PROJECT MANUAL

For the Project Titled:

SBI – 000242A
HVAC RETROFIT PHASE I
SHELBY COUNTY CRIMINAL JUSTICE CENTER
201 POPLAR AVENUE
MEMPHIS, TENNESSEE 38103

OWNER
SHELBY COUNTY GOVERNMENT

DESIGNERS
PICKERING FIRM, INC.
Planning, Architecture,
Engineering, Management
6775 Lenox Center Court Suite 300
Memphis, Tennessee 38115
901-726-0810

OGCB, INC.
3485 Poplar Avenue, Suite 200
Memphis, Tennessee 38111
901-452-9640

PFI No. 24308.00

DATE: March 3, 2014

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JONATHAN R. FOSTER
REGISTERED ENGINEER
AGRICULTURE
No. 23366
STATE OF TENNESSEE
3/3/2014

PFI No. 24308.00

DATE: March 3, 2014

CHARLES K. HODGE
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 1008223
STATE OF TENNESSEE
3/3/14

Pickering

OGCB
Incorporated

SECTION 00 01 10

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SECTION 00 01 20

PROJECT DIRECTORY

OWNER:

Support Services
Shelby County Government
584 Adams Avenue
Memphis, TN 38103
901.222.2400 phone
901.222.2518 fax
diep.tran@shelbycountytn.gov
ATTN: Diep Tran

ARCHITECT/ENGINEERS

Pickering Firm, Inc.
6775 Lenox Center Court
Suite 300
Memphis, TN 38115
901.726.0810 phone
901.272.6911 fax
jfoshee@pickeringfirm.com
ATTN: Jonathan Foshee

OGCB, Inc.
3485 Poplar Avenue
Suite 200
Memphis, TN 38111
901.452.6283 phone
901.458.9640 fax
asanders@ogcbinc.com
ATTN: Alan Sanders

Shelby County

Tennessee

Mark H. Luttrell, Jr., Mayor

SEALED BID

Shelby County Government

Purchasing Department

160 N. Main, Suite 900
Memphis, TN 38103

Issued: March 3, 2014

Due: March 19, 2014 at 2:30 PM (Central Standard Time)

SEALED BID # I-000242A

HVAC RETROFIT
201 POPLAR AVENUE
PHASE 1

Shelby County Government is soliciting proposals for the provision of Construction Services to provide HVAC Retrofit, Shelby County Criminal Justice Center, 201 Poplar Avenue, Memphis, Tennessee 38103. The SEALED BID is located on the County's website at www.shelbycountytn.gov and click the link "Department" at the top, then P for the Purchasing Department, then click on the link "Bids". Bidders are required to download the information for submittal.

A voluntary pre-bid conference will be held Friday, March 12, 2014 at 9:30 a.m. at the Shelby County Criminal Justice Center, 201 Poplar, Auditorium, First Floor, 201 Poplar Avenue, Memphis, Tennessee 38103.

A public bid opening will be held at 2:30 p.m. in the office of the Administrator of Purchasing, located at, Vasco A. Smith Jr. Administration Building, 160 North Main Street, Suite 900, Memphis, Tennessee 38103.

Proposals must be received in the office of the Administrator of Purchasing **no later than March 19, 2014 at 2:30 p.m.** Proposals should be addressed to:

Nelson Fowler, Manager A
Shelby County Government
160 N. Main, Rm. 900
Memphis, TN 38103

The package containing an original **(clearly identified as original)** and four (4) copies must be sealed and marked with the Bidders name and "**CONFIDENTIAL, "HVAC Retrofit, 201 POPLAR AVENUE, PHASE 1**", **SEALED BID # I-000242A** noted on the outside.

THE LABEL, WHICH IS ATTACHED TO THE BID NOTIFICATION LETTER SHALL BE COMPLETELY FILLED OUT AND ATTACHED TO THE BID SUBMISSION ENVELOPE. YOU MUST DISPLAY YOUR CURRENT E.O.C. ELIGIBILITY NUMBER ON THE OUTSIDE OF YOUR ENVELOPE. UNLESS THE LABEL IS COMPLETELY FILLED OUT AND YOUR CURRENT CERTIFICATION NUMBER OR ELIGIBILITY NUMBER IS NOTED THEREON, YOUR BID WILL BE RETURNED TO YOU UNOPENED. SHOULD YOUR LABEL BE LOST OR MISPLACED, PLEASE NOTE THE APPROPRIATE INFORMATION IN THE LOWER LEFT-HAND CORNER OF YOUR ENVELOPE.

Sincerely,

Nelson Fowler, Manager A
Purchasing Department, Shelby County Government

Cc: Diep Tran, Support Services

I. INTRODUCTION

Shelby County Government (the "County"), is seeking proposals from interested and qualified firms for HVAC Retrofit, 201 Poplar Avenue, Memphis, Tennessee 38013. This Sealed Bid is being released to invite interested and qualified firms to prepare and submit proposals in accordance with instructions provided where the successful candidate will be selected and invited to enter into a contractual relationship with Shelby County for the Services outlined in this Sealed Bid document.

II. MINIMUM PROPOSER REQUIREMENTS

All bidders must:

1. **Prime** and **LOSB** contractors must **apply** and **qualify** for an Equal Opportunity Compliance (EOC) certification number through our EOC Administration **prior to submitting your response**.
2. Firms located within the boundaries of Shelby County are required to have a current Shelby County Business License or be considered exempt from the license requirement by the Shelby County Clerks Office.
3. Meet all other requirements for the performance such as LOSB and performance requirements for Services in accordance with the provisions of this Sealed Bid.
4. Must submit a Bid Bond in the amount of 5% of their bid. This bond must be submitted with your bid.
5. The successful contractor must be able to submit a performance/labor material bond separate bonds each in the amount of 100% of the amount of the contract.
6. Must submit LOSB Form B and A with their bid. Please see page 22, item L for documents to be submitted with your bid.
7. Have all appropriate licenses and certifications required in the State of Tennessee to perform the Services.
8. A written statement of compliance to Title VI must be submitted in your bid response. Please see item **"H"** for Title VI.
9. Independent contractors (sole proprietors) must adhere to State of Tennessee Public Chapter No. 436, know as the "Tennessee Lawful Employment Act (effective date of 1/1/2012). Proof and documentation of employment eligibility must be included with the proposal.

III. CORRESPONDENCE

All correspondence, proposals, and questions concerning the Sealed Bid are to be submitted to:

Nelson Fowler, Manager A
Shelby County Government
160 N. Main St. Suite 900
Memphis, TN 38103
(901) 222-2250

Respondents requesting additional information or clarification are to contact Nelson Fowler in writing at nelson.fowler@shelbycountytn.gov or at the address listed above. Questions should reference the section of the SEALED BID to which the question pertains and all contact information for the person submitting the questions. ***IN ORDER TO PREVENT AN UNFAIR ADVANTAGE TO ANY RESPONDENT, VERBAL QUESTIONS WILL NOT BE ANSWERED***. ***The deadline for submitting questions will be Wednesday ,March 14, 2014 @ 12:00 p.m.***

Note: All written questions submitted by the deadline indicated above will be answered and posted on the County's website at *www.shelbycountytn.gov* within forty eight (48) hours of the above cut-off date.

These guidelines for communication have been established to ensure a fair and equitable process for all respondents. Please be aware that contact with any other personnel (other than the person clearly identified in this document) within Shelby County or its benefit administrators regarding this Sealed Bid may disqualify your company from further consideration.

Vendor Number (Purchasing Department)

At the top of the home page, click on the links "Department", "P" for the Purchasing Department and "Conducting Business with Shelby County". The "Vendor Registration" link is at the bottom of the drop down box. Please download the application instructions and read thoroughly prior to accessing the application. ***(Applications for a vendor number are accepted online only.)***

Equal Opportunity Compliance (EOC) Number (EOC Administration Office)

At the top of the home page, click on the links "Department", "E" for the Equal Opportunity Compliance and "Contract Compliance Program". The "Contract Compliance Packet" link is in the middle of the page. Please print the packet and mail or fax the completed packet to the EOC office. The mailing address is 160 N. Main Street, Suite 501, Memphis, TN 38103. The fax number is 901-222-1101.

If you have any questions regarding the application, you may contact Purchasing at (901)222-2250 or the EOC Administration at (901) 222-1100.

IV. PROPOSAL SUBMISSION DEADLINE

All proposals must be received at the address listed above no later than **March 19, 2014 @ 2:30 PM. (CST).** Facsimile or electronically transmitted proposals will not be accepted since they do not contain original signatures. Postmarks will not be accepted in lieu of actual receipt. Late or incomplete proposals may not be opened and considered. Under no circumstances, regardless of weather conditions, transportation delays, or any other circumstance, will extend this deadline.

V. PROPOSAL TIMELINE

Shelby County reserves the right to modify this timeline at any time. If the due date for proposals is changed, all prospective Bidders shall be notified.

Sealed Bid Released	**Monday, March 3, 2014**
Pre-Bid Conference	**Friday, March 12, 2014 at 9:30 am.**
Deadline for Questions	**Wednesday, March 14, 2014 at 12:00 p.m.**
Proposal Due Date	**Friday, March 19 2014 at 2:30 p.m.**
Notification of Award	**April 2014**

The County may reproduce any of the Bidders proposal and supporting documents for internal use or for any other purpose required by law.

VI. PROPOSAL CONDITIONS

A. Contingencies

This Sealed Bid does not commit the County to award a contract. The County reserves the right to accept or reject any or all proposals if the County determines it is in the best interest of the County to do so. The County will notify all Bidders, in writing, if the County rejects all proposals.

B. Modifications

The County reserves the right to issue addenda or amendments to this Sealed Bid.

C. Proposal Submission

To be considered, all proposals must be submitted in the manner set forth in this Sealed Bid. It is the Bidders responsibility to ensure that its proposals arrive on or before the specified time.

D. Incurred Costs

This Sealed Bid does not commit the County to pay any costs incurred in the preparation of a proposal in response to this Sealed Bid and Bidders agree that all costs incurred in developing this Sealed Bid are the Bidders responsibility.

E. Final Authority

The final authority to award a contract rests solely with the Shelby County Purchasing Department.

F. Proposal Validity

Proposals submitted hereunder will be firm for one hundred twenty (120) calendar days from the due date unless otherwise qualified.

G. Disclosure of Proposal Contents

Proposer understands and acknowledges that the County is a governmental entity subject to the laws of the State of Tennessee and that any reports, data or other information supplied to the County is subject to being disclosed as a public record in accordance with the laws of the State of Tennessee. All proposals and other materials submitted become the property of Shelby County Government.

H. Non-discrimination and Title VI

The contractor hereby agrees, warrants, and assures compliance with the provisions of Title VI and VII of the Civil Rights Act of 1964 and all other federal statutory laws which provide in whole or in part that no person shall be excluded from participation or be denied benefits of or be otherwise subjected to discrimination in the performance of this Contract or in the employment practices of the contractor on the grounds of handicap and/or disability, age, race, color, religion, sex, national origin, or any other classification protected by federal, Tennessee State Constitutional or statutory law. The contractor shall upon request show proof of such non-discrimination and shall post in conspicuous places available to all employees and applicants notices of non-discrimination.

Any recipient entity shall be subject to the requirements of Title VI of the Civil Rights Act of 1964, 42 U.S.C. 2000d et seq., and regulations promulgated pursuant thereto. It shall develop a Title VI implementation plan with participation by protected beneficiaries as may be required by such law or regulations. To the extent applicable, such plan shall include Title VI implementation plans sub-recipients of federal funds through the entity. The contractor shall produce the plan upon request of Shelby County Government. Failure to provide same shall constitute a material breach of contract.

I. LOSB

SHELBY COUNTY GOVERNMENT
LOCALLY OWNED SMALL BUSINESS (LOSB) PROGRAM
FOR CONSTRUCTION SERVICES

General

Shelby County Government is committed to a policy of non-discrimination pursuant to the Equal Protection provisions of the United States Constitution. It is further the policy of Shelby County that it's purchasing and contracting practices encourage the use of Locally-Owned Small Businesses (LOSB's) in all solicitations. In furtherance of these policy objectives, Shelby County seeks to afford all citizens equal opportunities to do business on county contracts and to ensure that all bidders, or Contractors doing business with Shelby County provide to LOSB's, maximum practicable opportunities, commensurate with availability, price and capabilities required, to participate on contracts which are paid for, in whole or in part, with monetary appropriations from Shelby County.

Shelby County seeks to prevent discrimination against any person or business in pursuit of these opportunities on the basis of race or gender. Shelby County will conduct its contracting and purchasing programs to discourage any discrimination and will actively seek to resolve all claims of discrimination brought against Shelby County or any Contractors involved in such contracting and purchasing programs.

Shelby County has determined that **10%** of the contract sum will be contracted with LOSB vendors. For assistance and information regarding LOSB participation, Bidders shall contact:

Ms. Carolyn Griffin
Office of Equal Opportunity Compliance
Board of Commissioners of Shelby County
160 North Main Street, Suite 501
Memphis, Tennessee 38103
Phone: 901-222-1100
Fax: 901-222-1101
E-mail: Carolyn.Griffin@shelbycountytn.gov

Definitions

The definitions used in this document are as follows:

1. **"Bidder"** means any person, firm, partnership, association, or joint venture seeking to be awarded a contract or subcontract to provide goods, commodities, or services.
2. **"Certification"** or **"Certified"** means a Business that is certified by Shelby County Government under the LOSB program.
3. **"Commercially useful function"** means being responsible for the management and performance of a distinct element of the total work.

4. **"Contractor"** shall mean any person or business enterprise that submits a bid or proposal to provide labor, goods, or services to Shelby County by contract for profit in the area of construction or construction-related activities; and, any person or firm who supplies or provides labor, goods, or services to Shelby County by contract for profit.
5. **"Efforts to Achieve LOSB Participation"** means that the Contractor will solicit LOSB Participation with respect to the procurement and will consider all sub-bids and quotations received from LOSB's. When a subcontract is not awarded to the LOSB, the Contractor must document the reason(s) the award was not made and substantiate that documentation in writing pursuant to the provisions of this Program.
6. **"Locally Owned Small Business (LOSB)"** means a business whose home office is located in Shelby County, whose annual revenues do not exceed $3,000,000 and who has been certified by Shelby County Office of Equal Opportunity Compliance.
7. **"Non-LOSB"** means a business, which is not certified as a LOSB.
8. **"Unavailable"** means either that: (1) there is no LOSB providing goods or services requested; or, (2) no LOSB submitted a bid.

Requirements and Compliance

All firms or entities seeking to become Contractors as outlined herein are required to make good faith efforts to achieve LOSB participation when submitting a proposal or bidding on Shelby County procurements. Bidders shall not discriminate on the basis of race or gender when soliciting bids in the performance of Shelby County's procurements. Discrimination complaints brought to the attention of Shelby County Office of Equal Opportunity Compliance (or its designee) will be reviewed and investigated to the extent necessary to determine the validity of such complaints and what actions, if any, should be taken by Shelby County.

Policies and Procedures

Shelby County may adopt policies and procedures as necessary to carry out and implement its powers and duties with regard to the LOSB Program. It is the goal of Shelby County to encourage participation by LOSB's and to adopt rules and regulations which achieve to the greatest extent possible a level of participation by LOSB's taking into account the total number of all Contractors and suppliers. Therefore, Shelby County will review each procurement request to determine the maximum potential for utilization of LOSB's. This review is based on the availability of qualified LOSB's providing goods or services as it relates to the scope of the bid or procurement process. The following procedures may be utilized during the procurement process.

1. Pre-Bid Activity

a. Bid Language

Shelby County may insert language into each bid specification describing the LOSB Program to assure that all prospective bidders are aware of the requirements to make efforts to utilize LOSB's.

b. Notification

Shelby County may provide written notification to Contractors and LOSB's regarding pre-bid conferences; technical assistance to LOSB's; LOSB Program procedures and required documentation; and, provide a list of

LOSB's who have expressed an interest in competing for the bid or in performing as a subcontractor.

2. Contractor's Responsibilities

a. Efforts to Achieve LOSB Participation

All entities seeking to become Contractors are required to make efforts to achieve maximum LOSB participation, as outlined in this LOSB Program, when submitting a response to a bid or negotiated proposal in response to a Shelby County procurement opportunity. Such Efforts should be documented on **LOSB Form "A."** and submitted with your bid.

b. Utilization

Contractors are required to utilize legitimate LOSB's in order to receive credit for the utilization of a LOSB. Contractors must document all LOSB's to be utilized, the percentage of utilization and the intended scope of work. Such information should be submitted on **LOSB Form "B."** This documentation must be submitted with the bid or negotiated proposal document.

c. Commercially Useful Functions

All LOSB's identified on **LOSB Form "C"** or **LOSB Form "D"** shall perform a Commercially Useful Function.

d. Unavailability

If a potential Contractor's efforts to obtain LOSB participation are unsuccessful due to the unavailability of a LOSB, the Contractor will submit a statement of unavailability. **LOSB Form "A**."

e. Pre-Work Conference

Any Contractor who is the successful bidder shall be required to attend a conference with Shelby County prior to beginning the work. The primary purpose of this conference is to review the project scope and review LOSB participation as outlined in **LOSB Form "B."** Shelby County will also review the Statement of Intent to Perform as a Subcontractor or Provide Supplies or Services as documented on **LOSB Form "C."**

f. Post-Award Change

Any Contractor who determines that a LOSB identified on **LOSB Form "B"** cannot perform shall request approval from Shelby County to contract with an alternate subcontractor pursuant to this LOSB Program. Such request will be reviewed and approved only after adequate documentation for the proposed change is presented.

g. LOSB Certification

Each month the Contractor shall submit **LOSB Form "D"** certifying all payments made to LOSB's.

3. LOSB Responsibilities

a. Commercially Useful Function

It is the responsibility of each LOSB providing subcontracted goods and/or services to submit **LOSB Form "C"** certifying that it is performing the work and that it is a Commercially Useful Function.

Written Agreement

Shelby County policies and procedures on LOSB participation are designed to create contractual relationships between Contractors and LOSB's. Therefore, a Contractor may utilize the services of a LOSB in estimating and satisfying the scope of work, provided that a written contract/agreement is executed between the Contractor and the LOSB.

Certification

To ensure that the ownership and control over decision-making and day-to-day operations of a Certified LOSB is legitimate, Shelby County reserves the right to verify the ownership and control of each LOSB utilized.

Monitoring LOSB Utilization

Shelby County intends to monitor and enforce this LOSB Program. Shelby County reserves the right to conduct random audits of each of its Contractor's/ LOSB's. Shelby County reserves the right to reevaluate a LOSB's certification at any time.

Efforts to Achieve LOSB Participation

The Contractor shall consider all bids and/or quotations received from LOSB's. When a subcontract is not awarded by a Contractor to any of the competing LOSB's, the Contractor must document the reason(s) the award was not made to the LOSB's. It is the responsibility of the Contractor to prove that it employed Efforts to Achieve LOSB participation. Evidence supporting the Contractor's Efforts must be documented on **LOSB Form "A,"** which must include, but is not limited to, the following:

1. Contractor must submit proof that it solicited LOSB participation through reasonable and available means including, but not limited to:
    a. Written notices to LOSB's who have the capability to perform the work of the contract or provide the service;
    b. Direct mailing, electronic mailing, facsimile or telephone requests.
2. Contractor must submit proof that it provided interested LOSB's with adequate information about plans, requirements and specifications of the contract in a timely manner to assist them in responding to a solicitation.
3. Contractor must submit proof that it made Efforts to Achieve LOSB Participation including, but not limited to, proof that it made opportunities available to LOSB suppliers and identified opportunities commensurate with opportunities made available and identified to Non LOSB's. Such proof will include~~s~~ the names of businesses, contact person(s), addresses, telephone numbers, and, a description of the specifications for the work selected for subcontracting.
4. Contractor must submit proof that it allowed LOSB's the opportunity to review bid specifications, blue prints and all other bid related items at no charge. The Contractor must allow sufficient time for review prior to the bid deadline.
5. Contractor must submit proof that it made Efforts to Achieve LOSB Participation by not rejecting a LOSB as unqualified or unacceptable without sound reasons based on a thorough investigation of their capabilities. Contractor must submit proof of the basis for rejecting

any LOSB deemed unqualified or unacceptable by the Contractor. The Contractor will not impose unrealistic conditions of performance on LOSB's seeking subcontracting opportunities.

The Contractor must fully cooperate with Shelby County in its post-contract award LOSB Program audit and compliance efforts.

Substitution of LOSB's after Contract Award

In order to make a substitution of a LOSB, a Contractor must make a request to Shelby County. This request must be submitted in writing to Shelby County. Shelby County reserves the right to approve any substitution of a LOSB. The Contractor has the responsibility to provide Shelby County with a reasonable basis for the substitution. If the Contractor desires to substitute the LOSB with a Non-LOSB, then the Contractor must comply with the Effort to Achieve LOSB Participation provisions set forth herein.

Noncompliance with LOSB Program

Any of the following reasons, individually or collectively, may result in suspension from bidding, prohibition from contracting, or cancellation of contracts:

1. The failure to perform according to contract provisions relating to this LOSB Program;
2. Violation of, circumvention of, or failure to comply with the LOSB Program; and/or, other reasons deemed appropriate by Shelby County.

Questions and Information

Questions regarding this LOSB Program and requests for information should be directed to:

Ms. Carolyn Griffin
Office of Equal Opportunity Compliance
Board of Commissioners of Shelby County
160 North Main Street, Suite 501
Memphis, Tennessee 38103
Phone: 901-222-1100
Fax: 901-222-1101
E-mail: Carolyn.Griffin@shelbycountytn.gov

Construction

This LOSB Program is consistent with Shelby County Policies and Procedures. Wherever conflicts exist, the provision in the Shelby County Policies and Procedures will prevail.

LOSB Program Forms Description

- **LOSB Form A -- Certification of Efforts**

Contractors are required to submit **LOSB Form "A"** with proposals as evidence and documentation of efforts that have been made to contact LOSB's for participation as subcontractors, joint venture partners, or suppliers of goods and services. Contractors are required to contact LOSB's and solicit quotes for goods and services. All responses to the Contractor's solicitation should be recorded and reported.

- **LOSB Form B -- LOSB Utilization Plan**

A Contractor is required to submit **LOSB Form "B"** with its Proposal in order to identify all LOSB's they propose to utilize in providing the goods and services included in the Proposal. Contractors may only include a proposed provider of goods or services on **LOSB Form "B,"** if the entity is a legitimate LOSB. Additionally, if such entity will provide services, Contractors may only list LOSB's on **LOSB Form "B"** if the entity will perform a Commercially Useful Function. The Successful Contractor will be required to finalize and submit **LOSB Form "B"** prior to award of a contract. **LOSB Form "B"** will be incorporated into the contract and will become a contractual obligation of the Successful Contractor. **LOSB Form "B"** shall not be changed or altered after award of a contract without approval from Shelby County. The Contractor is required to provide written notice describing the reasons for any proposed change to Shelby County and to obtain approval from Shelby County of any changes to **LOSB Form "B."**

LOSB Form C –Statement of Intent to Perform as a Subcontractor or Provide Supplies or Services.

Contractors are required to have each subcontracted LOSB providing services complete **LOSB Form "C**" certifying that it is performing the work and that it is a Commercially Useful Function.

- **LOSB Form D – Statement of Payments to LOSB's**

Contractors are required to record and maintain information regarding the utilization of LOSB's and all other information during the performance of awarded contracts. This information shall be recorded and maintained on **LOSB Form "D."** The form is required to be submitted to Shelby County each month. **LOSB Form "D"** must be completed in its entirety with information regarding the types of goods purchased from LOSB's or the types of services rendered by LOSB's and dollars amounts paid for their goods or services.

Shelby County
LOSB Program
LOSB FORM A
CERTIFICATION OF EFFORTS TO ACHIEVE LOSB PARTICIPATION
(To Be Submitted with the Bid/Proposal)

Company Name: _____
Bid No.: _____

I certify that the following efforts where made to achieve LOSB participation:

		YES	NO
A	Provided written notices to LOSB's who have the capability to perform the work of the contract or provide the service		
B	Direct mailing, electronic mailing, facsimile or telephone requests		
C	Provided interested LOSB's with adequate information about plans, requirements and specifications of the contract in a timely manner to assist them in responding to a solicitation		
D	Allowed LOSB's the opportunity to review bid specifications, blue prints and all other bid/SEALED BID related items at no charge, and allowed sufficient time for review prior to the bid deadline		
E	Acted in good faith with interested LOSB's, and did not reject LOSB's as unqualified or unacceptable without sound reasons based on a thorough investigation of their capabilities		
F	Did not impose unrealistic conditions of performance on LOSB's seeking subcontracting opportunities		

Additionally, I contacted the referenced LOSB's and sealed bid/proposal. The responses I received were as follows:

Name and Address of LOSB	Type of Work And Contract Items, Supplies or Services to be Performed	Response	Reason for Not Accepting Bid/Proposal

(If additional space is required, this form maybe duplicated)

If applicable, please complete the following:

I hereby certify that LOSB's were "Unavailable" as defined in the LOSB Program to submit bids to provide goods and services for this SEALED BID's purpose.

Reasons for the "Unavailability":
_____

_____

Submitted by:

_____ _____
Authorized Representative Signature Title

_____
Date

Shelby County
LOSB Program

LOSB FORM B

LOSB UTILIZATION PLAN
(To Be Submitted with the Bid/Proposal)

Company: _____

Bid No.: _____

I, _____, do certify that on the following procurement opportunity,
(Contractor)
_____, the following LOSB's will be utilized as sub-contractors,
(Opportunity)
suppliers, or to provide professional services:

Name	Description of Work	Contract Value	LOSB Number

(If additional space is needed this form may be duplicated)

TOTAL CONTRACT VALUE: _____

TOTAL % OF LOSB PARTICIPATION: _____

The successful bidder is required to finalize and submit this form prior to award of a contract. Joint Venture Agreements, partnering agreements and all pertinent information must be presented prior to contract award. This information will be incorporated into the contract and will become a contractual obligation of the successful bidder. The finalized LOSB Form B shall not be changed or altered after award of a contract without approval from Shelby County. The successful bidder is required to provide written notice describing the reasons for the change to Shelby County to obtain approval of any changes to LOSB Form B.

Submitted by:

_____
Authorized Representative Signature

_____
Title

_____
Date

Shelby County
LOSB Program
LOSB FORM C

STATEMENT OF INTENT TO PERFORM AS A SUBCONTRACTOR OR PROVIDE SUPPLIES OR SERVICES
(To Be Submitted Prior to Contract Award)

Company Name: _____
Bid No.:_____

I, _____, intend to provide supplies or services in connection with the
(Subcontractor/Provider)
above **bid/proposal** request as a LOSB.

I am prepared to perform a **"Commercially Useful Function"** in connection with the above project.

The following are the work items to be performed:

_____

_____

at the following price: $_____.

If applicable, please complete the following:

I have or will enter into a formal agreement with _____ for the above-
(Company)
described scope of work, supplies, or services conditioned upon the execution of a contract

with Shelby County.

I hereby certify that this statement is true and correct:

Business Information: Submitted by: _____

Business: _____ Authorized Representative (Print):

Address: _____ _____

Title: _____

Phone: _____ Authorized Representative's Signature:

_____

Facsimile: _____ Date: _____

Shelby County
LOSB Program

LOSB FORM D

STATEMENT OF PAYMENTS TO LOSB'S
(To Be Submitted Monthly and with Final Payment Request)

Company Name: _____
Name/Contract No.: _____
Payment Request Number: _____

Name of Firm	Description of work	Total Amount Due This Month	Total Dollars Paid To Date	% of Contract Completed	Start Date of Contract	End Date of Contract

(If additional space is needed this form may be duplicated)

I hereby certify that this statement is true and that above payments have been made.

Business Information: Submitted by:

Business: _____ Authorized Representative (Print):

Address: _____ _____

_____ Title: _____

Phone: _____ Authorized Representative's Signature:

_____

Facsimile: _____ Date: _____

LOCALLY OWNED SMALL BUSINESS PURCHASING PROGRAM RULES AND REGULATIONS:

1. The Administrator of Purchasing in conjunction with the Administrator of EOC shall identify certain goods and services required by the County to be set aside for special purchasing procedures for locally owned small businesses.

2. Only certified locally owned small businesses will be allowed to submit competitive bids on the goods or services identified under paragraph (i) above.

3. The Administrator of Purchasing shall, in conjunction with the Administrator of EOC, annually review the Shelby County Capital Improvement Program to determine those projects with a construction cost of $250,000 or more. Contracts amounting to at least ten (10%) of the construction costs of such project shall be awarded to locally owned small businesses as defined herein, except as set forth in sub-paragraph (vi) of this section, either as part of the conditions of the solicitation for general contractors bidding on these projects, or as separate bids issued by the County for subcontracts that may be assigned to general contractors.

4. After adhering to all other bidding and purchasing requirements of the County, not inconsistent with this part, if no bids are received from locally owned small businesses, then the County may solicit bids for the goods or services from all other sources.

5. On all purchases and/or contracts entered into by the County, the Purchasing Administrator or his or her designee shall have the right to negotiate with any supplier of goods or services to the County for the inclusion of locally owned small business subcontractors and/or suppliers in the contract award.

6. Failure by a supplier or contractor to include locally owned small business sub-contractors or suppliers in its bid or contract may be grounds for rejection of said bid or contract unless the supplier or contractor can show documented evidence of good cause why none were included.

7. Any locally owned small business awarded a contract or purchase order under this section shall not sublet, subcontract, or assign any work or services awarded to it without the prior written consent of the Mayor or the Purchasing Administrator.

8. As to those purchases below the requirement for a formal bid solicitation (currently, under $15,000) and not included in the locally owned small business set aside, the Administrator of Purchasing shall determine if any locally owned small business offers that product or service. If so, at least one such eligible locally owned small business should be included in the vendors contacted for an opportunity to bid, and the Administrator of Purchasing may, at his discretion, designate in a purchase order the purchase of such goods and services from the identified locally owned small business.

9. In those situations where a locally owned small business as defined herein, engages in open competitive bidding for County contracts, the Administrator of Purchasing shall provide for a preference for the locally owned small business where responsibility and quality are equal. Said preferences shall not exceed five percent (5%) of the lowest possible bidder meeting specifications. The preference shall be applied on a sliding scale in the following manner:

a. A preference of up to five percent (5%) shall be allowed for contracts up to $ 500,000.00;
b. A preference of up to three and five-tenths percent (3.5%) shall be allowed for contracts up to $750,000.00;
c. A preference of two and one-half percent (2.5%) shall be allowed for contracts up to $1,000,000.00;
d. A preference of two percent (2%) shall be allowed for contracts that exceed $1,000,000.00.

10. For construction contracts over $2,000,000.00, the Administrator of Purchasing shall provide for a preference of two percent (2%) to general contractors meeting the requirements of Section 1, Subparagraph B, if fifty percent (50%) or more of the total work comprising the bid has been or will be awarded to certified locally owned small businesses. The fifty percent subcontracting threshold must be met prior to contract execution.

11. The Administrator of Purchasing may divide a single bid package for any purchase of goods and services into two or more smaller bid packages in any case that the Administrator of Purchasing reasonably believes that the smaller bid packages will result in a greater number of bids by locally owned small businesses.

12. The Administrator of Purchasing, upon approval of the County Mayor, may establish special insurance and bonding requirements for certified locally owned small businesses so long as they are not in conflict with the laws of the State of Tennessee.

13. The Administrator of Purchasing, with the approval of the County Mayor, shall adopt and promulgate, and may from time to time, amend rules and regulations not inconsistent with the provisions of this ordinance, governing the purchase of goods and services from locally owned small business concerns to effectuate and implement the Locally Owned Small Business Purchasing Program within the intent of this ordinance.

14. The Administrator of EOC shall, in conjunction with the Administrator of Purchasing, provide a written quarterly report to the Mayor and Board of Commissioners which shall include a summary of the purchases selected for this program, a listing of the contracts awarded to locally owned small businesses for the period, and the dollar amounts of each such contract, and the percentage which such contracts bear to the total amount of purchases for the period.

J. DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF_____

COUNTY OF_____

The undersigned, principal officer of _____, an employer of five (5) or more employees contracting with _____County government to provide construction services, here states under oath as follows:

1. The undersigned is a principal officer of _____ (hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.

2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title *50,* Chapter 9, of the *Tennessee Code Annotated.*

3. The Company is in compliance with T.C.A. ~ 50-9-113. Further affiant smith not.

Principal Officer

STATE OF_____

COUNTY OF_____

Before me personally appeared with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purposes therein contained. Witness my hand and seal at office this day of _____.

Notary Public
My commission expires:

K. GRATUITY DISCLOSURE FORM:

CODE OF ETHICS
Section 18-59

SHELBY COUNTY GOVERNMENT
GRATUITY DISCLOSURE FORM

INSTRUCTIONS: *This form is for all persons receiving any Shelby County Government contract, subcontract, land use approval or financial grant of money to report any gratuity that has been given, directly or indirectly, to any elected official, employee or appointee (including their spouses and immediate family members) who is involved in the decision regarding the contract, land use approval, or financial grant of money.*

1. NAME:

_____

2. DATE OF GRATUITY:

_____

3. NATURE AND PURPOSE OF THE GRATUITY:

_____

_____

_____

4. NAME OF THE OFFICIAL, EMPLOYEE, APPOINTEE, OR FAMILY MEMBER WHO RECEIVED THE GRATUITY:

_____

5. NAME OF THE PERSON OR ENTITY THAT PROVIDED THE GRATUITY:

_____

6. ADDRESS OF THE PERSON OR ENTITY THAT PROVIDED THE GRATUITY:

_____

_____

7. DESCRIPTION OF THE GRATUITY:

_____

_____

_____

8. COST OF THE GRATUITY: (If cost is unknown and not reasonably discernible by the person giving the gratuity, then the person giving the gratuity shall report a good faith estimate of the cost of the gratuity.)

_____

9. AFFIDAVIT:

The information contained in this Gratuity Disclosure Form, and any supporting documentation or materials referenced herein or submitted herewith, is true and correct to the best of my knowledge, information and belief and affirm that I have not given, directly or indirectly, any gratuity to any elected official, employee or appointee (including spouse and immediate family members) that has not been disclosed and I affirm that I have not violated the provisions of the Shelby County Government Code of Ethics.

_____ _____

Signature **Date**

_____

Print Name

A copy of your completed form will be placed on the Shelby County Internet Website.

L. FORMS TO BE SUBMITTED:

LOSB FORM A: MUST BE COMPLETED AND SUBMITTED IN YOUR BID ENVELOPE.

LOSB FORM B: MUST BE COMPLETED, SUBMITTED WITH YOUR BID DOCUMENTING ALL LOSB'S TO BE UTILIZED, THE PERCENTAGE OF UTILIZATION AND THE INTENDED SCOPE OF THE WORK.

LOSB FORM C- MUST BE COMPLETED AND SUBMITTED BY EACH LOSB PROVIDING SUBCONTRACTED GOODS AND OR SERVICES CERTIFYING THAT THEY ARE PERFORMING THE WORK AND THAT IT IS A COMMERCIALLY USEFUL FUNCTION. ONLY REQUIRED AFTER THE AWARD OF THE BID.

LOSB FORM D-MUST BE COMPLETED AND SUBMITTED BY THE SUCCESSFUL CONTRACTOR EACH MONTH CERTIFYING ALL PAYMENTS MADE TO LOSB'S.

DRUG FREE WORKPLACE AFFIDAVIT – MUST BE COMPLETED AND SUBMITTED WITH YOUR BID.

BID BOND – ALL BIDS MUST BE ACCOMPANIED BY A BANK CERTIFIED CHECK OF BANK DRAFT, LETTER OF CREDIT ISSUED BY ANY NATIONAL BANK OR APPROVED BID BOND FOR NOT LESS THAN 5% (PERCENT) OF THE AMOUNT OF THE BID. ALL PROPOSAL GUARANTEES SHALL BE MADE OUT TO THE COUNTY OF SHELBY.

NOTE: THE SUCCESSFUL CONTRACTOR WILL SUBMIT LOSB FORM C AND D.

FAILURE TO SUBMIT THE REQUIRED FORMS MAY RESULT IN YOUR BID BEING REJECTED AS BEING IN NON-COMPLIANCE WITH BID REQUIREMENTS.

VII. General Requirements:

A. Scope of Work

The County proposes replacing fans and components for two existing built-up Air Handling Units".

B. Project Time Frame

The Provider must be prepared to begin immediately upon receipt of a Notice to Proceed. The work under this contract shall be substantially completed within three hundred (300) calendar days. Liquidated damages are $250.00 per day.

C. Reservation of Rights

The County reserves the right, for any reason to accept or reject any one or more proposals, to negotiate the term and specifications for the services provided, to modify any part of the Sealed Bid, or to issue a new Sealed Bid.

D. Selection Criteria

Contract(s) will be awarded based on the lowest responsive proposals received. The contents of the proposal of the successful Bidders will become contractual obligations and failure to accept these obligations in a contractual agreement may result in cancellation of the award.

E. Additional Information and References

Any additional information that would be helpful to the County evaluating your proposal, including a list of current and former clients with a similar profile to Shelby County should be submitted.

VIII. Award of contract:

Bidders are advised that the lowest responsive proposal per set will be awarded the contract.

IX. NOTICE TO BIDDERS

Time and Place of Opening Bids:

March 19, 2014
Shelby County Government
160 North Main Street, Suite 900
Memphis, Tennessee 38103

Receipt of Bids:

Sealed Bid's for the improvements described herein will be received at THE OFFICE OF THE SHELBY COUNTY ADMINISTRATOR OF PURCHASING, SUITE 900, SHELBY COUNTY ADMINISTRATION BUILDING, 160 NORTH MAIN, MEMPHIS, TENNESSEE 38103, until **March 19, 2014 @ 2:30 PM.**

Description of Work:

The proposed work is officially known as: **HVAC RETROFIT, 201 POPLAR AVENUE, PHASE 1**

Pre-Bid Meeting:

Bidders are encouraged to attend a pre-bid meeting to be held on **March 12, 2014 @ 9:30 A.M.** at The Shelby County Criminal Justice Center, 201 Poplar Avenue, Auditorium, First Floor, Memphis, Tennessee 38103.

Instruction to Bidders:

(a) The SELAED BID MUST BE DOWNLOADED FROM THE SHELBY COUNTY GOVERNMENT WEBSITE at www.shelbycountytn.gov and click the link "Department" at the top, then P for the Purchasing Department, then click on the link "Bids."
(b) All bids must be accompanied by a bank cashier's check or bank draft, letter of credit issued by any national bank or certificate of deposit therein, duly assigned, or certified check or approved bid bond for not less than five (5) percent of the amount of the bid. All proposal guarantees shall be made out to the COUNTY OF SHELBY.
(c) All bidders must be licensed by the Tennessee State Board of Licensing
(d) General Contractors Evidence of this license must appear on the title page of the Proposal in the space provided, and also on the exterior of the sealed envelope. The envelope enclosing each bid must show the Contractor's name, license number, expiration date thereof, and license classification of the contractor(s) bidding for the prime contract and for the masonry, electrical, plumbing, heating, ventilation, and air conditioning subcontracts in accordance with TCA 62-6-119. Lacking all of this information, the bid shall be rejected and returned to the bidder unopened.

.

EOC Requirements:

As a condition precedent to bidding, bidders shall have received a current "Equal Opportunity Compliance Eligibility Number" which must be attached to each bid submission. To receive an E.O.C. Eligibility Number, specific information must be received by the E.O.C. Department at least 48 hours prior to the bid opening. To verify your E.O.C. Number or to receive information for obtaining a number, contact the E.O.C. Department, 222-1100. Use of Locally Owned Small Business (LOSB) participation on County projects is mandatory.

Bidders are encouraged to contact County-certified LOSB firms from the listing that can be obtained from Shelby County EOC department. Bidders may also provide the names of firms they believe would qualify as LOSB firms, by notifying the E.O.C. Department and filing the required forms at least five (5) working days prior to the bid opening

A Locally Owned Small Business is defined as a sole proprietorship, corporation, partnership, or joint venture located within Shelby County and at least 51% owned, operated and managed by a Shelby County resident and having an average annual sale of $5,000,000.00 or less over the past three (3) years.

Rejection of Bids:

The **COUNTY OF SHELBY** reserves the right to reject any and all proposals and to waive technicalities in any proposal.

BY ORDER OF: **CLIFTON DAVIS**

PURCHASING ADMINISTRATOR
SHELBY COUNTY GOVERNMENT

_____, 2014

SECTION 00 41 13

BID FORM

THE PROJECT AND THE PARTIES

1.01 TO:

A. SHELBY COUNTY GOVERNMENT
160 N. MAIN ST.
MEMPHIS, TN 38103

1.02 FOR:

A. SBI-000242 HVAC Retrofit Phase I
Criminal Justice Center
201 Poplar Avenue
Memphis, TN 38103

1.03 DATE: _____ (Bidder to enter date)

1.04 SUBMITTED BY: (Bidder to enter name and address)

A. Bidder's Full Name _____
1. Address _____
2. City, State, Zip_____

1.05 BASE BID

A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by Pickering Firm, Inc. for the above-mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:
_____
_____ dollars
($_____).

B. All applicable federal taxes are included and State of Tennessee taxes are included in the Bid Sum.

C. The Base Bid amount shall incorporate a 10% allowance for unidentified work as a contingency. Contingency funds may only be applied toward work that is not identified by the contract documents and is approved by the Owner. Any unused funds will be deducted from the contract by deductive change order at contract close-out.

1.06 ALTERNATES

A. Include work for the following Alternates, as specified in Section 01 23 00 Alternates, for the additional lump sums of (in both words and figures).Indicate if lump sum is additive or deductive.

ALTERNATE No.1: Replace existing electric coils in AHU-5B & AHU-7B in lieu of refurbishing.
_____
_____ dollars
($_____).

ALTERNATE No. 2: Provide AFMS stations in AHU-5B & AHU-7B supply air mains.
_____
_____ dollars
($_____).

ALTERNATE No. 3: Replace existing supply air fan in AHU-5B with a Fan Wall system in lieu of replacement with a plenum fan and high pressure wall.

_____
_____ dollars
($_____).

1.07 ACCEPTANCE

A. This offer shall be open to acceptance and is irrevocable for thirty days from the bid closing date.

B. If this bid is accepted by Owner within the time period stated above, we will:
   1. Execute the Agreement within seven days of receipt of Notice of Award.
   2. Furnish the required bonds within seven days of receipt of Notice of Award.
   3. Commence work within seven days after written Notice to Proceed of this bid.

C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.08 CONTRACT TIME

A. If this Bid is accepted, we will: Complete the Work within 300 days of Notice to Proceed.

B. If the Contractor fails to complete the work within the time specified in the Contract or any extensions, the Contractor shall pay the Owner as liquidated damages, the sum of $250.00 for each day of delay.

1.09 CHANGES TO THE WORK

A. When Architect establishes that the method of valuation for Changes in the Work (excluding Allowance Markup Percentage changes listed below) will be net cost plus a percentage fee in accordance with General Conditions, our percentage fee will be:
   1. _____ percent overhead and profit on the net cost of our own Work;
   2. _____ percent on the cost of work done by any Subcontractor.

B. On work deleted from the Contract, our credit to Owner shall be Architect-approved net cost plus _____ of the overhead and profit percentage noted above.

1.10 ADDENDA

A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
   1. Addendum # _____ Dated _____.
   2. Addendum # _____ Dated _____.
   3. Addendum # _____ Dated _____.
   4. Addendum # _____ Dated _____.

1.11 BID FORM SUPPLEMENTS

A. The following Supplements are attached to this Bid Form and are considered an integral part of this Bid Form:
   1. Document 00 43 10 - Supplement A - Subcontractors: Include the names of all Subcontractors and the portions of the Work they will perform.

2. Alternates: Include the cost variations to the Bid Sum applicable to the Work as described in Section 01 23 00.

1.12 BID FORM SIGNATURE(S)

A. The Corporate Seal of

B. _____

C. (Bidder - print the full name of your firm)

D. was hereunto affixed in the presence of:

E. _____

F. (Authorized signing officer, Title)

G. (Seal)

H. _____

I. (Authorized signing officer, Title)

1.13 If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF BID FORM

SECTION 00 43 10

SUPPLEMENT A - LIST OF SUBCONTRACTORS

PARTICULARS

Herewith is the list of Subcontractors referenced in the bid submitted by:

(Bidder) _____

To (Owner) .....

Dated _____ and which is an integral part of the Bid Form.

The following work will be performed (or provided) by Subcontractors and coordinated by us:

LIST OF SUBCONTRACTORS

WORK SUBJECT	SUBCONTRACTOR NAME
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

END OF SUPPLEMENT A

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A310

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we

(Here insert full name and address or legal title of Contractor>

as Principal, hereinafter called the Principal, and

(Here insert full name and address or legal title of Surety>

a corporation duly organized under the laws of the State of
as Surety, hereinafter called the Surety, are held and firmly bound unto

(Here insert full name and addre5s or legal title of Owner)

as Obligee, hereinafter called the Obligee, in the sum of

Dollars ($ *),*

for the payment 4f which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

(Here insert lull name, address and description of project)

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this day of 20

(Principal) *(Seal)*

(Witne5s)

(Title)

(Surety) *(Seal)*

(Witness)

(Title)

THIS IS A DRAFT ONLY!! ORIGINAL DOCUMENTS IN EXECUTED FORM ARE REQUIRED PRIOR TO COUNTY SIGNATURE. IT IS A MANDATORY REQUIREMENT THAT ALL DOCUMENTS WHICH ARE REQUIRED TO BE ATTACHED TO THIS AGREEMENT BE ATTACHED BEFORE SUBMITTAL TO SHELBY COUNTY FOR SIGNATURE. IF NOT, THE AGREEMENT WILL BE RETURNED FOR COMPLETION.

COUNTY/CONTRACTOR AGREEMENT

OWNER: SHELBY COUNTY GOVERNMENT
160 N. MAIN ST.
MEMPHIS, TN 38103

CONTRACTOR:

**ARCHITECT\
ENGINEER:**

THIS CONTRACT made and entered into this _____ day of _____, 20__, by and between SHELBY COUNTY GOVERNMENT, through its governing body and authorized representative, party of the first part, hereinafter referred to as "COUNTY," and _____, party of the second part, hereinafter referred to as "CONTRACTOR."

WITNESSETH

WHEREAS, the COUNTY issued Sealed Bid No. _____ for _____, hereinafter in this Contract referred to as "PROJECT".

WHEREAS, the said CONTRACTOR submitted a bid/proposal in accordance with bid specifications, a copy of which is attached hereto as Exhibit "A" and incorporated herein by reference, which bid was accepted by COUNTY.

NOW, THEREFORE, CONTRACTOR agrees and undertakes to **(describe work to be done)** in accordance with the Bid Specifications which are on file in the Shelby County Purchasing Department and which are incorporated herein by reference, and at the price quoted for said PROJECT by CONTRACTOR. Further, the parties agree that they will be governed by the Shelby County General Conditions of the Contract for work to be performed. The Contractor acknowledges that it has read and is familiar with the contents of said General Conditions, agrees to be bound thereby and has executed a copy of same at the place indicated thereon. A copy of said General Conditions is attached hereto as Exhibit "B" and incorporated fully herein by reference.

SECTION 1. CONTRACTOR'S RESPONSIBILITIES

1. CONTRACTOR shall perform all necessary work required by the contract documents for the satisfactory completion in full of the PROJECT.

2. CONTRACTOR shall coordinate all work with COUNTY through _____. Work shall be scheduled on a regular basis in as timely and orderly a manner as possible.

3. The CONTRACTOR shall give a Performance Bond and Labor and Material Bond, each equal to 100% of the amount of the Contract, with surety to be approved by the COUNTY, conditioned upon the full and faithful performance of all the terms and conditions of the Contract with special reference to paying in full in lawful money of the United States, all just and valid claims for material and labor entered into for the said work covered by this Contract. That further, this Contract shall not take effect until these Bonds have been executed and approved by the County.

4. The CONTRACTOR further agrees to provide insurance coverage of the type and in the amounts as required in section III, Specific Provision, paragraph 31.

5. The COUNTY shall pay the CONTRACTOR for the performance of the Contract _____ ($)Dollars, subject to additions and deductions as provided in the contract documents.

6. The CONTRACTOR shall execute the entire work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, within _____ (__) calendar days from the actual start date as specified in the written "Notice to Proceed."

7. All work by CONTRACTOR is to be performed in a manner satisfactory to COUNTY, and in accordance with the established customs, practices and procedures of COUNTY. CONTRACTOR is to periodically request sufficient conferences to insure that the work is being done by CONTRACTOR in a satisfactory manner in accordance with the wishes of COUNTY.

SECTION II. METHOD OF PAYMENT

1. CONTRACTOR shall provide an Application for Payment to be received by the Architect/Engineer not later than the 25th day of each month. COUNTY shall make payment to the CONTRACTOR not later than the 20th day of the following month. If an Application for Payment is received by the Architect/Engineer after the application date fixed above, payment shall be made by COUNTY not later than forty-five (45) days after receipt of the Application for Payment. If the CONTRACTOR submits an incorrect Application for Payment, payment date will be extended thirty (30) days from the date of correction.

2. Application for payment shall indicate the percentage of completion of each portion of the work as of the end of the period covered by the Application for Payment.

3. Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

   a. Take that portion of the contract sum properly allocable to completed work as determined by multiplying the percentage completion of each portion of the work by the total Contract Sum less retainage of five (5%) percent;

   b. Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by COUNTY, suitably stored off the site ate a location agreed upon in writing), less retainage of five (5%) percent;

c. Subtract the aggregate of previous payments made by the COUNTY; and

d. Subtract amounts, if any, for which the Architect/ Engineer has withheld or nullified a Certificate of Payment as provided in the General Conditions to Construction Contracts.

4. When all work embraced in this Contract has been fully and completely performed on the part of the CONTRACTOR, and accepted by the COUNTY, there shall be a statement by CONTRACTOR of the work done according to the terms herein, and the balance appearing to be due the CONTRACTOR out of funds applicable for payment for this work, excepting there from any sum that may be lawfully retained under the provisions of this Contract, Specifications, and General Conditions to Construction Contracts and all such funds as may be due the COUNTY.

5. The COUNTY shall have the right, at its option, to discharge the CONTRACTOR for any breach of any provision of this Contract, and such discharge shall not affect the right of the COUNTY against sureties on the Bonds provided.

6. It is further mutually agreed between the parties hereto that if at any time after the execution of this Contract and the Surety Bonds attached hereto for its faithful performance, the COUNTY shall deem the surety or sureties upon such bond inadequate to cover the performance of the work, the CONTRACTOR shall, at its expense, within five (5) days after the receipt of notice from the COUNTY so to do, furnish as additional bond or bonds, in satisfactory amount to the COUNTY. In such event, no further payment to the CONTRACTOR shall be deemed due under this Contract until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the COUNTY.

7. CONTRACTOR further agrees to provide COUNTY an amount equal to _____ ($) Dollars per day for liquidated damages for each consecutive calendar day required for the completion of the contract beyond the time stipulated. **(NOTE: If this paragraph is inapplicable, then N/A [not applicable] should be inserted in the applicable space.)**

8. Other contract provisions, including but not limited to

insurance provisions may be required to enter into a contract with Shelby County Government.

SECTION III. SPECIFIC PROVISIONS

The parties further agree as follows:

1. CONTROL

All Services by the CONTRACTOR will be performed in a manner satisfactory to the COUNTY, and in accordance with the generally accepted business practices and procedures of the COUNTY.

2. CONTRACTOR'S PERSONNEL

The CONTRACTOR certifies that it presently has adequate qualified personnel to perform all Services required under this Contract. All work performed during the Term of this Contract will be supervised by the CONTRACTOR. The CONTRACTOR further certifies that all of its employees assigned to serve the COUNTY have such knowledge and experience as required to perform the duties assigned to them. Any employee of the CONTRACTOR who, in the opinion of the COUNTY, is incompetent, or whose conduct becomes detrimental to the work, shall immediately be removed from association with the Services under this Contract.

3. INDEPENDENT STATUS

a. Nothing in this Contract shall be deemed to represent that the CONTRACTOR, or any of the Contractor’s employees or agents, are the agents, representatives, or employees of the COUNTY. The CONTRACTOR will be an independent CONTRACTOR over the details and means for performing the Services under this Contract. Anything in this Contract which may appear to give the COUNTY the right to direct the CONTRACTOR as to the details of the performance of the Services under this Contract or to exercise a measure of control over the CONTRACTOR is solely for purposes of compliance with local, state and federal regulations and means that the CONTRACTOR will follow the desires of the COUNTY only as to the intended results of the scope of this Contract.

b. It is further expressly agreed and understood by CONTRACTOR that neither it nor its employees or agents are entitled to any benefits which normally accrue to employees of the COUNTY; that CONTRACTOR has been retained by the COUNTY to perform the Services specified herein (not hired) and that the remuneration specified herein is considered fees for the Services performed (not wages) and that invoices submitted to the COUNTY by CONTRACTOR for the Services performed shall be on the Contractor's letterhead.

4. REPORTS

CONTRACTOR shall prepare and submit quarterly reports of its activities, funded under this Contract, to the originating department and the Contract Administration Department of the COUNTY. The reports shall include an itemization of the use of County's funds, inclusive of specific Services delivered. Any such reports provided to the COUNTY shall be prepared with the understanding that the COUNTY may make such reports available to the public. The quarterly reports and all books of account and financial records that are specific to the work performed in accordance with this Contract may be subject to audit by the Director of the Division of Administration and Finance of the COUNTY. The COUNTY shall have the right to withhold future disbursement of funds under this Contract and any future Contracts until this provision has been met.

5. TERMINATION OR ABANDONMENT

a. It shall be cause for the immediate termination of this Contract if, after its execution, the COUNTY determines that:

i) Either the CONTRACTOR or any of its principals, partners or corporate officers, if a corporation, including the corporation itself, has plead nolo contendere, or has plead or been found guilty of a criminal violation, whether state or federal, involving, but not limited to, governmental sales or purchases, including but not limited to the rigging of bids, price fixing, or any other collusive and illegal activity pertaining to bidding and governmental contracting; or

ii) CONTRACTOR has subcontracted, assigned, delegated, transferred its rights, obligations or interests

under this Contract without the County's consent or approval; or

iii) CONTRACTOR has filed bankruptcy, become insolvent or made an assignment for the benefit of creditors, or a receiver, or similar officer has been appointed to take charge of all or part of CONTRACTOR assets.

b. The COUNTY may terminate the Contract upon five (5) days written notice by the COUNTY or its authorized agent to the CONTRACTOR for Contractor's failure to provide the Services specified under this Contract.

c. This Contract may be terminated by either party by giving thirty (30) days written notice to the other, before the effective date of termination (the "Termination Date"). In the event of such termination, the CONTRACTOR shall be paid for all Services rendered prior to the Termination Date, provided the CONTRACTOR shall have delivered to COUNTY such statements, accounts, reports and other materials as required under this Contract; however, CONTRACTOR shall not be compensated for any anticipatory profits that have not been earned as of the date of the Termination Date. All Services completed by CONTRACTOR prior to the Termination Date shall be documented and tangible work documents shall be transferred to and become the sole property of the COUNTY prior to payment for the Services rendered.

d. Notwithstanding the above or any section herein to the contrary, CONTRACTOR shall not be relieved of liability to the COUNTY for damages sustained by the COUNTY by virtue of any breach of the Contract by CONTRACTOR and the COUNTY may withhold any payments to CONTRACTOR for the purpose of setoff until such time as the exact amount of damages due the COUNTY from CONTRACTOR is determined.

6. <u>COMPENSATION FOR CORRECTIONS</u>

No compensation shall be due or payable to CONTRACTOR pursuant to this Contract for any Contractor's Services performed by the CONTRACTOR in connection with effecting of corrections to the design of the Services, when such corrections are required as a direct result of negligence by the CONTRACTOR to properly fulfill any of his obligations as set forth in this Contract.

7. <u>SUBCONTRACTING, ASSIGNMENT OR TRANSFER</u>

a. Any subcontracting, assignment, delegation or transfer of all or part of the rights, responsibilities, or interest of either party to this Contract is prohibited unless by written consent of the other party. No subcontracting, assignment, delegation or transfer shall relieve the CONTRACTOR from performance of the Services under this Contract. The COUNTY shall not be responsible for the fulfillment of the Contractor's obligations to its transferors or subcontractors.

b. Upon the request of the other party, the subcontracting, assigning, delegating or transferring party shall provide all documents evidencing the subcontract, assignment, delegation or transfer.

8. CONFLICT OF INTEREST

The CONTRACTOR covenants that it has no public or private interest, and will not acquire directly or indirectly any interest, which would conflict in any manner with the performance of the Services. The CONTRACTOR warrants that no part of the total Contract Fee shall be paid directly or indirectly to any officer or employee of the COUNTY as wages, compensation, or gifts in exchange for acting as officer, agent, employee, subcontractor or consultant to the CONTRACTOR in connection with any work contemplated or performed relative to this Contract.

9. CONTINGENT FEES

The CONTRACTOR warrants that it has not employed or retained any company or person other than a bona fide employee working solely for the CONTRACTOR, to solicit or secure this Contract, and that it has not paid or agreed to pay any company or person, other than a bona fide employee working solely for the CONTRACTOR any fee, commission, percentage, brokerage fee, gift, or any other consideration contingent upon or resulting from the award or making of this Contract. For breach or violation of this warranty, the COUNTY will have the right to recover the full amount of such fee, commission, percentage, brokerage fee, gift, or other consideration.

10. EMPLOYMENT OF COUNTY WORKERS

The CONTRACTOR will not engage, on a full, part-time, or any other basis during the Term of the Contract, any professional or technical personnel who are or have been at any time during

the Term of the Contract in the employ of the COUNTY.

11. ACCESS TO RECORDS

During all phases of the work and Services to be provided hereunder, CONTRACTOR agrees to permit duly authorized agents and employees of the COUNTY to enter Contractor's offices for the purpose of inspections, reviews, and audits during normal working hours. Reviews may also be accomplished at meetings that are arranged at mutually agreeable times and places. The CONTRACTOR will maintain all books, documents, papers, accounting records, and other evidence pertaining to the Fee paid under this Contract and make such materials available at their offices at all reasonable times during the Term of this Contract and for three (3) years from the date of payment under this Contract for inspection by the COUNTY or by any other governmental entity or agency participating in the funding of this Contract, or any authorized agents thereof. Copies of said records shall be furnished to the COUNTY upon request.

12. ARBITRATION

Any dispute concerning a question of fact in connection with the work not disposed of by agreement between the CONTRACTOR and the COUNTY will be referred to the Shelby County Contract Administrator or its duly authorized representative, whose decision regarding same will be final.

13. RESPONSIBILITIES FOR CLAIMS AND LIABILITIES

a. CONTRACTOR shall indemnify, defend, save and hold harmless the COUNTY, and its elected officials, officers, employees, agents, assigns, and instrumentalities from and against any and all claims, liability, losses or damages—including but not limited to Title VII and 42 USC 1983 prohibited acts—arising out of or resulting from any conduct; whether actions or omissions; whether intentional, unintentional, or negligent; whether legal or illegal; or otherwise that occur in connection with or in breach of this Contract or in the performance of the Services hereunder, whether performed by the CONTRACTOR its subcontractors, agents, employees or assigns. This indemnification shall survive the termination or conclusion of this Contract.

b. CONTRACTOR expressly understands and agrees that any insurance protection required by this Contract or

otherwise provided by the CONTRACTOR shall in no way limit the responsibility to indemnify, defend, save and hold harmless the COUNTY or its elected officials, officers, employees, agents, assigns, and instrumentalities as herein provided.

c. The COUNTY has no obligation to provide legal counsel or defense to CONTRACTOR or its subcontractors in the event that a suit, claim or action of any character is brought by any person not a party to this agreement against CONTRACTOR as a result of or relating to performance of the Services under this Contract.

d. Except as expressly provided herein, the COUNTY has no obligation for the payment of any judgment or the settlement of any claims against CONTRACTOR as a result of or relating to performance of the Services under this Contract.

e. CONTRACTOR shall immediately notify the COUNTY of any claim or suit made or filed against CONTRACTOR or its subcontractors regarding any matter resulting from or relating to Contractor's performance of the Services under this Contract and will cooperate, assist and consult with the COUNTY in the defense or investigation thereof.

14. GENERAL COMPLIANCE WITH LAWS

a. The CONTRACTOR certifies that it is qualified or will take steps necessary to qualify to do business in the State of Tennessee and that it will take such action as, from time to time, may be necessary to remain so qualified and it shall obtain, at its expense all licenses, permits, insurance, and governmental approvals, if any, necessary to the performance of the Services under this Contract.

b. The CONTRACTOR is assumed to be familiar with and agrees that at all times it will observe and comply with all federal, state, and local laws, ordinances, and regulations in any manner affecting the performance of the Services. The preceding shall include, but is not limited to, compliance with all Equal Employment Opportunity laws, the Fair Labor Standards Act, Occupational Safety and Health Administration (OSHA) requirements, and the Americans with Disabilities Act (ADA).

c. This Contract will be interpreted in accordance with the laws of the State of Tennessee. By execution of this Contract, the CONTRACTOR agrees that all actions, whether sounding in contract or in tort, relating to the validity, construction, interpretation and enforcement of this Contract will be instituted and litigated in the courts of the State of Tennessee, located in Shelby County, Tennessee, and in no other. In accordance herewith, the parties to this Contract submit to the jurisdiction of the courts of the State of Tennessee located in Shelby County, Tennessee.

15. NON-DISCRIMINATION

The CONTRACTOR hereby agrees, warrants, and assures compliance with the provisions of Title VI and VII of the Civil Rights Act of 1964 and all other federal statutory laws which provide in whole or in part that no person shall be excluded from participation or be denied benefits of or be otherwise subjected to discrimination in the performance of this Contract or in the employment practices of the CONTRACTOR on the grounds of handicap and/or disability, age, race, color, religion, sex, national origin, or any other classification protected by federal, Tennessee State Constitutional or statutory law. The CONTRACTOR shall upon request show proof of such non-discrimination and shall post in conspicuous places available to all employees and applicants notices of non-discrimination.

16. ENTIRE AGREEMENT

This Contract represents the entire and integrated agreement between the parties and supersedes all prior negotiations, representations or agreements, whether oral or written.

17. AMENDMENT

This Contract may be modified or amended only by written instrument signed by both parties.

18. SEVERABILITY

If any provision of this Contract is held to be unlawful, invalid or unenforceable under any present or future laws, such provision shall be fully severable; and this Contract shall then be construed and enforced as if such unlawful, invalid or unenforceable provision had not been a part hereof. The remaining provisions of this Contract shall remain in full

force and effect and shall not be affected by such unlawful, invalid or unenforceable provision or by its severance here from. Furthermore, in lieu of such unlawful, invalid, or unenforceable provision, there shall be added automatically as a part of this Contract a legal, valid and enforceable provision as similar in terms to such unlawful, invalid or unenforceable provision as possible.

19. NO WAIVER OF CONTRACTUAL RIGHT

No waiver of any term, condition, default, or breach of this Contract, or of any document executed pursuant hereto, shall be effective unless in writing and executed by the party making such waiver; and no such waiver shall operate as a waiver of either (a) such term, condition, default, or breach on any other occasion or (b) any other term, condition, default, or breach of this Contract or of such document. No delay or failure to enforce any provision in this Contract or in any document executed pursuant hereto shall operate as a waiver of such provision or any other provision herein or in any document related hereto. The enforcement by any party of any right or remedy it may have under this Contract or applicable law shall not be deemed an election of remedies or otherwise prevent such party from enforcement of one or more other remedies at any time.

20. MATTER TO BE DISREGARDED

This title of the several sections, subsections, and paragraphs set forth in this Contract are inserted for convenience of reference only and shall be disregarded in construing or interpreting any of the provisions of this Contract.

21. SUBJECT TO FUNDING

This Contract is subject to annual appropriations of funds by the Shelby County Government. In the event sufficient funds for this Contract are not appropriated by Shelby County Government for any of its fiscal period during the Term hereof, then this Contract will be terminated. In the event of such termination, the CONTRACTOR shall be entitled to receive just and equitable compensation for any satisfactory work performed as of the Termination Date.

22. TRAVEL EXPENSES (If Applicable)

All travel expenses payable under this Contract shall be in

accordance with the County Travel Policy and Procedures. This includes advance written travel authorization, submission of travel claims, documentation requirements, and reimbursement rates. No travel advances will be made by the County.

23. PERFORMANCE AND LABOR AND MATERIALS BONDS

CONTRACTOR will provide COUNTY within ten (10) days from inception date of this Contract a Performance and Labor and Materials Bond each in the amount of 100% of the Contract price for each year that this contract is in effect. Said Bonds may be pro-rated for the initial year in the event that this period of time is less than a full twelve (12) month period.

24. NON-LIABILITY FOR CONTRACTOR EMPLOYEE TAXES

Neither CONTRACTOR nor its personnel are County's employees, and COUNTY shall not take any action or provide Contractor's personnel with any benefits and shall have no liability for the following:

a. Withholding FICA (Social Security) from Contractor's payments;

b. Making state or federal unemployment insurance contributions on behalf of CONTRACTOR or its personnel;

c. Withholding state and federal income tax from payment to CONTRACTOR;

d. Making disability insurance contributions on behalf of CONTRACTOR;

e. Obtaining workers' compensation insurance on behalf of CONTRACTOR or Contractor's personnel.

25. INCORPORATION OF OTHER DOCUMENTS

a. CONTRACTOR shall provide Services pursuant to this Contract in accordance with the terms and conditions set forth within the Shelby County Request for Proposals/Bids as well as the Response of CONTRACTOR thereto, all of which are maintained on file within the Shelby County Purchasing Department and incorporated herein by reference.

b. It is understood and agreed between the parties that in

the event of a variance between the terms and conditions of this Contract and any amendment thereto and the terms and conditions contained either within the Request for Proposals/Bids or the Response thereto, the terms and conditions of this Contract as well as any amendment shall take precedence and control the relationship and understanding of the parties.

26. CONTRACTING WITH LOCALLY OWNED SMALL BUSINESSES

The CONTRACTOR shall take affirmative action to assure that Locally Owned Small Businesses that have been certified by the COUNTY are utilized when possible as sources of supplies and equipment, construction and services.

27. RIGHT TO REQUEST REMOVAL OF Contractor’s EMPLOYEES

The COUNTY may interview the personnel CONTRACTOR assigns to County’s work. COUNTY shall have the right, at any time, to request removal of any employee(s) of CONTRACTOR, whom COUNTY deems to be unsatisfactory for any reason. Upon such request, CONTRACTOR shall use all reasonable efforts to promptly replace such employee(s) with substitute employee(s) having appropriate skills and training.

28. INCORPORATION OF WHEREAS CLAUSES

The foregoing whereas clauses are herby incorporated into this Contract and made a part hereof.

29. DISCLOSURE OF REPORTS, DATA OR OTHER INFORMATION

Notwithstanding anything to the contrary contained herein or within any other document supplied to COUNTY by CONTRACTOR, CONTRACTOR understands and acknowledges that COUNTY is a governmental entity subject to the laws of the State of Tennessee and that any reports, data or other information supplied to COUNTY by CONTRACTOR due to Services performed pursuant to this Contract is subject to being disclosed as a public record in accordance with the laws of the State of Tennessee.

30. ORGANIZATION STATUS AND AUTHORITY

a. CONTRACTOR represents and warrants that it is a corporation, limited liability company, partnership, or other entity duly organized, validly existing and in good standing under the laws of the state of Tennessee; it has

the power and authority to own its properties and assets and is duly qualified to carry on its business in every jurisdiction wherein such qualification is necessary.

b. The execution, delivery and performance of this Contract by the CONTRACTOR has been duly authorized by all requisite action and will not violate any provision of law, any order of any court or other agency of government, the organizational documents of CONTRACTOR, any provision of any indenture, agreement or other instrument to which CONTRACTOR is a party, or by which Contractor's respective properties or assets are bound, or be in conflict with, result in a breach of, or constitute (with due notice or lapse of time or both) a default under any such indenture, agreement or other instrument, or result in the creation or imposition of any lien , charge or encumbrance of any nature whatsoever upon any of the properties or assets.

31. INSURANCE REQUIREMENTS

a. The CONTRACTOR shall purchase and maintain, in a company or companies licensed to do business in the State of Tennessee, such insurance as will protect the County from claims which may arise out of or result from the Contractor's operations under the Contract, whether such operations are performed by himself or by any subcontractors or by anyone directly or indirectly employed by any of them, or by anyone for whose acts the CONTRACTOR or subcontractor may be liable.

b. The insurance required shall be written for not less than any limits of liability specified or required by law, whichever is greater. Shelby County Government, its elected officials, appointees and employees will be named as additional insured. All policies will provide for thirty (30) days written notice to COUNTY of cancellation or material change in coverage provided. The Contractor shall immediately notify Shelby county Government, Contract Administration, 160 N. Main Street, Suite 550, Memphis, Tennessee of cancellation or changes in any of the insurance coverage required. The CONTRACTOR will maintain throughout the life of this Contract insurance, through insurers rated A- or better by A.M. Best, in the following minimum requirements:

i) Commercial General Liability Insurance- $1,000,000.00 limit per occurrence for bodily injury and property damage/$1,000,000.00 personal and advertising injury/$2,000,000.00 General Aggregate/$2,000,000.00 Products-Completed Operations Aggregate. Shelby County Government, its elected officials, appointees, employees, volunteers, and members of boards, agencies, and commissions will be listed as additional insured regarding operations under this program. The insurance shall include coverage for the following:

a) Premises/Operations
b) Products/Completed Operations
c) Personal Injury
d) XCU coverage, where applicable
e) Contractual Liability
f) Independent Contractors
g) Broad Form Property Damage
h) When contract is awarded, the Contractor will be required to provide the County with a copy of the additional insured endorsement.

ii) Business Automobile Liability Insurance - $1,000,000.00 each accident for bodily injury and property damage. Coverage is to be provided on all:

a) Owned/Leased Autos
b) Non-owned Autos
c) Hired Autos

iii) Workers Compensation and Employer’s liability Insurance – All owners, sole proprietors, partners, and officers will elect to be covered by workers compensation coverage, regardless of requirement by Tennessee state status. Policy is to be specifically endorsed to include these individuals for coverage. Coverage is to include:

a. Employers Liability Coverage for $1,000,000 per accident;
b. Employers Liability Disease each employee $1,000,000; and
c. Employers Liability Disease Policy Limit $1,000,000

Note: The Contractor's workers compensation policy will include the following endorsement: WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT: (form WC 00 03 13) A completed copy of this form will be included in documents provided to Shelby County Government by Provider's insurance company.

iv) Builders Risk Insurance or Installation Floater (as applicable) for project. – All risk coverage in the amount of replacement cost of the structure/equipment, which is to be built or installed.

c. CONTRACTOR shall provide County with a current copy of the Certificate of Insurance at the time of contracting and shall maintain said insurance during the entire Contract period as well as provide renewal copies on each anniversary date. The certificate holder is to read:

Shelby County Government
Purchasing Department
160 N. Main, Suite 550
Memphis, TN 38103

d. Self insured retentions or deductibles of $25,000 or over per loss or claims must be reviewed and agreed to by Shelby County Government prior to commencement of work under this program.

All policies will provide for 30 day written notice to Shelby County of cancellation of coverage provided. Ten (10) days notice applicable to non-payment of premium. If insurer is not required by the policy terms and conditions to provide written notice of cancellation to Shelby County, the Contractor//Contractor will provide immediate notice to Shelby County.

32. NOTICE

Any notices required or permitted to be given under the provisions of this Contract shall be effective only if in writing and delivered either in person to the County's authorized agent or by First Class or U.S. Mail to the addresses set forth in the Contract, or to such other person or address as either party may designate in writing and deliver as herein provided.

33. HIPAA (If applicable)

CONTRACTOR warrants to the COUNTY and State that it is familiar with the requirements of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and its accompanying regulations, and will comply with all applicable HIPAA requirements in the course of this Contract. CONTRACTOR warrants that it will cooperate with the COUNTY and State in the course of performance of the Contract so that all parties will be in compliance with HIPAA, including cooperation and coordination with COUNTY and State privacy officials and other compliance officers required by HIPAA and its regulations. CONTRACTOR will sign any documents that are reasonably necessary to keep the State and the COUNTY in compliance with HIPAA, including, but not limited to, business associate agreements.

It is agreed that the following documents are made a part of and incorporated fully into this construction Contract:

1. Performance Bond
2. Labor and Material Bond
3. Insurance Certificate
4. Bid Specifications (SB #_____, _____)
5. Contractor's Bid/Proposal (Exhibit "A")
6. General Conditions to Contract (Exhibit "B")
7. List of subcontractors who will be performing work on project with attached required information per Exhibit "C"

NOTE: THE ABOVE DOCUMENTS MUST BE ATTACHED BEFORE EXECUTION OF THIS AGREEMENT BY SHELBY COUNTY.

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A311

Performance Bond

KNOW ALL MEN BY THESE PRESENTS: that **(Here insert full name and address or legal Idle of Contractor)**

as Principal, hereinafter called Contractor, and, **(Here insert lull name and address or legal title of Surety)**

as Surety, hereinafter called Surety, are held and firmly bound unto

(Here insert lull name and address or legal title of Owner)

as Obligee, hereinafter called Owner, in the amount of

Dollars ($),

for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated 20 entered into a contract with Owner for

(Here insert full name, address and description of project)

in accordance with Drawings and Specifications prepared by

(Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

PERFORMANCE BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

1) Complete the Contract in accordance with its terms and conditions, or

2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this day of 20

_____

____

_____

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A311

Labor and Material Payment Bond

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENTS: that **(Here insert full name and address or legal title or contractor)**

as Principal, hereinafter called Principal, and, **(Here insert full name and address or legal title of Surety)**

as Surety, hereinafter called Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the

amount of

(Here insert a sum equal to at least one-half of the contract price)

Dollars ($

for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Principal has by written agreement dated 20 entered into a contract with Owner for
(Here insert full name, address and description of project)

in accordance with Drawings and Specifications prepared by

re insert full name and address **or legal title of Architect)**

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

LABOR AND MATERIAL PAYMENT BOND

NOW. THEREFORE. THE CONDITION OF THIS OBLIGATION jS such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimants work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within 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, stating with substantial

Signed and sealed this

-- *(Wi(nc~s)*
(VVilnss)

day of

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 mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place 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 aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

20

(Principal)

(TiIlt)

(Surt'ty) **(Seal)**

SHELBY COUNTY GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Rev. 5/24/99

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE I
CONTRACT DOCUMENTS

1.1 Definitions

1.1.1 The Contract Documents

The Contract Documents consist of the Owner-Contractor Agreement, the conditions of the Contract (General, Supplementary and other conditions), the Drawings, the Specifications, and all Addenda issued prior to and all modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Engineer pursuant to Subparagraph 2.2.8, or (4) a written order for a minor change in the Work issued by the Engineer pursuant to Paragraph 12.3. The Contract Documents include Bidding Documents such as the Advertisement or invitation to Bid, the Instructions to Bidders, sample forms, the Contractorσ Bid, or portions of Addenda relating to any of these, and other documents specifically enumerated in the Owner-Contractor Agreement.

1.1.2 The Contract

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Engineer and the Contractor, but the Engineer shall be entitled to performance of obligations intended for his benefit, and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner or the Engineer or any Subcontractor or sub-subcontractor.

1.1.3 The Work

The Work comprises the completed construction required by the contract Documents and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

Initial _____

1.1.4 The Project

The Project is the total construction of which the Work performed under these Contract Documents may be the whole or a part.

1.2 Execution Correlation and Intent

1.2.1 The Contract Documents shall be signed in not less than four originals by the Owner and Contractor. If either Owner or Contractor or both do not sign the Conditions of the Contract, Drawings, Specifications, or any of the other Contract Documents, the Engineer shall identify such Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not specifically set forth in the Contract Documents will not be required unless it is consistent with work that is specifically set forth in the Contract Documents or is reasonably inferable from the Contract Documents as being necessary to produce the intended results. Words and abbreviations, which have well-known technical or trade meanings, are used in the Contract Documents in accordance with such recognized meanings.

1.2.4 The organization of the Specifications into divisions, sections, and articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Sub-contractors or in establishing the extent of Work to be performed by any trade.

1.3 Ownership and Use of Documents

1.3.1 All Drawings, Specifications and copies thereof furnished by the Engineer are the property of the Owner. They are to be used only with respect to this Project and are not to be used on any other project. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Engineer on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Engineerσ common law copyright or other reserved rights. The Engineer will furnish, free of charge, to

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the Contractor sufficient sets of Contract Documents to execute the Work not to exceed ten (10). The Contractor may purchase additional sets by paying reproduction costs.

ARTICLE II
ENGINEER

2.1 Definition

2.1.1 The Engineer is the person lawfully licensed to practice Engineering, or any entity lawfully practicing Engineering identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Engineer means the Engineer or his authorized representative.

2.2 Administration of the Contract

2.2.1 The Engineer will provide administration of the Contract as hereinafter described.

2.2.2 The Engineer will be the Ownerσ representative during construction and until final payment is due. The Engineer will advise and consult with the Owner. The Ownerσ instructions to the Contract shall be forwarded through the Engineer. The Engineer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument signed by the Owner.

2.2.3 The Engineer will visit the site at intervals appropriate to the stage of construction to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of his on-site observations as an Engineer, he will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.

2.2.4 The Engineer will not be responsible for and will not have control or charge of construction means, methods, techniques or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractorσ failure to carry out the Work in accordance with the Contract Documents. The Engineer will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

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2.2.5 The Engineer shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Engineer may perform his functions under the contract documents.

2.2.6 Based on the Engineerσ observations and an evaluation of the Contractorσ Applications for Payment, the Engineer will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts as provided in Paragraph 9.4.

2.2.7 The Engineer will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon so as to cause no delay the Project. Either party to the Contract may make written request to the Engineer for such interpretations.

2.2.8 All interpretations and decisions of the Engineer shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings.

2.2.9 The Engineerσ decision in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents. The Engineer shall rule on all claims and disputes that relate to the interpretation of the Contract Documents.

2.2.10 The Engineer will have authority to reject Work which does not conform to the Contract Documents. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the Work in accordance with Subparagraph 7.7.2 whether or not such Work is then fabricated, installed or completed. In the event the Engineer determines that any Work deleted by the Contractor should have been performed by the Contractor under the Contract Documents, he shall issue a final determination that the Contractor shall proceed with the Work as directed by the Engineer, and the Contractor shall proceed with the Work even if he is in disagreement with the decision of the Engineer.

2.2.11 The Engineer will review and approve or take other appropriate action under Contractorσ submittals such as Shop Drawings, Product Data, and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Engineerσ approval of a specific item shall not indicate approval of an assembly of which the item is a component.

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2.2.12 The Engineer will prepare Change Orders in accordance with Article 12 and will have the authority to order minor changes in the Work as provided in Subparagraph 12.3.

2.2.13 The Engineer will conduct inspections to determine the dates of Substantial Completion and completion will receive and forward to the Owner for the Ownerσ review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a Final Certificate for Payment upon compliance with the requirements of Paragraph 9.8.

ARTICLE III
OWNER

3.1 Definition

3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner, or his authorized representative.

3.2 Information and Services Required of the Owner

3.2.1 The Owner or Engineer shall furnish all surveys describing the physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

3.2.2 Except as provided in Subparagraph 4.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

3.2.3 Information or services under the Ownerσ control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

3.2.4 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the Work.

3.2.5 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Work by Owner or by Separate Contractors, Payments and Completion and Insurance in Article 6, 9 and 11, respectively.

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3.3 Ownerσ Right to Stop the Work

3.3.1 If the Contractor fails to correct defective Work as required by Paragraph 13.2 or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. Any such order to the Contractor shall be in writing.

3.4 Ownerσ Right to Carry Out the Work

3.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within two (2) days after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedy it may have, make good and correct such deficiencies with its own forces or with the forces of another contractor. In such case, an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Engineerσ additional services made necessary by such default, neglect, or failure. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

3.4.2 The Owner shall have access to the Project at all times.

ARTICLE IV
CONTRACTOR

4.1 Definition

4.1.1 The Contractor is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 Review of Contract Documents

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Engineer any error, inconsistency or omission he may discover.

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4.3 Supervision and Construction Procedures

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Engineer in his administration of the Contract, or by inspection, tests or approvals required or performed under Paragraph 7.7 by persons other than the Contractor.

4.4 Labor and Materials

4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

4.4.3 When a material, equipment or system is specified or approved in an addendum, by the name of one or more manufacturers, such material, equipment, or system shall form the basis of the contract. If Contractor desires to use another material, equipment, or system in lieu thereof, he shall request approval in writing and shall submit samples and data as required for the Engineerσ consideration. The Engineer and Owner will be the final judge for the acceptance or the substitution. No Substitution shall be made without authority in writing from the Engineer.

4.4.4 By making requests for substitutions based on Subparagraph 4.4.3 above, the Contractor:

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.1 represents that he has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

.2 represents that he will provide the same warranty for the substitute that is required by the Contract Documents for that specified.

.3 certifies that the cost data presented is complete and includes all related costs and excludes the Engineerσ redesign costs, and waives all claims for additional costs related to the substitution which subsequently became apparent; and

.4 will coordinate the installation of the accepted substitute, making such changes at no additional cost to Owner as may be required for the Work to be complete in all respects.

4.4.5 The General Contractor shall disclose the existence and extent of financial interests, whether direct or indirect, he has in subcontractors and material suppliers which he may propose for this Project.

4.5 **Warranty**

4.5.1 The Contractor warrants to the Owner and the Engineer that all materials and equipment furnished under this Contract will be new unless otherwise specified, and all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these requirements, including substitutions not properly approved and requirements including substitutions not properly approved and authorized, may be considered defective. If required by the Engineer, the Contractor shall furnish satisfactory evidence. This warranty is not limited by the provisions of Paragraph 13.2.

4.6 **Taxes**

4.6.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time bids are received, whether or not yet effective.

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4.7 Permits, Fees and Notices

4.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and for all other permits and governmental fees, licenses and inspections necessary for the proper execution of the Contract.

4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.

4.7.3 If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Engineer, he shall assume full responsibility therefore and shall bear all costs attributable thereto.

4.8 Allowances and Owner Furnished Equipment, Fixtures or Labor

4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

4.8.2 Unless otherwise provided in the Contract Documents:

.1 these allowances shall cover the cost to the Contractor, less any applicable trade discount, of the materials and equipment required by the allowance delivered at the site, and applicable taxes;

.2 the Contractorσ costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance;

.3 whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

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4.8.3 The Owner may directly furnish any or all of the equipment, fixtures or labor required for the Project. In the event the Owner elects to do so, the Contract Price for such equipment, fixtures or labor will be reduced by the amount for equipment of labor being furnished by Owner. A Change Order reducing the Contract Price for that item of work shall be executed by Owner and Contractor to reflect a reduction in the Contract Price for that item, equipment, fixtures or work that the Owner is to furnish. The Contractor shall assume responsibility for and be fully responsible for the care, custody and control of all Owner furnished equipment and/or fixtures once said equipment or fixtures arrive on the job site or in any approved off site storage facility.

4.9 Superintendent

4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor and shall be confirmed in writing.

4.10 Documents and Samples at the Site

4.10.1 The Contractor shall maintain at the site for the Owner, one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction and approved Shop Drawings, Product Data and Samples. These shall be available to the Engineer and shall be delivered to him for the Owner upon completion of the Work.

4.11 Shop Drawings, Product Data and Samples

4.11.1 Shop Drawings are drawings, diagrams, schedules and other data specifically prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

4.11.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

4.11.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

4.11.4 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

4.11.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and the Contract Documents.

4.11.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineerσ approval of Shop Drawings, Product Data or Samples under Subparagraph 2.2.11, unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data, or Samples by the Engineerσ approval thereof.

4.11.7 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Engineer on previous submittals.

4.11.8 No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Engineer as provided in Subparagraph 2.2.11. All such portions of the Work shall be in accordance with approved submittals.

4.12 <u>Use of Site</u>

4.12.1 The Contractor shall confine operations at the site to areas permitted by law, ordinance, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment.

4.13 <u>Cutting and Patching of Work</u>

4.13.1 The Contractor shall be responsible for all cutting,

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fitting or patching that may be required to complete the Work or to make its several parts fit together properly.

4.13.2 The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner. The Contractor shall not unreasonably withhold from the Owner his consent to cutting or otherwise altering the Work.

4.14 <u>Cleaning Up</u>

4.14.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the project as well as all his tools, construction equipment, machinery and surplus materials.

4.14.2 If the Contractor fails to clean up at the completion of the Work, the Owner may do so as provided in Paragraph 3.4 and the cost thereof will be charged to the Contractor.

4.15 <u>Royalties, Patents and Records</u>

4.15.1 The Contractor shall pay all royalties and license fees. He shall defend all suits and claims for infringement of any patent rights and shall save Owner and Engineer harmless from loss on account thereof.

4.15.2 The Contractor shall not discriminate against any subcontractor, employee or applicant for employment on the grounds of race, color, national origin or sex.

4.15.3 The Contractor and all subcontractors under the general contract shall maintain copies of every sub-payroll period for the life of the construction contract and for a period of three (3) years after final release and payment is made by the Owner to the Contractor.

4.15.4 Each Contractorσ request for payment, including final payment and each partial payment, if permitted by the contract, shall contain a certification by the Contractor that performance by the Contractor and his subcontractor for the period of work covered by the payment request has been in accordance with the contract clauses and requirements with respect to nondiscrimination.

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4.15.5 Representatives of Shelby County, as designated by the Mayor, shall have the right to inspect the Contractorσ facilities and payroll records during the term of the construction contract and for a period of three (3) years after final release and final payment by the Owner for the purposes of verifying nondiscrimination in employment.

4.15.6 The Contractor shall incorporate the same requirements set forth in Subparagraph 5.3.1 in all Subcontracts awarded by him with the further requirement that each Subcontract include identical requirements to be included in any lower tier Subcontracts together with the requirement to include it in any further subcontracts that might be made.

4.16 **Indemnification**

4.16.1 (a) By executing this Agreement, the Contractor assumes the entire responsibility and liability for any and all claims, damage or injury of any kind or nature (including death) to all persons, whether employees of the Contractor or otherwise, and to all property (including but not limited to the replacement cost and lose of use of property), caused by, resulting from, arising out of, or occurring in connection with the performance of the Work by the Contractor, its agents, servants, employees, or subcontractors or anyone directly or indirectly employed by any of them for whose acts any of them may be liable.

(b) If any claim is made against the Owner for any damage, injury, death, or loss, whether such claim is based upon the Contractorσ or its agents=, servants=, employees=, or subcontractors= alleged active or passive negligence or participation in the wrong, or upon any alleged active or passive negligence or participation in the wrong, or upon any alleged breach of any statutory duty or obligation on the part of the Contractor, its agents, servants, employees or subcontractors, or in any other instance for which the Contractor has assumed responsibility in this Agreement, the Contractor shall indemnify, defend, and hold harmless the Owner, its officers, directors, agents, servants and employees from and against any and all loss, expense, judgment, damage or injury (including attorneyσ fees and expenses) that the Owner or its officers, directors, agents, servants or employees may sustain as the result of any such claim. The Contractor shall assume on behalf of the Owner, its officers, directors, agents, servants and employees the defense of any action at law or in equity which may be brought against any of them upon any such claim, and shall pay on behalf of them the amount of any judgment with any costs or expenses incurred by any of them in connection with such claim.

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4.16.2 Labor Indemnity

4.16.2.1 The Contractor shall indemnify, defend and hold harmless the Owner from any and all administrative and judicial actions (including reasonable attorneyσ fees related to any such action) incurred by the Owner in connection with any labor related activity arising from the performance of the Work of the Contractor. As used in this Agreement, Alabor related activity≅ includes, but is not limited to strikes, walkouts, informational or organizational picketing, use of placards, distribution of handouts, leaflets or in the vicinity of any facility where the Owner conducts business. The Owner shall advise the contractor if any labor related activity occurs and the Contractor shall arrange for the legal representation necessary to protect the Owner, provided such representation is previously approved by the Owner.

4.16.3 Attorneyσ Fees

4.16.3.1 In the event it becomes necessary for Owner to employ an attorney to enforce any provision of this Agreement, then the Contractor shall be liable for all attorneyσ fees and litigation expense of Owner.

4.17 Progress Schedule

4.17.1 The Contractor shall, within five (5) days from receipt of the Notice to Proceed, prepare and submit for the Owner and Engineer an estimated project schedule for the Work. The Progress Schedule shall be updated each month to reflect actual progress made and to forecast future progress of the Work. The Progress Schedule shall be related to the entire Project as provided by the contract Documents and shall provide for expeditious and practicable execution of the Work. The Owner reserves the right to reasonably reschedule the Work or the sequence of activities of the contractor for no additional compensation should it deem rescheduling to be in its best interest.

ARTICLE V
SUBCONTRACTORS

5.1 Definition

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term Subcontractor does not include any separate contractor or his

subcontractor.

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5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site. The term Sub-subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.

5.2 Award of Subcontracts and Other Contracts for Portions of the Work

5.2.1 Unless otherwise required by the Contract Documents or Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Owner and the Engineer in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Engineer will promptly reply to the Contractor in writing stating whether or not the Owner or the Engineer, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Engineer to reply promptly shall constitute notice of no reasonable objection. No work shall be commenced until approval of all such Subcontractors has been given in writing by the Owner. If required, the Contractor shall furnish evidence satisfactory to the Owner, showing each proposed Subcontractor is competent to execute the Work covered by the Subcontract.

5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner or the Engineer has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.

5.2.3 If the Owner or the Engineer has reasonable objection to any such proposed person or entity, the Contractor shall submit a substitute to whom the Owner or the Engineer has no reasonable objection. Such substitution shall in no way affect the Contract Sum.

5.2.4 The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Owner or Engineer makes reasonable objection to such substitution.

5.2.5 The Contractor shall submit a status report with regard to Subcontractors identified on Exhibit C, which forms a part of the Contract Documents, as to any change in the subcontractors identified thereon and the reasons for same, the dollars paid to the prior subcontractor and the amount of the new subcontract.

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THIS REPORT SHALL BE SUBMITTED TO CONTRACTS ADMINISTRATION OF SHELBY COUNTY GOVERNMENT, 160 N. Main St., Suite 1109, Memphis, Tennessee, 38103.

5.3 Subcontractual Relations

5.3.1 By an appropriate agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and the Engineer. Said agreement shall preserve and protect the rights of the Owner and the Engineer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by the Paragraph 5.3, and identify to the Subcontractor any terms and conditions of the proposed subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to any Sub-subcontractors.

ARTICLE VI
WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 Ownerσ Right to Perform Work and to Award Separate Contracts

6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract.

6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

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6.2 Mutual Responsibility

6.2.1 The Contractor shall afford the Owner and separate contractor's reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall connect and coordinate his Work with theirs as required by the Contract Documents.

6.2.2 If any part of the Contractorσ Work depends on proper execution or results in the work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Engineer any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acceptance of the Ownerσ or separate contractorσ work as fit and proper to receive his Work.

6.2.3 Should the Contractor wrongfully cause damage to the work or property of the Owner or to other work on the site, the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.

6.2.4 Should the Contractor wrongfully cause damage to the work or property of any separate contractor, the Contractor shall upon due notice promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues the Owner on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings, and if any judgment or award against Owner arises there from, the Contractor shall pay or satisfy it and shall reimburse the Owner for all Attorneyσ fees and Court costs which the Owner has incurred.

6.3 Ownerσ Right to Clean Up

6.3.1 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by Paragraph 4.14, the Owner may clean up and charge the cost thereof to the contractors responsible therefore as the Owner shall determine to be just.

ARTICLE VII
MISCELLANEOUS PROVISIONS

7.1 GENERAL COMPLIANCE WITH LAWS

7.1.1 If required, the Contractor certifies that it is

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qualified or will take steps necessary to qualify to do business in the State of Tennessee and that it will take such action as, from time to time, may be necessary to remain so qualified and it shall obtain, at its expense all licenses, permits, insurance, and governmental approvals, if any, necessary to the performance of its obligations under this Agreement.

7.1.2 The Contractor is assumed to be familiar with and agrees that at all times it will observe and comply with all federal, state, and local laws, ordinances, and regulations in any manner affecting the conduct of the work. The preceding shall include, but is not limited to, compliance with all Equal Employment Opportunity laws, the Fair Labor Standards Act, Occupational Safety and Health Administration (OSHA) requirements, and the Americans with Disabilities Act (ADA).

7.1.3 This Contract will be interpreted in accordance with the laws of the State of Tennessee. By execution of this contract the Contractor agrees that all actions, whether sounding in contract or in tort, relating to the validity, construction, interpretation and enforcement of this contract will be instituted and litigated in the courts of the State of Tennessee, located in Shelby County, Tennessee, and in no other. In accordance herewith, the parties to this contract submit to the jurisdiction of the courts of the State of Tennessee located in Shelby County, Tennessee.

7.2 **Successors and Assigns**

7.2.1 This Agreement (including without limitation, all obligations imposed by the Contract Documents) shall be binding upon and shall inure to the benefit of the parties= successors, assigns and legal representative. The Contract shall not be assigned or sublet in whole or in part by the Contractor without the written consent of the Owner, nor shall the Contractor assign any monies due or to become due to him hereunder, without the previous written consent of the Owner.

7.3 **Written Notice**

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm, entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

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7.4 Claims for Damages

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party, or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.5 Performance Bond and Labor and Material Payment Bond

7.5.1 The Contractor shall furnish and keep in force throughout the performance of the Work a separate performance bond and separate labor and material payment bond, each in the amount of the total of the Contract (as the same may be modified from time to time) conditioned upon the faithful performance of the Work by the Contractor and payment of all obligations arising in connection with the Work by the Contractor. Said bonds shall also guarantee to the Owner that the Work shall be fee of all liens upon the property of the Owner. The bonds shall name the Owner as obligee and shall be with such Surety authorized to do business in the State of Tennessee and in such form and manner as approved by Owner. Said Bond shall be subject to final approval of the Shelby County Risk Management Department. Said bonds shall be furnished to the Owner prior to the commencement of the Work, or upon written request by Owner to Contractor after the Work has commenced.

7.6 Rights and Remedies

7.6.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available there under shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

7.6.2 No action or failure to act by the Owner, Engineer, or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach there under, except as may be specifically agreed in writing.

7.7 Tests

7.7.1 If the Contract Documents, laws, ordinances, rules,

regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Engineer timely notice of its readiness so the Engineer may observe such inspection, testing

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or approval. The Contractor shall bear all costs of such inspections, tests or approvals conducted by public authorities. Unless otherwise provided, the Owner shall bear all costs of other inspections or tests.

7.7.2 If the Engineer determines that any Work requires special inspection, testing or approval which Subparagraph 7.7.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in Subparagraph 7.7.1. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Engineerσ additional services and/or correction of the defective Work made necessary by such a failure; otherwise, the Owner shall bear such costs, and an appropriate Change Order shall be issued.

7.7.3 Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the Engineer.

7.7.4 If the Engineer is to observe the inspection, tests or approvals required by the Contract Documents, he will do so promptly where practicable, at the source of supply.

ARTICLE VIII
TIME

8.1 Definitions

8.1.1 Unless otherwise provided, the Contract time is the period of time allotted in the Contract Documents for Substantial Completion of the Work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

8.1.2 The date of commencement of the Work is the date established in a notice to proceed. If there is no notice to proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein.

8.1.3 The date of Substantial Completion of the Work or designated portion thereof is the Date certified by the Engineer

when construction is sufficiently complete, in accordance with the contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended.

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8.1.4 The term day as used in the Contract Documents shall mean calendar day unless otherwise specifically designated.

8.2 **Progress and Completion**

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the work forward expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 **Delays and Extensions of Time**

8.3.1 The Contractor shall proceed with each and every part of this Agreement in a prompt and diligent manner. The Contractor, without additional compensation, shall perform the Work at such times, in such order and in such manner as the Owner may direct. The Contractor shall commence, continue and complete its performance of the Project so as not to delay Owner or other separate contractors of the Owner or subcontractors= completion of the Work or any portions thereof, and so as to insure completion as directed by Owner. Any time specified for the completion of the Work, or portion thereof, is a material provision of this Agreement, and time is of the essence. The Contractor shall furnish sufficient forces to assure proper performance of its Work in strict compliance with all performance or progress schedules for the Project.

8.3.2 The Contractor shall, from time to time, on written demand of Owner, give adequate evidence to Owner to substantiate the planned performance and progress of the Work and the various parts thereof. The Contractor shall promptly increase its work force, accelerate its performance, work overtime, work Saturdays, Sundays and holidays, all without additional compensation, it in the opinion of the Owner, such work is necessary to maintain proper progress. The Contractor will fully cooperate and coordinate its work with any other separate contractors of Owner or subcontractors at the Project. The Contractor shall bear the costs of all damages done to other separate contractors of Owner or subcontractors and Shall be responsible for any damages caused by or resulting from acts or omissions of the Contractor in failing to make proper progress. The liability of the Contractor shall not be deemed

waived by any assent or acquiescence by Owner to the Contractorσ late performance. Owner shall be entitled to terminate this Agreement due to late or threatened late performance, upon seven (7) days notice to proceed and Contractors failure to do so.

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8.3.3 In the event any subcontractor should damage the Contractor, the Contractor shall neither seek nor be entitled to any compensation from Owner, but will seek its damages directly from such subcontractor. Should the Contractorσ performance, in whole or part, be disrupted, interfered with or delayed, or be suspended in the commencement, prosecution or completion, for reasons beyond the Contractorσ control and without its fault or negligence, the Contractor shall be entitled to an extension of time in which to complete its Work; but only if it shall have notified the Owner, in writing, of the cause of delay within five (5) days of the occurrence of the event. The Contractor and Owner agree that the Contractor shall not be entitled to any money damages regardless of fault as a result of any delay, acceleration, disruption, interference, suspension, or other event affecting the Contractor or the Contractorσ performance.

ARTICLE IX
PAYMENTS AND COMPLETION

9.1 Contract Sum

9.1.1 The Contract Sum is stated in the Owner-Contractor Agreement and, including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents.

9.2 Schedule of Values

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Engineer a schedule of values allocated to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Engineer may require. This schedule, unless objected to by the Engineer, shall be used only as a basis for the Contractorσ Applications for Payment.

9.3 Applications for Payment

9.3.1 At least ten days before the date of each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Engineer an itemized Application for Payment, notarized if required, supported by such data

substantiating the Contractorσ right to payment as the Owner or the Engineer may require, and reflecting retain age, if any, as provided elsewhere in the Contract Documents. The Contractor shall indicate on each Application for Payment the dollar amount and percentage due Subcontractors.

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Progress payments (monthly) will be made based upon Applications for Payment submitted to the Engineer by the Contractor and Certificates for Payment issued by the Engineer as follows:

On or before the 10th day of each month, 95% of the proportion of the Contract Sum properly allocable to labor, materials and equipment incorporated in the Work, up to the first day of that month, less the aggregate of previous payments in each case. Payments will be less such retainage as the Engineer shall determine for all incomplete work and unsettled claims.

9.3.1.1 Until final payment, the Owner will pay 95% of the amount due the Contractor on account of progress payments. If the manner of completion of the Work and its progress are and remain satisfactory to the Owner, it may, in its sole discretion, for each Work category shown to be 50% or more complete in the Application for Payment, without reduction of previous retainage, on presentation by the Contractor with Consent of Surety for each application, certify any remaining progress payments for each Work category to be paid in full.

9.3.1.2 The full Contract retainage may be reinstated at any time in the sole discretion of the Owner.

9.3.2 Unless otherwise provided in the Contract Documents, payments will be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site and, if approved in advance by the Owner, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Ownerσ title to such materials or equipment or otherwise protect the Ownerσ interest, including applicable insurance and transportation to the site for those materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in the Article IX as Aliens≅; and that no Work, materials or equipment covered by an Application for Payment

will have been acquired by the Contractor, or by any other persons performing Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

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9.3.4 The Contractor shall submit a report with each Application for Payment which sets forth all subcontractors performing work during that reporting period, the dollar amount paid to the subcontractor, etc. on the form provided by Shelby County Government.

9.4 Certificate for Payment

9.4.1 The Engineer will, within seven (7) days after the receipt of the Contractorσ Application for Payment, issue a Certificate for Payment to the Owner for such amount as the Engineer determines is properly due.

9.4.2 The issuance of a Certificate of Payment will constitute a representation by the Engineer to the Owner, based on his observations at the site as provided in Subparagraph 2.2.3 and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and any specific qualifications stated in his Certificate); and that the Contractor is entitled to payment in the amount certified.

9.5 Progress Payments

9.5.1 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractorσ Work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractorσ Work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payments to his Sub-subcontractors in similar manner.

9.6 Payments Withheld

9.6.1 The Engineer may decline to certify payments and may withhold his Certificate in whole or in part, to the extent necessary to protect the Owner, if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2. The Engineer may also decline to certify payment or,

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because of subsequently discovered evidence or subsequent observations, he may nullify the whole or any part of any Certificate for Payment previously issued, to such extent as may be necessary in his opinion to protect the Owner from loss because of:

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims;

.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or another contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time; or

.7 persistent failure to carry out the Work in accordance with the Contract Documents.

9.6.2 When the above grounds in Subparagraph 9.6.1 are removed, payment shall be made, without interest, for any amounts previously withheld.

9.7 Substantial Completion

9.7.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for submission to the Engineer a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Engineer on the basis of an inspection determines that the Work or designated portion thereof is substantially complete, he will then prepare a Certificate of substantial Completion which shall establish the Date of

Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall

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commence on the Date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

9.7.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Engineer, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof, as provided in the Contract Documents. Payment by the Owner upon application by the Contractor and certification by the Engineer for Substantial Completion does not waive any claims the Owner may have against the Contractor.

9.8 <u>Final Completion and Final Payment</u>

9.8.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Engineer will promptly make such inspection and, when he finds the Work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information and belief, and on the basis of his observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable. The Engineerσ final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractorσ being entitled to final payment as set forth in Subparagraph 9.7.2 have been fulfilled.

9.8.2 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Engineer (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety to final payment and (3) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of claims, encumbrances and/or alleged liens arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the

Contractor may furnish a bond satisfactory to the Owner to indemnify him against such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneyσ fees.

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9.8.3 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.

ARTICLE X
PROTECTION OF PERSONS AND PROPERTY

10.1 Safety Precautions and Programs

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

10.2 Safety of Persons and Property

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

.1 all employees on the Work and all other persons who may be affected thereby;

.2 all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

10.2.3 The Contractor shall erect and maintain, as required by

existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities. Pavements, sidewalks, alleys, adjacent buildings not included in this Contract, which may be damaged, shall be repaired and/or replaced immediately and in a manner satisfactory to the Engineer, Shelby County and/or other governing officials.

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10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy all damage or loss (other than damage or loss insured under Paragraph 11.3) to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, Subcontractor, or any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts the Contractor may be liable or responsible. The foregoing obligations of the Contractor are in addition to his obligations under Paragraph 4.16.

10.2.6 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractorσ superintendent unless otherwise designated by the Contractor in writing to the Owner and the Engineer.

10.2.7 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

10.3 **<u>Emergencies</u>**

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article XII for Changes in the Work.

10.3.2 Whenever the Contractor has not taken sufficient precautions for the safety of the public or the protection of work to be performed under this Project, or adjacent structures or property which may be injured by processes of construction, demolition and/or site clearance on account of such neglect, and whenever an emergency shall arise and immediate action shall be considered necessary in order to protect public or private, persons or property interest, then the Engineer and/or the Owner shall so instruct the Contractor.

10.3.3 If correction is not made in due time or if conditions such as lack of time prevent instructions to Contractor, then the Owner, without notice to the Contractor, may provide reasonable, suitable protection by causing such Work to be done and material to be furnished and placed as the Engineer and Owner may consider necessary and adequate. The cost and expense of such work and

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material so furnished shall be borne by the Contractor and, if the same shall not be paid on presentation of the bills thereof, such costs shall be deducted from any amounts due or to become due the Contractor. The performance of such emergency work under the direction of the Owner and/or Engineer shall in no way relieve the Contractor of the responsibility for damages which may occur during or after such performance.

10.3.4 None of the foregoing shall make the Owner and/or Engineer responsible for foreseeing and protecting against emergency.

ARTICLE XI
INSURANCE

11.1 Contractorσ Liability Insurance

11.1.1 The Contractor shall purchase and maintain, in a company or companies licensed to do business in the State of Tennessee, such insurance as will protect the Owner from claims set forth below which may arise out of or result from the Contractorσ operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts the Contractor or Subcontractor may be liable:

.1 claims under workers= compensation, disability benefits, and other similar employee benefit acts;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

.4 claims for damages insured by personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;

.5 claims for damages, other than the Work itself, because of injury to or destruction of tangible property, including loss of use resulting there from; and

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.6 claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than any limits of liability specified in the Contract Documents, section III, paragraph 31, or required by law, whichever is greater.

11.1.3 The insurance required by Subparagraph 11.1.1 shall include contractual liability insurance applicable to the Contractors obligations under Paragraph 4.16.

11.1.4 All insurance policies maintained by the Contractor shall provide that insurance as applying to the Owner shall be primary and non-contributing irrespective of such insurance as the Owner may maintain in its own name and on its own behalf.

11.1.5 Certificates of Insurance acceptable to the Owner shall be filed with the Owner at the time of submittal of the Contract Documents to the Owner for execution. These certificates shall contain a provision that coverage's afforded under the policies will not be canceled until at least thirty-(30) days= prior written notice has been given to the Owner. The Contractor shall immediately notify Shelby County Government, Contract Administration, 160 N. Main Street, Suite 550, Memphis, Tennessee 38103 of cancellation or changes in any of the insurance coverage required. Upon request of the Owner, certified copies of any of the required insurance policies may be requested from the Contractor or Contractor's insurance company, agency, or broker.

11.2 **<u>Owners Liability Insurance</u>**

11.2.1 The Owner shall at its discretion, purchase liability insurance or maintain a self-insured liability program.

11.3 **Property Insurance**

11.3.1 The General Contractor shall be responsible for all risk≅ insurance for physical loss or damage for the project during construction until the project is accepted by the Owner at which time the Owner will provide the property coverage.

11.3.2 The Contractor shall pay each Subcontractor a just share of any insurance monies received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require such Subcontractor to make payments to his Sub-subcontractors in similar manner.

11.3.3 The Contractor or his insurance agent, broker or insurance company shall furnish to Owner a copy of all policies with the Contactor within five days of request.

11.3.4 If the Owner requests in writing that insurance for risks other than those described in Subparagraphs 11.3 and 11.3.2 or 11.3.3 or other special hazards to be included in the property insurance policy, the Contractor shall, if possible, include such insurance, and the cost thereof shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order. Initial_____

ARTICLE XII
CHANGES IN THE WORK

12.1 Change Orders

12.1.1 A Change Order is a written order to the Contractor signed by the Owner issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time. The Contractor by execution of the Change Order waives any further claims or damages in any manner whatsoever for the changes set forth in the Change Order.

12.1.2 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be performed under the applicable conditions of the Contract Documents.

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

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.1 by lump sum properly itemized on the form furnished by the Owner which shall show the actual verified cost of the work, plus ten percent overhead and five percent profit; if the work is performed by a Subcontractor, the General Contractor is allowed an additional five percent;

.2 by unit prices stated in the Contract Documents or subsequently agreed upon;

.3 by cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 by the method provided in Subparagraph 11.1.4.

12.1.4 If none of the methods set forth in Clauses 12.1.3.1, 12.1.3.2, or 12.1.3.3 is agreed upon, the Contractor, provided he receives a written order signed by the Owner, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Engineer on the basis of the reasonable expenditures and savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit, which shall be defined as ten percent overhead and five percent profit with an additional five percent going to the General Contractor when the work is performed by a Subcontractor. In such case, and also under Clauses 12.1.3.3 and 12.1.3.4 above, the Contractor shall keep and present, in such form as the Engineer may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of labor, including social security, old age and unemployment insurance and fringe benefits required by agreement or custom; workers= or workmen compensation insurance; bond premiums, rental value of equipment and machinery; and the additional costs of supervision and field office personnel directly attributable to the change. Pending final determination of cost to the Owner, payments on account shall be made on the Engineerσ Certificate for Payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion or change which results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Engineer. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.

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12.2 <u>Concealed Conditions</u>

12.2.1 Should concealed conditions encountered in the performance of the Work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, Contractor, subject to approval by the Engineer, shall be entitled to a time extension for only the period that the Contractorσ performance is extended due to the unforeseen conditions.

12.3 <u>Minor Changes in the Work</u>

12.3.1 The Engineer will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such Changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE XIII
UNCOVERING AND CORRECTION OF WORK

13.1 Uncovering of Work

13.1.1 If any portion of the Work should be covered contrary to the request of the Engineer or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Engineer, be uncovered for his observation and shall be replaced at the Contractorσ expense.

13.1.2 If any other portion of the Work has been covered which the Engineer has not specifically requested to observe prior to being covered, the Engineer may request to see such Work and it shall be uncovered by the Contractor. If such Work is found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is found not in accordance with the Contract Documents, the Contractor shall pay such costs. If the Work to be uncovered by the Contractor should have been inspected by the Engineer prior to being covered, and the Work is found to be in accordance with the Contract Documents, the cost of the uncovering and recovering of the Work shall be borne by the Engineer.

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13.2 Correction of Work

13.2.1 The Contractor shall promptly correct all Work rejected by the Engineer as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Engineerσ additional services made necessary thereby.

13.2.2 If, within one year after the Date of Substantial Completion of the Work or designated portion thereof, within one year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the term of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not

in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so. This obligation shall survive termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

13.2.3 The Contractor shall remove from the site all portions of the Work which are defective or non-conforming, unless removal is waived by the Owner.

13.2.4 If the Contractor fails to correct defective or non-conforming Work as provided in Subparagraphs 4.5.1, 13.2.1 and 13.2.2, the Owner may correct it in accordance with Paragraph 3.4.

13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming Work within a reasonable time fixed by written notice from the Engineer, the Owner may remove it and store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Owner may, upon ten additional days= written notice, sell such Work at auction or a private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Engineerσ additional services made necessary thereby. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

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13.2.7 Nothing contained in Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractorσ liability with respect to his obligations other than specifically to correct the Work.

13.3 **<u>Acceptance of Defective or Non-Conforming Work</u>**

13.3.1 If the Owner prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be effective whether or not final payment has been made.

ARTICLE XIV
TERMINATION OF THE CONTRACT

14.1 Termination for Default

14.1.1 Should the Contractor fail to perform in strict accordance with this Agreement, where or as Owner may so direct, or should the Contractor become insolvent, unable to or fail to pay its obligations as they mature or, in any other respect fail in the opinion of the Owner, to properly prosecute and perform any part of its work, fail to exert its best performance efforts, be involved in labor disputes, or be terminated under any other contract with Owner, then the Contractor may be deemed by Owner to have materially breached and to have defaulted in its obligations under this Agreement. In case of a breach and default, the Owner, at its discretion, may terminate this Agreement, or any part thereof, by giving five (5) days written notice thereof to the Contractor. In case of such termination, Owner may use any and all materials, equipment, tools or chattels furnished by or belonging to the Contractor either at or for the Project.

14.1.2 The Contractor, on termination, will be deemed to have offered to Owner an assignment of all of its subcontracts and purchase orders relating to this Project. Owner may, at its discretion, do whatever is necessary to assure performance of any

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terminated work and to take such action, if necessary, in the Contractorσ name. Owner may withhold from Contractor any monies due or to become due under this or any other contract between the Contractor and Owner, to offset the damages incurred or possibly incurred as a result of the breach and default by the Contractor. In case of a breach, or in the event Owner is required to retain the services of an attorney to enforce any provisions of this Agreement, then the Contractor and its surety company shall be liable to Owner for any and all additional costs, expenses, attorneyσ fees and other damages, both liquidated and unliquidated, which directly or indirectly result from the Contractorσ breach, threatened breach, default or lack of performance of any term or condition of this Agreement.

14.1.3 If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including compensation for the

Engineerσ additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Engineer, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of this Contract.

14.2 Termination for Convenience

14.2.1 Owner, by written notice, shall have the right to terminate and cancel this Agreement, without the Contractor being at fault, for any cause or for its own convenience, and require the Contractor to immediately stop work. In such event, Owner shall pay the Contractor for that Work actually performed and materials furnished in an amount proportionate to the Contract price. Owner shall not be liable to the Contractor for any other costs, including prospective profits on Work not performed.

ARTICLE XV
RIGHT TO OCCUPY BY OWNER

15.1 Early Occupancy by Owner

15.1.1 The Owner has the right to occupy or use ahead of schedule all or any substantially completed or partially completed portion of the Work when such occupancy and use are in its best interest, notwithstanding the time of completion for all of the Work. If occupancy or use increases the cost of the Work (other than for corrections which are the responsibility of the Contractor) and/or as a result of the Owner exercising its rights

Initial _____

herein, the contractor shall be entitled to extra costs and extensions of time, or both. Claims for such extra costs and extensions of time, to be valid, shall be made in writing to the Owner within seven (7) calendar days of the notification of Owner to the Contractor of its intent to so occupy or use.

15.2 Corrections after Occupancy

15.2.1 After the Owner has taken occupancy of all or any substantially completed portion of the Work, the Contractor shall not disrupt the use and occupancy of the Owner to make corrections in the Work but shall, at the discretion of the Owner, make such corrections at the expense of the Contractor after normal working hours.

15.3 Heating, Ventilating and Air-Conditioning Systems

15.3.1 The Owner may require the use and operation of any completed heating, ventilating and air-conditioning equipment at the time it occupies or uses any substantially completed portion of the Work. In such event, the Owner may require the Contractor to operate such equipment and will pay the Contractor the cost of such utilities required for the use and occupancy of the Owner, but the Contractor shall be responsible for such equipment and for its careful and proper operation. At any time, the Owner may assume the care and maintenance of any portion of the Work which it is occupying and using for the operation of any such equipment, but in each case, the Contractor shall not be relieved of its responsibility for the full completion of the Work and the protection of its tools, materials and equipment.

ARTICLE XVI
REGULATIONS

16.1 Nondiscrimination in Employment

16.1.1 During the performance of this Contractual Agreement, the contracting party agrees as follows: The CONTRACTOR agrees that no person on the grounds of handicap, age, race, color, religion, sex, or national origin, shall be excluded from participation in, or be denied benefits of, or be otherwise subject to discrimination in the performance of this contract, or in the employment practices of the CONTRACTOR. The CONTRACTOR shall upon request show proof of such non-discrimination, and shall post in conspicuous places available to all employees and applicants notices of non-discrimination.

16.2 [RESERVED]

Initial _____

16.3 Maintenance and Records

16.3.1 The Contractor and all Subcontractors under the General Contract shall maintain copies of every subcontract awarded and their own payrolls, for each weekly payroll period during the term of the Construction Contract and for a period of one (1) year after release and payment is made by Owner to the Contractor.

16.4 Ownerσ Right of Inspection

16.4.1 Representative of the Owner, as designated by the County Mayor, shall have the right to inspect the Contractorσ facilities and payroll records during the life of the Construction Contract for a period of one (1) year after final release and final payment

by the Owner for the purpose of verifying nondiscrimination in employment.

ARTICLE XVII
PROCEDURE FOR INSTALLATION OR REMOVAL OF FIBERGLASS INSULATION

The following procedures should be adhered to when disturbing, installing or removing fiberglass insulation. These procedures are established to minimize employee exposure to the adverse health affects of fiberglass exposure.

The below procedures are the minimal requirements for handling fiberglass in Shelby County Facilities. Mandates by code or law must be adhered to.

17.1 **Installation, Removal, or Disturbance of Fiberglass Insulation**

17.1.1 Install in well ventilated areas and avoid breathing dust.

17.1.2 Wear loose, comfortable clothing and long-sleeved shirts to minimize skin contact.

17.1.3 Handle carefully to minimize airborne dust.

17.1.4 If high dust levels are anticipated during installation, such as with power tools, use appropriate NIOSH approved dust respirator.

17.1.5 All power cutting tools must be equipped with dust collectors.

Initial _____

17.2 **Exposure**

17.2.1 After use, wash with warm water and mild soap. Do not scratch or rub skin if it becomes irritated. Utilize running water.

17.2.2 Wash work clothes separately, and then rinses the washer.

17.2.3 Eye exposure: Flush with flowing water for at least 15 minutes. If symptoms persist, seek immediate medical attention.

17.3 **Work Site Environment**

17.3.1 Insure area is free of obvious partials through proper cleanup procedures. Use of vacuum with proper filters, or wet cleanup is acceptable. (This includes office furniture, floors and walls.)

17.3.2 Initially there may be a potential adverse impact on indoor air quality within the general work area during the installation process. Notify building manager or other appropriate person that it will be necessary to establish and maintain adequate ventilation of the work area, without causing the entry of contaminants to other parts of the building. Persons who are sensitive to odors and/or chemicals should be advised to avoid the work area during this process.

17.3.3 Exposure to employees should be kept to a minimum.

17.3.4 Disturbance of ceiling tiles where fiberglass insulation exists requires the same procedures as if installation or removal was taking place.

BY THE SIGNING OF THIS DOCUMENT AND INITIALING EACH PAGE HEREOF, THE CONTRACTOR CERTIFIES THAT HE HAS READ AND UNDERSTANDS ALL OF THE ABOVE AND AGREES TO ABIDE BY THESE GENERAL CONSTRUCTION CONDITIONS.

CONTRACTOR

BY: _____

TITLE: _____

DATE: _____

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SECTION 01 10 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Summary.

B. Contractor’s Use of Site.

C. Owner Occupancy.

D. General Requirements.

E. Progress Meetings.

1.02 SUMMARY

A. Project Name: SBI-000242 HVAC Retrofit Phase I, Shelby County Criminal Justice Center.

B. Owner's Name: Shelby County Government.

C. Designer’s Names: Pickering Firm, Inc. and OGCB, Inc.

D. Briefly without force and effect on the Contract Documents the Work can be described as follows:

The project consists of renovation and retrofit of two existing built up central station air handlers located in the Sixth Floor Mechanical Room of the Criminal Justice Center.

1.03 CONTRACTOR USE OF SITE

A. Limit use of site to allow:
   1. Owner occupancy and nearly normal use of the facilities during the construction. Avoid noise levels and disruption that interrupt normal business/court activities. Disruptive work must be done when the space is unoccupied. Keep occupant's work areas free from excess noise, vibration, fumes and construction dust. Protect the office equipment, computers and other electronic equipment free of dust 100% of the lime during all work activities.
   2. Office hours vary through the facility with occupancy beginning about 08:00 and ending about 17:00 Monday through Friday. Some areas are occupied 24/7 and work these areas is to be scheduled by the owner. Work of this project is allowed during occupied hours provided the Contractor's staff can perform the necessary work in a reasonably quiet and professional manner.
      Upon reasonable notification from Contractor the Owner will arrange for after hours access to facilities as needed to comply with requirement for nearly normal use of facility. II is specifically identified that work which causes plumbing, HVAC or electrical service interruptions as well as any work in the area of court rooms, over desks and in private offices will need to be performed after hours.
   3. Work which involves objectionable odors, noise, vibration or similar disruptive activity must be performed at limes acceptable to the owner. These times are generally on the weekend or after 5PM until 7AM on weekdays.

B. Temporary Office & Toilet Accommodations:
   1. The Owner will not provide office facilities. If required the Prime Contractor shall provide a portable building / trailer as necessary during the period of construction for a job office. The Contractor is responsible for his own telephone.
   2. The Prime Contractor shall furnish, install, and maintain ample toilet facilities for the workers.

The Owner will allow use of toilets provided there is no unusual soiling or excessive cleaning made necessary due to Contractor use. If required by the Owner the Contractor will provide outdoor toilets placed where directed and shall be installed and maintained as required by the local building department and health ordinances. Contractor shall also provide any necessary enclosures/bases to accommodate the toilets.

C. Temporary Light and Power
   1. The Prime Contractor shall make all necessary connections for temporary electric service and shall provide all temporary fixtures and electrical devices. The Owner will pay for 120 VAC single phase electrical power used by the Contractor. Power for electric welders is available from the building electrical service; the Contractor is to request direction from the Owner on where they may connect for service to the welding machines. The Contractor is responsible for providing power to serve any special equipment needs during the implementation of this work.

D. Water for Construction:
   1. The Owner will pay for water required for construction purposes. The Contractor shall provide and run the necessary lines and meters for construction use.

E. Signage:
   1. The Contractor is not allowed to erect signage without the written consent of the Owner.

F. Utilities Service Work:
   1. The Owner will pay directly to the local utility any cost involved in work performed by the local utility in connection with supplying gas or electric service, rerouting gas and electric service, furnishing metering equipment, furnishing and installation of transformers and gas meters. Coordinate with local utility concerning the extent of services they are providing and include the balance of services needed for a complete installation as a part of the Contract requirements.

G. Drug Free Workplace
   1. The contractor shall maintain a "drug free workplace" policy. Provide documentation of this policy.

H. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Coordinate with Owner for all exits required by code during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.
   3. Coordinate with Owner for all required escorts and onsite security requirements for access to jobsite.

1.04 OWNER OCCUPANCY

A. Owner continuously occupies this facility.

B. Coordinate with Owner to minimize conflict and to facilitate Owner's daily operations.

C. Schedule Work to accommodate Owner’s continuous occupancy and any required relocation of inmate population.

D. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.
Except for special reasons the Owner will not fully vacate the site to accommodate the construction. Refer to the drawings and Summary of Work for any special phasing requirements.

E. Schedule the Work to accommodate this requirement. Work in areas as the occupants will permit. This will require some work outside of normal business hours. There will be no change in

the Contract amount due to this requirement.

F. Construct and maintain substantial barricades for the protection of all persons around the building site as required. Place barricades around open trenches with warning tape between barricades to warn pedestrians of danger. Provide plywood walkways over cuts through sidewalks.

G. Provide temporary healing as required for the proper protection, curing and drying of all work and for freeze protection.

1.05 GENERAL REQUIREMENTS

A. The Contractor, in accordance with the General Conditions, shall be responsible for securing all applicable construction and building permits. As part of the permit process, the Contractor shall be responsible for obtaining final construction plan review and approval. The Owner, at his option, may elect to submit final construction drawings for review, in an effort to reduce the time required to secure permits. This effort on the part of the Owner shall in no way relieve the Contractor of any responsibility in the attainment of said permits.

B. The Contractor shall provide and maintain a project schedule in accordance with the General Conditions and as further outlined in Section 01 32 16 Construction Progress Schedule.

C. Phasing of the Project: The Contractor shall construct this project to satisfy the milestone requirements of the contract documents to allow the Owner to perform its related activities.

D. The drawings are diagrammatic and show general layouts (or bidding purposes only. It is the responsibility of the Contractor to prepare detailed shop drawings and/or to confirm space allocations.

E. Remove and/or re-route existing utilities interfering with new work as required to allow installation of new work. Repair any damage to utilities, structure or other that results from any excavation, trenching or similar activity at no additional cost.

F. Existing conditions are based on owner supplied information and limited field verification. Verify existing conditions, sizes, locations of services and equipment prior to pricing, fabrication, or actual construction. Allow for variances in the bid price.

G. Remove duct/piping/raceway serving equipment noted as removed under this project. Cap at existing mains leaving no excess duct, raceway or piping.

H. Relocate existing services contained within or concealed by building components/structure removed under this project. Conceal relocated services.

I. Repair to the satisfaction of the Owner any damage, alterations or soiling of the Owner's or occupants property. To verify and document the existing conditions the contractor shall make a video record of all areas where work will occur. The Owner will accompany the contractor during video recording and make appropriate comments to establish existing conditions. The contractor shall make a copy for the Owner, the Architect/Engineer and retain a copy.

J. Refer to architectural and structural drawings, if available, for building dimensions, details, elevations and exact locations of equipment.

K. Verify all equipment connections and service requirements with respective manufacturer prior to rough-in.

L. Conform to manufacturer's recommendations, the latest edition of the plumbing code, gas code, mechanical code, national electrical code, life safety code, local building codes and state regulations having jurisdiction.

M. Adjust layout and configuration of new work to reduce installation costs, comply with codes and avoid conflicts with other work. Provide drawings to detail the proposed rearrangement and submit a request to the engineer explaining the reason for rearrangement. Written approval from the engineer is required prior to implementation.

N. Saw-cut or core drill concrete, asphalt and other masonry removed under this project. Protect spaces and equipment from dust and water. Under no circumstance are beams, columns or thickened slabs to be cut or core drilled without written instructions from the Engineer on reinforcing requirements prior to any work.

O. Coordinate electrical requirements of new work with DIV 26 prior to ordering. New equipment shall be UL listed and NEMA approved.

P. Review the drawings associated with other trades to coordinate work with these other trades. Avoid interference with architectural features, beams, footings, windows, etc. Notify engineer of any conflicts.

Q. Sleeve penetrations of new work through all fire rated separations. Seal floor sleeves and weather exposed wall sleeves to prevent water seepage. Fire-stop around sleeves in fire rated partitions.

R. Seal penetrations of new work through all smoke rated partitions to prevent passage of smoke.

S. Use manufactured pipe hangers, threaded rods, structural HRS, concrete inserts and clamps in conjunction with the building structural members to support piping and equipment from the walls and overhead. Do not use band iron, metal or wire strapping for pipe or equipment support.

T. Secure pipe and equipment and provide shock arresters to prevent pipe movement and water hammer.

U. Provide removable doors for access to and servicing of: valves, adjustable &/or replaceable components, coils, filters, moving assemblies, lubrication points, fire/smoke dampers, and shock stops.

V. Any portions of the work of this contract that may require a shutdown of the existing mechanical and electrical systems shall be scheduled with owner to achieve an acceptable time for this work.

W. Upon completion of the work covered by this contract, furnish the owner with one (1) set of reproducible "as-built" drawings and set of computer diskettes with CAD (computer aided drafting) "as-built" drawing data files which show all work installed under this contract. Pay particularly close attention to locations of new underground or concealed work and any existing underground utilities or abnormal subsurface conditions uncovered during excavations. Engineer will furnish diskettes of floor plans that form the Construction drawings.

X. All work must be done in a manner so that facility functions are not interrupted.

Y. Do not disturb materials that may contain asbestos. If the project affects suspect material the contractor should request the owner to test and verify that the suspect material is either considered asbestos free or an asbestos containing material (ACM).

If it is found to be an ACM the Owner will provide the services of an asbestos abatement contractor to remove the ACM portions of the material. Removal will be by others not in this contract.

Z. If the Contractor is suspect of any materials in the area of this contract that his personnel must be exposed to in the performance of this project he should bring such concerns, in writing, to the owner prior to signing the construction contract.

AA. All equipment that is removed or functionally abandoned as a part of this contract shall be relocated or disposed of as directed by the Owner. Stockpile this equipment in a location as directed by Owner. After Owner review of equipment, and written summary of equipment he wishes to keep, dispose of all unwanted equipment.

BB. Broom clean area disturbed by work on this project on a daily basis. Keep corridors and walkways clear. Do not block exits. Debris to be hauled away from site on a weekly basis. Provide dust barriers, sticky walk-off mats and maintain the construction area at a negative pressure to contain dust and debris within the renovated area.

CC. Provide 10% spare lamps for all new lighting fixtures installed under this project.

DD. Provide cover plates and/or restore to original condition any wall, ceiling, or floor surface exposed by work under this project. Cover plates may be used on abandoned device boxes recessed in wall. Where used they shall be brushed stainless steel with smooth rounded edges.

EE. All terminations of control wiring are to be "crimped spade" or "wire looped around screw" connections to match the requirements of the connected device. Provide a tight connection of the conductors at controlled devices with sufficient slack to allow easy removal and replacement of devices while protecting terminations from being pulled loose.

FF. Conceal control wiring to thermostats, temperature sensors and other devices in wall cavities or above the ceilings wherever possible. When wall or ceiling construction in finished spaces prohibits internal routing provide surface mounted EMT raceway. Provide wall boxes or wall plates as appropriate to facilitate raceway connection. Overall dimension (normal to wall or ceiling) of the control assembly, wall box (if required), and mounting hardware shall be less than 3 inches.

GG. Color selections - painting: the prime contractor will assemble all colors and/or color charts or cards for all items requiring paint for approval by the Owner.

HH. Allow for two 2 hour sessions of training of the building engineers on the operation and maintenance of the newly installed systems.

II. Start up of equipment shall only be performed in the Owner's presence. The manufacturer's representative shall oversee the contractor in the actual start-up.

JJ. Provide identification badges for all construction personnel other than delivery drivers. Where uniforms with unique Identification are worn the badges are not required.

KK. There is no charge to the Contractor for the use of the owner's dumpster.

LL. Key individual may obtain badges through the Department of Homeland Security and bypass security screenings.

MM. There is no owner provided parking. Access to the loading dock is provided for transfer of materials and tools.

NN. Staging space is very limited with some unsecured material storage available east of the loading dock.

1.06 PROGRESS MEETINGS

A. A job site meeting with all actively involved subcontractors will be held every two weeks. The prime Contractor shall make an audio record, keep written minutes of these meetings and distribute typed summaries of the minutes to all involved parties

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 10 00

SECTION 01 23 00

ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of alternates.

B. Procedures for pricing alternates.

C. Documentation of changes to Contract Price and Contract Time.

1.02 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in the Owner-Contractor Agreement.

B. Section includes identification of each Alternate by number, and describes the basic changes to be incorporated into the Work if a particular alternate is made a part of the Work by specific provisions in the Agreement between the Owner and the Contractor.

C. Coordination of related work and modifications to surrounding work as required to properly integrate the Work of each alternate, and to provide the complete construction required by the Contract Documents, is the responsibility of the Contractor.

1.03 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Replace existing electric preheat coils in AHU-5B and AHU-7B in lieu of refurbishment of existing electric preheat coils. Refer to plans for additional information and details.

B. Alternate No. 2: Provide airflow measuring stations (AFMS) in AHU-5B and AHU-7B supply air mains, equal to Ebtron Gold. Refer to plans for additional information and details.

C. Alternate No. 3: Replace existing supply air fan in AHU-5B with a Fan Wall system in lieu of replacement with a plenum fan (and associated high pressure plenum wall in existing fan section). Refer to plans for additional information and details.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 23 00

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project coordination.

B. Preconstruction meeting.

C. Construction progress meetings.

D. Special meetings.

C. Construction progress schedule.

D. Submittals for review, information, and project closeout.

E. Number of copies of submittals.

F. Submittal procedures.

1.02 PROJECT COORDINATION-GENERAL

A. Contractor shall be responsible for regulating access to perform the work and shall properly sequence the work so that all items required by the Contract Documents are installed in an orderly and workmanlike manner.

B. Scheduling of all work shall be closely coordinated with the Owner. All work within the present building shall be performed in a manner acceptable to the Owner and at a time mutually agreed upon prior to the time the work commences.

C. Make the following types of submittals to the Architect through the Owner's on-site inspector:
   1. Requests for Interpretation.
   2. Requests for Substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Manufacturer's instructions and field reports.
   6. Applications for payment and change order requests.
   7. Progress schedules.
   8. Coordination drawings.
   9. Closeout submittals.

PART 2 PRODUCTS – (NOT USED)

PART 3 EXECUTION

3.01 MEETINGS - GENERAL

A. Record minutes of all meetings and distribute copies within three (3) working days after the meeting to participants, with copies to the Architect/Engineer, Owner, participants, and those affected by decisions made.

3.02 PRECONSTRUCTION MEETING

A. Contactor will schedule a meeting after Notice of Award.

B. Attendance Required:

1. Owner.
2. Architect/Engineer.
3. Contractor.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of Products, Schedule of Values, and Progress Schedule.
5. Designation of personnel representing the parties to Contract, and Architect.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Owner may supplement items to the agenda.

3.03 CONSTRUCTION PROGRESS/COORDINATION MEETINGS

A. Schedule and administer meetings throughout progress of the Work at minimum one (1) week intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.

C. Attendance Required: Contractor’s job superintendent, major Subcontractors and suppliers, Owner, Architect/Engineer, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Safety.
3. Review of Work progress.
4. Field observations, problems, and decisions.
5. Identification of problems that impede, or will impede, planned progress.
6. Review of submittals schedule and status of submittals.
7. Review of detailed project activity schedule of immediate 2 weeks (a "Two Week Look Ahead" Schedule).
8. Maintenance of project's progress schedule.
9. Corrective measures to regain projected schedules.
10. Planned progress during succeeding work period.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

3.04 SPECIAL MEETINGS

A. Contractor shall schedule and conduct any special meetings as required by the Contract Documents or as necessary to perform the work. Such meetings would include but not be limited to meetings with local, state, or federal authorities and utility companies.

3.05 SUBMITTALS BY CONTRACTOR

A. Submittals must be approved by the Contractor prior to submittal to the Architect/Engineer or Owner**.**

B. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Shop drawings submitted to the Architect/Engineer without proper prior review and approval by the Contractor will be promptly returned by the Architect/Engineer without review and will not constitute delay of the project by the Architect/Engineer.

3.06 SUBMITTALS FOR REVIEW

A. The Contractor shall submit a submittal log to the Architect/Engineer within 14 calendar days of Notice to Proceed. This log shall list all anticipated submittals as required in the paragraphs below:

B. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

C. Submissions to the Architect for review are for the limited purpose of checking conformance with information given and the design concept expressed in the contract documents.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - CLOSEOUT SUBMITTALS.

3.07 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them per paragraph 1.03.H for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submittals are for Architect's or Owner's knowledge. No action will be taken.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

B. Submit for Owner's benefit during and after project completion.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review:
   1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies that Contractor requires, plus Two (2) that will be retained by the Architect.
   2. Larger Sheets, Not Larger Than 24 x 36 inches: Submit one opaque reproduction.

B. Documents for Information: Submit two copies.

C. Documents for Project Closeout: Make one reproduction of submittal finally reviewed. Submit one additional copy of submittals for information.

D. Operation and Maintenance Data: See Section 01 7800 Closeout Submittals for requirements

E. Samples: Submit the number specified in individual specification sections; one of which will be retained by the Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

F. At the same time submissions are made to the Architect/Engineer, the Contractor shall submit one copy of all shop drawings or setting drawings and schedules required to the Owner and to the Owner's on-site inspector.

3.10 SUBMITTAL PROCEDURES

A. Transmit each submittal with approved form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

D. Deliver submittals to the Architect/Engineer at their business address.

E. Schedule submittals to expedite the Project, and coordinate submission of related items.

F. For each submittal for review, allow 14 days excluding delivery time to and from the Contractor.

G. The Contractor must clearly and obviously identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work. Failure by the Contractor to be clear and obvious shall not relieve the Contractor of complete compliance with the Contract Documents.

H. Provide space for Contractor and Architect review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. The Contractor shall make any corrections required by the Architect/Engineer and file with the Architect/Engineer two corrected copies, file with the Owner one corrected copy, and file with the Owner's on-site inspector one corrected copy, and furnish other copies as may be needed. Instruct parties to promptly report any inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

L. Owner’s Responsibility
   1. The Owner will, with reasonable promptness, furnish additional instructions consistent with the Contract Documents by means of drawings, sketches, or otherwise, necessary for the proper execution of the work.

M. Architect/Engineer’s Responsibility
   1. The Architect/Engineer will review and return submittals within 14 calendar days after receipt of suitable, accurate, complete submittals. Unsuitable, inaccurate, incomplete submittals shall be returned as rejected within said 14-day period.
   2. The Architect/Engineer will return two copies of the submittals to the Contractor, along with one copy each to the Owner and the Owner's on-site inspector.

3.11 JOB COMPLETION

A. At the completion of the work and before final payment, the Contractor shall turn over to the Owner's Project Manager all drawings, manufacturer instruction sheets, and all other technical data applicable to work furnished under this contract.

END OF SECTION 01 30 00

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, with network analysis diagrams and reports.

1.02 SUBMITTALS

A. Within 5 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 10 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 5 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

F. Submit one copy each to the Owner and the Owner's Architect/Engineer.

G. Submit under transmittal letter form specified in Section 01 30 00 Administrative Requirements.

1.03 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Diagram Sheet Size: Maximum 24 x 36 inches.

C. Sheet Size: Multiples of 8-1/2 x 11 inches.

D. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS – (NOT USED)

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

A. Indicate complete sequence of construction by activity, with dates for beginning and completion of each element of construction. Each activity's duration shall be defined in terms of calendar days.

B. Identify each item by specification section number.

C. Identify work at separate stages and other logically grouped activities.

D. Provide sub-schedules for each stage of Work identified in Section 01 10 00 Summary and

Scope of Work.

E. Provide sub-schedules to define critical portions of the entire schedule.

F. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

G. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, and dates reviewed submittals will be required from the Architect.

H. Indicate delivery dates for owner-furnished products.

I. Provide legend for symbols and abbreviations used.

3.03 NETWORK ANALYSIS

A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.

B. Illustrate order and interdependence of activities and sequence of work, how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.

C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
   1. Preceding and following event numbers.
   2. Activity description.
   3. Estimated duration of activity, in maximum 21 calendar day intervals.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Total and free float: Float time shall accrue to joint ownership, available to either Owner or Contractor as needed to meet schedule milestones and contract completion date.
   11. Percentage of activity completed.
   12. Responsibility.

D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.

E. Required Reports: List activities in sorts or groups:
   1. By preceding work item or event number from lowest to highest.
   2. By amount of float, then in order of early start.

F. The following items, while not an all-inclusive list, influence construction activities and shall be the minimum considered during the preparation of the schedule:
   1. Normal or anticipated weather patterns.
   2. National or recognized holidays.
   3. Curing time for concrete requiring wet curing.
   4. Delivery time of long lead times.

3.04 REVIEW AND EVALUATION OF SCHEDULE

A. Review and evaluate project status to determine work behind schedule and work ahead of schedule.

3.05 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Annotate diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in the Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.06 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Architect/Engineer, Owner, separate contractors, testing and inspection agencies, and other parties identified by the Contractor with need-to-know schedule responsibility.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION 01 32 16

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

D. Control of installation.

E. Tolerances.

F. Inspection services.

G. Manufacturers' field services.

1.02 REFERENCE STANDARDS

A. ASTM E329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2011.

B. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2009.

1.03 SUBMITTALS

A. Testing Agency Qualifications (for Testing Agencies not hired by the Owner):
   1. Prior to start of Work, submit agency name, address, and telephone number, website, and names of full time registered Engineer and responsible officer.

B. Design Data: Submit for Architect/Engineer's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

C. Test Reports: After each test/inspection, the Testing Agency shall promptly submit one copy each of report to the Owner, the Architect/Engineer, the Contractor, and the Owner's on-site inspector.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Summary of work scope from letter of authorization.
      d. Testing laboratory name, address, and telephone number.
      e. Name and signature of laboratory inspector.
      f. Date and time and location of sampling or inspection.
      g. Record of temperature and weather conditions.
      h. Identification of product and specifications section.
      i. Location of sample or test in the Project.
      j. Type of test/inspection.
      k. Date of test/inspection.
      l. Results of test/inspection in compliance with the contract documents.
      m. Conformance with Contract Documents.
      n. Interpretation of results.
   2. Test report submittals are for Architect/Engineer's knowledge for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect/Engineer, in quantities specified for Product Data.

1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect/Engineer.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.04 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect/Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS – (NOT USED)

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with the Contract Documents, request clarification from the Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand

stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect/Engineer.
   6. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used which require testing.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect/Engineer and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect/Engineer. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Sum.

3.04 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to the Owner's on-site inspector, 30 days in advance of required observations.

1. Observer subject to approval of the Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of the Owner or Architect/Engineer, it is not practical to remove and replace the Work, the Owner or Architect/Engineer will direct an appropriate remedy or adjust payment.

END OF SECTION 01 40 00

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary telecommunications services.

B. Temporary sanitary facilities.

C. Temporary Controls: Barriers, enclosures, and fencing.

D. Security requirements.

E. Waste removal facilities and services.

F. Project identification sign.

1.02 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

1.03 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures in a manner acceptable to health authorities. Provide at time of project mobilization.

B. New permanent facilities may not be used during construction operations. Contractor shall keep permanent toilet facilities locked during construction.

C. The Contractor shall furnish all toilet tissue and shall maintain the toilets in a clean, dry, sanitary condition.

1.04 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades required by authorities having jurisdiction for public rights-of-way and for public access to existing buildings.

C. Provide protection for plants designated to remain. Replace damaged plants.

1.05 EXTERIOR ENCLOSURES

A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.06 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings if and where indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces.

1.07 SECURITY

A. Coordinate with Owner for security and facilities to protect work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.08 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site regularly.

C. Materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers. Locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.09 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

D. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS – (NOT USED)

PART 3 EXECUTION – (NOT USED)

END OF SECTION 01 50 00

SECTION 01 55 00

VEHICULAR ACCESS AND PARKING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall provide, pay for parking areas for construction personnel.

1.02 SECTION INCLUDES

A. Temporary Parking.

1.03 SUBMITTALS

A. Submit, within 15 calendar days of the Contractor's execution of the Agreement, a plan to the Owner for approval, showing the Contractor's proposed layout, sequencing, and phasing of all access roads and parking areas.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 PARKING

A. Arrange for temporary parking areas to accommodate use of construction personnel. Contractor shall be responsible for parking fees for their personnel.

END OF SECTION 01 55 00

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Transportation, handling, storage and protection.

B. Product option requirements.

C. Substitutions.

D. Maintenance materials, including extra materials, spare parts, tools, and software.

1.04 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

C. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Do not use products having any of the following characteristics:
   1. Manufactured using or containing CFC's or HCFC's.

C. Motors: NEMA MG 1 Type. Specific motor type is specified in individual specification sections.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions:

Submit a request for substitution for any manufacturer not named.

2.04 SPARE PARTS MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site.

PART 3 EXECUTION

3.01 SUBSTITUTIONS

A. The specifically named manufacturers, products, and systems, and descriptive characteristics used in the Contract Documents normally serve only to establish a level of quality and a performance standard. Unless specific restriction is placed upon an item in the specifications, Contractor may submit proposals for substitutions during the performance of the Work. The Owner reserves the right to disallow substitutions. Contractor assumes risks associated with possible rejection of proposals for substitution submitted.

B. Delays caused by tardiness of Contractor in preparing and forwarding submittals do not constitute an acceptable basis for consideration of substitute products. Delays due to factors that were in effect prior to project bidding do not constitute an acceptable basis for consideration of substitute products.

C. When making requests for substitutions, Contractor assumes the following responsibilities:
   1. To have personally investigated the proposed substitute product and determined it is equal or superior in all respects to that specified;
   2. To provide the same warranty for substitute that Contractor would for that specified;
   3. To provide complete cost data and waive all claims for additional costs related to substitution which subsequently become apparent; and
   4. To coordinate installation of the accepted substitute, making such changes as may be required for Work to be complete in all respects.

D. Decisions heretofore made concerning the equivalence or equality of materials, supplies and equipment furnished for or incorporated in other projects, completed or under construction for the Owner shall not be considered as precedents or criteria and shall have no bearing or influence on the question of equivalent, equal or comparable materials, supplies and equipment for the Work.

3.02 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to

excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Prevent contact with material that may cause corrosion, discoloration, or staining.

I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION 01 60 00

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Owner personnel.

H. Closeout procedures, except payment procedures.

I. General requirements for maintenance service.

1.02 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2009.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.
   6. Include in request:
      a. Identification of Project.
      b. Location and description of affected work.
      c. Necessity for cutting or alteration.
      d. Description of proposed work and products to be used.
      e. Alternatives to cutting and patching.
      f. Effect on work of Owner or separate Contractor.
      g. Written permission of affected separate Contractor.
      h. Date and time work will be executed.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.04 QUALIFICATIONS

A. For demolition work, employ a firm specializing in the type of work required.

B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in

design of this type of work and licensed in the State in which the Project is located.

1.05 PROJECT CONDITIONS

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

D. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

E. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.06 COORDINATION

A. See Section 01 10 00 Summary and Scope of Work for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect/Engineer four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner, participants, and those affected by decisions made.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Provide vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Provide consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Provide neat transitions between different surfaces, maintaining texture and appearance.

3.05 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:

1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Firestopping, to full thickness of the penetrated element.

I. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

J. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

K. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 SYSTEM STARTUP

A. The Contractor shall start up, adjust, and place all systems in proper working condition.

B. The Contractor shall demonstrate to the Owner or his designated representative, all features and all functions of all systems.

C. Systems to be started up and demonstrated shall include but not be limited to:
   1. Heating, ventilating, and air conditioning systems.
   2. Electrical systems.

D. Coordinate schedule for start-up of various equipment and systems.

E. Notify the Architect/Engineer and owner seven days prior to start-up of each item.

F. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

G. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

H. Verify that wiring and support components for equipment are complete and tested.

I. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

J. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

K. All systems shall be started and adjusted in accordance with manufacturer’s recommendations to ensure trouble-free operation.

L. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. See Section 01 79 00 - Demonstration and Training.

B. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

F. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual

with Owner's personnel in detail to explain all aspects of operation and maintenance.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems.

3.12 FINAL CLEANING

A. Final cleaning shall be performed prior to the final inspection.

B. The Contractor shall be responsible for final cleaning and seeing that the building is in a clean condition when it is turned over to the Owner. At the completion of the work, all subcontractors shall remove all their tools, scaffolding, and surplus materials from the site.

C. The Contractor shall remove all labels, marks, paint, caulking, streaks, or spots. Leave all metal surfaces, including hardware, free from marks and dust. Clean all trim, utilities, and equipment and clean all electrical fixtures, lenses, wall plates, and equipment.

D. Use cleaning materials that are nonhazardous.

F. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

G. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

H. Replace or clean filters of operating equipment. Lubricate all parts requiring lubrication. Fill all grease cups, oilers, etc.

I. Clean debris from roofs, gutters, downspouts, and drainage systems, including inlets, catch basins, detention/retention areas, out fall and overflow devices..

J. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to the Architect/Engineer and Owner.

B. Accompany the Owner's on-site inspector on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Notice of Substantial Completion.

C. Notify the Architect/Engineer when work is considered ready for Substantial Completion.

D. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for the Architect/Engineer's review.

E. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

F. Accompany the Owner's on-site inspector on preliminary final inspection.

G. Notify the Architect/Engineer when work is considered finally complete.

H. Complete items of work determined by the Architect/Engineer's final inspection.

3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION 01 70 00

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 SUBMITTALS

A. Project Record Documents: Submit documents to the Architect/Engineer with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before submitting operation and maintenance data. The Architect/Engineer will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by the Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with the Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with the Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS – (NOT USED)

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Complete set of Project Record As-Built Drawings.
   2. Specifications.
   3. Addenda.
   4. Bulletins.
   5. Change Orders and other modifications to the Contract.
   6. Reviewed shop drawings, product data, and samples.
   7. Field test records.
   8. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by the Owner.

C. File documents and samples in accordance with CSI format.

D. Label each document "Project Record" in neat large printed letters.

E. Make documents and samples available at all times for inspection by the Owner and the Owner's on-site inspector.

F. Store record documents separate from documents used for construction.

G. Record information concurrent with construction progress. Do not conceal any work until required information is recorded.

H. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

I. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   2. Field changes of dimension and detail.
   3. Changes made by field order or by change order.
   4. Details not on original Contract drawings.
   5. Elevations and horizontal locations, items crucial to future expansions as indicated on the drawings.

J. At contract closeout, deliver record documents to the Owner. Accompany submittal with transmittal letter in duplicate containing:
   1. Date.
   2. Project title and number.
   3. Contractor's name and address.
   4. Title and number of each record document.
   5. Signature of Contractor or his authorized representative.

3.02 OPERATION AND MAINTENANCE DATA

A. At contract closeout, deliver record documents to the Owner. Accompany submittal with transmittal letter in duplicate containing:

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
   1. Project title and number.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
   1. Contractor's name and address.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
   1. Title and number of each record document.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.

2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Include color coded wiring diagrams as installed.

D. Operation and Maintenance Software: Where applicable, provide necessary software and training to restore systems to original configuration.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

O. Include test and balancing reports.

P. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.
      b. Air and water balance reports.
      c. Certificates.

J. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with the Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION 01 78 00

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems where indicated in specific specification sections.

B. Training of Owner personnel in operation and maintenance is required for:
   1. HVAC systems and equipment.
   2. Electrical systems and equipment.
   3. Items specified in individual product Sections.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to Owner.
   2. Submit not less than two weeks prior to start of training.
   3. Revise and resubmit until acceptable.
   4. Provide an overall schedule showing all training sessions.
   5. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such a slides, video tapes/Power-point and hand-outs.
      h. Training equipment required, such as projector and projection screen, to be provided by Contractor.

C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
   1. Include applicable portion of O&M manuals.
   2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
   3. Provide one extra copy of each training manual to be included with operation and maintenance data.

D. Training Reports:
   1. Identification of each training session, date, time, and duration.
   2. Sign-in sheet showing names and job titles of attendees.
   3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
   1. Format: DVD Disc.
   2. Label each disc and container with session identification and date.

1.04 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.

1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS – (NOT USED)

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by the Owner.

B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.

C. Demonstration may be combined with the Owner personnel training if applicable.

D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.
   2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Commissioning Authority will prepare the training plan based on draft submitted.

B. Conduct training on-site unless otherwise indicated

C. The Owner will provide classroom and seating at no cost to Contractor.

D. Do not start training until Functional Testing is complete.

E. Provide training in minimum two hour segments.

F. The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.

G. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

H. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

I. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.

2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
4. Provide hands-on training on all operational modes possible and preventive maintenance.
5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
6. Discuss common troubleshooting problems and solutions.
7. Discuss any peculiarities of equipment installation or operation.
8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
9. Review recommended tools and spare parts inventory suggestions of manufacturers.
10. Review spare parts and tools required to be furnished by Contractor.
11. Review spare parts suppliers and sources and procurement procedures.

J. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION 01 79 00

SECTION 23 05 00

BASIC HVAC REQUIREMENTS

1. GENERAL

1.01 DRAWINGS

A. Be acquainted with any and all peculiarities and limitations of the spaces available for the installation of all work and materials furnished and installed under this section of the specifications. Exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.

B. Although the locations of the equipment and piping may be shown on the drawings in certain positions, should the Contractor discover conflicts or interferences during progress of the work, he shall report any discrepancies or interferences that are discovered.

1.02 SAFETY DEVICES

A. Contractor shall furnish and install safety guards for all dangerous moving parts such as belts and pulleys, flexible shaft connections and the like, and shall provide all required safety controls to prevent dangerous or damaging operation of equipment.

1.03 GUARANTEE

A. Latent defects arising during this period shall, upon notification by the Owner or Designer, be promptly corrected at no additional cost to the Owner. Loss of lubricant shall be considered as a defect in workmanship.

2. PRODUCTS

2.01 MOTORS

A. Provide motors for equipment under this contract.

B. Motors shall be sized such that at final balanced operation of systems, no motor shall have a brake horsepower load exceeding the nameplate horsepower of the motor.

1. Motors shall be non-radio interfering type, of standard manufacture, complete with pulleys, belts, slide rails or flexible couplings. Open motors shall be 40 degrees centigrade rated, totally enclosed, 50 degree centigrade rated, of size and type suitable for the application, and shall run without objectionable noise under all operating conditions. The Contractor shall be responsible for correct operating and current characteristics for motors furnished under this Contract.
2. Motors larger than 1/2 HP shall be three phase motors and, unless otherwise indicated, shall operate at 1800 RPM.
3. Coordinate motor current voltage with Division 26, Electrical.
4. Motors of 5 HP or greater, shall comply with the following efficiency schedule:

HP	% Efficiency	% Power Factor

15	91.1	86.0
25	91.1	86.0
30	93.0	88.0
40	94.1	89.0
60	94.1	89.0
75	94.1	89.0

C. After the Contractor has checked the motor for alignment, oil, etc., and after final connections, Division 26000 will test motor for proper rotation, determine the load current, and make necessary adjustment for proper starting and overload protection.

2.02 VARIABLE FREQUENCY DRIVES

A. Provide variable frequency drives equal to ABB ACH Series or Square D.

B. All drives on the project shall be by the same manufacturer.

C. Drives shall be in NEMA-1 cabinetry and provided with:

1. Input circuit breaker.
2. Bypass with remote activation capability.
3. Separate VFD, only, switch so that the VFD assembly can be operated in bypass function while the VFD controller is serviced.
4. Overload protection in both VFD and bypass operation.
5. LED control panel with removal capability so that the remote can be used on any drive and/or used to program drives to similar parameters.
6. Integral 5% impedance DC Bus line reactors.

D. Provide vendor startup with 24-month parts and labor warranty.

3. EXECUTION

3.01 COORDINATION

A. Coordinate all work with that of the other trades on the job and also with that of the Owner in order that there will be no delay in the proper installation and completion of the work. Any cost for extra work or materials resulting from lack of coordination of work performed under this section shall be borne by this section

3.02 WORKMANSHIP, MATERIALS AND EQUIPMENT

A. All work shall be performed in a workmanlike manner and shall present a neat and mechanical appearance when completed. All materials shall be of type, quality, and of minimum rating prescribed herein or as indicated on the plans.

3.03 MANUFACTURER'S RECOMMENDATIONS

A. All material and equipment shall be installed in strict accordance with the manufacturer of such material and equipment.

B. In the event of discrepancy between manufacturer's recommendations and any requirements of drawings or specifications, Contractor shall notify Designer in order that the matter can be cleared up prior to any installation of materials or equipment.

3.04 PROTECTION OF WORK

A. Protect work at all times from danger by freezing, breakage, dirt, foreign materials, etc., and replace all work so damaged. Use every precaution to protect the work of others, and be responsible for all damage to other work caused by work of, or through the neglect of, workmen under this section of the specifications.

3.05 EQUIPMENT/PIPING SUPPORTS

A. Furnish and erect all necessary steel members, frames, connections, etc., to support equipment and piping installed under this section, regardless of whether the drawings indicate support details or not. Submit details of supports to Designer for approval prior to fabrication.

B. Concrete Pads: Modify or supplement existing pads where required. Provide pads where none exist.

3.06 PATCHING

A. Perform all cutting required for the introduction and placement of work. Cutting and patching required as a result of the omission of an opening in construction shall be done at this section's expense.

3.07 PAINTING

A. Equipment including pumps, motors, and similar factory fabricated and assembled units shall be furnished with factory applied, protective, prime coat paint of finished baked enamel as specified hereinbefore. Equipment surfaces damaged during the course of construction shall be refinished by the Contractor.

3.08 TESTING

A. Upon completion of work, all equipment shall be cleaned and adjusted for proper operation and any defects discovered shall be corrected before final inspection prior to acceptance.

B. Water circuits shall be thoroughly cleaned, pressure tested and proven tight with minimum 100 lbs. hydrostatic pressure.

C. All air leaks shall be repaired. Ductwork shall be tested for leaks before applying external insulation and before concealing in inaccessible locations.
   1. Test duct upstream of VAV boxes per United Sheet Metal’s “System Pressure Testing for Leaks” procedure.
      a. 2-inch W. G. pressure class: Unless otherwise indicated, this shall be limited to systems or sections of systems operating at static pressures over 1-inch of water and up to 2-inches of water, above or below atmospheric pressure with a type C seal class. Velocities shall be no greater than 2500 fpm. Utilize for return air, outside air, branch supply, exhaust ductwork downstream (low pressure side) of air terminal units and laboratory air control units (excluding fume hood and biological safety cabinet exhaust) and general exhaust ductwork.
      b. 4-inch W.G. pressure class: Unless otherwise indicated, this shall be limited to systems or sections of systems operating at static pressures over 3-inches of water and up to 4-inches of water, above or below atmospheric pressure with Type A seal class. Velocities shall be no greater than 2500 fpm. Utilize for main supply ductwork upstream (high pressure side)

of air terminal units and laboratory air control units; laboratory exhaust ductwork; fume hood and biological safety cabinet exhaust ductwork; radioisotope exhaust ductwork.

c. Inspection shall be performed after all ductwork is installed. Bubble test each welded joint at full operating pressure, and return system to proper operation

D. The above tests shall be made in the presence of the Designer or his authorized representative.

3.09 ADJUSTMENTS

A. Upon completion of the installation of all work and equipment, the Contractor shall start all equipment and make all necessary adjustments to place entire heating, ventilating and air conditioning systems in a satisfactory condition for continuous safe operation.

B. All filters shall be replaced with the specified type after the period of adjustment.

C. Air circulation systems shall be cleaned free of all dirt and debris by vacuuming air ducts from each end of the system on the floors being renovated, and adjusted to provide uniform heating and/or cooling of all spaces served by each system.

D. Lubricate all bearings of equipment furnished using only lubricant recommended by manufacturer of such equipment. Tag each piece of equipment with date of lubrication, with subcontractor's name imprinted thereon. Bearings shall be left in cool, trouble free, operating condition.

E. Temperature and safety controls shall be adjusted as necessary to ensure continuous, trouble free, safe, and automatic operation of systems.

3.10 INSTRUCTION OF OWNER

A. Provide the services of approved qualified engineer, technician or mechanic to instruct the Owner or his authorized representative, in all phases of operation and maintenance of each of the mechanical systems. Give the Owner seven days notice prior to instruction so that plans can be made to video tape the presentation.

B. The period of time to be used in instruction shall be as specified in the respective sections of Division 23.

END OF SECTION

SECTION 23 05 29

HANGERS AND SUPPORTS

1. GENERAL - Not Used.

2. PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

A. Manufacturer: Anvil International.

B. Other Acceptable Manufacturers:
1. Cooper B-Line.

C. Hydronic and Steam Piping:
1. Conform to ASME B31.9, ASME B31.2, ASTM F708, MSS SP58, MSS SP69 and MSS SP89.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
9. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
10. Wall Support for Hot Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
11. Vertical Support: Steel riser clamp.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.02 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.03 INSERTS

A. Manufacturer: Anvil International; Product: Fig. 117.

B. Other Acceptable Manufacturers:
1. Cooper B-Line.

C. Inserts: Malleable iron expansion shields in drilled holes.

2.04 SHIELDS

A. Provide curved sheet metal shields at horizontal insulated pipes at support points.

3. EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.02 INSERTS

A. Expansion shields in drilled holes may be used provided they do not exceed 500 lbs. per anchor.

3.03 PIPE HANGERS AND SUPPORTS

A. Support horizontal piping as scheduled.

B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

C. Place hangers within 18 inches of each horizontal elbow or 4” (or larger valve).

D. Use hangers with 1-1/2 inch minimum vertical adjustment.

E. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

F. Design hangers for pipe movement without disengagement of supported pipe.

3.04 HANGER SPACING AND ROD SIZE FOR HYDRONIC, STEAM AND PLUMBING PIPING

PIPE SIZE (Inches)	MAX. HANGER SPACING (Feet)	HANGER ROD DIAMETER (inches)
1/2 to 1-1/4	6.5	3/8
1-1/2 to 2	10	3/8
2-1/2 to 3	10	1/2
4 to 6	10	5/8
8 to 14	14	7/8
C.I. Bell and Spigot(or No-Hub) and at Joints	5	5/8

3.05 PROTECTION SHIELDS

A. Pipe covering shall be protected at each supporting unit with 14 gauge protection shields made of steel that extends up to pipe centerline and will transmit the load of the pipe line through the insulation to the supporting unit. Protection shields shall not be less than the following lengths:

PIPE SIZE (inches)	LENGTH (inches)	METAL GAUGE
1/2 to 3	12	18
4	12	16
5 to 6	18	16
8 to 14	24	14

END OF SECTION

SECTION 23 05 48

VIBRATION ISOLATION AND SEISMIC RESTRAINT FOR MECHANICAL AND ELECTRICAL SYSTEMS

1. GENERAL – Not Used.

2. PRODUCTS

2.01 MANUFACTURERS

A. Equal to Mason Industries, Vibro-Acoustics or Kinetics.

2.02 VIBRATION ISOLATION AND SEISMIC RESTRAINT

A. Air handler fans, pumps, hydronic equipment, piping, ductwork, conduit, panelboards and other mechanical and electrical equipment installed in this Work shall be seismically braced per the International Building Code 2012 for a Risk Category = III and Seismic Design Category = D building, with a Spectral Response Acceleration SDs = 0.737 g, and SD1 = 0.397 g. Seismic restraint design shall be stamped by a P.E. in the employ of the restraint manufacturer. Design shall include attachment of equipment to building.

B. Materials and systems specified in this section shall be obtained from a single vibration isolation materials manufacturer. The isolation materials manufacturer shall be responsible for the proper selection of isolators to accomplish the specified minimum static deflections, for all spring and pad type isolators, based on the weight distribution of equipment to be isolated.

C. The Contractor shall furnish the vibration isolation manufacturer a complete set of shop drawings, including operating weights and weight distribution. The isolation manufacturer shall then submit drawings for approval showing construction of specific devices to be used on this project including complete design of supplementary bases, tabulation of design data for each isolator including spring O.D.; free, operating and solid heights; and all other data to show that minimum static deflection requirements are met.

3. EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install isolation for motor driven equipment.

C. Indicate special procedures and setting dimensions.

3.02 MANUFACTURER'S FIELD SERVICES

A. Inspect braced equipment after installation and submit report. Include static deflections.

B. Manufacturer's Certificate: Certify that isolators are properly installed and adjusted to meet or exceed specified requirements.

END OF SECTION

SECTION 23 05 53

MECHANICAL IDENTIFICATION

1. GENERAL – Not Used.

2. PRODUCTS

2.01 NAMEPLATE

A. Manufacturer: Seton; Product: Nameplates.

B. Other Acceptable Manufacturers:

1. Brady.

C. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.02 PIPE MARKERS

A. Manufacturer: Seton; Product: Setmark Series.

B. Other Acceptable Manufacturers:

1. Brady: Product: Snap-on Series.

C. Color: Conform to ASME A13.1.

D. Description: Plastic Pipe Markers, factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

2.03 CEILING TACKS

A. Description: Steel with 3/4” diameter color-coded head.

B. Color Code:
1. Red - Sprinkler valves, fire and smoke dampers
2. Yellow – VAV boxes
3. Green - Plumbing valves

3. EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners.

B. Install plastic pipe markers in accordance with manufacturer's instructions.

C. Identify air handling units, VAV boxes, fans, air valves, heating coils, and heat transfer equipment with plastic nameplates.

D. Identify control panels and major control components outside panels with plastic nameplates.

E. Identify thermostats relating to terminal boxes or valves with nameplates.

F. Label automatic controls, instruments, and relays. Key to submitted control schematics.

G. Identify piping, concealed or exposed, with plastic pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

H. Provide ceiling tacks to locate valves above lay-in ceilings. Locate in corner of ceiling grid closest to valve.

3.03 TABLES

A. Pipe identification bands shall be installed on piping at each shut-off valve, each piece of equipment, each branch take-off, and indentify at not less than one (1) point each piping run visible in each room. Pipe bands shall be installed on systems indicated below.

TABLE I - BAND AND LETTER SIZE

PIPE OR PIPE COVERING DIAMETER (inches)	WIDTH OF BAND (inches)	LETTER & NUMBER SIZE (inches)
3/4 to 1-1/4	8	1/2
1-1/2 to 2	8	3/4
2-1/2 to 6	12	1-1/4
8 to 14	24	2-1/2

TABLE II - BAND COLORING

PIPE	BAND COLOR	LETTERING	LETTERING COLOR
Chilled Water Supply	Green	CHILLED WATER SUPPLY	White
Chilled Water Return	Green	CHILLED WATER RETURN	White
Hot Water Heating Supply	Yellow	HOT WATER SUPPLY	Black
Hot Water Heating Return	Yellow	HOT WATER RETURN	Black
High Pressure Steam Supply	Yellow	HIGH PRESSURE STEAM SUPPLY	Black
Low Pressure Steam Supply	Yellow	LOW PRESSURE STEAM SUPPLY	Black
High Pressure Steam Condensate	Yellow	HIGH PRESSURE STEAM CONDENSATE	Black
Low Pressure Steam Condensate	Yellow	LOW PRESSURE STEAM CONDENSATE	Black
Pumped Steam Condensate	Yellow	PUMPED STEAM CONDENSATE	Black

END OF SECTION

SECTION 23 05 93

BALANCING AND TESTING BY INDEPENDENT AGENCY

PART 1 GENERAL

1.1 REFERENCE STANDARDS:

A. Published Specifications Standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work in this section where cited by abbreviations noted below:
   1. AABC - Associated Air Balance Council.
   2. NEBB - National Environmental Balancing Bureau.
   3. SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Inc.

1.2 QUALITY ASSURANCE:

A. Total system balance shall be performed by an agency certified by the Associated Air Balance Council (AABC) or by the National Environmental Balancing Bureau (NEBB). All work done by this agency shall be by qualified technicians under the direct supervision of a certified test and balance engineer.

B. Acceptable Test and Balance Contractors shall be as listed below – **NO EXCEPTIONS**:
   1. Environmental Test & Balance Co. (AABC) – Memphis, TN 901-373-9946
   2. Systems Analysis and Balancing, Inc. (NEBB) – Memphis, TN 901-452-8230
   3. ATS Test and Balance, Inc. (NEBB) - Memphis, TN 901-388-2210.
   4. United Test and Balance, Inc. (AABC) – Nashville, TN 615-331-1294
   5. Thermal Balance, Inc. (AABC) – Paducah, KY 270-744-9723
   6. Systems Analysis Incorporated (NEBB) – Birmingham, AL 205-802-7850
   7. Test and Balance Corporation (AABC) – Atlanta, GA 404-255-8295

C. If so requested by the Engineer, the Balancing and Testing Agency shall conduct the specified tests in the Engineer's presence.

D. Provide all instruments required for testing, adjusting and balancing operations.

1.3 SUBMITTALS:

A. Submit the following to Engineer:
   1. In list of materials submittal, furnish Engineer statement that:
      a. Air Balance Company is a member of Balance Council/Bureau.
      b. It has satisfactorily balanced at least three systems of comparable type and size.
      c. Sample forms for use in compiling and recording test and balance data.
   2. Final submission shall include records and tabulations required hereinafter.

B. At least fifteen days prior to Trade Contractor's request for final inspection, submit required copies of final reports, on applicable reporting forms, for review.
   1. Schedule testing and balancing of parts of systems which is delayed due to seasonal, climatic, occupancy, or other conditions beyond control of Trade Contractor, as early as proper conditions will allow, after consultation with Engineer/Architect.
   2. Submit reports of delayed testing promptly after execution of those services.
   3. Form of final reports:
      a. Each individual final reporting form must bear the signature of person who recorded date and that of supervisor of the reporting organization.
      b. Identify instruments of all types which were used, and last date of calibration of each.

1.4 JOB CONDITIONS:

A. Prior to start of testing, adjusting, and balancing, verify that required "Job Conditions" are met:
   1. Systems installation is complete and in full operation.
   2. Outside conditions are within a reasonable range relative to design conditions.
   3. Lights are turned "on" when lighting is included in the cooling load.
   4. Special equipment such as computers, and electronic equipment are in full operation.

PART 2 PRODUCTS – NOT APPLICABLE

PART 3 EXECUTION

3.1 AIR SYSTEM BALANCING:

Perform operational testing of central station equipment including but not limited to, balancing of air distribution and exhaust systems, and adjustment of air terminal devices for HVAC systems of Project.

A. Operating test procedure shall be as follows:
   1. Records must be submitted in tabulated form to Engineer/Architect for review.

B. Check that filters are installed, free of bypass, and clean, type as specified.
   1. Make allowance for air filter resistance at time of tests.
   2. Main air supply to be at design air quantity at pressure drop across filter banks midway between pressure drop for clean and dirty filters.

C. Test and adjust blower rpm to design requirements.

D. Test and record motor full load amperes.

E. Make pitot tube traverse of supply, return and exhaust ducts at each floor take-off from respective mains, and obtain design cfm at fans by taking traverse in duct adjacent to inlet and outlet of air handling device.

F. Test and record system static pressures, suction and discharges.

G. Test and adjust system for design recirculated air, cfm.

H. Test and adjust system for design cfm outside air.

I. Test and record entering DB heating and cooling temperature.

J. Test and record entering WB cooling air temperature.

K. Test and record leaving DB heating and cooling temperature.

L. Test and record leaving WB cooling temperature.

M. Test and record AHU filter pressure drop.

N. Measure and record differential pressure and corresponding CFM at each air flow measuring station.

O. Adjust main supply, return, and exhaust air ducts to proper design cfm.

P. Adjust zones to proper design cfm, supply, return and exhaust.

Q. Test and adjust each supply and return diffuser, grille, and register to within 5 percent below and 10 percent above design requirements. After balancing a space, smoke test the space to verify that design space pressurization is accomplished.

R. Test and adjust each exhaust grille and register to within 5 percent below or 10 percent above design requirements. Verify that space pressurization requirements meet the design intent as indicated on the plans.

S. Identify each grille, diffusers and register as to location area, size, type, and manufacturer.

T. Readings and tests of diffusers, grilles, and registers shall include:
1. Required fpm velocity.
2. Test resultant velocity.
3. Required cfm.
4. Test resultant cfm after adjustments.

U. In cooperation with control manufacturer, set adjustments of automatically operated dampers and terminal boxes to operate as indicated.

V. In cooperation with control manufacturer and mechanical section set adjustments of air terminal boxes as required to product design performance.

W. Adjust diffusers, throw pattern, grilles, and registers to minimize drafts.

X. Test and record DB temperature in occupied zones.

Y. Make changes in pulleys, belts, and dampers as required for correct balance as required at no additional cost to Owner.

Z. Outside climatic conditions at the time of testing: Read and record DB and WB temperatures, sunny, cloudy, or windy.

3.2 HYDRONIC SYSTEMS BALANCING:

Perform flow testing of hydronic systems, adjust and record liquid flow at each piece of equipment, including but not limited to each hot water coil, chilled water coil, heat recovery coil, heat exchanger, chiller, cooling tower cell and pumps.

A. Provide the following instruments for field use:
1. One set of pressure gauges and fittings.
2. Dry bulb thermometer.
3. Wet bulb thermometer.
4. Thermocouple unit and thermocouples.
5. Set of balancing cock adjustment wrenches.
6. Portable field flowmeter.

B. Prepare Water Systems for Balancing in the following manner:
1. Open valve to full-open position.
2. Check pump rotation.
3. Check air vents at high points of water system.
   a. Verify that all are installed and operating freely.
4. Set temperature controls so all coils are calling for:

a. Full cooling: when balancing chilled water coils.
b. Full heating: when balancing hot water coils.
5. Check operation of automatic valves.
6. Check and set operating temperatures on secondary and primary systems.
7. Complete air balance must have been accomplished before actual water balance begins.

C. Initial Adjustments:
1. Set chilled water and hot water pumps to proper gpm delivery.
2. Adjust flow of water through:
a. Heat exchangers and valves in heating water mains and branches where these valves are indicated on the drawings.
b. Valves in chilled water mains and branches where these valves are indicated on the drawings.
3. Check water temperature at inlet side of cooling and heating coils.
4. Proceed to balance each chilled water coil and hot water coil.
5. Upon completion of flow reading and adjustments at coils, mark all settings and record all data.

D. Detailed Balance: Upon completion of preparation and adjustments, proceed as follows:
1. After adjustments to coils are made:
a. Recheck settings at pumps, temperatures, and performance of every water system heat exchanger.
b. Readjust as required.
2. Install pressure gages on coil:
a. Read pressure drop through coil at set rate on call for full flow.
3. Record and check following items at each cooling coil and terminal unit heating coil:
a. Inlet water temperature.
b. Leaving water temperature.
c. Pressure drop and flow rate of each coil and circuit setter.
4. Record and check following items at each pump:
a. Pump operating suction and discharge pressure and final total dynamic head.
b. No flow (pump discharge valve closed) suction and discharge pressure and corresponding total dynamic head.
c. List all mechanical specifications of pumps.
d. Rated and actual running amperage, voltage and brake horesepower of each pump motor.

E. Final Tabulation:
1. Test all component systems of air conditioning system during an operational test, in presence of Engineer's representative.
2. After balancing air conditioning components, put entire system into operation.
a. Record all pressures, temperatures, gpm, cfm, velocities, etc.
b. Check recorded data against design schedules.
3. Approved test reports shall be included in "Operating Instructions" submitted as specified under Section 23 05 00 - BASIC HVAC REQUIREMENTS.
4. Measure and record differential pressure and corresponding flow rate at each circuit setter or flow measuring device.

3.3 OPPOSITE SEASON TEST:

A. The balancing agency shall perform an inspection of the HVAC system during the opposite season from that in which the initial adjustments were made. The balancing agency shall make any necessary modifications to the initial adjustments to produce optimum system operation.

3.4 CONTROL COORDINATION:

A. Coordinate with controls installer and equipment installer making adjustments to the following items as required to accomplish indicated performance:
   1. Terminal air units.
   2. Control dampers.
   3. Control valves.
   4. Variable frequency drives and control pressure setpoints, as applicable.

B. The HVAC Section shall furnish copies of the manufacturer's literature and other data to the Balancing and Testing Agency for their use in balancing the air and water systems: pump curves; fan performance data and curves; air handling unit coil flow curves; and other pertinent air and water distribution data.

END OF SECTION

SECTION 23 07 13

DUCTWORK INSULATION

1. GENERAL

1.01 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original factory packaging, labeled with manufacturer's density and thickness.

B. Store insulation in original wrapping and protect from weather and construction traffic.

C. Protect insulation against dirt, water, chemical, and mechanical damage.

1.02 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

2. PRODUCTS

2.01 DUCTS

A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255, and UL 723. This shall apply to all insulation materials and coverings.

B. Concealed single wall supply and return ducts shall be insulated with 2 inch thick .75 pcf insulation faced wrap as manufactured by Owens-Corning Fiberglas Corp. Insulation shall be wrapped tightly on the ductwork with all circumferential joints butted and all longitudinal joints overlapped a minimum of 2 inch. Additionally secure insulation to the bottom of rectangular ductwork, over 24 inch wide, with mechanical fasteners at not more than 18 inch O.C. All pin penetrations and/or punctures shall be covered with FRJ tape.

C. All non-factory insulated duct in Mechanical Rooms shall be wrapped with 2", 3 pcf density duct board with foil-faced vapor barrier jacket installed on weld pins, equal to Owens-Corning Type 705. Use 3” thick insulation where noted on the plans.

3. EXECUTION

3.01 EXAMINATION

A. Verify that ductwork has been sealed and tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install materials in accordance with manufacturer's instructions. Insulation materials shall not be exposed to the airstream.

B. Insulated ductwork conveying air below ambient temperature:

1. Provide insulation with vapor barrier jackets.

2. Finish with tape and vapor barrier jacket.

3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.

4. Insulate entire system including fittings, joints, and flanges.

5. Provide duct wrap on VAV box hot water coils.

6. Provide ½" flexible sheet-type elastomeric insulation on the top surfaces of ceiling diffusers.

C. External Duct Insulation Application:

1. Install without sag on underside of ductwork. Use mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.

2. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.

3. Stop and point insulation around access doors, duct-mounted instrumentation and damper operators to allow operation without disturbing wrapping.

END OF SECTION

SECTION 23 07 19

PIPING AND EQUIPMENT INSULATION

1. GENERAL

1.01 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum three years experience.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Store insulation in original wrapping and protect from weather and construction traffic.

C. Protect insulation against dirt, water, chemical, and mechanical damage.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

2. PRODUCTS

2.01 MECHANICAL PIPING

A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255, and UL 723. This shall apply to all insulation materials and coverings.

B. Interior chilled and hot water pipe shall have 3.25 lb. density preformed glass fiber insulation with foil-Kraft-scrim all purpose, flame safe vapor jacket, fittings finished with glass cloth. Thickness shall be 1 inch through 1-1/4 inch pipe, 1-1/2 through 3 inch pipe, 2 inch for larger pipe. Install Armalock or Foamglas at each hanger and extend 6 inches past each end of the protector shield. Fittings are to be treated same as pipe covering and insulated as noted in 3.02, C.

C. Interior steam pipe insulation shall be similar to chilled water pipe. Insulation thickness shall be 3".

D. Interior steam condensate insulation shall be similar to chilled water pipe. Insulation thickness shall be 2".

E. Provide .016" smooth aluminum metal jacket over piping up to 7 feet above floor level, in the Mechanical Rooms and above roof. Secure with sheet metal screws and/or 3/8" wide aluminum bands. Fittings shall be covered with factory-formed aluminum elbow covers.

F. A/C unit condensate drains shall be insulated with ½" flexible elastomeric pipe insulation. Provide vapor barrier jacket on exterior pipe.

2.02 STEAM VALVE AND STRAINER INSULATION

A. All new steam valves except PRV's and all new steam strainers shall be insulated with manufactured removable pads that strap in place. Pads shall be 2" thick fiberglass covered with silicone cloth.

3. EXECUTION

3.01 EXAMINATION

A. Verify that piping and equipment have been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install materials in accordance with manufacturer's instructions. Insulation materials shall not be exposed to the airstream.

B. On exposed piping and equipment, locate insulation and cover seams in least visible locations.

C. Insulated:

1. Provide vapor barrier jackets, factory applied or field applied.

2. Insulate fittings, joints, and water valves with factory pre-molded fittings of like material and thickness as adjacent pipe. Fittings shall be Hamfab or equal. Finish with glass cloth and vapor barrier adhesive. PVC fitting covers may not be used.

3. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.

4. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

5. Flexible fiberglass inserts may not be used.

D. Inserts and Shields:

1. Application: Piping 1-1/2 inch diameter or larger.

2. Shields: As specified in Section 23 05 29.

3. Insert Location: Between support shield and piping and under the finish jacket.

4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated. Extend 6" past each end of shield.

5. Insert Material: Foamglass, hydrous calcium silicate insulation, or other heavy density insulating material suitable for the planned temperature range.

E. Finish insulation at supports, protrusions, and interruptions.

F. Do not insulate factory insulated equipment.

G. On exposed equipment, locate insulation and cover seams in least visible locations.

H. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Secure insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

I. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface.

J. Do not insulate over nameplate or ASME stamps. Bevel and seal insulation around such.

END OF SECTION

SECTION 23 09 23

TEMPERATURE CONTROLS

1. GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01, Division 23 and Division 26 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Work included under this Section consists of replacement of and modifications to a pneumatic electric temperature control system for the heating, ventilating and air conditioning systems.

B. All sensors, valves, operators, dampers, control air tubing, wiring, conduit, and other necessary devices for a complete and operable system shall be provided under this bid.

C. The controls subcontractor shall submit proof, upon request, they have maintained an established office within 50 miles of the project site for a minimum continuous five year period prior to this installation and are adequately equipped with personnel and service stock to render emergency service in the event of a customer warranty or service call. The system shall be installed and commissioned by factory-trained technicians under the direct employment of the system manufacturer.

D. Related Work: The following items of related work are specified in other Sections:

1. All Division 23 Sections.
2. All Division 26 Sections.
3. Mechanical Subcontractor shall provide the following:
   a. Install all automatic dampers; except those provided as part of air handling units.
   b. Assemble multiple section dampers with required interconnecting linkages and extend required number of shafts through duct for external mounting of damper motors.
   c. Provide access doors or other approved means of access through ducts for service to control equipment.
   d. Install immersion wells, pressure tapping and any associated shut-off cocks.
   e. Install automatic control valves and dampers.
   f. Furnish automatic valve flanges and flange nuts as required.

E. The temperature control contractor shall provide all hardware and software necessary to implement the functions and sequence of operations specified.

F. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this work and in the regular employment of the approved manufacturer's local field office.

1.03 SUBMITTALS

A. Submittal Data Brochures:

1. For inclusion in the submittal data brochures, the temperature control manufacturer shall submit a minimum of five (5) copies of complete temperature control diagrams showing existing temperature control system and components being replaced or added. Provide with written "sequence of control" and factory-printed specification data sheets, covering each control device proposed to be used, for the Engineer's approval prior to installation of any equipment or part of system.
2. Submittal data shall include a schedule of all devices to be installed. Deviations from the existing sequence of control will not be permitted without prior approval of the Engineer.

B. Operating and Maintenance Manuals:

1. For inclusion in the operating and maintenance manuals, provide three sets of complete operating and maintenance instructions with drawings, typewritten instructions and operating sequences, and descriptive data sheets. Assemble each set in a hard cover binder with "Temperature Controls" title placed on front cover and binding.

1.04 QUALITY ASSURANCE

A. The temperature controls subcontractor shall perform a "quality check" of the entire control system with an Owner's representative immediately after completion of the installation of the control system. This shall involve inspection and validation of all points, control loops, features, etc., of the control system, and will also serve as hands-on training for the Owner's personnel. Provide minimum 8 hours training with Owner's maintenance staff.

1.05 SYSTEM MAINTENANCE

A. Perform temperature control system preventative maintenance and support for a period of 1 year (beginning the date of substantial completion).

1. Make a minimum of 2 complete temperature control system inspections, in addition to normal warranty requirements. Inspections to include:
   a. System Review – Review the temperature control system to correct errors, failed points, points in alarm, and points that have been overridden manually.
   b. Seasonal Control Loop Tuning – Control loops are reviewed to reflect changing seasonal conditions and/or facility heating and cooling loads.
   c. Sequence of Operation Verification – Systems all verified to be operating as designed and in automatic operation. Scheduling and setpoints are reviewed and modified.
   d. Operator coaching.

2. PRODUCTS

2.01 AIR FLOW CONTROL DAMPERS AND SMOKE DAMPERS

A. Temperature control contractor shall provide control dampers of types indicated other than those provided with air handling units, dampers for miscellaneous use only are to be furnished hereinunder.

B. Frames shall not be less than 13 gauge galvanized steel. Blades must not be over 8 inches wide nor less than 16 gauge galvanized steel roll formed. Bearings shall be iolite, ball bearing or nylon with ½ inch shafts. Side seals shall be stainless steel of the tight-seal spring type. Dampers and seals shall be suitable for temperature ranges of -40 to 200 degrees F.

C All proportional control dampers shall be opposed or parallel blade type and all two-position dampers shall be parallel-blade types.

D. Dampers shall be minimum leakage type to conserve energy and the manufacturer shall submit leakage and flow characteristic data for all control dampers with the temperature control submitted. Maximum leakage shall be 3% at static pressure of 3 inches of w.c.

E. All control dampers shall be factory-manufactured. Local fabrication of dampers is not allowed.

F. Smoke dampers shall meet the requirements of the U.L. 555S. Leakage class I. Rated pressure and velocity shall exceed design airflow conditions.

2.02 CONTROL VALVES

A. All modulating two-way water valves shall be provided with equal-percentage contoured throttling plugs. All three-way valves shall be provided with linear throttling plugs such that the total flow through the valves shall remain constant regardless of the valve's position.

B. Valves 2 inches and smaller shall be screwed type; valves 2-1/2 inches and larger shall be flanged. Valves shall be factory-rated to withstand the pressure encountered. Valves shall have stainless steel stems and spring-loaded Teflon packing.

C. Water valves shall be sized for a pressure drop equal to the coil they serve but not to exceed 5 psi. Valves shall have replaceable seats and disc.

2.03 PNEUMATIC CONTROL VALVE ACTUATORS

A. Actuators for Hydronic Control Valves: Shutoff against system pump shutoff head.

B. Position indicator and graduated scale on each actuator.

C. Provide diaphragm action (air-to-open, air-to-close), as required by the sequence of operation, in the event of air supply failure.

D. For each modulating control valve, provide a positive positioner with the valve actuator. The positioners shall operate on a 3- to 15-psig input signal unless otherwise required to satisfy control sequences of operation. Integrally mount each positioner with an air regulator, air set, and gauges for supply, input and output. The positioner shall have the following performance characteristics:

1. Linearity: Plus or minus 1 percent of the output signal span.
2. Hysteresis: 0.5 percent of span.

E. Diaphragms shall be replaceable.

F. Actuator Construction:

1. Cast-iron or steel diaphragm casing and plate. Cast aluminum is acceptable on valves NPS 4 and smaller.
2. Cast iron or steel yoke. Cast aluminum is acceptable on valves NPS 4 and smaller.
3. Reinforced synthetic rubber or nitrile diaphragm.
4. Steel or steel alloy spring, stem, and spring adjuster.

G. Rate actuators for not less than 1.2 times the main air pressure to the valve, minimum 30 psig.

2.04 PNEUMATIC ACTUATORS

A. Where two or more actuators are installed for interrelated operation in unison, such as dampers used for mixing, provide the dampers with a positive positioner.

B. Equip pneumatic modulating actuators with a positive positioner, having the following performance characteristics:

1. Linearity: Plus or minus 1 percent of output signal span.
2. Hysteresis: 0.5 percent of the span.

C. Provide each positioner with an integrally mounted air set and pressure gauges for supply, input and output. Positioners shall operate on a 3- to 15-psig input signal unless otherwise required to satisfy the control sequences of operation.

D. Rate actuators for a pressure of at least 25 psig.

E. Provide actuators with replaceable diaphragms.

F. Actuator Construction:

1. Construct the diaphragm casing and plate of cast iron, steel, or cast aluminum.
2. Construct the yoke of cast iron, steel, or cast aluminum.
3. Construct the diaphragm of reinforced synthetic rubber or nitrile.
4. Construct the spring, stem, and spring adjuster of steel or steel alloy.

G. Provide actuator with adjustable stops for both maximum and minimum positions.

H. Provide a position indicator and graduated scale on each actuator. Indicate open and closed travel limits.

I. Actuators shall produce sufficient power and torque to close off against the maximum system pressures encountered. Actuators shall be sized to close off against the fan shutoff pressure as a minimum requirement.

J. The total damper area operated by an actuator shall not exceed 80 percent of manufacturer's maximum area rating.

K. Provide one actuator for each damper assembly where possible. Multiple actuators required to drive a single damper assembly shall operate in unison.

L. Avoid the use of excessively oversized actuators which could overdrive and cause linkage failure when the damper blade has reached either its full open or closed position.

M. Use jackshafts and shaft couplings in lieu of blade-to-blade linkages when driving axially aligned damper sections.

N. Provide mounting hardware and linkages for connecting actuator to damper.

O. Select actuators to fail in desired position in the event of a power failure as determined by field conditions.

2.05 SENSING AND CONTROL DEVICES

A. Start/stop relays shall provide maintained switching action as appropriate for the motor being controlled. All relays shall be plug-in, interchangeable, mounted on a circuit board or base and wired to numbered terminal strips.

B. Differential pressure transmitters for air service shall be equal to those existing to be replaced. Scales and ranges shall be determined by the application. Ranges shall be sized as to operate in the middle of the control range under normal operation.

C. New control panels shall be NEMA 12.

D. Duct mounted pneumatic temperature controllers shall be provided as indicated. Controllers shall be direct or reverse acting (field selectable) as required by the application and shall function with 20 psig supply pressure. Controllers shall incorporate adjustable sensitivity and differential for field fine-tuning, and operate between -20 and 150 deg. F. Element and capillary shall be copper, and be installed in the duct at a location where accurate sensing of the airstream is accomplished. Minimum capillary length shall be 4 ft. Controller shall be equipped with integral output signal gauge to indicate output pressure.

E. Pneumatic receiver controllers shall be provided as indicated. Controllers shall be direct or reverse action (field selectable), and shall be provided in single or dual input models with auxiliary reset as required. Controllers shall incorporate proportional or PI control (field selectable), and have adjustable gain, ratio, and integral time values. Controllers shall be installed in local control panels, and be equipped with integral output signal gauge to indicate output pressure. Controller body shall be a non-corrosive plastic enclosed in a clear, dustproof protective cover.

F. Duct low limit thermostat: Normally closed SPST contacts shall be provided to facilitate AHU shutdown upon detection of a temperature below setpoint in any one foot section of its 20 foot sensing element. Sensing element to be installed at the entering side of the AHU chilled water coil.

G. Capillary thermostats shall be of the liquid-filled type with stainless steel capillary tubing. The thermal system shall be field detachable and shall be of sufficient length to meet the control problem involved. A separable socket shall be furnished for each thermostat bulb that enters a liquid line. Capillary thermostats in air streams shall have averaging elements.

2.06 MISCELLANEOUS

A. Equipment and components not listed shall be equal to the existing equipment and components being replaced.

3. EXECUTION

3.01 EXAMINATION

A. Examine installation instructions.

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

3.02 INSTALLATION

A. Control equipment and connecting piping shall be installed in a neat and workmanlike manner by trained mechanics in the direct employ of the control manufacturer. Install in accordance with manufacturer's instructions.

3.03 WIRING

A. Temperature control subcontractor shall perform any and all wiring necessary for the operating sequence herein described with properly licensed personnel. Interlock or power wiring for control devices furnished under this section or furnished with mechanical equipment will be by Division 26 only where indicated on the electrical drawings.

B. All wiring in mechanical rooms and other areas without ceilings shall be installed in conduit.

C. All conduit shall use threaded fittings. Screw type fittings are not allowed.

D. Coordinate all control signals with equipment manufacturers. Hardware or software required for use of signal shall be provided by Section 23 09 00.

E. All control and interlock wiring shall comply with the National, Local Electrical Codes, and Division 26 of these Contract Document specifications. Where the requirements of this section differ with those in Section 26000, the requirements of this section shall take precedence.

F. Where Class 2 wires are in concealed and accessible locations; including ceiling return air plenums, approved cables outside of electrical raceway can be used provided that the following conditions are met:

1. Circuits meet NEC Class 2 (current-limited) requirements. (Low-voltage power circuits shall be sub-fused when required to meet Class 2 current-limit.)
2. All cables shall be UL listed for application (i.e., cables used in ceiling plenums shall be UL listed specifically for that purpose).

G. Do not install Class 2 wiring in conduits containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the two via control relays and transformers.

H. Where Class 2 wiring is run exposed, wiring shall be run parallel along a surface or perpendicular to it, and bundled, using approved wire ties at no greater than 10 ft. intervals. Such bundled cable shall be fastened to the structure, using industry approved fasteners, at 5 ft. intervals or more often to achieve a neat and workmanlike result.

I. All wire-to-device connections shall be made at a terminal blocks or terminal strip. All wire-to wire connections shall be at a terminal block, or with a crimped connector. All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.

J. Maximum allowable voltage for control wiring shall be 120Vac. If only higher voltages are available for use, the temperature control contractor shall provide step-down transformers to achieve the desired control voltages.

K. All control wiring shall be installed as continuous lengths, where possible. Any required splices shall be made only within an approved junction box or other approved protective device.

L. Install plenum wiring in sleeves where it passes through walls and floors. Maintain fire rating at all penetrations in accordance with Contract Documents and National and/or Local Codes.

M. Conduit and wire sizing shall be determined by the temperature control contractor in order to maintain manufacturer's recommendation and must meet National and Local Codes.

N. Control and status relays are to be located in pre-fabricated enclosures that meet the application. These relays may also be located within packaged equipment control panel enclosures as coordinated. These relays shall not be located within Class 1 starter enclosures.

O. Adhere to Division 26 requirements for installation of electrical raceways.

P. Temperature control contractor shall terminate all control and/or interlock wiring and shall maintain updated (as-built) wiring diagrams with terminations identified at the job site.

Q. Flexible metal conduits and liquid-tight flexible metal conduits shall not exceed 3' in length and shall be supported at each end. Flexible metal conduit less than 1/2" electrical trade size shall not be used. In areas exposed to moisture, including chiller and boiler rooms, liquid-tight, flexible metal conduits shall be used.

3.04 PNEUMATIC TUBING INSTALLATION

A. The control equipment and connecting piping shall be installed in a neat and workmanlike manner by trained mechanics in the direct employ of the control manufacturer.

B. All tubing shall be enclosed in conduit. Conduit shall be run parallel to or at right angles to the building structure and shall be concealed in all finished spaces. Tubing shall be run in hard conduit in mechanical rooms or areas where other piping is exposed. Tubing shall not be strapped to ducts, pipes, conduits, ceiling support system, ceiling grid, etc.

C. Non-metallic tubing used shall be virgin polyethylene, meeting stress-crack test ASTM D1693-60T. Tubing shall be self-extinguishing under ASTM D635, flammability test. This tubing shall be run within adequately supported rigid metallic raceway or electrical tubing.

D. Short run final terminations shall be made with flexible polyethylene in lengths no longer than one foot.

E. Number-coded polyethylene shall be used inside control cabinets. Flexible connections bridging the cabinet and its door shall be neatly fastened along the hinge-side and protected against abrasion.

3.05 IDENTIFICATION

A. Install labels on control components. Labels shall match those shown on control drawings.

END OF SECTION

23 21 13

HYDRONIC PIPING AND SPECIALTIES

1. GENERAL – Not Used.

2. PRODUCTS

2.01 CHILLED AND HOT WATER PIPING, CONDENSATE DRAIN PIPING, ABOVE GROUND

A. Piping:

1. 2" and smaller copper. Copper pipe to be hard drawn Type "L" seamless copper tubing with wrought copper solder joint long radius fittings, ANSI B16.22, and 95-5 solder. “Tee-pullers” shall not be used. Condensate drain pipe shall be similar with drainage fittings.
2. 2-1/2" and larger piping shall be Schedule 40 seamless black steel, ASTM, Grade B, or A106 with Schedule 40 buttweld or flange ANSI B16.9 fittings. No short radius elbows or field-fabricated fittings will be allowed. Conform to ANSI/ASME B31.9.

2.02 MAKE-UP WATER PIPING

A. Type "L" hard copper with wrought copper fittings and 95-5 solder. Install dielectric union at point of connection to ferrous piping or equipment.

2.03 UNIONS

A. Unions, 2 inches and smaller, shall be of malleable ground joint pattern with brass-to-iron seat. Larger unions shall be of cast iron, malleable iron, or forged steel of flange-and-gasket type with ring or face gasket of such composition as will be entirely suitable for the fluid service.

B. Dielectric type unions shall be provided at junction of piping of different material. Manufacturer shall have at least 10 years experience in this equipment.

2.04 FLANGES, BOLTS AND GASKETS

A. Flanges for welded piping shall be forged steel, ANSI B16.5, 150 psi. Flanges shall be flat faced when used with full face gaskets and raised face when used with ring type gaskets. Flange may be weldneck at flanged connections or slip-on type for straight pipe. Slip-on type shall be backwelded. Flanges shall be compatible with valve and equipment connections.

B. Gaskets shall be ring type unless full face type is required by connected equipment. Garlock Model IFG 5500, non-asbestos.

C. Bolts shall be Type B-7 stud bolts with hexagon nuts with lock-washers or lock-nuts.

D. Dissimilar Metals: Where dissimilar metals are connected at a flanged joint, an insulating/isolating gasket and bolt set shall be used.

2.05 BALL VALVES

A. Manufacturer: Equal to Apollo, Model 77-200.

B. Up to 2 Inches: Bronze, full port two-piece body, stainless steel ball and stem, teflon seats and stuffing box ring, lever handle, solder ends, rated for 600 psig WOG.

C. Provide valve handle extensions on valves installed in insulated pipe.

2.06 BUTTERFLY VALVES

A. Manufacturer: Equal to Nibco, Model LD-2000.

B. 2 ½" and Lager: Iron body, aluminum bronze disc, lug-type body, resilient replaceable EPT seat for service to 250 degrees F, lug ends, extended neck, infinite position lever handle with memory stop. Valve shall be rated “bubble-tight” at 200 psig WG.

C. Provide chain-wheel operators for valves 8 inches and larger and installed 96 inches or higher above finished floor elevation. Extend chains to an elevation of 5'-0" above finished floor elevation.

2.07 SWING CHECK VALVES

A. Manufacturer: Equal to Nibco, Model T-433.

B. Up to 3 Inches: Bronze 45 degree swing disc, screwed ends.

2.08 SPRING LOADED CHECK VALVES

A. Manufacturer: Equal to Nibco, Model 2" and smaller - T-480
2-1/2" and larger - F-960-B

B. 2-1/2" and larger, iron body, bronze trim, stainless steel spring, renewable composition disc, flanged ends.

2.09 STRAINERS

A. Size 2 inch and Under: Screwed bronze body for 150 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen, equal to Mueller # 351.

B. Size 2-1/2 inch to 8 inch: Flanged iron body for 125 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen, equal to Mueller # 751.

C. Provide blowdown provisions on all strainers. Provide ball valve with hose end.

2.10 THERMOMETERS AND GAUGES

A. Where pressure gauges will be required or indicated on the plans, provide dial indicating type, minimum 4-1/2" diameter, Bourdon tube type, cast aluminum case, stainless steel ring, white dial, black letters of suitable pressure range, and brass ball valve for shut-off. Pump gauges shall be compound type. Minimum gauge accuracy shall be 1/2% over scale range. See paragraph 2.05 Ball Valves. Provide with impulse dampeners and needle/1/4" ball valves. Gauges shall be liquid-filled equal to Trerice 500X.

B. Red organic liquid-filled thermometers shall have an adjustable angle body equal to Trerice #A407. Scale shall be not less than 9 inches long with 2-1/2" extension neck. Case face shall be

manufactured from manufacturer's standard polished aluminum or AISI 300 series polished corrosion-resistant steel. Thermometers shall be provided with nonferrous separable wells. Lagging extension to accommodate insulation thickness shall be provided. Chilled water thermometers shall have 0 - 100° range. Hot water thermometers shall have a 220° range.

2.11 AUTO-FLOW VALVES

A. Units shall be brass-body with integral flow-limiting cartridge. The valve shall maintain flow rate between 2 and 60 psi of system pressure. Provide integral PT ports.

B. Equal to Bell & Gossett Circuit Sentry – Flow Setter or Griswold Controls.

3. EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. After completion, fill, clean, and treat systems.

3.02 PIPING INSTALLATION

A. Except where indicated otherwise, all piping shall be run concealed above ceilings, and in the furred spaces of the building, except that piping at mechanical equipment rooms and other areas without furred ceilings shall be run exposed.

B. Piping systems shall include all bypasses, vents, dirt pockets, drips, etc., complete as shown, specified, or as required for proper system operation.

C. Couplings and nipples shall be of the same materials as the pipe on which used.

D. All piping shall be arranged and installed as indicated on the drawings and shall be straight, plumb, and as direct as possible, forming right angles on parallel lines with building walls.

E. Locate groups of pipes parallel to each other, spaced at distances to permit applying full insulation and to permit access for servicing.

F. All piping shall be arranged so as not to interfere with removal of other equipment or devices or to block access to doors, windows, or other access openings.

G. Piping shall be installed so as to ensure unrestricted circulation, eliminate air pockets, and permit complete drainage, providing manual air vents at all high points and drain valves at all unavoidable pockets. Use reducing fittings with eccentricity down, top level at size changes in horizontal lines.

H. All piping shall be installed so as to allow for expansion. Connections to coils and other equipment shall be made in such a manner as to eliminate undue strains in piping and equipment. Necessary fittings and bends shall be furnished to avoid springing of pipes during assembly. Connections to coils shall be in accordance with detail on drawings.

I. Horizontal water piping generally shall be run with a pitch of not less than one (1) inch in 40 feet and arranged so as to drain to a minimum number of low points. Low points shall be equipped with drain valves and hose nipples not smaller than 3/4 inch in size. High points shall be provided with 1/4 inch manual air vent ball valves.

J. Unions or flanges shall be provided in all piping for the easy removal of each piece of equipment and coils without disturbing the connecting piping.

K. Piping nipples shall be of the same material as the pipe on which they are installed, and shall be extra heavy when the unthreaded shoulder is less than one inch in length. Running thread nipples will not be permitted.

L. Valves shall be installed at all connections to equipment and elsewhere as may be required for complete control or isolation of any piece of equipment or service to branch lines. Valves shall be accessibly located and of same size as piping in which they will be installed.

M. Saddle-type weldolets or threadolets may be used in tees where the branch pipe is no more than ½ the diameter of the main pipe. Welding tees shall be used where the branch pipe is greater than ½ the diameter of the main pipe. Tee-pullers are not acceptable.

N. Extend drain piping from primary and auxiliary condensate drain pan connections to floor drains.

O. Include installation instruction, assembly views, lubrication instructions, and replacement parts list.

3.03 UNIONS

A. Install unions at each connection of screwed piping to equipment, and at valves, traps and accessories where required to permit disconnection of pipe and removal of equipment, valves, etc., without disassembly of piping other than between union and equipment. In welded piping or piping 2-1/2" and larger, flanged joints or flanged unions shall be used.

3.04 VALVES

A. A shutoff valve shall be installed in each connection to each piece of equipment, and valves shall be located such that the equipment may be serviced or removed and replaced without shutdown of the general piping system. Shutoff valves shall also be installed in branch lines to risers dropping in walls, partitions or chases.

B. Check valves in water lines shall be guided disc spring loaded non-slam type. No swing check valve shall be installed in a vertical line. Guided disc type check valves shall be globe pattern when installed adjacent to butterfly valves.

3.05 FLANGES, BOLTS AND GASKETS

A. Flanges shall be used for connections to valves and equipment in pipe sized 2-1/2 inches and larger.

B. Slip-on flanges shall be installed on straight pipe only. Use weldneck flanges adjacent to fittings. Faces of flanges shall be raised face or flat face as required to match the face of valve on equipment to which flange connects.

C. Use ring gaskets on raised face flanges and full face gaskets on flat face flanges.

3.06 THERMOMETERS AND GAUGES

A. Thermometers shall be provided where shown on the drawings. Pressure gauges shall be provided where indicated on the drawings. Provide snubbers on all hydronic gauges.

B. Thermometers shall be located to be readable by a person standing on the floor. All thermometers in water lines shall be installed in wells. Fill space between sensing bulb and well with graphite-grease mixture.

C. Provide wells deep enough for the entire thermometer bulb to be immersed in the flow.

3.07 SPECIALTIES INSTALLATION AND APPLICATION

A. Install specialties in accordance with manufacturer's instructions to permit intended performance.

B. Provide manual air vents at system high points, at changes in pipe elevation, and at 100' intervals in long runs. Provide minimum 1/4" ball valves.

C. Remove temporary strainers after cleaning systems.

3.08 WELDING

A. Welding shall conform to ANSI B31.1. All welds shall be of the single “V” butt joint type with optimum fusion and 100% weld penetration of wall thickness. Piping shall be welded by the shielded-arc type electrode-electric arc process. Butt joints shall use split backing rings. Direct weld connections shall not be made to valves, strainers, equipment, etc.

END OF SECTION

SECTION 23 31 00

DUCTWORK

1. GENERAL

1.01 DEFINITIONS

A. Duct Sizes: Inside sheet metal dimensions. Allowance has been made for liner in ducts.

B. Low Pressure: 2 inch WG positive or negative static pressure and velocities less than 2,500 fpm. All ductwork not classified medium pressure below shall be classified low pressure ductwork.

2. PRODUCTS

2.01 LOW PRESSURE DUCTWORK

A. Ductwork subject to pressures up to 2.0" water column shall be designated low pressure ductwork and shall be constructed of the following:

1. Galvanized steel ASTM A525-75, Grade G90, hot dip galvanized to 0.90 oz. of zinc per square foot of metal.

B. All construction and construction methods shall be in accordance with NFPA 90A and 1985 SMACNA recommendations. All duct shall be sealed as if it were high pressure duct.

C. Metal gauge, longitudinal and transverse joints shall be for 2.0" plus or minus static pressure, unless otherwise indicated on drawings.

D. Radius elbows shall have minimum centerline radius of 1.5 x duct width. Rectangular elbows shall have turning vanes per SMACNA HVAC Duct Construction Standards, Fig. 2-3.

E. Transitions shall be as gradual as possible, but not to exceed 30° per side.

F. Branch duct takeoffs for rectangular ducts shall be one of the following:

1. 90° takeoff with 45° entry.

G. The Ductmate" transverse joint flanging system as manufactured by Ductmate Industries is acceptable when installed in accordance with manufacturer's recommendations.

H. Duct Access Doors:

1. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards and as indicated.

2. Review locations prior to fabrication.

3. Fabricate rigid and close-fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch thick insulation with sheet metal cover.

4. Provide three hinges and two compression latches with outside and inside handles for sizes up to 24 x 48 inches. Provide an additional hinge for larger sizes.

5. Access doors with sheet metal screw fasteners are not acceptable.

6. Access door size shall be 14" x 14" by duct width, whichever is greater. Increase duct/damper size to accommodate door size.

I. Manual Dampers:

1. Manual dampers shall have minimum 20 gauge thickness blades. Damper handle in externally insulated duct shall have stand-off brackets and locking quadrants.

2. For dampers located in inaccessible spaces that require balancing from remote locations, provide Young Regulator Model 5020-CC damper with Model 270-301 regulators with cover plate, for operation with Bowden Cable Control System.

2.02 MEDIUM PRESSURE DUCTWORK

A. All construction and construction methods shall be in accordance with NFPA 90A and 1985 SMACNA recommendations. All duct shall be sealed as if it were high pressure duct.

B. Round and oval medium velocity ducts shall be machine made, single wall spiral, Uniseal Ducts as manufactured by United Sheet Metal Company or Eastern Sheet Metal. Supply duct upstream of VAV boxes inside building shall be single-wall construction with 2” thick insulation.

C. Fittings shall be United Sheet Metal "Uniform" or equal of Eastern Sheet Metal fabricated of 20 gauge galvanized sheet steel with all joints welded (spot welding is unacceptable). The spiral duct system shall have locked seams to eliminate any leakage under the system pressure. Fittings shall have continuous welds along all seams. Divided flow fittings shall be manufactured as separate fittings, not as tap collars welded into spiral duct sections. All tee and lateral branch duct connections shall be made with conical fittings. Samples or data shall be submitted for any fittings or ducts other than United Sheet Metal.

D. Access doors in high pressure ductwork shall be equal to United Sheet Metal Type AR2-W. Provide at each smoke or fire damper. Doors shall be minimum 6”x9” oval in size.

E. Seal all high and medium pressure duct in strict accordance Class C of with the above referenced SMACNA standard. Provide hardcast pressure-less tape and RTA-50 adhesive.

F. Leak test ductwork in accordance with United Sheet Metal “System Pressure Testing for Leaks” procedure.

2.03 DUCT TEST HOLES

A. Cut or drill temporary test holes in ducts as required by the Test/Balance Agent. Test ports shall be Vent Lock Test Ports with extended neck fitting.

B. Permanent test holes shall be factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.01 FLEXIBLE DUCT CONNECTIONS

A. Manufacturer: Vent Fabrics.

B. Other Acceptable Manufacturers:

1. Dura-Dyne.
2. Young Regulator.

C. Substitutions: Permitted under provisions of Section 01630.

D. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.

E. UL listed fire-retardant, double neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz. per sq.yd.

2.02 FIRE DAMPERS

A. Contractor shall furnish and install where indicated on plans, in strict accordance with manufacturer's data and the requirements of Underwriters Laboratories UL-555, Ruskin, Inc., models and types as scheduled below. All dampers shall bear the UL label of fire resistance rating, for 1-1/2 hours actuation or operation applies. Air Balance, Inc. will be acceptable. Submittal shall include damper installation details.

Wall Penetration, Thermal Actuated	IBD Style B or BR
Any High Velocity Penetration	IBD Style BR
Floor Penetration	IBD Style B or BR

3. EXECUTION

3.01 DUCTWORK

A. Follow recommendations of ASHRAE "Handbook", SMACNA "Duct Construction Standards", NFPA 90A, and the drawings.

B. Seal duct joints with Hardcast pressure-less tape with RTA-50 adhesive, or equal.

C. Low pressure transverse joint systems manufactured by Ductmate are acceptable.

D. In general, vertical risers and other duct runs where the method of support specified above is not applicable shall be supported by substantial angle brackets designed to meet field conditions and installed to allow for duct expansion.

E. Where ducts pass through walls, floors or partitions, the edges shall be packed with non-combustible safing insulation. After hole is filled, provide sheet metal collar around the duct to cover the rough opening.

F. Access doors shall be installed in ductwork where indicated and for ready access to turning vanes, smoke detectors, control dampers, intake and exhaust louver plenums, and operating parts of any kind. Coordinate with Section 23 09 23 Building Management and Control System.

G. Provide duct access doors at control dampers, at turning vanes, and every 20 feet along ducts.

H. All rectangular duct elbows or offsets shall be constructed using radius elbows, unless radius elbow will not fit. Then, rectangular elbow with turning vanes shall be used.

I. Provide paint-grip surface on exposed duct.

3.02 SMOKE DETECTORS (DUCT MOUNTED)

A. Smoke detectors shall be furnished by Division 26 and installed by this section.

B. Install in locations shown on the mechanical plans and as required by the manufacturer.

END OF SECTION 23 31 00

SECTION 23 34 00

FANS

PART 1 GENERAL

1.01 OPERATION AND MAINTENANCE DATA

A. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products and materials to site in original factory packaging, labeled with manufacturer's identification.

B. Protect motors, shafts, and bearings from weather and construction dust.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

PART 2 PRODUCTS

2.01 GENERAL

A. Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.

B. Sound Ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal.

C. Fabrication: Conform to AMCA 99.

D. Performance Base: Sea level conditions.

E. Temperature Limit: Maximum 300 degrees F.

F. Static and Dynamic Balance: Eliminate vibration or noise transmission to occupied areas.

G. Where available for fans, provide accessible grease fittings for motors and bearings. Also, provide tubing and remote Zurk fittings in order to lubricate unit without disassembly.

H. See Section 23 05 00 - Basic HVAC Requirements for Motors and VFDs.

I. Also refer to Section 23 05 48 - Vibration Isolation and Seismic Restraint for Mechanical and Electrical Systems.

2.02 PLENUM FAN

A. Description: Fan shall be a single width, single inlet backward inclined centrifugal airfoil, belt or direct driven plenum blower as specified.

B. Certifications: Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705). Fan shall bear the AMCA

Certified Ratings Seal for Sound and Air Performance. Performance shall be certified for both inlet and outlet sound.

C. Construction: The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The inlet panel shall be constructed from heavy gauge reinforced steel with an integral rectangular formed duct connection. High performance airflow baffle shall be standard to reduce under-unit turbulence and improve efficiency. Integral lifting points shall be standard. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM, static pressure and maximum fan RPM. Unit shall be shipped in ISTA Certified Transit Tested Packaging.

D. Coating: Steel fan components shall be protected with an electro-statically applied, baked polyester powder coating. Each component shall be subject to a five stage environmentally friendly wash system, followed by a minimum 2 mil thick baked powder finish. Paint must exceed 1,000 hour salt spray under ASTM B117 test method.

E. Wheel: Wheel shall be steel, non-overloading, centrifugal backward inclined, high efficiency, airfoil type. Blades on all sizes shall be continuously welded to the back plate and inlet shroud. All sizes shall be securely keyed to the fan shaft. Wheel shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 204-05, *Balance Quality and Vibration Levels for Fans.*

F. Motor: Motor shall be NEMA design B with class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.

G. Blower Shaft: Blower shaft shall be AISI C-1045 hot rolled and accurately turned, ground and polished. Shafting shall be sized for a critical speed of at least 125% of maximum RPM.

H. Bearings: Bearings shall be designed and tested specifically for use in air handling applications. Construction shall be heavy duty regreasable ball or roller type in a cast iron pillow block housing selected for a minimum L50 life in excess of 200,000 hours at maximum cataloged operating speed.

I. Belts and Drives: Belts shall be oil and heat resistant, static conducting. Drives shall be precision machined cast iron type, keyed and securely attached to the wheel and motor shafts. Drives shall be sized for 150% of the installed motor horsepower. The variable pitch motor drive must be factory set to the specified fan RPM.

J. Product: Fan shall be equal to model PLC as manufactured by Loren Cook Company, or approved equal of Greenheck or Twin City.

2.03 MIXED FLOW FANS

A. Description: Fan shall be a belt driven, tubular mixed-flow inline blower.

B. Certifications: Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL/cUL 705) for US and Canada. For restaurant applications, fan shall be listed by Underwriters Laboratories (UL/cUL 762) for US and Canada. Fan shall bear the AMCA Certified Ratings Seal for Sound and Air Performance. Performance shall be certified for both inlet and outlet sound.

C. Construction: The fan shall be of welded and bolted construction utilizing corrosion resistant fasteners. Housing shall be minimum 14 gauge steel with integral inlet and outlet collars for slip fit duct connections. Straightening vanes shall be included to assure maximum efficiency and low noise levels. Adjustable motor plate shall utilize threaded studs for positive belt tensioning. Extended lube lines shall be furnished for lubrication of fan bearings. Lifting lugs shall be provided for ease of installation. Adjustable mounting feet shall allow field adjustment of motor position. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM, static pressure, and maximum fan RPM. Unit shall be shipped in ISTA certified transit tested packaging.

D. Coating: Steel fan components shall be protected with an electrostatically applied, baked polyester powder coating. Each component shall be subject to a five stage environmentally friendly wash system, followed by a minimum 2 mil thick baked powder finish. Paint must exceed 1,000 hour salt spray under ASTM B117 test method.

E. Wheel: Wheel shall be steel, non-overloading, high efficiency mixed-flow type. Contoured single thickness blades shall incorporate 3-D curvature for maximum efficiency across the entire surface of the blade. Blades shall be continuously welded to the backplate and inlet shroud. Hubs shall be keyed and securely attached to the fan shaft. Wheel shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.

F. Motor: Motor shall be NEMA design B with class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.

G. Blower Shaft: Blower shaft shall be AISI C-1045 hot rolled and accurately turned, ground and polished. Shafting shall be sized for a critical speed of at least 125% of maximum RPM.

H. Bearings: Bearings shall be designed and tested specifically for use in air handling applications. Construction shall be heavy duty regreasable ball or roller type in a cast iron pillow block housing selected for a minimum L50 life in excess of 200,000 hours at maximum cataloged operating speed.

I. Belts and Drives: Belts shall be oil and heat resistant, static conducting. Drives shall be precision machined cast iron type, keyed and securely attached to the wheel and motor shafts. Drives shall be sized for 150% of the installed motor horsepower.

J. Product: Fan shall be model QMX as manufactured by Loren Cook Company, or approved equal of Greenheck or Twin City.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

C. Deliver, store, protect and handle products to site under provisions of Division 1.

D. Protect motors, shafts, and bearings from weather and construction dust.

3.02 PLENUM FANS

A. Suspend on spring type vibration isolators from base frame of fan.

B. Coordinate mounting with fabricated fan plenum/enclosure installed within existing air handler supply fan section.

3.03 MIXED FLOW FANS

A. Suspend on spring type vibration isolators from hanger rods to steel angles or channels spanning between and welded to upper chord of bar joists, or from structural supports provided for this purpose. Provide flexible duct connections at inlet and outlet.

END OF SECTION 23 34 00

SECTION 23 73 13

AIR HANDLING UNIT COMPONENTS

PART 1 GENERAL

1.01 PRODUCT DATA

A. Product Data:

1. Provide literature which indicates dimensions, weights, capacities, ratings, fan performance, gages and finishes of materials, and electrical characteristics and connection requirements.

2. Provide data of filter media, filter performance data, filter assembly, and filter frames.

3. Provide fan curves with specified operating point clearly plotted.

4. Submit sound power level data for both fan outlet and casing radiation at rated capacity.

5. Submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.

1.02 OPERATION AND MAINTENANCE DATA

A. Maintenance Data: Include instructions for lubrication, filter replacement, motor and drive replacement, spare parts lists, and wiring diagrams.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1.

B. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

PART 2 PRODUCTS

2.01 AIR HANDLING UNIT COMPONENTS

A. Furnish and install where shown on plans central station air handling unit components of sizes, types and performance shall be as indicated in the unit schedule.

B. Fan wheels shall be constructed of galvanized steel.

C. V-belt drive shall be enclosed in unit casing. All units shall have internally mounted seismic spring isolators or springs and snubbers, in accordance with the requirements of section 23 05 48.

D. All fans shall be dynamically balanced before and after being installed in the fan cabinet section. Fan cabinet shall be double wall, R-13 insulated. Maximum fan RPM shall be well below the first critical speed. Bearings shall be self aligning, grease lubricated, ball type with a minimum 200,000 L_{50} hour life. All bearings shall be equipped with lubrication fittings and shall have grease fittings extended to the exterior drive side of the cabinet. See Section 23 05 00 for motors and Section 233400 for fan types as scheduled. Provide one spare set of bearings for each fan.

E. Provide 1.5 MHP S.F. variable pitch vee-belt drives. See Section 23 05 00 for VFDs. Provide one spare set of belts for each fan. Provide additional sheaves as required for Test/Balance. Fans may be provided as direct drive.

F. Coil section shall be fabricated of continuous galvanized steel. Double-wall drain pan shall be thermally isolated from unit casing with 1" thick insulation and shall be stainless steel. All coils shall be arranged within the coil section for horizontal airflow. Where multiple cooling coils are used in a single stacked arrangement, intermediate drain pans shall be provided between each coil with drain lines connecting the intermediate pans to the main drain pan. Coil headers and chilled water distributors shall be completely enclosed within the insulated casing with only the connections extending through the cabinet.

G. See Section 23 05 00 for warranty.

K. The drain pan shall be sloped and constructed so as to completely drain and have no standing water.

L. Chilled and Hot Water Water Coils: Water coils shall be ARI certified.

1. Primary surface shall be round seamless 5/8" O.D. x 0.024" thick copper tubes on 1-1/2" centers, staggered in the direction of air flow. All joints shall be brazed.

2. Secondary surface shall consist of aluminum plate type tins for higher capacity and structural strength. Fins shall have a minimum thickness of .0075" with full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Bare copper tube shall not be visible between fins. Fins shall have no openings punched in them so as to accumulate lint and dirt. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Tubes that have been expanded through the use of hydraulic expansion methods shall not be acceptable. Headers shall be non-ferrous materials using seamless copper tubing with intruded tube holes to permit expansion and contraction without creating undue stress or strain. Fin spacing shall not exceed 11 per inch.

3. Coil connections shall be carbon steel with connection size to be determined by manufacturer based upon the most efficient coil circuiting. Vent connections shall be provided at the highest point to assure proper venting. Drain connections shall be provided at the lowest point to ensure complete drainage and prevent freeze-up.

4. The use of internal restrictive devices to obtain turbulent flow will not be allowed.

2.02 AIRFLOW MEASUREMENT STATION TRANSMITTER/SENSOR PROBE FOR DUCTS/PLENUMS

A. The transmitter/sensor probe system shall have field selectable, isolated 4-20mA and 0-10 VDC output signals for airflow and temperature. Output scales shall be configured by DIP switches on the transmitter. The transmitter/sensor probe system shall be factory tested system that does not require additional transmitters or transducers to provide the host B.A.S. with linear signals for both airflow and temperature. Transmitter/Sensor probe shall be Ebtron Model GTA1116 Gold Series or approved equal.

2.03 PRESSURIZED PLENUMS AND EQUIPMENT CASINGS

A. GENERAL:
Double-wall (insulated) plenums shall be provided as specified on drawings. All panels and components shall be prefabricated and supplied by a nationally-recognized manufacturer with published standards of constructions, assembly, and technical performance. The manufacturer shall have produced a standardized, prefabricated panel system for at least 10 years. Construction and performance of the installed system and components shall conform to all specifications listed in this document. The system and components shall not be susceptible to damage from extended exposure to airflow, pressure differentials, vibrations, air temperature or humidity. Plenums shall be by Kinetics Noise Control, Inc., NOISEBLOCK™ Plenums and Equipment Casings, or approved equal of Semco and United Sheetmetal.

B. JOINT CONSTRUCTION:
Panels shall have a tongue-and-groove joint construction. Panels will be held together with self-tapping sheet metal screws. Standard panel types should not require H-connectors, tape, or any other type of connector device.

C. PANEL CONSTRUCTION:
Standard panels shall be 2 or 4 inches thick, as noted on the drawings, with a solid galvanized steel exterior skin, and a solid or perforated interior galvanized steel skin as noted on the drawings.

1. The outer and inner skins shall be tack-or spot-welded to the perimeter and internal longitudinal steel channel frames in such a manner and spacing that the panel will not fail at the maximum specified operating internal static pressure.

2. The outer skin shall be constructed of galvanized steel of a minimum 18 gauge thickness.

3. The inner skin shall be constructed of galvanized steel (solid or perforated) with a minimum 22-gauge thickness.

4. Perforated material shall have a 23 percent open area.

5. All perimeter and internal longitudinal steel channel members shall be constructed of ASTM Type-A 653, commercial-quality, galvanized steel with a minimum 18-gauge thickness.

6. All steel panel surfaces, internal channels, and trim items shall be fabricated from galvanized steel type G90 coating class as determined by ASTM A-924 and shall meet all requirements of ASTM A-653 for commercial–quality galvanized carbon steel.

7. Each panel shall be completely filled with acoustical/thermal insulating material that is noncombustible, inert, mildew-resistant, and vermin-proof. Insulation shall not settle within the panel and shall be installed under proper compression. No insulating materials shall be used that have a flame spread greater than 25 or a smoke developed greater than 50, as specified per ANSI/NFPA-90A.\

8. Where specified, septum panels shall consist of a solid galvanized steel skin (minimum 22 gauge thickness), a gypsum septum, acoustic grade fill and perforated or solid, galvanized, steel skin (minimum 22-gauge thickness).

D. COMPONENTS and INSTALLATION:

1. All base channels shall be installed on a level concrete curb, the dimensions of which shall be determined from plan-view shop drawings of the system provided by the system manufacturer. Spacing and attachment method of base channel attachment to curb shall be designed and supplied by installing contractor.

2. All enclosure trim items shall be constructed of galvanized steel, type G90 (minimum 18-gauge thickness) and furnished in standard lengths to be field cut to the required dimensions. Spacing of sheet metal screws, application of duct sealant, and positioning of trim shall be in accordance with the manufacturer's published installation details.

3. All mechanical joints and external trim items shall be sealed with a UL-Classified duct sealant suitable for the application (indoors/outdoors) supplied by the installing contractor.

4. Access doors shall be provided where specified on drawings and shall be 24 inches wide by 60 inches high unless otherwise indicated. All doors shall be the same nominal thickness as the adjacent panels. All access door skins shall be constructed with an 18-gauge solid inner and outer shell. Each door shall have a minimum of two heavy duty strap hinges and two, wedge-lever, door latches. All levers shall be installed to open against the air pressure differential. Doors shall seat against neoprene gasket materials, installed around the entire perimeter of the doorframe in such a manner that door operation will provide direction compression with no sliding action between the door and gasket.

5. Where shown on drawings, doors shall be furnished with windows, which are composed of wire-reinforced, double-pane glass separated by an air space, and sealed against acoustical and air leakage by interior and exterior rubber seals. Windows shall be 12 inches wide by 12 inches high unless otherwise indicated.

6. Openings for pipe conduits shall be field cut by the installing contractor to ensure proper positioning. All framing members, collars, and bell mouth fittings shall be insulated, welded, and sealed according to the manufacturer's published installation details.

F. STRUCTURAL PERFORMANCE:

1. The entire panel system shall be designed by the manufacturer to be self-supporting. Where roof spans and wall loading require additional structural strength, it shall be provided by heavier panel skins, additional internal longitudinal reinforcing members, or additional structural members and necessary supporting pipe, tube steel or W-shape columns and beams. The installing contactor shall supply and install all structural members and pipe columns according to the drawings and published installation details provided by the manufacturer.
2. The furnished enclosure shall be able to withstand a positive internal static pressure of 10.0 inches wg and a negative internal static pressure of 10.0 inches wg.

3. The assembled structure shall not exhibit any panel joint deflections in excess of L/200, where L is the unsupported span length of any panel section within the completed system.

G. ACOUSTICAL PERFORMANCE:

1. The manufacturer shall provide certified independent test data listing sound absorption and transmission loss of panels. When requested by the engineer, the manufacturer shall arrange to have a copy of all pertinent acoustical laboratory reports forwarded directly to the engineer.

2. When tested according to ANSI/ASTM C423 or a subsequent version of the standard, the panel shall have minimum sound absorption coefficients, as shown in Table 1.

Table 1-NOISEBLOCK™ STL-2” & 4”, HTL-4”
Sound absorption Coefficients per ASTM C-423-66

Octave Band Number	2	3	4	5	6	7	NRC
Center Frequency (HZ)	125	250	500	1000	2000	4000	-----
Absorption Coefficients							
NOISEBLOCK (STL)-2”	0.15	0.66	1.07	1.06	0.97	0.86	0.95
NOISEBLOCK (STL)-4"	0.60	1.13	1.12	1.09	1.03	0.91	1.00
NOISEBLOCK (HTL)-4”	0.60	1.13	1.12	1.09	1.03	0.91	1.00

3. When tested according to ASTM E90-70 or a subsequent version of this standard, the panel shall have minimum airborne sound transmission losses as listed in Table 2.

Table 2-NOISEBLOCK™ STL-2” & 4”, HTL-4”
Sound Transmission Loss per ASTM E90-70

Octave Band Number	2	3	4	5	6	7	STC
Center Frequency (HZ)	125	250	500	1000	2000	4000	------
Absorption Coefficients							
NOISEBLOCK (STL)-2”	17	23	34	47	55	57	37
NOISEBLOCK (STL)-4"	21	28	39	48	56	58	40
NOISEBLOCK (HTL)-4”	27	34	48	61	66	70	48

H. THERMAL PERFORMANCE:

1. Insulating materials used in all prefabricated panels shall have the following maximum thermal conductance at a mean temperature of 75°F: 0.06 BTU per hour per square foot °F (4-inch panels) and 0.12 BTU per hour per square foot per °F (2-inch panels).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in conformance with ARI 435.

C. A thermometer of the proper range and size shall be provided in the discharge duct of each air-handling unit, and located where easily visible.

D. Refer to Section 23 34 00 for air handler supply and return fan specifications.

E. Penetrations made into existing air handler sections shall be restored to the same pressure rating as original construction.

END OF SECTION

SECTION 26 01 00

GENERAL REQUIREMENTS FOR ELECTRICAL

1. GENERAL

1.01 WORK INCLUDED

A. The complete electrical system for lighting, power, control, and other purposes, as herein specified and/or indicated on the drawings, consisting generally of, but not limited to, complete and operable systems and components of the following types:

1. Modifications to existing electrical distribution equipment.
2. Branch circuits and outlets.
3. Connection of motors and equipment installed by other Sections.
4. Installation of motor starting equipment furnished by other Sections.
5. Provisions for Owner-furnished equipment including connections where shown.
6. Fire alarm system modifications.

1.02 RELATED DOCUMENTS

A. Divisions 0 and 1 CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS: These shall apply to all work included in this Section.

B. Related Work:

1. Division 03 Section “Concrete”
2. Division 09 Section “Finishes”
3. Division 11 Section “Equipment”
4. Division 14 “Conveying Equipment”
5. Division 21 Fire Suppression
6. Division 22 Plumbing
7. Division 23 "Heating, Ventilating and Air Conditioning
8. Division 30 "Commissioning Requirements"

1.03 REGULATIONS, CODES, FEES AND PERMITS

A. Regulations and Codes: This work shall be installed to the requirements of the latest edition of the Memphis/Shelby County Joint Electric Code, and to the applicable requirements of the 2008 National Electrical Code. If any work shown on the Drawings or specified appears to conflict in any way with any regulations and codes, notify the Architect before performing work.

B. Permits and Fees: All permits, fees, etc., required for the work in Division 26 shall be paid for under the Section(s) involved.

C. Standards: In addition to applicable codes, the following industry standards, specifications and codes are minimum requirements. Standards are referenced hereinafter in accordance with the following abbreviations:

1. NEMA - The National Electrical Manufacturer's Association Standards.
2. ICEA - The Insulated Cable Engineer's Association Standards.
3. UL - Underwriters' Laboratories, Inc., Standards.
4. ANSI - American National Standards Institute.
5. ETL - Electrical Testing Laboratories, Inc. Standards.

6. CBM - Certified Ballast Manufacturers, Standards.
7. OSHA - Occupational Safety & Health Act.
8. IES - Illuminating Engineering Society.
9. IEEE - Institute of Electrical & Electronics Engineers.
10. EIA - Electronics Industry Association.
11. NEC - National Fire Protection Association No. 70, National Electrical Code.
12. NFPA - National Fire Protection Association.
13. LSC - National Fire Protection Association No. 101, Life Safety Code.

1.04 SUBMITTALS

A. Submittal Data Brochures: Provide in accordance with requirements of Division 01, Section 01 30 00 "Administrative Procedures".

B. Operating and Maintenance Manuals: Provide in accordance with Division 01, Section 01 70 00, "Execution and Closeout Requirements".

C. Test and Inspection Reports: Provide in accordance with Division 01, Section 01 30 00 "Administrative Procedures".

D. Shop Drawings: Provide in accordance with Division 01, Section 01 30 00 "Administrative Procedures".

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Make provisions for the delivery and safe storage of all materials, and arrange for the introduction into the building of equipment too large to pass through finished openings. Provide moisture and dirt protection for materials as appropriate.

B. Arrange to have materials delivered to the job at such stages of the work as will expedite the work as a whole. Mark and store all materials in such a manner as to be easily checked on inspection.

C. Where materials are indicated to be furnished to this Division for installation and/or connection, make a complete and careful check of all materials thus received and furnish a receipt acknowledging acceptance of the delivery and condition of the materials received. Check shall include ascertaining that materials are the appropriate items for the installation planned and are complete including all accessories. After such acceptance, assume full responsibility for the safe-keeping of same until such time as the completed installation has been approved and accepted.

1.06 JOB CONDITIONS

A. Examination of Site:

1. Bidders shall visit the site of the work before submitting bids and satisfy themselves as to the nature and scope of all work to be done, or required by local authorities to be done, to meet with their requirements or codes. Failure to recognize conditions made apparent by such a site visit shall not justify additional cost to the Owner.
2. The submission of a bid shall be taken as evidence that such an examination has been made and difficulties, if any, noted.

B. Coordination: Coordinate all work with that of others on the job and also with that of the Owner, in order that there will be no delay in the proper installation and completion of the work. Extra work or materials resulting from lack of coordination shall be performed under this Section without additional cost to Owner.

C. Openings through walls, floor and roof:

1. Ascertain that all openings through walls, floors, ceilings and roofs and through any other parts of the structure shall be properly sized and located. Prepare and furnish to the General Contractor a sleeve plan for all sleeves required in proposed structure. Set all required sleeves in concrete, and/or be responsible for same. All openings shall be done in a manner to maintain fire rating and water integrity of structure.
2. All framed openings in proposed structure shall be constructed by another Section from details and locations furnished hereinunder.

D. Protection of Work:

1. Protect installation at all times from danger by freezing, breakage, dirt, foreign materials, etc., and replace all work so damaged.
2. Use every precaution to protect the work of others, and be responsible for all damage to other work caused by work of or through the neglect of workmen under this Division of the Specifications.
3. Protect raceway openings with temporary plugs or caps.

1.07 USE OF DOCUMENTS

A. Drawings and Specifications together describe the project. Any provisions occurring in one shall be considered to occur in both. Where discrepancies occur between Drawings and Specifications, the more stringent requirements shall prevail.

B. Electrical branch circuits shall have indicated loads connected; however, routing of conduit may be rearranged, where specifically approved by Architect to best fit building conditions.

C. Refer to the various working drawings for other trades in order that work required shall conform in detail with the work of others.

D. No additional compensation will be allowed for any labor or material unless Contractor can clearly show same to be an addition beyond the requirements of the Drawings and/or Specifications.

E. The Drawings are diagrammatic; therefore, for all dimensions and exact locations, refer to the Architectural and Structural Drawings unless specifically noted otherwise.

F. In preparation of the Drawings it is intended that they be utilized by competent mechanics in completing the system installations.

G. Where equipment is specified to be installed in accordance with manufacturer's recommendations, a copy of these recommendations shall be kept on the job site at all times and shall be made available to the Owner's representative upon a request for same.

1.08 RECORD (AS-BUILT) DRAWINGS

A. Prepare reproducible record drawings in accordance with Division 01, Section 017700 "Closeout Procedures.

1.09 GUARANTEE

A. Guarantee to the Owner all work performed to be free from defects in workmanship and materials for a period of one year from date of final acceptance. Lamps shall be excluded

from guarantee; however, one complete and operative set shall be in place at time of final acceptance.

B. Defects arising during this period shall be promptly remedied at no expense to Owner, upon notice by the Owner.

2. PRODUCTS

2.01 GENERAL

A. Materials and workmanship involved in the specified installation shall be properly applied for the purpose intended and of high quality. The Owner reserves the right to reject any materials and workmanship not in accordance with those specified, either before or after installation.

B. Generally, each Division 26 section includes a list of acceptable manufacturers. Unless noted otherwise, materials and/or equipment specified herein to be of a certain manufacture or brand are used as a standard. Materials and/or equipment of listed manufacture may be submitted for consideration provided that they meet all space requirements and capacities specified. Materials and/or equipment from manufacturers not listed will not be considered, unless noted otherwise.

C. All material shall be new except where specifically noted otherwise.

2.02 SAFETY DEVICES

A. Provide suitable guards to enclose wire connections, electrical contacts, etc. Guards shall be sheet metal, wire mesh or insulating material as applicable, rigidly secured so as to be readily removable.

B. Provide warning signs to caution personnel of possible dangers.

3. EXECUTION

3.01 GENERAL

A. Inspect job site thoroughly at commencement of work and plan execution of work around conditions prevailing.

B. Thoroughly plan execution of the work with respect to all trades. Layout all openings and systems specifically listed herein and otherwise as required.

C. All equipment shall be placed and arranged so that all items requiring periodic service are accessible. This shall include all motors, controllers, relays, lamps and such related items.

3.02 WORKMANSHIP

A. All work is to be installed by competent mechanics in their respective fields. The installation is at all times to be under supervision of a supervisor who is thoroughly familiar with all portions of the installation.

B. All work is to be accomplished in a finished and workmanlike manner in accordance with best standards of the trade.

3.03 TESTING AND ADJUSTMENTS

A. Test all circuits with a "megger" tester to determine that insulation values conform to NEC; check all motor controllers to determine that properly sized overload devices are installed, and all other electrical equipment for proper operation.

B. Test all systems for proper operation. Check and adjust all equipment to operate smoothly, quietly and according to manufacturer's recommendations.

C. Provide all testing equipment including instruments, fuel, etc. and prepare all reports.

3.04 SUPPORTS

A. Provide all supports required for electrical installation. Coordinate with construction of partitions to the end that studs are located, stiffened and thickened as required for support of wall mounted equipment.

B. Provide angle iron or steel strut supports where required to obtain proper equipment support.

3.05 CLEAN-UP

A. Maintain premises free from accumulation of waste materials and rubbish caused by work herein.

B. At the completion of the work, remove all surplus materials, tools, etc., and leave the premises "broom-clean". Clean all fixtures and equipment and remove all paste-on tags. All items shall be left in a clean condition free of dust, dirt and all foreign materials. This shall include interior of boxes, panels, etc.

3.06 PAINTING

A. Provide a prime coat of paint for all supports, hangers, frames, etc., furnished and installed under this Section of the Specifications.

B. Touch-up equipment finishes where factory finish is damaged using matching color as recommended by factory.

3.07 INSTRUCTION

A. Provide instruction in operation of all systems installed under this Division. Instruction shall consist of "along-side equipment" discussion with operating personnel. Instructor(s) shall be thoroughly familiar with components discussed.

END OF SECTION

SECTION 26 05 00

BASIC MATERIALS AND METHODS FOR ELECTRICAL

1. GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Supporting devices for electrical components.
2. Concrete equipment bases.
3. Electrical demolition.
4. Cutting and patching for electrical construction.

1.03 SUBMITTALS

A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.04 QUALITY ASSURANCE

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

B. Comply with NFPA 70.

1.05 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.

1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work.

2. PRODUCTS

2.01 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch-diameter slotted holes at a maximum of 2 inches o.c., in webs.

1. Channel Thickness: Selected to suit structural loading.
2. Fittings and Accessories: Products of the same manufacturer as channel supports.

D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

E. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

F. Expansion Anchors: Carbon-steel wedge or sleeve type.

G. Toggle Bolts: All-steel springhead type.

2.02 TOUCHUP PAINT

A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.

B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

3. EXECUTION

3.01 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.02 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.

B. Dry Locations: Steel materials.

C. Support Clamps for PVC Raceways: Click-type clamp system.

D. Selection of Supports: Comply with manufacturer's written instructions.

E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb design load.

3.03 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.

E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.

F. Install 1/4-inch-diameter or larger threaded steel hanger rods, unless otherwise indicated.

G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

I. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.

J. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.

K. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

L. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:

1. Wood: Fasten with wood screws or screw-type nails.
2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
3. New Concrete: Concrete inserts with machine screws and bolts.
4. Existing Concrete: Expansion bolts.
5. Instead of expansion bolts, threaded studs driven by a powder charge and provided with lock washers may be used in existing concrete.
6. Steel: Welded threaded studs or spring-tension clamps on steel.
   a. Field Welding: Comply with AWS D1.1.

7. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
8. Light Steel: Sheet-metal screws.
9. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.04 FIRESTOPPING

A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping".

3.05 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new firestopping where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.06 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work, including the following:

1. Raceways.
2. Building wire and connectors.
3. Supporting devices for electrical components.
4. Electrical identification.
5. Cutting and patching for electrical construction.
6. Touchup painting.

END OF SECTION

SECTION 26 05 19

CONDUCTORS AND CABLES

1. GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

1.04 QUALITY ASSURANCE

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

B. Comply with NFPA 70.

2. PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for 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, the manufacturers specified.

2.02 CONDUCTORS AND CABLES

A. Available Manufacturers:

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.
3. Senator Wire & Cable Company.
4. Southwire Company.

B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor size: Minimum size shall be #12 AWG.

D. Conductor Material: Stranded copper complying with NEMA WC 5.

E. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC 5.

2.03 CONNECTORS AND SPLICES

A. Available Manufacturers:

1. AFC Cable Systems, Inc.
2. AMP Incorporated/Tyco International.
3. Hubbell/Anderson.
4. O-Z/Gedney; EGS Electrical Group LLC.
5. 3M Company; Electrical Products Division.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

3. EXECUTION

3.01 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway .

B. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

F. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

G. Fire Alarm Circuits: Power-limited, fire-protective, signaling circuit cable, in raceway.

H. Class 1 Control Circuits: Type THHN-THWN, in raceway.

I. Use of MC cable is not allowed.

3.02 INSTALLATION

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. 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.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Support cables according to Division 26 Section "Basic Materials and Methods for Electrical."

E. Seal around cables penetrating fire-rated elements according to Division 07 Section "Penetration Firestopping."

F. Identify and color-code conductors and cables according to Division 26 Section "Electrical Identification."

3.03 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 and UL 486B.

B. Make splices 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 conductors at each outlet with at least 6 inches of slack.

3.04 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:

1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING

1. GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

C. Field Test Reports: Submit written test reports to include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.04 QUALITY ASSURANCE

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

1. Comply with UL 467.

B. Comply with NFPA 70.

2. PRODUCTS

2.01 MANUFACTURERS

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. Grounding Conductors, Cables, Connectors, and Rods:
   a. Apache Grounding/Erico Inc.
   b. Chance/Hubbell.
   c. Copperweld Corp.
   d. Erico Inc.; Electrical Products Group.
   e. Framatome Connectors/Burndy Electrical.

f. Hastings Fiber Glass Products, Inc.
g. Heary Brothers Lightning Protection Co.
h. Ideal Industries, Inc.
i. ILSCO.
j. Kearney/Cooper Power Systems.
k. Korns: C. C. Korns Co.; Division of Robroy Industries.
l. O-Z/Gedney Co.; a business of the EGS Electrical Group.
m. Raco, Inc.; Division of Hubbell.
n. Thomas & Betts, Electrical.

2.02 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 26 Section "Conductors and Cables."

B. Equipment Grounding Conductors: Insulated with green-colored insulation.

C. Grounding Electrode Conductors: Stranded cable.

D. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B 3.
2. Assembly of Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

E. Copper Bonding Conductors: As follows:

1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.
2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.03 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

3. EXECUTION

3.01 APPLICATION

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.

D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

3.02 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

C. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

D. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.

3.03 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for underground locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

3.04 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to 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.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Tighten screws and bolts for grounding and bonding 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.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES

1. GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:

1. Division 07 Section "Penetration Firestopping" for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.
2. Division 26 Section "Basic Materials and Methods for Electrical" for supports, anchors, and identification products.
3. Division 26 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. LFMC: Liquidtight flexible metal conduit.

D. RNC: Rigid nonmetallic conduit.

E. RMC: Rigid Metallic Conduit

1.04 SUBMITTALS

A. Product Data: For conduits, surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.05 QUALITY ASSURANCE

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

B. Comply with NFPA 70.

1.06 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

2. PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for 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, the manufacturers specified.

2.02 METAL CONDUIT AND TUBING

A. Available Manufacturers:

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
4. LTV Steel Tubular Products Company.
5. O-Z Gedney; Unit of General Signal.
6. Wheatland Tube Co.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

D. EMT and Fittings: ANSI C80.3.

1. Fittings: Steel set-screw type.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

2.03 NONMETALLIC CONDUIT AND TUBING

A. Available Manufacturers:

1. American International.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corp.
4. Cantex Inc.
5. Certainteed Corp.; Pipe & Plastics Group.
6. Condux International.
7. ElecSYS, Inc.

8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; Division of Hubbell, Inc.
12. Spiralduct, Inc./AFC Cable Systems, Inc.
13. Thomas & Betts Corporation.

B. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.

2.04 METAL WIREWAYS

A. Available Manufacturers:

1. Hoffman.
2. Square D.

B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 1**.**

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

E. Wireway Covers: Screw-cover type**.**

F. Finish: Manufacturer's standard enamel finish.

2.05 BOXES, ENCLOSURES, AND CABINETS

A. Available Manufacturers:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. Emerson/General Signal; Appleton Electric Company.
3. Erickson Electrical Equipment Co.
4. Hoffman.
5. Hubbell, Inc.; Killark Electric Manufacturing Co.
6. O-Z/Gedney; Unit of General Signal.
7. RACO; Division of Hubbell, Inc.
8. Robroy Industries, Inc.; Enclosure Division.
9. Spring City Electrical Manufacturing Co.
10. Thomas & Betts Corporation.
11. Walker Systems, Inc.; Wiremold Company (The).
12. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

2.06 FACTORY FINISHES

A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard color paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

3. EXECUTION

3.01 RACEWAY APPLICATION

A. Indoors:

1. Exposed: EMT above 8’, or RMC where subject to damage.
2. Concealed: EMT**.**
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFMC in damp or wet locations.
4. Damp or Wet Locations: RMC, except for vibrating equipment.
5. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
   a. Damp or Wet Locations: NEMA 250, Type 4, nonmetallic**.**

B. Minimum Raceway Size: 1/2-inch trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. EMT: Steel set screw type.
2. Rigid Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.02 INSTALLATION

A. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Division 26 Section "Basic Materials and Methods for Electrical."

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

H. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.
2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

I. Join raceways with fittings designed and approved for that purpose and make joints tight.

J. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

L. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

M. Flexible Connections: Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

N. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.

3.03 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.04 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

1. GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

1.03 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.04 QUALITY ASSURANCE

A. Comply with ANSI C2.

B. Comply with NFPA 70.

C. Comply with ANSI A13.1 and NFPA 70 for color-coding.

2. PRODUCTS

2.01 RACEWAY AND CABLE LABELS

A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

1. Color: Black letters on orange field.
2. Legend: Indicates voltage and service.

B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear, weather- and chemical-resistant coating.

C. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

E. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.

1. Not less than 6 inches wide by 4 mils thick.
2. Compounded for permanent direct-burial service.
3. Embedded continuous metallic strip or core.

4. Printed legend indicating type of underground line.

F. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

G. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.

2.02 NAMEPLATES AND SIGNS

A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.

B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.

C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.

D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.

E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

2.03 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb minimum.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: According to color-coding.

B. Paint: Formulated for the type of surface and intended use.

1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.
4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

3. EXECUTION

3.01 INSTALLATION

A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before applying.

E. Install painted identification according to manufacturer's written instructions and as follows:

1. Clean surfaces of dust, loose material, and oily films before painting.
2. Prime surfaces using type of primer specified for surface.
3. Apply one intermediate and one finish coat of enamel.

F. Exposed Cables: Band exposed of the systems listed below:

1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches wide, and place adjacent bands of two-color markings in contact, side by side.
2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
3. Apply the following colors to the systems listed below:
   a. Fire Alarm System: Red.

G. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.

H. Circuit Identification Labels on Boxes: Install labels externally.

1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover.
2. Concealed Boxes: Permanent marker on cover showing circuit ID.

I. Color-Coding of Secondary Phase and Neutral Conductors: Use the following colors for service, feeder and branch-circuit phase and neutral conductors:

1. 208/120-V Conductors:
   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.
   d. Neutral: White.

2. 480/277-V Conductors:
   a. Phase A: Brown.
   b. Phase B: Orange.
   c. Phase C: Yellow.
   d. Neutral: Gray.

3. Factory apply color the entire length of conductors, except the following field-applied color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
   a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch-

wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.

4. See Division 26 Section “Grounding and Bonding” for color coding of grounding conductors.

J. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.

1. Legend: 1/4-inch steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
2. Tag Fasteners: Nylon cable ties.
3. Band Fasteners: Integral ears.

K. Apply identification to conductors as follows:

1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.

L. Apply warning, caution, and instruction signs as follows:

1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

M. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, and on each switch, circuit breaker and motor controller. Unless otherwise indicated, provide a single line of text with 1/2-inch high lettering on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high. Use white lettering on black field, except for emergency (life safety, not optional stand-by) equipment, which shall use white lettering on red field.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

1. GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Single and duplex receptacles, ground-fault circuit interrupters, and isolated-ground receptacles.
2. Single-, and double-pole and three-way snap switches and dimmer switches.
3. Device wall plates.
4. Floor service outlets and multioutlet assemblies.

1.03 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. PVC: Polyvinyl chloride.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

1.05 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device through one source from a single manufacturer.

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

C. Comply with NFPA 70.

1.06 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

2. PRODUCTS

2.01 MANUFACTURERS

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. Wiring Devices:
   a. Hubbell Incorporated; Wiring Device-Kellems.
   b. Leviton Mfg. Company Inc.
   c. Pass & Seymour/Legrand; Wiring Devices Div.

2.02 RECEPTACLES

A. Straight-Blade-Type Receptacles: Comply with NEMA WD 1, NEMA WD 6, DSCC W-C-596G, and UL 498.

B. Straight-Blade and Locking Receptacles: Heavy -Duty grade.

C. GFCI Receptacles: Straight blade, non-feed-through type, Heavy-Duty grade, with integral NEMA WD 6, Configuration 5-20R duplex receptacle; complying with UL 498 and UL 943. Design units for installation in a 2-3/4-inch- deep outlet box without an adapter.

D. All receptacles shall be markable type and shall have feature which allows the panel id and circuit number to be written in indelible ink in between the receptacles which will then be covered up by the coverplates. Mark circuit number and panel on all outlets throughout.

2.03 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.04 SWITCHES

A. Single- and Double-Pole Switches: Comply with DSCC W-C-896F and UL 20.

B. Snap Switches: Heavy-Duty grade, quiet type.

C. Combination Switch and Receptacle: Both devices in a single gang unit with plaster ears and removable tab connector that permit separate or common feed connection.

1. Switch: 20 A, 120/277-V ac.
2. Receptacle: NEMA WD 6, Configuration 5-15R.

2.05 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Smooth, high-impact thermoplastic.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Wet Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

2.06 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.

B. Wall Plate Color: For plastic covers, match device color.

3. EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

D. Device Installation:

1. Where existing devices are indicated on plans to remain, location and wiring is reused unless noted otherwise, but device shall be replaced.

2. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
3. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
4. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
5. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
6. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
7. Use a torque screwdriver when a torque is recommended or required by manufacturer.
8. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
9. Tighten unused terminal screws on the device.
10. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Where possible, group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.02 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.03 IDENTIFICATION

A. Comply with Section 260553 "Electrical Identification."

B. Identify each receptacle with panelboard identification and circuit number per 2.2 D.

3.04 FIELD QUALITY CONTROL

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

1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
2. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

B. Remove malfunctioning units, replace with new units, and retest as specified above.

END OF SECTION