR.
13 3500.A15	CORRUGATED GALVANIZED MTL. BUILDING ROOF PANELS EXTERIOR & INTERIOR, PROVIDED BY MTL. BLDG. MFR.
13 3500.A16	COLD FORMED MTL. EAVE STRUT PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A17	PRE-FINISHED MTL. RIDGE VENT, PROVIDED BY MTL. BLDG. MFR.
13 3500.A19	PRE-FINISHED MTL. RAKE TRIM W/ DRIP EDGE PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A41	FLOOR AUGER SYSTEM BY MTL. BLDG. MFR.



A BUILDING SECTION-NUTRITIONAL STUDIES BUILDING
1/4" = 1'-0"



B BUILDING SECTION - NUTRITIONAL STUDIES BUILDING
1/4" = 1'-0"



C BUILDING SECTION-NUTRITIONAL STUDIES BUILDING
1/4" = 1'-0"

JRA architects
3225 Summit Square Place, Suite 200
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859.252.6781

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CONSTRUCTION DOCUMENTS

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VERSAILLES, KENTUCKY

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BUILDING SECTIONS

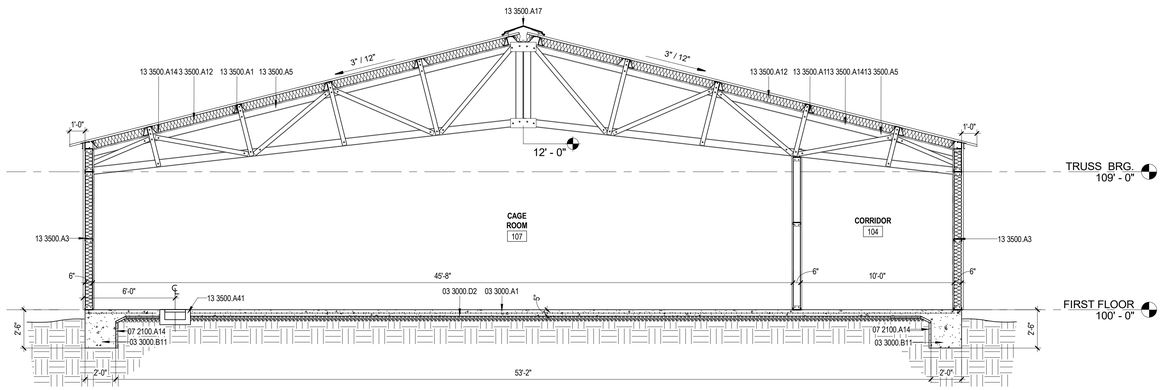
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KEYNOTE LEGEND	
KEY VALUE	**KEYNOTE DESCRIPTION**
03 3000.A1	5" SLAB ON GRADE W/ WELDED WIRE FABRIC ON A MIN. 10 MIL POLYOLEFIN/RESIN VAPOR RETARDER OVER A MIN OF 4" CRUSHED STONE BASE - REFER TO STRUCT. DRAWINGS
03 3000.B11	CONCRETE FOOTING - TURN DOWN SLAB, REFER TO STRUCT.
03 3000.D2	VAPOR BARRIER
07 2100.A14	2" RIGID INSULATION CONT. AT PERIMETER OF FOUNDATION, EXTEND 24" MIN. HORIZONTAL
13 3500.A1	COLD-FORMED METAL Z PURLIN, PROVIDED BY MTL. BLDG. MFR.
13 3500.A3	COLD FORMED MTL. STUD @ 16" O.C. , GIRT, AND FIBERGLASS LAMINATED INSULATION PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A5	COLD FORMED MTL. SCISSOR TRUSS @ 24" O.C. PROVIDED BY MTL. BLDG. MFR.
13 3500.A12	BLANKET INSULATION
13 3500.A14	CORRUGATED GALVANIZED STEEL METAL BUILDING WALL PANELS EXTERIOR & INTERIOR, PROVIDED BY MTL. BLDG MFR.
13 3500.A17	PRE-FINISHED MTL. RIDGE VENT, PROVIDED BY MTL. BLDG. MFR.
13 3500.A41	FLOOR AUGER SYSTEM BY MTL. BLDG. MFR.



A BUILDING SECTION - LAYER/BREEDER BUILDING
1/4" = 1'-0"

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859.252.6781

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BUILDING SECTIONS

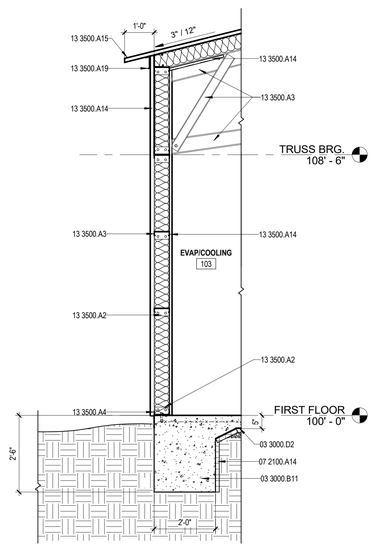
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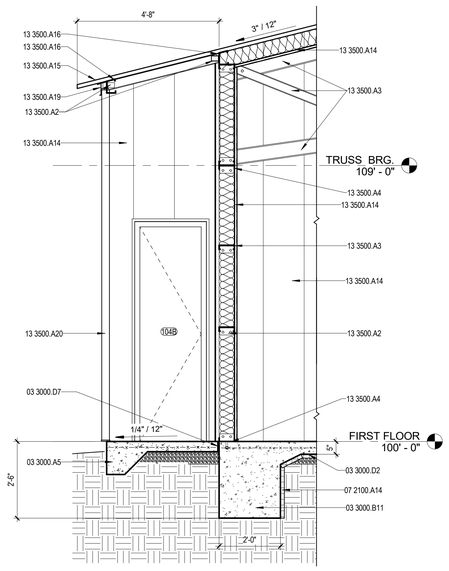
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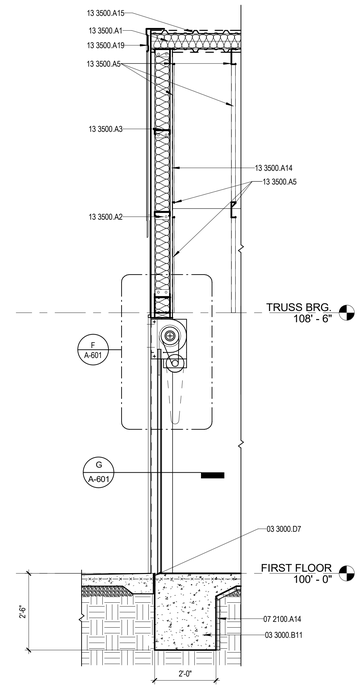
KEYNOTE LEGEND	
KEY VALUE	**KEYNOTE DESCRIPTION**
03 3000.A5	SLOPED CONCRETE SLAB WITH TURN DOWN FOUNDATION OVER CRUSHED STONE - REFER TO STRUCTURAL
03 3000.B11	CONCRETE FOOTING - TURN DOWN SLAB, REFER TO STRUCT.
03 3000.D2	VAPOR BARRIER
03 3000.D7	EXPANSION JOINT MATERIAL - SEE STRUCTURAL FOR REQUIRED THICKNESS
07 2100.A14	2" RIGID INSULATION CONT. AT PERIMETER OF FOUNDATION, EXTEND 24" MIN. HORIZONTAL
13 3500.A1	COLD-FORMED METAL Z PURLIN, PROVIDED BY MTL. BLDG. MFR.
13 3500.A2	COLD-FORMED METAL CLIP ANGLE BY MTL. BLDG MFR.
13 3500.A3	COLD FORMED MTL. STUD @ 16" O.C. , GIRT, AND FIBERGLASS LAMINATED INSULATION PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A4	COLD FORMED METAL STUD RUNNER CHANNEL @ 16" O.C., PROVIDED BY MTL. BLDG. MFR.
13 3500.A5	COLD FORMED MTL. SCISSOR TRUSS @ 24" O.C. PROVIDED BY MTL. BLDG. MFR.
13 3500.A14	CORRUGATED GALVANIZED STEEL METAL BUILDING WALL PANELS EXTERIOR & INTERIOR, PROVIDED BY MTL. BLDG MFR.
13 3500.A15	CORRUGATED GALVANIZED MTL. BUILDING ROOF PANELS EXTERIOR & INTERIOR, PROVIDED BY MTL. BLDG. MFR.
13 3500.A16	COLD FORMED MTL. EAVE STRUT PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A19	PRE-FINISHED MTL. RAKE TRIM W/ DRIP EDGE PROVIDED BY POULTRY MTL. BLDG. MFR.
13 3500.A20	PRE-FINISHED MTL. OUTSIDE CORNER TRIM, PROVIDED BY BLDG. MFR.



A WALL SECTION
1/2" = 1'-0"



B WALL SECTION
1/2" = 1'-0"



C WALL SECTION
1/2" = 1'-0"

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WALL SECTIONS

A-351

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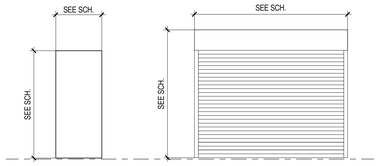
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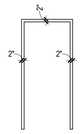
DOOR AND FRAME SCHEDULE - NUTRITIONAL STUDIES

NO.	DOORS PAIR	SIZE LEAF 1 WIDTH	SIZE LEAF 2 WIDTH	SIZE HEIGHT	SIZE THICK.	MAT'L.	TYPE	GLAZ.	FRAMES MAT'L.	TYPE	DETAILS JAMB	DETAILS HEAD	DETAILS THRESH.	HARDWARE CLOSER	HARDWARE SET NO.	RATING (MIN.)	REMARKS
100A	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--	GALV. STL.	-	G/A-601	F/A-601	PER MFR.	--	--	0	NUTRITIONAL STUDIES
100B	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
100C	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	PER MFR.	--	--	0	NUTRITIONAL STUDIES
100D	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	-	--	--	0	NUTRITIONAL STUDIES
100E	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--	GALV. STL.	-	G/A-601	F/A-601	PER MFR.	--	--	0	NUTRITIONAL STUDIES
101A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
101B	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--	GALV. STL.	-	G/A-601	F/A-601	PER MFR.	--	--	0	NUTRITIONAL STUDIES
102A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
102B	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
102C	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
103A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
103B	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
103C	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
104A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	PER MFR.	--	--	0	NUTRITIONAL STUDIES
104B	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
104C	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	PER MFR.	--	--	0	NUTRITIONAL STUDIES
105A	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--	GALV. STL.	-	G/A-601	F/A-601	PER MFR.	--	--	0	NUTRITIONAL STUDIES
105B	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--	GALV. STL.	-	G/A-601	F/A-601	PER MFR.	--	--	0	NUTRITIONAL STUDIES
105C	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
106A	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
106B	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES
106C	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	NUTRITIONAL STUDIES

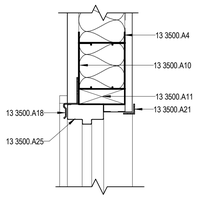
DOOR AND FRAME SCHEDULE - LAYER / BREEDER BUILDING

NO.	DOORS PAIR	SIZE LEAF 1 WIDTH	SIZE LEAF 2 WIDTH	SIZE HEIGHT	SIZE THICK.	MAT'L.	TYPE	GLAZ.	FRAMES MAT'L.	TYPE	DETAILS JAMB	DETAILS HEAD	DETAILS THRESH.	HARDWARE CLOSER	HARDWARE SET NO.	RATING (MIN.)	REMARKS
100A	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--	GALV. STL.	-	G/A-601	F/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
100B	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
100C	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--	GALV. STL.	-	G/A-601	F/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
101A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F		GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
101B	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
101C	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
102A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F		GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
102B	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
102C	--	2' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
103A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
103B	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--	GALV. STL.	-	G/A-601	F/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
103C	PR.	3' - 0"	3' - 0"	7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	-	--	--	0	LAYER / BREEDER BUILDING
103D	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	-	--	--	0	LAYER / BREEDER BUILDING
104	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
105A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F				D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
105B	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--			G/A-601	F/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
105C	PR.	3' - 0"	3' - 0"	7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	-	--	--	0	LAYER / BREEDER BUILDING
106A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F				D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
106B	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--			G/A-601	F/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
106C	PR.	3' - 0"	3' - 0"	7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	-	--	--	0	LAYER / BREEDER BUILDING
107A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F				D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
107B	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--			G/A-601	F/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
107C	PR.	3' - 0"	3' - 0"	7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	-	--	--	0	LAYER / BREEDER BUILDING
108A	--	3' - 0"		7' -0"	1 3/4"	GALV. H.M.	F				D/A-601	C/A-601	E/A-601	--	--	0	LAYER / BREEDER BUILDING
108B	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--			G/A-601	F/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
108C	PR.	3' - 0"	3' - 0"	7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	-	--	--	0	LAYER / BREEDER BUILDING
109A	--	10' - 0"		7' -0"	1 3/4"	GALV. STL.	RC	--			G/A-601	F/A-601	PER MFR.	--	--	0	LAYER / BREEDER BUILDING
109B	PR.	3' - 0"	3' - 0"	7' -0"	1 3/4"	GALV. H.M.	F	--	GALV. H.M.	1	I/A-601	H/A-601	-	--	--	0	LAYER / BREEDER BUILDING

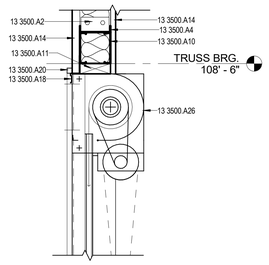




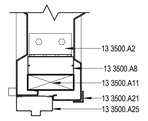
A DOOR TYPES
1/4" = 1'-0"



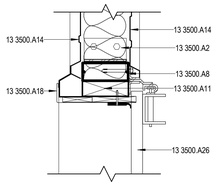
B DOOR FRAME TYPES
1/4" = 1'-0"



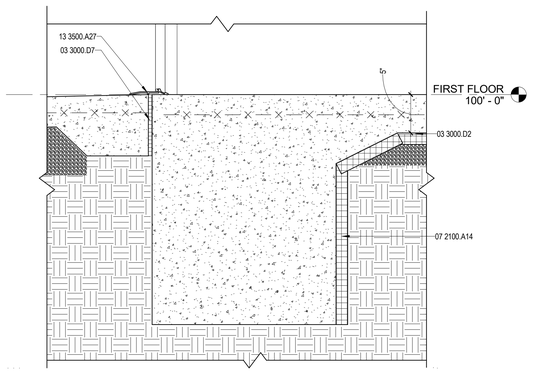
C HEAD DETAIL - EXTERIOR, TYP.
1 1/2" = 1'-0"



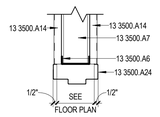
F OVERHEAD DOOR HEAD DETAIL
1" = 1'-0"



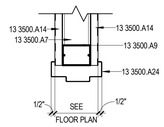
D JAMB DETAIL - EXTERIOR, TYP.
1 1/2" = 1'-0"



G OVERHEAD DOOR JAMB DETAIL
1 1/2" = 1'-0"



H HEAD DETAIL - INTERIOR,TYP.
1 1/2" = 1'-0"



E THRESHOLD DETAIL
1 1/2" = 1'-0"

I JAMB DETAIL - INTERIOR-TYP.
1 1/2" = 1'-0"

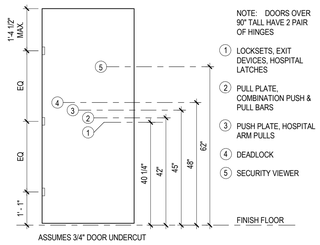
KEYNOTE LEGEND

KEY VALUE	KEYNOTE DESCRIPTION
03 3000.D2	VAPOR BARRIER
03 3000.D7	EXPANSION JOINT MATERIAL - SEE STRUCTURAL FOR REQUIRED THICKNESS
07 2100.A14	2" RIGID INSULATION CONT. AT PERIMETER OF FOUNDATION, EXTEND 24" MIN. HORIZONTAL
13 3500.A2	COLD-FORMED METAL CLIP ANGLE BY MTL. BLDG. MFR.
13 3500 A4	COLD FORMED METAL STUD RUNNER CHANNEL @ 16" O.C., PROVIDED BY MTL. BLDG. MFR.
13 3500.A6	3 5/8" RUNNER CHANNEL
13 3500.A7	3 5/8" COLD-FORMED METAL STUD @ 24" O.C.
13 3500.A8	(2) 6" METAL STUD JAMB
13 3500.A9	(2) 3 5/8" METAL JAMB STUDS
13 3500.A10	6" BOX HEADER
13 3500.A11	P.T. 2X WOOD BLOCKING
13 3500.A14	CORRUGATED GALVANIZED STEEL METAL BUILDING WALL PANELS EXTERIOR & INTERIOR, PROVIDED BY MTL. BLDG MFR.
13 3500.A18	PRE-FINISHED METAL FLASHING
13 3500.A20	PRE-FINISHED MTL. OUTSIDE CORNER TRIM, PROVIDED BY BLDG. MFR.
13 3500.A21	INSIDE METAL CORNER TRIM.
13 3500.A24	HOLLOW METAL FRAME - REFER TO DOOR SCHEDULE OR WINDOW FRAME ELEVATIONS
13 3500.A25	HOLLOW METAL DOOR TRIM BY METAL BUILDING MFR.
13 3500.A26	OVERHEAD COILING DOOR - REFER TO DOOR SCHEDULE
13 3500.A27	THRESHOLD BY METAL BUILDING MFR.

GENERAL NOTES

1. DOOR & FRAME NUMBERS CORRESPOND TO RESPECTIVE ROOM NUMBERS. IN ROOMS WITH MULTIPLE OPENINGS, A SUFFIX HAS BEEN ADDED TO THE DOOR NUMBERS, I.E., 100A.
2. REFER TO WALL SECTIONS AND INTERIOR PARTITION TYPES FOR ADDITIONAL NOTES REGARDING TYPICAL WALL CONSTRUCTION.
3. LOCATE INSIDE FACE OF DOOR FRAME JAMBS 6" FROM FINISH FACE OF ADJACENT WALLS UNLESS NOTED OTHERWISE.
4. PROVIDE CYLINDERS AND CORES FOR ALL DOOR HARDWARE CAPABLE OF BEING CHANGED AND KEYED TO THE OWNER'S MASTER KEYING SYSTEM.
5. ALL INTERIOR H.M. DOOR FRAMES SHALL BE PAINTED UNLESS NOTED OTHERWISE.
6. PROVIDE SEALANT BETWEEN H.M. FRAME PERIMETERS AND SURROUNDING DOOR CONSTRUCTION UNLESS OTHERWISE INDICATED.
7. WHERE A FIRE RATING IS INDICATED ON THE DOOR SCHEDULE, HARDWARE AND DOOR ASSEMBLY COMPONENTS SHALL MEET THE REQUIREMENTS OF THAT LABEL.
8. ALL FIRE RATED DOORS LISTED SHALL BE CATEFORY "A" POSITIVE PRESSURE RATED COMPLYING WITH THE REQUIREMENTS OF UL 10C TESTING. ADDITIONAL INTUMESCENT SEALS SHALL NOT BE ACCEPTABLE.
9. MOUNT ANY INTERIOR SIGNAGE ON LATCH SIDE OF DOOR.

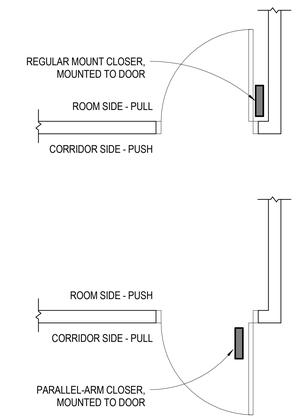
ANSI DOOR HARDWARE LOCATIONS



GENERAL NOTE

1. REFER TO WALL SECTIONS & INTERIOR PARTITION TYPES FOR ADDITIONAL NOTES REGARDING TYPICAL WALL CONSTRUCTION.
2. HANDING AS INDICATED ON PLANS.

DOOR CLOSER LOCATIONS - UNLESS OTHERWISE NOTED



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RESERVED FOR AHJ STAMP

CONSTRUCTION DOCUMENTS

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1171 MIDWAY ROAD
VERSAILLES, KENTUCKY

University of Kentucky

ARCHITECTURAL

PROJECT	201918
DATE	4-16-21

REVISIONS

No.	Description	Date

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DOOR SCHEDULE AND DETAILS

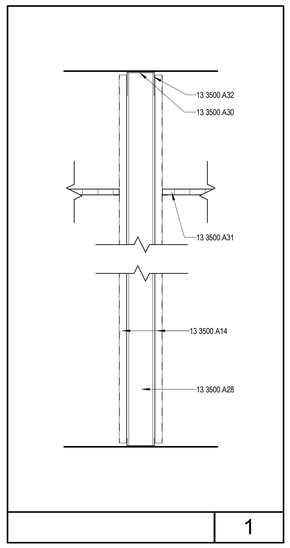
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PARTITION TYPE SCHEDULE								
NUMBER	TYPE DRAWING	STRUCT. SIZE	TOTAL WIDTH	GYP. BD. TERMINATION	INSULATION	STC RATING	FIRE RATING (HOUR)	UL DESIGN
96D	1	6"	8"	BRACE TO STRUCTURE ABOVE	--	--	--	--



1

1 PARTITION TYPE DRAWINGS
1 1/2" = 1'-0"

KEYNOTE LEGEND	
KEY VALUE	KEYNOTE DESCRIPTION
13 3500.A14	CORRUGATED GALVANIZED STEEL METAL BUILDING WALL PANELS EXTERIOR & INTERIOR. PROVIDED BY MTL BLDG MFR.
13 3500.A28	METAL STUDS - REFER TO PARTITION TYPE SCHEDULE FOR WIDTH
13 3500.A30	BRACE FRAMING TO STL. TRUSS ABOVE.
13 3500.A31	REFER TO REFLECTED CEILING PLANS FOR CEILING TYPE AND HEIGHT
13 3500.A32	DEEP LEG DEFLECTION TRACK BY MTL. BLDG. MFR.

GENERAL NOTES - PARTITION TYPES

A INTERIOR STUD SPACING SHALL BE MAXIMUM 16" ON CENTER UNLESS NOTED OTHERWISE.

B GAUGE, SPACING, AND PERFORMANCE REQUIREMENTS OF METAL STUDS SHALL BE DETERMINED BY SPECIFICATION, UNO.

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University of Kentucky

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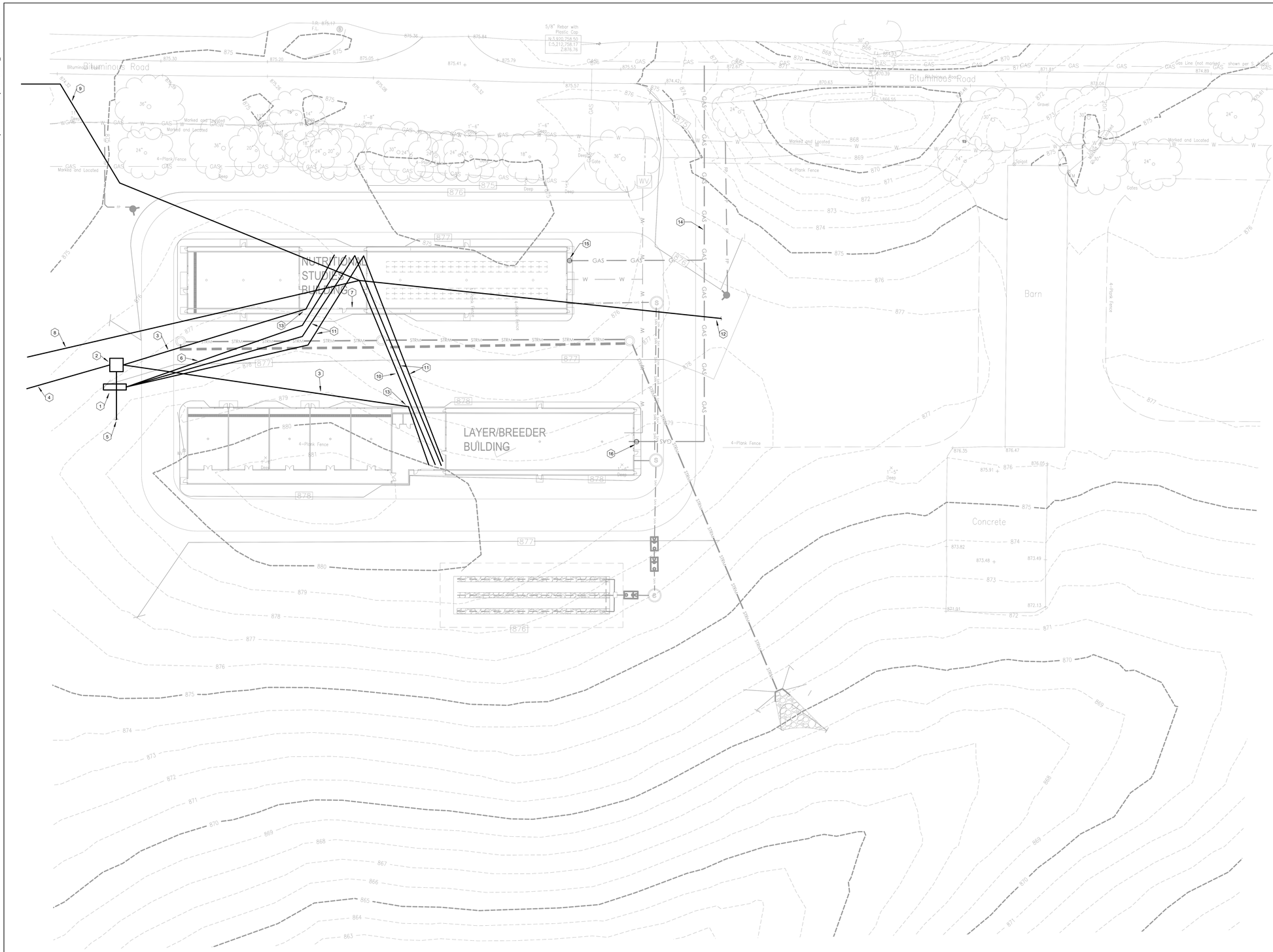
PARTITION TYPE SCHEDULE AND DETAILS

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SITE UTILITES PLAN
SCALE: 1" = 30'-0"

NOTE:
IT IS NOT INTENDED THAT THE PLANS SHOW ALL OFFSETS IN PIPES, CONDUITS, AND DUCTS REQUIRED FOR INSTALLATION OF THE WORK. DETAILS AND SECTIONS ARE INCLUDED FOR SOME AREAS TO SHOW INTENDED RELATIONSHIP OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB-CONTRACTORS TO COORDINATE INSTALLATION OF THE WORK AND TO PROVIDE THE NECESSARY OFFSETS, TRANSFORMATIONS, AND FITTINGS REQUIRED. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR CORRECTION CONFLICTS BETWEEN THE WORK OF VARIOUS TRADES. DETAILS AND SECTIONS ARE SHOWN FOR THE CONTRACTORS CONVENIENCEAND SHALL NOT BE CONSIDERED COMPLETE IN EVERY DETAIL.

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GENERAL NOTES:

1. THIS CONTRACTOR SHALL COORDINATE ALL SITE UTILITY WORK REQUIRED WITH LOCAL UTILITY COMPANIES TO MEET PROJECT SCHEDULE. ALL REQUIRED SUBMITTALS AND ASSOCIATED FEES BY THIS CONTRACTOR.
2. LOCATION OF UTILITIES ARE APPROXIMATE AND SUBJECT TO MINOR CHANGES IN THE FIELD. DO NOT SCALE THE DRAWINGS.
3. THE CONTRACT DOCUMENTS SHOW THE APPROXIMATE LOCATION OF THE EXISTING AND NEW SUBSURFACE UTILITY LINES. THESE LINES HAVE BEEN IDENTIFIED AND LOCATED AS ACCURATELY AS POSSIBLE USING AVAILABLE INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL ACTUAL LOCATIONS. IF ANY CHARTED, UNCHARTED, OR MIS-LOCATED UTILITY SERVICE IS INTERRUPTED FOR ANY REASON, THE CONTRACTOR WILL WORK CONTINUOUSLY TO RESTORE SERVICE TO SATISFACTION OF THE OWNER.
4. SHOULD EXISTING UTILITIES REQUIRE RELOCATION OR REROUTING NOT SHOWN OR INDICATED TO BE RELOCATED OR REROUTED, CONTACT AND COOPERATE WITH THE OWNER TO MAKE THE REQUIRED ADJUSTMENTS AT AN EQUITABLE CHANGE IN THE CONTRACT PRICE.
5. EXISTING UTILITIES SHOWN MAY ACTUALLY BE IN DIFFERENT LOCATIONS AND ADDITIONAL UTILITIES NOT SHOWN MAY EXIST AND MAY BE IN USE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT ALL UTILITIES DURING CONSTRUCTION.
6. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATING. THE OWNER WILL NOT LOCATE THE UTILITIES FOR THE CONTRACTOR. IF AN OUTSIDE SERVICE OR COMPANY IS REQUIRED TO ACCURATELY LOCATE BURIED UTILITIES THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING THIS WORK AND IS RESPONSIBLE FOR THE COSTS. THE CONTRACTOR SHOULD CONTACT APPROPRIATE UTILITY COMPANIES BEFORE DOING ANY EXCAVATING.
7. TOP ELEVATIONS OF NEW UNDERGROUND STRUCTURE ARE APPROXIMATE AND ARE FOR ESTIMATING PURPOSES ONLY. ACTUAL TOP ELEVATIONS MUST BE THE SAME AS FINISHED GRADE IN THE SAME AREA. SEE ARCHITECTURAL PLANS FOR FINISHED GRADES.
8. INSTALL DOMESTIC WATER PIPING WITH 3'-6" MINIMUM COVER.
9. INSTALL FIRE PROTECTION WITH 4'-0" MINIMUM COVER.
10. INSTALL NATURAL GAS PIPING WITH 2'-0" MINIMUM COVER.
11. INSTALL SITE SANITARY PIPING WITH 3'-0" MINIMUM COVER.
12. INSTALL UNDERGROUND FEEDERS WITH 2'-0" MINIMUM COVER.
13. EXCAVATION: MATERIALS TO BE EXCAVATED SHALL INCLUDE EARTH AND ANY OTHER MATERIAL, INCLUDING ROCK ENCOUNTERED IN TRENCH EXCAVATION.
14. SITE LIGHTING CIRCUITS SHALL BE #6 CONDUCTORS IN 1-1/4" CONDUITS.
15. TESTING OF EXTERIOR SEWER MANHOLES SHALL BE AS FOLLOWS:
    - A. EXTERIOR SANITARY SEWER SHALL BE PLUGGED BETWEEN MANHOLES AND SUBJECTED TO AN AIR PRESSURE TEST WITH ALL OPENINGS TIGHTLY CLOSED. AIR SHALL BE PUMPED IN UNTIL THE PRESSURE IS NOT LESS THAN 5 POUNDS PER SQUARE INCH. THE AIR PRESSURE GAGE SHALL REMAIN CONSTANT WITHOUT PUMPING ADDITIONAL AIR INTO THE SYSTEM.
    - B. MANHOLE SHALL BE PLUGGED AND FILLED WITH WATER AND A VISUAL INSPECTION MADE FOR LEAKS. ALL LEAKS SHALL BE CORRECTED.
    - C. ALL TESTS SHALL BE DONE PRIOR TO BACKFILLING.

CODED NOTES:

1 DIESEL GENERATOR WITH WEATHER ENCLOSURE.

2 PAD-MOUNTED SERVICE TRANSFORMER.

3 UNDERGROUND ELECTRICAL SECONDARY OF THREE 3-1/2" CONDUITS WITH FOUR 500 MCM IN EACH CONDUIT. MINIMUM BURY IS 30".

4 UNDERGROUND ELECTRICAL PRIMARY. ROUTE TO EXISTING UTILITY POLE APPROXIMATELY 130' FROM TRANSFORMER LOCATION. FIELD VERIFY EXACT DISTANCE.

5 STUB OUT CONDUITS FROM PRIMARY SECTION OF TRANSFORMER FOR FUTURE EXTENSION TO ANOTHER UTILITY TRANSFORMER. SEE ELECTRICAL DISTRIBUTION SYSTEM RISER DIAGRAM.

6 PROVIDE AND INSTALL CIRCUITS FROM THE GENERATOR BATTERY CHARGER AND JACKET HEATER TO A 120/208V/3PH/4W PANELBOARD IN THE NUTRITION BUILDING. RUN THE CHARGING CIRCUIT WITH 3 #10 CONDUCTORS AND RUN THE HEATER CIRCUIT WITH 3 #8 AND 1 #10 CONDUCTORS.

7 PROPOSED LOCATION FOR GENERATOR ANNUNCIATOR. PROVIDE CABLING, IN CONDUIT AS REQUIRED, TO GENERATOR CONTROLS.

8 RUN TWO 3" SCH. 40 PVC CONDUITS FROM TELEPHONE/DATA BACKBOARD TO SAME UTILITY POLE AS INDICATED BY CODED NOTE #4, THIS SHEET. MAST CONDUITS UP POLE PER WINDSTREAM STANDARDS. MINIMUM BURY IS 30". TERMINATE CONDUITS AT BACKBOARD INSIDE BUILDING. PROVIDE PULL STRINGS. CONDUITS ARE FOR TELEPHONE SERVICE.

9 RUN ONE 4" SCH. 40 CONDUIT AND ONE QUAD 1-1/4" CONDUIT TELEBUNDLE FROM TELEPHONE/DATA BACKBOARD IN NUTRITION BUILDING TO EXISTING TELECOMMUNICATIONS EQUIPMENT RACK IN EXISTING ADMINISTRATION BUILDING (APPROXIMATELY 1100'). FIELD VERIFY EXACT DISTANCE AND LOCATION. MECHANICALLY SEAL PENETRATIONS THROUGH EXTERIOR WALL OF ADMINISTRATION BUILDING. RUN ONE 24 STRAND SINGLE MODE FIBER AND TERMINATE IN NEW FIBER TERMINATION PANELS IN TELECOMMUNICATION EQUIPMENT RACKS AT BOTH ENDS.

10 RUN ONE 4" SCH. 40 CONDUIT AND ONE QUAD 1-1/4" CONDUIT TELEBUNDLE FROM TELEPHONE/DATA BACKBOARD IN NUTRITION BUILDING TO TELEPHONE/DATA BACKBOARD IN LAYER/BREEDER BUILDING. RUN ONE 24 STRAND SINGLE MODE FIBER AND ONE 25 PAIR COPPER CABLE. TERMINATE CABLES IN EQUIPMENT RACKS AT BOTH ENDS.

11 EMERGENCY LIFE SAFETY AND EQUIPMENT FEEDERS UNDERGROUND. SEE ELECTRICAL DISTRIBUTION RISER SYSTEM DIAGRAM.

12 RUN ONE 4" SCH. 40 CONDUIT AND ONE QUAD 1-1/4" CONDUIT TELEBUNDLE FROM TELEPHONE/DATA BACKBOARD IN NUTRITION BUILDING TO LOCATION SHOWN. CAP CONDUITS FOR FUTURE EXTENSION AND MARK LOCATION WITH A UTILITY MARKER. CONDUITS ARE FOR FUTURE EXTENSION TO ANOTHER BUILDING.

13 APPROXIMATE LOCATION OF CT CABINET AND ELECTRIC METER.

14 GAS SERVICE LINE BY COLUMBIA GAS. CONTRACTOR SHALL COORDINATE WITH COLUMBIA GAS AS REQUIRED.

15 GAS METER BY COLUMBIA GAS. PROVIDE REGULATOR AND LINE FROM METER TO BUILDING AS REQUIRED. TOTAL EXPECTED LOAD 1200 CFH @ 14" W.C. COORDINATIE FINAL LOCATION WITH BUILDING MEP PLANS.

16 GAS METER BY COLUMBIA GAS. PROVIDE REGULATOR AND LINE FROM METER TO BUILDING AS REQUIRED. TOTAL EXPECTED LOAD 1700 CFH @ 14" W.C. COORDINATIE FINAL LOCATION WITH BUILDING MEP PLANS.

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STATE OF KENTUCKY — WAYNE A THOMAS 18303 — LICENSED PROFESSIONAL ENGINEER

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VERSAILLES, KENTUCKY

University of Kentucky

SITE UTILITIES

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SITE UTILITIES PLAN

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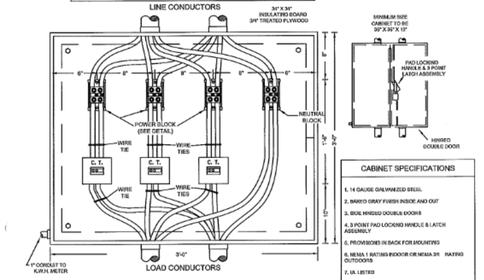
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Electric System Codes & Standards

MINIMUM C.T. ENCLOSURE FOR 1 OR 2 CABLES PER PHASE 81 10 07
120/208V 3Ø 4W - 277/480V 3Ø 4W - <800 AMP (LG&E/KU) Rev. B

NOTE:
THE C.T. ENCLOSURE SHALL NOT BE USED AS AN AUXILIARY GUTTER OR JUNCTION BOX.

MINIMUM C.T. ENCLOSURE SIZE USING 1 OR 2 CABLES PER PHASE
120/208V 3Ø 4W - 277/480V 3Ø 4W - 800AMP MAX (LGE/KU)
120/240V 3Ø 4W - 240/480V 3Ø 4W - 800A MAX. (KU)



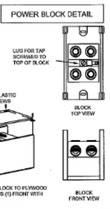
CABINET SPECIFICATIONS

1. 14 GAUGE GALVANIZED STEEL
2. BAKED GRAY FINISH INSIDE AND OUT
3. SIDE HINGED DOUBLE DOORS
4. 3 POINT PAD LOCKING HANDLE & LATCH ASSEMBLY
5. PROVISIONS IN BACK FOR MOUNTING
6. NEMA 1 RATING INDOOR OR NEMA 3R RATING OUTDOORS
7. UL LISTED

NUMBER OF CONDUCTORS	MAX. CONDUCTOR SIZE	
	COPPER	ALUMINUM
SINGLE (MAX. OF 1 PER LEG)	500MCM	500MCM
PARALLEL (MAX. OF 2 PER LEG)	600MCM	600MCM

EQUIPMENT	FURNISHED BY	INSTALLED BY
	COPPER	ALUMINUM
C.T. ENCLOSURE, GROUNDING LUGS, PLYWOOD, POWER BLOCKS & CONDUIT	CONTRACTOR	CONTRACTOR
C.T.S. METER ENCLOSURES	UTILITY	CONTRACTOR
METER & SECONDARY WIRING	UTILITY	UTILITY

POWER BLOCK DETAIL



CONTRACTOR NOTES:

1. CONTRACTOR SHALL PROVIDE BONDING FOR C.T. & METER ENCLOSURE AND SHALL GROUND EQUIPMENT PER N.E.C. AND LOCAL CODES.
2. CONTRACTOR SHALL INSTALL EQUIPMENT AT THE LOCATION DESIGNATED BY LG&E/KU SERVICE LOCATORS OR METER DEPARTMENT SUPERVISORS.
3. THE POLARITY MARKS ON EACH CURRENT TRANSFORMER SHOULD POINT TOWARDS THE LINE OR FEED CONDUCTORS.
4. THE INSTALLATION MUST BE ACCEPTABLE TO LG&E/KU BEFORE THE SERVICE IS ENERGIZED.
5. LINE CONDUCTORS SHALL ENTER LOAD CONDUCTORS SHALL EXIT ON OPPOSITE SIDES OF THE C.T. ENCLOSURE WITH TOP 24" AND BOTTOM 12" FREE. POWER BLOCKS & C.T. LAYOUT SHALL BE ROTATED AS NECESSARY TO KEEP POWER BLOCKS CONNECTED ON LINE SIDE OF C.T.
6. POWER BLOCKS SHALL BE LG&E/KU #LDB-22-900-LG (WHICH INCLUDES (LG&E/KU #ILUH-90 LUG FOR TAP) OR APPROVED EQUAL.
7. PROVIDE WIRE TIES FOR MULTIPLE CABLES PER LEG TO KEEP THE CABLES FROM PUTTING STRAIN ON C.T.

LG&E KU — Electric Design And Construction Standards

99

Replaces LGE 81 10 07 A KU None

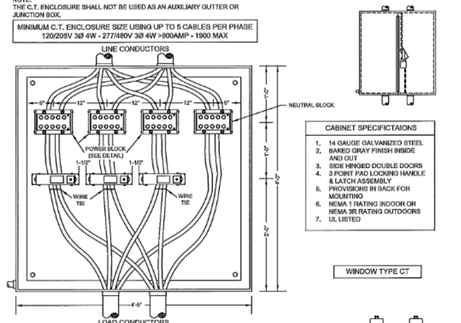
By: Hethcox/Stickler 01/14/10 Page 1 of 1

Electric System Codes & Standards

MINIMUM C.T. ENCLOSURE FOR UP TO 5 CABLES PER PHASE 81 10 12
120/208V 3Ø - 4W - 277/480V 3Ø 4W - >800 AMP - (1900A MAX.) Rev. B

NOTE:
THE C.T. ENCLOSURE SHALL NOT BE USED AS AN AUXILIARY GUTTER OR JUNCTION BOX.

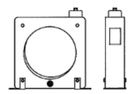
MINIMUM C.T. ENCLOSURE SIZE USING UP TO 5 CABLES PER PHASE
120/208V 3Ø 4W - 277/480V 3Ø 4W >800AMP - 1900 MAX



CABINET SPECIFICTAIONS

1. 14 GAUGE GALVANIZED STEEL
2. BAKED GRAY FINISH INSIDE AND OUT
3. SIDE HINGED DOUBLE DOORS
4. 3 POINT PAD LOCKING HANDLE & LATCH ASSEMBLY
5. PROVISIONS IN BACK FOR MOUNTING
6. NEMA 1 RATING INDOOR OR NEMA 3R RATING OUTDOORS
7. UL LISTED

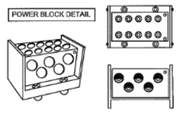
WINDOW TYPE CT



NUMBER OF CONDUCTORS	MAX. CONDUCTOR SIZE	
	COPPER	ALUMINUM
PARALLEL MAX. OF 5 PER PHASE	600	660

EQUIPMENT	FURNISHED BY	INSTALLED BY
	COPPER	ALUMINUM
C.T. ENCLOSURE, GROUNDING LUGS, PLYWOOD, POWER BLOCKS & CONDUIT	CONTRACTOR	CONTRACTOR
C.T.S. TEST BOXES	UTILITY	CONTRACTOR
METER & SECONDARY WIRING	UTILITY	UTILITY

POWER BLOCK DETAIL



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4. THE INSTALLATION MUST BE ACCEPTABLE TO LG&E/KU BEFORE THE SERVICE IS ENERGIZED.
5. POWER BLOCKS & C.T. LAYOUT SHALL BE ROTATED AS NECESSARY TO KEEP POWER BLOCKS CONNECTED ON LINE SIDE OF C.T.
6. POWER BLOCKS SHALL BE ILSCO #POB-55-600-1 OR POB-55-500-1 OR APPROVED EQUAL
7. PROVIDE WIRE TIES FOR MULTIPLE CABLES PER LEG TO KEEP THE CABLES FROM PUTTING STRAIN ON C.T.

LG&E KU — Electric Design And Construction Standards

101

Replaces LGE 81 10 12 A KU None

By: Hethcox/Stickler 01/14/10 Page 1 of 1

SITE UTILITIES LEGEND

MECHANICAL		ELECTRICAL	
ES	EXISTING SANITARY SEWER	EOE	EXISTING OVERHEAD ELECTRIC
S	NEW SANITARY SEWER	OE	OVERHEAD ELECTRIC
ESS	EXISTING STORM SEWER	OE/T	OVERHEAD ELECTRIC/TELEPHONE
SS	NEW STORM SEWER	EE	EXISTING ELECTRIC UNDERGROUND
FP	FIRE PROTECTION LINE		BRANCH CIRCUIT UNDERGROUND
EW	EXISTING COLD WATER SERVICE	P	UNDERGROUND PRIMARY SERVICE
W	NEW COLD WATER SERVICE	UE	UNDERGROUND SECONDARY SERVICE
EHPG	EXISTING HIGH PRESSURE GAS	ET	EXISTING TELEPHONE UNDERGROUND
HPG	NEW HIGH PRESSURE GAS	T	UNDERGROUND TELEPHONE CONDUIT
EG	EXISTING GAS	TV	UNDERGROUND TELEVISION CONDUIT
G	NEW GAS		LIGHTING STANDARD
	VALVE WITH VALVE BOX		EXISTING POST LIGHT
M	UTILITY MARKER		POST LIGHT
	THRUST BLOCK		PANELBOARD OR TERMINAL CABINET (REFER TO PLANS AND RISER FOR SIZE)
C.I.	CAST IRON		SECTIONAL SWITCH GEAR (REFER TO PLANS AND RISER FOR NUMBER OF SECTIONS AND LAYOUT)
ELEV.	ELEVATION		
EXIST.	EXISTING		TRANSFORMER (REFER TO PLANS AND RISER FOR SIZE)
F.H.	FIRE HYDRANT	J	JUNCTION BOX
G.C.O.	GRADE CLEANOUT		ENCLOSED CIRCUIT BREAKER
I.E.	INVERT ELEVATION		DISCONNECT SWITCH
P.I.V.	POST INDICATOR VALVE		FUSED DISCONNECT
P.V.C.	POLYVINYL CHLORIDE PIPING		COMBINATION MAGNETIC STARTER AND FUSED SWITCH
T.E.	TOP ELEVATION		MOTOR
		HOT, GROUND, NEUTRAL	WIRE / CONDUIT
		12	BOTTOM OF DEVICE (IN INCHES A.F.F.)
		1	SEE NOTE 1 THIS SHEET
		HW 22	HEADWALL - FOR SERVICES, SEE DETAILS
			GROUND
			DUPLEX CONVENIENCE OUTLET
			QUADRAPLEX CONVENIENCE OUTLET
		GFI	GROUND FAULT INTERRUPTING OUTLET
		WP	WEATHERPROOF OUTLET
		SW	SWITCHED/CONTROLLED DUPLEX OUTLET
		E	DUPLEX RECEPTACLE ON EMERGENCY CIRCUIT
		CM	CEILING MOUNTED RECEPTACLE.
		USB	USB DUPLEX RECEPTACLE.
			SIMPLEX WALL OUTLET (RATING AS NOTED)
			WALL OUTLET (240V, 1-PHASE) (RATING AS NOTED)
			WALL OUTLET (240V, 3-PHASE) (RATING AS NOTED)
			EQUIPMENT CONNECTION

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1171 MIDWAY ROAD
VERSAILLES, KENTUCKY

University of Kentucky

SITE UTILITIES

PROJECT	201918
DATE	4-16-21

REVISIONS

No.	Description	Date

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SITE UTILITIES DETAILS AND LEGENDS

U-200

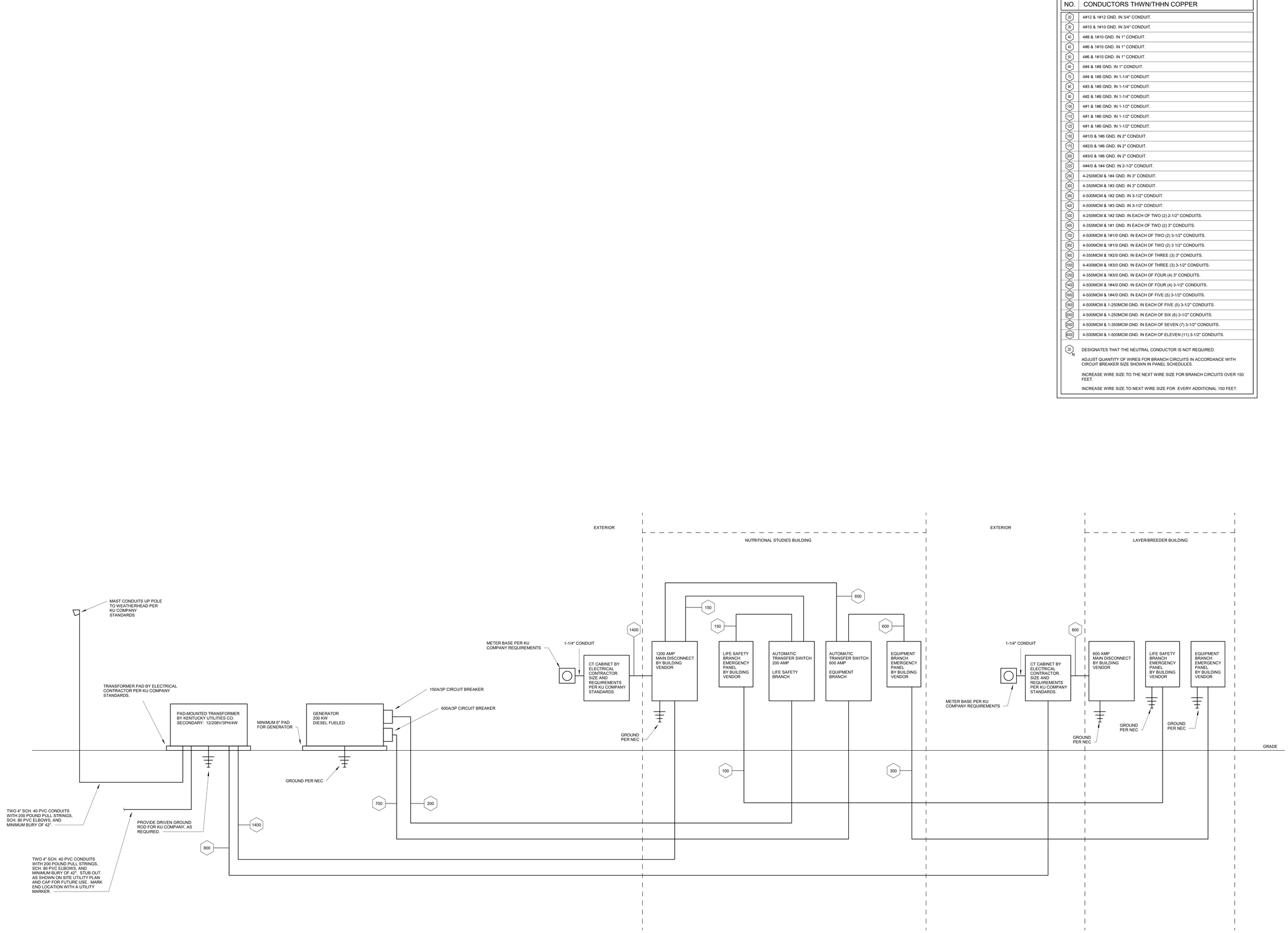
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FEEDER AND BRANCH CIRCUIT SCHEDULE

NO.	CONDUCTORS THWN/THHN COPPER
20	4#12 & 1#12 GND. IN 3/4" CONDUIT.
30	4#10 & 1#10 GND. IN 3/4" CONDUIT.
40	4#8 & 1#10 GND. IN 1" CONDUIT.
45	4#6 & 1#10 GND. IN 1" CONDUIT.
30	4#6 & 1#10 GND. IN 1" CONDUIT.
60	4#4 & 1#8 GND. IN 1" CONDUIT.
75	4#4 & 1#8 GND. IN 1-1/4" CONDUIT.
80	4#3 & 1#8 GND. IN 1-1/4" CONDUIT.
90	4#2 & 1#8 GND. IN 1-1/4" CONDUIT.
100	4#1 & 1#6 GND. IN 1-1/2" CONDUIT.
115	4#1 & 1#6 GND. IN 1-1/2" CONDUIT.
125	4#1 & 1#6 GND. IN 1-1/2" CONDUIT.
150	4#1/0 & 1#6 GND. IN 2" CONDUIT.
175	4#2/0 & 1#6 GND. IN 2" CONDUIT.
200	4#3/0 & 1#6 GND. IN 2" CONDUIT.
225	4#4/0 & 1#4 GND. IN 2-1/2" CONDUIT.
250	4-250MCM & 1#4 GND. IN 3" CONDUIT.
300	4-350MCM & 1#3 GND. IN 3" CONDUIT.
350	4-500MCM & 1#2 GND. IN 3-1/2" CONDUIT.
400	4-500MCM & 1#3 GND. IN 3-1/2" CONDUIT.
500	4-250MCM & 1#2 GND. IN EACH OF TWO (2) 2-1/2" CONDUITS.
600	4-350MCM & 1#1 GND. IN EACH OF TWO (2) 3" CONDUITS.
700	4-500MCM & 1#1/0 GND. IN EACH OF TWO (2) 3-1/2" CONDUITS.
800	4-500MCM & 1#1/0 GND. IN EACH OF TWO (2) 3 1/2" CONDUITS.
900	4-350MCM & 1#2/0 GND. IN EACH OF THREE (3) 3" CONDUITS.
1000	4-400MCM & 1#3/0 GND. IN EACH OF THREE (3) 3-1/2" CONDUITS.
1200	4-350MCM & 1#3/0 GND. IN EACH OF FOUR (4) 3" CONDUITS.
1400	4-500MCM & 1#4/0 GND. IN EACH OF FOUR (4) 3-1/2" CONDUITS.
1600	4-500MCM & 1#4/0 GND. IN EACH OF FIVE (5) 3-1/2" CONDUITS.
1800	4-500MCM & 1-250MCM GND. IN EACH OF FIVE (5) 3-1/2" CONDUITS.
2000	4-500MCM & 1-250MCM GND. IN EACH OF SIX (6) 3-1/2" CONDUITS.
2500	4-500MCM & 1-350MCM GND. IN EACH OF SEVEN (7) 3-1/2" CONDUITS.
3000	4-500MCM & 1-500MCM GND. IN EACH OF ELEVEN (11) 3-1/2" CONDUITS.
20 N	DESIGNATES THAT THE NEUTRAL CONDUCTOR IS NOT REQUIRED.
	ADJUST QUANTITY OF WIRES FOR BRANCH CIRCUITS IN ACCORDANCE WITH CIRCUIT BREAKER SIZE SHOWN IN PANEL SCHEDULES.
	INCREASE WIRE SIZE TO THE NEXT WIRE SIZE FOR BRANCH CIRCUITS OVER 150 FEET.
	INCREASE WIRE SIZE TO NEXT WIRE SIZE FOR EVERY ADDITIONAL 150 FEET.



ELECTRICAL DISTRIBUTION SYSTEM RISER DIAGRAM

NOT TO SCALE

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