PROJECT MANUAL FOR:

NANO AND MOLECULAR MEDICINE – FITOUT SHELL SPACE, RM 114A

PROJECT NO.: CP190821

AT:
UNIVERSITY OF MISSOURI - COLUMBIA
COLUMBIA, MISSOURI

FOR:
THE CURATORS OF THE
UNIVERSITY OF MISSOURI

PREPARED BY:

PLANNING
DESIGN &
CONSTRUCTION

CAMPUS FACILITIES
UNIVERSITY OF MISSOURI

OCTOBER 10, 2019
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AT
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FOR:

THE CURATORS OF THE UNIVERSITY OF MISSOURI

PREPARED BY:

PLANNING, DESIGN, AND CONSTRUCTION
CAMPUS FACILITIES
GENERAL SERVICES BUILDING
UNIVERSITY OF MISSOURI
(573) 882-6800

DATE:  OCTOBER 10, 2019
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ADVERTISEMENT FOR BIDS

Sealed bids for:

NANO AND MOLECULAR MEDICINE –
FITOUT SHELL SPACE, RM 114A
UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI
PROJECT NUMBER: CP190821  CONSTRUCTION ESTIMATE $271,800 - $302,000

will be received by the Curators of the University of Missouri, Owner, at Campus Facilities, Planning, Design & Construction, Room L100 (Front Reception Desk), General Services Building, University of Missouri, Columbia, Missouri 65211, until 1:30 p.m., C.T., October 24, 2019 and then immediately opened and publicly read aloud.

Drawings, specifications, and other related contract information may be obtained at http://operations-webapps.missouri.edu/pdc/adsite/ad.html. Electronic bid sets are available at no cost and may be printed as desired by the plan holders. No paper copies will be issued. If paper copies are desired, it is the responsibility of the user to print the files or have them printed.

Questions regarding the scope of work and commercial conditions should be directed to Design Services Project Manager Mike Stornello at (573) 884-7146 or stornellom@missouri.edu.

A prebid meeting will be held at 10:00 a.m., C.T., October 14, 2019 in the General Services Bldg., Rm 185, University of Missouri, Columbia, Missouri, followed by a walk-through at the site. All interested bidders are invited to attend this meeting. A walk-through of the project may be scheduled by contacting the Prebid Inspection Guide at (573) 882-2228.

Information regarding bid results will be available the day following the bid opening by calling (573) 882-1133

A Diversity Participation goal of 10% Combined MBE, WBE, DBE and Veteran / 3% SDVE has been established for this contract.

The Owner reserves the right to waive informalities in bids and to reject any and all bids.

Individuals with special needs as addressed by the Americans with Disabilities Act may contact (573) 882-1133.

Advertisement Date: October 10, 2019

Gary L. Ward
Vice Chancellor for Operations and Chief Operating Officer
University of Missouri
The Architect's seal on these contract documents has been affixed in accordance with the requirements of Chapter 327, RSMO. In affixing this seal, the Architect takes responsibility for the attached architectural specifications. The Architect hereby disclaims any and all responsibility for project specifications other than these, included in these project documents, they being the responsibility of the other design professionals, whose seals and statements appear herein.

02 4100 Demolition
03 0516 Underslab Vapor Barrier
03 3000 Cast-In-Place Concrete
04 0511 Mortar and Masonry Grout
04 2600 Single-Wythe Unit Masonry
05 4000 Cold-Formed Metal Framing
06 1000 Rough Carpentry
07 9200 Joint Sealants
08 1113 Hollow Metal Doors and Frames
08 7100 Door Hardware
09 2116 Gypsum Board Assemblies
09 5100 Acoustical Ceilings
09 6500 Resilient Flooring
09 6700 Fluid-Applied Flooring
09 7200 Wall Coverings
09 9000 Painting and Coating
10 7313 Awnings
12 3553.13 Metal Laboratory Casework
31 2200 Grading
32 1313 Concrete Paving
32 3119 Decorative Metal Fences and Gates

(seal) Signature: _______________________________
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The Engineers seal on these contract documents has been affixed in accordance with the requirements of Chapter 327, RSMO. In affixing this seal, the engineer takes responsibility for the attached engineering specifications. The Engineer hereby disclaims any and all responsibility for project specifications other than these, included in these project documents, they being the responsibility of the other design professionals, whose seals and statements appear herein.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>22 0553</td>
<td>Identification for Plumbing Piping and Equipment</td>
</tr>
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<tr>
<td>22 1005</td>
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<td>Identification for HVAC Piping and Equipment</td>
</tr>
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<td>23 0593</td>
<td>Contractor Scope for Owner Supplied Tab</td>
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<td>23 0713</td>
<td>Duct Insulation</td>
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<tr>
<td>23 0719</td>
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<td>23 3416</td>
<td>Centrifugal HVAC Fans</td>
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<td>HVAC Air Cleaning Devices</td>
</tr>
<tr>
<td>23 8200</td>
<td>Convection Heating and Cooling Units</td>
</tr>
</tbody>
</table>

(seal) Signature: 

MU Project #CP190821
ELECTRICAL

The Engineers seal on these contract documents has been affixed in accordance with the requirements of Chapter 327, RSMO. In affixing this seal, the engineer takes responsibility for the attached engineering specifications. The Engineer hereby disclaims any and all responsibility for project specifications other than these, included in these project documents, they being the responsibility of the other design professionals, whose seals and statements appear herein.

26 0501  Minor Electrical Demolition
26 0510  Electrical Materials and Methods
26 2417  Low Voltage Equipment
26 5100  Interior Lighting Fixtures

(seal) Signature: ____________________________

James L. Dove P.E.
Digitally signed by James L.
Dove P.E.
Date: 2019.10.04 10:27:32 -05'00'
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23 3416  Centrifugal HVAC Fans  23 3416/1-2
23 3600  Air Terminal Units  23 3600/1-3
23 4000  HVAC Air Cleaning Devices  23 4000/1-2
23 8200  Convection Heating and Cooling Units  23 8200/1-2

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**END OF SECTION**
SECTION 1.A

BID FOR LUMP SUM CONTRACT

Date: ___________________________

BID OF
(hereinafter called "Bidder") a corporation* organized and existing under laws of the State of ________________________________,
a partnership* consisting of ________________________________,
an individual* trading as ________________________________,
a joint venture* consisting of ________________________________

*Insert Corporation(s), partnership or individual, as applicable.

TO: Curators of the University of Missouri
    c/o Associate Vice Chancellor – Facilities
    Room L100, General Services Building
    University of Missouri
    Columbia, Missouri 65211

1. Bidder, in compliance with invitation for bids for construction work in accordance with Drawings and Specifications prepared by Planning, Design, and Construction, entitled "Nano and Molecular Medicine – Fitout Shell Space, Room 114A", project number CP190821, dated October 10, 2019 having examined Contract Documents and site of proposed work, and being familiar with all conditions pertaining to construction of proposed project, including availability of materials and labor, hereby proposes to furnish all labor, materials and supplies to construct project in accordance with Contract Documents, within time set forth herein at prices stated below. Prices shall cover all expenses, including taxes not covered by the University of Missouri’s tax exemption status, incurred in performing work required under Contract documents, of which this Bid is a part.

Bidder acknowledges receipt of following addenda:

Addendum No. __________________________ Dated ___________
Addendum No. __________________________ Dated ___________
Addendum No. __________________________ Dated ___________

2. In following Bid(s), amount(s) shall be written in both words and figures. In case of discrepancy between words and figures, words shall govern.
3. BID PRICING

a. Base Bid:

The Bidder agrees to furnish all labor, materials, tools, and equipment required to Renovate approximately 1,275 square feet of currently unfinished space to animal holding and laboratory space; all as indicated on the Drawings and described in these Specifications for sum of:

_________________________________ DOLLARS ($________________).  

b. Additive Alternate Bids:

Above Base Bid may be changed in accordance with following Alternate Bids as Owner may elect. Alternates are as described in Section 1.H of Project Manual. Alternates are written in a priority order, but Owner is not required to accept or reject in order listed. This is a one (1) contract project, therefore, Alternates shall be studied by each Bidder to determine effect on Bids of Contractor and each Subcontractor and/or Material supplier.

(1) Additive Alternate No. 1:

Exterior improvements including concrete drive and drainage improvements, fabric awning, and fencing. These improvements also require inclusion of construction fencing. All for sum of:

_________________________________ DOLLARS ($________________).  

(2) Additive Alternate No. 2:

Modify the overhead channel ceiling support grid to increase to a 2'x2' spacing from the base bid scope. All for sum of:

_________________________________ DOLLARS ($________________).

4. PROJECT COMPLETION

a. Contract Period - Contract period begins on the day the Contractor receives unsigned Contract, Performance Bond, Payment Bond, and "Instructions for Execution of Contract, Bonds, and Insurance Certificates." Bidder agrees to complete project within one hundred fifty (150) calendar days from receipt of aforementioned documents. Fifteen (15) calendar days have been allocated in construction schedule for receiving aforementioned documents from Bidder.
b. Commencement - Contractor agrees to commence work on this project after the "Notice to Proceed" is issued by the Owner. "Notice to Proceed" will be issued within seven (7) calendar days after Owner receives properly prepared and executed Contract documents listed in paragraph 4.a. above.

5. SUBCONTRACTOR LIST:

Bidder hereby certifies that the following subcontractors will be used in performance of Work:

NOTE: Failure to list subcontractors for each category of work identified on this form or listing more than one subcontractor for any category of work without designating the portion of work performed by each shall be grounds for rejection of bid. List name, city, and state of designated subcontractor, for each category of work listed in Bid For Lump Sum Contract. If work within a category will be performed by more than one subcontractor, Bidder shall provide name, city, and state of each subcontractor and specify exact portion of work to be performed by each. If acceptance/non-acceptance of Alternates will affect designation of a subcontractor, Bidder shall provide information, for each affected category, with this bid form. If Bidder intends to perform any designated subcontract work by using Bidder's own employees, then Bidder shall list their own name, city, and state. The bidder may petition the Owner to change a listed subcontractor only within 48 hours of the bid opening. See Information For Bidders Section 16 List of Subcontractors for requirements.

<table>
<thead>
<tr>
<th>Work to be performed</th>
<th>Subcontractor Name, City, and State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gypsum Board</td>
<td></td>
</tr>
<tr>
<td>Mechanical</td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
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</tbody>
</table>

6. SUPPLIER DIVERSITY PARTICIPATION GOALS

a. The Contractor shall have as a goal, subcontracting with Minority Business Enterprise (MBE) and with Women Business Enterprise (WBE), Disadvantage Business Enterprise (DBE), and/or Veteran Owned Business of a combined ten percent (10%), and with Service Disabled Veteran Owned Business (SDVE) of three percent (3%) of awarded contract price for work to be performed.

b. Requests for waiver of this goal shall be submitted on the attached Application For Waiver form. A determination by the Director of Facilities
Planning & Development, UM, that a good faith effort has not been made by Contractor to achieve above stated goal may result in rejection of bid.

c. The Undersigned proposes to perform work with following Supplier Diversity participation level:

MBE, WBE, DBE, and/or VETERAN PERCENTAGE PARTICIPATION
__________________________ percent (_______%)

SDVE PERCENTAGE PARTICIPATION:
__________________________ percent (_______%)

d. A Supplier Diversity Compliance Evaluation form shall be submitted with this bid for each diverse subcontractor to be used on this project.

7. BIDDER’S ACKNOWLEDGMENTS

a. Bidder declares that he has had an opportunity to examine the site of the work and he has examined Contract Documents therefore; that he has carefully prepared his bid upon the basis thereof; that he has carefully examined and checked bid, materials, equipment and labor required thereunder, cost thereof, and his figures therefore. Bidder hereby states that amount, or amounts, set forth in bid is, or are, correct and that no mistake or error has occurred in bid or in Bidder’s computations upon which this bid is based. Bidder agrees that he will make no claim for reformation, modifications, revisions or correction of bid after scheduled closing time for receipt of bids.

b. Bidder agrees that bid shall not be withdrawn for a period of sixty (60) days after scheduled closing time for receipt of bids.

c. Bidder understands that Owner reserves right to reject any or all bids and to waive any informalities in bidding.

d. Accompanying the bid is a bid bond, or a certified check, or an irrevocable letter of credit, or a cashier's check payable without condition to "The Curators of the University of Missouri" which is an amount at least equal to five percent (5%) of amount of largest possible total bid herein submitted, including consideration of Alternates.

e. Accompanying the bid is a Bidder's Statement of Qualifications. Failure of Bidder to submit the Bidder's Statement of Qualifications with the bid may cause the bid to be rejected. Owner does not maintain Bidder's Statements of Qualifications on file.
f. It is understood and agreed that bid security of two (2) lowest and responsive Bidders will be retained until Contract has been executed and an acceptable Performance Bond and Payment Bond has been furnished. It is understood and agreed that if the bid is accepted and the undersigned fails to execute the Contract and furnish acceptable Performance/Payment Bond as required by Contract Documents, accompanying bid security will be realized upon or retained by Owner. Otherwise, the bid security will be returned to the undersigned.

8. BIDDER'S CERTIFICATE

Bidder hereby certifies:

a. His bid is genuine and is not made in interest of or on behalf of any undisclosed person, firm or corporation, and is not submitted in conformity with any agreement or rules of any group, association or corporation.

b. He has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid.

c. He has not solicited or induced any person, firm or corporation to refrain from bidding.

d. He has not sought by collusion or otherwise to obtain for himself any advantage over any other Bidder or over Owner.

e. He will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin in connection with performance of work.

f. By virtue of policy of the Board of Curators, and by virtue of statutory authority, a preference will be given to materials, products, supplies, provisions and all other articles produced, manufactured, mined or grown within the State of Missouri. By virtue of policy of the Board of Curators, preference will also be given to all Missouri firms, corporations, or individuals, all as more fully set forth in "Information For Bidders."

END OF BIDDER’S CERTIFICATE
9. **BIDDER’S SIGNATURE**

Note: All signatures shall be original; not copies, photocopies, stamped, etc.

<table>
<thead>
<tr>
<th>Authorized Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printed Name</td>
<td>Title</td>
</tr>
<tr>
<td>Company Name</td>
<td></td>
</tr>
<tr>
<td>Mailing Address</td>
<td></td>
</tr>
<tr>
<td>City, State, Zip</td>
<td></td>
</tr>
<tr>
<td>Phone No.</td>
<td>Federal Employer ID No.</td>
</tr>
<tr>
<td>Fax No.</td>
<td>E-Mail Address</td>
</tr>
</tbody>
</table>

Circle one: Individual Partnership Corporation Joint Venture

If a corporation, incorporated under the laws of the State of__________

Licensed to do business in the State of Missouri? _____yes _____no

(Each Bidder shall complete bid form by manually signing on the proper signature line above and supplying required information called for in connection with the signature. Information is necessary for proper preparation of the Contract, Performance Bond and Payment Bond. Each Bidder shall supply information called for in accompanying "Bidder's Statement of Qualifications.")

**END OF SECTION**
BIDDER'S STATEMENT OF QUALIFICATIONS

Submit with Bid for Lump Sum Contract in separate envelope appropriately labeled. Attach additional sheet if necessary.

1. Company Name ____________________________________________________________

   Phone# ______________________________ Fax #: _______________________________

   Address _________________________________________________________________

2. Number of years in business ______. If not under present firm name, list previous firm names and types of organization.

   ________________________________________________________________

   ________________________________________________________________

3. List contracts on hand (complete the following schedule, include telephone number).

<table>
<thead>
<tr>
<th>Project &amp; Address</th>
<th>Owner/Owner's Representative</th>
<th>Phone Number</th>
<th>Architect</th>
<th>Amount of your Contract</th>
<th>Percent Completed</th>
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</table>

4. General character of work performed by your company personnel.

   ________________________________________________________________

5. List important projects completed in the last five (5) years on a type similar to the work now bid for, including approximate cost and telephone number.

<table>
<thead>
<tr>
<th>Project &amp; Address</th>
<th>Owner/Owner's Representative</th>
<th>Phone Number</th>
<th>Architect</th>
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</tbody>
</table>

6. Other experience qualifying you for the work now bid.

   ________________________________________________________________

7. No default has been made in any contract complete or incomplete except as noted below:
   (a) Number of contracts on which default was made _______________________
   (b) Description of defaulted contracts and reason therefor

   ________________________________________________________________

8. (a) Have you or your company participated in any contract subject to an equal opportunity clause similar to that described in the General Conditions?
     Yes _____ No _____

   (b) Have you filed all required compliance reports?
     Yes _____ No _____
(c) Is fifty percent or more of your company owned by a minority?
Yes _____ No _____
(d) Is fifty percent or more of your company owned by a woman?
Yes _____ No _____
(e) Is fifty percent or more of your company owned by a service disabled veteran?
Yes _____ No _____
(f) Is fifty percent or more of your company owned by a veteran?
Yes _____ No _____
(g) Is your company a Disadvantaged Business Enterprise?
Yes _____ No _____

9. Have you or your company been suspended or debarred from working at any University of Missouri campus?
Yes _____ No _____ (If the answer is "yes", give details.)

10. Have any administrative or legal proceedings been started against you or your company alleging violation of any wage and hour regulations or laws?
Yes _____ No _____ (If the answer is "yes", give details.)

11. Workers Compensation Experience Modification Rates (last 3 yrs): _____ / _____ / _____
Incidence Rates (last 3 years): _____ / _____ / _____

12. List banking references.

13. (a) Do you have a current confidential financial statement on file with Owner?
Yes _____ No _____ (If not, and if desired, Bidder may submit such statement with bid, in a separate sealed and labeled envelope.)
(b) If not, upon request will you file a detailed confidential financial statement within three (3) days?
Yes _____ No _____

Dated at __________________________ this _________ day of ______________________ 20_____

Name of Organization

_______________________________
Signature

_______________________________
Printed Name

_______________________________
Title of Person Signing

END OF SECTION
SUPPLIER DIVERSITY COMPLIANCE EVALUATION FORM

This form shall be completed by Bidders and submitted with the Bidder's Statement of Qualifications form for each diverse firm who will function as a subcontractor on the contract.

The undersigned submits the following data with respect to this firm's assurance to meet the goal for Supplier Diversity participation.

I. Project:

II. Name of General Contractor:

III. Name of Diverse Firm:

   Address:

   Phone No.: Fax No.:

   Status (check one) MBE _____ WBE _____ Veteran_____ Service Disabled Veteran______ DBE_____

IV. Describe the subcontract work to be performed. (List Base Bid work and any Alternate work separately):

   Base Bid:

   Alternate(s), (Identify separately):

V. Dollar amount of contract to be subcontracted to the Diverse firm:

   Base Bid:

   Alternate(s), (Identify separately):

VI. Is the proposed subcontractor listed in the Directory of M/W/DBE Vendors, Directory of Serviced Disabled Veterans and/or the Directory of Veterans maintained by the State of Missouri?

   Yes _____ No _____

SD/1
Is the proposed subcontractor certified as a diverse supplier by any of the following: federal government agencies, state agencies, State of Missouri city or county government agencies, Minority and/or WBE certifying agencies?

Yes ______  No ______  If yes, please provide details and attach a copy of the certification.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Does the proposed subcontractor have a signed document from their attorney certifying the Supplier as a Diverse and meeting the 51% owned and committed requirement?

Yes ______  No ______  If yes, please attach letter.

Signature: ________________________________

Name: __________________________________

Title: __________________________________

Date: _________________________________
APPLICATION FOR WAIVER

This form shall be completed and submitted with the Bidder's Statement of Qualifications. Firms wishing to be considered for award are required to demonstrate that a good faith effort has been made to include diverse suppliers. This form will be used to evaluate the extent to which a good faith effort has been made. The undersigned submits the following data with respect to the firm's efforts to meet the goal for Supplier Diversity Participation.

1. List pre-bid conferences your firm attended where Supplier Diversity requirements were discussed.

2. Identify advertising efforts undertaken by your firm which were intended to recruit potential diverse subcontractors for various aspects of this project. Provide names of newspapers, dates of advertisements and copies of ads that were run.

3. Note specific efforts to contact in writing those diverse suppliers capable of and likely to participate as subcontractors for this project.

4. Describe steps taken by your firm to divide work into areas in which diverse suppliers/contractors would be capable of performing.

5. What efforts were taken to negotiate with prospective diverse suppliers/contractors for specific sub-bids? Include the names, addresses, and telephone numbers of diverse suppliers/contractors contacted, a description of the information given to diverse suppliers/contractors regarding plans and specifications for the assigned work, and a statement as to why additional agreements were not made with diverse suppliers/contractors.

6. List reasons for rejecting a diverse supplier/contractor which has been contacted.
8. Describe the follow-up contacts with diverse suppliers/contractors made by your firm after the initial solicitation.

9. Describe the efforts made by your firm to provide interested diverse suppliers/contractors with sufficiently detailed information about the plans, specifications and requirements of the contract.

10. Describe your firm's efforts to locate diverse suppliers/contractors.

Based on the above stated good faith efforts made to include supplier diversity, the bidder hereby requests that the original supplier diversity percentage goal be waived and that the percentage goal for this project be set at ________ percent.

The undersigned hereby certifies, having read the answers contained in the foregoing Application for Waiver, that they are true and correct to the best of his/her knowledge, information and belief.

Signature
Name
Title
Company
Date
AFFIDAVIT

"The undersigned swears that the foregoing statements are true and correct and include all material information necessary to identify and explain the operation of ______________________ (name of firm) as well as the ownership thereof. Further, the undersigned agrees to provide through the prime contractor or directly to the Contracting Officer current, complete and accurate information regarding actual work performed on the project, the payment therefore and any proposed changes, if any, of the project, the foregoing arrangements and to permit the audit and examination of books, records and files of the named firm. Any material misrepresentation will be grounds for terminating any contract which may be awarded and for initiating action under federal or state laws concerning false statements."

Note - If, after filing this information and before the work of this firm is completed on the contract covered by this regulation, there is any significant change in the information submitted, you must inform the Director of Facilities Planning and Development of the change either through the prime contractor or directly.

Signature _____________________________________________________________
Name _________________________________________________________________
Title _________________________________________________________________
Date _________________________________________________________________

Corporate Seal (where appropriate)

Date _________________________________________________________________
State of ___________________________________________________________________
County of ___________________________________________________________________

On this __________________ day of _____________________________, 19__, before me appeared (name) ____________________________ to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (name of firm)

______________________________________________________________

____________________________ to execute the affidavit and did so as his or her own free act and deed.

(Seal)

Notary Public ___________________________________________________________________
Commission expires ___________________________________________________________________
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AFFIDAVIT FOR AFFIRMATIVE ACTION

State of Missouri       )
County of             )  ss.

_______________________________________________ first being duly sworn on his/her oath
states: that he/she is the (sole proprietor, partner, or officer) of ________________________________________________
_______________________ a (sole proprietorship, partnership, corporation), and as such (sole proprietor, partner, or officer) is
duly authorized to make this affidavit on behalf of said (sole proprietorship, partnership, corporation); that under the contract
known as "___________________________________________________________________________________________"
Project No. ________________ less than 50 persons in the aggregate will be employed and therefore, the applicable Affirmative
Action requirements as set forth in the "Nondiscrimination in Employment Equal Opportunity," Supplemental Special
Conditions, and Article 13 in the General Conditions do not apply.

_______________________________________________

Subscribed and sworn before me this _______________ day of ___________________________, 19________.

My commission expires ____________________________________________, 19________.
CERTIFYING SUPPLIER DIVERSITY AGENCIES

Diverse firms are defined in General Conditions Articles 1.1.7 and those businesses must be certified as disadvantaged by an approved agency. The Bidder is responsible for obtaining information regarding the certification status of a firm. A list of certified firms may be obtained by contacting the agencies listed below. Any firm listed as disadvantaged by any of the following agencies will be classified as a diverse firm by the Owner.

St. Louis Development Corporation
1520 Market St., Ste. 2000
St. Louis, MO 63103
P: 314.982.1400
W: www.stlouis-mo.gov/sldc/

Bi-State Development
211 N. Broadway, Ste. 700
St. Louis, MO 63102
P: 314.982.1400
W: www.metrostlouis.dbesystem.com

St. Louis Minority Business Council
211 N. Broadway, Ste. 1300
St. Louis, MO 63102
P: 314.231.5555
W: www.slmbc.org

U.S. Small Business Administration - St. Louis, MO
8(a) Contractors, Minority Small Business
1222 Spruce Street, Suite 10.103
St. Louis, MO 63101
P: 314.539.6600
W: www.sba.gov

Lambert St. Louis International Airport
Business Diversity Development Office
11495 Navaid
Bridgeton, MO 63044
P: 314-426-8111

City of Kansas City, Missouri
Human Relations Department, MBE/WBE Division
4th Floor, City Hall
414 E. 12th Street
Kansas City, MO 64106
P: 816.513.1836
W: kcmohrd.mwdbce.com/?TN=kcmohrd

Mid-States Minority Supplier Development Council
505 N. 7th Street, Ste. 1820
St. Louis, MO 63101
P: 314.278.5616
W: midstatesdc.org

U.S. Small Business Administration - Kansas City, MO
8(a) Contractors, Minority Small Business
1000 Walnut, Suite 500
Kansas City, MO 64106
P: 816.426.4900
W: kcmohrd.mwdbce.com/?TN=kcmohrd

Missouri Department of Transportation
Division of Construction
1617 Missouri Blvd.
P.O. Box 270
Jefferson City, MO 65102
P: 573.526.2978
W: www.modot.org/mrcc-directory

Illinois Department of Transportation
MBE/WBE Certification Section
2300 Dirksen Parkway
Springfield, IL 62764
217/782-5490; 217/785-1524 (Fax)
W: webapps.dot.illinois.gov/UCP/ExternalSearch

State of Missouri OA
Office of Equal Opportunity
301 W. High St. HSC Rm 870-B
Jefferson City, MO 65101
P: 877.259.2963
W: oa.mo.gov/sites/default/files/sdvelisting.pdf
W: oeo.mo.gov/
Minority Newspapers

Dos Mundos Bilingual Newspaper
902A Southwest Blvd.
Kansas City, MO 64108
816-221-4747
www.dosmundos.com

Kansas City Hispanic News
2918 Southwest Blvd.
Kansas City, MO 64108
816/472-5246
www.kchispanicnews.com

The Kansas City Globe
615 E. 29th Street
Kansas City, MO 64109
816-531-5253
www.thekcglobe.com/about_us.php

St. Louis American
4144 Lindell
St. Louis, MO 63108
314-533-8000
www.stlamerican.com

St. Louis Chinese American News
1766 Burns Ave, Suite 201
St. Louis, MO 63132
314-432-3858
www.scannews.com

St. Louis Business Journal
815 Olive St., Suite 100
St. Louis, MO 63101
314-421-6200
www.bizjournal.com/stlouis

Kansas City Business Journal
1100 Main Street, Suite 210
Kansas City, MO 64105
816-421-5900
www.bizjournals.com/kansascity
AFFIDAVIT OF SUPPLIER DIVERSITY PARTICIPATION

The apparent low Bidder shall complete and submit this form within 48 hours of bid opening for each Diverse firm that will participate on the contract.

1. Diverse Firm: ____________________________
   Contact Name: ____________________________
   Address: ____________________________
   Phone No.: ____________________________ E-Mail: ____________________________
   Status (check one) MBE ☐ WBE ☐ Veteran ☐ Service Disabled Veteran ☐ DBE ☐
   If MBE, Certified as (circle one): 1) Black American 2) Hispanic American 3) Native American 4) Asian American

2. Is the proposed diverse firm certified by an approved agency [see IFB article 15]? Yes ☐ No ☐
   Agency: ____________________________ [attach copy of certification authorization from agency]
   Certification Number: ____________________________

3. Diverse firm scope work and bid/contract dollar amount of participation (List Base Bid and Alternate work separately). The final Dollar amount will be determined at substantial completion:

<table>
<thead>
<tr>
<th>Scope of Work</th>
<th>Bid/Contract Amount</th>
<th>Final Dollar Amount</th>
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</thead>
<tbody>
<tr>
<td>Base Bid</td>
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<tr>
<td>Alternate #1</td>
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The undersigned certifies that the information contained herein (i.e. Scope of Work and Bid/Contract Amount) is true and correct to the best of their knowledge, information and belief.

General Contractor: ____________________________ Diverse Firm: ____________________________
Signature: ____________________________ Signature: ____________________________
Name: ____________________________ Name: ____________________________
Title: ____________________________ Title: ____________________________
Date: ____________________________ Date: ____________________________

The undersigned certifies that the information contained herein (i.e. Scope of Work and Final Dollar Amount) is true and correct to the best of their knowledge, information and belief. If the Final Dollar Amount is different than the Bid/Contract Amount, then attach justification for the difference.

Contractor: ____________________________ Diverse Firm: ____________________________
Signature: ____________________________ Signature: ____________________________
Name: ____________________________ Name: ____________________________
Title: ____________________________ Title: ____________________________
Date: ____________________________ Date: ____________________________
# INFORMATION FOR BIDDERS

1. **Contract Documents**
   1.1 Drawings, specifications, and other contract documents, pursuant to work which is to be done, may be obtained shown in the Advertisement for Bids and Special Conditions.

2. **Bidder Obligations**
   2.1 Before submitting bids each bidder shall carefully examine the drawings and specifications and related contract documents, visit site of work and fully inform themselves as to all existing conditions, facilities, restrictions and other matters which can affect the work or the cost thereof.

   2.2 Each bidder shall include in their bid the cost of all work and materials required to complete the contract in a first-class manner as hereinafter specified.

   2.3 Failure or omission of any bidder to receive or examine any form, instrument, addendum, or other document, or to visit the site and acquaint themselves with existing conditions, shall in no way relieve them from any obligation with respect to their bid or contract, and no extra compensation will be allowed by reason of any thing or matter concerning which bidder should have fully informed themselves prior to bidding.

   2.4 Submission of bids shall be deemed acceptance of the above obligations and each and every obligation required to be performed by all of the contract documents in the event the bid is accepted.

3. **Interpretation of Documents**
   3.1 If any prospective bidder is in doubt as to the true meaning of any part of the drawings and specifications or contract documents, they shall submit a written request to the Architect for an interpretation.

   3.2 Requests for such interpretations shall be delivered to the Architect at least one (1) week prior to time for receipt of bids.

3.3 Bids shall be based only on interpretations issued in the form of addenda mailed to each person who is on the Architect's record as having received a set of the contract documents.

4. **Bids**
   4.1 Bids shall be received separately or in combination as shown in and required by the Bid for Lump Sum contract. Bids will be completed so as to include insertion of amounts for alternate bids, unit prices and cost accounting data.

   4.2 Bidders shall apportion each base bid between various phases of the work, as stipulated in the Bid for Lump Sum contract. All work shall be done as defined in the specifications and as indicated on the drawings.

   4.3 Bids shall be presented in sealed envelopes which shall be plainly marked "Bids for (indicate name of project from cover sheet)", and mailed or delivered to the building and room number specified in the Advertisement for Bids. Bidders shall be responsible for actual delivery of bids during business hours, and it shall not be sufficient to show that a bid was mailed in time to be received before scheduled closing time for receipt of bids, nor shall it be sufficient to show that a bid was somewhere in a university facility.

   4.4 The bidder's price shall include all federal sales, excise, and similar taxes, which may be lawfully assessed in connection with their performance of work and purchase of materials to be incorporated in the work. City & State taxes shall not be included as defined within Article 3.16 of the General Conditions for Construction Contract included in the contract documents.

   4.5 Bids shall be submitted on a single bid form, furnished by the Owner or Architect. Do not remove the bid form from the specifications.

   4.6 No bidder shall stipulate in their bid any conditions not contained in the bid form.
4.7 The Owner reserves the right to waive informalities in bids and to reject any or all bids.

5. **Modification and Withdrawal of Bids**
5.1 The bidder may withdraw their bid at any time before the scheduled closing time for receipt of bids, but no bidder may withdraw their bid after the scheduled closing time for receipt of bids.

5.2 Only telegrams, letters and other written requests for modifications or correction of previously submitted bids, contained in a sealed envelope which is plainly marked "Modification of Bid on (name of project on cover sheet)," which are addressed in the same manner as bids, and are received by Owner before the scheduled closing time for receipt of bids will be accepted and bids corrected in accordance with such written requests.

6. **Signing of Bids**
6.1 Bids which are signed for a partnership shall be manually signed in the firm name by at least one partner, or in the firm name by Attorney-in-Fact. If signed by Attorney-in-Fact there should be attached to the bid, a Power of Attorney evidencing authority to sign the bid dated the same date as the bid and executed by all partners of the firm.

6.2 Bids that are signed for a corporation shall have the correct corporate name thereon and the signature of an authorized officer of the corporation manually written below corporate name. Title of office held by the person signing for the corporation shall appear below the signature of the officer.

6.3 Bids that are signed by an individual doing business under a firm name, shall be manually signed in the name of the individual doing business under the proper firm name and style.

6.4 Bids that are signed under joint venture shall be manually signed by officers of the firms having authority to sign for their firm.

7. **Bid Security**
7.1 Each bid shall be accompanied by a bid bond, certified check, or cashier's check, acceptable to and payable without condition to The Curators of the University of Missouri, in an amount at least equal to five percent (5%) of bidder's bid including additive alternates.

7.2 Bid security is required as a guarantee that bidder will enter into a written contract and furnish a performance bond within the time and in form as specified in these specifications; and if successful bidder fails to do so, the bid security will be realized upon or retained by the Owner. The apparent low bidder shall notify the Owner in writing within 48 hours (2 work days) of the bid opening of any circumstance that may affect the bid security including, but not limited to, a bidding error. This notification will not guarantee release of the bidder's security and/or the bidder from the Bidder's Obligations.

7.3 If a bid bond is given as a bid security, the amount of the bond may be stated as an amount equal to at least five percent (5%) of the bid, including additive alternates, described in the bid. The bid bond shall be executed by the bidder and a responsible surety licensed in the State of Missouri with a Best's rating of no less than A-/XI.

7.4 It is specifically understood that the bid security is a guarantee and shall not be considered as liquidated damages for failure of bidder to execute and deliver their contract and performance bond, nor limit or fix bidder's liability to Owner for any damages sustained because of failure to execute and deliver the required contract and performance bond.

7.5 Bid security of the two (2) lowest and responsive Bidders will be retained by the Owner until a contract has been executed and an acceptable bond has been furnished, as required hereby, when such bid security will be returned. Surety bonds of all other bidders will be destroyed and all other alternative forms of bid bonds will be returned to them within ten (10) days after Owner has determined the two (2) lowest and responsive bids.

8. **Bidder's Statement of Qualifications**
8.1 Each bidder submitting a bid shall present evidence of their experience, qualifications, financial responsibility and ability to carry out the terms of the contract by completing and submitting with their bid the schedule of information set forth in the form furnished in the bid form.

8.2 Such information, a single copy required in a separate sealed envelope, will be treated as confidential information by the Owner, within the meaning of Missouri Statue 610.010.

8.3 Bids not accompanied with current Bidder's Statement of Qualifications may be rejected.

9. **Award of Contract**
9.1 The Owner reserves the right to let other contracts in connection with the work, including, but not by way of limitation, contracts for furnishing and installation of furniture, equipment, machines, appliances, and other apparatus.

9.2 In awarding the contract, the Owner may take into consideration the bidder's, and their subcontractor's, ability to handle promptly the additional work, skill, facilities, capacity, experience, ability, responsibility, previous work, financial standing of bidder, and the bidder's ability to provide the required bonds and insurance; quality, efficiency and construction of equipment proposed to be furnished; period of time within which equipment is proposed to be furnished and delivered; success in achieving the specified Supplier Diversity goal, or demonstrating a good faith effort as described in Article 15; necessity of prompt and efficient completion of work herein described, and the bidder's status as suspended or debarred. Inability of any bidder to meet the requirements mentioned above may be cause for rejection of their bid.

10. **Contract Execution**
10.1 The Contractor shall submit within fifteen (15) days from receipt of notice, the documents required in Article 9 of the General Conditions for Construction Contract included in the contract documents.
10.2 No bids will be considered binding upon the Owner until the documents listed above have been furnished. Failure of Contractor to execute and submit these documents within the time period specified will be treated, at the option of the Owner, as a breach of the bidder's bid security under Article 7 and the Owner shall be under no further obligation to Bidder.

11. Contract Security
11.1 When the Contract sum exceeds $50,000, the Contractor shall procure and furnish a Performance bond and a Payment bond in the form prepared by Owner. Each bond shall be in the amount equal to one hundred percent (100%) of the contract sum, as well as adjustments to the Contract Sum. The Performance Bond shall secure and guarantee Contractor’s faithful performance of this Contract, including but not limited to Contractor’s obligation to correct defects after final payment has been made as required by the Contract Documents. The Payment Bond shall secure and guarantee payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract. These Bonds shall be in effect through the duration of the Contract plus the Guaranty Period as required by the Contract Documents.

11.2 The bonds required hereunder shall be meet all requirements of Article 11 of the General Conditions for Construction Contract included in the contract documents.

11.3 If the surety of any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to conduct business in the State of Missouri is terminated, or it ceases to meet the requirements of this Article 11, Contractor shall within ten (10) days substitute another bond and surety, both of which must be acceptable to Owner. If Contractor fails to make such substitution, Owner may procure such required bonds on behalf of Contractor at Contractor’s expense.

12. Time of Completion
12.1 Contractors shall agree to commence work within five (5) days of the date “Notice to Proceed” is received from the Owner, and the entire work shall be completed by the completion date specified or within the number of consecutive calendar days stated in the Special Conditions. The duration of the construction period, when specified in consecutive calendar days, shall begin when the contractor receives notice requesting the documents required in Article 9 of the General Conditions for Construction Contract included in the contract documents.

13. Number of Contract Documents
13.1 The Owner will furnish the Contractor a copy of the executed contract and performance bond.

13.2 The Owner will furnish the Contractor the number of copies of complete sets of drawings and specifications for the work, as well as, clarification and change order drawings pertaining to change orders required during construction as set forth in the Special Conditions.

14. Missouri Products and Missouri Firms
14.1 The Curators of the University of Missouri have adopted a policy which is binding upon all employees and departments of the University of Missouri, and which by contract, shall be binding upon independent contractors and subcontractors with the University of Missouri whereby all other things being equal, and when the same can be secured without additional cost over foreign products, or products of other states, a preference shall be granted in all construction, repair and purchase contracts, to all products, commodities, materials, supplies and articles mined, grown, produced and manufactured in marketable quality and quality in the State of Missouri, and to all firms, corporations or individuals doing business as Missouri firms, corporations or individuals. Each bidder submitting a bid agrees to comply with, and be bound by the foregoing policy.

15. Supplier Diversity
15.1 Award of Contract
The Supplier Diversity participation goal for this project is stated on the Bid for Lump Sum Contract Form, and the Owner will take into consideration the bidder's success in achieving the Supplier Diversity participation goal in awarding the contract. Inability of any bidder to meet this requirement may be cause for rejection of their bid.

The University will grant a three (3) point bonus preference to a Missouri based, certified Service Disabled Veteran Enterprise (SDVE) bidder as defined in Article 1 – (Supplier Diversity Definitions) of the General Conditions of the Contract for Construction included in the contract documents. The three percent (3%) goal can be met, and the bonus points obtained, by a qualified SDVE vendor and/or through the use of qualified subcontractors or suppliers that provide at least three percent (3%) of the total contract value.

15.2 List of Supplier Diversity Firms
15.2.1 The bidder shall submit as part of their bid a list of diverse firms performing as contractor, subcontractors, or suppliers. The list shall specify the single designated diverse firm name and address. If acceptance or non-acceptance of alternates will affect the designation of a subcontractor, provide information for each affected category.

15.2.2 Failure to include a complete list of diverse firms may be grounds for rejection of the bid.

15.2.3 The list of diverse firms shall be submitted in addition to any other listing of subcontractors required in the Bid for Lump Sum Contract Form.

15.3 Supplier Diversity Percentage Goal
The bidder shall have a minimum goal of subcontracting with diverse contractors, subcontractors, and suppliers, the percent of contract price stated in the Supplier Diversity goal paragraph of the Bid for Lump Sum Contract Form.

15.4 Supplier Diversity Percent Goal Computation
15.4.1 The total dollar value of the work granted to the diverse firms by the successful bidder is counted towards the applicable goal of the entire contract, unless otherwise noted below.

15.4.2 The bidder may count toward the Supplier Diversity goal only expenditures to diverse firms that perform a commercially useful function in the work of a contract. A diverse firm is considered to perform a commercially useful function when it is responsible for executing a distinct element of the work and carrying out its responsibilities by
actually performing, managing and supervising the work involved. A bidder that is a certified diverse firm may count as 100% of the contract towards the Supplier Diversity goal. For projects with separate MBE, SDVE, and WBE/Veteran/DBE goals, a MBE firm bidding as the prime bidder is expected to obtain the required SDVE, and WBE/Veteran/DBE participation; a WBE or Veteran or DBE firm bidding as the prime bidder is expected to obtain the required MBE and SDVE participation and a SDVE firm bidding as the prime bidder is expected to obtain the required MBE, and WBE/Veteran/DBE participation.

15.4.3 When a MBE, WBE, Veteran Business Enterprise, DBE, or SDVE performs work as a participant in a joint venture, only the portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the MBE, WBE, Veteran Business Enterprise, DBE, or SDVE performs with its own forces shall count toward the MBE, WBE, Veteran Business Enterprise, DBE, or SDVE individual contract percentages.

15.4.4 The bidder may count toward its Supplier Diversity goal expenditures for materials and supplies obtained from diverse suppliers and manufacturers, provided the diverse firm assumes the actual and contractual responsibility for the provision of the materials and supplies.

15.4.4.1 The bidder may count its entire expenditure to a diverse manufacturer. A manufacturer shall be defined as an individual or firm that produces goods from raw materials or substantially alters them before resale.

15.4.4.2 The bidder may count its entire expenditure to diverse suppliers that are not manufacturers provided the diverse supplier performs a commercially useful function as defined above in the supply process.

15.4.4.3 The bidder may count 25% of its entire expenditures to diverse firms that do not meet the definition of a subcontractor, a manufacturer, nor a supplier. Such diverse firms may arrange for, expedite, or procure portions of the work but are not actively engaged in the business of performing, manufacturing, or supplying that work.

15.4.5 The bidder may count toward the Supplier Diversity goal that portion of the total dollar value of the work awarded to a certified joint venture equal to the percentage of the ownership and control of the diverse partner in the joint venture.

15.4.6 On projects with separate MBE and WBE/Veteran/DBE goals, the Owner may allow MBE participation provided in excess of the MBE goal to be counted towards the WBE/Veteran/DBE goal.

15.5 Certification by Bidder of Diverse Firms

15.5.1 The bidder shall submit with its bid the information requested in the "Supplier Diversity Compliance Evaluation Form" for every diverse firm the bidder intends to award work to on the contract.

15.5.2 Diverse firms are defined in Article 1 – (Supplier Diversity Definitions) of the General Conditions of the Contract for Construction included in the contract documents, and as those businesses certified as disadvantaged by an approved agency. The bidder is responsible for obtaining information regarding the certification status of a firm. A list of certified firms may be obtained by contacting the agencies listed in the proposal form document “Supplier Diversity Certifying Agencies”. Any firm listed as disadvantaged by any of the identified agencies will be classified as a diverse firm by the Owner.

15.5.3 Bidders are urged to encourage their prospective diverse contractors, subcontractors, joint venture participants, team partners, and suppliers who are not currently certified to obtain certification from one of the approved agencies.

15.6 Supplier Diversity Participation Waiver

15.6.1 The bidder is required to make a good faith effort to locate and contract with diverse firms. If a bidder has made a good faith effort to secure the required diverse firms and has failed, the bidder shall submit with the bid, the information requested in "Application for Supplier Diversity Participation Waiver." The Contracting Officer will review the bidder's actions as set forth in the bidder's "Application for Waiver" and any other factors deemed relevant by the Contracting Officer to determine if a good faith effort has been made to meet the applicable percentage goal. If the bidder is judged not to have made a good faith effort, the bid may be rejected. Bidders who demonstrate that they have made a good faith effort to include Supplier Diversity participation may be awarded the contract regardless of the percent of Supplier Diversity participation, provided the bid is otherwise acceptable and is determined to be the best bid.

15.6.2 To determine good faith effort of the bidder, the Contracting Officer may evaluate factors including, but not limited to, the following:

15.6.2.1 The bidder’s attendance at pre-proposal meetings scheduled to inform bidders and diverse firms of contracting and subcontracting opportunities and responsibilities associated with Supplier Diversity participation.

15.6.2.2 The bidder’s advertisements in general circulation trade association, and diverse (minority) focused media concerning subcontracting opportunities.

15.6.2.3 The bidder’s written notice to specific diverse firms that their services were being solicited in sufficient time to allow for their effective participation.

15.6.2.4 The bidder’s follow-up attempts to the initial solicitation(s) to determine with certainty whether diverse firms were interested.

15.6.2.5 The bidder’s efforts to divide the work into packages suitable for subcontracting to diverse firms.

15.6.2.6 The bidder’s efforts to provide interested diverse firms with sufficiently detailed information about the drawings, specific actions and requirements of the contract, and clear scopes of work for the firms to bid on.

IFB/4
04/18
15.6.2.7 The bidder’s efforts to solicit for specific sub-bids from diverse firms in good faith. Documentation should include names, addresses, and telephone numbers of firms contacted a description of all information provided the diverse firms, and an explanation as to why agreements were not reached.

15.6.2.8 The bidder's efforts to locate diverse firms not on the directory list and assist diverse firms in becoming certified as such.

15.6.2.9 The bidder's initiatives to encourage and develop participation by diverse firms.

15.6.2.10 The bidder’s efforts to help diverse firms overcome legal or other barriers impeding the participation of diverse firms in the construction contract.

15.6.2.11 The availability of diverse firms and the adequacy of the bidder's efforts to increase the participation of such business provided by the persons and organizations consulted by the bidder.

15.7 Submittal of Forms

15.7.1 The bidder will include the Supplier Diversity Compliance Evaluation Form(s), or the Application for Waiver and other form(s) as required above in the envelope containing the "Bidder's Statement of Qualifications", see Article 8.

15.8 Additional Bid/Proposer Information

15.8.1 The Contracting Officer reserves the right to request additional information regarding Supplier Diversity participation and supporting documentation from the apparent low bidder. The bidder shall respond in writing to the Contracting Officer within 24 hours (1 work day) of a request.

15.8.2 The Contracting Officer reserves the right to request additional information after the bidder has responded to prior 24 hour requests. This information may include follow up and/or clarification of the information previously submitted.

15.8.3 The Owner reserves the right to consider additional diverse subcontractor and supplier participation submitted by the bidder after bids are opened under the provisions within these contract documents that describe the Owner’s right to accept or reject subcontractors including, but not limited to, Article 16 below. The Owner may elect to waive the good faith effort requirement if such additional participation achieves the Supplier Diversity goal.

15.8.4 The Bidder shall provide the Owner information related to the Supplier Diversity participation included in the bidder’s proposal, including, but is not limited to, the complete Application for Waiver, evidence of diverse certification of participating firms, dollar amount of participation of diverse firms, information supporting a good faith effort as described in Article 15.6 above, and a list of all diverse firms that submitted bids to the Bidder with the diverse firm’s price and the name and the price of the firm awarded the scope of work bid by the diverse firm.

16. List of Subcontractors

16.1 If a list of subcontractors is required on the Bid for Lump Sum Contract Form, the bidders shall list the name, city and state of the firm(s) which will accomplish that portion of the contract requested in the space provided. This list is separate from both the list of diverse firms required in Article 15.2, and the complete list of subcontractors required in Article 10.1 of this document. Should the bidder choose to perform any of the listed portions of the work with its own forces, the bidder shall enter its own name, city and state in the space provided. If acceptance or non-acceptance of alternates will affect the designation of a subcontractor, the bidder shall provide that information on the bid form.

16.2 Failure of the bidder to supply the list of subcontractors required or the listing of more than one subcontractor for any category without designating the portion of the work to be performed by each, shall be grounds for the rejection of the bid. The bidder can petition the Owner to change a listed subcontractor within 48 hours of the bid opening. The Owner reserves the right to make the final determination on a petition to change a subcontractor. The Owner will consider factors such as clerical and mathematical bidding errors, listed subcontractor’s inability to perform the work for the bid used, etc. Any request to change a listed subcontractor shall include at a minimum, contractor’s bid sheet showing tabulation of the bid; all subcontractor bids with documentation of the time they were received by the contractor; and a letter from the listed subcontractor on their letterhead stating why they cannot perform the work if applicable. The Owner reserves the right to ask for additional information.

16.3 Upon award of the contract, the requirements of Article 10 of this document and Article 5 of the General Conditions of the Contract for Construction included in the contract documents will apply.
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General Conditions
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August 2018 Edition
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ARTICLE 1
GENERAL PROVISIONS

1.1 Basic Definitions
As used in the Contract Documents, the following terms shall have the meanings and refer to the parties designated in these definitions.

1.1.1 Owner
The Curators of the University of Missouri. The Owner may act through its Board of Curators or any duly authorized committee or representative thereof.

1.1.2 Contracting Officer
The Contracting Officer is the duly authorized representative of the Owner with the authority to execute contracts. Communications to the Contracting Officer shall be forwarded via the Owner's Representative.

1.1.3 Owner's Representative
The Owner’s Representative is authorized by the Owner as the administrator of the Contract and will represent the Owner during the progress of the Work. Communications from the Architect to the Contractor and from the Contractor to the Architect shall be through the Owner's Representative, unless otherwise indicated in the Contract Documents.

1.1.4 Architect
When the term "Architect" is used herein, it shall refer to the Architect or the Engineer specified and defined in the Contract for Construction or its duly authorized representative. Communications to the Architect shall be forwarded to the address shown in the Contract for Construction.

1.1.5 Contractor
The Contractor is the person or entity with whom the Owner has entered into the Contract for Construction. The term “Contractor” means the Contractor or the Contractor’s authorized representative.

1.1.6 Subcontractor and Lower-tier Subcontractor
A Subcontractor is a person or organization who has a contract with the Contractor to perform any of the Work. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or its authorized representative. The term "Subcontractor" also is applicable to those furnishing materials to be incorporated in the Work whether work performed is at the Owner’s site or off site, or both. A lower-tier Subcontractor is a person or organization who has a contract with a Subcontractor or another lower-tier Subcontractor to perform any of the Work at the site. Nothing contained in the Contract Documents shall create contractual relationships between the Owner or the Architect and any Subcontractor or lower-tier Subcontractor of any tier.

1.1.7 Supplier Diversity Definitions
Businesses that fall into the Supplier Diversity classification shall mean an approved certified business concern which is at least fifty-one percent (51%) owned and controlled by one (1) or more diverse suppliers as described below.

1.1.8 Minority Business Enterprises (MBE)
Minority Business Enterprise [MBE] shall mean an approved certified business concern which is at least fifty-one percent (51%) owned and controlled by one (1) or more minorities as defined below or, in the case of any publicly-owned business, in which at least fifty-one percent (51%) of the stock of which is owned by one (1) or more minorities as defined below, and whose management and daily business operations are controlled by one (1) or more minorities as defined herein.

.1 "African Americans", which includes persons having origins in any of the black racial groups of Africa.

.2 "Hispanic Americans", which includes persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

.3 "Native Americans", which includes persons of American Indian, Eskimo, Aleut, or Native Hawaiian origin.

.4 "Asian-Pacific Americans", which includes persons whose origins are from Japan, China, Taiwan, Korea, Vietnam, Laos, Cambodia, the Philippines, Samoa, Guam, the U.S. Trust Territories of the Pacific, or the Northern Marinas.

.5 "Asian-Indian Americans", which includes persons whose origins are from India, Pakistan, or Bangladesh.

1.1.9 Women Business Enterprise (WBE)
Women Business Enterprise [WBE] shall mean an approved certified business concern which is at least fifty-one percent (51%) owned and controlled by one (1) or more women or, in the case of any publicly-owned business, in which at least fifty-one percent (51%) of the stock of which is owned by one (1) or more women, and whose management and daily business operations are controlled by one (1) or more women.

1.1.10 Veteran Owned Business
Veteran Owned Business shall mean an approved certified business concern which is at least fifty-one percent (51%) owned and controlled by one (1) or more Veterans or, in the case of any publicly-owned business, in which at least fifty-one percent (51%) of the stock of which is owned by one (1) or more Veterans, and whose management and daily business operations are controlled by one (1) or more Veterans. Veterans must be certified by the appropriate federal agency responsible for veterans’ affairs.

1.1.11 Service Disabled Veteran Enterprise (SDVE)
Service Disabled Veteran Enterprise (SDVE) shall mean a business certified by the State of Missouri Office of Administration as a Service Disabled Veteran Enterprise, which is at least fifty-one percent (51%) owned and controlled by one (1) or more Serviced Disabled Veterans or,
in the case of any publicly-owned business, in which at least fifty-one percent (51%) of the stock of which is owned by one (1) or more Service Disabled Veterans, and whose management and daily business operations are controlled by one (1) or more Serviced Disabled Veterans.

.5 Disadvantaged Business Enterprise (DBE)
A Disadvantaged Business Enterprise (DBE) is a for-profit small business concern where a socially and economically disadvantaged individual owns at least 51% interest and also controls management and daily business operations. These firms can and also be referred to as Small Disadvantaged Businesses (SDB). Eligibility requirements for certification are stated in 49 CFR (Code of Federal Regulations), part 26, Subpart D.

U.S. citizens that are African-Americans, Hispanics, Native Americans, Asian-Pacific and Subcontinent Asian Americans, and women are presumed to be socially and economically disadvantaged. Also recognized as DBE’s are Historically Black Colleges and Universities (HBCU) and small businesses located in Federal HUB Zones. To be regarded as economically disadvantaged, an individual must have a personal net worth that does not exceed $1.32 million. To be seen as a small business, a firm must meet Small Business Administration (SBA) size criteria (500 employees or less) and have average annual gross receipts not to exceed $22.41 million. To be considered a DBE/SDB, a small business owned and controlled by socially and/or economically disadvantaged individuals must receive DBE certification from one of the recognized Missouri state agencies to be recognized in this classification.

1.1.9 Work
Work shall mean supervision, labor, equipment, tools, material, supplies, incidentals operations and activities required by the Contract Documents or reasonably inferable by Contractor therefrom as necessary to produce the results intended by the Contract Documents in a safe, expeditious, orderly, and workmanlike manner, and in the best manner known to each respective trade.

1.1.10 Approved
The terms "approved", "equal to", "directed", "required", "ordered", "designated", "acceptable", "satisfactory", and similar words or phrases will be understood to have reference to action on the part of the Architect and/or the Owner's Representative.

1.1.11 Contract Documents
The Contract Documents consist of (1) the executed Contract for Construction, (2) these General Conditions of the Contract for Construction, (3) any Supplemental Conditions or Special Conditions identified in the Contract for Construction, (4) the Specifications identified in the Contract for Construction, (5) the Drawings identified in the Contract for Construction, (6) Addenda issued prior to the receipt of bids, (7) Contractor’s bid addressed to Owner, including Contractor’s completed Qualification Statement, (8) Contractor’s Performance Bond and Contractor’s Payment Bond, (9) Notice to Proceed, (10) and any other exhibits and/or post bid adjustments identified in the Contract for Construction, (11) Advertisement for Bid, (12) Information for Bidders, and (13) Change Orders issued after execution of the Contract. All other documents and technical reports and information are not Contract Documents, including without limitation, Shop Drawings, and Submittals.

1.1.12 Contract
The Contract Documents form the Contract and are the exclusive statement of agreement between the parties. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior representations or agreements, either written or oral. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Owner and a Subcontractor or any lower-tier Subcontractor.

1.1.13 Change Order
The Contract may be amended or modified without invalidating the Contract, only by a Change Order, subject to the limitations in Article 7 and elsewhere in the Contract Documents. A Change Order is a written instrument signed by the Owner and the Contractor stating their agreement to a change in the Work, the amount of the adjustment to the Contract Sum, if any, and the extent of the adjustment to the Contract Time, if any. Agreement to any Change Order shall constitute a final settlement of all matters relating to the change in the work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments of the Contract sum, time and schedule.

1.1.14 Substantial Completion
The terms “Substantial Completion” or "substantially complete" as used herein shall be construed to mean the completion of the entire Work, including all submittals required under the Contract Documents, except minor items which in the opinion of the Architect, and/or the Owner's Representative will not interfere with the complete and satisfactory use of the facilities for the purposes intended.

1.1.15 Final Completion
The date when all punch list items are completed, including all closeout submittals and approval by the Architect is given to the Owner in writing.

1.1.16 Supplemental and Special Conditions
The terms “Supplemental Conditions” or “Special Conditions” shall mean the part of the Contract Documents which amend, supplement, delete from, or add to these General Conditions.

1.1.17 Day
The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

1.1.18 Knowledge.
The terms “knowledge,” “recognize” and “discover,” their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows or should know, recognizes or should recognize and discovers or should discover in exercising the care, skill, and diligence of a diligent and prudent contractor familiar with the work. Analogously, the expression “reasonably inferable” and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a diligent and prudent contractor familiar with the work.

1.1.19 Punch List
“Punch List” means the list of items, prepared in connection with the inspection of the Project by the Owner’s Representative or Architect in connection with Substantial Completion of the Work or a portion of the Work, which the Owner’s Representative or Architect has designated as remaining to be performed, completed or corrected before the Work will be accepted by the Owner.

1.1.20 Public Works Contracting Minimum Wage
The public works contracting minimum wage shall be equal to one hundred twenty percent of the average hourly wage in a particular locality, as determined by the Missouri economic research and information center within the department of economic development, or any successor agency.

1.2 Specifications and Drawings
1.2.1 The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction system, standards and workmanship and performance of related services for the Work identified in the Contract for Construction. Specifications are separated into titled divisions for convenience of reference only. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Such separation will not operate to make the Owner or the Architect an arbiter of labor disputes or work agreements.

1.2.2 The drawings herein referred to, consist of drawings prepared by the Architect and are enumerated in the Contract Documents.

1.2.3 Drawings are intended to show general arrangements, design, and dimensions of work and are partly diagrammatic. Dimensions shall not be determined by scale or rule. If figured dimensions are lacking, they shall be supplied by the Architect on the Contractor's written request to the Owner's Representative.

1.2.4 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complimentary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be by required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

1.2.5 In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes and ordinances, the Contractor shall (1) provide the better quality or greater quantity of Work or (2) comply with the more stringent requirement; either or both in accordance with the Owner’s Representative’s interpretation. On the Drawings, given dimensions shall take precedence over scaled measurements and large scale drawings over small scale drawings. Before ordering any materials or doing any Work, the Contractor and each Subcontractor shall verify measurements at the Work site and shall be responsible for the correctness of such measurements. Any difference which may be found shall be submitted to the Owner’s Representative and Architect for resolution before proceeding with the Work. If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such change, for the approval by the Owner’s Representative and Architect before making the change.

1.2.6 Data in the Contract Documents concerning lot size, ground elevations, present obstructions on or near the site, locations and depths of sewers, conduits, pipes, wires, etc., position of sidewalks, curbs, pavements, etc., and nature of ground and subsurface conditions have been obtained from sources the Architect believes reliable, but the Architect and Owner do not represent or warrant that this information is accurate or complete. The Contractor shall verify such data to the extent possible through normal construction procedures, including but not limited to contacting utility owners and by prospecting.

1.2.7 Only work included in the Contract Documents is authorized, and the Contractor shall do no work other than that described therein.
ARTICLE 2
OWNER

2.1 Information and Services Required of the Owner
2.1.1 Permits and fees are the responsibility of the Contractor under the Contract Documents, unless specifically stated in the contract documents that the Owner will secure and pay for specific necessary approvals, easements, assessments, and charges required for construction, use or occupancy of permanent structures, or for permanent changes in existing facilities.

2.1.2 When requested in writing by the Contractor, information or services under the Owner's control, which are reasonably necessary to perform the Work, will be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

2.2 Owner's Right to Stop the Work
2.2.1 If the Contractor fails to correct Work which is not in strict accordance with the requirements of the Contract Documents or fails to carry out Work in strict accordance with the Contract Documents, the Owner's Representative may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work will not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. Owner's lifting of Stop Work Order shall not prejudice Owner's right to enforce any provision of this Contract.

2.3 Owner's Right to Carry Out the Work
2.3.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a seven (7) day period after receipt of a written notice from the Owner to correct such default or neglect, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect’s additional services and expenses made necessary by such default or neglect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to Owner. However, such notice shall be waived in the event of an emergency with the potential for property damage or the endangerment of students, faculty, staff, the public or construction personnel, at the sole discretion of the Owner.

2.3.2 In the event the Contractor has not satisfactorily completed all items on the Punch List within thirty (30) days of its receipt, the Owner reserves the right to complete the Punch List without further notice to the Contractor or its

1.2.8 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. Contractor represents that it has performed its own investigation and examination of the Work site and its surroundings and satisfied itself before entering into this Contract as to:

1. physical condition or safety of the Work site or any improvements located on the Work site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time concerning any failure by the Contractor or any Subcontractor to comply with the requirements of this Paragraph.

1.2.9 Drawings, specifications, and copies thereof furnished by the Owner are and shall remain the Owner’s property. They are not to be used on another project and, with the exception of one contract set for each party to the Contract, shall be returned to the Owner's Representative on request, at the completion of the Work.

1.3 Required Provisions Deemed Inserted
Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein; and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the written application of either party the Contract shall forthwith be physically amended to make such insertion or correction.
In such case, Owner shall be entitled to deduct from payments then or thereafter due the Contractor the cost of completing the Punch List items, including compensation for the Architect's additional services. If payments then or thereafter due Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to Owner.

2.4 Extent of Owner Rights
2.4.1 The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (1) granted in the Contract Documents, (2) at law or (3) in equity.

2.4.2 In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3
CONTRACTOR

3.1 Contractor's Warranty
3.1.1 The Contractor warrants all equipment and materials furnished, and work performed, under this Contract, against defective materials and workmanship for a period of twelve months after acceptance as provided in this Contract, unless a longer period is specified, regardless of whether the same were furnished or performed by the Contractor or any Subcontractors of any tier. Upon written notice from the Owner of any breach of warranty during the applicable warranty period due to defective material or workmanship, the affected part or parts thereof shall be repaired or replaced by the Contractor at no cost to the Owner. Should the Contractor fail or refuse to make the necessary repairs, replacements, and tests when requested by the Owner, the Owner may perform, or cause the necessary work and tests to be performed, at the Contractor's expense, or exercise the Owner's rights under Article 14.

3.1.2 Should one or more defects mentioned above appear within the specified period, the Owner shall have the right to continue to use or operate the defective part or apparatus until the Contractor makes repairs or replacements or until such time as it can be taken out of service without loss or inconvenience to the Owner.

3.1.3 The above warranties are not intended as a limitation, but are in addition to all other express warranties set forth in this Contract and such other warranties as are implied by law, custom, and usage of trade. The Contractor, and its surety or sureties, if any, shall be liable for the satisfaction and full performance of the warranties set forth herein.

3.1.4 Neither the final payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner, nor expiration of warranty stated herein, will constitute an acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any responsibility for non-conforming work. The Contractor shall immediately remedy any defects in the Work and pay for any damage to other Work resulting therefrom upon written notice from the Owner. Should the Contractor fail or refuse to remedy the non-conforming work, the Owner may perform, or cause to be performed the work necessary to bring the work into conformance with the Contract Documents at the Contractor's expense.

3.1.5 The Contractor agrees to defend, indemnify, and save harmless The Curators of the University of Missouri, their Officers, Agents, Employees and Volunteers, from and against all loss or expense from any injury or damages to property of others suffered or incurred on account of any breach of the aforesaid obligations and covenants. The Contractor agrees to investigate, handle, respond to and provide defense for and defend against any such liability, claims, and demands at the sole expense of the Contractor, or at the option of the University, agrees to pay to or reimburse the University for the defense costs incurred by the University in connection with any such liability claims, or demands. The parties hereto understand and agree that the University is relying on, and does not waive or intend to waive by any provision of this Contract, any monetary limitations or any other rights, immunities, and protections provided by the State of Missouri, as from time to time amended, or otherwise available to the University, or its officers, employees, agents or volunteers.

3.2 Compliance with Laws, Permits, Regulations and Inspections
3.2.1 The Contractor shall, without additional expense to the Owner, comply with all applicable laws, ordinances, rules, statutes, and regulations (collectively referred to as "Laws").

3.2.2 Since the Owner is an instrumentality of the State of Missouri, municipal, or political subdivision, ordinances, zoning ordinances, and other like ordinances are not applicable to construction on the Owner's property, and the Contractor will not be required to submit plans and specifications to any municipal or political subdivision authority to obtain construction permits or any other licenses or permits from or submit to, inspection by any municipality or political subdivision relating to the construction on the Owner's property, unless required by the Owner in these Contract Documents or otherwise in writing.
3.2.3 All fees, permits, inspections, or licenses required by municipality or political subdivision for operation on property not belonging to the Owner, shall be obtained by and paid for by the Contractor. The Contractor, of its own expense, is responsible to ensure that all inspections required by said permits or licenses on property, easements, or utilities not belonging to the Owner are conducted as required therein. All connection charges, assessments or transportation fees as may be imposed by any utility company or others are included in the Contract Sum and shall be the Contractor’s responsibility, as stated in 2.1.1 above.

3.2.4 If the Contractor has knowledge that any Contract Documents are at variance with any Laws, including Americans with Disabilities Act – Standards for Accessible Design, ordinances, rules, regulations or codes applying to the Work, Contractor shall promptly notify the Architect and the Owner’s Representative, in writing, and any necessary changes will be adjusted as provided in Contract Documents. However, it is not the Contractor’s primary responsibility to ascertain that the Contract Documents are in accordance with applicable Laws, unless such Laws bear upon performance of the Work.

3.3 Anti-Kickback
3.3.1 No member or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

3.3.2 No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction, or material supply contract or any Subcontract of any tier in connection with the construction of the Work shall have a financial interest in this Contract or in any part thereof, any material supply contract, Subcontract of any tier, insurance contract, or any other contract pertaining to the Work.

3.4 Supervision and Construction Procedures
3.4.1 The Contractor shall supervise and direct the Work, using the Contractor’s best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract. The Contractor shall supply sufficient and competent supervision and personnel, and sufficient material, plant, and equipment to prosecute the Work with diligence to ensure completion thereof within the time specified in the Contract Documents, and shall pay when due any laborer, Subcontractor of any tier, or supplier.

3.4.2 The Contractor, if an individual, shall give the Work an adequate amount of personal supervision, and if a partnership or corporation or joint venture the Work shall be given an adequate amount of personal supervision by a partner or executive officer, as determined by the Owner's Representative.

3.4.3 The Contractor and each of its Subcontractors of any tier shall submit to the Owner such schedules of quantities and costs, progress schedules in accordance with 3.17.2 of this document, payrolls, reports, estimates, records, and other data as the Owner may request concerning Work performed or to be performed under the Contract.

3.4.4 The Contractor shall be represented at the site by a competent superintendent from the beginning of the Work until its final acceptance, whenever contract work is being performed, unless otherwise permitted in writing by the Owner's Representative. The superintendent for the Contractor shall exercise general supervision over the Work and such superintendent shall have decision making authority of the Contractor. Communications given to the superintendent shall be binding as if given to the Contractor. The superintendent shall not be changed by the contractor without approval from the Owner’s Representative.

3.4.5 The Contractor shall establish and maintain a permanent bench mark to which access may be had during progress of the Work, and Contractor shall establish all lines and levels, and shall be responsible for the correctness of such. Contractor shall be fully responsible for all layout work for the proper location of Work in strict accordance with the Contract Documents.

3.4.6 The Contractor shall establish and be responsible for wall and partition locations. If applicable, separate contractors shall be entitled to rely upon these locations and for setting their sleeves, openings, or chases.

3.4.7 The Contractor’s scheduled outage/tie-in plan, time, and date for any utilities is subject to approval by the Owner’s Representative. Communication with the appropriate entity and planning for any scheduled outage/tie-in of utilities shall be the responsibility of the Contractor. Failure of Contractor to comply with the provisions of this Paragraph shall cause Contractor to forfeit any right to an adjustment of the Contract Sum or Contract Time for any postponement, rescheduling or other delays ordered by Owner in connection with such Work. The Contractor shall follow the following procedures for all utility outages/tie-ins or disruption of any building system:

.i All shutting of valves, switches, etc., shall be by the Owner's personnel.
Contractor shall submit its preliminary outage/tie-in schedule with its baseline schedule.

The Contractor shall request an outage/tie-in meeting at least two weeks before the outage/tie-in is required.

The Owner's Representative will schedule an outage/tie-in meeting at least one week prior to the outage/tie-in.

3.4.8 The Contractor shall coordinate all Work so there shall be no prolonged interruption of existing utilities, systems and equipment of Owner. Any existing plumbing, heating, ventilating, air conditioning, or electrical disconnection necessary, which affect portions of this construction or building or any other building, must be scheduled with the Owner's Representative to avoid any disruption of operation within the building under construction or other buildings or utilities. In no case shall utilities be left disconnected at the end of a work day or over a weekend. Any interruption of utilities, either intentionally or accidentally, shall not relieve the Contractor from repairing and restoring the utility to normal service. Repairs and restoration shall be made before the workers responsible for the repair and restoration leave the job.

3.4.9 The Contractor shall be responsible for repair of damage to property on or off the project occurring during construction of project, and all such repairs shall be made to meet code requirements or to the satisfaction of the Owner's Representative if code is not applicable.

3.4.10 The Contractor shall be responsible for all shoring required to protect its work or adjacent property and shall pay for any damage caused by failure to shore or by improper shoring or by failure to give proper notice. Shoring shall be removed only after completion of permanent supports.

3.4.11 The Contractor shall maintain at his own cost and expense, adequate, safe and sufficient walkways, platforms, scaffolds, ladders, hoists and all necessary, proper, and adequate equipment, apparatus, and appliances useful in carrying on the Work and which are necessary to make the place of Work safe and free from avoidable danger for students, faculty, staff, the public and construction personnel, and as may be required by safety provisions of applicable laws, ordinances, rules regulations and building and construction codes.

3.4.12 During the performance of the Work, the Contractor shall be responsible for providing and maintaining warning signs, lights, signal devices, barricades, guard rails, fences, and other devices appropriately located on site which shall give proper and understandable warning to all persons of danger of entry onto land, structure, or equipment, within the limits of the Contractor’s work area.

3.4.13 The Contractor shall pump, bail, or otherwise keep any general excavations free of water. The Contractor shall keep all areas free of water before, during and after concrete placement. The Contractor shall be responsible for protection, including weather protection, and proper maintenance of all equipment and materials installed, or to be installed by him.

3.4.14 The Contractor shall be responsible for care of the Work and must protect same from damage of defacement until acceptance by the Owner. All damaged or defaced Work shall be repaired or replaced to the Owner's satisfaction, without cost to the Owner.

3.4.15 When requested by the Owner's Representative, the Contractor, at no extra charge, shall provide scaffolds or ladders in place as may be required by the Architect or the Owner for examination of Work in progress or completed.

3.4.16 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor’s employees, Subcontractors of any tier and their agents and employees, and any entity or other persons performing portions of the Work.

3.4.17 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner’s Representative or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.4.18 The Contractor shall be responsible for inspection of portions of the Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

3.5 Use of Site

3.5.1 The Contractor shall limit operations and storage of material to the area within the Work limit lines shown on Drawings, except as necessary to connect to exiting utilities, shall not encroach on neighboring property, and shall exercise caution to prevent damage to existing structures.

3.5.2 Only materials and equipment, which are to be used directly in the Work, shall be brought to and stored on the Work site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Work site. Protection of construction materials and equipment stored at the Work site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.
3.5.3 No project signs shall be erected without the written approval of the Owner's Representative.

3.5.4 The Contractor shall ensure that the Work is at all times performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. Particular attention shall be paid to access for emergency vehicles, including fire trucks. Wherever there is the possibility of interfering with normal emergency vehicle operations, Contractor shall obtain permission from both campus and municipal emergency response entities prior to limiting any access. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, Contractor shall not interfere with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work or (2) the Work in the event of partial occupancy. Contractor shall assume full responsibility for any damage to the property comprising the Work or to the owner or occupant of any adjacent land or areas resulting from the performance of the Work.

3.5.5 The Contractor shall not permit any workers to use any existing facilities at the Work site, including, without limitation, lavatories, toilets, entrances, and parking areas other than those designated by Owner. The Contractor, Subcontractors of any tier, suppliers and employees shall comply with instructions or regulations of the Owner’s Representative governing access to, operation of, and conduct while in or on the premises and shall perform all Work required under the Contract Documents in such a manner as not to unreasonably interrupt or interfere with the conduct of Owner’s operations. Any request for Work, a suspension of Work or any other request or directive received by the Contractor from occupants of existing buildings shall be referred to the Owner’s Representative for determination.

3.5.6 The Contractor and the Subcontractor of any tier shall have its’ name, acceptable abbreviation or recognizable logo and the name of the city and state of the mailing address of the principal office of the company, on each motor vehicle and motorized self-propelled piece of equipment which is used in connection with the project. The signs are required on such vehicles during the time the Contractor is working on the project.

3.6 Review of Contract Documents and Field Conditions by Contractor

3.6.1 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Architect and Owner and shall at once report in writing to the Architect and Owner’s Representative any errors, inconsistencies or omissions discovered. If the Contractor performs any construction activity which it knows or should have known involves a recognized error, inconsistency or omission in the Contract Documents without such written notice to the Architect and Owner’s Representative, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

3.6.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported in writing to the Architect and Owner’s Representative within twenty-four (24) hours. During the progress of work, Contractor shall verify all field measurements prior to fabrication of building components or equipment, and proceed with the fabrication to meet field conditions. Contractor shall consult all Contract Documents to determine the exact location of all work and verify spatial relationships of all work. Any question concerning said location or spatial relationships shall be submitted to the Owner's Representative. Specific locations for equipment, pipelines, ductwork and other such items of work, where not dimensioned on plans, shall be determined in consultation with Owner's Representative and Architect. Contractor shall be responsible for the proper fitting of the Work in place.

3.6.3 The Contractor shall provide, at the proper time, such material as required for support of the Work. If openings or chases are required, whether shown on Drawings or not, the Contractor shall see they are properly constructed. If required openings or chases are omitted, the Contractor shall cut them at the Contractors own expense, but only as directed by the Architect, through the Owner Representative.

3.6.4 Should the Contract Documents fail to particularly describe materials or goods to be used, it shall be the duty of the Contractor to inquire of the Architect and the Owner’s Representative what is to be used and to supply it at the Contractor’s expense, or else thereafter replace it to the Owner’s Representative’s satisfaction. At a minimum, the Contractor shall provide the quality of materials as generally specified throughout the Contract Documents.

3.7 Cleaning and Removal

3.7.1 The Contractor shall keep the Work site and surrounding areas free from accumulation of waste materials, rubbish, debris, and dirt resulting from the Work and shall
clean the Work site and surrounding areas as requested by the Architect and the Owner's Representative, including mowing of grass greater than 6 inches high. The Contractor shall be responsible for the cost of clean up and removal of debris from premises. The building and premises shall be kept clean, safe, in a workmanlike manner, and in compliance with OSHA standards at all times. At completion of the Work, the Contractor shall remove from and about the Work site tools, construction equipment, machinery, fencing, and surplus materials. Further, at the completion of the work, all dirt, stains, and smudges shall be removed from every part of the building, all glass in doors and windows shall be washed, and entire Work shall be left broom clean in a finished state ready for occupancy. The Contractor shall advise his Subcontractors of any tier of this provision, and the Contractor shall be fully responsible for leaving the premises in a finished state ready for use to the satisfaction of the Owner's Representative. If the Contractor fails to comply with the provisions of this paragraph, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.8 Cutting and Patching

3.8.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

3.8.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

3.8.3 If the Work involves renovation and/or alteration of existing improvements, Contractor acknowledges that cutting and patching of the Work is essential for the Work to be successfully completed. Contractor shall perform any cutting, altering, patching, and/or fitting of the Work necessary for the Work and the existing improvements to be fully integrated and to present the visual appearance of an entire, completed, and unified project. In performing any Work which requires cutting or patching, Contractor shall use its best efforts to protect and preserve the visual appearance and aesthetics of the Work to the reasonable satisfaction of both the Owner’s Representative and Architect.

3.9 Indemnification

3.9.1 To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, the Architect, Architect’s consultants, and the agents, employees, representatives, insurers and re-insurers of any of the foregoing (hereafter collectively referred to as the “Indemnitees”) from and against claims, damages (including loss of use of the Work itself), punitive damages, penalties and civil fines unless expressly prohibited by law, losses and expenses, including, but not limited to, attorneys’ fees, arising out of or resulting from performance of the Work to the extent caused in whole or in part by negligent acts or omissions or other fault of Contractor, a Subcontractor of any tier, or anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by the negligent acts or omissions or other fault of a party indemnified hereunder. The Contractor’s obligations hereunder are in addition to and shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that the Owner may possess. If one or more of the Indemnitees demand performance by the Contractor of obligations under this paragraph or other provisions of the Contract Documents and if Contractor refuses to assume or perform, or delays in assuming or performing Contractor’s obligations, Contractor shall pay each Indemnitee who has made such demand its respective attorneys’ fees, costs, and other expenses incurred in enforcing this provision. The defense and indemnity required herein shall be a binding obligation upon Contractor whether or not an Indemnitee has made such demand. Even if a defense is successful to a claim or demand for which Contractor is obligated to indemnify the Indemnitees from under this Paragraph, Contractor shall remain liable for all costs of defense.

3.9.2 The indemnity obligations of Contractor under this Section 3.9 shall survive termination of this Contract or final payment thereunder. In the event of any claim or demand made against any party which is entitled to be indemnified hereunder, the Owner may in its sole discretion reserve, return or apply any monies due or to become due the Contractor under the Contract for the purpose of resolving such claims; provided, however, that the Owner may release such funds if the Contractor provides the Owner with reasonable assurance of protection of the Owner’s interests. The Owner shall in its sole discretion determine if such assurances are reasonable. Owner reserves the right to control the defense and settlement of any claim, action or proceeding which Contractor has an obligation to indemnify the Indemnitees against under Paragraph 3.9.1.

3.9.3 In claims against any person or entity indemnified under this Section 3.9 by an employee of the Contractor, a Subcontractor of any tier, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section 3.9 shall not be limited by a limitation on amount or type of
damages, compensation or benefits payable by or for the Contractor or a Subcontractor of any tier under workers’ or workmen’s compensation acts, disability benefit acts or other employee benefit acts.

3.9.4 The obligations of the Contractor under Paragraph 3.9.1 shall not extend to the liability of the Architect, his agents or employees, arising out of the preparation and approval of maps, drawings, opinions, reports, surveys, Change Orders, designs, or Specifications.

3.10 Patents
3.10.1 The Contractor shall hold and save harmless the Owner and its officers, agents, servants, and employees from liability of any nature or kind, including cost and expense, for, or on account of, any patented or otherwise protected invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Owner, unless otherwise specifically stipulated in the Contract Documents.

3.10.2 If the Contractor uses any design, device, or material covered by letters patent or copyright, he shall provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device, or material. It is mutually agreed and understood, without exception, that the Contract Sum includes and the Contractor shall pay all royalties, license fees or costs arising from the use of such design, device, or material in any way involved in the Work. The Contractor and/or sureties shall indemnify and save harmless the Owner from any and all claims for infringement by reason of the use of such patented or copyrighted design, device, or material or any trademark or copyright in connection with Work agreed to be performed under this Contract and shall indemnify the Owner for any cost, expense, or damage it may be obligated to pay by reason of such infringement at any time during the prosecution of the Work or after completion of the Work.

3.11 Materials, Labor, and Workmanship
3.11.1 Materials and equipment incorporated into the Work shall strictly conform to the Contract Documents and representations and approved Samples provided by Contractor and shall be of the most suitable grade of their respective kinds for their respective uses, and shall be fit and sufficient for the purpose intended, merchantable, of good new material and workmanship, and free from defect. Workmanship shall be in accordance with the highest standard in the industry and free from defect in strict accordance with the Contract Documents.

3.11.2 Materials and fixtures shall be new and of latest design unless otherwise specified, and shall provide the most efficient operating and maintenance costs to the Owner. All Work shall be performed by competent workers and shall be of best quality.

3.11.3 The Contractor shall carefully examine the Contract Documents and shall be responsible for the proper fitting of his material, equipment, and apparatus into the building.

3.11.4 The Contractor shall base his bid only on the Contract Documents.

3.11.5 Materials and workmanship shall be subject to inspection, examination, and test by the Architect and the Owner's Representative at any and all times during manufacture, installation, and construction of any of them, at places where such manufacture, installation, or construction is performed.

3.11.6 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.11.7 Unless otherwise specifically noted, the Contractor shall provide and pay for supervision, 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.

3.11.8 Substitutions
3.11.8.1 A substitution is a Contractor proposal of an alternate product or method in lieu of has been specified or shown in the Contract Documents, which is not an “or equal” as set forth in Section 3.12.1.

3.11.8.2 Contractor may make a proposal to the Architect and the Owner’s Representative to use substitute products or methods as set forth herein, but the Architect's and the Owner’s Representative’s decision concerning acceptance of a substitute shall be final. The Contractor must do so in writing and setting forth the following:

.1 Full explanation of the proposed substitution and submittal of all supporting data including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other like information necessary for a complete evaluation of the substitution.

.2 Reasons the substitution is advantageous and necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable.

.3 The adjustment, if any, in the Contract Sum, in the event the substitution is acceptable.

.4 The adjustment, if any, in the time of completion of the Contract and the construction schedule in the event the substitution is acceptable.

.5 An affidavit stating that (a) the proposed substitution conforms to and meets all of the
Contract Documents, except as specifically disclosed and set forth in the affidavit and (b) the Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect. Proposals for substitutions shall be submitted to the Architect and Owner’s Representative in sufficient time to allow the Architect and Owner’s Representative no less than ten (10) working days for review. No substitution will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated herein.

3.11.8.3 Substitutions may be rejected without explanation in Owner’s sole discretion and will be considered only under one or more of the following conditions:

1. Required for compliance with interpretation of code requirements or insurance regulations then existing;
2. Unavailability of specified products, through no fault of the Contractor;
3. Material delivered fails to comply with the Contract Documents;
4. Subsequent information discloses inability of specified products to perform properly or to fit in designated space;
5. Manufacturer/fabricator refuses to certify or guarantee performance of specified product as required; or
6. When in the judgment of the Owner or the Architect, a substitution would be substantially to the Owner's best interests, in terms of cost, time, or other considerations.

3.11.8.4 Whether or not any proposed substitution is accepted by the Owner or the Architect, the Contractor shall reimburse the Owner for any fees charged by the Architect or other consultants for evaluating each proposed substitute.

3.12 Approved Equal

3.12.1 Whenever in the Contract Documents any article, appliance, device, or material is designated by the name of a manufacturer, vendor, or by any proprietary or trade name, the words "or approved equal," shall automatically follow and shall be implied unless specifically indicated otherwise. The standard products of manufacturers other than those specified will be accepted when, prior to the ordering or use thereof, it is proven to the satisfaction of the Owner’s Representative and the Architect they are equal in design, appearance, spare parts availability, strength, durability, usefulness, serviceability, operation cost, maintenance cost, and convenience for the purpose intended. Any general listings of approved manufacturers in any Contract Document shall be for informational purposes only and it shall be the Contractor’s sole responsibility to ensure that any proposed “or equal” complies with the requirements of the Contract Documents.

3.12.2 The Contractor shall submit to Architect and Owner’s Representative a written and full description of the proposed “or equal” including all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and similar information demonstrating that the proposed “or equal” strictly complies with the Contract Documents. The Architect or Owner’s Representative shall take appropriate action with respect to the submission of a proposed “or equal” item. If Contractor fails to submit proposed “or equals” as set forth herein, it shall waive any right to supply such items. The Contract Sum and Contract Time shall not be adjusted as a result of any failure by Contractor to submit proposed “or equals” as provided for herein. All documents submitted in connection with preparing an “or equal” shall be clearly and obviously marked as a proposed “or equal” submission.

3.12.3 No approvals or action taken by the Architect or Owner’s Representative shall relieve Contractor from its obligation to ensure that an “or equal” article, appliance, devise or material strictly complies with the requirements of the Contract Documents. Contractor shall not propose “or equal” items in connection with Shop Drawings or other Submittals, and Contractor acknowledges and agrees that no approvals or action taken by the Architect or Owner’s Representative with respect to Shop Drawings or other Submittals shall constitute approval of any “or equal” item or relieve Contractor from its sole and exclusive responsibility. Any changes required in the details and dimensions indicated in the Contract Documents for the incorporation or installation of any “or equal” item supplied by the Contractor shall be properly made and approved by the Architect at the expense of the Contractor. No ‘or equal’ items will be permitted for components of or extensions to existing systems when, in the opinion of the Architect, the named manufacturer must be provided in order to ensure compatibility with the existing systems, including, but not limited to, mechanical systems, electrical systems, fire alarms, smoke detectors, etc. No action will be taken by the Architect with respect to proposed “or equal” items prior to receipt of bids, unless otherwise noted in the Special Conditions.

3.13 Shop Drawings, Product Data, Samples, and Coordination Drawings/BIM Models

3.13.1 Shop Drawings are drawings, diagrams, schedules and other data specifically prepared for the Work by the Contractor or a Subcontractor, sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
3.13.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

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

3.13.4 Coordination Drawings are drawings for the integration of the Work, including work first shown in detail on shop drawings or product data. Coordination drawings show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided, or function as indicated. Coordination Drawings are the responsibility of the contractor and are submitted for informational purposes. The Special Conditions will state whether coordination drawings are required. BIM models may be used for coordination in lieu of coordination drawings at the contractor’s discretion, unless required in the Special Conditions. The final coordination drawings/BIM Model will not change the contract documents, unless approved by a fully executed change order describing the specific modifications that are being made to the contract documents.

3.13.5 Shop Drawings, Coordination Drawings/BIM Models, Product Data, Samples and similar submittals (collectively referred to as “Submittals”) are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

3.13.6 The Contractor shall schedule submittal of Shop Drawings and Product Data to the Architect so that no delays will result in delivery of materials and equipment, advising the Architect of priority for checking of Shop Drawings and Product Data, but a minimum of two weeks shall be provided for this purpose. Because time is of the essence in this contract, unless noted otherwise in the Special Conditions or Technical Specifications, all submittals, shop drawings and samples must be submitted as required to maintain the contractor’s plan for proceeding, but must be submitted within 90 days of the Notice To Proceed. If Contractor believes that this milestone is unreasonable for any submittal, Contractor shall request an extension of this milestone, within 60 days of Notice To Proceed, for each submittal that cannot meet the milestone. The request shall contain a reasonable explanation as to why the 90 day milestone is unrealistic, and shall specify a date on which the submittal will be transmitted, for approval by the Owner’s Representative. Failure of the Contractor to comply with this section may result in delays in the submittal approval process and/or charges for expediting approval, both of which will be the responsibility of the Contractor.

3.13.7 The Contractor, at its own expense, shall submit Samples required by the Contract Documents with reasonable promptness as to cause no delay in the Work or the activities of separate contractors and no later than twenty (20) days before materials are required to be ordered for scheduled delivery to the Work site. Samples shall be labeled to designate material or products represented, grade, place of origin, name of producer, name of Contractor and the name and number of the Owner’s project. Quantities of Samples shall be twice the number required for testing so that Architect can return one set of the Samples. Materials delivered before receipt of Architect’s approval may be rejected by Architect and in such event, Contractor shall immediately remove all such materials from the Work site. When requested by Architect or Owner’s Representative, samples of finished masonry and field applied paints and finishes shall be located as directed and shall include sample panels built at the site of approximately twenty (20) square feet each.

3.13.8 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect. Such Work shall be in accordance with approved submittals.

3.13.9 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents such Submittals strictly comply with the requirements of the Contract Documents and that the Contractor has determined and verified field measurements and field construction criteria related thereto, that materials are fit for their intended use and that the fabrication, shipping, handling, storage, assembly and installation of all materials, systems and equipment are in accordance with best practices in the industry and are in strict compliance with any applicable requirements of the Contract Documents. Contractor shall also coordinate each Submittal with other Submittals.

3.13.10 Contractor shall be responsible for the correctness and accuracy of the dimensions, measurements and other information contained in the Submittals.

3.13.11 Each Submittal will bear a stamp or specific indication that the Submittal complies with the Contract Documents and Contractor has satisfied its obligations under the Contract Documents with respect to Contractor’s review and approval of that Submittal. Each Submittal shall bear the signature of the representative of Contractor who approved the Submittal, together with the Contractor’s name, Owner’s name, number of the Project, and the item name and specification section number.

3.13.12 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect’s approval of Shop Drawings, Product Data,
Samples or similar submittals. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof. Specifically, but not by way of limitation, Contractor acknowledges that Architect's approval of Shop Drawings shall not relieve Contractor for responsibility for errors and omissions in the Shop Drawings since Contractor is responsible for the correctness of dimensions, details and the design of adequate connections and details contained in the Shop Drawings.

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

3.13.14 The Contractor represents and warrants that all Shop Drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the Shop Drawing is prepared and, if required by the Architect or applicable Laws, by a licensed engineer or other design professional.

3.14 Record Drawings

3.14.1 The Contractor shall maintain a set of Record Drawings on site in good condition and shall use colored pencils to mark up said set with "record information" in a legible manner to show: (1) bidding addendums, (2) executed change orders, (3) deviations from the Drawings made during construction; (4) details in the Work not previously shown; (5) changes to existing conditions or existing conditions found to differ from those shown on any existing drawings; (6) the actual installed position of equipment, piping, conduits, light switches, electric fixtures, circuiting, ducts, dampers, access panels, control valves, drains, openings, and stub-outs; and (7) such other information as either Owner or Architect may reasonably request. The prints for Record Drawing use will be a set of "blue line" prints provided by Architect to Contractor at the start of construction. Upon Substantial Completion of the Work, Contractor shall deliver all Record Drawings to Owner and Architect for approval. If not approved, Contractor shall make the revisions requested by Architect or Owner's Representative. Final payment and any retainage shall not be due and owing to Contractor until the final Record Drawings marked by Contractor as required above are delivered to Owner.

3.15 Operating Instructions and Service Manuals

3.15.1 The Contractor shall submit four (4) volumes of operating instructions and service manuals to the Architect before completing 50% of the adjusted contract amount. Payments beyond 50% of the adjusted contract amount may be withheld until all operating instructions and service manuals are received. The operating instructions and service manuals shall contain:

.1 Start-up and Shutdown Procedures: Provide a step-by-step write up of all major equipment. When manufacturer's printed start-up, trouble shooting and shut-down procedures are available, they may be incorporated into the operating manual for reference.

.2 Operating Instructions: Written operating instructions shall be included for the efficient and safe operation of all equipment.

.3 Equipment List: List of all major equipment as installed shall include model number, capacities, flow rate, and name-plate data.

.4 Service Instructions: The Contractor shall be required to provide the following information for all pieces of equipment.

(a) Recommended spare parts including catalog number and name of local suppliers or factory representative.

(b) Belt sizes, types, and lengths.

(c) Wiring diagrams.

.5 Manufacturer's Certificate of Warranty: Manufacturer's certificates of warranty shall be obtained for all major equipment. Warranty shall be obtained for at least one year from the date of Substantial Completion. Where longer period is required by the Contract Documents, the longer period shall govern.

.6 Parts catalogs: For each piece of equipment furnished, a parts catalog or similar document shall be provided which identifies the components by number for replacement ordering.

3.15.2 Submission

.1 Manuals shall be bound into volumes of standard 8 1/2" x 11" hard binders. Large drawings too bulky to be folded into 8 1/2" x 11" shall be separately bound or folded and in brown envelopes, cross-referenced and indexed with the manuals.

.2 The manuals shall identify the Owner's project name, project number, and include the name and address of the Contractor and major Subcontractors of any tier who were involved with the activity described in that particular manual.

3.16 Taxes

3.16.1 The Contractor shall pay all applicable sales, consumer, use, and similar taxes for the Work which are legally enacted when the bids are received, whether or not yet effective or scheduled to go into effect. However, certain purchases by the Contractor of materials incorporated in or consumed in the Work are exempt from certain sales tax pursuant to RSMo § 144.062. The Contractor shall be issued a Project Tax Exemption Certificate for this Work to obtain the benefits of RSMo § 144.062.

3.16.2 The Contractor shall furnish this certificate to all subcontractors, and any person or entity purchasing materials
for the Work shall present such certificate to all material suppliers as authorization to purchase, on behalf of the Owner, all tangible personal property and materials to be incorporated into or consumed in the Work and no other on a tax-exempt basis. Such suppliers shall provide to the purchasing party invoices bearing the name of the exempt entity and the project identification number. Nothing in this section shall be deemed to exempt from any sales or similar tax the purchase of any construction machinery, equipment or tools used in construction, repairing or remodeling facilities for the Owner. All invoices for all personal property and materials purchased under a Project Tax Exemption Certificate shall be retained by the Contractor for a period of five years and shall be subject to audit by the Director of Revenue.

3.16.3 Any excess resalable tangible personal property or materials which were purchased for the project under this Project Tax Exemption Certificate but which were not incorporated into or consumed in the Work shall either be returned to the supplier for credit or the appropriate sales or use tax on such excess property or materials shall be reported on a return and paid by such purchasing party not later than the due date of the purchasing party’s Missouri sales or use tax return following the month in which it was determined that the materials were not used in the Work.

3.16.4 If it is determined that sales tax is owed by the Contractor on property and materials due to the failure of the Owner to revise the certificate expiration date to cover the applicable date of purchase, Owner shall be liable for the tax owed.

3.16.5 The Owner shall not be responsible for any tax liability due to Contractor’s neglect to make timely orders, payments, etc. or Contractor’s misuse of the Project Tax Exemption Certificate. Contractor represents that the Project Tax Exemption Certificate shall be used in accordance with RSMo § 144.062 and the terms of the Project Tax Exemption Certificate. Contractor shall indemnify the Owner for any loss or expense, including but not limited to, reasonable attorneys’ fees, arising out of Contractor’s use of the Project Tax Exemption Certificate.

3.17 Contractor’s Construction Schedules

3.17.1 The Contractor, within fifteen (15) days after the issuance of the Notice to Proceed, shall prepare and submit for the Owner's and Architect's information Contractor's construction schedule for the Work and shall set forth interim dates for completion of various components of the Work and Work Milestone Dates as defined herein. The schedule shall not exceed time limits current under the Contract Documents, shall be revised on a monthly basis or as requested by the Owner’s Representative as required by the conditions of the Work, and shall provide for expeditious and practicable execution of the Work. The Contractor shall conform to the most recent schedule.

3.17.2 The construction schedule shall be in a detailed format satisfactory to the Owner’s Representative and the Architect and in accordance with the detailed schedule requirements set forth in this document and the Special Conditions. If the Owner’s Representative or Architect has a reasonable objection to the schedule submitted by Contractor, the construction schedule shall be promptly revised by the Contractor. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays.

3.17.3 As time is of the essence to this contract, the University expects that the Contractor will take all necessary steps to ensure that the project construction schedule shall be prepared in accordance with the specific requirements of the Special Conditions to this contract. At a minimum, contractor shall comply with the following:

1. The schedule shall be prepared using Primavera P3, Oracle P6, Microsoft Project or other software acceptable to the Owner’s Representative.
2. The schedule shall be prepared and maintained in CPM format, in accordance with Construction CPM Scheduling, published by the Associated General Contractors of American (AGC).
3. Prior to submittal to the Owner’s Representative for review, Contractor shall obtain full buy-in to the schedule from all major subcontractors, in writing if so requested by Owner’s Representative.
4. Schedule shall be updated, in accordance with Construction CPM Scheduling, published by the AGC, on a monthly basis at minimum, prior to, and submitted with, the monthly pay application or as requested by the Owner’s Representative.
5. Along with the update the Contractor shall submit a narrative report addressing all changes, delays and impacts, including weather to the schedule during the last month, and explain how the end date has been impacted by same.
6. The submission of the updated certifies that all delays and impacts that have occurred on or to the project during the previous month have been factored into the update and are fully integrated into the schedule and the projected completion date.

Failure to comply with any of these requirements will be considered a material breach of this contract. See Special Conditions for detailed scheduling requirements.

3.17.4 In the event the Owner’s Representative or Architect determines that the performance of the Work, as of a Milestone Date, has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the
right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime, (2) supplying additional manpower, equipment, facilities, (3) expediting delivery of materials, and (4) other similar measures (hereinafter referred to collectively as Extraordinary Measures). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule. The Contractor shall not be entitled to an adjustment in the Contract Sum concerning Extraordinary Measures required by the Owner under or pursuant to this Paragraph 3.17.3. The Owner may exercise the rights furnished the Owner under or pursuant to this Paragraph 3.17.3 as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with any Milestone Date or completion date set forth in the Contract Documents.

ARTICLE 4
ADMINISTRATION OF THE CONTRACT

4.1 Rights of the Owner
4.1.1 The Owner's Representative will administer the Construction Contract. The Architect will assist the Owner's Representative with the administration of the Contract as indicated in these Contract Documents.

4.1.2 If, in the judgment of the Owner's Representative, it becomes necessary to accelerate the work, the Contractor, when directed by the Owner's Representative in writing, shall cease work at any point and transfer its workers to such point or points and execute such portions of the work as may be required to enable others to hasten and properly engage and carry out the work, all as directed by the Owner's Representative. The additional cost of accelerating the work, if any, will be borne by the Owner, unless the Contractor's work progress is behind schedule as shown on the most recent progress schedule.

4.1.3 If the Contractor refuses, for any reason, to proceed with what the Owner believes to be contract work, the Owner may issue a Construction Directive, directing the Contractor to proceed. Contractor shall be obligated to promptly proceed with this work. If Contractor feels that it is entitled to additional compensation for this work, it may file a claim for additional compensation and/or time, in accordance with 4.4 of this document.

4.1.4 The Owner's Representative, may, by written notice, require a Contractor to remove from involvement with the Work, any of Contractor’s personnel or the personnel of its Subcontractors of any tier whom the Owner's Representative may deem abusive, incompetent, careless, or a hindrance to proper and timely execution of the Work. The Contractor shall comply with such notice promptly, but without detriment to the Work or its progress.

4.1.5 The Owner's Representative will schedule Work status meetings that shall be attended by representatives of the Contractor and appropriate Subcontractors of any tier. Material suppliers shall attend status meetings if required by the Owner's Representative. These meetings shall include preconstruction meetings.

4.1.6 The Owner does not allow smoking on University property.

4.2 Rights of the Architect
4.2.1 The Architect will interpret requirements of the Contract Documents with respect to the quality, quantity and other technical requirements of the Work itself within a reasonable time after written request of the Contractor. Contractor shall provide Owner’s Representative a copy of such written request.

4.3 Review of the Work
4.3.1 The Architect and the Owner's Representative shall, at all times, have access to the Work; and the Contractor shall provide proper and safe facilities for such access.

4.3.2 The Owner’s Representative shall have authority to reject Work that does not strictly comply with the requirements of the Contract Documents. Whenever the Owner’s Representative considers it necessary or advisable for implementation of the intent of the Contract Documents, Owner’s Representative shall have the authority to require additional inspection or testing of the Work, whether or not such Work is fabricated, installed or completed.

4.3.3 The fact that the Architect or the Owner's Representative observed, or failed to observe, faulty Work, or Work done which is not in accordance with the Contract Documents, regardless of whether or not the Owner has released final payment, shall not relieve the Contractor from responsibility for all damages and additional costs of the Owner as a result of defective or faulty Work.

4.4 Claims
4.4.1 A Claim is a demand or assertion by Contractor seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or any other relief with respect to the terms of the Contract. The term "Claim(s)" also includes demands and assertions of Contractor arising out of or relating to the Contract Documents, including Claims based upon breach of contract, mistake, misrepresentation, or other cause for Contract Modification or
Claims must be made by written notice. Contractor shall have the responsibility to substantiate Claims.

4.4.2 Claims by Contractor must be made promptly, and no later than within fourteen (14) days after occurrence of the event giving rise to such Claim. Claims must be made by written notice. Such notice shall include a detailed statement setting forth all reasons for the Claim and the amount of additional money and additional time claimed by Contractor. The notice of Claims shall also strictly comply with all other provisions of the Contract Documents. Contractor shall not be entitled to rely upon any grounds or basis for additional money on additional time not specifically set forth in the notice of Claim. All Claims not made in the manner provided herein shall be deemed waived and of no effect. Contractor shall furnish the Owner and Architect such timely written notice of any Claim provided for herein, including, without limitation, those in connection with alleged concealed or unknown conditions, and shall cooperate with the Owner and Architect in any effort to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition which is the cause of such a Claim.

4.4.3 Pending final resolution of a Claim, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments that are not in dispute in accordance with the Contract Documents.

4.5 Claims for Concealed or Unknown Conditions

4.5.1 If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the Contractor shall be given to the Owner's Representative promptly before conditions are disturbed, and in no event later than three (3) days after first observance of the conditions. The Owner's Representative will promptly investigate such conditions. If such conditions differ materially, as provided for above and cause an increase or decrease in the Contractor’s cost, or time, required for performance of the Work, an equitable adjustment in the Contract sum or Contract Time, or both, shall be made, subject to the provisions and restrictions set for herein. If the Owner's Representative determines that the conditions at the site are not materially different from those indicated in the Contract Documents, and that no change in the terms of the Contract is justified, the Owner's Representative will so notify the Contractor in writing. If the Contractor disputes the finding of the Owner’s Representative that no change in the terms of the Contract terms is justified, Contractor shall proceed with the Work, taking whatever steps are necessary to overcome or correct such conditions so that Contractor can proceed in a timely manner. The Contractor may have the right to file a Claim in accordance with the Contract Documents.

4.5.2 It is expressly agreed that no adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews and preconstruction investigations for the Project, or (2) inspections, tests, reviews and preconstruction inspections which the Contractor had the opportunity to make or should have performed in connection with the Project.

4.6 Claim for Additional Cost

4.6.1 If the Contractor makes a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. In addition to all other requirements for notice of a Claim, said notice shall detail and itemize the amount of all Claims and shall contain sufficient data to permit evaluation of same by Owner.

4.7 Claims for Additional Time

4.7.1 If the Contractor makes a Claim for an increase in the Contract Time, written notice as provided herein shall be given. In addition to other requirements for notice of a Claim, Contractor shall include an estimate of the probable effect of delay upon the progress of the Work, utilizing a CPM Time Impact Schedule Analysis, (TIA) as defined in the AGC Scheduling Manual. In the case of a continuing delay, only one Claim is necessary.

.1 Time extensions will be considered for excusable delays only. That is, delays that are beyond the control and/or contractual responsibility of the contractor.

4.7.2 If weather days are the basis for a Claim for additional time, such Claim shall be documented by the Contractor by data acceptable to the Owner's Representative substantiating that weather conditions for the period of time in question, had an adverse effect on the critical path of the scheduled construction. Weather days shall be defined as days on which critical path work cannot proceed due to weather conditions (including but not limited to rain, snow, etc.), in excess of the number of days shown on the Anticipated Weather Day schedule in the Special Conditions. To be considered a weather day, at least four hours must be lost due to the weather conditions on a critical path scope item for that day. Weather days and Anticipated weather days listed in the Special Conditions shall only apply to Monday through Friday. A weather day claim cannot be made for Saturdays, Sundays, New Year’s Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving Day and
for time extensions due to changes or other events beyond in conjunction with the monthly application for payment. with the submission of the Contractor's updated schedule, the control of the Contractor on a monthly basis only, is submitted in accordance with the contract requirements. The Owner will consider and evaluate requests from the Contractor that delay to the critical path of the project, the Owner will if any other Force Majeure event results in the delay to the critical path of the project, the Owner will consider a time extension request from the Contractor that is submitted in accordance with the contract requirements. The Owner will consider and evaluate requests for time extensions due to changes or other events beyond the control of the Contractor on a monthly basis only, with the submission of the Contractor’s updated schedule, in conjunction with the monthly application for payment.

4.8 Resolution of Claims and Disputes

4.8.1 The Owner's Representative will review Claims and take one or more of the following preliminary actions within ten days of receipt of a Claim: (1) request additional supporting data from the Contractor, (2) reject the Claim in whole or in part, (3) approve the Claim, or (4) suggest a compromise.

4.8.2 If a Claim has not been resolved, the Contractor shall, within ten days after the Owner's Representative's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested, (2) modify the initial Claim, or (3) notify the Owner's Representative that the initial Claim stands.

4.8.3 If a Claim has not been resolved after consideration of the foregoing and of further information presented by the Contractor, the Contractor has the right to seek administrative review as set forth in Section 4.9. However, Owner’s Representative’s decisions on matters relating to aesthetics will be final.

4.9 Administrative Review

4.9.1 Claims not resolved pursuant to the procedures set forth in the Contract Documents except with respect to Owner’s Representative’s decision on matters relating to aesthetic effect, and except for claims which have been waived by the making or acceptance of final payment, or the Contractor's acceptance of payments in full for changes in work may be submitted to administrative review as provided in this section. All requests for administrative review shall be made in writing.

4.9.2 Upon written request from the Contractor, the Owner’s Review Administrator authorized by the Campus Contracting Officer will convene a review meeting between the Contractor and Owner’s Representative’s within fifteen (15) days of receipt of such written request. The Contractor and Owner’s Representative will be allowed to present written documentation with respect to the claim(s) before or during the meeting. The Contractor and Owner’s Representative will be allowed to present the testimony of any knowledgeable person regarding the claim at the review meeting. The Owner’s Review Administrator will issue a written summary of the review meeting and decision to resolve the Claim within fifteen (15) days. If the Contractor is in agreement with the decision the Contractor shall notify the Owner’s Review Administrator in writing within five (5) days, and appropriate documentation will be signed by the parties to resolve the Claim.

4.9.3 If the Contractor is not in agreement with the proposal of the Owner’s Review Administrator as to the resolution of the claim, the Contractor may file a written appeal with the UM System Contracting Officer, [in care of the Director of Facilities Planning and Development,
University of Missouri, 109 Old Alumni Centers, University of Missouri, Columbia, Missouri 65211] within fifteen (15) days after receipt of the Owner’s Review Administrator’s proposal. The UM System Contracting Officer will call a meeting of the Contractor, the Owner’s Representative, and the Owner’s Review Administrator by written notice, within thirty (30) days after receipt of the Contractor's written appeal. The Owner’s Review Administrator shall provide the UM System Contracting Officer with a copy of the written decision and summary of the review meeting, the Contractor's corrections or comments regarding the summary of the review meeting, and any written documentation presented by the Contractor and the Owner’s Representative at the initial review meeting. The parties may present further documentation and/or present the testimony of any knowledgeable person regarding the claim at the meeting called by the UM System Contracting Officer.

4.9.4 The UM System Contracting Officer will issue a written decision to resolve the claim within fifteen (15) days after the meeting. If the Contractor is in agreement with the UM System Contracting Officer's proposal, the Contractor shall notify the UM System Contracting Officer in writing within five (5) days, and the Contractor and the Owner shall sign appropriate documents. The issuance of the UM System Contracting Officer's written proposal shall conclude the administrative review process even if the Contractor is not in agreement. However, proposals and any opinions expressed in such proposals issued under this section will not be binding on the Contractor nor will the decisions or any opinions expressed be admissible in any legal actions arising from the Claim and will not be deemed to remove any right or remedy of the Contractor as may otherwise exist by virtue of Contract Documents or law. Contractor and Owner agree that the Missouri Circuit Court for the County where the Work is located shall have exclusive jurisdiction to determine all issues between them. Contractor agrees not to file any complaint, petition, lawsuit or legal proceeding against Owner except with such Missouri Circuit Court.

ARTICLE 5
SUBCONTRACTORS

5.1 Award of Subcontracts

5.1.1 Pursuant to Article 9, the Contractor shall furnish the Owner and the Architect, in writing, with the name, and trade for each Subcontractor and the names of all persons or entities proposed as manufacturers of products, materials and equipment identified in the Contract Documents and where applicable, the name of the installing contractor. The Owner’s Representative will reply to the Contractor in writing if the Owner has reasonable objection to any such proposed person or entity. The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection.

5.1.2 The Contractor may request to change a subcontractor. Any such request shall be made in writing to the Owner’s Representative. The Contractor shall not change a Subcontractor, person, or entity previously disclosed if the Owner makes reasonable objection to such change.

5.1.3 The Contractor shall be responsible to the Owner for acts, defaults, and omissions of its Subcontractors of any tier.

5.2 Subcontractual Relations

5.2.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor of any tier, to the extent of the Work to be performed by the Subcontractor of any tier, to be bound to the Contractor by 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 Architect. Each subcontract agreement of any tier shall preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor of any tier so that subcontracting thereof will not prejudice such rights and shall allow to the Subcontractor of any tier, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with its sub-subcontractors. The Contractor shall make available to each proposed Subcontractor of any tier, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor of any tier shall be bound Subcontractors of any tier shall similarly make copies of applicable portions of such documents available to their respective proposed Subcontractors of any tier.

5.2.2 All agreements between the Contractor and a Subcontractor or supplier shall contain provisions whereby Subcontractor or supplier waives all rights against the Owner, contractor, Owner’s representative, Architect and all other additional insureds for all losses and damages caused by, arising out of, or resulting from any of the perils covered by property or builders risk insurance coverage required of the Contractor in the Contract Documents. If Contractor fails to include said provisions in all subcontracts, Contractor shall indemnify, defend and hold all the above entities harmless in the event of any legal action by Subcontractor or supplier. If insureds on any such policies require separate
waiver forms to be signed by any Subcontractors of any tier or suppliers, Contractor shall obtain the same.

5.3 Contingent Assignment of Subcontract

5.3.1 No assignment by the Contractor of any amount or any part of the Contract or of the funds to be received thereunder will be recognized unless such assignment has had the written approval of the Owner, and the surety has been given due notice of such assignment and has furnished written consent hereto. In addition to the usual recitals in assignment Contracts, the following language must be set forth: “it is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor of the contract and to claims and to liens for services rendered or materials supplied for the performance of the Work called for in said contract in favor of all persons, firms or corporations rendering such services or supplying such materials.

ARTICLE 6
SEPARATE CONTRACTS AND COOPERATION

6.1 The Owner reserves the right to let other contracts in connection with the Work.

6.2 It shall be the duty of each Contractor to whom Work may be awarded, as well as all Subcontractors of any tier employed by them, to communicate immediately with each other in order to schedule Work, locate storage facilities, etc., in a manner that will permit all Contractors to work in harmony in order that Work may be completed in the manner and within the time specified in the Contract Documents.

6.3 No Contractor shall delay another Contractor by neglecting to perform his work at the proper time. Each Contractor shall be required to coordinate his work with other Contractors to afford others reasonable opportunity for execution of their work. Any costs caused by defective or ill-timed work, including actual damages and liquidated damages for delay, if applicable, shall be borne by the Contractor responsible therefor.

6.4 Each Contractor shall be responsible for damage to Owner's or other Contractor's property done by him or persons in his employ, through his or their fault or negligence. If any Contractor shall cause damage to any other Contractor, the Contractor causing such damage shall upon notice of any claim, settle with such Contractor.

6.5 The Contractor shall not claim from the Owner money damages or extra compensation under this Contract when delayed in initiating or completing his performance hereunder, when the delay is caused by labor disputes, acts of God, or the failure of any other Contractor to complete his performance under any Contract with the Owner, where any such cause is beyond the Owner's reasonable control.

6.6 Progress schedule of the Contractor for the Work shall be submitted to other Contractors as necessary to permit coordinating their progress schedules.

6.7 If Contractors or Subcontractors of any tier refuse to cooperate with the instructions and reasonable requests of other contractors performing work for the Owner under separate contract, in the overall coordinating of the Work, the Owner's Representative may take such appropriate action and issue such instructions as in his judgement may be required to avoid unnecessary and unwarranted delay.

ARTICLE 7
CHANGES IN THE WORK

7.1 CHANGE ORDERS

7.1.1 A change order is a written instrument prepared by the Owner and signed by the Owner and Contractor formalizing their agreement on the following:

.1 a change in the Work
.2 the amount of an adjustment, if any, in the Contract amount
.3 an adjustment, if any, in the Contract time

7.1.2 The Owner may at any time, order additions, deletions, or revisions in the Work by a Change Order or a Construction Change Directive. Such Change Order or Construction Change Directive shall not invalidate the Contract and requires no notice to the surety. Upon receipt of any such document, or written authorization from the Owner’s Representative directing the Contractor to proceed pending receipt of the document, Contractor shall promptly proceed with the Work involved in accordance with the terms set forth therein.

7.1.3 Until such time as the change order is formalized and signed by both the Owner and the Contractor it shall be considered a Change Order Request.

7.1.4 The amount of adjustment in the contract price for authorized Change Orders will be agreed upon before such Change Orders becomes effective and will be determined as follows:

.1 By a lump sum proposal from the Contractor and the Subcontractors of any tier, including overhead and profit.
.2 By a time and material basis with or without a specified maximum. The Contractor shall submit to the Owner’s Representative itemized time and material sheets depicting labor, materials, equipment utilized in completing the Work on a daily basis for the Owner's Representative approval. If this pricing option is utilized, the
Contractor may be required to submit weekly reports summarizing costs to date on time and material change orders not yet finalized.

3. By unit prices contained in the Contractor's original bid and incorporated in the Construction Contract or subsequently agreed upon. Such unit prices contained in the Contractor's original proposal are understood to include the Contractor's overhead and profit. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order that application of such unit prices to quantities of the Work proposed will cause substantial inequity to the Owner or to the Contractor, the applicable unit prices shall be equitably adjusted.

7.1.5 The Contractor shall submit all fully documented change order requests with corresponding back-up documentation within the time requested by the Owner but no later than fourteen (14) working days following 1.) the Owner’s request for change order pricing in the case of a lump sum; or 2.) the completion of unit price or time and material work.

7.1.6 The Contractor shall submit change order requests in sufficient detail to allow evaluation by the Owner. Such requests shall be fully itemized by units of labor, material and equipment and overhead and profit. Such breakdowns shall be itemized as follows:

1. Labor: The Contractor's proposal shall include breakdowns by labor, by trade, indicating number of hours and cost per hour for each Subcontractor as applicable. Such breakdowns shall only include employees in the direct employ of Contractor or Subcontractors in the performance of the Work. Such employees shall only include laborers at the site, mechanics, craftsmen and foremen. Payroll cost shall include base rate salaries and wages plus the cost of fringe benefits required by agreement or custom and social security contributions, unemployment, payroll taxes and workers' or workmen's compensation insurance and other customary and legally required taxes paid by the Contractor or Subcontractors. Any item or expense outside of these categories is not allowed. The expense of performing Work after regular working hours, on Saturdays, Sundays or legal holidays shall not be included in the above, unless approved in writing and in advance by Owner.

2. Material, supplies, consumables and equipment to be incorporated into the Work at actual invoice cost to the Contractor or Subcontractors; breakdowns showing all material, installed equipment and consumables fully itemized with number of units installed and cost per unit extended. Any singular item or items in aggregate greater than one thousand dollars ($1,000) in cost shall be supported with supplier invoices at the request of the Owner's Representative. Normal hand tools are not compensable.

3. Equipment: Breakdown for required equipment shall itemize (at a minimum) delivery / pick-up charge, hourly rate and hours used. Operator hours and rate shall not be included in the equipment breakdown. Contractor must use the most cost effective equipment available in the area and should not exceed the rates listed in the Rental Rate Blue Book for Construction Equipment (Blue Book). Contractor shall submit documentation for the Blue Book to support the rate being requested.

7.2 Construction Change Directive

7.2.1 A construction change directive is a written order prepared and signed by the Owner, issued with supporting documents prepared by the Architect (if applicable), directing a change in the Work prior to agreement on adjustment of the Contract amount or Contract time, or both. A Construction Change Directive shall be used in the absence of complete agreement between the Owner and Contractor on the terms of a change order. If the Construction Change Directive allows an adjustment of the contract amount or time, such adjustment amount shall be based on one of the following methods:

1. A lump sum agreement, properly itemized and supported by substantiating documents of sufficient detail to allow evaluation.

2. By unit prices contained in the Contractor's original proposal and incorporated in the Construction Contract or subsequently agreed upon.

3. A method agreed to by both the Owner and the contractor with a mutually agreeable fee for overhead and profit.

4. In the absence of an agreement between the Owner and the Contractor on the method of establishing an adjustment of the contract amount, the Owner, with the assistance of the architect, shall determine the adjustment amount on the basis of expenditures by the Contractor for labor, materials, equipment and other costs consistent with other provisions of the Contract. The contractor shall keep and submit to the Owner an itemized accounting of all cost components, either expended or saved, while performing the Work covered under the Construction Change Directive.

7.2.2 Upon receipt of a Construction Change Directive, Contractor shall promptly proceed with the change in the Work involved and advise Owner of Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum, Contract Time or both.

7.2.3 A Construction Change Directive signed by Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them.
Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3 **Overhead and Profit**
7.3.1 Overhead and Profit on Change Orders shall be applied as follows:

1. The overhead and profit charged by the Contractor and Subcontractors shall be considered to include, but not limited to, job site office and clerical expense, normal hand tools, incidental job supervision, field supervision, payroll costs and other compensation for project manager, officers, executives, principals, general managers, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, time-keepers, and other personnel employed whether at the site or in principal or a branch office for general superintendent and administration of the Work.

2. The percentages for overhead and profit charged on Change Orders shall be negotiated and may vary according to the nature, extent, and complexity of the Work involved but in no case shall exceed the following:
   - 15% To the Contractor or the Subcontractor of any tier for Work performed with their respective forces or materials purchased
   - 5% To the Contractor on Work performed by other than his forces
   - 5% To first tier Subcontractor on Work performed by his Subcontractor of any tier

3. The Contractor will be allowed to add 2% for the cost of bonding and insurance to their cost of work. This 2% shall be allowed on the total cost of the added work, including overhead and profit.

4. Not more than three mark-ups, not to exceed individual maximums shown above, shall be allowed regardless of the number of tier subcontractors. Overhead and profit shall be shown separately for each subcontractor of any tier and the Contractor.

5. On proposals covering both increases and decreases in the amount of the Contract, the application of overhead and profit shall be on the net change in direct cost for the Contractor or Subcontractor of any tier performing the Work.

6. The percentages for overhead and profit credit to the Owner on Change Orders that are strictly decreases in the quantity of work or materials shall be negotiated and may vary according to the nature, extent, and complexity of the Work involved, but shall not be less than the following: Overhead and Profit
   - 7.5% Credit to the Owner from the Contractor or Subcontractor of any tier for Work performed with their respective forces or materials purchased
   - 2.5% Credit to the Owner from the Contractor on Work performed by other than his forces
   - 2.5% Credit to the Owner from the first tier Subcontractor on Work performed by his Subcontractor of any tier

7.4 **Extended General Conditions**
7.4.1 The Contractor acknowledges that the percentage mark-up allowed on change orders for overhead and profit cover the Contractor’s cost of administering and executing the Work, inclusive of change orders that increase the contract time. Contractor further acknowledges that no compensation beyond the specified mark-up percentages for extended overhead shall be due or payable as a result of an increase in the Contract Time.

7.4.2 The Owner may reimburse the Contractor for extended overhead if an extension of the Contract Time is granted by the Owner, in accordance with Article 4.7.1 and the Owner determines that the extension of the Contract Time creates an inequitable condition for the Contractor. If these conditions are determined by the Owner to exist the Contractor may be reimbursed by unit prices contained in the Contractor’s original bid and incorporated in the Construction Contract or by unit prices subsequently agreed upon.

7.4.3 If unit prices are subsequently agreed upon, the Contractor’s compensation shall be limited as follows:

1. For the portion of the direct payroll cost of the Contractor’s project manager expended in completing the Work and the direct payroll cost of other onsite administrative staff not included in Article 7.3.1. Direct payroll cost shall include base rate salaries and wages plus the cost of fringe benefits required by agreement or custom and social security contributions, unemployment, payroll taxes and workers’ or workmen's compensation insurance and other customary and legally required taxes paid by the Contractor;

2. Cost of Contractor’s temporary office, including temporary office utilities expense;

3. Cost of temporary utilities required in the performance of the work;

4. Profit not to exceed 5% of the total extended overhead direct costs;

7.4.4 All costs not falling into one of these categories and costs of the Contractors staff not employed onsite are not allowed.

7.5 **Emergency Work**
7.5.1 If, during the course of the Work, the Owner has need to engage the Contractor in emergency work, whether related to the Work or not, the Contractor shall immediately
proceed with the emergency work as directed by the Owner under the applicable provisions of the contract. In so doing, Contractor agrees that all provisions of the contract remain in full force and effect and the schedule for the Work is not impacted in any way unless explicitly agreed to in writing by the Owner.

ARTICLE 8
TIME

8.1 Progress and Completion
8.1.1 Contractor acknowledges and agrees that time is of the essence of this Contract

8.1.2 Contract Time is the period of time set forth in the Contract for Construction required for Substantial Completion and Final Completion of the entire Work or portions of the Work as defined in the Contract Documents. Time limits stated in the Contract Documents are of the essence of the Contract. The Contract Time may only be changed by a Change Order. By executing the Contract, the Contractor confirms that the Contract Time is a sufficient period for performing the Work in its entirety.

8.1.3 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance and bonds required by Article 11 to be furnished by the Contractor.

8.1.4 The Contractor shall proceed expeditiously and diligently with adequate forces and shall achieve Substantial Completion and Final Completion within the time specified in the Contract Documents.

8.2 Delay in Completion
8.2.1 The Contractor shall be liable for all of the Owner's damages for delay in achieving Substantial Completion and/or Final Completion of the entire Work or portions of Work as set forth in the Contract Documents within the Contract Time unless liquidated damages are specifically provided for in the Contract Documents. If liquidated damages are specifically provided for in the Contract for Construction, Contractor shall be liable for such liquidated damages as set forth in Paragraph 8.3

8.2.2 All time limits stated in the Contract are of the essence of the Contract. However, if the Contractor is delayed at any time in the progress of the Work by any act or neglect of the Owner or by the Owner's Representative, by changes ordered in the Work, by strikes, lockouts, abnormal weather conditions, jurisdictional disputes, or any other causes beyond the Contractor's reasonable control which the Owner's Representative determines may justify delay then, upon submission of the Time Impact Schedule Analysis (TIA) called out in Section 4.7 of these General Conditions, the Contract Time may be extended for a reasonable time to the extent such delay will prevent Contractor from achieving Substantial Completion and/or Final Completion within the Contract Time and if performance of the Work is not, was not or would not have been delayed by any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. It shall be a condition precedent to any adjustment of the Contract Time that Contractor provide the Owner's Representative with written notice of the cause of delay within seven (7) days from the occurrence of the event or condition which caused the claimed delay. Written notices hereunder shall be in accordance with the applicable provisions of Section 4.7.

8.2.3 The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (1) is not caused, or could not have been anticipated, by the Contractor, (2) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay, (3) prevents Contractor from completing its Work by the Contract Time, and (4) is of a duration not less than one (1) day. Delays attributable to and within the control of a Subcontractor or supplier shall not justify an extension of the Contract Time.

8.2.4 Notwithstanding anything to the contrary in the Contract Documents, except as otherwise noted in these General Conditions, an extension in the Contract Time, to the extent permitted under this Article, shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution or completion of the Work, (2) hindrance or obstruction in the performance of the Work, (3) loss of productivity, or (4) other similar claims due to or caused by any events beyond the control of both the Owner and Contractor. In no event shall the Contractor be entitled to any compensation or recovery of any damages or any portion of damages resulting from delays caused by or within the control of Contractor or by acts or omissions of Contractor or its Subcontractors of any tier or delays beyond the control of both Owner and Contractor. If the Contractor contends that delay, hindrance, obstruction or other adverse condition results from acts or omissions of the Owner, the Owner's Representative or the Architect, Contractor shall promptly provide written notice to the Owner. Contractor shall only be entitled to an adjustment in the Contract Sum to the extent that such acts or omissions continue after the Contractor's written notice to the Owner of such acts or omissions. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, without limitation, ordering changes in the Work, or directing suspension, rescheduling or correction of the Work) regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be the basis of any Claim for an increase in the Contract Sum or Contract...
Time. In the event Contractor is entitled to an adjustment in the Contract Sum for any delay, hindrance, obstruction or other adverse condition caused by the acts or omissions of the Owner, the Owner’s Representative or the Architect, Contractor shall only be entitled to its actual direct costs caused thereby and Contractor shall not be entitled to and waives any right to special, indirect, or consequential damages including loss of profits, loss of savings or revenues, loss of anticipated profits, labor inefficiencies, idle equipment, home office overhead, and similar type of damages.

8.2.5 If the Contractor submits a progress report or any construction schedule indicating, or otherwise expressing an intention to achieve completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied. Further, the Contractor acknowledges and agrees that even if Contractor intends or is able to complete the Work prior to the Contract Time, it shall assert no Claim and the Owner shall not be liable to Contractor for any failure of the Contractor, regardless of the cause of the failure, to complete the Work prior to the Contract Time.

8.3 Liquidated Damages

8.3.1 If Liquidated Damages are prescribed on the Bid Form and Special Conditions in the Contract Documents, the Owner may deduct from the Contract Sum and retain as Liquidated Damages, and not as penalty or forfeiture, the sum stipulated in the Contract Documents for each calendar day after the date specified for completion of the Work that the entire Work is not substantially complete and/or finally complete.

8.3.2 The Owner’s Representative shall establish the date of Substantial completion and the date of Final Completion of the Work which shall be conclusive and binding on the Owner and Contractor for the purpose of determining whether or not Liquidated Damages shall be assessed under terms hereof and the sum total amount due.

8.3.3 Liquidated Damages or any matter related thereto shall not relieve the Contractor or his surety of any responsibility or obligation under this Contract.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 Commencement, Prosecution, and Completion

9.1.1 The Contractor shall commence Work within five (5) days upon the date of a “Notice to Proceed” from the Owner or the date fixed in the Notice to Proceed. Contractor shall prosecute the Work with faithfulness and diligence, and the Contractor shall complete the Work within the Contract Time set forth in the Contract Documents.

9.1.2 The Owner will prepare and forward three (3) copies of the Contract and Performance Bond to the bidder to whom the contract for the Work is awarded and such bidder shall return two (2) properly executed prescribed copies of the Contract and Bond to the Owner.

9.1.3 The construction period, when specified in consecutive calendar days, shall begin when the Contractor receives notice requesting the instruments listed in below. Before the Owner will issue Notice to Proceed to permit the Contractor to begin Work, the Owner shall have received the following instruments, properly executed as described in the Contract Documents. The documents below shall have been received by the Owner within fifteen (15) days after receipt of request for documents:

.1 Contract
.2 Bond (See Article 11)
.3 Insurance (See Article 11)
.4 List of Subcontractors of any tier
.5 Affirmative Action Plan (see Article 13.4)

9.1.4 In the event Contractor fails to provide Owner such documents, Contractor may not enter upon the site of the Work until such documents are provided. The date the Contractor is required to commence and complete the Work shall not be affected by the Owner denying Contractor access to the site as a result of Contractor’s failure to provide such documents and Contractor shall not be entitled to an adjustment of the Contract Time or Contract sum as a result of its failure to comply with the provisions of this Paragraph.

9.1.5 Contracts executed by partnerships shall be signed by all general partners of the partnership. Contracts signed by corporations shall be signed by the President or Vice President and the Secretary or Assistant Secretary. In case the Assistant Secretary or Vice President signs, it shall be so indicated by writing the word "Asst." or "Vice" in front of the words "Secretary" and "President". The corporate seal of the corporation shall be affixed. For all other types of entities, the Contractor and the person signing the Contract on behalf of Contractor represent and warrant that the person signing the Contract has the legal authority to bind Contractor to the Contract.

9.1.6 Any successful bidder which is a corporation organized in a state other than Missouri or any bidder doing business in the State of Missouri under a fictitious name shall furnish, at no cost to the Owner, no later than the time at which the executed Contract for Construction, the Payment Bond, and the Performance Bond are returned, a properly certified copy of its current Certificate of Authority and License to do business in the State of Missouri. No contract will be executed by the Owner until such certificate is furnished by the bidder, unless there already is on file with
the Owner a current certificate, in which event, no additional certificate will be required during the period of time for which such current certificate remains in effect.

9.1.7 Within fifteen (15) calendar days of the issuance of a Notice to Proceed, the Contractor shall submit one (1) signed copy of the following instruments. No payment will be processed until all of these instruments are received and approved by the Owner’s Representative.

.1 Reproducible progress and payment schedule
.2 Contractor’s Schedule of Values
.3 List of material suppliers
.4 Itemized breakdown of all labor rates for each classification. Overhead and profit shall not be included. Payroll cost shall include base rate salaries and wages plus the cost of fringe benefits required by agreement or custom and social security contributions, unemployment, payroll taxes and workers' or workmen’s compensation insurance and other customary and legally required taxes paid by the Contractor or Subcontractors. Any item or expense outside of these categories is not allowed. The expense of performing Work after regular working hours, on Saturdays, Sundays or legal holidays shall not be included in the above, unless approved in writing and in advance by Owner.

.5 Itemized breakdown of anticipated equipment rates (breakout operator rate). Overhead and profit shall not be included. Breakdown for required equipment shall itemize (at a minimum) delivery/ pick-up charge, hourly rate and hours used. Operator hours and rate shall not be included in the equipment breakdown. Contractor must use the most cost effective equipment available in the area and should not exceed the rates listed in the Rental Rate Blue Book for Construction Equipment (Blue Book). Contractor shall submit documentation for the Blue Book to support the rate being requested.

9.1.8 The Contractor shall be paid electronically using the Owner’s web-based payment program with a direct electronic transfer from the Owner’s account into the Contractor’s account. The Contractor must submit the following information to the Owner’s Representative:

.1 Bank Transit Number for the Contractor’s bank into which the electronic deposit will be made.
.2 Bank Account Number for the Contractor’s account into which the electronic deposit will be made.
.3 Contractor’s E-Mail address so that formal notification of the deposit by the Owner can be provided.

9.2 Contract Sum

9.2.1 The Owner shall compensate Contractor for all Work described herein and in the Contract Documents the Contract Sum set forth in the Contract for Construction, subject to additions and deletions as provided hereunder.

9.3 Schedule of Values

9.3.1 Within fifteen (15) days after receipt of the Notice to Proceed, the Contractor shall submit to the Owner’s Representative a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Owner’s Representative may require. This schedule, unless objected to by the Owner’s Representative, shall be used as a basis for reviewing the Contractor’s Applications for Payment. The values set forth in such schedule may, at the Owner’s option be used in any manner as fixing a basis for additions to or deletions from the Contract Sum.

9.3.2 The progress and payment schedule of values shall show the following:

.1 Enough detail as necessary to adequately evaluate the actual percent complete of any line item on a monthly basis, as determined by the Owner’s Representative.

.2 Line items, when being performed by a subcontractor or material supplier, shall correlate directly back to the subcontract or purchase order amount if requested by the Owner’s Representative.

9.4 Applications for Payment

9.4.1 The Contractor shall submit monthly to the Owner’s Representative and the Architect an itemized Application for Payment for operations completed in accordance with the Schedule of Values. Such application shall be supported by such data substantiating the Contractor’s right to payment as the Owner’s Representative or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage as provided for herein.

9.4.2 Such applications shall not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier.

9.4.3 Progress payments shall be made on account of materials and equipment delivered to the site and incorporated in the Work. No payments will be made for materials and equipment stored at the Project site but not yet incorporated into the Work except as provided in Paragraph 9.4.4.

9.4.4 If approved in writing and in advance by Owner, progress payments may be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. Owner may in its sole discretion refuse to grant approval for payments for materials and equipment stored at the Project site but not yet incorporated in the Work. Any approval by Owner for payment for materials and equipment delivered and suitably
stored at the site, or stored offsite as noted below, for subsequent incorporation in the Work shall be conditioned upon Contractor’s demonstrating that such materials and equipment are adequately protected from weather, damage, vandalism and theft and that such materials and equipment have been inventoried and stored in accordance with procedures established by or approved by the Owner. Nothing in this clause shall imply or create any liability on the part of the Owner for the Contractor’s inventory and storage procedures or for any loss or damage to material, equipment or supplies stored on the site, whether incorporated into the work or not. In the event any such loss or damage occurs, the Contractor remains solely responsible for all costs associated with replacement of the affected materials, supplies and equipment including labor and incidental costs, and shall have no claim against the Owner for such loss.

No allowance shall be made in the project pay requests for materials not delivered to the site of the work and incorporated into the work, except as noted below. For the purposes of this Article, Offsite is defined as any location not owned or leased by the Owner. Contractor shall submit a list of materials that they are requesting payment for offsite storage within 60 days of Notice Proceed.

.1 Items considered to be major items of considerable magnitude, if suitably stored, may be allowed in project pay requests on the basis of ninety percent (90%) of invoices

.2 Determination of acceptable “major items of considerable magnitude” and “suitably stored” shall be made by the Owner’s Representative.

.3 Aggregate quantities of materials not considered unique to this project will not be considered for offsite storage payment.

.4 Contractor shall submit to the Owner’s Representative a list of the material for which application for payment for offsite storage is anticipated no less than forty-five days prior to the submission of the applicable pay request. The list shall include a material description, applicable division, quantity and discounts offered to the Owner for early payment. Contractor shall also submit the location the material will be stored and the method of protection.

.5 The storage facility shall be subject to approval by the Owner’s representative, shall be located within an acceptable distance of the project sites as established by the Owner’s Representative and all materials for the Owner’s project must be stored separately from all other items within the storage facility and shall be labeled and stored in the name of the Curators of the University of Missouri.

.6 The Owner’s representative shall be provided a minimum of two weeks tice to visit the storage facility and inspect the stored material prior to submission of the pay request.

.7 Upon favorable inspection by the Owner’s Representative, the Contractor shall, at the Owner’s option, submit the appropriate UCC filing, transferring title of the material or equipment to The Curators of the University of Missouri.

.8 An invoice provided by the supplier shall be included with the applicable pay request.

.9 The contractor shall remain fully responsible for all items, until acceptance of the project by the Owner.

.10 The contractor shall reimburse all costs incurred by the Owner in inspecting and verifying all material stored offsite, including mileage, airfare, meals, lodging and time, charged at a reasonable hourly rate.

9.4.5 The Application for Payment shall constitute a representation by the Contractor to the Owner that the Work has progressed to the point indicated; the quality of the Work covered by the Application for Payment is in accordance with the Contract Documents; and the Contractor is entitled to payment in the amount requested.

9.4.6 The Contractor will be reimbursed for ninety-five percent (95%) of the value of all labor furnished and material installed and computed in the same manner, less all previous payments made. On projects where a bond is not required, the contractor will be reimbursed for ninety percent (90%) of the value of all labor furnished and material installed and computed in the same manner, less all previous payments made.

9.5 Approval for Payment

9.5.1 The Owner’s Representative will, within fifteen (15) days after receipt of the Contractor's Application for Payment, either approve Contractor’s Application for Payment for such amount as the Owner’s Representative determines is properly due, or notify the Contractor of the Owner’s Representative's reasons for withholding certification in whole or in part as provided in Section 9.6.

9.6 Decisions to Withheld Approval

9.6.1 The Owner’s Representative may decide not to certify payment and may withhold approval in whole or in part, to the extent reasonably necessary to protect the Owner. If the Owner’s Representative is unable to approve payment in the amount of the Application, the Owner’s Representative will notify the Contractor as provided in Paragraph 9.5.1. If the Contractor and Owner’s Representative cannot agree on a revised amount, the Owner’s Representative will promptly issue approval for payment for the amount for which the Owner’s Representative is able to determine is due Contractor. The Owner’s Representative may also decide not to approve payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of approval for payment previously issued, to such extent as may
be necessary in the Owner’s Representative opinion to protect the Owner from loss because of:

.1 defective Work not remedied or damage to completed Work;
.2 failure to supply sufficient skilled workers or suitable materials;
.3 third party claims filed or reasonable evidence indicating probable filing of such claims;
.4 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment, Owner may, at its sole option issue joint checks to subcontractors who have presented evidence that it has not been paid in accordance with the Contract;
.5 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.6 damage to the Owner or another contractor;
.7 reasonable evidence that the Work will not be completed within the Contract Time or an unsatisfactory rate of progress made by Contractor;
.8 Contractor's failure to comply with applicable Laws;
.9 Contractor’s or Subcontractor’s failure to comply with contract Prevailing Wage requirements; or
.10 Contractor’s failure to carry out the Work in strict accordance with the Contract Documents.

9.6.2 When the above reasons for withholding approval are removed, approval will be made for amounts previously withheld.

9.7 Progress Payments

9.7.1 Based upon Applications for Payment submitted to the Owner by the Contractor and approvals issued by the Owner’s Representative, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

9.7.2 The period covered by each Application for Payment shall be one (1) calendar month.

9.7.3 The Owner shall make payment to Contractor for amounts due and approved by Owner’s Representative not later than thirty (30) days after the Owner approves a properly detailed Application for Payment which is in compliance with the Contract Documents. The Owner shall not have the obligation to process or pay such Application for Payment until it receives an Application for Payment satisfying such requirements.

9.7.4 Based on the Schedule of Values submitted by Contractor, Applications for Payment submitted by Contractor shall indicate the actual percentage of completion of each portion of Contractor's Work as of the end of the period covered by the Application for Payment.

9.7.5 The Contractor shall promptly pay each Subcontractor and Supplier, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's or supplier's portion of the Work, the amount to which said Subcontractor or supplier is entitled, reflecting percentages actually retained from payments to the Contractor on account of each Subcontractor's or supplier's portion of the Work, in full compliance with state statute. The Contractor shall, by appropriate agreement with each Subcontractor or supplier, require each Subcontractor or supplier to make payments to Sub-subcontractors in similar manner.

9.7.6 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor of any tier nor a laborer or employee of Contractor except to the extent required by law. Retainage provided for by the Contract Documents are to be retained and held for the sole protection of Owner, and no other person, firm or corporation shall have any claim or right whatsoever thereto.

9.7.7 An approval for payment by Owner’s Representative, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

9.8 Failure of Payment

9.8.1 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment by Contractor shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to: (1) deduct an amount equal to that to which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that to which the Owner is entitled.

9.9 Substantial Completion

9.9.1 Substantial Completion is the stage in the progress of the Work as defined in Paragraph 1.1.9 as certified by the Owner.

9.9.2 When the Contractor considers the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Owner and the Architect. The Owner’s Representative will make an inspection to determine whether the Work or designated...
portion thereof is substantially complete. If the Owner’s Representative's inspection discloses any item which is not in accordance with the requirements of the Contract Documents, the Contractor shall complete or correct such item upon notification by the Owner’s Representative. The Contractor shall then submit a request for another inspection by the Owner’s Representative to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the Owner will issue a Certificate of Substantial Completion. Substantial Completion shall transfer from the Contractor to the Owner responsibilities for security, maintenance, heat, utilities, damage to the Work and insurance. In no event shall Contractor have more than thirty (30) days to complete all items on the Punch List and achieve Final Completion. Warranties required by the Contract Documents shall commence on the date of Substantial Completion or as agreed otherwise.

9.9.3 At the date of Substantial Completion, the Contractor may apply for, and if approved by Owner’s Representative, the Owner, subject to the provisions herein, shall increase total payments to one hundred percent (100%) of the Contract Sum less one hundred fifty percent (150%) of the value of any incomplete Work and unsettled claims, as determined by the Owner’s Representative.

9.10 Partial Occupancy or Use
9.10.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, security, maintenance, heat, utilities, damage to the Work and insurance. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by the Owner’s Representative.

9.10.2 Immediately before such partial occupancy or use, the Owner, and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work. Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.11 Final Completion and Final Payment
9.11.1 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 Owner’s Representative and the Architect will promptly make such inspection and, when the Owner’s Representative and Architect find the Work acceptable under the Contract Documents and the Contract fully performed, the Owner’s Representative will promptly issue a final approval for payment; otherwise, Owner’s Representative will return Contractor's Final Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application. Submission of a Final Application for Payment shall constitute a further representation that conditions listed in Paragraph 9.11.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. All warranties and guarantees required under or pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Owner’s Representative as part of the final Application for Payment. The final approval for payment will not be issued by the Owner’s Representative until all warranties and guarantees have been received and accepted by the Owner.

9.11.2 The Owner will request the Contractor to submit the application for final payment along with a manually signed notarized letter on the Contractor's letterhead certifying that:

.1 Labor costs, prevailing wage rates, fringe benefits and material costs have been paid.
.2 Subcontractors of any tier and manufacturers furnishing materials and labor for the project have fully completed their Work and have been paid in full.
.3 The project has been fully completed in accordance with the Contract Documents as modified by Change Orders.
.4 The acceptance by Contractor of its Final Payment, by check or electronic transfer, shall be and operate as a release of all claims of Contractor against Owner for all things done or furnished or relating to the Work and for every act or alleged neglect of Owner arising out of the Work.

9.11.3 Final Payment constituting the entire unpaid balance due shall be paid by the Owner to the Contractor within thirty (30) days after Owner's receipt of Contractor's Final Application for Payment which satisfies all the requirements of the Contract Documents and Owner’s receipt of all information and documents set forth in Section 9.11.

9.11.4 No payment under this Contract, including but not limited to final payment, shall constitute acceptance by Owner of any Work or act not in accordance with the requirements of the Contract Documents.

9.11.5 No recourse shall be had against any member of the Board of Curators, or officer thereof, for any payment under the Contract or any claim based thereon.

ARTICLE 10
PROTECTION OF PERSONS AND PROPERTY

GC/27
08/18
10.1 Safety Precautions and Programs

10.1.1 The Contractor shall at all times conduct operations under this Contract in a manner to avoid the risk of bodily harm to persons or risk of damage to any property. The Contractor shall promptly take precautions which are necessary and adequate against conditions created during the progress of the Contractor's activities hereunder which involve a risk of bodily harm to persons or a risk of damage to property. The Contractor shall continuously inspect Work, materials, and equipment to discover and determine any such conditions and shall be solely responsible for discovery, determination, and correction of any such conditions. The Contractor shall comply with applicable safety laws, standards, codes, and regulations in the jurisdiction where the Work is being performed, specifically, but without limiting the generality of the foregoing, with rules, regulations, and standards adopted pursuant to the Williams-Steiger Occupational Safety and Health Act of 1970 and applicable amendments.

10.1.2 All contractors, subcontractors and workers on this project are subject to the Construction Safety Training provisions 292.675 RSMo.

10.1.3 In the event the Contractor encounters on the site, material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), lead, mercury, or other material known to be hazardous, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner's Representative and the Architect in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner's Representative and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB) and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos or polychlorinated biphenyl (PCB), or when it has been rendered harmless by written agreement of the Owner's Representative and the Contractor. “Rendered Harmless” shall mean that levels of such materials are less than any applicable exposure standards, including but limited to OSHA regulations.

10.2 Safety Of Persons And Property

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

1. students, faculty, staff, the public, construction personnel, and other persons who may be affected thereby;

2. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor or the Contractor's Subcontractors of any tier; and

.3 other property at the site or adjacent thereto, such as 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 notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on 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 performance of the Contract, safeguards for safety and protection, including, but not limited to, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

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

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Article 10 caused in whole or in part by the Contractor, a Subcontractor of any tier, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable, and for which the Contractor is responsible under Article 10, except damage or loss attributable solely to acts or omissions of Owner or the Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's other obligations stated elsewhere in the Contract.

10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents, and the maintaining, enforcing and supervising of safety precautions and programs. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner's Representative and Architect. The Contractor shall hold regularly scheduled safety meetings to instruct Contractor personnel on safety practices, accident avoidance and prevention, and the Project Safety Program. The Contractor shall furnish safety equipment, and enforce the use of such equipment by it's employees and it's subcontractors of any tier.

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.
10.2.8 The Contractor shall promptly report in writing to the Owner all accidents arising out of or in connection with the Work which cause death, lost time injury, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner.

10.2.9 The Contractor shall promptly notify in writing to the Owner of any claims for injury or damage to personal property related to the work, either by or against the Contractor.

**ARTICLE 11**

**INSURANCE & BONDS**

11.1 Insurance

11.1.1 Contractor shall secure from the date of the Contract for Construction and maintain for such periods of time as set forth below, insurance of such types and in such amounts specified below, to protect Contractor, Owner and others against all hazards or risks of loss described below. The form of such insurance together with carriers thereof, in each case, shall be approved by Owner, but, regardless of such approval, it shall be the responsibility of Contractor to maintain the insurance coverages set forth herein.

11.1.2 The contractor shall not be allowed on the Owners property without proof of the insurance coverages set forth herein.

11.2 Commercial General Liability

11.2.1 Contractor shall secure and maintain from the date of the Contract for Construction and for a period of at least five (5) years from the date of Final Completion of the entire Work Commercial General Liability insurance (“CGL”) with a combined single limit of not less than $2,000,000 per occurrence, $5,000,000 general aggregate, $5,000,000 products and completed operations aggregate and $1,000,000 personal injury and advertising injury. General Aggregate should apply per project. An umbrella policy may be used to satisfy these limits. If the General Aggregate is not on a per project basis, the contractor shall provide an additional $2,000,000 general aggregate.

11.2.2 CGL insurance shall be written on a comprehensive form and shall cover claims and liability in connection with or resulting from the Contractor’s operations and activities under the Contract, for personal injuries, occupational sickness, disease, death or damage to property of others, including loss of use resulting therefrom, arising out of any operations or activities of the Contractor, its agents, or any Subcontractors of any tier or by anyone directly or indirectly employed by either of them.

11.2.3 CGL insurance shall include premises, operations, independent contractors, products-completed operations, personal injury and advertising injury and liability assumed under an insured contract (including the tort liability of another assumed in a business contract) coverages. In particular, and not by way of any limitation, the CGL insurance shall cover the Contractor’s indemnity obligations contained in the Contract Documents.

11.2.4 There shall be no endorsement or modification of the CGL policy limiting the scope of coverage for liability arising from blasting, explosion, collapse, or underground property damage.

11.2.5 “The Curators of the University of Missouri” shall be endorsed as an “additional insured” under the CGL policy. The additional insured status must be conveyed by the ISO CG 2 10 (2004) edition or equivalent and the ISO CG 20 37 (2004) edition. The policy shall be endorsed to be primary coverage and any other insurance carried by the Owner shall be excess only and will not contribute with Contractors’ insurance. To confirm, the Endorsement should accompany the insurance certificate.

11.2.6 Contractor waives all rights against Owner and its agents, officers, representatives and employees for recovery of damages to the extent those damages are covered by the CGL policy required hereunder.

11.3 Licensed for Use Vehicle Liability

11.3.1 Contractor shall secure and maintain from the date of the Contract for Construction until the date of Final Completion of the entire Work, insurance, to be on comprehensive form, which shall protect Contractor against any and all claims for all injuries and all damage to property arising from the use of automobiles, trucks and motorized vehicles, in connection with the performance of Work under this Contract, and shall cover the operation on or off the site of the Work of all motor vehicles licensed for highway use whether they are owned, non-owned or hired. Such insurance shall include contractual liability coverage and shall provide coverage on the basis of the date of any accident. The liability limits under such policy shall not be less than $2,000,000 combined single limit for bodily injury and property damage per accident.

11.3.2 Contractor waives all rights against Owner and its agents, officers, directors and employees for recovery of damages to the extent such damages are covered by the automobile liability insurance required hereunder.

11.4 Workers’ Compensation Insurance

11.4.1 Contractor shall purchase and maintain workers’ compensation insurance and employers’ liability insurance
which shall protect Contractor from claims for injury, sickness, disease or death of Contractor’s employees or statutory employees. The insurance policies required hereunder shall include an “all states” or “other states” endorsement. In case any Work is sublet, Contractor shall require any Subcontractor of any tier to provide the insurance coverages required under this Section 11.4.

11.4.2 Contractor’s workers’ compensation insurance coverage shall be in compliance with all applicable Laws, including the statutes of the State of Missouri. Contractor’s employers’ liability coverage limits shall not be less than $1,000,000 each accident for bodily injury by accident or $1,000,000 each employee for bodily injury by disease.

11.5 Liability Insurance General Requirements

11.5.1 All insurance coverages procured by Contractor shall be provided by agencies and insurance companies acceptable to and approved by Owner. Any insurance coverage shall be provided by insurance companies that are duly licensed to conduct business in the State of Missouri as an admitted carrier. The form and content of all insurance coverage provided by Contractor are subject to the approval of Owner. All required insurance coverages shall be obtained and paid for by Contractor. Any approval of the form, content or insurance company by Owner shall not relieve the Contractor from the obligation to provide the coverages required herein.

11.5.2 All insurance coverage procured by the Contractor shall be provided by insurance companies having policyholder ratings no lower than "A-" and financial ratings not lower than "XI" in the Best's Insurance Guide, latest edition in effect as of the date of the Contract, and subsequently in effect at the time of renewal of any policies required by the Contract Documents. Insurance coverages required hereunder shall not be subject to a deductible amount on a per-claim basis of more than $10,000.00 and shall not be subject to a per-occurrence deductible of more than $25,000.00. Insurance procured by Contractor covering the additional insureds shall be primary insurance and any insurance maintained by Owner shall be excess insurance.

11.5.3 All insurance required hereunder shall provide that the insurer’s cost of providing the insureds a defense and appeal, including attorneys’ fees, shall be supplementary and shall not be included as part of the policy limits but shall remain the insurer’s separate responsibility. Contractor shall cause its insurance carriers to waive all rights of subrogation, except for Workers’ Compensation, against the Owner and its officers, employees and agents.

11.5.4 The Contractor shall furnish the Owner with certificates, Additional Insured endorsements, policies, or binders which indicate the Contractor and/or the Owner and other Contractors (where required) are covered by the required insurance showing type, amount, class of operations covered, effective dates and dates of expiration of policies prior to commencement of the work. Contractor is required to maintain coverages as stated and required to notify the University of a Carrier Change or cancellation within 2 business days. The University reserves the right to request a copy of the policy. Contractor fails to provide, procure and deliver acceptable policies of insurance or satisfactory certificates or other evidence thereof, the Owner may obtain such insurance at the cost and expense of the Contractor without notice to the Contractor.

11.5.5 With respect to all insurance coverages required to remain in force and affect after final payment, Contractor shall provide Owner additional certificates, policies and binders evidencing continuation of such insurance coverages along with Contractor’s application for final payment and shall provide certificates, policies and binders thereafter as requested by Owner.

11.5.6 The maintenance in full current force and effect of such forms and amounts of insurance and bonds required by the Contract Documents shall be a condition precedent to Contractor’s exercise or enforcement of any rights under the Contract Documents.

11.5.7 Failure of Owner to demand certificates, policies and binders evidencing insurance coverages required by the Contract Documents, approval by Owner of such certificates, policies and binders or failure of Owner to identify a deficiency from evidence that is provided by Contractor shall not be construed as a waiver of Contractor’s obligations to maintain the insurance required by the Contract Documents.

11.5.8 The Owner shall have the right to terminate the Contract if Contractor fails to maintain the insurance required by the Contract Documents.

11.5.9 If Contractor fails to maintain the insurance required by the Contract Document, Owner shall have the right, but not the obligation, to purchase said insurance at Contractor’s expense. If Owner is damaged by Contractor’s failure to maintain the insurance required by the Contract Documents, Contractor shall bear all reasonable costs properly attributable to such failure.

11.5.10 By requiring the insurance set forth herein and in the Contract Documents, Owner does not represent or warrant that coverage and limits will necessarily be adequate to protect Contractor, and such coverages and limits shall not be deemed as a limitation on Contractor’s liability under the indemnities granted to Owner in the Contract Documents.
11.5.11 If Contractor’s liability policies do not contain a standard separation of insureds provision, such policies shall be endorsed to provide cross-liability coverage.

11.5.12 If a part of the Work hereunder is to be subcontracted, the Contractor shall: (1) cover any and all Subcontractors in its insurance policies; (2) require each Subcontractor to secure insurance which will protect said Subcontractor and supplier against all applicable hazards or risks of loss designated in accordance with Article 11 hereunder; and (3) require each Subcontractor or supplier to assist in every manner possible in the reporting and investigation of any accident, and upon request, to cooperate with any insurance carrier in the handling of any claim by securing and giving evidence and obtaining the attendance of witnesses as required by any claim or suit.

11.5.13 It is understood and agreed that the insurance coverages required by the provisions of this Article 11 are required in the public interest and that the Owner does not assume any liability for acts of Contractor or Subcontractors of any tier or their employees in the performance of the Contract or Work.

11.6 Builder’s Risk Insurance

11.6.1 The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the State of Missouri, as an admitted carrier, builder’s risk insurance on the entire Work. Such insurance shall be written on a completed value form for the entire Work. The insurance shall apply on a replacement cost basis.

11.6.2 The insurance as required herein shall name as insureds the Owner, Contractor and all Subcontractors of any tier. The insurance policy shall contain a provision that the insurance will not be canceled, allowed to expire or materially changed until at least thirty (30) days prior written notice has been given to Owner.

11.6.3 The insurance as required herein shall cover the entire Work, including reasonable compensation for Architect’s services and expenses made necessary by an insured loss. Insured property shall include portions of the Work located away from the site (including all offsite stored materials) but intended for use at the site, and shall also cover portions of the Work in transit, including ocean transit. The policy shall include as insured property scaffolding, falsework, and temporary buildings located at the site. The policy shall cover the cost of removing debris, including demolition as may be made legally necessary by the operation of any law, ordinance or regulation.

11.6.4 The insurance required herein shall be on an all risk form and shall be written to cover all risks of physical loss or damage to the insured party and shall insure at least against the perils of fire and extended coverage, theft, vandalism, malicious mischief, collapse, lightening, earthquake, flood, frost, water damage, windstorm and freezing.

11.6.5 If there are any deductibles applicable to the insurance required herein, Contractor shall pay any part of any loss not covered because of the operation of such deductibles.

11.6.6 The insurance as required herein shall be maintained in effect until the earliest of the following dates:

1. the date which all persons and organization who are insureds under the policy agree in writing that it shall be terminated;

2. the date on which final payment of this Contract has been made by Owner to Contractor; or

3. the date on which the insurable interests in the property of all insureds other than the Owner have ceased.

11.6.7 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors of any tier, suppliers, agents and employees, each of the other, (2) the Architect and Architect's consultants, and (3) separate contractors described in Article 6, if any, and any of their subcontractors of any tier, suppliers, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Section 11.7 or other insurance applicable to the Work, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors of any tier, suppliers, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, was at fault or was negligent in causing the loss and whether or not the person or entity had an interest in the property damaged.

11.6.8 A loss insured under Contractor's property insurance shall be adjusted by the Owner in good faith and made payable to the Owner for the insureds, subject to requirements of the Contract Documents. The Contractor shall pay Subcontractors of any tier their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors of any tier to make payments to their Sub-subcontractors in similar manner.

11.7 Bonds
11.7.1 When the Contract sum exceeds Fifty Thousand Dollars ($50,000), the Contractor shall procure and furnish a Performance Bond and a Payment Bond in the form prepared by the Owner, each in an amount equal to one hundred percent (100%) of the Contract Sum, as well as adjustments to the Contract Sum. The Performance Bond shall secure and guarantee Contractor’s faithful performance of this Contract, including but not limited to Contractor’s obligation to correct defects after final payment has been made as required by the Contract Documents. The Payment Bond shall secure and guarantee payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract. These Bonds shall be in effect through the duration of the Contract plus the Guaranty Period as required by the Contract Documents.

11.7.2 The bonds required hereunder shall be executed by a responsible surety licensed in the State of Missouri, with a Best’s rating of no less than A-/XI. The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of this power of attorney indicating the monetary limit of such power.

11.7.3 If the surety of any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to conduct business in the State of Missouri is terminated, or it ceases to meet the requirements of this paragraph, Contractor shall within ten (10) days substitute another bond and surety, both of which must be acceptable to Owner. If Contractor fails to make such substitution, Owner may procure such required bonds on behalf of Contractor at Contractor’s expense.

11.7.4 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds to such person or entity.

11.7.5 The Contractor shall keep the surety informed of the progress of the Work, and, where necessary, obtain the surety’s consent to or waiver of: (1) notice of changes in the Work; (2) request for reduction or release of retention; (3) request for final payment; and (4) any other material required by the surety. The Owner shall be notified by the Contractor, in writing, of all communications with the surety, as it relates to items one through four. The Owner may, in the Owner’s sole discretion, inform surety of the progress of the Work, any defects in the Work, or any defaults of Contractor under the Contract Documents and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the Work.

11.7.6 Contractor shall indemnify and hold harmless the Owner and any agents, employees, representative or member of the Board of Curators from and against any claims, expenses, losses, costs, including reasonable attorneys’ fees, as a result of any failure of Contractor to procure the bonds required herein.

ARTICLE 12
UNCOVERING AND CORRECTION OF THE WORK

12.1 Uncovering of the Work
12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it shall, if required in writing by the Architect or the Owner's Representative, be uncovered for the Architect's observation and be replaced at the Contractor's expense without change in the Contract Time.

12.1.2 If a portion of the Work has been covered which the Architect or the Owner's Representative has not specifically requested to observe, prior to its being covered, the Architect or the Owner's Representative may request to see such Work, and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner will be responsible for payment of such costs.

12.2 Correction of the Work
12.2.1 The Architect or Owner’s Representative shall have the right to reject Work not in strict compliance with the requirements of the Contract Documents. The Contractor shall promptly correct Work rejected by the Architect or the Owner's Representative for failing to conform to the requirements of the Contract Documents. The Contractor shall pay all claims, costs, losses and damages caused by or resulting from the correction, removal or replacement of defective Work, including but not limited to, all costs of repair or replacement of Work of others. The Contractor shall bear costs of correcting, removing and replacing such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby. If prior to the date of final payment, the Contractor, a Subcontractor or anyone for whom either is responsible uses or damages any portion of
the Work, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause such item to be restored to “like new” condition at no expense to the Owner.

12.2.2 If, within twelve (12) months after the date of Final Completion of the Work or designated portion thereof, or after the date for commencement of warranties, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found not to be in strict accordance with the requirements of the Contract Documents, the Contractor shall correct or remove and replace such defective Work, at the Owner’s discretion. Such twelve (12) month period is referred to as the “Guarantee Period.” The obligations under this Paragraph 12.2.2 shall cover any repairs, removal and replacement to any part of the Work or other property caused by the defective Work.

12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

12.2.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct or remove it and replace such nonconforming Work. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Owner, the Owner may take action to correct or remove the nonconforming work at the contractor’s expense.

12.2.5 The Contractor shall bear the cost of correcting destroyed or damaged Work or property, whether completed or partially completed, of the Owner or of others caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

12.2.6 Nothing contained in Article 12 shall be construed to establish a period of limitation with respect to other obligations that the Contractor might have under the Contract Documents. Establishment of the twelve (12) month Guarantee Period as described in Article 12 relates only to the specific obligation of the Contractor to correct, remove or replace the Work, and has no relationship to the time within which the 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 Contractor's liability with respect to the Contractor's obligations under the Contract Documents. The requirements of Article 12 are in addition to and not in limitation of any of the other requirements of the Contract for warranties or conformance of the Work to the requirements of the Contract Documents.

12.3 Acceptance of Nonconforming Work
12.3.1 The Owner may accept Work which is not in accordance with the Contract Documents, instead of requiring its removal and correction, in its sole discretion. In Such case the Contract Sum will be adjusted as appropriate and equitable. Such adjustment shall be made whether or not final payment has been made. Nothing contained herein shall impose any obligation upon the Owner to accept nonconforming or defective Work.

ARTICLE 13
MISCELLANEOUS PROVISIONS

13.1 Written Notice
13.1.1 All notices required to be given by the contractor under the terms of this Contract shall be made in writing. Written notice when served by the Owner will be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an office of the corporation for which it was intended, or if delivered at or sent to the last business address known to the party giving notice.

13.2 Rights and Remedies
13.2.1 Duties and obligations imposed by the Contract Documents, and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

13.2.2 No action or failure to act by the Owner, the Architect, or the Owner’s Representative will constitute a waiver of a right or duty afforded to the Owner under the Contract Documents, nor will such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.2.3 The terms of this Contract and all representations, indemnifications, warranties and guarantees made in, required or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Work and shall remain in effect so long as the Owner is entitled to protection of its rights under applicable law.

13.2.4 Contractor shall carry out the Work and adhere to the current construction schedule during all disputes or disagreements with the Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements except as the Owner and Contractor may otherwise agree to in writing.
13.3 Tests and Inspections
13.3.1 Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules or regulations shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, and shall bear related costs of tests, inspections, and approvals. The Contractor shall give the Architect and the Owner's Representative timely notice of when and where tests and inspections are to be made so the Architect and/or the Owner's Representative may observe procedures.

13.3.2 If the Architect or the Owner's Representative determine that portions of the Work require additional testing, inspection or approval not included in the Contract Documents, or required by law, the Architect, or the Owner's Representative will instruct the Contractor to make arrangements for such additional testing, inspection, or approval by an entity acceptable to the Owner's Representative and the Contractor shall give timely notice to the Architect, and the Owner's Representative, of when and where tests and inspections are to be made so the Architect and/or the Owner's Representative may observe such procedures. The Owner will bear such costs except as provided elsewhere in Article 13.

13.3.3 If such procedures for testing, inspection, or approval under Article 13 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses.

13.3.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Owner's Representative and Architect.

13.3.5 Contractor shall take all necessary actions to ensure that all tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

13.3.6 Contractor shall arrange for and pay for all costs of all testing required by the Contract Documents or any applicable Laws for materials to be tested or certified at or on the place or premises of the source of the material to be supplied. The Owner shall have the right to require testing of all materials at the place of the source of the material to be supplied if not required by the Contract Documents or any applicable Laws. The Owner shall bear the costs of such tests and inspections not required by the Contract Documents or by applicable Laws unless prior defective Work provides Architect or Owner with a reasonable belief that additional defective Work may be found, in which case Contractor shall be responsible for all costs of tests and inspections ordered by the Owner or Architect, whether or not such tests or inspection reveals that Work is in compliance with the Contract Documents.

13.4 Nondiscrimination in Employment Equal Opportunity
13.4.1 The University serves from time to time as a contractor for the United States government. Accordingly, the provider of goods and/or services shall comply with federal laws, rules and regulations applicable to subcontractors of government contracts including those relating to equal employment opportunity and affirmative action in the employment of minorities (Executive Order 11246), women (Executive Order 11375), persons with disabilities (29 USC 706) and Executive Order 11758, and certain veterans (38 USC 4212 formerly [2012]) contracting with business concerns with small disadvantaged business concerns (Publication L. 95-507). Contract clauses required by the Government in such circumstances are incorporated herein by reference.

13.5 Supplier Diversity Goal Program
13.5.1 The Contractor shall subcontract with diverse firms no less than the amount pledged in the Contractor's Bid and/or the amount accepted by the Owner.

13.5.2 If the Contractor must remove any diverse subcontractor of any tier, the Contractor shall replace the diverse subcontractor of any tier with another diverse subcontractor(s) of equal dollar value to the diverse supplier removed. The Contractor shall immediately notify the Owner's Representative in writing of the Contractor's intent to remove any, and the Contractor's plan to maintain subcontracts with diverse firms of no less than amount pledged in the Contractor's Bid and/or the amount accepted by the Owner. All changes of diverse subcontractor of any tier shall be approved by the Director of Facilities Planning & Development.

13.5.3 If the Contractor fails to meet or maintain the contractor's Supplier Diversity subcontracting pledge, the Contractor shall immediately notify in writing the Owner's Representative, and the Director of Facilities Planning & Development. Such notice shall include a description of the Contractor’s good faith effort to comply with their Supplier Diversity subcontracting pledge.

13.5.4 If the Director of Facilities Planning & Development finds the Contractor has failed to comply in good faith with the Owner’s Supplier Diversity goal program, the Director may take appropriate action, including but not limited to, declaring the Contractor ineligible to participate in any contracts with the Owner for a period not to exceed six (6) months, and/or directing that the Contractor's actions be
declared a material breach of the Contract and that the Contract be terminated.

13.5.5 The Contractor and his subcontractors shall develop, implement, maintain, and submit in writing to the Director of Facilities Planning & Development, an affirmative action program if at least fifty (50) persons in the aggregate are employed under this contract. If less than fifty (50) persons in the aggregate are to be employed under this contract, the Contractor shall submit, in lieu of the written affirmative action program, a properly executed "Affidavit for Affirmative Action" in the form included in the Contract Documents. For the purpose of this section, an "Affirmative Action Program" means positive actions to influence all employment practices (including, but not limited to, recruiting, hiring, promoting, and training) in providing equal employment opportunity regardless of race, color, sex, national origin, religion, age (where the person affected is between 40 and 70), disabled and Vietnam-era veteran status, and handicapped otherwise qualified status. Such affirmative action program shall include:

1. A written policy statement committing the total organization to affirmative action and assigning management responsibilities and procedures for evaluation and dissemination.
2. The identification of a person designated to handle affirmative action.
3. The establishment of non-discriminatory selection standards, objective measures to analyze recruitment, an upward mobility system, a wage and salary structure, and standards applicable to lay-off, recall, discharge, demotion, and discipline.
4. The exclusion of discrimination from collective bargaining agreements.
5. Performance of an internal audit of the reporting system to monitor execution and to provide for future planning.

13.5.6 In the enforcement of this non-discrimination requirement, the Owner may use any reasonable procedures available, including but not limited to: requests, reports, site visits, and inspection of relevant documents of Contractors and Subcontractors of any tier. The contractor shall submit a final Affidavit of Supplier Diversity Participation for each diverse firm at the end of the project stating the actual amount paid to the diverse firm.

13.6 Wage Rates (If the contract amount is less than $75,000, the requirements of this section will not apply. Any contract adjustments that increase the contract above $75,000 will be subject to this section.)

13.6.1 The Contractor shall pay workers employed in the execution of this contract in full each week and not less than the predetermined wage rates and overtime for work of a similar character that have been made a part of this Contract. These rates are determined by the University of Missouri Director of Facilities Planning and Development. The rates are based on wage rates published in the Annual Wage Orders of the Missouri Department of Labor and Industrial Relations (MDLIR). The Contractor is to use MDLIR 8 CSR 30-3.020; .030; .040, .060 in determining the appropriate occupational titles and rates for workers used in the execution of this contract. All determinations and/or interpretations regarding wage rates and classification of workers will be made by the office of the University of Missouri Director of Facilities Planning and Development.

The Contractor is responsible for the payment of the aggregate of the Basic Hourly Rate and the Total Fringe Benefits to the workers on the project. Fringe benefit payments may be made to the worker in cash, or irrevocably made by a Contractor or Subcontractor to a third person pursuant to a fund, plan or program, or pursuant to an enforceable commitment, or any combination thereof, to carry out a financially responsible plan or program which was communicated in writing to the workmen affected, for medical or hospital care, pensions on retirement or death, compensation for injuries or illness resulting from occupational activity, or insurance to provide any of the foregoing, for unemployment benefits, life insurance, disability and sickness insurance, accident insurance, for vacation and holiday pay, for defraying costs of apprenticeship or other similar programs, or for other bona fide fringe benefits, but only where the Contractor or Subcontractor is not required by other federal or state law to provide any of the benefits as referenced in §290.210(5) RSMo 1994. Pay for travel, mileage, meals, bonuses, or other expenses are not fringe benefits and cannot be considered part of the workers wage rate. The Contractor shall not make any deductions for food, sleeping accommodations, transportation, use of small tools, uniforms, or anything of any kind or description, unless the Contractor and employee enter into an agreement in writing at the beginning of the worker’s term of employment, and such agreement is approved by the Owner. In the event the contract contains more than one wage determination the Contractor shall comply with both.

13.6.2 The Contractor shall submit to the Owner with the Contractor’s periodic pay request, certified payroll records for labor performed by the Contractor and Subcontractors of any tier. The Contractor shall submit all required certified payroll information records electronically in pdf format using the Owner’s web-based payment program. The certified payroll forms shall contain the name, address, personal identification number, and occupational title of the workers as well as the hours they work each day. The Owner’s acceptance of certified payroll records does not in any way relieve the Contractor of any responsibility for the payment of prevailing wages to workers on the project. The Contractor shall also maintain copies of the certified payroll
records. The Owner may, at any time, request copies of, and/or inspect all of the Contractor's payroll records for the Work to verify compliance. The Contractor shall furnish the Owner copies of payroll records within 10 days of the Owner’s written request. The Contractor shall provide copies of workers I-9 forms within 24 hours of written notice. (If applicable, and required by Owner, the Contractor will demonstrate that the Contractor is enrolled and participating in a federal work authorization program with respect to the employees working in connection with this project.) Such payroll records shall be maintained in accordance with Article 13.7.1 and shall be available for inspection for two (2) years after final completion of the Work. The contractor further agrees, in the event the records are not presented as requested, he will abide by any decision made by the Owner regarding underpayment of wages to workers and amounts owed them as well as liquidated damages for underpayment of wages. Falsification of the certified payroll records may result in the debarment of the contractor or subcontractor from future work with the University.

13.6.3 The acquisition of products or services is subject to the supplier's conformance to the rules and regulations of the President's Committee on Equal Employment Opportunity (41 CFR, Ch. 60).

13.6.4 The Contractor shall comply with the Copeland Regulations of the Secretary of Labor (29 CFR, Part 3), which are incorporated herein by reference. In addition, the Weekly Statement of Compliance required by these Regulations shall also contain a statement that the applicable fringe benefits paid are equal to or greater than those set forth in the minimum wage decision.

13.6.5 Contractor acknowledges that violation of the requirements of Article 13.6 result in additional costs to Owner, including, but not limited to, cost of construction delays, of additional work for Owner’s staff and legal expense. The cost of Contractor’s violation of the provisions of Article 13.6 would be and is difficult to determine and establish. In the event that Contractor fails to comply with the provisions of this Article 13.6, Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, the sum of Fifty Dollars ($50.00) per day per individual who is paid less than the applicable prevailing wage, to approximate the investigative cost resulting to the Owner for such violations. To approximate the delay costs, Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, the sum of One Hundred Dollars ($100.00) per day for each day the Contract cannot be closed out and final payment made because of Contractor’s failure to comply with the provisions of this Article 13.6. Such liquidated damages shall be collected regardless of whether the Work has been completed. The liquidated damages and other amounts set forth in this Article 13.6 shall be in addition to all other liquidated damages the Owner may be entitled as set forth in the Contract Documents.

13.6.6 The Owner may deduct liquidated damages described Article 13 and the amounts set forth in Article 13 from any unpaid amounts then or thereafter due the Contractor under the Contract. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be payable to the Owner at the demand of the Owner.

13.6.7 The Contractor shall specifically incorporate the obligations of Article 13 into the subcontracts, supply agreements and purchase orders for the Work and require the same of any Subcontractors of any tier.

13.6.8 Contractor acknowledges and recognizes that a material factor in its selection by the Owner is the Contractor’s willingness to undertake and comply with the requirements of this Article 13.6. If Contractor fails to comply with the provisions of this Article 13.6, Owner may, in its sole discretion, immediately terminate the Contract upon written notice. The rights and remedies of Owner provided herein shall not be exclusive and are in addition to other rights and remedies provided by law or under this Contract.

13.6.9 Only such workers who are individually registered in a bona fide apprenticeship program approved by the U.S. Department of Labor, Office of Apprenticeship can be paid less than the journeyperson rate of pay. “Entry Level Workers; must be registered apprentices. The apprenticeship ratio will be one to one with a journeyperson of the same classification. Any worker not registered as an apprentice per this section will be paid as a journeyperson.

13.6.10 The Contractor shall post the wage rates for the contract in a conspicuous place at the field office on the project. On projects where there is no field office the Contractor may post the wage rates at their local office, as long as they provide a copy of the wage rates to a worker upon request. The wage rates shall be kept in a clearly legible condition for the duration of the project.

13.6.11 Neither the Contractor, nor any Subcontractor of any tier, nor any person hired by them or acting on their behalf, shall request or demand that workers pay back, return, donate, contribute or give any part, or all, of said workers wages, salary, or any thing of value, upon the statement, representation or understanding that failure to comply with such request or demand will prevent such worker from procuring or retaining employment. The exception being to an agent or representative of a duly constituted labor organization acting in the collection of dues or assessments of such organization.
13.6.12 No contractor or subcontractor may directly or indirectly receive a wage subsidy, bid supplement, or rebate for employment on this project if such wage subsidy, bid supplement, or rebate has the effect of reducing the wage rate paid by the employer on a given occupational title below the prevailing wage rate as provided in contract. In the event a wage subsidy, bid supplement, or rebate is provided or received, the entity receiving such subsidy, supplement, or rebate shall report the date and amount of such subsidy, supplement, or rebate to the University within thirty days of receipt of payment. This disclosure report shall be a matter of public record. Any employer not in compliance with this Article shall owe to the University double the dollar amount per hour that the wage subsidy, bid supplement, or rebate has reduced the wage rate paid by the employer below the prevailing wage rate for each hour that work was performed.

13.6.13 Time and one half overtime will be paid on all hours over 10 hours per day or 40 hours per week. The wage rate is the total of the “Basic Hourly Rate” plus “Total Fringe Benefits” or the “public works contracting minimum wage”. For all work performed on a Sunday or Holiday, not less than twice the prevailing hourly rate of pay or public works contracting minimum wage will apply. Holidays are as follows: January first, the last Monday in May, July fourth, the first Monday in September, November 11, the fourth Thursday in November, December twenty-fifth. If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

13.7 Records

13.7.1 The Owner, or any parties it deems necessary, shall have access to and the right to examine any accounting or other records of the Contractor involving transactions and Work related to this Contract for five (5) years after final payment or five (5) years after the final resolution of any on going disputes at the time of final payment. All records shall be maintained in accordance with generally accepted accounting procedures, consistently applied. Subcontractors of any tier shall be required by Contractor to maintain records and to permit audits as required of Contractor herein.

13.8 Codes and Standards

13.8.1 The Work shall be performed to comply with the International Code Council (ICC) Codes, and the codes and standards noted below. The latest editions and supplements of these Codes and Standards in effect on the date of the execution of the Contract for Construction shall be applicable unless otherwise designated in the Contract Documents. Codes and standards required by accreditation agencies will also be used unless the ICC requirements are more stringent. In the event that special design features and/or construction systems are not covered in the ICC codes, the applicable edition of the National Fire Protection Association (NFPA) family of standards and/or the NFPA 101 Life Safety Code shall be used.

.1 ICC International Building Code and reference standards
.2 ICC International Plumbing Code
.3 ICC International Mechanical Code
.4 NFPA 70 National Electric Code (NEC)
.5 Americans with Disabilities Act – Standards for Accessible Design.
.6 American National Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks as published by the American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI) A17.1
.7 NFPA 101 Life Safety Code (as noted above)
.8 American Concrete Institute (ACI)
.9 American National Standards Institute (ANSI)
.10 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
.11 American Refrigeration Institute (ARI)
.12 American Society for Testing and Materials (ASTM)
.13 Missouri Standard Specification for Highway Construction, Missouri State Highway Commission
.14 National Electrical Manufacturers Association (NEMA)
.15 Underwriter's Laboratories, Inc. (UL), Federal Specifications
.16 Williams Steiger Occupational Safety and Health Act of 1970 (OSHA)

13.9 General Provisions

13.9.1 Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and are also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

13.9.2 This Contract shall be interpreted, construed, enforced and regulated under and by the laws of the State of Missouri. Whenever possible, each provision of this Contract shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Contract, or a portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without invalidating or affecting the remaining provisions of this Contract or valid portions of such provision, which are hereby deemed severable. Contractor and Owner further agree that in the event any provision of this Contract, or a portion thereof, is prohibited by law or found…
invalid under any law, this Contract shall be reformed to replace such prohibited or invalid provision or portion thereof with a valid and enforceable provision which comes as close as possible to expressing the intention of the prohibited or invalid provision.

13.9.3 Contractor and Owner each agree that the State of Missouri Circuit Court for the County where the Project is located shall have exclusive jurisdiction to resolve all Claims and any issue and disputes between Contractor and Owner. Contractor agrees that it shall not file any petition, complaint, lawsuit or legal proceeding against Owner in any other court other than the State of Missouri Circuit Court for the County where the Project is located.

13.9.4 Owner’s total liability to Contractor and anyone claiming by, through, or under Contractor for any Claim, cost, loss, expense or damage caused in part by the fault of Owner and in part by the fault of Contractor or any other entity or individual shall not exceed the percentage share that Owner’s fault bears to the total fault of Owner, Contractor and all other entities and individuals as determined on the basis of comparative fault principles.

13.9.5 Contractor agrees that Owner shall not be liable to Contractor for any special, indirect, incidental, or consequential damage whatsoever, whether caused by Owner’s negligence, fault, errors or omissions, strict liability, breach of contract, breach of warranty or other cause or causes whatsoever. Such special, indirect, incidental or consequential damages include, but are not limited to loss of profits, loss of savings or revenue, loss of anticipated profits, labor inefficiencies, idle equipment, home office overhead, and similar types of damages.

13.9.6 Nothing contained in this Contract or the Contract Documents shall create any contractual relationship with or cause of action in favor of a third party against the Owner.

13.9.7 No member or officer of the Board of Curators of the University incurs or assumes any individual or personal liability under the Contract or by reason of the default of the Owner in the performance of any of the terms thereof. Contractor releases and discharges all members or officers of the Board of Curators of the University from any liability as a condition of and as consideration for the award of the Contract to Contractor.

13.9.8 The Contractor hereby binds itself, its partners, successors, assigns and legal representatives to the Owner in respect to covenants, agreements and obligations contained in the Contract Documents. Contractor shall not assign the Contract or proceeds hereof without written consent of the Owner. If Contractor attempts to make such an assignment without such consent, it shall be void and confer no rights on third parties, and Contractor shall nevertheless remain legally responsible for all obligations under the Contract. The Owner’s consent to any assignment is conditioned upon Contractor entering into a written assignment which contains the following language: “it is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor and to claims and to liens for services rendered or materials supplied for the performance of the Work required in said Contract in favor of all persons, firms, corporations rendering such services or supplying such materials.”

13.10 Debarment and Suspension Certification
The contractor certifies to the best of its knowledge and belief that it and its principals are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency in accordance with Executive Order 12549 (2/18/86).

ARTICLE 14
TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 Termination by Owner for Cause
14.1.1 In addition to other rights and remedies granted to Owner under the Contract Documents and by law, the Owner may terminate the Contract if the Contractor:

.1 refuses or fails to supply enough properly skilled workers, superintendents, foremen, or managers;
.2 refuses or fails to supply sufficient or proper materials;
.3 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
.4 disregards laws, ordinances, rules, or regulations or orders of a public authority having jurisdiction;
.5 disregards the authority of the Owner’s Representative or Architect;
.6 breaches any warranty or representations made by the Contractor under or pursuant to the Contract Documents;
.7 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents;
.8 fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than ten (10) days, except as permitted under the Contract Documents;
.9 fails to maintain a satisfactory rate of progress with the Work or fails to comply with approved progress schedules; or
.10 violates in any substantial way any provisions of the Contract Documents.

14.1.2 When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner,
terminate this Contract by delivering a written notice of termination to Contractor and Contractor’s surety, and may:

1. take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
2. accept assignment of subcontracts pursuant to Paragraph 5.3; and
3. finish the Work by whatever reasonable method the Owner may deem expedient, including turning the Work over to the surety.

14.1.3 The Contractor, in the event of a termination under Section 14.1, shall not be entitled to receive any further payments under the Contract until the Work is completed in its entirety. Then, if the unpaid balance under the Contract shall exceed all expenses of the Owner in finishing the Work, including additional compensation for theArchitect’s services and expenses made necessary thereby, such excess will be paid to the Contractor; but, if such expenses of Owner to finish the Work shall exceed the unpaid balance, the Contractor and its surety shall be liable for, and shall pay the difference and any damages to the Owner. The obligation of the Contractor and its surety for payment of said amounts shall survive termination of the Contract.

14.1.4 In exercising the Owner's right to secure completion of the Work under any of the provisions hereof, the Owner shall have the right to exercise the Owner's sole discretion as to the manner, methods, and reasonableness of costs of completing the Work.

14.1.5 The rights of the Owner to terminate pursuant to Article 14.1 will be cumulative and not exclusive and shall be in addition to any other remedy provided by law or the Contract Documents.

14.1.6 Should the Contractor fail to achieve Final Completion of the Work within thirty (30) calendar days following the date of Substantial Completion, the Owner may exercise its rights under Article 14.1.

14.2 Suspension by the Owner for Convenience

14.2.1 The Owner may, without cause, order the Contractor in writing to suspend, delay, or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.2.2 An adjustment will be made to the Contract Sum for increases in the cost of performance of the Contract caused by suspension, delay or interruption. However, in the event of a suspension under this Article 14.2, Contractor hereby waives and forfeits any claims for payment of any special, indirect, incidental or consequential damages such as lost profits, loss of savings or revenue, loss of anticipated profits, idle labor or equipment, home office overhead, and similar type damages. No adjustment will be made to the extent:

1. that performance is, was, or would have been so suspended, delayed or interrupted by another cause for which the Contractor in whole or in part is responsible, or
2. that an equitable adjustment is made or denied under another provision of this Contract.

14.3 Owner’s Termination for Convenience

14.3.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. Termination by the Owner under this Paragraph shall be by a notice of termination delivered to the Contractor specifying the extent of termination and the effective date.

14.3.2 Upon receipt of a notice of termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

1. cease operation as specified in the notice;
2. place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete Work not terminated;
3. terminate all subcontracts and orders to the extent they relate to the Work terminated;
4. proceed to complete the performance of Work not terminated; and
5. take actions that may be necessary, or that the Owner may direct, for the protection and preservation of the terminated Work.

14.3.3 Upon such termination, the Contractor shall recover as its sole remedy payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project site, delivered and stored in accordance with the Owner's instructions and for all Owner approved claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors and suppliers. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits, consequential damages and other economic losses.

14.3.4 The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the Work, (2) claims which the Owner has against the Contractor under the Contract and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

14.3.5 Upon determination by a court that termination of Contractor or its successor in interest pursuant to Paragraph 14.1 was wrongful, such termination will be deemed converted
to a termination for convenience pursuant to Paragraph 14.3, and Contractor's sole and exclusive remedy for wrongful termination is limited to recovery of the payments permitted for termination for convenience as set forth in Paragraph 14.3.
SECTION 1.E

SPECIAL CONDITIONS

1. DEFINITIONS

a. "Drawings"

Drawings referred to in and accompanying Project Manual consist of Drawings prepared by and bearing name of below defined Architect, bearing Date of October 10, 2019, entitled "Nano and Molecular Medicine – Fitout Shell Space, Room 114A", project number CP190821.

b. Architect / Engineer
Planning, Design, and Construction
Campus Facilities
University of Missouri
Columbia, MO 65211
(573) 882-6800

c. Other Definitions: See Article 1., General Conditions.

2. SPECIAL SCHEDULING REQUIREMENTS

a. All critical submittals, including epoxy tops, shall be submitted within ten (10) calendar days from the contract award.

b. On-site construction will not start for the first thirty (30) calendar days, of the one hundred fifty (150) calendar days, contract period.

3. SCOPE OF WORK

a. The Contractor shall furnish all labor, materials, tools, equipment necessary for, and incidental to, construction of this project as indicated on Drawings and specified herein.

b. Work shall include everything requisite and necessary to finish work properly, notwithstanding that every item of labor or materials or accessories required to make project complete may not be specifically mentioned.

c. General Description of Work:

Project consists of the renovation of roughly 1,275 square feet of existing unfinished space within the International Institute for Nano & Molecular Medicine Research Facility to accommodate Air Pollution Chambers.
Laboratory research. Roughly 380 square feet of this total is to serve as temporary animal holding for research animals. The remainder of the floor area is to be research space.

4. LOCATION

a. Work shall be performed under this Contract on campus of the University of Missouri - Columbia, at the International Institute of Nano and Molecular Medicine Building, 1514 Research Park Drive.

5. NUMBER OF CONSTRUCTION DOCUMENTS

a. The Owner's Representative will furnish the Contractor a copy of executed Contract and a complete set of Drawings and Specifications in PDF format.

b. The Owner will furnish explanatory and changed Drawings in PDF format to Contractor as issued during project.

c. Hard copy prints of any documents (bid or explanatory) will be printed at the Contractor's expense through a printer of their choosing.

6. SUBMITTALS

a. The Contractor shall submit for approval to the Architect, equipment lists and Shop Drawings, as expediently as possible. Failure of the Contractor to submit Shop Drawings in a timely manner will result in the Owner holding back Contractor payments. (See General Conditions)

b. The material and equipment lists shall be submitted and approved before any material or equipment is purchased and shall be corrected to as-built conditions before the completion of the project.

c. The Contractor shall submit electronic versions of all required Shop Drawings, material and equipment lists. The Contractor shall upload all Shop Drawings to a secure information sharing website determined by the Owner notifying the Owner and Consultant that these shop drawings are available for review. Each submittal shall have the General Contractors digital stamp affixed to the first page signifying their review and acceptance. Review comments, approvals, and rejections will be posted on this same site with notification to the contractor. Submittals requiring a professional seal shall be submitted hard copy with a manual seal affixed.

(1) The Contractor shall identify each submittal item with the following:

(a) Project Title and Location

(b) Project Number

(c) Supplier's Name

(d) Manufacturer's Name
(e) Contract Specification Section and Article Number
(f) Contract Drawing Number
(g) Acrobat file name: Spec Section_Times Submitted-Spec Title:
(Example - 033000 _01-Cast In Place Concrete.pdf)

(2) Reference the accompanying Shop Drawing and Submittal Log at the end of this section (1.E.2) for required submittal information.

d. The Contractor shall submit to the Architect one (1) electronic copy, in PDF form of all required Operating Instructions and Service Manuals with one PDF file per specification division for the Architect’s and the Owner’s sole use prior to completing 50% of the adjusted contract. Payments beyond 50% of the contract amount may be withheld until all Operating Instructions and Service Manuals are received as referenced in the accompanying Operating Instructions and Service Manual Log at the end of this section (1.E.3).

e. The Contractor shall submit to the Owner’s Representative all items referenced in the accompanying Closeout Log (1.E.4) within 30 days following substantial completion of the work. The Owner’s Representative will maintain the closeout log and include as an agenda item at all coordination meetings.

7. NOTIFICATION

a. Before beginning Demolition Work or service outages, the Contractor shall provide, at minimum, seventy-two (72) hours advance notice to Owner’s Representative for purpose of verifying utility locations including, but not limited to, gas, telecommunications, electric, water, steam, sewer, and nitrogen. Contractor shall minimize the number of outages, minimize the length of outages and related work shall be continuous until the utility is restored.

8. USE OF PREMISES

a. Access: Access to construction site shall be as indicated on Drawings and as directed by the Owner's Representative.

b. Parking:

(1) The Owner will issue Contractor two (2) service vehicle parking permits for use in University Parking lot RP10. The permits will be issued at no cost to the contractor up to the contract completion date. After the contract completion date, the permits will be re-issued on an as available basis at the contractors’ expense. These permits are to be used for general contractor or subcontractor owned and labeled vehicles only. Personal vehicles are prohibited from use of these permits. Violation of this requirement may result in ticketing and/or
towing at the vehicle owner’s expense and suspension of progress payments.

(2) Parking of personal vehicles within project access/lay down/staging areas is prohibited. Violation of this requirement may result in ticketing and/or towing at the vehicle owner’s expense and suspension of progress payments.

(3) Parking or driving on sidewalks, landscaped areas, within fire and service lanes or generally in areas not designated for vehicular traffic is prohibited except as allowed in the contract documents. Violation of this requirement may result in ticketing and/or towing at the vehicle owner’s expense and suspension of progress payments.

(4) Free parking for contractor employees is available in the Ashland Road Contractor lot on an as available basis. This space is for use by contractor employees for parking their personal vehicles only and is not to be used for staging or storage.

(5) Vendor Permits may be purchased by contractor management personnel on an as available basis by contacting the Parking and Transportation office in the Turner Avenue Parking Structure. These permits will allow contractor management personnel to park in various University lots while conducting business on University construction projects.

(6) Temporary University parking permits may be purchased by contractor employees for use with their personal vehicles on an as available basis by contacting the Parking and Transportation office in the Turner Avenue Parking Structure.

(7) Conley Avenue between Missouri Avenue and University Avenue and Hitt Street between University Avenue and the Memorial Union are designated for pedestrian use only during the work week between the hours of 8:15 AM and 3:45 PM. Unless otherwise indicated in the contract documents, this area is strictly off limits to vehicular traffic without authorization from the Owner's Representative.

c. Storage of materials: The Contractor shall store all materials within project limits. The Contractor shall confine apparatus, materials, and operation of workers to location established by the Owner's Representative. The Contractor shall not unreasonably encumber premises with materials. In addition, storage trailer locations may be available within 1-1/2 miles of project site as directed by the Owner’s Representative. Storage trailer locations shall be subject to approval by the Owner's Representative and are available to the Contractor without cost.
d. Utilities: Drinking water, water required to carry on work, and 120 volt electrical power required for small tool operation may be obtained without cost to the Contractor from existing utilities at locations designated by the Owner's Representative. Provisions for obtaining power, including temporary extensions, shall be furnished and maintained by the Contractor. Upon completion of work such extensions shall be removed and any damage caused by use of such extensions shall be repaired to satisfaction of the Owner's Representative, at no cost to the Owner.

e. Restroom: Existing toilet facilities within Project Limits or Restrooms designated by the Owner's Representative for use by the Contractor will be available. Failure of the Contractor to maintain restrooms in a clean condition will be cause for the Contractor's discontinued use of the restroom.

f. Smoking is prohibited at the University of Missouri and all properties owned, operated, leased or controlled by the University of Missouri. Violation of the policy is defined as smoking any tobacco products, including e-cigarettes.

g. Landfill: The Contractor shall not use the Owner’s landfill. Dumping or disposal of excavated or demolition materials on Owner’s property shall not be permitted. The Contractor shall remove and legally dispose of excavated or demolished materials off the Owner’s property.

h. Care of Project Work Site: The contractor shall be responsible for maintaining the construction site in a reasonably neat and orderly condition by regular cleaning and mowing of the premises as determined by the Owner's Representative.

i. Discharge to Sewer Request: The University of Missouri's MS4 permit and NPDES Storm Water Discharge Permits along with the City of Columbia’s POTW Operating Permit as well as local ordinances, and state and federal environmental regulations prohibit hazardous materials from being disposed into either the storm water or sanitary sewer systems. Unless specifically approved, all chemical products such as paints, dyes, lawn care products, maintenance products, and oil is are prohibited from drain disposal. Any product, including contaminated water, being discarded into the storm water or sanitary sewer systems requires written approval from the Owner through a formal “Discharge to Sewer Request” form obtained at Discharge to Sewer Request Form. The contractor should submit the form to the Owner’s Representative, not to the Department of Environmental Health and Safety as the form indicates.

j. All concrete waste material including washout water shall be totally contained and removed from the Owner’s property.

k. Artifacts Found During Construction: Contractor shall immediately notify the Owner’s Representative when artifacts are uncovered or found during
the demolition or construction process. Artifacts include, but are not limited to, tools, drawings (construction or other), photographs, books and other objects/devices which may hold historical importance/significance. Do not remove or disturb the object(s) in question. Artifacts are not considered part of demolished materials and shall remain the property of the University of Missouri.

I. “Permit Required Confined Space” Entry Communication and Coordination

(See OSHA 1926 subpart aa – Construction Confined Space for the definition of “permit required confined spaces” - Note: OSHA does not apply to the University. However, the University will provide a list of all known “permit required confined spaces”)

There are no known “permit required confined spaces” within the project limits. Each contractor shall conduct a survey to confirm whether or not any confined spaces exist within the project limits. It is incumbent upon each contractor to list all “permit required spaces”.

The Contractor shall notify the Owner’s Representative if 1) conditions change resulting in a non-permit required confined space being reclassified to a “permit required confined space” after evaluation of the space by a competent person; 2) a space previously thought to be non-permit required space is classified as a “permit required confined space”; or 3) during the course of construction a “permit required confined space” is created after evaluation by a competent person.

The Contractor shall submit to the Owner’s Representative a copy of the cancelled confined space entry permit and a written report summarizing the permit space program followed and all hazards confronted or created during entry operations. This information shall be submitted within one week of cancelling the permit.

9. PROTECTION OF OWNER'S PROPERTY

a. The Contractor shall be responsible for repair of damage to building exterior and interior, drives, curbs, streets, walks, grass, shrubbery and trees, which was caused by workmen or equipment employed during progress of work. All such repairs shall be made to satisfaction of the Owner's Representative, at no cost to the Owner, or reimburse the Owner if the Owner elects to make repairs. For landscape damage, the Owner shall make such repairs. Compensation for these repairs shall be determined by the Owner's Representative using the "Valuation of Landscape Trees, Shrubs, and other Plants" as published by the International Society of Arboriculture, as last revised.
b. Preserving and Protecting Existing Vegetation:

1) Protection and compensation for damages:

(a) Trees and shrubs within work area designated to remain shall be protected from damage during construction by fencing or armoring as indicated on Drawings or specified herein. Plant protection devices shall be installed before work has begun and shall be maintained for duration of work unless otherwise directed by Owner's Representative.

2) Plants within work area designated for removal shall be removed by Contractor.

3) To prevent compaction of soil over tree roots, vehicles or equipment shall not at any time park or travel over, nor shall any materials be stored within drip line of trees designated to remain.

4) Owner's Representative will stop work immediately when proper measures are not being employed to protect trees and shrubs. Contractor will be notified to resume work after required protection measures are implemented.

5) Pruning of limbs necessary to repair damage or provide clearance for work shall be done by the MU Landscape Services Department at the direction of the Owner's Representative. Limbs shall be cut off cleanly and cut surfaces treated according to established horticultural standards.

c. Hot Work Permitting:

1) Hot work Requirements – The contractor shall comply with the following hot work requirements and the requirements of NFPA 51B.

(a) Hot work shall be defined as any work involving burning, welding, grinding, cutting, or similar operation that is capable of initiating fires or explosions.

(b) A Hot Work Permit shall be used on all hot work outside a designated hot work area. This permit shall be clearly visible within proximity of the hot work. The permit authorizing individual(s) shall be as designated by the Contractor. These permits may be obtained from the Owner's Representative.

(c) Notify the Owner's Representative prior to starting hot work in buildings where fire alarm / fire suppression systems exist so Campus Maintenance can be notified.
(d) A copy of all completed hot work permits shall be provided to the Owner’s Representative.

10. SUBSTITUTIONS and EQUALS
   a. Substitutions are defined in General Conditions article 3.11.8 for and Equals are defined General Conditions Article 3.12.
   b. Use of materials, products or equipment other than those named and described in the Contract Documents are substitutions and/or equal. Substitutions and/or equals submitted during the bidding period shall be received by both the Architect and the Owner at least ten calendar days prior to the date for receipt of bids. To be considered, bidder’s proposal shall include a complete description of the proposed substitution and/or equal and a comparison of significant qualities of the proposed substitution and/or equal with those specified including drawings, performance and test data, and other information necessary for an evaluation. The Architect's decision on the approval or disapproval of a proposed substitution and/or equal shall be final.
   c. If the Architect and Owner approve a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approval made in any other manner.

11. CODES AND STANDARDS
   a. The Contractor shall comply with applicable codes and standards as listed in General Conditions.

12. PERMITS
   a. The Owner’s Representative shall secure University Authority Having Jurisdiction building permits required for the project and shall provide a list of required inspections to the Contractor. The Contractor shall work with the Owner’s Representative to coordinate and provide reasonable scheduling and access to the Work for the Owner’s inspection.
   b. Prior to commencement of Boilers, Water Heaters or Pressure Vessels the Contractor must obtain an installation permit from the State of Missouri, Division of Fire Safety, Boiler and Pressure Unit as required by 11 CSR 40-2.010 through 11 CSR 40-2.065.

      The permit applications are available at: www.dfs.dps.mo.gov/programs/bpv/.

13. SPECIALTIES
   a. Owner furnished topsoil: The contractor shall place Owner provided topsoil and grade to the finish elevation as defined in the contract. The contractor
will load and haul topsoil from the Owner’s stockpile located within two (2) miles of the project site. The contractor is required to notify the Owner a minimum of five working days in advance of the needed topsoil. Topsoil shall be placed with rubber tracked equipment to minimize compaction. Placement shall be sequenced to minimize compaction and damage to the topsoil. Topsoil or subsoil damaged, contaminated, or compacted during topsoil placement shall be repaired or replaced as directed by the Owner’s Representative. Hand work shall be required next to adjacent structures and around utilities. Erosion control measures shall be maintained throughout and after topsoil placement.

(1) The sub-grade is to be left at minus six inches (6") in all areas unless indicated otherwise. All planting bed sub-grades are to be left a minus eighteen inches (18"). The contractor is to remove all deleterious material from the sub-grade prior to placing topsoil. All subgrade areas shall contain at least 6" of subsoil, (ie. cover clean rock backfilled areas). All subgrade areas shall be “ripped” a minimum of 6" deep and a maximum of 12" apart in opposite directions with minimal tire traffic to follow. All exposed deleterious material and unacceptable rock shall be removed.

(2) The contractor shall adjust all yard boxes, valve boxes, pull boxes, cleanouts, and manhole lid rings etc. (includes irrigation, sewers, water and electric), to the indicated finish grade.

(3) Final plantings will be by the Owner. The Owner will water and maintain all seed, sod and landscaping.

14. PRE-BID INSPECTION

a. All pre-bid inspections of work areas shall be scheduled with pre-bid inspection guide, telephone: (573) 882-2228.

15. PROJECT SCHEDULING

a. The project scheduling specification for the project are included immediately after the Special Conditions. For this project the Contractor shall meet the following scheduling requirements.

(1) Option #1 - Contractor Schedule (Small Projects only): Contractor is responsible for the schedule and must comply with the Owner’s requirements. See Contractor Schedule Specification included in these documents.

16. PROJECT COORDINATION

a. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the
Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.

3. Make provisions to accommodate items scheduled for later installation.

b. **Coordination Drawings:** Within fifteen (15) days of Notice to Proceed provide coordination drawings for the integration of the Work, including work first shown in detail on shop drawings or product data. Show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided, or function as indicated.

   1. Show the interrelationship of components shown on separate shop drawings.

   2. Indicate required installation sequences.

   3. Call attention in advance to Architect of any dimensional or detail information needed to complete the coordination drawings.

17. **BUILDING SYSTEM COMMISSIONING**

a. Contractor shall provide all personnel and equipment required to complete the commissioning activities referenced in the Commissioning Plan. The requirements of the commissioning plan shall be completed in their entirety before substantial completion and submitted as referenced in the Closeout Log.

b. The contractor shall designate a competent person, separate from the superintendent or project manager, to act as the contractor’s commissioning coordinator. The commissioning coordinator is responsible for planning, scheduling, coordinating, conducting and verifying all commissioning activities required by the commissioning plan and ensuring all building systems are complete, operable and ready for use by the Owner. At a minimum, building ventilation systems, chilled/hot water generation systems, hydronic distribution systems, power distributions systems and fire detection and alarm systems, as applicable.
18. MECHANICAL, ELECTRICAL, PLUMBING (MEP) PRE-INSTALLATION MEETING(S)

a. Before the start of MEP installation, the Owner’s Representative will convene an MEP pre-installation meeting. Meeting participants to include contractor (including MEP subcontractors), Owner’s Representative and additional contractor and University operational staff invited by the Owner’s Representative. Topics will include underground rough-ins, steam piping, chilled water piping, sprinkler piping, hot water piping, electrical system, duct, telephone/data wiring, control wiring. Additional meetings will be conducted as required for the review of coordination drawings and scope specific installations. Cross section drawings of corridor ceilings and other congested areas will be of highest priority and will be reviewed prior to the start of installations in the affected areas. Meeting minutes and sign-up sheet will be transcribed by contractor and distributed to attendees.

19. GENDER NEUTRAL SIGNAGE

a. All contractor installed signs including signs referenced in General Conditions articles 3.5.3 and 10.2.3 shall be gender neutral in wording.

20. CONSTRUCTION WASTE MANAGEMENT

a. The goal of Construction Waste Management is to divert waste from the sanitary landfill. This shall be accomplished through reuse, recycling and/or salvage of non-hazardous construction and demolition debris to the greatest extent practical. Track and report all efforts related to reuse, recycling and/or salvage materials from the project (including clean fill material). Report all material types and weights, where material was diverted, type of diversion, documentation of diversion (eg: waste or recycling tickets), and applicable dates. In order to calculate the diversion percentage, total weights of all non-hazardous landfill material must be reported. This information shall be updated monthly utilizing the Construction Waste Management Worksheet provided here: [http://www.cf.missouri.edu/cf/pdc/contractor_information](http://www.cf.missouri.edu/cf/pdc/contractor_information). Copies of all applicable receipts, tickets and tracking logs shall be uploaded to the Owner’s information sharing website or reported as required by the Project Manager.

b. Include the following material to be salvaged or recycled during the course of the project and any additional items:

   (1) Cardboard
   (2) Beverage containers
   (3) Metals from framing, banding, stud trim, ductwork, piping, rebar, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze
   (4) Mechanical and electrical equipment
(5) Building components which can be removed relatively intact from existing construction
(6) Packaging materials
(7) Glass
(8) Acoustical ceiling panels
(9) Plastics

21. WARRANTY WALKTHROUGH

a. Contractor shall attend a walk-thru with the Owner at 11 months after acceptance to review and document any warranty items to be addressed as part of the 12 month warranty stated in article 3.1 of the General Conditions.

END OF SECTION
SECTION 1.E.1

SCHEDULING SPECIFICATION

Option #1

1. GENERAL

a. Time is of the essence for this contract. The time frames spelled out in this contract are essential to the success of this project. The University understands that effective schedule management, in accordance with the General Conditions and these Special Conditions is necessary to ensure that the critical milestone and end dates spelled out in the contract are achieved.

b. Related Documents
   Drawings and general provisions of the Contract, including General Conditions' Article 3.17 shall apply to this Section.

c. Stakeholders
   A Stakeholder is anyone with a stake in the outcome of the Project, including the University, the University Department utilizing the facility, the Design Professionals, the Contractor and subcontractors.

d. Weather
   
   (1) Contractor acknowledges that there will be days in which work cannot be completed due to the weather, and that a certain number of these lost days are to be expected under normal weather conditions in Missouri.

   (2) Rather than speculate as to what comprises "normal" weather at the location of the project, Contractor agrees that it will assume a total of 44 lost days due to weather over the course of a calendar year, and include same in its as planned schedule. For projects of less than a calendar year, lost weather days should be prorated for the months of construction in accordance with the following schedule.

   (3) Anticipated weather days for allocation/proration only. For projects lasting 12 months or longer, the 44 days per year plus whatever additional months are included will constitute normal weather.

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2. SCHEDULING PROCESS

a. The intent of this section is to insure that a well-conceived plan, that addresses the milestone and completion dates spelled out in these documents, is developed with input from all stakeholders in the project. Input is limited to all reasonable requests that are consistent with the requirements of the contract documents, and do not prejudice the Contractor’s ability to perform its work consistent with the contract documents. Further, the plan must be documented in an understandable format that allows for each stakeholder in the project to understand the plan for the construction and/or renovation contained in the Project.

b. Contractor Requirements

(1) Schedule Development
Contractor shall prepare the Project Schedule using Primavera SureTrack or P3, Microsoft Project, Oracle P6, or other standard industry scheduling software, approved by the Owner’s Representative.

(2) Schedule Development
Within 2 weeks of the NTP, contractor shall prepare a schedule, preferably in CPM format, but in detailed bar chart format at a minimum, that reflects the contractor’s and each subcontractors plan for performing the contract work.

Contractor shall review each major subcontractor's schedule with the sub and obtain the subcontractor’s concurrence with the schedule, prior to submitting to the University.

(3) Schedule Updates

(a) Schedule Updates will be conducted once a month, at a minimum. Actual Start and Finish dates should be recorded regularly during the month. Percent Complete, or Remaining Duration shall be updated as of the data date, just prior to Contractor’s submittal of the update data.

(b) Contractor will copy the previous months schedule and will input update information into the new monthly update version.

(c) Contractor will meet with the Owner’s Representative to review the draft of the updated schedule. At this meeting, Owner’s Representative and Contractor will:
   (i) Review out of sequence progress, making adjustments as necessary
(ii) Add any fragments necessary to describe changes or other impacts to the project schedule

(iii) Review the resultant critical and near critical paths to determine any impact of the occurrences encountered over the last month.

(4) Schedule Narrative

After finalization of the update, the Contractor will prepare a Narrative that describes progress for the month, impacts to the schedule and an assessment as to the Contractor’s entitlement to a time extension for occurrences beyond its control during the month and submit in accordance with this Section.

(5) Progress Meetings

(a) Review the updated schedule at each monthly progress meeting. Payments to the Contractor may be suspended if the progress schedule is not adequately updated to reflect actual conditions.

(b) Submit progress schedules to subcontractors to permit coordinating their progress schedules to the general construction work. Include 4 week look ahead schedules to allow subs to focus on critical upcoming work.

3. CRITICAL PATH METHOD (CPM)

a. This Section includes administrative and procedural requirements for the critical path method (CPM) of scheduling and reporting progress of the Work.

b. Refer to the General and Special Conditions and the Agreement for definitions and specific dates of Contract Time.

c. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships and network calculations determine when activities can be performed and the critical path of the Project.

d. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall project duration.

e. Network Diagram: A graphic diagram of a network schedule, showing the activities and activity relationships.
f. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling, the construction project. Activities included in a construction schedule consume time and resources.

g. Critical activities are activities on the critical path.

h. Predecessor activity is an activity that must be completed before a given activity can be started.

i. Milestone: A key or critical point in time for reference or measurement.

j. Float or Slack Time: The measure of leeway in activity performance.

k. Accumulative float time is not for the exclusive use or benefit of the Owner or Contractor, but is a project resource available to both parties as needed to meet contract milestones and the completion date.

l. Total float is herein defined as the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.

m. Weather: Adverse weather that is normal for the area must be taken into account in the Contractor's Project Schedule. See 1.d.3, above.

n. Force Majeure Event: Any event that delays the project but is beyond the control and/or contractual responsibility of either party.

o. Schedule shall including the following, in addition to Contractor's work.

(1) Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by the following:
   (a) Requirements for phased completion and milestone dates.
   (b) Work by separate contractors.
   (c) Work by the Owner.
   (d) Coordination with existing construction.
   (e) Limitations of continued occupancies.
   (f) Uninterruptible services.
   (g) Partial occupancy prior to Substantial Completion.

p. Area Separations: Use Activity Codes to identify each major area of construction for each major portion of the Work. For the purposes of this Article, a "major area" is a story of construction, a separate building, or a similar significant construction element.

4. TIME EXTENSION REQUEST

a. Refer to General Conditions of the Contract for Construction, Article 4.7 Claims for Additional Time.
b. Changes or Other Impacts to the Contractor’s Work Plan
The Owner will consider and evaluate requests for time extensions due to changes or other events beyond the control of the Contractor on a monthly basis only, with the submission of the Contractor’s updated schedule, in conjunction with the monthly application for payment. The Update must include:

(1) An activity depicting the event(s) impacting the Contractor’s work plan shall be added to the CPM schedule, using the actual start date of the impact, along with actually required predecessors and successors.

(2) After the addition of the impact activity, the Contractor will identify subsequent activities on the critical path, with finish to start relationships that can be realistically adjusted to overlap using good, standard construction practice.

   (a) If the adjustments above result in the completion date being brought back within the contract time period, no adjustment will be made in the contract time.

   (b) If the adjustments above still result in a completion date beyond the contract completion date, the delay shall be deemed excusable and the contract completion date shall be extended by the number of days indicated by the analysis.

   (c) Contractor agrees to continue to utilize its best efforts to make up the time caused by the delays. However the Contractor is not expected to expend costs not contemplated in its contract, in making those efforts.

c. Questions of compensability of any delays shall be held until the actual completion of the project. If the actual substantial completion date of the project based on excusable delays, excluding weather delays, exceeds the original contract completion date, AND there are no delays that are the responsibility of the contractor to consider, the delays days shall be considered compensable. The actual costs, if any, of the Contractor’s time sensitive jobsite supervision and general conditions costs, shall be quantified and a change order issued for these costs.

END SECTION
SECTION 1.E.2
SHOP DRAWING AND SUBMITTAL LOG

Project: Nano and Molecular Medicine – Fitout Shell Space, Rm 114
Project Number: CP190821
 Contractor:

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SECTION 1.E.2

SHOP DRAWING AND SUBMITTAL LOG

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MU Project #CP190821

SDSL - 2
# SECTION 1.E.2

## SHOP DRAWING AND SUBMITTAL LOG

**Project:** Nano and Molecular Medicine – Fitout Shell Space, Rm 114  
**Project Number:** CP190821  
**Contractor:**

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<th>Section</th>
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<th>Date Returned</th>
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SECTION 1.E.2
SHOP DRAWING AND SUBMITTAL LOG

Project: Nano and Molecular Medicine – Fitout Shell Space, Rm 114
Project Number: CP190821
Contractor:

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<th>Date to Consultant</th>
<th>Date Returned</th>
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<td>32 3119</td>
<td>Decorative Metal Fences and Gates – Product Data</td>
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## SECTION 1.E.3

### OPERATING INSTRUCTIONS AND SERVICE MANUAL LOG

**Project:** Nano and Molecular Medicine – Fitout Shell Space, Rm 114  
**Project Number:** CP190821  
**Contractor:**

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<th>Section</th>
<th>Description</th>
<th>Catalog Data</th>
<th>Wiring Diagrams</th>
<th>Installation Instructions</th>
<th>Service &amp; Maintenance Instructions</th>
<th>Parts List &amp; Availability</th>
<th>Performance Curves</th>
<th>Startup &amp; Operating Instructions</th>
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<td>08 7100</td>
<td>Door Hardware</td>
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<td>09 7200</td>
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<td>Metal Laboratory Casework</td>
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## SECTION 1.E.4

### CLOSEOUT LOG

Project: Nano and Molecular Medicine – Fitout Shell Space, Rm 114  
Project Number: CP190821  
Contractor:  

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<tr>
<th>Section</th>
<th>Description</th>
<th>Contractor / Subcontractor</th>
<th>Date Rec'd</th>
<th># of Copies</th>
<th>CPM Initials</th>
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<tr>
<td>GC / 3.11</td>
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<td>08 7100</td>
<td>Door Hardware – Warranty</td>
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<td>09 5100</td>
<td>Acoustical Ceilings – 15% 2x2</td>
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<td>09 9000</td>
<td>Painting and Coating – 1 gal. of each color</td>
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<td>12 3553.13</td>
<td>Metal Laboratory Casework – Finish Touch-up Kit</td>
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<td>Warranty</td>
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<td>23 3600</td>
<td>Air Terminal Units - Warranty</td>
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<td>32 3119</td>
<td>Decorative Metal Fences and Gates – Warranty</td>
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<tr>
<th>Commissioning Items by CSI Division</th>
<th>Verified by:</th>
<th>Date compl</th>
<th>Coord Initial</th>
<th>Documentation Required</th>
<th>Owner Witness Required</th>
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<tbody>
<tr>
<td><strong>1 Building System Commissioning</strong></td>
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<tr>
<td>Commissioning Agent - Conduct pre-installation meetings per specifications.</td>
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<tr>
<td><strong>24100 Demolition</strong></td>
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<tr>
<td>Clean adjacent structures and improvements of dust, dirt and debris caused by selective demolition operations. Return adjacent areas to conditions existing before demolition.</td>
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<td><strong>33000 Cast-In-Place Concrete</strong></td>
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<tr>
<td>Provide a Copy Of Field Cured Concrete Cylinder Test Report to Owner's Rep Prior to Stripping Any Load Bearing Formwork</td>
<td></td>
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<td>Test Report From Independent Testing Lab</td>
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</tr>
<tr>
<td>Submit concrete mix designs prepared by a qualified testing laboratory for approval prior to placement.</td>
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<td>mix design reports</td>
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<td><strong>54000 Cold-Formed Metal Framing</strong></td>
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<tr>
<td>Provide welder qualification report for each welder on site</td>
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<td>Welder Qualifications</td>
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<td><strong>79200 Joint Sealants</strong></td>
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<tr>
<td>Clean out joints immediately before installing joint sealant</td>
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<tr>
<td><strong>81113 Hollow Metal Doors &amp; Frames</strong></td>
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<tr>
<td>Check Fire Label on Door and Frames</td>
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<td>itemized list of doors</td>
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<tr>
<td><strong>84113</strong> Aluminum Entrances and Storefronts</td>
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<tr>
<td>Notify Owner When Section of Work Is Ready For Infiltration Test</td>
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</tbody>
</table>

| **87100** Door Hardware | | | | | |
| Verify door closures comply with ADA requirements | | | | | ✔

| **99000** Painting and Coating | | | | | ✔
| Periodically Check Wet Film Thickness To Assure Conformance With Manufacturer’s Requirements To Achieve Dry Film Thickness | | | | | ✔

| **220553** Identification for Plumbing Piping and Equipment | | | | | ✔
| Install valve tags on valves and control devices per specifications | | | | | ✔

| **220719** Plumbing Piping Insulation | | | | | |
| Verify all valve stems are extended and accessible | | | | | |

| **221005** Plumbing Piping | | | | | ✔
| Flush, chlorinate, and reflush the potable water system. Take water sample at farthest point in system and perform test by approved lab. | | | | | ✔
| If test pressure is not indicated, hydrostatically test each system to 1.5 times the system operating pressure. For 1 hour. Pressure test sewer and storm pipe at 10 ft head for 15 minutes | | | | | ✔

9/27/2019
<table>
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<tr>
<th>Commissioning Items by CSI Division</th>
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<th>Firm</th>
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<td>224000 Plumbing Fixtures</td>
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<td>Test Report</td>
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<td>Adjust water pressure at drinking fountains, electric water coolers, faucets, shower valves, and flushometer valves. Verify proper flow and stream. Verify water temperature</td>
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<td>230553 Identification for HVAC Piping and Equipment</td>
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<td>Install pipe markers per specifications</td>
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<td>230593 Contractor Scope for Owner Supplied TAB</td>
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<td>Confirm approved shop drawings, as-builds, O&amp;Ms and change orders have been submitted to the TAB engineer prior to testing and balancing</td>
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<td>Ensure pre-test requirements as specified in paragraph 1.01 have been completed</td>
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<td>Hold PreBalancing Conference as specified</td>
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<td>Verify all valves &amp; damper controls are extended and accessible</td>
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<td>Verify all piping unions are accessible for maintenance</td>
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<td>Hydrostatic Pressure test all pipe to 1.5 times working pressure for 1 hour.</td>
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<td>test for duct leakage prior to testing and balancing</td>
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<td>Demonstrate Proper Operation of All Fire Dampers per NFPA-90A.</td>
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<td>Verify fire and smoke dampers are in full open position</td>
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<td>Verify that shipping blocks and bracing are removed</td>
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<td>Verify controls are accessible</td>
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<td>260510 Electrical Materials and Methods</td>
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<td>Verify that every penetration through fire walls (re: life safety plans) has been properly firestopped</td>
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<td>Test Emergency Lighting fixtures for proper operation</td>
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<td>312200 Grading</td>
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<tr>
<td>Proofroll subgrade under road and parking lot structures per contract documents</td>
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<tr>
<td>321313 Concrete Paving</td>
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<tr>
<td>Proof rolling shall be performed in the presence of Owner's Representative per specifications</td>
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</tr>
</tbody>
</table>
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Water – turned on to the first valve past Energy Management’s last valve.

- Review all piping and equipment being turned on for proper installation and completed testing.
- Insulation installed (preferred but not required).
- Meter properly installed, working, and in readable location.
- Contractor has swabbed out with chlorine all piping from the backflow preventer to the source while installing.
- All bacteriological tests have been completed and passed.
- Backflow preventer installed and tested. (will need water pressure to test)
- Pressure test completed in piping being turned on.
- Contractor has method to communicate “Services On” to other contractor personnel and Owner’s personnel.
- Consultant has signed off

Steam – turned on to the first valve past Energy Management’s last valve.

- Review all piping, equipment, valves, reducing stations, relief valves, etc. for proper installation and complete testing.
- Piping protected from the weather.
- Insulation must be installed.
- All hangers and bolts have been installed.
- Meter installed, working and in readable location. (Don’t need metasys to turn on.)
- All needed traps are installed and able to be tested as they are turned on.
- Condensate system is installed and operating including the pumping system.
- Pressure test completed in piping being turned on.
- Contractor has method to communicate “Services On” to other contractor personnel and Owner’s personnel.
- Consultant has signed off

Condensate – turned on to the first valve past Energy Management’s last valve.

- Review all piping and equipment being turned on for proper installation and completed testing.
- Insulation installed (preferred but not required)
- Pressure test completed in piping being turned on.
- Contractor has method to communicate “Services On” to other contractor personnel and Owner’s personnel.
- Consultant has signed off

Electric – turned on to the first breaker past 13.8kV transformer.

- Review all wiring and equipment being turned on for proper installation and completed testing.
- GFCI set and tested.
- Breakers set and tested.
- All needed permanent grounds are installed.
- Meter installed, working and in readable location.
- Main switchgear protected from the weather.
- Contractor has method to communicate “Services On” to other contractor personnel and Owner’s personnel.
- Consultant has signed off

Chilled Water – turned on to the first valve inside of building.

- Review all piping and equipment being turned on for proper installation and completed testing.
- Insulation must be installed.
- Meter installed, working and connected to Metasys.
- Building pump and automatic isolation/control valve must be installed and under control.
- If chillers are installed, automatic loop pump isolation must be installed.
- Control valves must be installed and automatically controlled on all loads.
- Contractor has method to communicate “Services On” to other contractor personnel and Owner’s personnel.
- Consultant has signed off
Please see following website for suggested commissioning forms:

https://www.cf.missouri.edu/cf/pdc/commissioning-forms
SECTION 1.F

INDEX OF DRAWINGS

Drawings referred to in and accompanying Project Manual consists of following sheets dated October 10, 2019.

G001 of 1:  Cover Sheet
FP101 of 1:  Fire Protection Plan
A101 of 4:  Floor and Ceiling Plans
A401 of 4:  Elevations, Sections, and Details
A402 of 4:  Structural Details
A601 of 4:  Schedules
P101 of 2:  Plumbing Plans
P601 of 2:  Plumbing Schedules and Details
M101 of 4:  Mechanical Demolition Plan
M102 of 4:  Mechanical Renovation Plan
M601 of 4:  Mechanical Schedules and Details
M701 of 4:  Mechanical Control Details
E101 of 4:  Electrical and Lighting Plans
E501 of 4:  Electrical Details and Schedules
E701 of 4:  Electrical Control Diagrams
E702 of 4:  Electrical Riser Diagram

END OF SECTION
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SECTION 1.G
PREVAILING WAGE RATES

1. The prevailing wage rates for Boone County as issued by the Missouri Division of Labor.

Annual Wage Order No. 25 - Boone County
Effective 8/28/2018

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<thead>
<tr>
<th>OCCUPATIONAL TITLE</th>
<th>BASIC HOURLY RATES</th>
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<tbody>
<tr>
<td>Asbestos Worker (H&amp;F) Insulator</td>
<td>$55.87</td>
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<tr>
<td>Boilermaker</td>
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<tr>
<td>Bricklayer</td>
<td>$48.19</td>
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<tr>
<td>Carpenter, Pile Driver, Millwright, Lather, Linoleum Layer</td>
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<td>Cement Mason, Plasterer</td>
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<td>Communication Technician</td>
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<td>Electrician (Inside Wireman)</td>
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<tr>
<td>Electrician (Outside-Line Construction/Lineman)</td>
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<tr>
<td>Elevator Constructor</td>
<td>$80.35</td>
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<td>Glazier</td>
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<td>Ironworker</td>
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<td>Laborer, 1st Semi Skilled Laborer, 2nd Semi Skilled Laborer</td>
<td>$37.55</td>
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<tr>
<td>Mason, Marble Mason, Marble Finisher, Terrazzo Worker, Terrazzo Finisher, Tile Setter, Tile Finisher</td>
<td>$35.29</td>
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<tr>
<td>Operating Engineer</td>
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<td>Painter</td>
<td>$36.67</td>
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<td>Plumber, Pipefitter</td>
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<td>Roofer/Waterproofer</td>
<td>$45.59</td>
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<td>Sheet Metal Worker</td>
<td>$49.43</td>
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<tr>
<td>Sprinkler Fitter - Fire Protection</td>
<td>$57.26</td>
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<tr>
<td>Truck Driver</td>
<td>$36.00</td>
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</tbody>
</table>
SECTION 1.H

ALTERNATES

Base Bid may be increased in accordance with following Additive Alternate proposal(s) as Owner may elect:

1. Additive Alternate No. 1: Exterior improvements including concrete drive and drainage improvements, fabric awning, and fencing. These improvements also require inclusion of construction fencing.

2. Additive Alternate No. 2: Modify the overhead channel ceiling support grid to increase to a 2'x2' spacing from the base bid scope.

END OF SECTION
SECTION 02 4100
DESTRUCTION

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Selective demolition of building elements for alteration purposes.

1.02 REFERENCE STANDARDS
A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE
A. Remove items indicated on drawings for demolition.
B. Remove other items indicated, for salvage, relocation, and recycling.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS
A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   2. Provide, erect, and maintain temporary barriers and security devices.
   3. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   4. Do not close or obstruct roadways or sidewalks without permit.
   5. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
B. Do not begin removal until receipt of notification to proceed from Owner's Representative.
C. Do not begin removal until built elements to be salvaged or relocated have been removed.
D. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.
E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
F. If hazardous materials are discovered during removal operations, stop work and notify Architect/Engineer and Owner's Representative; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
G. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Dismantle existing construction and separate materials.
   2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.03 EXISTING UTILITIES
A. Protect existing utilities to remain from damage.
B. Do not disrupt public utilities without permit from authority having jurisdiction.
C. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner's Representative.
D. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

E. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

F. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

### 3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect/Engineer before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction consisting of 6 mil polyethylene sheeting.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

### 3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 02 4100
SECTION 03 0516
UNDERSLAB VAPOR BARRIER

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Sheet vapor barrier under concrete slabs on grade.

1.02 RELATED REQUIREMENTS
A. Section 03 3000 - Cast-in-Place Concrete: Preparation of subgrade, granular fill, placement of concrete.

1.03 REFERENCE STANDARDS
A. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

PART 2 PRODUCTS

2.01 MATERIALS
A. Underslab Vapor Barrier:
   1. Water Vapor Permeance: Not more than 0.010 perms, maximum.
   2. Thickness: 15 mils.
   3. Basis of Design:
B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

3.02 INSTALLATION
A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
C. Lap joints minimum 6 inches.
D. Repair damaged vapor retarder before covering with other materials.
SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Concrete formwork.
B. Floors and slabs on grade.
C. Concrete reinforcement.
D. Joint devices associated with concrete work.
E. Concrete curing.

1.02 RELATED REQUIREMENTS
A. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS
C. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
E. ACI 308R - Guide to Curing Concrete.
F. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

1.04 QUALITY ASSURANCE
A. Perform work of this section in accordance with ACI 301 and ACI 318.

PART 2 PRODUCTS

2.01 FORMWORK
A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.

2.02 REINFORCEMENT MATERIALS
A. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
   1. WWR Style: 4 x 8-W6 x W10.
B. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.03 CONCRETE MATERIALS
A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
B. Fine and Coarse Aggregates: ASTM C33/C33M.
C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
2.04 ADMIXTURES
   A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

2.05 CONCRETE MIX DESIGN
   A. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION
   A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
   B. Verify that forms are clean and free of rust before applying release agent.
   C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
   D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS
   A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
   B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.04 PLACING CONCRETE
   A. Place concrete in accordance with ACI 304R.
   B. Place concrete for floor slabs in accordance with ACI 302.1R.
   C. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 SLAB JOINTING
   A. Locate joints as indicated on drawings.
   B. Anchor joint fillers and devices to prevent movement during concrete placement.
   C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
   1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

3.06 CONCRETE FINISHING
   A. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, thin set ceramic tile, and epoxy flooring.

3.07 CURING AND PROTECTION
   A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
   B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   C. Surfaces Not in Contact with Forms:
1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.

2. Final Curing: Begin after initial curing but before surface is dry.

3.08 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION 03 3000
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Mortar for masonry.

1.02 RELATED REQUIREMENTS
A. Section 04 0200 - Unit Masonry: Installation of mortar.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

1.05 QUALITY ASSURANCE
A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.07 FIELD CONDITIONS
A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 MORTAR AND GROUT APPLICATIONS
A. At Contractor's option, mortar and grout may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready-mixed.
B. Mortar Color: Natural gray unless otherwise indicated.
   1. Interior, Non-loadbearing Masonry: Type O.

2.02 MATERIALS
A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.

B. Portland Cement: ASTM C150/C150M.
   1. Type: Type I - Normal; ASTM C150/C150M.

C. Masonry Cement: ASTM C91/C91M.
   1. Type: Type N; ASTM C91/C91M.

D. Hydrated Lime: ASTM C207, Type S.

E. Quicklime: ASTM C5, non-hydraulic type.

F. Mortar Aggregate: ASTM C144.

G. Water: Clean and potable.

2.03 MORTAR MIXING

   A. Ready Mixed Mortar: ASTM C1142, Type equivalent to that specified according to ASTM C270.

   B. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

   C. Maintain sand uniformly damp immediately before the mixing process.

   D. Do not use anti-freeze compounds to lower the freezing point of mortar.

   E. If water is lost by evaporation, re-temper only within two hours of mixing.

PART 3 EXECUTION

3.01 INSTALLATION

   A. Install mortar to requirements of section(s) in which masonry is specified.

END OF SECTION 04 0511
SECTION 04 2600
SINGLE-WYTHE UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Concrete masonry units.
   B. Reinforcement, anchorage, and accessories.

1.02 RELATED REQUIREMENTS
   A. Section 04 0511 - Mortar and Masonry Grout: Mortar and grout for single wythe unit masonry.
   B. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS
   C. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.

1.04 SUBMITTALS
   A. Product Data: Provide data for _________ masonry units and fabricated wire reinforcement.

1.05 QUALITY ASSURANCE
   A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 FIELD CONDITIONS
   A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
   B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS
   A. Concrete Block: Comply with referenced standards and as follows:
      1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on drawings for specific locations.
         a. Hollow block, as indicated.
         b. Lightweight.

2.02 MORTAR AND GROUT MATERIALS
   A. Mortar and Grout: As specified in Section 04 0511.

2.03 REINFORCEMENT AND ANCHORAGE
   A. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in. width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A153/A153M, Class B.

2.04 ACCESSORIES
   A. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; .5 inch wide x by maximum lengths available.
   B. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field conditions are acceptable and are ready to receive masonry.
   B. Verify that related items provided under other sections are properly sized and located.
   C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION
   A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING
   A. Establish lines, levels, and coursing indicated. Protect from displacement.
   B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
   C. Concrete Masonry Units:
      1. Bond: Running.
      2. Coursing: One unit and one mortar joint to equal 8 inches.

3.04 PLACING AND BONDING
   A. Lay hollow masonry units with face shell bedding on head and bed joints.
   B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
   C. Remove excess mortar as work progresses.
   D. Interlock intersections and external corners.
   E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.05 REINFORCEMENT AND ANCHORAGE
   A. Install horizontal joint reinforcement 16 inches on center.
   B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
   C. Place continuous joint reinforcement in first and second joint below top of walls.
   D. Lap joint reinforcement ends minimum 6 inches.
   E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
   F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 16 inches vertically.

3.06 BUILT-IN WORK
   A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
   B. Install built-in items plumb, level, and true to line.

3.07 TOLERANCES
   A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
   B. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
   C. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

3.08 CLEANING
   A. Remove excess mortar and mortar smears as work progresses.
B. Replace defective mortar. Match adjacent work.
C. Clean soiled surfaces with cleaning solution.
D. Use non-metallic tools in cleaning operations.

END OF SECTION 04 2600
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Formed steel slotted channel framing for interior ceiling grid.
   B. Framing shall be a strut type metal framing system (Strut System)
   C. Strut System shall be used:
      1. To support mechanical and electrical equipment and devices.
   D. Strut System and components must be supplied from a single approved Manufacturer.

1.02 SUBMITTALS
   A. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations and selection of framing members, fittings, and accessories.
   B. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, and type and location of fasteners, and accessories or items required of related work.

1.03 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
   B. American Iron and Steel Institute (AISI) Specification for the Design of Cold-Formed Steel Structural Members 2001 Edition
   C. American Society for Testing And Materials (ASTM)
   D. Metal Framing Manufacturer’s Association (MFMA)

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Metal Framing: Unistrut; slotted channel framing: .
      Eaton; slotted channel framing:
      1. See Section 1.E for Substitutions and Equals
   B. Fitting Connectors and Accessories:
      1. Same manufacturer as slotted channel framing.

2.02 FRAMING SYSTEM
   A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

2.03 FRAMING MATERIALS
   12 GA Steel factory painted: ASTM C955.
   1. Gage and Depth: As required to meet specified performance levels.

PART 3 EXECUTION

3.01 EXAMINATION
   A. The installer shall inspect the work area prior to installation. If work area conditions are unsatisfactory, installation shall not proceed until satisfactory corrections are completed.

3.02 INSTALLATION
   A. Installation shall be accomplished by a fully trained manufacturer authorized installer.
   B. Set Strut System components into final position true to line, level and plumb, in accordance with approved drawings.
   C. Anchor material firmly in place, and tighten all connections to their recommended torques.

END OF SECTION 05 4000
SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS
A. Section 09 2116 - Gypsum Board Assemblies: Metal stud framing.

1.03 REFERENCE STANDARDS

1.04 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS
A. Sizes: Nominal sizes as indicated on drawings, S4S.
B. Moisture Content: S-dry or MC19.
C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 ACCESSORIES
A. Fasteners and Anchors:

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL
A. Select material sizes to minimize waste.
B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.02 BLOCKING, NAILERS, AND SUPPORTS
A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
B. Provide the following specific non-structural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
3. Wall-mounted door stops.

END OF SECTION 06 1000
SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Nonsag gunnable joint sealants.

1.02 RELATED REQUIREMENTS
   A. Section 09 2116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

1.03 REFERENCE STANDARDS
   F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168.

1.04 SUBMITTALS
   A. See General Conditions and Special Conditions for submittal procedures.
   B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
      1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
      2. List of backing materials approved for use with the specific product.
      3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
      4. Substrates the product should not be used on.
      5. Substrates for which use of primer is required.
   C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.

2.02 JOINT SEALANT APPLICATIONS
   A. Scope:
      1. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
         a. Joints between door, window, and other frames and adjacent construction.
         b. In wall assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall and other construction; and other flanking sound paths.
         c. Other joints indicated below.
2. Do not seal the following types of joints.
   a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
   b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
   c. Joints where installation of sealant is specified in another section.
   d. Joints between suspended panel ceilings/grid and walls.

B. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

2.03 JOINT SEALANTS - GENERAL
   A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.04 NONSAG JOINT SEALANTS
   A. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
      3. Color: To be selected by Architect/Engineer from manufacturer's standard range.
      4. Service Temperature Range: Minus 40 to 180 degrees F.
      5. Manufacturers:
   B. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
      1. Color: To be selected by Architect/Engineer from manufacturer's standard range.
      2. Grade: ASTM C834; Grade - Minus 18 Degrees C.
      3. Manufacturers:

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that joints are ready to receive work.
   B. Verify that backing materials are compatible with sealants.

3.02 PREPARATION
   A. Remove loose materials and foreign matter that could impair adhesion of sealant.
   B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
   C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
   D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION
   A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
   B. Perform installation in accordance with ASTM C1193.
   C. Perform acoustical sealant application work in accordance with ASTM C919.
D. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
   2. Neck dimension no greater than 1/3 of the joint width.
   3. Surface bond area on each side not less than 75 percent of joint width.

E. Install bond breaker backing tape where backer rod cannot be used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION 07 9200
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SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Non-fire-rated hollow metal doors and frames.

1.02 RELATED REQUIREMENTS
A. Section 08 7100 - Door Hardware.

1.03 ABBREVIATIONS AND ACRONYMS
B. HMMA - Hollow Metal Manufacturers Association.

1.04 REFERENCE STANDARDS
A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.
D. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
E. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).
F. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
J. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames.
L. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames.
M. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames.
N. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames.

1.05 SUBMITTALS
A. See General Conditions and Special Conditions for submittal procedures.
B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.
B. Maintain at project site copies of reference standards relating to installation of products specified.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Hollow Metal Doors and Frames See Section 1.E for Substitutions and Equals:
   3. JR Metal Frames; jrmetalframes.com

2.02 DESIGN CRITERIA
A. Requirements for Hollow Metal Doors and Frames:
   1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.
   3. Door Edge Profile: Manufacturers standard for application indicated.
   5. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS
A. Door Finish: Factory primed and field finished.
B. Interior Doors, Non-Fire Rated:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
   2. Door Core Material: Kraftpaper honeycomb.

2.04 HOLLOW METAL FRAMES
A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
B. Frame Finish: Factory primed and field finished.
C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
   1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.

2.05 FINISHES
   A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES
   A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify that opening sizes and tolerances are acceptable.
   C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION
   A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION
   A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
   B. Coordinate frame anchor placement with wall construction.
   C. Install door hardware as specified in Section 08 7100.
      1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
   D. Coordinate installation of electrical connections to electrical hardware items.

3.04 TOLERANCES
   A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
   B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING
   A. Adjust for smooth and balanced door movement.

END OF SECTION 08 1113
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Hardware for hollow metal doors.
B. Electrically operated and controlled hardware.
C. Weatherstripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS
A. Section 08 1113 - Hollow Metal Doors and Frames.
B. Section 08 7110 - Basis of Design Door Hardware - Hager.

1.03 REFERENCE STANDARDS
A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
B. BHMA A156.1 - American National Standard for Butts and Hinges.
C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches.
G. BHMA A156.31 - American National Standard for Electric Strikes and Frame Mounted Actuators.
H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames.
I. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.
L. UL (DIR) - Online Certifications Directory.

1.04 SUBMITTALS
A. See Special Conditions for submittal procedures.
B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
D. Keying Schedule: Submit for approval of Owner.
E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
G. Keys: Deliver uncombined cores with identifying tags to Owner.
   1. Final keying will be accomplished by the Owner.
H. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
   B. Hardware Supplier Qualifications: Company specializing in supplying the type of products specified in this section with at least three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.07 WARRANTY
   A. See Special Conditions for additional warranty requirements
   B. Provide five year warranty for door closers and all related hardware.

PART 2 PRODUCTS

2.01 DOOR HARDWARE SUPPLIERS

2.02 MANUFACTURERS
   A. Allegion Brands, Ives, LCN, Schlage, Steelcraft, or Von Duprin: www.allegion.com/us.
   E. GE Companies
   F. Substitutions see Section 1.E for Substitutions and Equals__________.

2.03 GENERAL REQUIREMENTS
   A. Provide door hardware specified within the hardware schedule included with the plans, or as required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
   B. Provide products that comply with the following:
      1. Applicable provisions of federal, state, and local codes.
      5. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
   C. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.
   D. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.
   E. Finishes: Identified in schedule.

2.04 LOCKS AND LATCHES
   A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
   B. Electrically Operated Locks: Fail secure unless otherwise indicated.
   C. Lock Cylinders: Owner will supply, seven-pin standard core.
   D. Keying: Owner provided keys and seven-pin cores.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
   B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION
   A. Install hardware in accordance with manufacturer's instructions and applicable codes.
   B. Use templates provided by hardware item manufacturer.
   C. Do not install surface mounted items until finishes applied to substrate are complete.
   D. Mounting heights for hardware from finished floor to center line of hardware item. As indicated in the following list; unless noted otherwise in Door Hardware Sets Schedule or on the drawings.
      1. For steel doors and frames: Comply with DHI (LOCS) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames".

3.03 ADJUSTING
   A. Adjust hardware for smooth operation.
   B. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING
   A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION
   A. Do not permit adjacent work to damage hardware or finish.

3.06 SCHEDULE

END OF SECTION 08 7100
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Performance criteria for gypsum board assemblies.
B. Metal stud wall framing.
C. Metal channel ceiling framing
D. Gypsum wallboard.
E. Joint treatment and accessories.
F. Acoustic (sound-dampening) wall and ceiling board
G. Gypsum Board Accessories

1.02 RELATED REQUIREMENTS
A. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS
A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute.
B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
G. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
H. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
L. ASTM E413 - Classification for Rating Sound Insulation.
M. GA-216 - Application and Finishing of Gypsum Board.

1.04 SUBMITTALS
A. See Section 1.E for submittal procedures.
B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
D. Samples: Submit two 12" samples of gypsum board trim accessories to be used.
E. Contractor to provide ceiling framing layout, sizes, gauge and types for review conforming to applicable reference standards.
1.05 QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 3 years of documented experience.
B. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Storage: Stack materials off floor on pallets or similar platforms providing continuous support to prevent sagging or deformation. Stack such that long lengths are not over short lengths.
D. Handling: Handle materials to prevent damage to surfaces, edges, and finishes and ends of sheet and metal items. Reject and remove damaged material from site at no cost to the owner.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES
A. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 50-54 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

2.02 METAL FRAMING MATERIALS
A. Manufacturers - Metal Framing, Connectors, and Accessories:
   5. SCAFCO Corporation: www.scafcocom/#sle.
B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
   1. Studs: “C” shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C-shaped.
C. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.

2.03 BOARD MATERIALS
A. Manufacturers - Gypsum-Based Board:
   5. USG Corporation: www.usg.com/#sle.
B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Thickness:
3. Paper-Faced Products:
   a. American Gypsum Company; FireBloc Type X Gypsum Wallboard.
   b. Georgia-Pacific Gypsum; ToughRock.
   c. Georgia-Pacific Gypsum; ToughRock Fireguard X.
   e. 

C. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings, unless otherwise indicated.
   2. Thickness: 5/8 inch.
   4. Products:
      a. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board.

2.04 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 5/8 inch.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
   1. Products:

C. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
   1. Rigid Corner Beads: Low profile, for 90 degree outside corners.
   2. L-Trim: Sized to fit 5/8 inch thick gypsum wallboard.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
   2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.

E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
   1. Level ceiling system to a tolerance of 1/1200.
   2. Laterally brace entire suspension system.

C. Studs: Space studs at 16 inches on center unless noted otherwise.
   1. Extend partition framing where indicated on drawings to structure where indicated and to ceiling in other locations.
2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 16 inches on center.
   2. Spacing: At 16 inches on center unless otherwise noted.

F. Blocking: Install mechanically fastened steel channel blocking for support of:
   1. Framed openings.
   2. Wall mounted cabinets.
   3. Plumbing fixtures.
   4. Wall mounted door hardware.
   5. drywall accessories, trim, and reveals

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board perpendicular to framing, with ends and edges occurring over firm bearing.

C. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.05 JOINT TREATMENT


B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.06 TOLERANCES

A. Allowable tolerances in horizontal planes:
   1. Variation from level: =1/8" in 12'-0".
   2. Variation in plane of adjacent wall board panels prior to joint treatment: 1/16".

B. Allowable tolerances in framed vertical construction.
   1. Position: +1/4 maximum variation from design position.
2. Alignment: 1/8" in 8'-0"; 1/4" maximum in any continuous wall, line or surface.
3. Surface smoothness: No joint or fastener location, roughness or blemish discernable after application of finish when viewed at any single angle from a distance of 5'-0" under occupancy lighting conditions, with surface preparation as specified in Painting section.

END OF SECTION 09 2116
SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Acoustical units.

1.02 RELATED REQUIREMENTS
A. Section 26 5100 - Interior Lighting: Light fixtures in ceiling system.

1.03 REFERENCE STANDARDS
B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

1.04 SUBMITTALS
A. Product Data: Provide data on suspension system components.
B. Samples: Submit two samples 6 by 6 inch in size illustrating material and finish of acoustical units.
C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Acoustical Units: Quantity equal to fifteen percent of total installed.

1.05 QUALITY ASSURANCE
A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Acoustic Tiles/Panels:
B. Suspension Systems:
   1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS
A. Acoustical Units - General: ASTM E1264, Class A. per finish material schedule

2.03 SUSPENSION SYSTEM(S)
A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required per finish material schedule.

2.04 ACCESSORIES
A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
C. Touch-up Paint: Type and color to match acoustical and grid units.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM
   A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
   B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
   C. Locate system on room axis according to reflected plan.
   D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
   E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
   F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
   G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
   H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
   I. Do not eccentrically load system or induce rotation of runners.
   J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
      1. Use longest practical lengths.
      2. Overlap corners.

3.03 INSTALLATION - ACOUSTICAL UNITS
   A. Install acoustical units in accordance with manufacturer's instructions.
   B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
   C. Fit border trim neatly against abutting surfaces.
   D. Install units after above-ceiling work is complete.
   E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
   F. Cutting Acoustical Units:
      1. Cut to fit irregular grid and perimeter edge trim.
      2. Make field cut edges of same profile as factory edges.

3.04 TOLERANCES
   A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
   B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 1 degree.

END OF SECTION 09 5100
SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Resilient base.

1.02 RELATED REQUIREMENTS
   A. Section 09-6700 - Fluid Applied Flooring: Recessed floor accessories.

1.03 REFERENCE STANDARDS

1.04 QUALITY ASSURANCE
   A. Installer Qualifications: Engage an experienced installer to perform work of this Section who
      has specialized in installing resilient product similar to those required for this project and with a
      record of successful in-service performance. Installer must have a minimum of 5 years
      experience.
   B. Source Limitations: Obtain each type, color, and pattern of product specified from one source
      with resources to provide products of consistent quality in appearance and physical properties
      without delaying the Work.
   C. Warranty: Vinyl Composition tile, adhesives and accessories should be warranted by the
      manufacturer to be free of defect for a period of 5 years. The manufacturer’s standard written
      warranty form should be supplied as a submittal item.

1.05 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Verification Samples: Submit two full-size samples, illustrating color and pattern for each
      resilient floor base product specified.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the
      correct style, color, quantity and run numbers.
   B. Store all materials off of the floor in an acclimatized, weather-tight space.

PART 2 PRODUCTS
2.01 RESILIENT BASE
   A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove per
      finish materials schedule
      1. Manufacturers:
         b. Roppe Corp: www.roppe.com/#sle.
      2. Height: 4 inch.
      3. Thickness: 0.125 inch.
      5. Length: Roll.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that surfaces are flat to tolerances acceptable to meet manufacturer's requirements.

3.02 INSTALLATION - GENERAL
   A. Starting installation constitutes acceptance of sub-floor conditions.
   B. Install in accordance with manufacturer's written instructions.
   C. Spread only enough adhesive to permit installation of materials before initial set.
D. Fit joints and butt seams tightly.
E. Set flooring in place, press with heavy roller to attain full adhesion.
F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.03 INSTALLATION - RESILIENT BASE
   A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
   B. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.04 CLEANING
   A. Remove excess adhesive from floor, base, and wall surfaces without damage.
   B. Clean in accordance with manufacturer’s written instructions.

END OF SECTION 09 6500
SECTION 09 6700
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Resinous Flooring and integral base.

1.02 REFERENCE STANDARDS
B. ASTM C 293 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading).
F. ASTM C 884 - Standard Test Method for Thermal Compatibility Between Concrete and an Epoxy-Resin Overlay.

1.03 SUBMITTALS
A. Product Data: Manufacturer's data sheets on each product to be used, including:
B. System Data: Submit manufacturer's specifications on cured system and individual components of the Flooring System, including physical properties and performance properties and tests along with Material Safety Data Sheets. Each individual component of the system shall be evaluated on the basis of these standards. For any tests not listed in the manufacturer's standard nationally published data, the manufacturer shall supply the missing data accompanied by the independent testing laboratory's test results which prove compliance in accordance with the referenced standards. Furnish required number of sets of this information for review.
C. Samples: Submit two samples, 6 inch in size illustrating color and pattern for each floor material for each color specified.

1.04 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
B. Applicator Qualifications: Company specializing in performing the work of this section.
   1. Minimum three years of documented experience.
   2. Approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
B. Primary system materials shall be delivered in the manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the following:
   1. Product names and/or Numbers.
   2. Manufacturer's name.
   3. Component designation (A, B, etc.).
   4. Product Mix Ratio.
   5. Health and Safety Information.
   6. CHEMTREC Emergency Response Information.

C. Provide equipment and personnel to handle the materials by methods which prevent damage.

D. The Contractor shall promptly inspect direct jobsite material deliveries to assure that quantities are correct, comply with requirements and are not damaged.

E. The Contractor shall be responsible for materials furnished and shall replace, at its expense, such materials that are found to be defective in manufacture or that have become damaged in transit, handling or storage.

F. Store materials in accordance with manufacturer's instructions, with seals and labels intact and legible. Maintain temperatures within the required range. Do not use materials which exceed the manufacturer's maximum recommended shelf life.

G. Handling: Handle materials to avoid damage.

1.06 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

B. The Contractor shall visit the jobsite prior to the installation of the Flooring System to evaluate substrate condition, including substrate moisture transmission, quantity and severity of cracking, and the extent of repairs needed. Substrate imperfections should be repaired only after mechanical preparation of the substrate. Surface preparation reveals most imperfections requiring repair. Concrete substrates shall be tested to verify that the moisture vapor transmission of the substrate does not exceed the Flooring System manufacturers' recommendations. Cost associated with repair, leveling and remediation of the substrate are the responsibility of the provider of the substrate.

C. The Contractor shall exercise care during surface preparation and system installation to protect surrounding substrates and surfaces, as well as in-place equipment. The Contractor shall prepare the substrate to remove laitance and open the surface. This shall be achieved by light brush grit blasting. Surface profile achieved shall be similar to medium grit sandpaper and free from bond-inhibiting contaminants.

D. The minimum slab temperature shall be conditioned to 60 degrees F (16 degrees C) before commencing installation, during installation, and for at least 72 hours after installation is complete. The substrate temperature shall be at least 5 degrees F above the dew point during installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Roll-Applied Epoxy Flooring:
   1. Sherwin Williams Armorseal per finish materials schedule

B. Double Broadcast Epoxy Flooring:
   1. Desco Cremona per finish materials schedule

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of materials to sub-floor surfaces.
C. Verify that concrete sub-floor surfaces are ready for flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by flooring materials manufacturer.

3.02 PREPARATION
A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.
B. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - FLOORING
A. Apply in accordance with manufacturer's instructions.
B. Apply each coat to minimum thickness required by manufacturer.
C. Finish to smooth level surface.

3.04 PROTECTION
A. Cure the flooring system materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of the installation and prior to completion of the curing process.
B. Protect the flooring system from damage and wear during other phases of the construction operation, using temporary coverings as recommended by the manufacturer, if required. Remove temporary covering just prior to final inspection.
C. Protect the flooring system from damage and wear during other phases of the construction operation, using temporary coverings as recommended by the manufacturer, if required. Remove temporary covering just prior to final inspection.

END OF SECTION 09 6700
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SECTION 09 7200
WALL COVERINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Decorative Fiberglass Reinforced Wall Panels
   1. Prefinished polyester glass reinforced plastic sheets and adhered to unfinished gypsum wallboard.
   2. PVC trim.

1.02 REFERENCE STANDARDS
A. ASTM D 256 - Izod Impact Strengths (ft #/in)
B. ASTM D 570 - Water Absorption (%)
C. ASTM D 638 - Tensile Strengths (psi) & Tensile Modulus (psi)
D. ASTM D 790 - Flexural Strengths (psi) & Flexural Modulus (psi)
E. ASTM D 2583 - Barcol Hardness

1.03 SUBMITTALS
A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:
   B. Preparation instructions and recommendations.
   C. Storage and handling requirements and recommendations.
   D. Installation methods.
   E. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.
   F. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.
   G. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
      1. Submit complete with specified applied finish.
      2. For selected patterns show complete pattern repeat.
      3. Exposed Molding and Trim: Provide samples of each type, finish, and color.

1.04 QUALITY ASSURANCE
A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
   1. ASTM E 84 (Method of test for surface burning characteristics of building Materials)
      a. Wall Required Rating - Class A

1.05 DELIVERY, STORAGE, AND HANDLING
A. Deliver materials factory packaged on strong pallets.
B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (70°) for 48 hours prior to installation.
C. Inspect roll materials at arrival on site, to verify acceptability.
D. Protect packaged adhesive from temperature cycling and cold temperatures.
E. Do not store roll goods on end.
1.06 FIELD CONDITIONS

A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work.

B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
   1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

C. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.

D. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

PART 2 PRODUCTS

2.01 PANELS

A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
   1. Coating: Multi-layer print, primer and finish coats or applied over-layer.
   2. Dimensions:
      a. Thickness - 0.090 “ (2.29mm) nominal
      b. Width - 4’-0” (1.22m) nominal
      c. Length - 10’-0” (3.0m) As indicated on the drawings nominal
   3. Tolerance:
      a. Length and Width: +/-1/8 “ (3.175mm)
      b. Square - Not to exceed 1/8 “ for 8 foot (2.4m) panels or 5/32 “ (3.96mm) for 10 foot (2.4m) panels

B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
   1. Flexural Strength - 1.0 x 104 psi per ASTM D 790. (7.0 kilogram-force/square millimeter)
   2. Flexural Modulus - 3.1 x 105 psi per ASTM D 790. (217.9 kilogram-force/square millimeter)
   3. Tensile Strength - 7.0 x 103 psi per ASTM D 638. (4.9 kilogram-force/square millimeter)
   4. Tensile Modulus - 1.6 x 105 psi per ASTM D 638. (112.5 kilogram-force/square millimeter)
   5. Water Absorption - 0.72% per ASTM D 570.
   6. Barcol Hardness (scratch resistance) of 35 55 as per ASTM D 2583.
   7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256

C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

D. Front Finish: Pebbled as Indicated on the Drawings
   1. Color: [100 White]

E. Surface: Smooth

F. PVC Trim: Thin-wall semi-rigid extruded PVC.
   1. M 350 Inside Corner, [10’ length]
   2. M 360 Outside Corner, [10’ length]
   3. M 365 Division, [10’ length]
   4. M 370 Edge, [10’ length]
   5. Color: [White]

G. Fasteners: Non-staining nylon drive rivets.
   1. Match panel colors.
   2. Length to suit project conditions.

H. Adhesive: Either of the following construction adhesives complying with ASTM C 557.
   1. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive.
2. Marlite C-375 Construction Adhesive - Flexible, water-resistant, solvent based adhesive, formulated for fast, easy application.
3. Titebond Advanced Polymer Panel Adhesive - VOC compliant, non-flammable, environmentally safe adhesive.

I. Sealant:
   1. White Silicone Sealant.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that substrate surfaces are ready to receive work, and conform to requirements of the wall covering manufacturer.

3.02 INSTALLATION
   A. Comply with manufacturer's recommended procedures and installation sequence.
   B. Cut sheets to meet supports allowing 1/8" (3 mm) clearance for every 8 foot (2.4m) of panel.
      1. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.
      2. Pre-drill fastener holes 1/8" (3mm) oversize with high speed drill bit.
         a. Space at 8" (200mm) maximum on center at perimeter, approximately 1" from panel edge.
         b. Space at in field in rows 16' (40.64cm) on center, with fasteners spaced at 12" (30.48 cm) maximum on center.
   C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
      1. Install panels with manufacturer's recommended gap for panel field and corner joints.
         a. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations.
         b. Drive fasteners for snug fit. Do not over-tighten.
   D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
      1. All moldings must provide for a minimum 1/8 " (3mm) of panel expansion at joints and edges, to insure proper installation.
      2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.
   E. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface.
   F. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.03 CLEANING
   A. Clean panels of excess adhesive, dust, dirt, and other contaminants.
   B. Reinstall wall plates and accessories removed prior to work of this section.

END OF SECTION 09 7200
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.
B. Field application of paints and other coatings.
C. Scope: Finish all interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Mechanical and Electrical:
      a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.

1.02 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS


1.04 SUBMITTALS

A. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
B. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Paint and Coatings: 1 gallon of each color; store where directed.
   2. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
1.07 FIELD CONDITIONS
A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
C. Paints:

2.02 PAINTS AND COATINGS - GENERAL
A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
   1. Gypsum Board: Interior Latex Primer Sealer; MPI #50.
   2. Concrete: Same as top coats.
   3. Concrete Masonry: Interior/Exterior Latex Block Filler; MPI #4.
C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect/Engineer from the manufacturer's full line.
D. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect/Engineer after award of contract.
   2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR
A. Refer to Finish Materials Schedule
B. All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry, and uncoated steel.
   1. Two top coats and one coat primer unless noted otherwise.
   2. Primer(s): As recommended by manufacturer of top coats.

2.04 ACCESSORY MATERIALS
A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

PART 3 EXECUTION
3.01 EXAMINATION
A. Do not begin application of coatings until substrates have been properly prepared.
B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
C. Examine surfaces scheduled to be finished prior to commencement of work. Report any 
condition that may potentially affect proper application.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes 
unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3.02 PREPARATION
A. Clean surfaces thoroughly and correct defects prior to coating application.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best 
result for the substrate under the project conditions.
C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, 
escutcheons, and fittings, prior to preparing surfaces or finishing.
D. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate 
and bleach. Rinse with clean water and allow surface to dry.
E. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or 
alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium 
phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding 
metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime 
defects after repair.

3.03 APPLICATION
A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical 
components and paint separately.
B. Apply products in accordance with manufacturer’s instructions.
C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is 
applied.
D. Apply each coat to uniform appearance.
E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior 
to applying next coat.
F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed 
prior to finishing.

3.04 CLEANING
A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and 
remove daily from site.

3.05 PROTECTION
A. Protect finished coatings until completion of project.
B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION 09 9000
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SECTION 10 7313
AWNINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Aluminum framing and fittings.
B. Covering material.

1.02 REFERENCE STANDARDS

1.03 DESIGN REQUIREMENTS
A. Awning materials, assembly and attachments to resist snow loads, positive and negative wind design loads of 5 lb/sq ft at any point without damage or permanent set.

1.04 SUBMITTALS
A. Product Data: Provide data on awning covering, color fastness, stitching and seaming methods, attachment devices to framing system.
B. Shop Drawings: Indicate awning profiles, sizes, connection attachments, anchorage, size and type of fasteners, accessories.
C. Samples, Covering: Submit 12 by 12 inch sample of covering with representative hem stitch detail, seam with reinforcement, and attachment devices to framing system.

1.05 REGULATORY REQUIREMENTS
A. Conform to applicable code for fire resistance ratings for awning covering.

PART 2 PRODUCTS

2.01 ALUMINUM FRAMING SYSTEM
A. Framing: verify size inch square tubing size to be determined, conforming to ASTM B241/B241M.
B. Fittings: Elbows, T-shapes, wall brackets; cast aluminum.
C. Mounting: Brackets and flanges, with aluminum inserts for embedding into masonry.
D. Splice Connectors: Concealed spigot; cast aluminum.
E. Exposed Fasteners: Flush countersunk galvanized steel screws or bolts; consistent with design of system.

2.02 COVERING MATERIALS
A. Vinyl Coated/Laminated Polyester: 16 oz/sq yd, resistant to ultra-violet light, mildew and water; single color as selected.

2.03 FABRICATION - FRAMING
A. Fit and shop assemble components in largest practical sizes, for delivery to site.
B. Fabricate components with joints tightly fitted and secured.
C. Exposed Fastenings: Unobtrusively located; consistent with design of component, except where specifically noted otherwise.
D. Supply components required for anchorage of framing. Fabricate anchors and related components of same material and finish as framing, except where specifically noted otherwise.

E. Continuously seal joined pieces by intermittent welds and plastic filler.

F. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

G. Accurately form components to suit each other and to building structure.

2.04 FABRICATION - COVERING

A. Manufacture covering in one piece wherever possible, sized and configured to suit framing.

B. Form covering heading of triple thickness 2 inches wide, double fold bottom hem 2 inches wide.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall substrate anchors are acceptable and are ready to receive work.

3.02 INSTALLATION - FRAMING

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Provide anchors required for connecting framing to structure. Anchor framing to structure.

D. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.03 INSTALLATION - COVERING

A. Install covering over framing members, stretched taut without creases or folds.

B. Attach covering and fasten securely.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Misalignment From True Position: 1/4 inch.

END OF SECTION 10 7313
SECTION 12 3553.13
METAL LABORATORY CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Standard metal cabinets and cabinet hardware.
   B. Countertops.
   C. Laboratory sinks.

1.02 RELATED REQUIREMENTS
   A. Section 07 9200 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.
   B. Section 09 2116 - Gypsum Board Assemblies: Reinforcements in metal-framed partitions for anchoring casework.

1.03 REFERENCE STANDARDS
   D. SEFA 2 - Installations.
   E. SEFA 3 - Work Surfaces.
   F. SEFA 7 - Laboratory and Hospital Fixtures.
   G. SEFA 8M - Laboratory Grade Metal Casework.

1.04 SUBMITTALS
   A. Product Data: Details of materials, component dimensions and configurations, construction details, joint details, attachments; manufacturer's catalog literature on hardware and keying, accessories, and service fittings, if any.
   B. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements placement dimensions and tolerances, clearances required, and utility locations, if any. Include coordinated information for laboratory equipment specified in another section and/or furnished by Owner.
   C. Samples For Color Selection: Color charts for each different finish material.
   D. Manufacturer's Qualification Statement.
   E. Installer's Qualification Statement.
   F. Maintenance Data: Manufacturer's recommendations for care and cleaning.
   G. Finish touch-up kit for each type and color of materials provided.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
   B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.
1.06 DELIVERY, STORAGE, AND HANDLING
A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

1.07 WARRANTY
A. Correct defective work within a five year period after Date of Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:
   1. Discoloration, or lack of finish integrity.
   2. Cracking or peeling of finish.
   3. Failure of hardware.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Metal Laboratory Casework:
   3. Labconco.
B. Countertops:
C. Sinks and Cup Sinks:
D. Obtain casework from single source and manufacturer, unless otherwise indicated.

2.02 METAL LABORATORY CASEWORK
A. Casework: Die-formed metal sheet; each unit self-contained and not dependent on adjacent units or building structure for rigidity; factory-fabricated, factory-assembled, and factory-finished.
   1. Style: Flush overlay - square edge.
   2. Steel Sheet Metal:
      a. Gables, Front and Back Panels, Gusset Plates, Aprons, and Rails: 18 gage, 0.0478 inch minimum thickness.
      b. Drawers, Cabinet Floors, Shelves, Filler Panels and Drawer Dividers: 20 gage, 0.0359 inch minimum thickness.
      c. Backing Sheet to Door and Door Fronts: 22 gage, 0.0299 inch minimum thickness.
   3. Structural Performance: In addition to the requirements of SEFA 3, SEFA 7 and SEFA 8M, provide components that safely support the following minimum loads, without deformation or damage:
      a. Base Units: 500 pounds per linear foot across the cabinet ends.
      b. Hanging Upper Cases: 300 pounds.
   4. Corners and Joints: Without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.
   5. Edges and Seams: Smooth. Form counter tops, shelves, and drain boards from continuous sheets.
   8. Welding: Electric spot welded; joints ground smooth and flush.
   9. Drawers and Doors: Fabricate drawer and door fronts of sandwiched sheets of sheet steel welded together and reinforced for hardware.
  10. Glazing: Type and thickness standard with manufacturer.
      a. Framed Doors: Float glass, with gaskets and removable stops; minimize rattling and vibration.
  11. Stainless Steel Finish: No.4, brushed finish.
  12. Separation: Use bituminous paint or non-conductive tape to coat metal surfaces in contact with cementitious materials, and to separate dissimilar metals.
2.03 CABINET HARDWARE
A. Manufacturer's standard styles, and as indicated on the drawings.
B. Locks: On casework drawers and doors, where indicated as per drawings. Lock with 7 pin cylinder and 2 keys per lock.
C. Swinging Doors:
   1. Hinges: Offset pin.
   2. Catches: Magnetic.
   3. Pulls: Chrome-plated brass from manufacturer's standard selections, 4 inches Brushed Aluminum Pull.
D. Drawers:
   1. Pulls: from manufacturer's standard selections wire pulls, 4 inches wide Brushed Aluminum Pull.
   2. Slides: Steel, full extension arms, ball bearings; self-closing; capacity as recommended by manufacturer for drawer height and width.

2.04 COUNTERTOPS
A. Countertops:
   1. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
      a. Flat Surface Thickness: 1 inch, nominal.
      b. Surface Finish: Smooth, non-glare.
      c. Color: Black.
      d. Exposed Edge Shape: 1/8 inch bevel chamfer.
      e. Drip Edge: Drip groove 1/8 inch wide and deep, located 1/2 inch back from edge on underside of each exposed edge.
      f. Back and End Splashes: Same material, same thickness; separate for field attachment.
      g. Fabricate in accordance with manufacturer's standard requirements.

2.05 SINKS
A. Laboratory sinks.
   1. General: Manufacturer's adjustable support system for undermount sink installation.
      a. Basis of Design: Model U60E manufactured by Durcon.

2.06 FINISHES
A. Sheet Steel Finish: Having chemical resistance equal to Level 0 (no change) or Level 1 (slight change of gloss or slight discoloration) according to SEFA 8M. Test applied finishes using procedures specified in ASTM D522/D522M.
   1. Coating Type, New Casework: Baked on epoxy; minimum two coats.
   2. Color: As selected from manufacturer's standard selection.
   3. Preparation: Degrease and phosphate etch, and prime.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify adequacy of support framing and anchors.
B. Verify that service connections are correctly located and of proper characteristics.

3.02 INSTALLATION
A. Perform installation in accordance with manufacturer's instructions and with SEFA 2.
B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.

C. Set casework items plumb and square, securely anchored to building structure, with no distortion.
   1. **Base Cabinets:** Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 3/4 inch leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.
   2. **Wall Cabinets:** Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
      a. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 feet and 1/2 inch in 20 feet or more, and/or maximum variation from plumb exceeds 1/4 inch per story.
      b. Maximum variation of finished gypsum board surface from true flatness exceeds 1/8 inch in 10 feet in any direction.

D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.

E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch. In addition, do not exceed the following tolerances:
   1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
   2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet.
   3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
   5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.

F. Secure upper and floor cabinets to concealed reinforcement at gypsum board assemblies.

G. Separate dissimilar metals to prevent galvanic action.

H. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.

I. Replace units that are damaged, including those that have damaged finishes.

J. Countertops: Install countertops in one true plane, with ends abutting at hairline joints, and no raised edges.

K. Deliver sinks in properly marked boxes, accompanied with written instructions, for supervised installation by appropriate trade contractor(s).

3.03 **ADJUSTING**
   A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.04 **CLEANING**
   A. Clean casework and other installed surfaces thoroughly.

3.05 **PROTECTION**
   A. Do not permit finished casework to be exposed to continued construction activity.
   B. Protect casework and countertops from ongoing construction activities. Prevent installers from standing on or storing tools and materials on casework or countertops.
   C. Repair damage that occurs prior to Date of Substantial Completion, including finishes, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

**END OF SECTION 12 3553.13**
SECTION 22 0553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Tags.
   B. Pipe markers.
   C. Ceiling tacks.

1.02 REFERENCE STANDARDS

PART 2 PRODUCTS
2.01 IDENTIFICATION APPLICATIONS
   A. Piping: Pipe markers.
   B. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 TAGS
   A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
   B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

2.03 PIPE MARKERS
   A. Manufacturers:
   B. Comply with ASME A13.1.
   C. 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.
   D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
   E. Color code as follows:
      1. Potable, Cooling, Boiler, Feed, Other Water: Green with white letters.

2.04 CEILING TACKS
   A. Description: Steel with 3/4 inch diameter color coded head.
   B. Color code as follows:
      1. Plumbing Valves: Green.

PART 3 EXECUTION
3.01 PREPARATION
   A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION
   A. Install tags with corrosion resistant chain.
   B. Install plastic pipe markers in accordance with manufacturer's instructions.
C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

END OF SECTION 22 0553
SECTION 22 0719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Piping insulation.
   B. Jackets and accessories.

1.02 RELATED REQUIREMENTS
   A. Section 22 1005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
   B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.07 FIELD CONDITIONS
   A. Maintain ambient conditions required by manufacturers of each product.
   B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS
   A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 FLEXIBLE ELASTOMERIC CELLULAR INSULATION
   A. Manufacturer:
      1. Aeroflex USA, Inc: www.aeroflexusa.com/#sle.
   B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
      1. Minimum Service Temperature: Minus 40 degrees F.
      2. Maximum Service Temperature: 220 degrees F.
   C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.03 JACKETS
   A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire retardant lagging adhesive.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that piping has been tested before applying insulation materials.
   B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
   C. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
   D. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 8400.
   E. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with canvas jacket sized for finish painting.

3.03 SCHEDULES
   A. Plumbing Systems:
      1. Domestic Cold and Hot Water Supply:
         a. Flexible Elastomeric Cellular Insulation:
            1) Pipe Size Range: 1-1/4 inch or less.
            2) Thickness: 3/4 inch.
      2. Sanitary and Vent (PVC): Wrapped with plenum-rated material to comply with Flame spread index/Smoke developed index of 25/50.

END OF SECTION 22 0719
SECTION 22 1005
PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Pipe, pipe fittings, specialties, and connections for piping systems.
   1. Sanitary sewer.
   2. Domestic water.
   3. Flanges, unions, and couplings.
   4. Pipe hangers and supports.
   5. Valves.

1.02 RELATED REQUIREMENTS
A. Section 22 0553 - Identification for Plumbing Piping and Equipment.
B. Section 22 0719 - Plumbing Piping Insulation.

1.03 REFERENCE STANDARDS
A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
J. NSF 61 - Drinking Water System Components - Health Effects.

1.04 SUBMITTALS
A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.05 QUALITY ASSURANCE
A. Perform work in accordance with applicable codes.
B. Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING
A. PVC Pipe: ASTM D2665 or ASTM D3034.
   1. Fittings: PVC.

2.03 SANITARY SEWER PIPING, ABOVE GRADE
A. PVC Pipe: ASTM D2665.
   1. Fittings: PVC.

2.04 CHEMICAL RESISTANT SEWER PIPING
A. PP Pipe: Fuse Seal Polypropylene, flame retardant.
   1. Fittings: Polypropylene, ASTM F1412.

2.05 DOMESTIC WATER PIPING, ABOVE GRADE
A. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   3. Mechanical Press Sealed Fittings: Double pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, non toxic synthetic rubber sealing elements.
      a. Manufacturers:
         2) Viega LLC: www.viega.com/#sle.

2.06 FLANGES, UNIONS, AND COUPLINGS
A. Unions for Pipe Sizes 3 Inches and Under:
   1. Ferrous pipe: Class 150 malleable iron threaded unions.
   2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
B. Flanges for Pipe Size Over 1 Inch:
   1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
   2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.07 PIPE HANGERS AND SUPPORTS
A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
B. Plumbing Piping - Drain, Waste, and Vent:
   1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
   2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
   3. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
C. Plumbing Piping - Water:
   1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

2.08 BALL VALVES
   A. Manufacturers:
   B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze body, chrome plated brass ball, full port, teflon seats and stuffing box ring, blow-out proof stem, lever handle, threaded or grooved ends.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 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.

3.03 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
   C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
   D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
   E. Group piping whenever practical at common elevations.
   F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
   G. Provide access where valves and fittings are not exposed.
   H. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
   I. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
   J. Install water piping to ASME B31.9.
   K. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
   L. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
   M. Pipe Hangers and Supports:
      1. Install in accordance with ASME B31.9.
      2. Support horizontal piping as indicated.
      3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
      4. Place hangers within 12 inches of each horizontal elbow.
      5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
7. Provide copper plated hangers and supports for copper piping.
8. Support cast iron drainage piping at every joint.

3.04 APPLICATION
   A. Install unions downstream of valves and at equipment or apparatus connections.
   B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
   C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.05 TOLERANCES
   A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.
   B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM
   A. Disinfect water distribution system in accordance with Section 33 0110.58.
   B. Prior to starting work, verify system is complete, flushed and clean.
   C. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
   D. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
   E. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
   F. Maintain disinfectant in system for 24 hours.
   G. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
   H. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

3.07 SCHEDULES
   A. Pipe Hanger Spacing:
      1. Metal Piping:
         a. Pipe Size: 1/2 inches to 1-1/4 inches:
            1) Maximum Hanger Spacing: 6.5 ft.
            2) Hanger Rod Diameter: 3/8 inches.
SECTION 22 1006
PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Drains.
   B. Cleanouts.
   C. Water hammer arrestors.

1.02 RELATED REQUIREMENTS
   A. Section 22 1005 - Plumbing Piping.
   B. Section 22 4000 - Plumbing Fixtures.

1.03 REFERENCE STANDARDS
   A. ASME A112.6.3 - Floor and Trench Drains.
   B. NSF 61 - Drinking Water System Components - Health Effects.
   C. NSF 372 - Drinking Water System Components - Lead Content.
   D. PDI-WH 201 - Water Hammer Arresters.

1.04 SUBMITTALS
   A. Product Data: Floor drains: Provide component sizes, rough-in requirements, service sizes, and finishes.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
   A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 DRAINS
   A. Manufacturers:
   B. Floor Drain:
      1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

2.03 CLEANOUTS
   A. Manufacturers:
   B. Cleanouts at Interior Finished Floor Areas:
1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

C. Cleanouts at Interior Finished Wall Areas:
1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

D. Cleanouts at Interior Unfinished Accessible Areas: Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.04 WATER HAMMER ARRESTORS
A. Manufacturers:

B. Water Hammer Arrestors:
1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F and maximum 250 psi working pressure.

PART 3 EXECUTION
3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
C. Install floor cleanouts at elevation to accommodate finished floor.
D. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatory sinks.

END OF SECTION 22 1006
SECTION 22 4000
PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Sinks.
   B. Emergency showers.

1.02 RELATED REQUIREMENTS
   A. Section 22 1005 - Plumbing Piping.
   B. Section 22 1006 - Plumbing Piping Specialties.

1.03 REFERENCE STANDARDS
   A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
   C. ASME A112.18.1 - Plumbing Supply Fittings.
   D. ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).
   E. NSF 61 - Drinking Water System Components - Health Effects.
   F. NSF 372 - Drinking Water System Components - Lead Content.

1.04 SUBMITTALS
   A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Accept fixtures on site in factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 GENERAL
   A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
   B. Water Efficiency: EPA WaterSense label is required for all water closets, urinals, lavatory faucets, and showerheads.

2.02 SINKS
   A. Sink Manufacturers:
   B. See Drawing schedules for selections.

2.03 EMERGENCY SHOWERS
   A. Emergency Shower Manufacturers:
   B. Emergency Shower: ANSI Z358.1; free standing, self-cleaning, non-clogging 10 inch diameter stainless steel deluge shower head with elbow, one inch full flow valve with pull chain and 8 inch diameter ring, one inch interconnecting fittings, with Eye/face wash station.
PART 3  EXECUTION

3.01  EXAMINATION
   A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
   B. Verify that electric power is available and of the correct characteristics.
   C. Confirm that millwork is constructed with adequate provision for the installation of counter top
lavatories and sinks.

3.02  PREPARATION
   A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture
      rough-in schedule for particular fixtures.

3.03  INSTALLATION
   A. Install each fixture with trap, easily removable for servicing and cleaning.
   B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and
      escutcheons.
   C. Install components level and plumb.
   D. Install and secure fixtures in place with wall supports and bolts.

3.04  INTERFACE WITH WORK OF OTHER SECTIONS
   A. Review millwork shop drawings. Confirm location and size of fixtures and openings before
      rough-in and installation.

3.05  ADJUSTING
   A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or
      overflow.

3.06  CLEANING
   A. Clean plumbing fixtures and equipment.

3.07  PROTECTION
   A. Protect installed products from damage due to subsequent construction operations.
   B. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 22 4000
SECTION 23 0553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Nameplates.
   B. Tags.
   C. Adhesive-backed duct markers.
   D. Pipe markers.

1.02 REFERENCE STANDARDS

PART 2 PRODUCTS
2.01 IDENTIFICATION APPLICATIONS
   A. Air Terminal Units: Tags.
   B. Automatic Controls: Tags. Key to control schematic.
   C. Control Panels: Nameplates.
   D. Dampers: Ceiling tacks, where located above lay-in ceiling.
   E. Ductwork: Duct Markers.
   F. Piping: Pipe markers.
   G. Small-sized Equipment: Tags.
   H. Thermostats: Nameplates.
   I. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 NAMEPLATES
   A. Manufacturers:
   C. Letter Height: 1/4 inch.
   D. Background Color: Black.
   E. Plastic: Conform to ASTM D709.

2.03 TAGS
   A. Manufacturers:
   B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
   C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
2.04 ADHESIVE-BACKED DUCT MARKERS

A. Manufacturers:

B. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch; printed with UV and chemical resistant inks.

C. Style: Individual Label.

D. Color: Green/White.

2.05 PIPE MARKERS

A. Manufacturers:

B. Color: Conform to ASME A13.1.

C. 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.

D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

E. Color code as follows:
   1. Heating, Cooling, and Boiler Feedwater: Green with white letters.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Install ductwork with Duct Markers. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 23 0553
SECTION 23 0593
CONTRACTOR SCOPE FOR OWNER SUPPLIED TAB DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SPECIAL CONDITIONS APPLY TO THIS SECTION.

1.01 DESCRIPTION OF WORK
A. This scope of services specifies the requirements and procedures for mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, and recording and reporting the results. The test and balance work will be performed by the Owner’s personnel. It is the Contractor’s responsibility to assist as outlined below.

1. Test, adjust and balance the following mechanical systems which are shown in the construction documents.
   a. Supply air systems, all pressure ranges, including variable volume and constant volume systems.
   b. Exhaust air systems.
   c. Hydronic systems.
   d. Verify temperature control system operation.

   e. The contractor’s responsibilities are as follows:
      1) Notify the Owner’s Representative fourteen (14) days prior to the schedule date for balancing the system.
      2) Schedule a two (2) week allowance for the testing and balancing firm to complete the testing and balancing work when scheduling completion of all work required of the Contractor by the contract documents.
      3) Cooperate with the testing and balancing firm and shall make all necessary preparations for the TAB efforts.
      4) Complete the following work prior to requesting the TAB effort.
         (a) Clean and flush all piping systems.
         (b) Leak test and make tight all piping systems.
         (c) Fill all piping systems with clean water.
         (d) Clean and seal all ductwork systems.
         (e) Service and tag all equipment.
         (f) Set and align all motors and drives.
         (g) Start up and prove all equipment and systems.
         (h) Make preliminary settings on all control devices and have all systems operational.
         (i) Operate all systems successfully for twenty-four (24) hours minimum.
         (j) Lubricate all motors and bearings.
         (k) Check fan belt tension.
         (l) Check fan rotation.
         (m) Patch insulation, ductwork and housing, using materials identical to those removed.
         (n) Seal ducts and piping, and test for and repair leaks.
         (o) Seal insulation to re-establish integrity of the vapor barrier.
            (1) Attend a coordination meeting prior to the balancing of the system and a coordination meeting following the balancing of the system.
            (2) Provide a complete set of as-built drawings prior to the TAB effort.
            (3) Provide craftsmen of the proper trade to work with the TAB firm to make adjustments and installation changes as required.
            (4) Change out fan sheaves when and if required by the TAB firm.
            (5) Dedicate the resources to accommodate all changes identified by the test and balance firm in a timely manner.
            (6) If a significant rebalance (Owner’s determination) of the HVAC system is required due to the Contractor’s failure to properly install and check
out the HVAC system, the cost of rebalancing the system shall be borne by the Contractor.

2. SEQUENCING AND SCHEDULING OF SERVICES
   a. Test, adjust and balance the air conditioning systems during summer season and heating systems during winter season. This includes at least a period of operation at outside conditions within 5 deg. F wet bulb temperature of maximum summer design condition, and within 10 deg. F dry bulb temperature of minimum winter design conditions. Take final temperature readings during seasonal operation.

PART 2 – PRODUCTS

2.01 PRODUCTS (NOT APPLICABLE) PART 3 – EXECUTION

2.02 GENERAL (NOT APPLICABLE)

END OF SECTION 23 0593
PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Duct insulation.

1.02 REFERENCE STANDARDS
   F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

1.03 SUBMITTALS
   A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
   B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
   B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS
   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.

PART 2 PRODUCTS
2.01 REGULATORY REQUIREMENTS
   A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, FLEXIBLE
   A. Manufacturer:
   B. Insulation: ASTM C553; flexible, noncombustible blanket.
      1. 'K' value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 1200 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent by weight.

C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

E. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturer:
1. Armacell LLC; AP Armaflex: www.armacell.us/#sle.
2. K-Flex USA LLC; Insul-Sheet: www.kflexusa.com/#sle.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
1. Minimum Service Temperature: Minus 40 degrees F.
2. Maximum Service Temperature: 180 degrees F.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that ducts have been tested before applying insulation materials.
B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Insulated ducts 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, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated ducts conveying air above ambient temperature:
1. Provide with or without standard vapor barrier jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

D. Duct and Plenum Liner Application:
1. Adhere insulation with adhesive for 90 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.

3.03 SCHEDULES

A. Supply Ducts: 2" R-6

END OF SECTION 23 0713
SECTION 23 0719
HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Piping insulation.
B. Jackets and accessories.

1.02 RELATED REQUIREMENTS
A. Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.07 FIELD CONDITIONS
A. Maintain ambient conditions required by manufacturers of each product.
B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS
A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER
A. Manufacturers:
B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
1. 'K' Value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
E. Vapor Barrier Lap Adhesive: Compatible with insulation.

2.03 JACKETS
A. PVC Plastic.
   1. Manufacturers:
   2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil.
      e. Connections: Brush on welding adhesive.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that piping has been tested before applying insulation materials.
B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Exposed Piping: Locate insulation and cover seams in least visible locations.
C. Insulated pipes conveying fluids below ambient temperature; insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
D. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
E. Glass fiber insulated pipes conveying fluids above ambient temperature.
   1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

F. Inserts and Shields:
   1. Application: Piping 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   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 fabricating.
   5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

G. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 8400.

3.03 SCHEDULE
A. Heating Systems:
1. Heating Water Supply and Return: Fiberglass with ASJ, 1.5” thick up to and including 1-1/4” diameter piping, 2” thick for 1-1/2” diameter and larger.

END OF SECTION 23 0719
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SECTION 23 2113
HYDRONIC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Hydronic system requirements.
B. Heating water piping, above grade.
C. Pipe hangers and supports.
D. Unions, flanges, mechanical couplings, and dielectric connections.
E. Valves:
   1. Ball valves.
   2. Check valves.

1.02 RELATED REQUIREMENTS
A. Section 22 0719 - Plumbing Piping Insulation.
B. Section 23 2114 - Hydronic Specialties.

1.03 REFERENCE STANDARDS
A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications.
B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300.
C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
E. ASME B31.9 - Building Services Piping.
M. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
O. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
P. AWS D1.1/D1.1M - Structural Welding Code - Steel.
Q. AWWA C606 - Grooved and Shouldered Joints.

1.04 SUBMITTALS
A. Product Data:
   1. Include data on pipe materials, pipe fittings, valves, and accessories.
B. Project Record Documents: Record actual locations of valves.
1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.
   B. Provide all grooved joint couplings, fittings, valves, specialties, and grooving tools from a single manufacturer.
   C. Welder Qualifications: Certify in accordance with ASME BPVC-IX.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
   B. Provide temporary protective coating on cast iron and steel valves.
   C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
   D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 HYDRONIC SYSTEM REQUIREMENTS
   A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
   B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
      1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
      2. Use non-conducting dielectric waterways whenever jointing dissimilar metals.
      3. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.
   C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges or unions to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
      1. Where grooved joints are used in piping, provide grooved valve/equipment connections if available; if not available, provide flanged ends and grooved flange adapters.
   D. Valves: Provide valves where indicated:
      1. Provide drain valves where indicated, and if not indicated provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate valves with cap; pipe to nearest floor drain.
      2. For throttling, bypass, or manual flow control services, use ball valves.
      3. For shut-off and to isolate parts of systems or vertical risers, use ball valves.
   E. Welding Materials and Procedures: Conform to ASME BPVC-IX.

2.02 HEATING WATER PIPING, ABOVE GRADE
   A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types:
         a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
         b. Brazing: AWS A5.8M/A5.8 BCuP copper/silver alloy.
      2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
         a. Manufacturers:
            2) Viega LLC: www.viega.com/#sle.
2.03 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.
   4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
   6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
   7. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
   8. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

B. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

2.04 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. Unions for Pipe 2 Inches and Less:
   1. Copper Pipe: Bronze, soldered joints.

B. Flanges for Pipe 2 Inches and Greater:
   1. Copper Piping: Bronze.
   2. Gaskets: 1/16 inch thick preformed neoprene.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
   1. Dimensions and Testing: In accordance with AWWA C606.
   2. Mechanical Couplings: Comply with ASTM F1476.
   3. Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F to 230 degrees F.
   4. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
   5. When pipe is field grooved, provide coupling manufacturer's grooving tools.

D. Dielectric Connections:
   1. Waterways:
      a. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
      b. Dry insulation barrier able to withstand 600 volt breakdown test.
      c. Construct of galvanized steel with threaded end connections to match connecting piping.
      d. Suitable for the required operating pressures and temperatures.

2.05 BALL VALVES

A. Manufacturers:

B. Up To and Including 2 Inches:
   1. Bronze two piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle, solder or threaded ends.

2.06 SWING CHECK VALVES

A. Manufacturers:

B. Up To and Including 2 Inches:
   1. Bronze body, bronze trim, bronze rotating swing disc, with composition disc, solder or threaded ends.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs.
B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.
C. Remove scale and dirt on inside and outside before assembly.
D. Prepare piping connections to equipment using jointing system specified.
E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.
F. After completion, fill, clean, and treat systems. Refer to Section 23 2500 for additional requirements.

3.02 INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. Install heating water, glycol, chilled water, condenser water, and engine exhaust piping to ASME B31.9 requirements.
C. Route piping in orderly manner, parallel to building structure, and maintain gradient.
D. Install piping to conserve building space and to avoid interfere with use of space.
E. Group piping whenever practical at common elevations.
F. Sleeve pipe passing through partitions, walls and floors.
G. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified.
H. Slope piping and arrange to drain at low points.
I. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.
   2. Support horizontal piping as scheduled.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.
   5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   8. Provide copper plated hangers and supports for copper piping.
J. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 0719.
K. Provide access where valves and fittings are not exposed.
L. Install valves with stems upright or horizontal, not inverted.

3.03 SCHEDULES

A. Hanger Spacing for Copper Tubing.
   1. 1/2 inch and 3/4 inch: Maximum span, 5 feet; minimum rod size, 1/4 inch.
   2. 1 inch: Maximum span, 6 feet; minimum rod size, 1/4 inch.
3. 1-1/2 inch and 2 inch: Maximum span, 8 feet; minimum rod size, 3/8 inch.

END OF SECTION 23 2113
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SECTION 23 2114
HYDRONIC SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Air vents.
   B. Strainers.
   C. Pressure-temperature test plugs.

1.02 RELATED REQUIREMENTS
   A. Section 23 2113 - Hydronic Piping.

1.03 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.04 DELIVERY, STORAGE, AND HANDLING
   A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
   B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
   C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 AIR VENTS
   A. Manufacturers:
      2. ITT Bell & Gossett: www.bellgossett.com/#sle.
   B. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.
   C. Float Type:
      1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
      2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.
   D. Washer Type:
      1. Brass with hygroscopic fiber discs, vent ports, adjustable cap for manual shut-off, and integral spring loaded ball check valve.

2.02 STRAINERS
   A. Manufacturers:
   B. Size 2 inch and Under:
      1. Screwed brass or iron body for 175 psi working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

2.03 PRESSURE-TEMPERATURE TEST PLUGS
   A. Manufacturers:

B. Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F.
C. Application: Use extended length plugs to clear insulated piping.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install specialties in accordance with manufacturer's instructions.
B. Provide manual air vents at system high points and as indicated.
C. Provide valved drain and hose connection on strainer blow down connection.

END OF SECTION 23 2114
SECTION 23 3100
HVAC DUCTS AND CASINGS

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Metal ductwork.
   B. Duct cleaning.

1.02 RELATED REQUIREMENTS
   A. Section 23 0713 - Duct Insulation: External insulation and duct liner.
   B. Section 23 3300 - Air Duct Accessories.
   C. Section 23 3600 - Air Terminal Units.
   D. Section 23 3700 - Air Outlets and Inlets.

1.03 REFERENCE STANDARDS
   C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
   G. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements.
   L. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

1.05 FIELD CONDITIONS
   A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
   B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS
2.01 DUCT ASSEMBLIES
   A. Regulatory Requirements: Construct ductwork to NFPA 90A standards.
   B. Ducts: Galvanized steel, unless otherwise indicated.
   C. Low Pressure Supply (Heating Systems): 2 inch w.g. pressure class, galvanized steel.
   D. Low Pressure Supply (System with Cooling Coils): 2 inch w.g. pressure class, galvanized steel.
   E. General Exhaust: 2 inch w.g. pressure class, galvanized steel.
2.02 MATERIALS
A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
   1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
   2. VOC Content: Not more than 250 g/L, excluding water.
   3. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
   4. For Use With Flexible Ducts: UL labeled.
C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
   3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
   5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
   6. Other Types: As required.

2.03 DUCTWORK FABRICATION
A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
D. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.04 MANUFACTURED DUCTWORK AND FITTINGS
A. Flexible Ducts: Black polymer film supported by helically wound spring steel wire.
   1. UL labeled.
   2. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
   3. Pressure Rating: 2 inches WG positive and 0.5 inches WG negative.
   5. Temperature Range: Minus 20 degrees F to 175 degrees F.
   6. Manufacturers:

PART 3 EXECUTION
3.01 INSTALLATION
A. Install, support, and seal ducts in accordance with SMACNA (DCS).
B. Install in accordance with manufacturer's instructions.
C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
D. Flexible Ducts: For concealed areas only. Connect to metal ducts with draw bands.
E. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

H. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp. For concealed areas only.

3.02 CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.

END OF SECTION 23 3100
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SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Air turning devices/extractors.
   B. Duct access doors.
   C. Duct test holes.
   D. Flexible duct connections.
   E. Volume control dampers.
   F. Miscellaneous products:
      1. Duct opening closure film.

1.02 RELATED REQUIREMENTS
   A. Section 23 3100 - HVAC Ducts and Casings.
   B. Section 23 3600 - Air Terminal Units: Pressure regulating damper assemblies.

1.03 REFERENCE STANDARDS
   C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.
   D. UL 33 - Safety Heat Responsive Links for Fire-Protection Service.
   E. UL 555 - Standard for Fire Dampers.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
   B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS
2.01 AIR TURNING DEVICES/EXTRACTORS
   A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.02 DUCT ACCESS DOORS
   A. Manufacturers:
   B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch thick insulation with sheet metal cover.
      1. Less Than 12 inches Square: Secure with sash locks.
      2. Up to 18 inches Square: Provide two hinges and two sash locks.
3. Up to 24 by 48 inches: Three hinges and two compression latches with outside and inside handles.

C. Access doors with sheet metal screw fasteners are not acceptable.

2.03 DUCT TEST HOLES
A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.04 FLEXIBLE DUCT CONNECTIONS
A. Manufacturers:
B. Fabricate in accordance with SMACNA (DCS) and as indicated.
C. Flexible Duct Connections: Fabric crimped into metal edging strip.
D. Maximum Installed Length: 60 inch.

2.05 VOLUME CONTROL DAMPERS
A. Manufacturers:
B. Fabricate in accordance with SMACNA (DCS) and as indicated.
C. Single Blade Dampers:
   1. Fabricate for duct sizes up to 6 by 30 inch.
   2. Blade: 24 gage, 0.0239 inch, minimum.
D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
   1. Blade: 18 gage, 0.0478 inch, minimum.
E. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
F. Quadrants:
   1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
   2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

2.06 MISCELLANEOUS PRODUCTS
A. Duct Opening Closure Film: Mold-resistant, self-adhesive film to keep debris out of ducts during construction.
   1. Thickness: 2 mils.
   2. High tack water based adhesive.
   3. UV stable light blue color.

PART 3 EXECUTION

3.01 PREPARATION
A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION
A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.
B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 by 8 inch size for hand access, size for shoulder access, and as indicated. Provide 8 by 8 inch otherwise. Review locations prior to fabrication.

C. Provide duct test holes where indicated and required for testing and balancing purposes.

D. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

E. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

F. Provide balancing dampers on high velocity systems where indicated. Refer to Section 23 3600 - Air Terminal Units.

G. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION 23 3300
SECTION 23 3416
CENTRIFUGAL HVAC FANS

PART 1  GENERAL
1.01  SECTION INCLUDES
   A.  Forward curved centrifugal fans.

1.02  RELATED REQUIREMENTS
   A.  Section 23 0713 - Duct Insulation.
   B.  Section 23 3300 - Air Duct Accessories:  Backdraft dampers.

1.03  REFERENCE STANDARDS
   A.  AMCA (DIR) - [Directory of] Products Licensed Under AMCA International Certified Ratings Program.
   D.  AMCA 300 - Reverberant Room Method for Sound Testing of Fans.
   E.  AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data.
   F.  SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

1.04  SUBMITTALS
   A.  Product Data:  Provide data on centrifugal fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

1.05  QUALITY ASSURANCE
   A.  Manufacturer Qualifications:  Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06  DELIVERY, STORAGE, AND HANDLING
   A.  Protect motors, shafts, and bearings from weather and construction dust.

1.07  FIELD CONDITIONS
   A.  Permanent fans may not be used for ventilation during construction.

PART 2  PRODUCTS
2.01  MANUFACTURERS
   B.  Carnes, a division of Carnes Company Inc; VIBK:  www.carnes.com/#sle.

2.02  PERFORMANCE REQUIREMENTS
   A.  Performance Ratings:  Determined in accordance with AMCA 210 and bearing 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.  See Drawing schedule for fan performance requirements.
2.03 WHEEL AND INLET
   A. Forward Curved: Black enameled steel construction with inlet flange, back plate, shallow blades with inlet and tip curved forward in direction of airflow, mechanically secured to flange and back plate; steel hub swaged to back plate and keyed to shaft with set screw.

PART 3 EXECUTION
3.01 INSTALLATION
   A. Install in accordance with manufacturer’s instructions.
   B. Install flexible connections between fan inlet and discharge ductwork; refer to Section 23 3300. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.

END OF SECTION 23 3416
SECTION 23 3600
AIR TERMINAL UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Single-duct terminal units.
   B. Air volume control valves.

1.02 RELATED REQUIREMENTS
   A. Section 23 2113 - Hydronic Piping: Connections to heating coils.
   B. Section 23 2114 - Hydronic Specialties: Connections to heating coils.
   C. Section 23 3100 - HVAC Ducts and Casings.
   D. Section 23 3300 - Air Duct Accessories.
   E. Section 23 3700 - Air Outlets and Inlets.

1.03 SUBMITTALS
   A. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation. Include electrical characteristics and connection requirements.
   B. Project Record Documents: Record actual locations of units and locations of access doors required for access of valving.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.05 WARRANTY
   A. Provide five year manufacturer warranty for air terminal units.

PART 2 PRODUCTS

2.01 SINGLE-DUCT, VARIABLE-VOLUME UNITS
   A. Manufacturers:
      1. Metalaire, a brand of Metal Industries Inc: www.metalaire.com/#sle.
      4. Titus, Inc.
   B. General:
      1. Factory-assembled, AHRI 880 (I-P) rated and bearing the AHRI seal, air volume control terminal with damper assembly, flow sensor, externally mounted volume controller, duct collars, and all required features.
      2. Control box bearing identification, including but not necessarily limited to nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil (right or left hand) connection, where applicable.
   C. Unit Casing:
      1. Minimum 22 gage, 0.0299 inch galvanized steel.
      2. Air Inlet Collar: Provide round, suitable for standard flexible duct sizes.
      3. Unit Discharge: Rectangular, with slip-and-drive connections.
      4. Acceptable Liners:
         a. 1/2 inch thick, coated, fibrous-glass complying with ASTM C1071.
            1) Secure with adhesive.
            2) Coat edges exposed to airstream with NFPA 90A approved sealant.
            3) Cover liner with non-porous foil.
b. Liner not to contain pentabrominated diphenyl ether (CAS #32534-81-9) or octabrominated diphenyl ether.

D. Damper Assembly:
   1. Heavy-gage, galvanized steel or extruded aluminum construction with solid steel, nickel-plated shaft pivoting on HDPE, self-lubricating bearings.
   2. Provide integral position indicator or alternative method for indicating damper position over full range of 90 degrees.
   3. Incorporate low leak damper blades for tight airflow shutoff.

E. Hot Water Heating Coil:
   1. Coil Casing: Minimum 22 gage, 0.0299 inch galvanized steel, factory-installed on terminal discharge with rectangular outlet, duct connection type.
   2. Coil Fins: Aluminum or aluminum plated fins, mechanically-bonded to seamless copper tubes.
   3. Coil leak tested to minimum 350 psig.
   4. Base performance data on tests run in accordance with AHRI 410 and units to bear AHRI 410 label.

2.02 AIR VOLUME CONTROL VALVES

A. General:
   1. Factory-assembled air volume control valves rated in accordance with AHRI 880 (I-P).
   2. Clearly label each unit indicating maximum/minimum cfm, tag/mark number, model number, and manufacturer's order number.

B. Construction:
   1. Casing: Minimum 20 gage, 0.0375 inch Type 316L stainless steel suitable for welding in place without distortion, meeting the requirements of NFPA 90A and UL 181.
   2. Damper: Minimum 22 gage, 0.0299 inch Type 316L stainless steel with teflon damper shaft bearings and damper gasket.
   3. Air Leakage: Not exceed 2 percent of the nominal catalog rating 3 inch wg inlet static pressure when tested in accordance with ASHRAE Std 130.
   4. Air volume control assemblies to consist of galvanized steel damper, steel, cylindrical flow diverter valve, or sliding gate valve.

C. Electrical Requirements:
   1. Single-point power connection.
   2. Equipment wiring to comply with requirements of NFPA 70.

D. Controls:
   1. DDC (Direct-Digital Controls):
      a. Bi-directional Damper Actuator: 24 volt, powered closed, spring return open.
      b. Microprocessor-Based Controller: Air volume controller, pressure-independent with electronic airflow transducers, factory-calibrated maximum and minimum CFM's.
         1) Occupied and unoccupied operating mode.
         2) Remote reset of temperature or CFM set points.
         3) Proportional, plus integral control of room temperature.
         4) Monitoring and adjusting with portable terminal.
      c. Room Sensor:
         1) Compatible with temperature controls specified.
         2) Wall-mounted, system powered, with temperature set-point adjustment including connection access for portable operator terminal.
   2. Control Sequence: See Section 23 0993.

PART 3 EXECUTION

3.01 EXAMINATION

   A. Verify that conditions are suitable for installation.
   B. Verify that field measurements are as indicated on drawings.
3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install the inlets of air terminal units and air flow sensors a minimum of four duct diameters from elbows, transitions, and duct takeoffs.

C. See drawings for the size(s) and duct location(s) of the air terminal units.

D. Provide ceiling access doors or locate units above easily removable ceiling components.

E. Support units individually from structure with wire rope complying with ASTM A492 and ASTM A603 in accordance with SMACNA (SRM). See Section 23 0548.

F. Do not support from ductwork.

G. Connect to ductwork in accordance with Section 23 3100.

H. Install heating coils in accordance with Section 23 8200.

I. Verify that electric power is available and of the correct characteristics.

3.03 ADJUSTING

A. Reset volume with damper operator attached to assembly allowing flow range modulation from 100 percent of design flow to zero percent full flow.

END OF SECTION 23 3600
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SECTION 23 3700
AIR OUTLETS AND INLETS

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Diffusers.
   B. Registers/grilles.

1.02 REFERENCE STANDARDS
   A. AHRI 880 (I-P) - Performance Rating of Air Terminals.
   B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

1.03 SUBMITTALS
   A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS
2.01 MANUFACTURERS
   D. Tuttle and Bailey: www.tuttleandbailey.com/#sle.
   E. See drawings for schedule, capacities, material, type, etc.

PART 3 EXECUTION
3.01 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
   C. Install diffusers to ductwork with air tight connection.
   D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

   END OF SECTION 23 3700
SECTION 23 4000
HVAC AIR CLEANING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. High efficiency particulate air (HEPA) filters.

1.02 REFERENCE STANDARDS
   A. AHRI 851 (SI) - Performance Rating of Commercial and Industrial Air Filter Equipment.
   B. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
   D. UL 586 - High Efficiency, Particulate, Air Filter Units.
   E. UL 900 - Standard for Air Filter Units.

1.03 SUBMITTALS
   A. Product Data: Provide data on filter media, filter performance data, filter assembly and filter frames, dimensions, motor locations and electrical characteristics and connection requirements.

PART 2 PRODUCTS

2.01 FILTER MANUFACTURERS
   A. American Filtration Inc: www.americanfiltration.com/#sle.

2.02 PERFORMANCE REQUIREMENTS
   A. Conform to the rating requirements in AHRI 851 (SI).

2.03 HIGH EFFICIENCY PARTICULATE AIR (HEPA) FILTERS
   A. Media: UL 586, pleated, water-resistant glass fiber with separators of aluminum:
      3. Face Gasket: Neoprene expanded rubber.
   B. Minimum Efficiency Reporting Value (MERV): 15, when tested in accordance with ASHRAE Std 52.2.
   C. Performance Rating: See drawings for airflows.
      1. MIL-STD-282 Test 0.3 Micron Dioctyl Phthalate Smoke (DOP) Efficiency: 99.97 percent.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Install air cleaning devices in accordance with manufacturer's instructions.
   B. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.
   C. Install filter gauge static pressure tips upstream and downstream of filters. Mount filter gauges on outside of filter housing or filter plenum, in accessible position. Adjust and level.
   D. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with clean set.
   E. Provide filter gauges on filter banks, installed with separate static pressure tips upstream and downstream of filters.

END OF SECTION 23 4000
SECTION 23 8200
CONVECTION HEATING AND COOLING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Air coils.

1.02 RELATED REQUIREMENTS
   A. Section 23 0716 - HVAC Equipment Insulation.
   B. Section 23 0719 - HVAC Piping Insulation.
   C. Section 23 2113 - Hydronic Piping.
   D. Section 23 2114 - Hydronic Specialties.
   E. Section 23 3100 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS
   D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS
   A. Product Data: Provide typical catalog of information including arrangements.

1.06 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 AIR COILS
   A. Manufacturers:
      1. Water Coils:
         b. Trane, a brand of Ingersoll Rand: www.trane.com/#sle.
         c. USA Coil & Air: www.usacoil.com/#sle.
      B. Water Coils:
         1. Coils rated and tested in accordance with AHRI 410.
         2. Tubes: Material to consist of seamless copper or brass, mechanically expanded or tension wound to fins; appropriate tube joining methods based on tube material.
         3. Fins: Material to consist of aluminum or copper, continuous plate type with full fin collars or individual helical finned tube type wound under tension.
         4. Casing: Heavy gage galvanized steel with mounting holes, including intermediate tube supports if required by coil design and length.
         5. Headers (Manifolds): Construct of seamless copper pipe or cast iron material with tube connection appropriate to header material provided.
         6. Acceptable Factory Testing Methods:
            a. Proof test at 1.5 times the maximum operating pressure and leak test at the maximum operating temperature.
            b. Leak test at minimum 300 psig air pressure under water.
            c. Perform hydrostatic testing for coils with removable headers in accordance with approved shop drawings and normally accepted means and methods.
C. See drawing schedule for coil performance requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are suitable for installation.
B. Verify that field measurements are as indicated on drawings.

3.02 INSTALLATION

A. Install in accordance with manufacturer's recommendations.
B. Do not damage equipment or finishes.
C. Air Coils:
   1. Install in ducts and casings in accordance with SMACNA (DCS).
      a. Support coil sections independent of piping on steel channel or double angle frames and secure to casing.
      b. Arrange supports to avoid piercing drain pans.
      c. Provide airtight seals between coil and casing or duct.
      d. Refer to Section 23 3100.
   2. Coil Safeguards:
      a. Protect coils to prevent damage to flanges and fins.
      b. Comb out damaged fins.
   3. Install all coils level except cleanable coils with 1:50 pitch.
   4. Make connections to hydronic coils with unions and flanges.
   5. Hydronic (Drainable) Coils:
      a. Connect water supply to leaving air side of coil (counterflow arrangement).
      b. Provide with shut-off valve on supply piping and tamper-proof, balancing valve with memory stop on return piping.
      c. Locate supply water connection on leaving air side at bottom of supply header, and return water connection at top.
      d. Provide manual air vents with stop valves at high points.
         1) Install drain connections at low points of installation.

END OF SECTION 23 8200
PART 1 GENERAL
1.01 GENERAL
   A. Provisions of the General Requirements and Special Conditions, Division 1, are a part of this Division and Section.

1.02 SECTION INCLUDES
   A. Electrical demolition.

PART 2 PRODUCTS
2.01 MATERIALS AND EQUIPMENT
   A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify field measurements and circuiting arrangements are as shown on Drawings.
   B. Verify that abandoned wiring and equipment serve only abandoned facilities.
   C. Demolition drawings are based on casual field observation and existing record documents.
   D. Report discrepancies to Architect/Engineer before disturbing existing installation.
   E. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION
   A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
   B. Coordinate utility service outages with Owner's Representative.
   C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
   D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   E. Existing Fire Alarm System: Maintain existing system in service.
      1. Make temporary connections to maintain service in areas adjacent to work area.
      2. Minimize outage duration.
      3. Notify Owner's Representative before partially or completely disabling system.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK
   A. Remove, relocate, and extend existing installations to accommodate new construction.
   B. Remove abandoned wiring to source of supply.
   C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
   D. Disconnect abandoned outlets and remove wiring devices and conductors. Remove abandoned outlets if conduit and conductors servicing them is abandoned and removed. Provide blank cover for abandoned device boxes which are not removed.
   E. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
   F. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
      1. Fluorescent Ballasts:
         a. Contractor shall inspect fluorescent ballasts and dispose of all ballasts that are marked as Non-PCB.
b. All ballasts that are not marked as Non-PCB shall be removed from the fixtures and returned to the Owner's Representative for disposal.

2. Fluorescent Lamp Handling Procedures:
   a. Empty boxes/drums for disposal of fluorescent lamps will be provided by Owner.
   b. Do not tape bulbs together prior to putting them in the lamp boxes. Close container lid after placing lamps into the lamp box.
   c. Lamps must be sorted by type:
      1) Green tipped ("Alto") lamps are included in lamps to be recycled.
      2) Up to 4' straight tube lamps in 4' box or fiber drum.
      3) Shattershield lamps (i.e., lamps covered with a plastic coating to protect from breakage) must be accumulated/stored/counted separate from regular straight fluorescent lamps.
      4) Broken lamps (of all types) must be put into the broken lamp drum (see paragraph h below).
   d. When a used lamp is first placed into a consolidation box or drum, that container shall be labeled with a "Universal Waste" label (contact Owner's Representative for instructions on proper completion of this label). The label must be placed correctly on the box:
      1) All labels must be visible from the front of the box.
      2) All labels must be right side up.
      3) Labels must be placed within 12" from the top of the container.
   e. When the lamp container is full, inventory the contents and post this information to the "Universal Waste" label as shown on the label instructions.
   f. Close and tape shut the filled lamp container.
   g. Store boxes inside a dry, secured area.
   h. Broken lamps must go into the plastic bag located in the metal drum provided by EHS.
      1) At the time that the first broken bulb(s) are placed in the metal drum, a completed Hazardous Materials Label (EHS HML 10/93) must be affixed to the drum (please see separate instructions for completion of this label).
      2) The plastic bag in the drum must be kept securely closed except when adding broken lamps to it.
      3) The lid must be kept on the drum and secured with the lever-lock ring except when adding broken lamps to the drum.
   i. Deliver containers of lamps to Columbia Campus location as directed by Owner's Representative.

G. Repair adjacent construction and finishes damaged during demolition and extension work.

H. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

3.04 CLEANING AND REPAIR
   A. Clean and repair existing materials and equipment which remain or are to be reused.

END OF SECTION 26 0501
SECTION 26 0510
ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.01 GENERAL
A. Provisions of the General Requirements and Special Conditions, Division 1, are a part of this Division and Section.

1.02 SCOPE OF WORK
A. The Contractor shall provide all labor, materials, tools, and equipment required to furnish, construct, and install electrical power circuits, and other items and equipment as detailed on the Drawings and specified herein.
B. The Work shall include everything requisite and necessary to finish the Work properly, notwithstanding that every item of labor or materials or accessories required to make the installation complete may not be specifically mentioned.
C. The Work shall include, but shall not necessarily be limited to: Furnish and install all wiring, splices, and terminations required to connect new equipment, and to reconnect existing equipment.

1.03 REFERENCES

1.04 SUBMITTALS
A. Product Data: Provide data for conduit fittings & hardware, wire, receptacles & switches.

PART 2 MATERIALS

2.01 RACEWAYS
A. Metallic Conduit: Conduit for low voltage electrical circuits (Rated 600 volts or below) shall consist of all metal raceway, fittings and hardware, unless indicated otherwise in the specifications or on the drawings. Conduit shall be hot dipped galvanized. Conduit installed outdoors shall be Rigid Metal Conduit and conduit installed indoors shall be EMT, unless indicated otherwise in the specifications or on the Drawings. Flexible Metal Conduit and Liquidtight Flexible Metal Conduit shall be used for raceway terminating at motors, light fixtures, and pre-engineered equipment where vibration isolation is required. Conduit shall be manufactured by Triangle PWC, Inc., or approved equal.
1. Fittings: Fittings shall consist of die-cast, metal alloy bodies, device boxes, insulated bushings, sealing fittings, cord fittings, etc., as manufactured by Appleton Electric Co., Crouse-Hinds, or approved equal.
2. All EMT fittings shall be compression type.
   a. Set screw type EMT fittings are NOT permitted.
3. Hardware: Hardware shall consist of all malleable iron conduit clamps, beam clamps and hangers required to install the raceway system. Raceway support spacing shall not exceed ten feet.
4. All conduit and fittings shall be UL listed for use as an equipment grounding conductor.
5. Minimum conduit size shall be 3/4-inch diameter unless otherwise indicated.
B. Dual Channel Aluminum Surface Raceway: Raceway shall be a three-piece design with a base and a two piece snap-on cover. The raceway and all fittings shall be made by the same company. The dual channel raceway shall be designed for use with electric power in one channel, and data or telephone in the other channel.
1. Base shall be electrical grade extruded aluminum which includes a center divider that separates the raceway into two equal compartments. The base shall be 6" wide, 2 1/4" deep with a center divider. The two piece snap-on cover sections shall each be 3" wide so that a cover can be removed without exposing circuits installed in the adjacent section. The cover sections and cover plates shall be removable by use of a standard screwdriver without marring the extrusion finish.
2. The dual channel raceway system shall be furnished complete with all fittings including wiring clips, grounding adapters, couplings, end fittings, and 2” bend radius inserts for elbows.

3. All telephone and data shall be installed using factory cover plates with 1 3/4” x 2 3/4” openings with 6-32 tapered holes.

4. Receptacles shall be install using factory cover plates designed for the specific device, such as duplex receptacle cover plates, single receptacle cover plates, or GFCI cover plates.

5. The installed raceway system shall be electrically continuous, and meet UL and NEC requirements for a grounding conductor. A separate copper grounding conductor shall also be installed.

6. The dual channel aluminum surface raceway shall be WIREMOLD series ALA4800 Aluminum Surface metal Raceway, or approved equal.

C. Single Channel Aluminum Surface Raceway:

1. Surface mounted aluminum raceway system shall be two piece design with a base and a snap-on cover. The contractor shall furnish and install the raceway as a complete system including all fittings. Raceway shall be anchored to wall with a maximum spacing of four (4) feet between anchors. Surface mounted aluminum raceway system shall be Wiremold ALA3800 series raceway unless otherwise indicated, as manufactured by The Wiremold Company, Electrical Division, West Hartford, Connecticut, or approved equal.

2. Receptacles shall be install using factory cover plates designed for the specific device, such as duplex receptacle cover plates, single receptacle cover plates, or GFCI cover plates.

3. The installed raceway system shall meet UL and NEC requirements for a grounding conductor. A separate copper grounding conductor shall be installed.

2.02 Wires and Cables

A. Equipment grounding conductors shall be copper conductors, with solid or stranded construction. Grounding conductors other than copper shall NOT be used.

B. Wiring shall be copper conductor with a minimum size of #12 AWG (Aluminum conductors shall not be used). Conductor insulation shall be type THHN/THWN unless noted otherwise.

C. Electrical Tape: Vinyl electrical tape shall be flame-retardant, weather-resistant, conformable down to zero degrees Fahrenheit, with a maximum operating temperature range not less than 220 degrees Fahrenheit (105 degrees Celsius). Electrical tape shall be resistant to UV rays, moisture, alkalis, and acids. Scotch Super 33+ or Scotch Super 88 as manufactured by 3M Electrical Products Division, or approved equal.

D. Strain-Relief Grips: Designed to prevent pullout due to tension and limit the arc of bend at the point of entry, by distributing the strain over the length of the mesh rather than concentrated at one point.

1. Shall include an insulated dust-tight bushing.

2. Basis of design is Leviton Model L7507 Single Weave Galvanized Steel Mesh.

2.03 Fire Stop Compound

A. Firestop compound shall be Fire Barrier Caulk CP25, Putty 303 as manufactured by 3M Company, or approved equal.

2.04 Wall Plates

A. Wall Plates: Wall plates for switches and receptacles shall be high impact, abuse-resistant nylon, as manufactured by Hubbell Wiring Device Division, Hubbell Incorporated, Leviton Manufacturing Co., Inc., or approved equal. Wall plates shall have a smooth finish, and match the color of the receptacle/switch. Preferred color for receptacles and switches is ivory. Other colors may be used to match existing devices or for special uses.

B. Designer will evaluate the need for steel, nylon or other special types of covers, depending on the usage of the area.
2.05 WIRING DEVICES

A. The mounting heights for receptacles and switches shall comply with ADA reach restrictions, and are preferred to be 46" for switches, and 18" for receptacles, above finished floor.

B. 20 ampere simplex receptacles shall be 125 volt, two (2) pole, three (3) wire grounding, straight blade (NEMA 5-20R), heavy-duty industrial specification grade, nylon construction, with side/back wired option. Receptacles shall be ivory color unless otherwise indicated on drawings. Hubbell Catalog No. 5361-I as manufactured by Hubbell Wiring Device Division, Hubbell, Inc., Leviton Catalog No. 5361-I as manufactured by Leviton Manufacturing Co., Inc.

C. 20 ampere duplex receptacles shall be 125 volt, two (2) pole, three (3) wire grounding, straight blade (NEMA 5-20R), heavy-duty industrial specification grade, nylon construction, with side/back wired option, one piece brass mounting strap with integral ground contacts. Receptacles shall be ivory color unless otherwise indicated on drawings. Hubbell Catalog No. 5362-I as manufactured by Hubbell Wiring Device Division, Hubbell Incorporated, Leviton Catalog No. 5362A-I as manufactured by Leviton Manufacturing Co., Inc., or approved equal.

D. In areas required to have ground fault interrupting capability, GFI receptacles shall be used in lieu of GFI breakers, unless approved by the Project Manager.

E. 20 ampere GFCI (Ground Fault Circuit Interrupter) receptacles shall be 125 volt, two (2) pole, three (3) wire grounding, straight blade (NEMA 5-20R), commercial specification grade, nylon construction, with 20 amp feed-through, and side wired option. Receptacles shall be ivory color unless otherwise indicated on Drawings. Hubbell Catalog No. GF5362-I as manufactured by Hubbell Wiring Device Division, Hubbell, Inc., or Leviton Catalog No. S7899-I as manufactured by Leviton Manufacturing Co., Inc.

F. 20 ampere Locking Devices, shall be 125 volt, two (2) pole, three (3) wire grounding, (NEMA L5-20R), industrial grade, nylon construction. Leviton Catalog No. 2313 as manufactured by Leviton Manufacturing Co., Inc., or approved equal.

2.06 SWITCHES

A. Single pole switches shall be 20 ampere heavy duty specification grade, with standard toggle, back and side wired, with grounding screw and clip. Switches shall have ivory color handle unless otherwise indicated. Hubbell Catalog No. HBL 1221-I as manufactured by Hubbell Wiring Device Division, Hubbell, Inc., Leviton Catalog No. 1221-2I as manufactured by Leviton Manufacturing Co., Inc., or approved equal.

B. Three way switches shall be 20 ampere, heavy duty specification grade, with standard toggle, back and side wired, with grounding screw and clip. Switches shall have ivory color handle unless otherwise indicated. Hubbell Catalog No. HBL 1223-I as manufactured by Hubbell Wiring Device Division, Hubbell, Inc., Leviton Catalog No. 1223-2I as manufactured by Leviton Manufacturing Co., Inc. or approved equal.

C. Four way switches shall be 20 ampere, heavy duty specification grade, with standard toggle, back and side wired, with grounding screw and clip. Switches shall have ivory color handle unless otherwise indicated. Hubbell Catalog No. HBL 1224-I as manufactured by Hubbell Wiring Device Division, Hubbell, Inc., Leviton Catalog No. 1224-2I as manufactured by Leviton Manufacturing Co., Inc. or approved equal.

D. Timer: Digital In-Wall Timer Switch shall be easy-to-program that provides up to 40 events per week. Programs for 24-hours or 7-day load control, with automatic daylight saving time adjustment, and a manual override feature. CFL/LED compatible, single-pole or 3-way, 120-277 VAC, and programming stored in non-volatile memory. Basis of design is the EI600 series as manufactured by Intermatic, Spring Grove, IL, 60081, www.intermatic.com.

E. Dimming switches shall be Leviton IllumaTech Preset Slide Control #IP710-LF with push button that provides preset On/Off switching, for 0-10V dimming power supplies, and rated for 1200VA at 120V, and 1500VA at 277V, or approved equal.

F. All dimmable lighting circuits require a dedicated neutral conductor.
2.07 MANUFACTURED WIRING SYSTEMS

A. No prewired cable such as type MC or armored cable shall be used unless indicated on Drawings and as permitted for use as a lighting fixture whip in Specification Section 26 5100.

PART 3 EXECUTION

3.01 INSTALLATION

A. Where circuits require more than one conductor per phase, the Contractor shall take steps (such as cutting all conductors for each phase to the same length) to prevent conductors from hogging load.

B. Conduits size shall meet or exceed the requirements of the National Electric Code for the wiring installed within.

C. All wiring shall be encased within a metallic raceway system. Flexible metal conduit and liquid tight flexible metal conduit shall not exceed the following lengths:
   1. Motor Terminations: Three (3) feet maximum length.
   2. Pre-Engineered Equipment: Three (3) feet maximum length.
   3. Light Fixtures: Six (6) feet maximum length.

D. The contractor shall provide and install branch circuit and feeder circuit identification using a typed identification card at each panelboard.

E. No splicing or joints shall be permitted in either feeder or branch circuits except at outlet boxes and junction boxes. Solderless compression type connectors or twist-on (wire nut) connectors shall be used when making splices. All compression type splices shall be insulated with cold shrink insulation, and twist on splices shall be taped with vinyl electrical tape.

F. All wiring and existing (reconnected) electrical equipment and lights shall be grounded in accordance with the NEC. The equipment grounding conductor shall be copper wire. Metallic conduit shall be installed to form a continuous ground path, with the copper equipment grounding conductor installed. Other types of equipment grounding conductors (such as water pipes) shall not be used.

G. All electrical conduit passing through building exterior walls, or fire rated partitions (such as the transformer vault wall) shall be sealed in the space between the conduit and wire with approved raceway sealing material. In addition, the space between the conduit and the building walls shall be caulked with an approved firestop compound. Escutcheons shall be provided to all finished interior penetrations. All damaged wall surfaces shall be patched and repaired to proper condition that is suitable for painting by owner.

H. Contractor shall coordinate all power outages with Owner's Representative.

END OF SECTION 26 0510
SECTION 26 2417
LOW VOLTAGE EQUIPMENT

PART 1  GENERAL

1.01  RELATED DOCUMENTS
A. Provisions of the General Requirements and Special Conditions, Division 1, are a part of this Division and Section.

1.02  SCOPE OF WORK
A. The Contractor shall provide all labor, materials, tools, and equipment required to furnish, construct, and install panelboards, motor starters, electrical power circuits, and other items and equipment as detailed on the Drawings and specified herein.
B. The Work shall include everything requisite and necessary to finish the Work properly, notwithstanding that every item of labor or materials or accessories required to make the installation complete may not be specifically mentioned.
C. The Work shall include, but shall not necessarily be limited to, the following:
D. Load Centers are not allowed. Minimum level of quality is a panelboard or switchboard.
E. Provide each Switchboard, Panelboard, or Motor Control Center with a permanently attached nameplate displaying, at a minimum, the (Switchboard, Panelboard, Motor Control Center) name, voltage, phase, and supply circuit origin.
F. Label each overcurrent protection device to show the load it supplies. Include permanent one-line diagram.

1.03  REFERENCES

1.04  SUBMITTALS
A. See General Conditions and Special Conditions for submittal procedures.
B. Product Data: Provide data per drawing.
C. Manufacturer’s Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.05  QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2  MATERIALS

2.01  PANELBOARDS
A. Lighting panelboard(s) shall be fully rated for amperages indicated on Drawings. Panelboard(s) shall be designed for use on a three (3) phase, four (4) wire grounded wye system with voltages as indicated on the Drawings. The completed panelboard shall have a minimum short circuit symmetrical (AIC) rating as indicated on the Drawings. Lighting panelboards shall be Square "D" NQOD, Square "D" NF, General Electric AQ, General Electric AE, or approved equal with 42 positions (unless otherwise specified). Branch circuit breakers shall be the type and manufacturer as listed below or approved equal, and shall meet the AIC requirement indicated on the project Drawings.
B. Bus bars shall be 98% conductivity copper (phase, neutral, and ground), with a fully rated neutral, and ground bus. Neutral bus shall be electrically isolated from ground.
C. Bus bar shall extend the full length of the panelboard to allow for the maximum number of future circuit breakers.

D. Panelboards shall include a NEMA 1 enclosure with a locking door-in-door with a hinged trim (both doors hinged) and metal directory frame with plastic cover.

E. Feeder Circuit Breaker(s) shall be the type and manufacturer as listed below, or approved equal, and shall meet the AIC rating requirement indicated on the project Drawings.
   1. AIC Rating: 22,000 at 240 V; Frame Size: 15-100 Amperes; Type: Square "D" QOB-VH or G.E. type THHQB

2.02 CIRCUIT BREAKER
   A. Bolt-in breakers shall be used. Plug-in breakers are not allowed. Square D I-Line and GE Spectra Series are acceptable.

2.03 CONTROL TRANSFORMERS
   A. Control transformer(s) shall be the type and manufacturer listed below and shall be 500 VA, unless otherwise indicated on the project drawings.
      1. Control transformer(s) shall be Type IP encapsulated core and coil transformers for machine tool and control power, as manufactured by General Electric. Control transformer(s) shall be U.L. Listed and CSA Certified, 60 Hertz, with primary and secondary fused overcurrent protection, and spade type terminals.
         a. Control transformer(s) shall have 120/240 volt primary, 24 volt secondary, and shall be RIB catalog number PSMN500A or approved equal.
         b. Control transformer(s) shall be furnished with a NEMA type 1 metal enclosure.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field measurements are as shown on the drawings.

3.02 INSTALLATION
   A. Perform work in accordance with NECA 1 (general workmanship).
   B. Install products in accordance with manufacturer's instructions.
   C. Where circuits require more than one conductor per phase, the Contractor shall take steps (such as cutting all conductors for each phase to the same length) to prevent conductors from hogging load.
   D. All wiring shall be encased within a raceway system. Existing conduit may be used, where size is at least 3/4-inch diameter and percent fill does not exceed NEC maximums.
   E. The Contractor shall provide and install branch circuit and feeder circuit identification using a typed identification card at each panelboard.
   F. All wiring and existing (reconnected) electrical equipment and lights shall be grounded in accordance with the NEC. The equipment grounding conductor shall be copper wire. Other types of equipment grounding conductors (such as conduit or water pipes) shall NOT be used.
   G. Provide appropriate grounding and bonding.
   H. All Exit lights and emergency lighting fixtures shall be wired in accordance with the manufacturer's requirements to ensure proper operation.
   I. The branch circuit feeding the Exit Lights and Emergency Lights shall be the same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches.
   J. Contractor shall coordinate all power outages with Owner's Representative.
   K. Contractor shall repaint scratched or marred surfaces to match original finish.

END OF SECTION 26 2417
SECTION 26 5100
INTERIOR LIGHTING FIXTURES

PART 1  GENERAL

1.01  RELATED DOCUMENTS
   A. Provisions of the General Requirements and Special Conditions, Division 1, are a part of this
      Division and Section.

1.02  SCOPE OF WORK
   A. Remove existing interior light fixtures in locations as indicated on Drawings.
   B. Dispose of ballasts and fluorescent lamps as indicated.
   C. Install exit signs in locations as indicated on Drawings.
   D. Install interior fluorescent light fixtures in locations as indicated on Drawings.

1.03  SUBMITTALS
   A. Product Data: Submit manufacturer's product data and installation instructions on each type
      interior building lighting fixture and component.
   B. Shop Drawings: Submit fixture shop drawings with proposed fixture and accessories clearly
      indicated on each sheet. Submit details indicating compatibility with ceiling suspension system.
   C. Maintenance Data: Submit maintenance data and parts list for each interior lighting fixture and
      accessory, including a "trouble shooting" maintenance guide. In addition to this data, provide
      product data and shop drawings in a maintenance manual.

1.04  QUALITY ASSURANCE
   A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of interior lighting
      fixtures of sizes, types, and ratings required, whose products have been in satisfactory use in
      similar service for not less than five (5) years.
   B. Installer's Qualifications: Firms with at least three (3) years of successful installation experience
      on projects with interior lighting fixture work similar to that required for this project.
   C. Codes and Standards:
      1. Electrical Code Compliance: Comply with NEC Articles 220, 410, and 510 as applicable to
         installation, and construction of interior building lighting fixtures.
      2. UL Compliance: Comply with UL standards, including UL 486A and B, pertaining to
         interior lighting fixtures. Provide interior lighting fixtures and components which are UL
         listed and labeled.
      3. CBM Labels: Provide fluorescent lamp ballasts which comply with Certified Ballast
         Manufacturers Association standards and carry the CBM label.

1.05  DELIVERY, STORAGE, AND HANDLING
   A. Deliver interior lighting fixtures in factory-fabricated containers or wrappings, which properly
      protect fixtures from damage.
   B. Store interior lighting fixtures in original packaging. Store inside well-ventilated area protected
      from weather, moisture, soiling, extreme temperatures, humidity, stored flat and blocked off
      ground.
   C. Handle interior lighting fixtures carefully to prevent damage, breaking, and scoring of finishes.
      Do not install damaged units or components; replace with new.

PART 2  PRODUCTS

2.01  FIXTURES
   A. General: Provide lighting fixtures of sizes, types, and ratings indicated; complete with, but not
      limited to, housings, energy efficient ballasts, lamp holders (Medium Bi-Pin), reflectors, and
      wiring. Ship fixtures factory-assembled with those components required for a complete
installation. Design fixtures with concealed hinges and catches, with metal parts grounded as common unit, and so constructed as to dampen ballast generated noise.

B. Exit Signs: Exit Signs shall have bright long-life LED lighting with UV stable housing. Exit signs shall be self contained for emergency operation, fully automatic with solid-state charger, maintenance-free battery, 2-hour minimum operation, automatic battery protection, test switch, normal power (AC-on) indicator and meet the minimum requirements for UL924 and NFPA101. Provide remote head where indicated on drawings.

1. Combination unit will contain two (2) LED heads, to provide emergency lighting.

C. Wiring: Provide electrical wiring within fixture suitable for connecting to branch circuit. Wiring shall be NEC Type SF-2, minimum No. 18 AWG.

D. Interior Lighting Fixture Types:

1. General: Various fixture types required are indicated below. Fixtures must comply with minimum requirements as stated herein. Review Drawings and Specifications to verify ceiling types, modules, and suspension systems appropriate to installation.

2. Architectural Troffer Lighting Fixtures (Mark 'A'): Provide recessed, LED fixtures as indicated on the drawings. Fixtures shall have length, width, lumen package, correlated color temperature, and voltage as indicated on drawings. Fixtures submitted as proposed equals shall have similar photometric characteristics and shall have full photometric and catalog data submitted at the time of bid. Photometric data shall be suitable for calculations on the Acuity Industries Visual Program.

   a. Housing: 22 gauge die formed and pre-punched with sufficient knockouts for mounting and supply wire.

   b. Manufacturers and Model Basis of Design:

      1) H.E. Williams HETL

   c. Diffuser:

      1) Frosted acrylic

   d. Lens: Transparent lensed door providing a barrier to minimize contaminants.

   e. Finish: All cold rolled steel parts shall be cleaned and pre-treated after fabrication with a phosphate process to ensure paint adhesion and corrosion resistance. A baked white gloss finish shall be applied. Minimum average reflectance shall be 90 percent.

3. Surface/Pendant Injection Molded Wrap Around Lens Lighting Fixtures (Mark 'B'): Fixtures shall be designed for surface or pendant style of mounting below ceiling. Surface/pendant fixtures shall be LED, Length, Lumen Package, Correlated Color Temperature, and voltage as indicated on drawing and be Series 39, with Frosted Ribbed Acrylic Lens, be Surface or Pendant Mounted as manufactured by H.E. Williams, Inc., Carthage, MO, or approved equal. Fixtures submitted as proposed equals shall have similar photometric characteristics and shall have full photometric and catalog data submitted at the time of bid. Photometric data shall be suitable for calculations on the Acuity Industries Visual Program.

   a. Housing: 20 gauge C.R.S. die-formed and pre-punched with sufficient knockouts for mounting and supply wiring.

   b. Wireway Cover: 22 gauge C.R.S. die-formed and removable without the use of tools.

   c. Shielding: Diffuser shall be Frosted Ribbed Acrylic.

   d. Finish: All cold rolled steel parts shall be cleaned and pre-treated after fabrication and prior to painting with a phosphate process to ensure paint adhesion and corrosion resistance. A baked white gloss finish shall be applied. Minimum average reflectance shall be 90 percent.

   e. Driver: 0-10 volt dimming.

   f. Emergency Battery: Where noted, include 10 watt emergency battery back-up module, wire to 'hot' unswitched conductor of lighting circuit.

4. Emergency Lighting Fixtures (Type 'EM' on drawing light fixture schedule): Fixtures shall be Engineering-grade thermoplastic that is impact-resistant, scratch-resistant, and corrosion-proof. Consist of two (2) LED lamp heads with a typical LED lamp life of 10 years. Dual-voltage capable, and ceiling or wall mount standard. Sealed,
maintenance-free nickel-cadmium battery delivering a minimum of 90 minutes of charge to emergency lamps. Self-Diagnostics with multi-color LED indicator, and a five-year warranty. Must meet minimum requirements for UL924 and NFPA 101.

5. Chamber Lighting (Type "X" in light fixture schedule): Can be used to retrofit existing luminaires, or as high quality light source in new luminaire designs. Fixtures shall be LED, with Luman Package, Correlated Color Temperature, and Voltage as indicated in Lighting Fixture Schedule. Fixtures submitted as proposed equals shall have similar photometric characteristics and shall have full photometric and catalog data submitted at the time of bid. Photometric data shall be suitable for calculations on the Acuity Industries Visual Program.
   a. Mounting: Can fit either center nipple or twist and lock mounts.
   b. Dimming: Shall be line voltage dimmable and compatible with Leviton IPL06 and/or Lutron DV-603P.
   c. Size: The size shall not exceed nine inches (9") in diameter.

E. OCCUPANCY SENSORS

1. Manufacturers:
   a. WattStopper: www.wattstopper.com
   b. Sensor Switch Inc: www.sensorswitch.com
   c. Lutron Electronics Company, Inc.: www.lutron.com
   d. Pass & Seymour: www.legrand.us/passandseymour
   e. Hubbell Building Automation, Inc.: www.hubbellautomation.com
   g. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2. All Occupancy Sensors:
   a. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
   b. Sensor Technology:
   c. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
   d. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.
   e. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
   f. Provide LED to visually indicate motion detection.
   g. Operation: Unless otherwise indicated, occupancy sensor to turn-on and hold-on activation.
   h. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
   i. Turn-off Delay: Field adjustable, with time delay setting up to 30 minutes.
   j. Sensitivity: Field adjustable.

3. Ceiling Mounted Occupancy Sensors:
   a. All ceiling mounted occupancy sensors:
   b. Description: Low profile occupancy sensors designed for ceiling installation.
   c. Unless otherwise indicated or required to control the load indicated on the drawings provide low voltage units, for use with separate compatible accessory power packs.
   d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
   e. Finish: White unless otherwise indicated.

4. Passive Infrared Technology Ceiling Mounted Occupancy Sensors:
a. Standard Range Sensors: Capable of detecting motion within an area of 500 square feet at a mounting height of eight (8) feet, with a field of view of 360 degrees.

PART 3 EXECUTION

3.01 INSTALLATION OF INTERIOR LIGHTING FIXTURES

A. Install interior lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NEMA standards, and with recognized industry practices to ensure that lighting fixtures fulfill requirements.

B. Provide fixtures and/or fixture outlet boxes with hangers to properly support fixture weight. Submit design of hangers, method of fastening, other than indicated or specified herein, for review by Engineer.

C. Verify that outlet bases are installed in proper location and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

D. Tap conductors shall be permitted to run from the fixture terminal connection to a junction box placed at least one (1) foot from the fixture. Tap conductors shall be MC cable or installed in flexible conduit at least four (4) feet in length, but not more than six (6) feet in length.

E. "Daisy Chaining" of MC Cable or flexible conduit from one light fixture to another is NOT permitted.

F. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and B, and the National Electrical Code.

G. Support surface mounted fixtures greater than two (2) feet in length at a point in addition to the outlet box fixtures stud.

H. The branch circuit feeding the Exit Lights and Emergency Lights shall be the same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches.

3.02 INSTALLATION OF LIGHTING CONTROL DEVICES

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes as required for installation of lighting control devices.

C. Mounting Heights: Unless otherwise indicated, as follows:
   1. Wall Switch Occupancy Sensors: 46 inches (to center) above finished floor.
   2. 360 degree field of view Occupancy Sensors: On Ceiling.
   3. Directional Occupancy Sensors: On Ceiling, or Wall not to exceed 8'-6" (to center) above finished floor, unless noted otherwise.

D. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.

E. Locate wall switch occupancy sensors on strike side of door with edge of wall plate three inches (3") from edge of door frame. Where locations are indicated otherwise, notify Architect/Engineer to obtain direction prior to proceeding with work.

F. Install lighting control devices in accordance with manufacturer's instructions.

G. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Install lighting control device plumb and level, and held securely in place.

3.03 EXAMINATION OF OCCUPANCY SENSORS

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.
D. Verify that final surface finishes are complete, including painting.
E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.
F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.
G. Verify that conditions are satisfactory for installation prior to starting work.
H. Inspect each lighting control device for damage and defects.
I. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.
J. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.04 ADJUSTING AND CLEANING
A. Clean interior lighting fixtures of dirt and construction debris upon completion of installation in accordance to manufacturer’s recommendations. Clean fingerprints and smudges from lenses and louvers.
B. Protect installed fixtures from damage during remainder of construction period.
C. Provide extension rings to bring outlet boxes flush with finished surface as necessary.
D. Adjust devices and wall plates to be flush and level.
E. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect/Engineer.
F. Adjust position of directional occupancy sensors and outdoor motion sensors to achieve optimal coverage as required.

3.05 GROUNDING
A. Provide equipment grounding connections for interior lighting fixtures.

END OF SECTION 26 5100
SECTION 31 2200
GRADING

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Removal of topsoil.
B. Finish grading.

1.02  RELATED REQUIREMENTS
A. Section 31 1000 - Site Clearing.
B. Section 31 2316 - Excavation.
C. Section 31 2316.13 - Trenching: Trenching and backfilling for utilities.
D. Section 31 2323 - Fill: Filling and compaction.
E. Section 32 9219 - Seeding: Finish ground cover.
F. Section 32 9223 - Sodding: Finish ground cover.
G. Section 32 9300 - Plants: Topsoil in beds and pits.

1.03  SUBMITTALS
A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 3  EXECUTION

2.01  EXAMINATION
A. Verify the absence of standing or ponding water.

2.02  PREPARATION
A. Identify required lines, levels, contours, and datum.
B. Stake and flag locations of known utilities.
C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
D. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
E. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
F. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

2.03  ROUGH GRADING
A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
B. Do not remove topsoil when wet.
C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
E. When excavating through roots, perform work by hand and cut roots with sharp axe.
F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
G. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

2.04  FINISH GRADING
A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. Where owner provided topsoil is to be placed, scarify surface to depth of 3 inches.

D. Place topsoil in areas where seeding are indicated.

E. Place topsoil where required to level finish grade.

F. Place topsoil to the following compacted thicknesses:

G. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

2.05 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

END OF SECTION 31 2200
SECTION 32 1313
CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Concrete roads.

1.02 RELATED REQUIREMENTS
A. Section 31 2200 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.

1.03 REFERENCE STANDARDS
B. ACI 301 - Specifications for Structural Concrete.
C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.

1.04 SUBMITTALS
A. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

PART 2 PRODUCTS

2.01 PAVING ASSEMBLIES
A. Comply with applicable requirements of ACI 301.
B. Design paving for light duty commercial vehicles.

2.02 FORM MATERIALS
A. Steel form material, profiled to suit conditions.

2.03 REINFORCEMENT
A. Reinforcing Steel: ASTM A615/A615M, Grade 80 (80,000 psi) yield strength; deformed billet steel bars; unfinished.
B. Steel Welded Wire Reinforcement: Plain type, ASTM A1064/A1064M; in flat sheets; unfinished.

2.04 CONCRETE MATERIALS
A. Obtain cementitious materials from same source throughout.
B. Concrete Materials: Provide in accordance with State of Missouri Highways standards.
C. Fiber Reinforcement: Synthetic fibers shown to have long-term resistance to deterioration when in contact with alkalis and moisture; 1/2 inch length.

2.05 CONCRETE MIX DESIGN
A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
B. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
B. Verify gradients and elevations of base are correct.
3.02 SUBBASE
   A. Prepare subbase in accordance with State of Missouri Highways standards.

3.03 PREPARATION
   A. Moisten base to minimize absorption of water from fresh concrete.

3.04 FORMING
   A. Place and secure forms to correct location, dimension, profile, and gradient.

3.05 PLACING CONCRETE
   A. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

3.06 FINISHING
   A. Inclined Vehicular Ramps: Broomed perpendicular to slope.

3.07 TOLERANCES
   A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
   B. Maximum Variation From True Position: 1/4 inch.

3.08 PROTECTION
   A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION 32 1313
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Decorative steel fences.

1.02 RELATED REQUIREMENTS
   A. Section 03 3000 - Cast-in-Place Concrete.

1.03 SUBMITTALS
   A. Product Data: Submit manufacturer's data sheets on each product to be used, including:
      1. Preparation instructions and recommendations.
      2. Storage and handling requirements and recommendations.
      3. Installation methods.
   B. Shop Drawings:
      1. Indicate plan layout, spacing of components, post foundation dimensions, hardware
         anchorage, and schedule of components.
      2. Foundation details, concrete design mix.
   C. Manufacturer's Warranty.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this
      section with minimum five years documented experience.

1.05 DELIVERY, STORAGE AND HANDLING
   A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage,
      weather, vandalism and theft.

1.06 WARRANTY
   A. Manufacturer shall provide twenty-year paint finish warranty against cracking,
      1. peeling and fading (not to exceed 5 N.B.S. units).
   B. B. Installer shall provide warranty against defects of the installed fence system
      1. for the period of two (2) years from the date of substantial completion

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Decorative Metal Fences and Gates:
      1. Berridge Manufacturing Company

2.02 FENCES
   A. Fences: Complete factory-fabricated system of posts and panels, accessories, fittings, and
      fasteners; finished with electrodeposition coating, and having the following performance
      characteristics:
   B. Electro-Deposition Coating: Multi-stage pretreatment/wash with zinc phosphate, followed by
      epoxy primer and acrylic topcoat.
      1. Total Coating Thickness: 2 mils, minimum.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Do not begin installation until substrates have been properly prepared.
   B. If substrate preparation is the responsibility of another installer, notify Architect/Engineer of
      unsatisfactory preparation before proceeding.
3.02 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Set fence posts in accordance with the manufacturer recommended spacing.

3.03 ERECTION TOLERANCES
   A. Maximum Variation From Plumb: 1/4 inch.
   B. Maximum Offset From Indicated Position: 1 inch.

3.04 CLEANING
   A. Leave immediate work area neat at end of each work day.
   B. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
   C. Clean fence with mild household detergent and clean water rinse well.
   D. Remove mortar from exposed posts and other fencing material using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.
   E. Touch up scratched surfaces using materials recommended by manufacturer. Match touchup paint color to fence finish.

3.05 PROTECTION
   A. Protect installed products until completion of project.
   B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION 32 3119