

PROJECT MANUAL FOR:

CP241342 – VARIOUS LOCATIONS – FY24 Summer Paving Project – Asphalt & Concrete

AT
UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI

FOR:

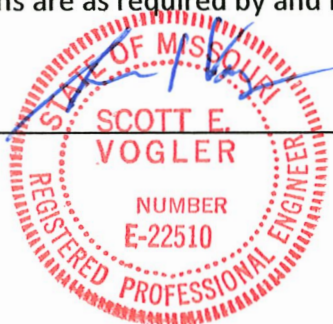
THE CURATORS OF THE UNIVERSITY OF MISSOURI

PREPARED BY:
MECO Engineering Co., Inc.
Scott E. Vogler, P.E.
2701 Industrial Drive
Jefferson City, MO 65109
Phone: 573-893-5558
Fax: 573-893-5404
MECO Project No. 473-070

ISSUED FOR BID DATE: March 25, 2024

I hereby certify that these Drawings and/or Specifications have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these Drawings and/or Specifications are as required by and in compliance with Building Codes of the University of Missouri.

Signature: _____



March 20, 2024

PROJECT MANUAL FOR: UNIVERSITY OF MISSOURI

CP241342 – VARIOUS LOCATIONS – FY24 SUMMER PAVING PROJECT – ASPHALT & CONCRETE

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END OF SECTION

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PLANNING DESIGN & CONSTRUCTION

900 E. Stadium, Ste. 130
Columbia, Missouri 65211
Telephone: (573) 882-6800

ADVERTISEMENT FOR BIDS

Sealed bids for:

VARIOUS LOCATIONS –
FY24 SUMMER PAVING PROJECT - ASPHALT & CONCRETE
UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI
PROJECT NUMBER: CP241342

CONSTRUCTION ESTIMATE: \$716,179 - \$795,754

will be received by the Curators of the University of Missouri, Owner, at Planning, Design & Construction, Room L100 (Front Reception Desk), General Services Building, University of Missouri, Columbia, Missouri 65211, until 1:30 p.m., C.T., April 11, 2024 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 should be directed to Scott Vogler with MECO Engineering at (573) 893-5558 or svogler@mecoengineering.com. Questions regarding commercial conditions should be directed to Scott Smith at (573) 882-9217 or smithws@missouri.edu.

A prebid meeting will be held at 10:00 a.m., C.T., April 2, 2024 in the General Services Bldg., Room 194A, followed by a site walk-through.

A Diversity Participation goal of 10% MBE, 10% Combined WBE, DBE, Veteran Owned Business and 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) 882-6800.

Advertisement Date: March 25, 2024

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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 Assistant Vice Chancellor – Facilities
Room L100 – General Services Building
University of Missouri
Columbia MO 65211

1. Bidder, in compliance with invitation for bids for construction work in accordance with Drawings and Specifications prepared by MECO ENGINEERING COMPANY, INC., entitled CP241342 – VARIOUS LOCATIONS – FY24 SUMMER PAVING PROJECT – ASPHALT & CONCRETE project number CP241342 dated March 25, 2024, 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 _____
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 construct VARIOUS LOCATIONS – FY24 SUMMER PAVING PROJECT – ASPHALT & CONCRETE all as indicated on the Drawings and described in these Specifications for sum of:

_____ DOLLARS (\$ _____).

b. Unit Prices:

(1) For changing specified quantities of work from those indicated by Contract Drawings and Specifications, upon written instructions of Owner, the following Unit Prices shall prevail in accordance with General Conditions.

Project No. CP241342

(2) The following Unit Prices include all labor, overhead and profit, materials, equipment, appliances, bailing, shoring, shoring removal, etc., to cover all work.

(3) The following Unit Prices are required where applicable to particular Base Bid being submitted.

(4) Only a single Unit Price shall be given, and it shall apply for either MORE or LESS work than that indicated on Drawings and called for in Specifications as indicated to be included in Base Bid. In the event that more or less units than so indicated is actually furnished, Change Orders will be issued for increased or decreased amounts as approved by the Owner.

(5) Bidder understands that the Owner will not be liable for any Unit Price or any amount in excess of Base Bid accepted at time of award of Contract, except as expressed in written Change Orders duly executed and delivered by Owner's Representative.

(6) These quantities, at the specified unit price are included in the Contractor's Base Bid Price. If not used, the cost will be deducted by Change Order.

- (a) Pavement Patch Type 1
Base Bid Quantity = 615 square yd. \$ _____/SY
- (b) Pavement Patch Type 2
Base Bid Quantity = 916 square yd. \$ _____/SY
- (c) Type A Curb and Gutter
Base Bid Quantity = 1,812 linear foot \$ _____/LF
- (d) Unsuitable Material Removal with Rock Replacement
Base Bid Quantity = 85 cubic yd. \$ _____/CY

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 ninety (90) 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.

c. Special Scheduling Requirements: The Contractor shall schedule construction to minimize disruption of the following scheduled university events. Scheduling shall comply with the requirements in the contract special conditions.

- (1) 2024 Commencement May 10, 2024 – May 12, 2024
- (2) Columbia Public Schools Graduation May 23, 2024 – May 24, 2024
- (3) Senior Show Me State Games June 6, 2024 – June 9, 2024

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.

Work to be performed

Subcontractor Name,

City, State

Concrete Pavement _____

Painting _____

6. SUPPLIER DIVERSITY PARTICIPATION GOALS

a. The Contractor shall have as a goal, subcontracting with Minority Business Enterprise (MBE) of Ten Percent (10%), with Service Disabled Veteran Owned Business (SDVE) of Three Percent (3%); and with Women Business Enterprise (WBE), Disadvantage Business Enterprise (DBE), and/or Veteran Owned Business of Ten Percent (10%) 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 UM Director of Facilities Planning & Development, 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 PERCENTAGE PARTICIPATION _____ PERCENT (____ %)
SDVE PERCENTAGE PARTICIPATION _____ PERCENT (____ %)
WBE, DBE, and/or VETERAN 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

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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."

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9. **BIDDER'S SIGNATURE**

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

Authorized Signature	Date
Printed Name	Title
Company Name	
Mailing Address	
City, State, Zip	
Phone No.	Federal Employer ID No.
Fax No.	E-Mail Address
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

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**UNIVERSITY OF MISSOURI
 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).

Project & Address	Owner/Owner's Representative	Phone Number	Architect	Amount of your Contract	Percent Completed

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.

Project & Address	Owner/Owner's Representative	Phone Number	Architect	Amount of your Contract	Percent Completed

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: _____

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 _____

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 _____

AFFIDAVIT FOR AFFIRMATIVE ACTION

State of Missouri)
) ss.
County of)

_____ 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.slmhc.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
W: www.flystl.com/business/business-diversity-development-1/directories

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.mwdbe.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.mwdbe.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
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
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816-421-5900
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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:

	Scope of Work	Bid/Contract Amount	Final Dollar Amount
Base Bid			
Alternate #1			
Alternate #2			
Alternate #3			
Alternate #4			
Alternate #5			
Alternate #6			

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: _____

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University of Missouri

INFORMATION FOR BIDDERS

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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 anything 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 workdays) 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 bid 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 Statute 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 quantity 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.

A 3-point Service-Disabled Veteran Enterprises (SDVE) bonus preference shall apply to this contract. The 3 bonus points can be obtained by a certified, Missouri based SDVE performing a commercially useful function, (as defined in Article 1 of the General Conditions of the Contract for Construction) either by submitting a bid directly to the Owner, or through the utilization of certified SDVE subcontractors and/or suppliers, whose participation provides atleast 3% of the total bid amount. A firm does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of SDVE participation. In determining whether a firm is such an extra participant, the Owner will examine similar transactions, particularly those in which SDVEs do not participate. The 3-point bonus preference shall be calculated and applied by reducing the bid amount of the eligible bidder by three (3) percent of the apparent low responsive bidder's bid. Based on this calculation, if the eligible bidder's resulting total bid valuation is less than the apparent low responsive bidder's bid, the eligible bid becomes the apparent low responsive bid. This reduction is for evaluation purposes only and will have no impact on the actual amount(s) of the eligible bidder's bid or the amount(s) of any contract awarded. The submitted bid form must include a minimum of 3% SDVE participation to obtain the three (3) point bonus. For every SDVE firm utilized, a completed AFFIDAVIT OF SUPPLIER DIVERSITY PARTICIPATION form shall be submitted to the Owner within 24 hours of the receipt of bids. Failure to do so may be grounds for rejection of the SDVE bonus preference.

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, and/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.

15.5 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.

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 workday) of 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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University of Missouri

General Conditions

of the

Contract

for

Construction

December 2021 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 Owner's Authorized Agent

When the term "Owner's Authorized Agent" is used herein, it shall refer to an employee or agency acting on the behalf of the Owner's Representative to perform duties related to code inspections, testing, operational systems check, certification or accreditation inspections, or other specialized work.

1.1.6 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.

1.1.7 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.

1.1.8 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 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.

- .1.1 "African Americans", which includes persons having origins in any of the black racial groups of Africa.
- .1.2 "Hispanic Americans", which includes persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
- .1.3 "Native Americans", which includes persons of American Indian, Eskimo, Aleut, or Native Hawaiian origin.
- .1.4 "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 Marianas.
- .1.5 "Asian-Indian Americans", which includes persons whose origins are from India, Pakistan, or Bangladesh.

.2 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.

.3 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.

.4 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", "compliant", "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(s) 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.

1.1.21 Force Majeure

An event or circumstance that could not have been reasonably anticipated and is out of the control of both the Owner and the Contractor.

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 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 departure 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.

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 conditions bearing upon transportation, disposal, handling, and storage of materials;
- .2 the availability of labor, materials, equipment, water, electrical power, utilities and roads;
- .3 uncertainties of weather, river stages, flooding and similar characteristics of the site;
- .4 conditions bearing upon security and protection of material, equipment, and Work in progress;
- .5 the form and nature of the Work site, including the surface and sub-surface conditions;
- .6 the extent and nature of Work and materials necessary for the execution of the Work and the remedying of any defects therein; and
- .7 the means of access to the site and the accommodations it may require and, in general, shall be deemed to have obtained all information as to risks, contingencies and other circumstances.
- .8 the ability to complete work without disruption to normal campus activities, except as specifically allowed in the contract documents.

The Owner assumes no responsibility or liability for the 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.

ARTICLE 2 OWNER

2.1 Information and Services Required of 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 surety. 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, Regulations, Permits, Codes, and Inspections

3.2.1 The Contractor shall, without additional expense to the Owner, comply with all applicable laws, ordinances, rules, permit requirements, codes, 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 the 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 benchmark 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:

- .1** All shutting of valves, switches, etc., shall be by the Owner's personnel.
- .2** Contractor shall submit its preliminary outage/tie-in schedule with its baseline schedule.
- .3** The Contractor shall request an outage/tie-in meeting at least two weeks before the outage/tie-in is required.
- .4** 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 workday 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 or inspection 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 compliant and 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 existing 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 and code 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 reinsurers 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 include, 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 Delegated Design

3.11.1 If the Contract Documents specify the Contractor is responsible for the design of any work as part of the project, then the Contractor shall procure all design services and certifications necessary to complete the Work as specified, from a design professional licensed in the State of Missouri. The signature and seal of that design professional shall appear on all drawings, calculations, specifications, certifications, shop drawings, and other submittals related to the Work. The design professional shall maintain insurance as required per Article 11.

3.12 Materials, Labor, and Workmanship

3.12.1 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.

3.12.2 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.

3.12.3 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.

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

3.12.5 Materials and workmanship shall be subject to inspection, examination, and testing 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.

3.12.6 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.

3.12.7 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.

3.12.8 Substitutions

3.12.8.1 A substitution is a Contractor proposal of an alternate product or method in lieu of what has been specified or shown in the Contract Documents, which is not an "or equal" as set forth in Section 3.12.1.

3.12.8.2 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 Document requirements and is code compliant, 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.

3.12.8.3 Substitutions may be rejected without explanation at the 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.

3.12.8.4 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 substitution.

3.13 Approved Equal

3.13.1 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 and is code compliant.

3.13.2 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.

3.13.3 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, device, 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.

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

3.14.1 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.

3.14.2 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.

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

3.14.4 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.

3.14.5 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.

3.14.6 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 provided, 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.

3.14.7 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.

3.14.8 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.

3.14.9 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.

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

3.14.11 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.

3.14.12 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.

3.14.13 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.

3.14.14 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.

3.15 Record Drawings

3.15.1 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.

3.16 Operating Instructions and Service Manuals

3.16.1 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.

3.16.2 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.

3.17 Taxes

3.17.1 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.

3.17.2 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.

3.17.3 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.

3.17.4 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.

3.17.5 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.

3.18 Contractor's Construction Schedules

3.18.1 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.

3.18.2 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.

3.18.3 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 schedule 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.

3.18.4 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, the Owner's Representative, and the Owner's Authorized Agent 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 rescission. 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 working 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 Christmas Day, unless that specific day was approved in writing for work by the Owner's Representative.

.1 The Contractor must have fulfilled its contract obligations with respect to temporary facilities and protection of its work, and worker protection for hot and cold weather per OSHA guidelines.

.2 If the contract obligations have been satisfied, the Owner will review requests for non-compensable time extensions for critical path activities as follows:

.2.1 If the Contractor cannot work on a critical path activity due to adverse weather, after implementing all reasonable temporary weather protection, the Contractor will so notify the Owner's Representative. Each week, the Contractor will notify the Owner's Representative of the number of adverse weather days that it believes it has experienced in the previous week. As provided in the contract, until such time as the weather days acknowledged by the Owner's Representative exceed the number of days of adverse weather contemplated in the Special Conditions, no request for extension of the contract completion time will be considered.

.2.2 If the Contractor has accumulated in excess of the number of adverse weather days contemplated in the Special Conditions due to the stoppage of work on critical path activities due to adverse weather, the Owner will consider a time extension request from the Contractor that is submitted in accordance with the contract requirements. The Owner will provide a change order extending the time for contract completion or direct an acceleration of the work in accordance with the contract terms and conditions to recover the time lost due to adverse weather in excess of the number of adverse weather working days contemplated in the Special Conditions.

4.7.3 A Force Majeure event or circumstance shall not be the basis of a claim by the Contractor seeking an adjustment in the Contract amount for costs or expenses of any type. With the exception of weather delays which are administered under this Article 4, and notwithstanding other requirements of the Contract, all Force Majeure events resulting in a delay

to the critical path of the project shall be administered as provided in Article 8.

4.7.4 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, non-compliant, 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, expeditors, 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
- .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, Force Majeure including but not limited to war, armed conflict, riot, civil commotion or disorder, act of terrorism or sabotage; epidemic, pandemic, outbreaks of infectious disease or any other public health crisis, including quarantine or other employee restrictions, compliance with any law or governmental order, rule, regulation or direction, curfew restriction, act of God or natural disaster such as earthquake, volcanic activity, landslide, tidal wave, tsunami, flood, damage or destruction by lightning, drought; explosion, fire, destruction of machines, equipment, prolonged break-down of transport, telecommunication or electric current; general labor disturbance such as but not limited to boycott, strike and lock-out, occupation of factories and premises, 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) justifying the delay 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 of 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. If a Force Majeure is approved by the Owner as the basis for a delay claim, an adjustment in the contract time to the extent the Force Majeure impacts the schedule is the only remedy. No increase in the contract sum for any reason shall be allowed due to a Force Majeure.

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 claims due to or caused by any events beyond the control of both the Owner and Contractor defined herein as Force Majeure. 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 provide written notice to the Owner within seven (7) calendar days of the event giving rise to such claim. 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, but in no case shall Force Majeure be the basis of an increase in the Contract sum. 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 to 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' notice 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 a Bill of Sale and Bailment Agreement on forms provided by the Owner's

Representative, 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.
- .11 The Contractor shall furnish and maintain insurance covering the replacement cost of the material stored offsite against all losses and shall furnish proof of coverage with the application for payment for material stored offsite.
- .12 The Contractor is responsible for all costs related to storage and handling of material stored offsite unless otherwise directed by the Owner's Representative.

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 Withhold 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 or non-compliant 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 1.1.14 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

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, standards, codes, 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 its employees and its 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.

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 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 officers, employees, and agents of 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 using 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/Other Requirements

11.5.1 Any Consultant/Contractor providing professional design services as part of the contract shall be required to provide and maintain, from the date of this Contract and for a period of ten (10) years after the date of Final Completion, Professional Liability insurance to cover any claims, including but not limited to errors, omissions, and negligence, which may arise from the Design and related Services performed by the Consultant. The minimum limits for such Policy shall be \$1,000,000.00 per occurrence/\$1,000,000.00 aggregate. The insurance afforded by the policy shall meet the requirements of this Section 11.2 and Section 11.5 relating to CGL Policies, and without limiting the foregoing, shall be extended to cover the liability of "The officers, employees, and agents of The Curators of the University of Missouri", who shall be named as additional insureds therein, and this liability is assumed in writing by the Contractor's Consultant under the written Subcontract described herein. 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, whether observed before or after final completion and whether or not fabricated, installed, or completed. If Work has been rejected by Architect or Owner's Representative, the Architect or Owner's Representative shall have the right to require the Contractor to remove it from the Project site and replace it with Work that strictly conforms to the requirements of the Contract Documents regardless, if such removal and replacement results in "economic waste." Contractor shall pay all claims, costs, losses and damages caused by or resulting from the correction, removal or replacement of defective, or non-compliant 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 by, 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, codes, 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, the Owner's Authorized Agent, or entity acceptable to the Owner, and the Contractor shall bear related costs of tests, inspections, and approvals as required in the Contract Documents. The Contractor shall give the Architect, Owner's Representative, and the Owner's Authorized Agent timely notice of when and where tests and inspections are to be made so the

Architect, the Owner's Representative and/or the Owner's Authorized Agent may observe procedures or perform the necessary tests or inspections.

13.3.2 If the Architect, Owner's Representative, or the Owner's Authorized Agent 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, the Owner's Representative or the Owner's Authorized Agent, of when and where tests and inspections are to be made so the Architect, Owner's Representative and/or the Owner's Authorized Agent, so may choose that the tests or inspections can be performed or observed. 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 and Owner's Authorized Agent'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 as 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 trustee or 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 journey person rate of pay. "Entry Level Workers; must be registered apprentices. The apprenticeship ratio will be one to one with a journey person of the same classification. Any worker not registered as an apprentice per this section will be paid as a journey person.

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 ICC International Fire Code
- .5 ICC International Fuel Gas Code
- .6 NFPA 70 National Electric Code (NEC)
- .7 Americans with Disabilities Act – Standards for Accessible Design.
- .8 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
- .9 NFPA 101 Life Safety Code (as noted above)
- .10 American Concrete Institute (ACI)
- .11 American National Standards Institute (ANSI)
- .12 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- .13 American Refrigeration Institute (ARI)
- .14 American Society for Testing and Materials (ASTM)
- .15 Missouri Standard Specification for Highway Construction, Missouri State Highway Commission

- .16 National Electrical Manufacturers Association (NEMA)
- .17 Underwriter's Laboratories, Inc. (UL), Federal Specifications
- .18 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 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 Certification

13.10.1 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).

13.10.2 If this contract is for \$100,000 or more, and if the Contractor is a company with ten (10) or more employees, then Contractor certifies that it, and any company affiliated with it, does not boycott Israel, and will not boycott Israel during the term of this Contract. In this paragraph, the terms "company" and "boycott Israel" shall have the meanings described in Section 34.600 of the Missouri Revised Statutes.

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, codes, regulations or orders of an authority having jurisdiction;
- .5 disregards the authority of the Owner's Representative, Architect, or Owner's Authorized Agent;
- .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 the Architects 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.

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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 Engineer, bearing date March 25, 2024 CP241342 – VARIOUS LOCATIONS – FY24 SUMMER PAVING PROJECT – ASPHALT & CONCRETE

b. Civil Engineer: Scott E. Vogler, P.E.
MECO Engineering Co., Inc.
2701 Industrial Drive
Jefferson City MO 65109
Phone: (573) 893-5558
Fax: (573) 893-5404

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

2. SPECIAL SCHEDULING REQUIREMENTS

a. Special scheduling requirements supplemental to the bid form

(1) The contractor shall schedule construction as follows to minimize disruption of the following scheduled University events with the requirements in the Contract Special Conditions

(a)	2024 Commencement	May 10, 2024 – May 12, 2024
(b)	Columbia Public Schools Graduation	May 23, 2024 – May 24, 2024
(c)	Senior Show Me State Games	June 6, 2024 – June 9, 2024
(d)	Show Me State Games	July 19, 2024 – July 21, 2024 July 26, 2024 – July 28, 2024

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

(1) PARKING AND TRANSPORTATION

(a) WG1/L: The design includes mill and wedge repair for alligator cracking. Replacement of subgrade failures. Crack fill and seal coat entire lot. The lot will be re-striped.

(2) FACILITY OPERATIONS

(a) East Campus Drive from Ashland Road to E. Campus Loop: The design includes

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repair and replacement of the concrete entrance panels. Repair subgrade failed areas. Reconfigure and replace pavement at the bus stop mill and overlay the entire street.

- (b) Drive West of Connaway between Rollins Street to Bouchelle: The design includes replacement of the entire road with curb and gutter and asphalt pavement.

(3) MU HEALTH

- (a) Fairview Clinic: The design includes mill and wedge repair, curb and gutter replacement, concrete entrance replacement, concrete slab at dumpster replacement, asphalt subgrade repairs and asphalt overlays. The lot will be re-stripped.

- (b) Circle Drive at Main Hospital: The design includes mill and wedge repairs, crack sealing and slurry seal of the drives.

4. LOCATION

Work shall be performed under this Contract on campus of the University of Missouri – at VARIOUS LOCATIONS – FY24 SUMMER PAVING PROJECT ASPHALT & CONCRETE.

5. NUMBER OF CONSTRUCTION DOCUMENTS

- a. The Owner's Representative will furnish the Contractor a copy of executed Contract and five (5) complete sets of Drawings and Specifications.
- b. Additional sets may be obtained from the Engineer at cost of reproduction.
- c. The Owner will furnish five (5) sets of explanatory and changed Drawings at no cost to Contractor as issued during project.

6. SUBMITTALS

- a. The Contractor shall submit for approval to the Engineer, 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

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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:
033000_01-Cast in Place Concrete.pdf
 - (2) Reference the accompanying Shop Drawing and Submittal Log at the end of this section (1.E.3) for required submittal information.
- d. The Contractor shall submit to the Owner's Representative all items referenced in the accompanying Closeout Log (1.E.5) 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

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) 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.
- (2) 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.
- (3) Sidewalk(s) and Hardscape – Parking/driving on hardscapes is strictly prohibited unless specifically directed by the Owner's Representative through the MU

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sidewalk permitting process. Restricted use permits will be limited to activities that are constrained by an absolute need to access from a sidewalk. Such activities shall be considered the exception and not the norm. Adequate signage, fencing and alternate routes must be provided in the immediate and adjacent areas.

- (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 General Services Building. 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 General Services Building.
 - (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 8:15am 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:** The Contractor shall provide and maintain, in a sanitary condition, chemical type portable toilet facilities at work site for use by his personnel. Toilets and toilet location shall be subject to approval by the Owner's Representative.
- 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.

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- 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 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.
- l. **"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

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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. Construction Project Fencing:
 - (1) Fencing will not be required as a part of work.
 - (2) Using existing landmarks, lamp posts, trees or other Owner property for support of fencing is strictly prohibited unless a written waiver is obtained from the Owner's Representative.
 - (3) Use of ribbon, snow fence, chicken wire, rope and wooden barricades as fencing is prohibited.
 - (4) Fencing shall be maintained in an "as-installed" condition throughout the life of the project.
 - (5) The Contractor may use used fencing provided it is in good condition and is satisfactory to the Owner's Representative.

- c. 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 fixed chain link 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.
 - (b) In the event that damage(s) to the Owner's trees, shrubs or vegetation occurs as a result of the Contractor's unauthorized operations, the Contractor shall pay or allow to the Owner compensation for said damage(s). Compensation 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.

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- (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.

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. If the Engineer 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

The Contractor shall comply with applicable codes and standards as listed in General Conditions.

12. SPECIALTIES

- a. Owner furnished topsoil: The Contractor shall place Owner provided topsoil and grade to the finish elevation as indicated in the contract. The Owner will deliver the topsoil to the project site in the quantity required. 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 subgrade is to be left at minus six inches (6") in all areas unless indicated otherwise. All planting bed subgrades are to be left a minus eighteen inches (18"). The Contractor is to remove all deleterious material from the subgrade 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.

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- (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.

13. PRE-BID INSPECTION

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

14. MODIFICATIONS TO INFORMATION TO BIDDERS

a. Information to Bidders:

- (1) Referenced Information to Bidders, Page IFB/5.
Add new Article 15.8.5 as follows:

15.8.5 Within 48 hours of the receipt of bids, the apparent low bidder shall submit to the UM Executive Director of Facilities Planning and Development an "Affidavit of Supplier Diversity Participation" for every diverse subcontractor or supplier the bidder intends to award work to on the contract. The affidavit will be signed by both the bidder and the diverse firm.

15. PROJECT SCHEDULING

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.

Contractor Schedule – Contractor is responsible for the schedule, and he may provide with in-house personnel or hire a third-party scheduling consultants. See Contractor Schedule Specification included in these documents.

16. CONSTRUCTION WASTE MANAGEMENT (for projects without a Division 02 specification)

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 (e.g.: 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: [for MU] 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 Construction Project Manager.

(A summary worksheet is required prior to substantial completion).

Project No. CP241342

17. WARRANTY WALKTHROUGH

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

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Contractor Schedule

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 insure to 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.

Jan – 5 days	Feb – 5 days	Mar – 4 days	Apr – 4 days
May – 3 days	Jun – 3 days	Jul – 2 days	Aug – 2 days
Sep – 3 days	Oct – 4 days	Nov – 4 days	Dec – 5 days

2. SCHEDULING PROCESS

- a) The intent of this section is to ensure 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

Project No. CP241342

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 P3 or Oracle P6.

(2) Schedule Development

Within 4 weeks of the NTP, contractor shall prepare a schedule, in CPM format that reflects the contractor's and each subcontractor's 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, adjusting as necessary,

(ii) Add any frag nets necessary to describe changes or other impacts to the project schedule and

(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.

Project No. CP241342

(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. 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.**
- k) Total float is herein defined as the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.**
- l) 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.**
- m) Force Majeure Event: Any event that delays the project but is beyond the control and/or contractual responsibility of either party.**
- n) Schedule shall include 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.**

Project No. CP241342

- (d) Coordination with existing construction.
- (e) Limitations of continued occupancies.
- (f) Uninterruptible services.
- (g) Partial occupancy prior to Substantial Completion.
- (h) 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 REQUESTS

- 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 (ies), 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.

Project No. CP241342

SHOP DRAWING AND SUBMITTAL LOG

Project: VARIOUS LOCATIONS – FY24 SUMMER PAVING PROJECT – ASPHALT & CONCRETE

Project Number: CP241342

Contractor:

	Description	Contractor	Date Rec'd	#	Date Sent to Cons.	Date Ret'd	Remarks	Date ret'd	Cont'r	Copies To Owner	File
033000	Portland Cement Concrete										
313219	Geotextile Separation Fabric										
320113.61	Slurry Seal										
320117.61	Pavement Crack Sealing										
321123	Aggregate Base Course										
321213.13	Tack Coat										
321216.13.A1	Plant Mix Bituminous Pavement										
321236.17	Asphalt Based Pavement Sealer										
321713	Parking Blocks										
321723	Pavement Marking										
334100.00.A2	HDPE/PVC Stormwater Piping										

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Project No. CP241342

CLOSEOUT LOG
Project: VARIOUS LOCATIONS – FY24SUMMER PAVING – ASPHALT & CONCRETE

Project Number: CP241342

Contractor:

Section	Description	Contractor/Subcontractor	Date Rec'd	# of Copies	CPM Initials	Remarks
GC /3.11	As-built Drawings					
GC /13.5.6	Final Affidavit of Supplier Diversity Participation for Each Diverse Firm					

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Sustainability Report

Material Description	Ticket No.	Date	Material Type	Weight	Notes

Total weight of all demolition material: _____

Percentage of total material diverted: _____

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SECTION 1.F

INDEX OF DRAWINGS

Drawings referred to in and accompanying Project Manual consist of following sheets dated March 25, 2024.

CP241342 - VARIOUS LOCATIONS – FY24 SUMMER PAVING PROJECT ASPHALT & CONCRETE

Sheet 1 of 18:	Cover Sheet / Project Location
Sheet 2 of 18:	Standard Notes
Sheet 3 of 18:	Sign Location and Traffic Control
Sheet 4 of 18:	WG1/L Repair Plan
Sheet 5 of 18:	WG1/L Striping Plan
Sheet 6 of 18:	Fairview Clinic Repair Plan
Sheet 7 of 18:	Fairview Clinic Striping Plan
Sheet 8 of 18:	Fairview Clinic Entrance Repair Plan
Sheet 9 of 18:	Hospital Circle Drive Repair Plan
Sheet 10 of 18:	Hospital Circle Drive Striping Plan
Sheet 11 of 18:	East Campus Drive Repair Plan
Sheet 12 of 18:	East Campus Drive Striping Plan
Sheet 13 of 18:	East Campus Drive Entrance Repair Plan
Sheet 14 and 15 of 18:	East Campus Drive Bus Stop
Sheet 16 of 18:	Connoway Building Road Repair Plan and Profile
Sheet 17 of 18:	Connoway Building Road Cross Sections and Details
Sheet 18 of 18:	Typical Details

END OF SECTION

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SECTION 1.G

PREVAILING WAGE RATES

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Missouri

Division of Labor Standards

WAGE AND HOUR SECTION



MICHAEL L. PARSON, Governor

Annual Wage Order No. 30

Section 010
BOONE COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by

Todd Smith, Director
Division of Labor Standards

Filed With Secretary of State: _____ **March 10, 2023**

Last Date Objections May Be Filed: **April 10, 2023**

Prepared by Missouri Department of Labor and Industrial Relations

Building Construction Rates for
BOONE County

Section 010

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Asbestos Worker	\$58.05
Boilermaker	\$73.87
Bricklayer	\$53.18
Carpenter	\$49.00
Lather	
Linoleum Layer	
Millwright	
Pile Driver	
Cement Mason	\$47.52
Plasterer	
Communications Technician	\$57.48
Electrician (Inside Wireman)	\$58.51
Electrician Outside Lineman	\$76.79
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Elevator Constructor	\$31.16*
Glazier	\$65.21
Ironworker	\$65.92
Laborer	\$42.86
General Laborer	
First Semi-Skilled	
Second Semi-Skilled	
Mason	\$31.16*
Marble Mason	
Marble Finisher	
Terrazzo Worker	
Terrazzo Finisher	
Tile Setter	
Tile Finisher	
Operating Engineer	\$64.73
Group I	
Group II	
Group III	
Group III-A	
Group IV	
Group V	
Painter	\$40.26
Plumber	\$69.73
Pipe Fitter	
Roofer	\$53.14
Sheet Metal Worker	\$56.02
Sprinkler Fitter	\$61.21
Truck Driver	\$31.16*
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. The public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.
**The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title as defined in RSMO Section 290.210.

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Carpenter	\$53.37
Millwright	
Pile Driver	
Electrician (Outside Lineman)	\$76.79
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Laborer	\$46.32
General Laborer	
Skilled Laborer	
Operating Engineer	\$65.15
Group I	
Group II	
Group III	
Group IV	
Truck Driver	\$31.16*
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

**The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title.

OVERTIME and HOLIDAYS

OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, "**overtime work**" shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

HOLIDAYS

January first;
The last Monday in May;
July fourth;
The first Monday in September;
November eleventh;
The fourth Thursday in November; and
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

ASPHALT & CONCRETE

TECHNICAL

SPECIFICATIONS

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 014500 - QUALITY CONTROL

1.00 GENERAL

1.01 SECTION INCLUDES

- A. Contractor's responsibility for quality assurance, control of the installation of improvements, field sampling and inspection services.

1.02 SUMMARY

- A. All materials and each part of the work shall be subject to inspection by the Owner's Representative.
- B. The Owner's Representative shall be allowed access to all parts of the work and shall be furnished with information and assistance, by the Contractor, as required to make a complete and detailed inspection.

1.03 QUALITY ASSURANCE CONTROL OF INSTALLATION

- A. It is the Contractors responsibility to monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of quality equal to or exceeding that specified.
- B. The Contractor shall comply fully with manufacturer's instructions, including each step in sequence.
- C. If the manufacturer's instructions are in conflict with the contract documents, the Contractor shall request clarification from the Owner's Representative before proceeding.
- D. The contractor's work shall comply with specified standards. The standards define the minimum quality for the work.
- E. Qualified persons shall perform all work of specified quality.

1.04 INSPECTION AND TESTING SERVICES

- A. Contractor shall give Owner's representative a 72-hour notice of readiness for all required inspections, tests, or approvals.
 - 1. Contractor shall notify the Owners representative by 3:00 p.m. of the preceding day if he will not be ready for a previously scheduled inspection. The Contractor may be responsible for the cost of additional inspections if this notification is not made.
 - 2. The Contractor shall provide the Owner's Representative one-week notice for pre-final and/or final inspection.
- B. Inspection fees will be the responsibility of the Owner unless otherwise stated in the Contract Documents. There shall be no direct charge to the Owner for materials taken as samples, either for field or laboratory tests.
- C. Testing will conform to the current standard specified to assure quality. The Owner's Representative will determine frequency of testing.
- D. This section shall not relieve the Contractor from his responsibility to provide certifications and substantiating test reports, from a supplier or fabricator.
- E. If the Contract Documents include the Contractor providing reports or testing, the Contractor shall retain the services of an independent testing firm. Test results or reports will be submitted to the Owner's

Representative, indicating observation and results of tests and compliance or noncompliance with Contract Documents.

1. If a test is not in conformance, the same independent firm shall perform re-testing.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 015526 -TRAFFIC CONTROL

1.00 GENERAL

1.01 DESCRIPTION OF WORK

- A. This work shall consist of furnishing and installing traffic control devices as required to protect the public and to protect the work throughout the duration of the project as directed by the Owner's Representative.
- B. If instructed by the Owner's Representative, the Contractor shall provide the City of Columbia-Joint Communications 24-hour notice, prior to closure.
- C. Access shall be maintained to drives unless permission is granted by the Owner's Representative for a temporary closure. The Contractor shall provide the Owner's Representative 72 hours notice prior to closure.
- D. The Contractor shall provide a contact, responsible for 24-hour maintenance of signage and traffic control devices. Provide the contact's telephone number(s) to Owner's Representative.

2.00 PRODUCTS

2.01 MATERIALS DESCRIPTION

- A. The materials used for traffic control shall include signage, cones, barricades, flashing lights, and other traffic control devices shall conform to the "Manual of Uniform Traffic Control Devices" (MUTCD).

3.00 EXECUTION

3.01 GENERAL

- A. The Contractor shall install, maintain, clean, and relocate the traffic control devices as the work progresses. Any device that becomes unreadable or inoperable shall be repaired or replaced with 24 hours of notification by the Owner or Owner's Representative.
- B. Signs and barricades shall be covered, removed, or relocated as their necessity ceases to exist. The temporary traffic control devices shall be removed at the end of the project.
- C. The Contractor shall add to the number and type of traffic control devices as required to adequately protect the public and the work as he considers necessary or as directed by the Owner's Representative.
- D. The Contractor shall coordinate the stages of construction and traffic control plan with the Owner's Representative. The contractor's traffic control plan shall protect the public and work during daytime and nighttime conditions. During periods of no work, the Contractor shall provide Type 2 Barricades with Flashing Lights at any closed location. Signage for specific construction operations is not listed but shall be provided by the Contractor in accordance with MUTCD.
- E. The Contractor shall give written notice to the Owner's Representative if any accident, pedestrian or vehicular, has occurred on the project. The Contractor shall provide any law enforcement reports of accidents on the project to the Owner's Representative.
- F. The Contractor shall keep lane closers to a minimum and closers shall be subject to the Owner's Representative approval.

END OF SECTION

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 017123.13 -CONSTRUCTION LAYOUT

1.00 GENERAL

1.01 SCOPE OF WORK

- A. Construction layout and staking.
- B. Drawings and General Provisions of contract apply to this section.

1.02 GENERAL

- A. The contractor will provide construction staking as herein described.
- B. Owner will provide control information for construction staking. The cost of additional control stakes or replacement of control stakes shall be the responsibility of the Contractor.

2.00 PRODUCTS
N/A

3.00 EXECUTION

3.01 GENERAL

- A. Contractor is responsible to protect control points. The Owner's Representative will provide re-establishment of control. The cost of re-establishment may be deducted from the contract.

END OF SECTION

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DIVISION 3 - CONCRETE

SECTION 033000 - PORTLAND CEMENT CONCRETE

1.00 GENERAL:

- A. This section of the specifications covers the materials, methods of construction, and requirements necessary to complete the Portland Cement Concrete work as indicated on the Drawings or as specified herein.

1.01 TESTING AGENCY:

- A. Inspection and testing will be performed by the Owner.
- B. Mix Design Submittals: Prior to beginning the work and within 14 days following the notice to proceed, the Contractor shall submit to the Owner's Representative, for review, previous independent laboratory generated data detailing performance (measures of performance as defined below) of the proposed mix design. Contractor shall also provide certification that materials used, and their proportions are to be essentially unchanged from the mixture for which the data was generated. If independent laboratory data is not available, the proposed mix design shall be checked by an independent laboratory acceptable to the Owner's Representative. All costs related to such testing shall be paid for by the Contractor. Since laboratory trial batches require 35 calendar days to complete, the Contractor may consider testing more than one mix design for each class of concrete. Include the following information for each mix design:

1. Water/cement materials ratio
2. Slump as per ASTM C 143
3. Air content as per ASTM C 231 (pressure method), or ASTM C 173 (volumetric method)
4. Unit weight of concrete as per ASTM C 138
5. Compressive strength at 3, 7, and 28 days per ASTM C 39
6. Shrinkage (length change) as measured in accordance with Section 1.01 - Testing Agency, Paragraph C. - Shrinking Testing Procedure

- C. Shrinkage Testing Procedure: Testing and reporting shall conform to the latest ASTM C 157-93 with the following modifications:

1. Wet cure specimens for a period of 7 days (including the period of time the specimens are in the mold). Wet cure may be achieved either through storage in a moist cabinet or room in accordance with ASTM C 511, or through storage in lime saturated water.
2. Slump of concrete for testing shall match job requirements and need not be limited to restrictions as stated in ASTM C 157 Section 7.4.
3. Report results in accordance with ASTM C 157 at 0, 7, 14, and 28 days of drying.

- D. Test of cement and aggregates shall be performed to ensure conformance with specification requirements. Manufacturer's certification that cement materials meet specification requirements and results of manufacturer's own material tests will be acceptable in lieu of tests by inspection and testing firm. Aggregate testing shall be performed by independent inspection and testing firm, for compliance with ASTM C33, including limits for deleterious substances, grading and physical property requirements.

- E. Field quality control tests are specified in Part 3 of this section.

1.02 REFERENCE STANDARDS:

- A. ACI 301 - Specification for Structural Concrete for Buildings.
- B. ACI 340 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

- C. ACI 305 - Recommended Practice for Hot Weather Concreting.
- D. ACI 306 - Recommended Practice for Cold Weather Concreting.
- E. ACI 318 - Building Code Requirements for Reinforced Concrete.
- F. ASTM C33 - Concrete Aggregates.
- G. ASTM C39 - Compressive Strength of Cylindrical Concrete Specimens.
- H. ASTM C94 - Ready-Mixed Concrete.
- I. ASTM C138 - Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
- J. ASTM C143 - Slump of Portland Cement Concrete.
- K. ASTM C150 - Portland Cement.
- L. ASTM C157-93 - Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
- M. ASTM C171 -Sheet Materials for Curing Concrete.
- N. ASTM C173 - Air Content of Freshly Mixed Concrete (Volumetric Method).
- O. ASTM C231 - Air Content of Freshly Mixed Concrete (Pressure Method).
- P. ASTM C260 - Air Entraining Admixtures for Concrete.
- Q. ASTM C309 - Liquid Membrane - Forming Compounds for Curing Concrete.
- R. ASTM C494 - Chemical Admixtures for Concrete.

2.00 MATERIALS

2.01 PORTLAND CEMENT:

- A. The Portland Cement shall conform to A.S.T.M. Specifications C-150, Type I, or A.S.T.M. Specification C-175, Type IA air entrained cement, if approved by the Engineer.
- B. The portland cement used under this contract shall be a standard brand of portland cement which has been in practical use in public works, and which has heretofore given satisfactory results. The cement when delivered to the site or at the location where the concrete is to be mixed, shall be stored so as to protect it from damage; and no damaged, partially set, or lumpy cement shall be used in the work and shall immediately be removed from the premises. The cement shall be manufactured by only one mill and used throughout the entire project. Brands of cement shall not be mixed.

2.02 FINE AGGREGATE:

- A. The fine aggregate shall consist of clean, natural sand of hard, strong, durable material, free from all foreign organic material or other injurious impurities conforming to A.S.T.M. C-33. The sand shall be graded to meet the following sieve analysis using the U.S. Standard sieve series, with all percentages determined by weight.

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
3/8 Inch	100
No. 4	95-100
No. 16	60-75
No. 50	10-30
No. 100	0-5

The fineness modulus of the fine aggregate shall not be less than 2.50 nor more than 3.00.

2.03 COARSE AGGREGATE:

- A. The coarse aggregate shall be clean washed and screened gravel or crushed limestone, having a specific gravity of not less than 2.56. The gravel shall be free from dust, loam, clay, alkali, or organic impurities, and free from thin, porous, elongated, or laminated particles. A sample of the gravel when subjected to the sodium sulfate accelerated soundness test for freezing and thawing shall have a weighted average loss of not more than 15%. Crushed limestone aggregate shall consist of uncoated particles of sound, durable rock of uniform quality without an excess of flat, elongated, or laminated pieces.
- B. The gravel or crushed limestone shall be graded to meet the following sieve analysis using the U.S. Standard Sieve Series, with all percentages determined by weight.

<u>SIEVE SIZE</u>	<u>PERCENTAGE PASSING</u>
-------------------	---------------------------

1 1/2 inch	100
1 inch	95-100
3/4 inch	70-85
3/8 inch	20-40
No. 4	0-5

- C. The use of frozen aggregates will not be permitted. When the temperature of the air permits concreting to be carried on, the aggregates must be thawed out, thoroughly removing all frost before inclusion in the concrete mixture.

2.04 WATER:

- A. The water in mixing concrete shall be clean and free from injurious amounts of oil, acids, alkalis, salts, or organic matter. The water used shall be of potable quality.

2.05 ADMIXTURES:

- A. Should the Contractor desire to incorporate in the concrete mix an admixture to improve the workability of the concrete, the approval must be obtained from the Engineer. However, no additional payment will be made for the use of the admixture; the use of such admixture will be made at the Contractor's expense.
 - 1. Air Entrainment: ASTM C260.
 - 2. Chemical: ASTM C494, Type A - water reducing. Type B - retarding. Type C - accelerating. Type D - water reducing and retarding. Type E - water reducing and accelerating. Type F - high range water reducer. Type G - high range water reducing and retarding.
 - 3. Shrinkage Reducing Admixture (SRA): Provide Eclipse™ Shrinkage Reducing Admixture as supplied by Grace Construction Products (or approved equal) at a rate of 1.5 gallons per cubic yard (liters per cubic meter).
 - 4. Fibrous Reinforcing: Provide Grade MicroFiber® as supplied by Grace Construction Products (or approved equal) at a dosage rate not less than 0.5 lb per cubic yard.
 - 5. The use of calcium chloride in concrete is strictly prohibited.

2.06 PREMOULDED EXPANSION JOINT:

- A. The premoulded expansion joint material shall be non-extruding resilient type conforming to ASTM designation D 1751.
- B. The joint filler shall be full depth of concrete section and 2" thick unless shown otherwise.

2.07 REINFORCING STEEL:

- A. The reinforcing steel shall be rolled from new Billet-Steel Bars for Concrete Reinforcement A.S.T.M.-615 with deformations conforming to A.S.T.M.-305 and 60,000 psi minimum yield strength, A.S.T.M. A-432.
- B. The reinforcing, when delivered, shall be protected from the weather. The reinforcing shall not be oiled or painted. Reinforcing with slight rust which can easily be removed with a wire brush may be used after removal of rust. All reinforcing steel unacceptable to the Owner will be immediately removed from the job site.
- C. Welded wire fabric shall conform to A.S.T.M. A-185 and shall be the size and gauge shown on the Drawings.
- D. All bent bars shall be accurately cold bent to conform to the approved shop drawings.
- E. All bars shall be tagged and bundled. Imperishable marking tags are to be used.
- F. Metal accessories, including spacers, chairs, ties, and other devices necessary for properly assembling, placing and spacing and supporting all reinforcing in place, shall be provided.
- G. Reinforcing steel shall be carefully handled so that it will not become bent or otherwise damaged, shall be stored on racks, skids or other supports which will keep the steel from contact with the ground.

2.08 CONCRETE ADHESIVE:

- A. Where indicated on the Drawings or requested by the Engineer, SIKA Corporation, SIKADUR 32, HI-MOD LPL, or equal adhesive shall be used.

2.09 LIQUID MEMBRANE CURING COMPOUND:

- A. Liquid Membrane Curing Compound shall comply with ASTM C-309, Type 1, and AASHTO M-148.
- B. Polyethylene Film: 4 mil thick, opaque ASTM C 171.

2.10 HIGH EARLY STRENGTH CONCRETE:

- A. For the concrete mixture, use a minimum of 846 pounds of cementitious material per cubic yard of concrete. Determine all materials and proportions of the concrete mixture to obtain a drivable surface with a minimum compressive strength in the concrete of 3,000 psi within 12 hours of placement. The contractor may add one or a combination of admixtures to the ingredients or to the mixture in order to obtain the required minimum strength and required air content. Do not retemper the concrete mixture.
- B. Discharge all concrete within 45 minutes after introducing the mixing water to the cement, or the cement to the aggregates, or within 30 minutes after introducing an accelerating admixture, whichever comes sooner.
- C. At least 15 calendar days before starting construction provide the engineer with adequate evidence that the required strength is obtainable in the field with the materials used and at the various temperatures encountered. Conduct a continued strength evaluation, if the engineer required, during the course of the work to ensure continued compliance with the strength requirements.
- D. Make concrete cylinders under the engineer's supervision. Use an independent testing facility to conduct preliminary and continued strength evaluations. Base each reported value on a minimum of 2 cylinders. After submitting data showing obtainment of the required strength, do not change the mix without first submitting a complete new set of test data showing compliance with the requirements.

3.00 CONSTRUCTION REQUIREMENTS:

3.01 CONCRETE:

- A. Mix concrete in accordance with ASTM C94.
- B. Provide concrete of the following strength:
 - 1. Compressive strength (28 day): 4000 psi
 - 2. Entrained Air Content: As indicated in ACI 301, Table 3.4.1 or 6% +/- 1.5% with the Shrinkage Reducing Admixture.
 - 3. Water Cement Ratio: Maximum 0.45.
 - 4. Slump: 1 inch minimum, 3 inch maximum for footings and substructure walls; 4 inch maximum for slabs, beams, reinforced walls and columns. Loss of slump in pumping shall not exceed 1 1/2 inch.
- C. Select proportions for normal weight concrete in accordance with ACI 301, Chapter 3, Section 3.9 or 3.10.
- D. Admixtures shall be included with the mix design submittal and reviewed by the Engineer.
- E. Use accelerating admixtures for use only in cold weather. Concrete techniques and placement requirements shall be in place under the application and reviewed by the Engineer. Calcium chloride or admixtures containing chlorides may not be used in the concrete.
- F. Use retaining admixtures only in hot weather and shall follow hot weather concrete techniques to lower concrete temperature to an acceptable level. These techniques shall be reviewed by the Engineer.
- G. Use air entrained concrete for all concrete exposed to the exterior.

3.02 MIXING:

- A. Ready Mix (Central Plant) concrete shall be used for all work on this project, provided the concrete conforms to the proportions and strengths as specified herein. Two speed mixer trucks shall be utilized for transit to the job site.
- B. The concrete must be in place within one hour after water is added to the mix. A.S.T.M. Specifications for Ready Mix Concrete C-94 shall apply. The Central Mixing Plant shall be designated in writing to the Engineer for his approval one week prior to the usage of concrete on the job site.

3.03 COLD AND HOT WEATHER REQUIREMENTS:

- A. Cold weather concreting shall not be continued when the air temperature is below 45 degrees F, unless the following conditions are maintained:
 - 1. Mixing water shall be heated to a maximum of 150 degrees F.
 - 2. Aggregates shall be heated until free of all ice and frost.
 - 3. The concrete temperature after mixing shall be between 50 degrees F and 70 degrees F if the air temperature is 25 degrees F to 45 degrees F.
 - 4. After the concrete is placed, it shall be covered, protected and heated so as to maintain a minimum of 70 degrees F air temperature for the first 24 hours and 50 degrees F for the next six days.
 - 5. Moist conditions shall be maintained during the heating period.
 - 6. All covering, heating equipment, etc., shall be on hand and approved by the Engineer before any concrete is placed.
- B. No concrete shall be placed on iced or frozen subgrade or when the air temperature is below 35 degrees F.

- C. Hot weather concrete work will not be permitted on exposed surfaces while air temperature exceeds 100 degrees F. Cover and protect and cool as necessary to maintain the internal temperature of the concrete below 100 degrees F. Concrete delivered to the job site while in the Ready Mix truck shall maintain a temperature less than 85 degrees F.

3.04 CURING:

- A. Curing shall be accomplished by preventing loss of moisture, rapid temperature change, and mechanical injury or injury from rain or flowing water for a period of not less than 5 days when normal Portland Cement has been used. Curing shall be started as soon as free water has disappeared from the surface of the concrete after placing and finishing. Curing shall be accomplished by using any of the following methods or combination thereof, as approved by the Engineer.
- B. Unformed surfaces shall be covered with approved fabric, mats, burlap, or with sand, and shall be kept continually wet, or be covered with waterproof paper or polyethylene sheeting, or be coated with liquid membrane. Where formed surfaces are cured in forms, the forms shall be kept continually wet or the top forms may be loosened, as directed or approved by the Owner and water allowed to run down between the forms and concrete. If forms are removed before the end of the curing period, curing shall be continued as on unformed surfaces. Burlap shall be used only on surfaces which will be exposed in the finish work and shall be in two layers. Water shall be applied in a manner which will not damage the concrete and shall be free from impurities which may damage or discolor the concrete.
- C. Liquid membrane-forming curing compounds, when approved by the Engineer, shall be applied by power spraying equipment using a spray nozzle equipped with a wind guard. The compound shall be applied in a two-coat, continuous operation at a coverage of not more than 200 square feet per gallon for each coat or as recommended by the manufacturer. The compound shall form a uniform, continuous, adherent film that will not check, crack or peel and shall be free from pinholes or other imperfections. Surfaces subject to heavy rainfall within 3 hours after application of compound shall be re-sprayed at the rate specified above. Surfaces coated with curing compound shall be kept free of foot and vehicle traffic or other abrasions during the curing period. Membrane curing compound shall not be used on surfaces that are to receive concrete, bituminous membrane waterproofing, resilient floor covering, nor surfaces that are to be painted.
- D. Waterproof paper or polyethylene sheeting shall be placed to completely cover the concrete with enough overlap for secure anchorage around the edges. Adjoining sheets shall be lapped 6 inches and appropriately weighted, or sealed with tape or other approved means. Edge and lap anchorage shall be sufficient to prevent billowing or displacement by the wind. The sheeting material shall be no less than 4 mils thick and black in color for cold weather use and white or clear for hot weather.
- E. To facilitate rubbing of concrete, or for other reasons, forms may be removed from vertical surfaces of thick sections 48 hours after concreting, with the approval of the Engineer. Extreme caution should be exercised to prevent injury of concrete surfaces and edges during form removal. Surfaces revealed by form removal before the 5 day curing period shall have one of the other curing methods applied as soon as possible after from stripping.

3.05 FORMS:

- A. The forms utilized for concrete shall be watertight, true to line and elevation, and rigidly braced so as not to be disturbed during the placement of concrete. If the forms develop any defects such as bulging, sagging, or showing signs of lateral displacement after the concrete has been placed, the concrete shall be removed and replaced correctly at the Contractor's expense. The inside of all forms shall be coated with a light, clear, paraffin based oil, which will not discolor or otherwise mar the concrete surface. The oil will be applied prior to erection of the forms; any reinforcing steel contaminated with form oil will be removed and replaced.
- B. Forms for concrete surfaces which will be visible in the finished structure shall be lined with wooden sheets such as masonite or smooth plywood. The joints of this lining shall be neat and close. Lining damaged with hammer imprints shall not be used.
- C. Removal of forms shall be restricted to the following minimum time requirements:
 - 1. Floor slab (structural): 120 hours

2. Floor slab on grade: 48 hours
3. Walls: 48 hours
4. Beam bottom forms 7 days or develop at least 3,000 psi

- D. The minimum times, shown above, shall be utilized unless specific instruction to increase this time period has been requested by the Engineer.
- E. Form ties shall be of the removable end, permanently embedded body type and shall have sufficient strength, stiffness, and rigidity to support and maintain the form in proper position and alignment without the use of auxiliary spreaders. Ties shall also have water stop collars.
- F. Chamfer strips shall be placed in forms to bevel all salient edges and corners and the top edges of walls. Unless otherwise noted, bevels shall be 3/4 inch wide and shall be cast in place.

3.06 PLACING REINFORCEMENT:

- A. Reinforcement shall be accurately formed and positioned, and shall be maintained in proper position while the concrete is being placed and compacted. Unless otherwise shown on the Drawings, the details of fabrication shall conform to ACI 315 and 318. In case of conflict, ACI 318 shall govern.
- B. Approval by the Owner's Representative is required at the completion of placing reinforcing steel prior to the placing of any concrete.

3.07 PLACING OF CONCRETE:

- A. The placing of concrete shall be accomplished by placing in one continuous operation between the limits of the work or between properly constructed and permissible construction joints.
- B. The Contractor shall place no concrete until after observation, by the Engineer of forms, reinforcing, and embedded items. Place no concrete over water covered, muddy, frozen soil or dry soil or sub-base. Dry sub-base shall be sprinkled with water prior to the placement of concrete.
- C. In preparation for the placing of concrete, all chips, and other construction debris and extraneous matter, shall be removed from the interior of the forms. Struts, stays and braces, serving temporarily to hold the forms in correct shape and alignment pending the placing of concrete in their locations, shall be removed when the concrete placing has reached an elevation rendering their services unnecessary. These temporary members shall be entirely removed from the forms and not buried in the concrete. Concrete shall be placed so as to avoid segregation of the materials and displacement of the reinforcement. The use of long troughs, chutes, and pipes for conveying concrete from the mixer to the forms shall be permitted only on written authorization from the Owner. In case an inferior quality of concrete is produced by the use of such conveyors, the Owner may order discontinuance of their use and the substitution of a satisfactory method of placing.
- D. Concrete shall be conveyed to place of deposit by methods which prevent separation of materials. Hoppers, chutes, tubes, or pumping equipment shall be sized to insure a practically continuous flow of concrete to point of delivery without separation of materials.
- E. The maximum free fall of concrete shall be less than six feet (6').
- F. Concrete shall be placed in a continuous operation until the panel or section is completed. Concrete for walls, piers, and columns shall be placed in layers not to exceed eighteen inches (18") in depth. Layers shall be incorporated together by vibrating a minimum of three inches (3") into the previously placed layer.
- G. During the placing of the concrete, it shall be compacted by mechanical vibration obtained by mechanical power operating within the mass of the concrete, supplemented by spading tools. Vibrators shall be of a type and design approved by the Engineer.
- H. The intensity of vibration shall be such as to visibly affect a mass of concrete of 1 inch slump over a radius of at least 18 inches. The Contractor shall provide a sufficient number of vibrators to properly compact each batch immediately after it is placed in the forms. Vibration shall be manipulated so as to thoroughly work the

concrete around the reinforcement and embedded fixtures and in the corners and angles of the forms. Vibration shall be applied at the point of deposit and in the areas of the freshly deposited concrete.

- I. The vibrators shall be inserted and withdrawn out of the concrete slowly. The vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but shall not be continued so as to cause segregation of aggregate. Vibration shall not be continued at any one point to the extent that localized areas of grout are formed.
- J. Vibrations shall not be applied directly or through the reinforcement to sections or layers of concrete which have hardened to the degree that the concrete ceases to be plastic under vibration. It shall not be used to make concrete flow in the forms over distances so great as to cause segregation, and vibrators shall not be used to transport concrete in the forms.
- K. Vibration shall be supplemented by such spading as is necessary to ensure smooth surfaces and dense concrete along form surfaces and in corners and locations impossible to reach with the vibrators.

3.08 FINISHING:

- A. Finishing of the concrete shall be accomplished as follows:
 - 1. Immediately after removing the forms, all fins or irregular projections shall be removed from all surfaces exposed above ground. On all surfaces the areas of cavities produced by form ties, holes, honeycombing, broken edges or corners, and other surface defects, shall be cleaned and carefully filled, pointed, and trowelled to a true uniform smooth surface with sand-cement mortar mixed in the proportions used in the grade of concrete being furnished. Defective concrete as determined by the Owner shall be repaired by cutting out the unsatisfactory material and placing new concrete which shall be secured with keys, dovetails or anchors. Concrete for patching shall be drier than the usual mixture and shall be thoroughly tamped into place.
 - 2. All exposed concrete surfaces, that is, those surfaces which will be visible (except floor slabs and sidewalks) shall be finished in the following manner: Forms shall be removed from such surfaces as soon as structurally possible, as approved by the Engineer and all depressions or imperfections immediately patched as described above. The surface shall then be machine or hand-rubbed until the entire surface has a smooth, homogeneous pleasant-appearing finish of uniform texture and color. Any delay in patching or rubbing such surfaces shall be cause for rejection of the entire structure or for requiring the surfaces to be ground smooth and painted or coated with thorseal.
 - 3. All surfaces to receive a decorative or protective coating shall be ground, rubbed and filled as necessary to provide a surface smooth enough to insure a good paint coverage.
 - 4. No mortar wet cement shall be used in finishing except the mortar necessary to fill imperfections. Edging tools shall be used on all exposed top edges.
 - 5. The top surface of walls where exposed shall receive a smooth trowelled finish. Where the top surface joins the sides, a 3/4 inch chamfer shall be provided. All floor slabs shall receive a steel trowel finish.
 - 6. On pedestrian walks, before final troweling and brooming, and while concrete is still wet, apply Carborundum Company "Silicon Carbide" grains by sprinkling on at a rate of 1/4 pound per square foot and working grains with a wood float. Walks shall receive a light brush finish.

3.09 SAMPLES AND TEST:

- A. Concrete Control Tests: For strength tests of cylinders during work provide 3 cylinders for each 50 cu. yd. of concrete, a part thereof over 20 cu. yds. used on one days pour for each concrete class. Test 1 at 7 days; 1 at 28 days. Make and cure test cylinder per ASTM C31. Cure specimens under laboratory conditions except Owner may require curing under field conditions when he considers that there is a possibility air temperature may fall below 40 degrees F. Test cylinders per ASTM C39.

- B. Testing Questionable Concrete: In event cylinders indicate that concrete does not meet specified strength requirements, Engineer reserves right to order cores from hardened concrete secured and tested per ASTM C42, or order load tests per ACI 318, or both. Costs of such cores and tests shall be borne by Contractor. If tests indicate that concrete placed does not conform to drawings and specifications, Contractor shall take measures as directed by Engineer to correct deficiency without extra cost to Owner.
- C. Slump Test: Test should occur at the beginning of the day, whenever questionable concrete is encountered and whenever test cylinders are taken.
- D. Air Test: Test should occur whenever the air temperature changes, the aggregate grading changes and whenever test cylinders are taken.
- E. Reinforcing Steel: With each shipment of steel, submit to Engineer three (3) copies of certified mill test covering tensile strength of samples from shipment.

4.00 SHOP DRAWINGS

- A. Shop drawings shall be submitted in accordance with the General Conditions and General Requirements. The Contractor shall furnish certified mill tests for all bars and shall submit duplicate copies of the bar drawings and schedules for preliminary checking and copies for final approval as specified in the General Conditions and General Requirements. Bending details shall conform to the standards of the Reinforcing Steel Institute.

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DIVISION 31 - EARTHWORK

SECTION 312313 - SUBGRADE PREPARATION

1.00 GENERAL

- A. This work shall consist of preparing the subgrade upon which a base course is to be constructed or a surfacing placed. After a base course has been constructed, the top of the completed base course will be considered the subgrade for the next operation. In surfacing contracts involving only incidental grading, the contract shall complete Subgrade Compaction before proceeding with this work.

2.00 PRODUCTS

- A. A self-propelled steel wheel roller weighing not less than 10 tons shall be used in preparing any subgrade for flexible type surfacing and weighing not less than 5 tons in preparing any subgrade for Portland cement concrete base course or pavement.

3.00 EXECUTION

- A. The subgrade shall be substantially uniform in density throughout its entire width. It shall conform to the lines, grades and typical cross sections shown on the plans, or as established by the engineer. The subgrade shall be constructed to drain surface water to the side ditches and all ditches shall be kept open by the contractor. Where hauling results in ruts or other objectionable irregularities, the contractor shall reshape and reroll the subgrade before the base or surfacing is placed. If an old traveled roadway comprises any part of the roadbed, the contractor shall loosen the compacted portions to a depth of at least 12 inches and shall reshape the roadbed.
1. All subgrades, except those for aggregate type surfacing, shall be rolled. The subgrades shall be checked after rolling and, if not at the proper elevation at all points, sufficient material shall be removed or added and compacted to bring all portions of the subgrade to the required elevation and density. The moisture content of the top 6 inches of the finished subgrade at the time the base is placed, or at the time the pavement is placed if no base is provided under the pavement, shall be not less than the minimum specified for compacting. If the moisture content has not been maintained, the subgrade shall be scarified, wet to the required moisture content and compacted. A roughly compensating maximum deviation of $\frac{1}{4}$ inch, plus or minus, from the required elevation will be permitted on the surface of the finished subgrade.
 2. Prior to laying base or setting paving forms, the subgrade shall conform to the moisture and density requirements for compaction. Soft spots and unsuitable material shall be removed to a depth not to exceed 24 inches and backfilled with approved stable material.
 3. The subgrade for Portland cement concrete pavement shall be compacted and brought to true shape by an approved subgrade machine. Any material added shall be satisfactorily incorporated and compacted. Before the concrete is placed, a true subgrade shall be shaped by an approved subgrade planer rolling on the forms and any resulting loose material on the subgrade behind the planer shall be recompacted with the 5-ton steel wheel roller. The planer shall be adjustable to produce a subgrade of the exact elevation and cross section. After all grading or planing operations have been completed, and immediately before the concrete is placed, the subgrade shall be checked with an approved heavy metal template which shall be rolled on the forms. Scratch templates with spikes or teeth will not be permitted. A taut line across the top of side forms and a ruler may be used in lieu of a template for checking the subgrade on irregular areas or variable widths. Extreme care shall be taken in forming the crown and shaping the subgrade to ensure that the specified thickness of concrete will be attained in the finished pavement.
 - a The finished subgrade at the time of paving shall be moist, but sufficiently firm to resist rutting or deforming under construction traffic.
 4. No direct payment will be made for subgrade preparation.

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DIVISION 31 - EARTHWORK

SECTION 312323.13 - SUBGRADE COMPACTION

1.00 GENERAL

- A. This work shall consist of compacting the earth subgrade on the roadbed of a previously graded roadway.
 - 1. The Contractor shall perform this work on the subgrade at all locations specified by the engineer. Tentative locations of subgrade compaction will be shown on the plans, but the engineer will specify all locations and depths of this work by written order. Any overrun, or partial or complete underrun, shall not be a basis for claim.

2.00 PRODUCTS

- A. NOT APPLICABLE

3.00 EXECUTION

- A. The subgrade for the full width of the roadbed shall be scarified to a depth of at least 12 inches, and the scarified material brought to a uniform moisture content either by drying or by adding water and manipulating with suitable equipment. At the contractor's option, the upper 12 inches of soil may be removed and replaced with satisfactory material or removed and manipulated with suitable equipment before replacing. The material shall be compacted to produce a subgrade having a density not less than the density required and within the moisture contents specified under Section 02236 by the use of approved equipment producing satisfactory results.
- B. If it is determined that the required subgrade density cannot be obtained by moisture control and compaction of the upper 12 inches, the unsuitable material shall be excavated to a depth not to exceed 18 inches and replaced with satisfactory material compacted in layers not to exceed 6 inches except as otherwise permitted by the engineer. Each 6-inch layer shall be processed, wetted, or dried as necessary, and compacted to the required density.
- C. If an unsatisfactory subgrade has developed through negligence on the part of the contractor, the contractor will be required to restore it to a satisfactory condition at the contractor's expense.

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DIVISION 31 – EARTHWORK

SECTION 312300 - EXCAVATING, FILLING AND GRADING

1.00 GENERAL

1.01 DESCRIPTION OF WORK

A. This section includes, but is not limited to, the following:

1. Backfill, Compaction and Grading
2. All Related Items

1.02 QUALITY ASSURANCE

A. Applicable Standards:

1. American Society for Testing and Materials (ASTM).

1.03 JOB CONDITIONS

A. Existing Utilities:

1. Locate existing underground utilities in the areas of work before starting earthwork operations. Where utilities are to remain in place, provide adequate means of protection during earthwork operations.
2. Should uncharted, or incorrectly charted piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with the owner and public and private utility companies in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the utility owner.
3. Do not interrupt existing utilities servicing facilities occupied and used by the Owner or others, except when permitted in writing by the Owner's Representative and only after acceptable temporary utility services have been provided. Completely remove from the site underground utilities indicated to be removed. Coordinate with local utility companies for shut-off services if lines are active.

B. Use of Explosives:

1. Blasting will not be permitted.

C. Temporary Protection:

1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout and other hazards created by excavation operations.

D. Temporary Erosion Control:

1. The Contractor shall be responsible for keeping surface water runoff free from silt, sediment and earth fill material in areas disturbed by all construction activities.

E. Rock Excavation:

1. No additional or separate payment will be made for rock excavation.

2.00 PRODUCTS

2.01 MATERIALS DESCRIPTION

- A. Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands exclusive of clayey and silty material, materials which are free-draining and for which impact compaction will not produce a well-defined moisture-density relationship curve and for which the maximum density by impact methods will generally be less than by vibratory methods.
- B. Cohesive materials shall include silts and clays generally exclusive of sands and gravel--materials for which impact compaction will produce a well-defined moisture-density relationship curve.
- C. Impervious cohesive materials shall be defined as CH or CL materials as defined by the Unified Soil Classification System.
- D. Permeable materials shall be defined as either non-cohesive or cohesive materials that do not meet the specifications for impervious cohesive materials.
- E. Waste:
 - 1. Waste materials include excess suitable materials and all materials unsuitable for use in the work.
 - a) Unsuitable materials include all materials that contain debris, roots, organic matter, frozen matter, rock (with any dimension greater than one-half the loose layer thickness) or other materials that are determined by Owner's Representative as too wet or otherwise unsuitable for providing a stable subgrade or stable foundation for structures.
 - b) Suitable materials include materials that are free of debris, roots, organic matter, refuse, ashes, cinders, frozen matter and that which is free of rock with any dimension greater than one-half of the specified loose layer thickness.
 - 2. All waste materials (excess suitable and all unsuitable) encountered during grading shall be removed from the immediate work area and disposed of by the Contractor, as directed by the Owner's Representative.
- F. Rock Excavation:
 - 1. No additional or separate payment will be made for rock excavation.
- G. Borrow:
 - 1. Borrow materials include all fill materials and topsoil obtained from approved locations.
 - 2. Borrow shall include all excavating, handling, and final disposal of materials as specified.
 - 3. Proper methods of erosion and sediment control of the borrow site shall also be the Contractor's responsibility.
- H. Topsoil Materials:
 - 1. Topsoil shall be a friable clay loam surface soil having a minimum depth of 4" and relatively free of subsoil, clay lumps, stones, and other objects over 2" in diameter, and without weeds, roots and other objectionable material.
 - 2. Topsoil shall be stripped to appropriate depths to prevent intermingling with the underlying subsoil or other objectionable material. Heavy growths of grass shall be removed from construction areas prior to stripping.
 - 3. Topsoil stripping shall be stopped a sufficient distance from trees to be left in place to prevent damage to the main root system.

4. Topsoil shall be stockpiled in designated areas or as otherwise directed. Piles shall be constructed to freely drain surface water.

2.02 SOIL CLASSIFICATIONS

- A. Satisfactory soil materials shall be nonswelling materials with plastic indexes of less than 20 and liquid limits less than 40. Soil meeting these requirements under the Unified Soil Classification System for the following soil groups are acceptable:

<u>Classification</u>	<u>Description</u>
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GW.	Well graded gravels, gravel-sand mixtures, little or no fines.
GP.	Poorly graded gravels, gravel-sand mixtures, little or no fines.
GM.	Silty gravels, poorly graded gravel-sand-silt mixtures.
SW.	Well graded sands, gravelly sand, little or no fines.

<u>Classification</u>	<u>Description</u>
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SP.	Poorly graded sands, gravelly sands, little or no fines.
SM.	Silty sands, poorly graded sand-silt mixture.
SC.	Silty sands, sand-clay mixtures.
ML.	Inorganic silts, and very fine sands with slight plasticity.
CL.	Silty or sandy clays of low plasticity.

- B. Unsatisfactory soil materials consist of all other materials including the followings that are classified under the Unified Soil Classification System:

<u>Classification</u>	<u>Description</u>
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OL.	Organic silts and organic silty clays of low plasticity.
MH.	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
CH.	Inorganic clays of high plasticity, fat clays.
OH.	Inorganic clays of medium to high plasticity, organic silts.
PT.	Peat and other highly organic soils.

2.03 SOIL CATEGORIES

- A. Embedment soils used in pipe installation are described by ASTM and are grouped into five categories below:
1. Class I - Angular, 6 to 40 mm (1/4" to 1 1/2") graded stone, including materials such as coral, slag, cinders, crushed stone, and crushed shells.
 2. Class II - Coarse sands and gravels with maximum particle size of 40 mm (1 1/2") including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW and SP are included in this class.
 3. Class III - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil types GM, GC, SM, and SC are included in this class.
 4. Class IV - Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH, and CL are included in this class. These materials are not recommended for bedding, haunching, or initial backfill.
 5. Class V - This class includes the organic soils, OL, OH, and PT as well as soils containing frozen earth, debris, rocks larger than 40 mm (1 1/2" in diameter), and other foreign materials. These materials are not recommended for bedding, haunching, or initial backfill.

3.00 EXECUTION

3.01 EXCAVATION

- A. Earth excavation includes the removal and disposal of pavements and other obstructions visible on the ground surface, underground structures and utilities indicated to be replaced and removed, material of any classification indicated in data on subsurface conditions and all other materials encountered that are not classified as rock excavation or unauthorized excavation.
- B. Rock excavation consists of the removal and disposal of materials encountered that cannot be excavated with a 3/4 cubic yard capacity power shovel without drilling and blasting, or continuous use of a ripper or other special equipment, except such materials that are classified as earth excavations.
 - 1. Typical of materials classified as rock are boulders 1/2 cubic yard or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.
 - 2. Intermittent drilling that may be performed to increase production and is not necessary to permit excavation of the material encountered will be classified as earth excavation.
- C. Unauthorized excavation consists of removal of materials beyond indicated elevations without the specific direction of the Owner's Representative. Unauthorized excavation shall be replaced by backfilling and compacting as specified for authorized excavations of the same classification, unless otherwise directed by the Owner's Representative.
- D. Additional excavation consists of carrying excavations deeper and replacing the excavated material as directed by the Owner's Representative if unsuitable materials are encountered at the required subgrade elevations. When excavation has reached required subgrade elevations, the Contractor shall notify the Owner's Representative, who will make an inspection of conditions.
- E. All open trenches and other excavations shall be provided with suitable barriers, signs, and lights to the extent that adequate protection is provided to the public. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights. All barricades and obstructions shall be illuminated by means of warning lights at night. All lights used for this purpose shall be kept burning from sunset to sunrise. Materials stored upon or alongside public streets and highways shall be so placed, and the work at all times shall be so conducted, so as to cause the minimum obstruction and inconvenience to the traveling public. All barricades and light expense will be paid by the Contractor.

3.02 DEWATERING

- A. Prevent surface water and subsurface or ground water from flowing into excavations and flooding the project site and surrounding area.
- B. Do not allow water to accumulate in excavations. Remove water from excavations to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey the water away from the site.
- C. Convey water removed from excavations and rainwater to collector run-off areas. Do not use trench excavations for site utilities as temporary drainage ditches.
- D. Provide an adequate system to lower and control the groundwater in order to permit excavation, construction of structures and the placement of fill materials to be performed under dry conditions. Install sufficient dewatering equipment to pre-drain the waterbearing strata above and below the bottom of structure foundations, drains, sewers, and other excavations.
- E. Reduce the hydrostatic head in the waterbearing strata below structure foundations, drains, sewers, and other excavations to the extent that the water level and piezometric water levels in the construction areas are below the prevailing excavation surface at all times.

- F. Maintain piezometric water level a minimum of 1' below the excavation surface.
- G. Prior to excavation below groundwater level, place the dewatering system into operation to lower the water levels as required and then operate it continuously 24 hours a day, 7 days a week until drains, sewers and structures have been constructed, including placement of fill materials, and dewatering is no longer required.
- H. Dispose of water removed from excavations in such a manner so as to not endanger public health, property, and portions of the work under construction or completed. Dispose of water in such a manner that will cause no inconvenience to others engaged in work about the site. Provide sumps, sedimentation tanks, and other flow control devices as required by governing authorities.
- I. Provide complete standby equipment, installed and available, for immediate operation as may be required, to adequately maintain dewatering on a continuous basis in the event that any part of the system becomes inadequate or fails. In the event dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system, perform such work as may be required to restore damaged structures and foundation soils at no additional expense.

3.03 MATERIAL STORAGE

- A. Stockpile excavated materials classified as satisfactory soil material where directed until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
- B. Locate and retain fill materials away from edges of excavations.
- C. Dispose of excess soil material and waste materials as herein specified, and as acceptable to the Owner.

3.04 MOISTURE CONTROL

- A. Where the subgrade of layer of soil material must be moisture conditioned before compaction, uniformly apply water to the surface of subgrade, or layer of soil material to prevent free water from appearing on the surface during or subsequent to compaction operations.
- B. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - 1. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until the moisture content is reduced to a satisfactory value.

3.05 FIELD QUALITY CONTROL

- A. The testing service, provided by the Owner, at the Owner's option, will inspect and approve subgrades and fill layers before additional construction work is performed. Otherwise, the subgrade shall be proof rolled by the Contractor and observed by the Owner's Representative. The proof shall consist of a fully loaded tandem axle truck passing over the prepared subgrade as directed by the Owner's Representative. If site conditions warrant, the unacceptable area shall be regraded then recompacted to the satisfaction of the Owner's Representative.
- B. Field density tests will be performed in accordance with ASTM C 1556 (sand cone method), ASTM D 2167 (rubber balloon test), ASTM D 2922-91 (density of soil and soil-aggregates in-place by Nuclear Methods) or ASTM D 3017 (water content of soil and rock in-place by Nuclear Methods).
- C. If, in the opinion of the Owner's Representative, based on testing service reports and inspection, the subgrade or fills which have been placed are below the specified density, additional compaction and testing will be required at no additional expense to the Owner.

3.06 MAINTENANCE

A. Protection of Graded Areas:

1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
2. Repair and re-establish grades in settled, eroded and rutted areas to the specified tolerances.
3. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, re-shape and compact to the required density prior to further construction. Use hand tamping for recompaction over underground utilities.

3.07 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Transport all trash, debris, trees, stumps, roots, ashes, cinders, or other refuse to an approved disposal area. Excess excavated material shall be removed by the Contractor.
- B. The disposal of waste and excess excavated materials, including hauling, handling, leveling and surfacing, shall be a subsidiary obligation of the Contractor and no separate payment will be made, therefore.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 313219 - GEOTEXTILE SEPARATION FABRIC

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

- A. The geotextile separation fabric material shall be Propex Geotex 315ST Geotextile Fabric or approved equal.
- B. This work shall consist of furnishing and placing a geotextile for use as a permeable separator to prevent inter-mixing of dissimilar materials such as subgrades and surfaced or unsurfaced pavement materials, and foundations and selected fill materials. The geotextile shall be designed to allow passage of water while retaining in-situ soil.

1.2 RELATED DOCUMENTS

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

1.3 SUBMITTALS

- A. Shop Drawings: NOT APPLICABLE.
- B. Material Certification:
 - 1. Geotextile Fabric
- C. The fabric producer's laboratory shall maintain records of its quality control results and the contractor shall provide, upon request of the Owner's Representative prior to shipment, manufacturer's certificate. The certificate shall include:
 - 1. Name of manufacturer.
 - 2. Chemical composition.
 - 3. Product description.
 - 4. Statement of compliance to specification requirements.
 - 5. Signature of legally authorized official attesting to the information requested.

1.4 QUALITY ASSURANCE:

- A. The average roll minimum value (weakest principle direction) for strength properties of any individual roll tested from the manufacturing lot or lots of a particular shipment shall be in excess of the average roll minimum value (weakest principal direction) as specified in the materials section.
- B. A competent laboratory must be maintained by the producer of the fabric at the point of manufacture to ensure quality control in accordance with ASTM testing procedures.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Geotextile Shipment/Storage: the geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Rolls shall be stored in a manner that protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover. At no time shall the geotextile be exposed to ultraviolet light for a period exceeding 14 days. The geotextile rolls shall be labeled as per ASTM D4873, "Guide for Identification, Storage and Handling of Geotextiles".
- B. The engineering fabric shall be provided in rolls wrapped with protective covering to protect the fabric from mud, dirt, dust, and debris.
- C. The fabric shall be free of defects or flaws which significantly affect its physical properties.

- D. Each roll of fabric in the shipment shall be labeled with a number or symbol to identify that production run.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. The geotextile shall be composed of synthetic fibers formed into a woven or nonwoven fabric. Fibers used in the manufacture of the geotextile shall be composed of at least 85 percent by weight polyolefins, polyesters, or polyamides. The geotextile shall be free of defects or flaws which significantly affect its physical properties. The geotextile shall meet the requirements of **Table 5.1**. The choice of a geotextile for this application is determined by the ability of the geotextile to survive installation stresses as shown in **Table 5.2**.
- B. The geotextile fabric shall be Propex Geotex 315ST Geotextile Fabric or approved equal and conform as specified in quality assurance section and as follows:
 - 1. Grab tensile strength (ASTM 4632) shall be 300 pounds minimum.
 - 2. Elongation at failure (ASTM 4632) shall be 15%.
 - 3. Burst strength (ASTM D3786) shall be 600 pounds per square inch minimum.
 - 4. Puncture strength (ASTM D4833) shall be 120 pounds per square inch minimum.
 - 5. Trapezoid tear (ASTM D4533) shall be 120 pounds per square inch minimum.
 - 6. Ultraviolet resistance (ASTM D4355) stability shall be 70/150 percent minimum of the grab tensile strength after fadometer exposure of 300 hours.
- C. Site Preparation: The installation area shall be prepared by clearing all debris or obstructions which may damage the geotextile. Trees and large bushes should be cut at ground level. In most cases, all native vegetation, roots and topsoil must be removed prior to geotextile placement. Where required by the contract documents, soft and otherwise unsuitable areas shall be identified, excavated, and backfilled with selected material in accordance with the contract documents. Stabilization of these areas may be enhanced by use of a geotextile at the bottom of the excavation before backfilling. However, when designed for soft or wet conditions, native vegetation, roots, and topsoil may be left in place so as to limit disturbance and resulting shear strength loss of the subgrade soil.
- D. Geotextile Placement: The geotextile shall be unrolled as smoothly as possible on the prepared area in the direction of construction. Geotextile rolls shall be overlapped in the direction of placement. The geotextile shall be overlapped or seamed in accordance with the minimum requirements provided in **Table 5-3**.

If required, the geotextile may be held in place prior to placement with pins, sandbags, or piles of fill or rock. On curves, the geotextile may be folded or cut to conform to the curve as illustrated in **Figure 5-1**. If site conditions require geotextile seaming, the geotextile shall be cut and seamed on the curve. The fold or overlap shall be in the direction of construction and shall be held in place as prescribed above. The geotextile shall not be dragged across the constructed area.

Damaged geotextiles, as identified by the Owner's Representative, shall be repaired immediately. The damaged area plus an additional 3 ft. around the damaged area shall be cleared of all fill material. A geotextile patch extending 3 ft. beyond the perimeter of the damage shall be constructed as directed by the Owner's Representative. Sewing of a geotextile patch may be required over soft subgrades as directed by the Owner's Representative.

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 PERFORMANCE:

- A. Inspection:

1. The contractor shall use mechanical laydown equipment as supplied by the supplier and place the fabric in accordance with manufacturer's specifications. The placement of the fabric shall be in such a manner that the fabric will be laid down without wrinkles and folds or both.
2. The contractor shall be responsible for providing notification to allow sufficient time for inspection.
3. Under no circumstances will work be accepted without the inspections being performed by the Owner's Representative.

TABLE 5-1

PHYSICAL REQUIREMENTS 1, 2, 3

GEOTEXTILES IN SEPARATION APPLICATIONS

Property	Units	Required Values		Test Method
		Medium Survivability ⁴	High Survivability ⁴	
Tensile Strength	lbs	180	270	ASTM D 4632
Elongation	%	50	50	ASTM D 4632
Seam Strength	lbs	160	240	ASTM D 4632
Puncture Strength	lbs	70	100	ASTM D 4833
Trapezoid Tear Strength	lbs	70	100	ASTM D 4533
Permittivity	1/sec	.02(5)	.02(5)	ASTM D 4491
Apparent Opening Size	U.S. Standard Sieve	(6)	(6)	ASTM D 4751
Ultraviolet ⁷ Stability	%	70	70	ASTM D 4355

Notes:

1. Conformance of geotextiles to specification property requirements shall be determined according to ASTM D 4759, "Practice for Determining the Specification Conformance of Geosynthetics."
2. Contracting agency may require a letter from the manufacturer certifying the geotextiles meet specification requirements.
3. All numerical values, except those of elongation, represent minimum average roll values (i.e., average test results from any sampled roll in a lot shall meet or exceed the minimum average roll values) in weaker principal direction. Values of elongation represent maximum average roll values. Lot sampled according to ASTM D 4354, "Practice for Sampling Geosynthetics for Testing".
4. Recommended survivability ratings are provided in **Table 5-2**.
5. Permittivity shall be greater than the specified minimum value and result in a geotextile permeability which is greater than the permeability of the subgrade soil.
6. Minimum #30 U.S. Standard Sieve (maximum 0.6mm) for subgrade soils with 50 percent or greater particles by weight passing the #200 U.S. Standard Sieve. Minimum #50 U.S. Standard Sieve (maximum 0.297 mm) for subgrade soils with more than 50 percent particles by weight passing the #200 U.S. Standard Sieve. Design apparent opening size to be selected by the design engineer based on site soil and groundwater conditions.
7. Percent of tensile strength retained as evaluated using ASTM D 4632, "Test Method for Grab Breaking Load and Elongation of Geotextiles" after conditioning for 500 hours.

TABLE 5-2

CONSTRUCTION SURVIVABILITY RATINGS

1, 2, 3, 4

Subgrade CDB At Installation	<1		1-2		>2	
Equipment Contact Pressure (psi)	>50	<50	>50	<50	>50	<50
Compacted Thickness Aggregate (in)(5)						
4(6)	NR	NR	H	M	M	M
6	NR	NR	H	H	M	M
12	NR	H	M	M	M	M
18	H	M	M	M	M	M

Notes:

1. From "Geotextile Design and Construction Guidelines", Federal Highway Administration, Publication No. FHWA-HI-90-001, October 1989.
2. H-High
3. M-Medium
4. NR-Not Recommended
5. Maximum aggregate size not to exceed one-half the compacted thickness.
6. The 4 in. minimum cover is intended for existing road bases and not intended for use in new construction.

TABLE 5-3

SEAM RECOMMENDATIONS

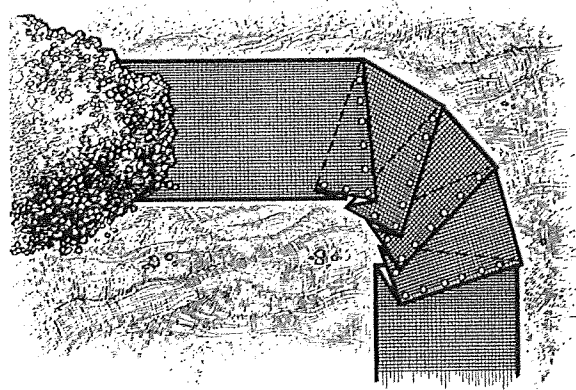
1, 2

Soil Strength (CBR)	Minimum Overlap (ft)
Less than 0.5	(3)
$0.5 \leq \text{CBR} < 1$	(3)(4)
$1 \leq \text{CBR} \leq 2$	2.5(5)
Greater than 2	1.5(5)

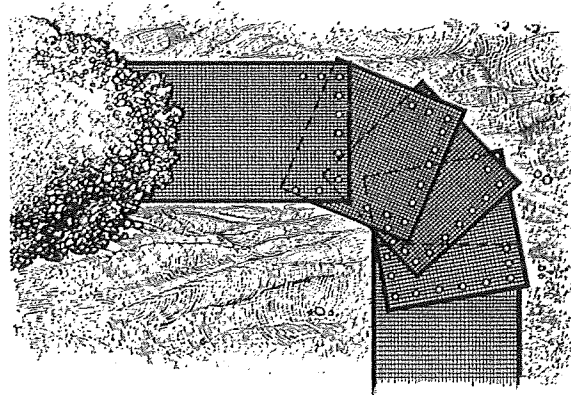
Notes:

1. Adapted from Task Force 25 and "Geotextile Design and Construction Guidelines", Federal Highway Administration, Publication No. FHWA-HI-90-001, October 1989.
2. Overlap requirements are not applicable to sewn seams.
3. Overlaps are not recommended for soil CBR less than 0.5.
4. Sewn seams of adjacent geotextile rolls are preferred for soil CBR greater than 0.5 but less than or equal to 1.

5. Sewn seams are acceptable for all soil CBRs.



A. FORMING A CURVE USING FOLDS



B. FORMING A CURVE USING CUT PIECES

Figure 5-1: Placement of separation geotextile on curves (FHWA, 1989)
(Note: o – indicates locations of pins, sandbags, piles of fill or rock, or other means of temporarily anchoring geotextile. Anchors shall be placed on 2ft. centers minimum.)

END OF SECTION

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DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 320113.61 - SLURRY SEAL

1.00 DESCRIPTION

This work shall consist of the application of Slurry Seal Material to an existing surface. The Slurry Seal shall consist of a mixture of emulsified asphalt, mineral aggregate and potable water, properly proportioned, mixed and spread on the surface in accordance with this specification and as directed by the Owner Representative.

1.01 WARRANTY

Warrant Emulsified Asphalt Slurry Seal paving for (1) year after final completion of paving. Warranty to be against settlement, low spots, lift separation (delamination), shoving, channeling, or any other surface irregularities which does not provide a smooth driving surface. Make any repairs necessary during warranty period to maintain paving in perfect condition.

1.02 MATERIALS

1. **Emulsified Asphalt:** The emulsified asphalt shall conform to Grade SS-1h of Specification ASTM D 977, for emulsified asphalt, or Grade CSS-1h of Specification ASTM D 2397, for cationic emulsified asphalt. Quick set emulsified asphalts QS-1h and CQS-1h shall be used. They shall conform to Specifications ASTM D 977 and ASTM D 2397 respectively, except that the test requirements for cement mixing and storage stability shall not apply. Refer to the International Slurry Surfacing Association (ISSA) bulletin NO. 139. The emulsified asphalt shall have not less than 60% residue after distillation when tested using Specification ASTM D 244 and shall have a penetration of between 40 and 90 when tested using specification ASTM D 2397 at 77° F (25° C). Each load of emulsified asphalt delivered shall have a certificate of analysis/compliance matching the material used in the mix design.
2. **Aggregate for Slurry Seal:** The mineral aggregate used for this work shall be natural or manufactured crushed granite, slag, limestone or chat which is a by-product of the milling of lead and zinc ores and shall conform to the following grading requirements for Type II aggregate when tested in accordance with Specification ASTM C136 and ASTM C117. All aggregate shall conform to the quality requirements of Specification ASTM D 1073. To assure the material is totally crushed, 100% of the parent aggregate will be larger than the largest stone in the gradation to be used.

GRADING REQUIREMENTS FOR AGGREGATE

Sieve Size	Amount Passing Sieves, Weight %		
	Type I	Type II	Tolerance
3/8 inch (9.5 mm)	100	100	
No. 4 (4.75 mm)	100	90-100	+5%
No. 8 (2.36 mm)	90-100	65-90	+5%
No. 16 (1.18 mm)	65-90	45-70	+5%
No. 30 (600 μm)	40-65	30-50	+5%
No. 50 (300 μm)	25-42	18-30	+4%
No. 100 (150 μm)	15-30	10-21	+3%
No. 200 (75 μm)	10-20	5-15	+2%

The percent passing the No. 200 (75 um) sieve shall be determined by Specification ASTM C 117.

3. **Mineral Filler:** Mineral Fillers are of two types, chemically active and chemically inactive. Both shall conform to Specification ASTM D 242. Chemically active mineral fillers such as Portland cement, hydrated lime, and ammonium sulfate are used to improve workability, regulate the setting time, and, in some cases, to alter the aggregate gradation. Chemically inactive mineral fillers such as limestone dust, fly ash, and rock dust are used mainly to alter aggregate gradation.
4. **Water:** All water used shall be potable and shall be free of harmful salts or contaminants.
5. **Mix Design:** The Owner's Representative shall approve all Slurry Seal Materials and methods prior to mixing and application. The contractor shall submit a completed and tested Slurry Seal mix design for the Owner's Representative approval. The approved test method for Emulsified Asphalt Slurry Seal shall be found in Specification ASTM D 3910. The mix design shall be made with the same materials the contractor will be using on the project. The percentage of each material must be shown on the mix design. Proportions of the mixture shall be as follows unless variations are approved by the Owner's Representative:

	TYPE II
Aggregate for Slurry Seal	13.5 to 16.5 lbs per sq yd 7.32 to 8.95 kg/m ² (dry basis)
Emulsified Asphalt (Residual Asphalt Content)	7.5 to 13.5% by weight of dry aggregate
Mineral Filler	1.5 to 3.0% by weight of dry aggregate
Water	Minimum amount necessary to obtain a fluid and homogeneous mixture

Once the proper consistency is obtained, changes in proportioning of the various components of the mixture shall be held to a minimum.

6. **Application Rates:** The Slurry Seal mixture shall be of proper consistency at all times so as to provide the application rate required by the surface condition and shall be in accordance with the following:

Type II: 13.5 to 20 lbs per sq yd (5.44 TO 9.07 kgs per sq meter)

Application rates are affected by the unit weight of the aggregate, the gradation of the aggregate and the demand of the surface to which the slurry seal is being applied.

7. **Equipment:** The slurry mixing machine shall be a continuous flow mixing unit and shall be capable of delivering accurately a predetermined proportion of aggregate, water and asphalt emulsion to the mixing chamber and to discharge the thoroughly mixed product on a continuous basis. The equipment shall be capable of prewetting the aggregate immediately prior to mixing with the emulsion. The mixing unit of the mixing chamber shall be capable of thoroughly blending all of the components together without violent mixing. The mixing machine shall be equipped with an approved fines feeder that

includes an accurate metering device or method to introduce a predetermined proportion of mineral filler into the mixer. The mineral filler shall be fed at the same time and location as the aggregate. The fines feeder shall be required whenever added mineral filler is a part of the aggregate blend. The mixing machine shall be equipped with a water pressure system and fog-type spray bar, adequate for complete fogging of the surface receiving slurry treatment. Attached to the mixer machine shall be a mechanical type squeegee distributor, equipped with flexible material in contact with the surface of the pavement to prevent loss of slurry from the distributor. It shall be maintained so as to prevent loss of slurry on varying grades and crown by adjustments to insure uniform spread. There shall be a steering device and a flexible strike-off. The spreader box shall have an adjustable width. The box shall be kept clean and build up of asphalt and aggregate on the box or in the corners shall not be permitted. Use of burlap drags or other drags shall be approved by the Owner's Representative. Hand squeegees, shoves, and other equipment shall be provided if necessary to supplement the slurry-mixing machine. Power brooms, power blowers, air compressors, and hand brooms suitable for cleaning the surface and cracks of the existing surface shall be implemented to provide a clean surface.

8. **Construction Requirements:**

- a. **Surface Preparation:** Immediately prior to applying the slurry, clean the surface of all loose material, mud spots, vegetation, and other objectionable material. Any standard cleaning method used to clean pavements will be acceptable except water flushing. A pickup sweeper must be used unless otherwise approved by the Owner's Representative. Manholes, valve boxes, drop inlets, and other service entrances shall be protected from the slurry seal by a method approved by the Engineer.
- b. **Application:** The surface shall be prewetted by fogging ahead of the slurry box unless waived by the Owner's Representative. Water used in prewetting the surface shall be applied at such a rate that the entire surface is damp with no apparent flowing water in front of the slurry box. The slurry mixture shall be of the desired consistency upon deposit on the surface and no additional elements shall be added. Total time of mixing shall not exceed 4 minutes. A sufficient amount of slurry shall be carried in all parts of the spreader at all times so that a complete coverage is obtained. Overloading of the spreader shall be avoided. No lumping, balling, or unmixed aggregate shall be permitted. No segregation of the emulsion and aggregate fines from the coarse aggregate shall be permitted. If the coarse aggregate settles to the bottom of the mix, the slurry shall be removed from the pavement. No excessive breaking of emulsion shall be allowed in the spreader box. No streaks, such as those caused by oversized aggregate will be left in the finished pavement.
- c. **Hand Work:** Approved squeegees shall be used to spread slurry in areas not accessible to the slurry mixer. Care should be exercised in leaving no unsightly appearance from the hand work.
- d. **Curing:** Treated areas shall be allowed to cure for four hours, or until such time as the Owner's Representative permits their opening to traffic.
- e. **Weather Limitation:** The slurry seal shall not be applied if either the pavement or air temperature is below 60° F (18° C) and falling.
- f. **Traffic Control:** Suitable methods shall be used to protect the slurry from all types of traffic until sufficiently cured to accept traffic. The length of time before

traffic is permitted to use the surface depends on the type of emulsified asphalt, mixture characteristics, and weather conditions.

- g. **Lines:** Care shall be taken to insure straight lines along curb and shoulders. No runoff on these areas will be permitted. Lines at intersections will be kept straight to provide good appearance.
- h. **Property Owners Notifications:** At least 24 hours before beginning slurry seal operations, the contractor shall notify all residents, businesses, and agencies by an approved written notice detailing the streets and limits of work to be done and the hours of work.
- i. **Provisions for Public Convenience During Sealing Operation:** The Contractor shall provide and maintain sufficient signs, barricades, warning lights, flag person and watch person to protect the work and public in a manner satisfactory to the Owner's Representative. Any areas damaged prior to acceptance by the University shall be repaired at the Contractor's expense. The Contractor shall take all necessary precautions to protect the public (pedestrian and vehicular) from flying debris. The Contractor shall use warning signs and devices to warn motorists and pedestrians of work ahead.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 320116.71 - MILLING AND PAVEMENT PREPARATION

1.00 GENERAL

1.01 SCOPE OF WORK

- A. Removal of surface or a portion of an asphaltic or concrete surface.
- B. Drawings and General Provisions of contract, including General and Special Conditions, apply to this section.

1.02 WORK INCLUDED

- A. The Contractor shall furnish milling equipment to mill in-place, and broom excess millings from pavement profile as shown on the drawings and described in the specifications. Any and all deviations to the cross slope or depth of milling operation must be approved by the Owner's Representative.

2.00 PRODUCTS

2.01 EQUIPMENT

- A. Equipment for profiling and removing bituminous or concrete pavement surface shall be a power operated, self-propelled planing machine or grinder. The machine shall be capable of removing a 2" thickness or specified depth and provide a uniform profile and cross slope.
- B. The equipment shall be self-propelled with sufficient power, traction, and stability (rigid suspension, non-pneumatic tire) to maintain accurate depth of cut and slope.
- C. The equipment shall be capable of accurately, and automatically, establishing profile grades with $\pm 1/8$ inch along each edge of the machine. Grade referencing shall be from the existing pavement, by means of a ski or matching shoe, or from an independent grade control. The equipment shall be controlled by an automatic system for controlling grade elevation and cross slope at a given rate.
- D. The machine shall be equipped with water spray to control dust and other particulate matter created by the cutting action.
- E. The machine shall have an effective means of removing cuttings from the pavement and discharging them into a hauling-unit, all in one operation as the pavement is milled.

3.00 EXECUTION

3.01 PREPARATION

- A. Setup signage and other safety and traffic control devices.
- B. Coldmilling shall only begin when the contractor is ready to immediately follow-up with the resurfacing operation.
- C. The milled surface shall not be exposed to traffic for an extended period before being resurfaced. If the milled surface begins to ravel under traffic, or other problems resulting from the milling occur, restrictions on the amount of time the milled area may be left open will be determined by the Owner's Representative.

3.02 MILLING

- A. The pavement surface shall be removed to the depth as noted on the drawings. The width, grade and cross section shall conform the drawings, or as approved by the Owner's Representative.

- B. Automatically control grade leveling and slope. Provide control to produce a uniform surface to the established grade and a cross slope conforming to the requirements of the typical section.
- C. Remove and plane asphalt or concrete surface around and over manholes, utility valves and drainage appurtenances.
 - 1. Damage to manholes, valves, or drainage appurtenances by the removal and planing operation shall be the responsibility of the Contractor to correct.
 - 2. Place a temporary wedge of bituminous material at a slope no steeper than one inch in 4 feet around the manholes, utility valves and other appurtenances in the driving lanes.
 - 3. Remove bituminous wedges prior to resurfacing.
- D. Existing material shall be removed, if necessary, to maintain surface drainage after the milling operation.
- E. Exercise care not to damage existing concrete pavement.
- F. Loose material on roadway surface, not picked up by the milling machine, shall be swept and picked up immediately behind the milling operation.
 - 1. In areas with earth or stabilized aggregate shoulders, small amounts of loose material, not picked up by the milling machine, may be swept to the shoulders.
- G. Milled material is the property of the Contractor. Dispose of material offsite unless otherwise provided in the contract.
- H. Cost of replacement milling teeth shall be borne by the Contractor.
- I. Cost of remobilization due to equipment failure shall be borne by the Contractor.

3.03 FIELD QUALITY CONTROL

- A. For pavement surfaces, the surface of each layer shall be substantially free from waves or irregularities.
- B. The final surface, including pavement repair limits, shall not vary from a 10-foot straightedge, applied parallel to the centerline, by more than 1/8 inch.
- C. Spelled areas shall be repaired using an approved plant mix bituminous pavement commercial mix.
- D. The texture produced for the finished pavement shall be a grid surface with discontinuous longitudinal striations.
- E. The milling shall produce a serviceable riding texture with no objectionable noise level.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 320117.61 - PAVEMENT CRACK SEALING

1.00 GENERAL

1.01 SCOPE OF WORK

- A. Sealing cracks and joints in bituminous or concrete pavements.
- B. Drawings and General Provisions of contract, including General and Special Conditions, apply to this section.

1.02 WORK INCLUDED

- A. Work under this section includes cleaning and filling of longitudinal and transverse cracks, greater than 1/8" in width, in asphaltic or concrete pavements prior to overlay, seal, or chip and seal.
- B. Areas with block or alligator cracks, that will be wedged or resurfaced, do not require crack sealing.

2.00 PRODUCTS

2.01 MATERIALS

- A. Crack filler shall be Trumball 3405 Rubber Asphalt Joint Sealer or an approved equal and shall conform to AASHTO 173 and/or ASTM D-3405 or D-1190.
- B. Crack sealing must be compatible with the surface sealing material.
- C. Cold type crack sealing material will not be accepted as an equal.

3.00 EXECUTION

3.01 EXECUTION

- A. Clean material out of existing cracks by mechanical hand routing or a stiff bristle broom and compressed air.
 - 1. Use a sharp pick or other tool as necessary to remove weeds and other debris.
 - 2. If compressed air is used, do not connect to a port with automatic oiling.
 - 3. Clean immediately before the sealing operation. Maintain in a clean condition until sealed.
- B. Cracks greater than 3/4" in width:
 - 1. Remove foreign and loose material to the granular subgrade.
 - 2. Mill 1 1/2 inches in depth, 6 inches wide and wedge in a BP-1 asphalt wedge course.
 - 3. For cracks greater than 1 1/2" deep, use sand to fill the crack up to the 1 1/2" depth.
- C. Fill cracks less than 3/4" in width to slightly above the surface. Squeegee excess material to the side. Blot with sand.
- D. Heat crack filling material in accordance with the manufacturer's recommendations.

END OF SECTION

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DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321113 - SUBGRADE FAILED AREAS

1.00 GENERAL

1.01 SCOPE OF WORK

- A. Replacement or patching subgrade failed areas or sections of flexible pavements.
- B. Drawings and General Provisions of contract, including General and Special Conditions, apply to this section.

1.02 WORK INCLUDED

- A. Work under this section includes removal of surface and failed subgrade, placement and recompaction of subgrade, and placement of hot plant mix bituminous surface to repair areas as noted on the drawings.

2.00 PRODUCTS

2.01 MATERIALS

- A. Asphalt: BP-1, Plant Mix Bituminous Surface shall be used for pavement repair.
- B. Granular Base shall conform to MODOT Type 5 Aggregate.
- C. In lieu of granular base, full depth asphalt patch may be utilized.

3.00 EXECUTION

3.01 PREPARATION

- A. Install signage and other safety and traffic control devices.

3.02 REPAIR PROCEDURE

- A. Reshape hole by cutting failed pavement area into square or rectangular shape with a pavement saw.
 - 1. Cut side faces vertically.
 - 2. Excavate vertically to solid material and around hole to sound pavement.
 - 3. Proceed with cutting and removal from the failure outward to sound pavement.
- B. Remove all loose material and thoroughly sweep the excavated area clean of mud and standing water.
- C. Fill hole and compact material in lifts no more than 3" thick.
- D. Place asphalt.
 - 1. Final uncompacted lift should be ½" to 1" above abutting pavement. Surface shall match the abutting pavement after compaction.
 - 2. Thoroughly compact each lift with a plate compactor or roller, generally 15-20 passes with a vibratory roller is necessary to insure good compaction.
 - 3. Hand tamp should be used only for small holes (less than 1 sf).

E. Clean up area. Do not leave excess fill or removal material on the pavement.

F. Remove traffic control signs and barricades.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321123 - AGGREGATE BASE COURSE

1.00 GENERAL

1.01 DESCRIPTION OF WORK

- A. Work covered under this section consists of furnishing and placing one or more courses of crushed stone aggregate on prepared subgrade.
- B. Construction of aggregate base course shall conform to the typical sections, lines, grades and thicknesses as shown on the drawings. Type 5 aggregate base shall conform to the gradation specified in the most current edition of the Specifications for Highway Construction.
- C. Applicable Sections: 312300 Excavating, Filling, and Grading

1.02 TESTING AND INSPECTION

- A. The aggregate base shall be proof rolled by the contractor and observed by the Owner's Representative. The proof roll shall consist of a fully loaded tandem axle truck passing over the prepared subgrade as directed by the Owner's Representative. If site conditions warrant, the unacceptable area shall be regraded then re-compacted to the satisfaction of the Owner's Representative.
 - 1. The Owner may hire a testing lab to perform compaction testing on the project. If in the opinion of the Owner's Representative, based on testing service reports and inspection, the subgrade or fills which have been placed are below the specified density, additional compaction and testing will be required.
- B. Referenced standards of the American Society for Testing of Materials (ASTM) apply to this section.

2.00 MATERIALS

- A. Aggregate shall be crushed stone and shall be the angular fragments resulting from crushing by mechanical means of calcareous or dolomitic limestone from undisturbed, consolidated deposits.
- B. The crushed stone shall contain not more than 15 percent deleterious rock and shale. Sand may be added to the crushed stone only for the purpose of reducing the plasticity index of the fraction passing the No. 40 sieve in the finished product. Any sand, silt, and clay, and any deleterious rock and shale shall be uniformly distributed throughout the mass.

- C. Gradation: The aggregates shall conform to the following gradation requirements:

	<u>Percent</u>
1. Passing 1 ½ Inch Sieve	100
1. Passing 1 Inch Sieve	90 – 100
2. Passing 1/2 Inch Sieve	60 – 90
3. Passing No. 4 Sieve	30 – 56
4. Passing No. 16 Sieve	10 – 40
5. Passing No. 200 Sieve	4 – 12

- D. Quality: The aggregate base material shall be from an approved source.

3.00 CONSTRUCTION REQUIREMENTS

3.01 INSTALLATION

- A. Inspection:
 - 1. Examine the areas and conditions under which the aggregate base course is to be placed for

conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

2. The subgrade shall be compacted, graded and cut to proper lines, grades, and cross-sections to the satisfaction of the Engineer before placing of the base course.
3. Subgrade shall be protected from cold weather; base course shall not be placed on frozen subgrade or when the atmospheric temperature is less than 35 degrees F.

B. Placing Base Course:

1. Contractor shall be responsible for maintaining lines and grades including crown and cross-slope in base course.
2. The Contractor shall be responsible for placing the correct quantity of base material to construct a base of the required finish thickness.
3. The thickness of the compacted base course shall be as shown on the drawings.
4. The maximum compacted thickness of any one layer shall not exceed six (6) inches.
 - a) When specified compacted depth of base course exceeds 6 inches, the base course shall be constructed in two or more layers of approximately equal thickness.
 - b) No single layer shall be less than 3 inches in thickness when compacted.
5. The mixture shall be uniformly spread in successive layers of such depth that when compacted, the base will approximate the thickness specified.
6. Immediately before spreading the aggregate, the subgrade shall be wetted as directed by the Owner's Representative.
7. The base material shall be delivered to the site for placement with the material thoroughly mixed with water to approximate moisture content for desired compaction.

C. Compaction:

1. Maintain optimum moisture content for compacting base course material during placement shaping and compaction operations.
2. Each layer shall be compacted to not less than 95% maximum dry density per ASTM D698.
3. Required compaction shall be accomplished by a self-propelled smooth-wheeled roller, weighing not less than 5 tons, or other methods approved by the Owner's Representative.

D. Grading:

1. Base course material after compaction shall be cut to proper lines, grades, sections and cross-slopes as shown on the drawings.
2. Tolerances shall be plus or minus .1 of a foot.
3. Compacted areas that are below .1 of a foot of grade, additional material shall be brought in place, shaped and compacted to attain the proper thickness and subbase elevation.

E. Maintenance:

1. Protect newly graded areas from traffic and erosion.
2. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.

3. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape and compact to required density prior to further construction.

F. Remove excess material, trash, debris, and waste materials from the site.

END OF SECTION

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DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321213.13 - TACK COAT

1.00 GENERAL

1.01 DESCRIPTION

A. This work shall consist of preparing and treating an existing bituminous or concrete surface with bituminous material, and blotter material if required, in accordance with these specifications, as shown on the plans or as directed by the engineer.

1.02 EQUIPMENT

A. The contractor may provide a system for heating and applying bituminous material and for applying blotter material. The system shall be designed, equipped, maintained and operated such that liquid asphalt at even heat may be applied uniformly on variable widths of surface up to 15 feet at readily determined controlled rates of 0.5 gallon per square yard with uniform pressure and with an allowable variation from any specified rate not to exceed 0.02 gallon per square yard. The system shall include a calibrated tank and a thermometer for measuring temperature of tank contents. The system shall be equipped with instrumentation that continuously verifies application rates. The calibration of the system shall be approved by the engineer prior to use, and the contractor shall furnish all equipment, material and assistance necessary if calibration is required.

2.00 MATERIALS

A. Emulsified asphalt for tack coat shall be SS-1, SS-1h, CSS-1 diluted one part water to one part emulsified asphalt. Before dilution the emulsified asphalt shall comply with the requirements of AASHTO Specification M140 or M 208 (ASTM Specification D 977 or D2397)

3.00 CONSTRUCTION REQUIREMENTS

A. The existing surface shall be free of all dust, loose material, grease or other foreign material at the time the tack is applied.

B. Asphalt emulsion shall be applied uniformly with a pressure distributor at the rate of 0.05 gallon per square yard. Water may be added to the asphalt emulsion and mixed therewith in such a proportion that the resulting mixture will contain no more than 50 percent of added water. The application of the resulting mixture shall be such that the original emulsion will be spread at the specified rate. The asphalt emulsion shall be heated at the time of application to a temperature in accordance with the following table and shall be properly cured and cleaned of all dirt and surplus sand before the next course is placed:

(See table next page)

Bituminous Material	Temperature, Degrees Fahrenheit (Celsius)			
	Spraying		Mixing	
	Min	Max	Min	Max
Asphalt Binder				
PG 46-28	260 (125)	325 (165)	---	---
All Other Grades	285 (140)	350 (175)	275 (135)	350 (175)
Liquid Asphalt RC-MC				
Grade				
30	70 (20)	150 (65)	50 (10)	110 (45)
70	100 (40)	180 (80)	90 (30)	140 (60)
250	150 (65)	220 (105)	130 (55)	170 (75)
800	180 (80)	260 (125)	170 (75)	210 (100)
3000	210 (100)	290 (145)	200 (95)	240 (115)
Asphalt Emulsions				
RS-1	70 (20)	140 (60)	---	---
RS-2	125 (50)	185 (85)	---	---
SS-1	70 (20)	160 (70)	70 (20)	160 (70)
SS-1h	70 (20)	160 (70)	70 (20)	160 (70)
CRS-1	125 (50)	185 (85)	---	---
CRS-2	125 (50)	185 (85)	---	---
CSS-1	70 (20)	160 (70)	70 (20)	160 (70)
CSS-1h	70 (20)	160 (70)	70 (20)	160 (70)
EA-90P	130 (55)	180 (80)	---	---
CRS-2P	130 (55)	180 (80)	---	---

- C. The tack coat shall be applied in such a manner as to cause the least inconvenience to traffic. All exposed tack coat shall be covered with sand or bituminous mixture prior to opening to traffic. Limestone or Dolomite sands shall not be used.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321216.13.A1 - PLANT MIX BITUMINOUS PAVEMENT AND BASE COURSE (PMB)

1.00 GENERAL

- A. The Contractor shall furnish all labor, materials and equipment necessary to complete all Plant Mix Bituminous (PMB) paving indicated on the drawings and as specified herein.

1.01 WARRANTY

- A. Warranty to be against settlement, low spots, lift separation (delamination), shoving, channeling, or any other surface irregularities which does not provide a smooth driving surface. Make any repairs necessary during warranty period to maintain paving in perfect condition.

1.02 PAVING AND BASE QUALITY REQUIREMENTS

- A. All paving and base shall conform to the current edition Missouri Department of Transportation (MoDOT) Specifications and Asphalt Institute Standards, Model Construction Specifications for Asphalt Concrete, Specification Series No. 1.

1.03 EQUIPMENT

- A. The equipment shall include: (1) one or more Plant Mix Bituminous (PMB) plants designed to produce a uniform PMB within the job-mix tolerances; (2) one or more self-powered pavers that are capable of spreading the PMB to the thickness and width specified, true to the line and grade shown on the plans; (3) enough smooth metal-bedded haul trucks with covers, when required, to ensure orderly and continuous paving operations; (4) a pressure distributor that is capable of applying tack coat and prime material uniformly without atomization or non-uniform "zebra-stripping", (5) one or more steel-wheeled, pneumatic-tired, or vibratory rollers capable of attaining the required density and smoothness; (6) a power broom or a power blower or both; (7) hand tools necessary to complete the job. Other equipment may be used in addition to, or in lieu of, the specified equipment when approved by the Engineer.

1.04 METHODS OF TESTING PLANT MIX BITUMINOUS PAVEMENT (PMB)

- A. Samples of materials will be tested for the requirements of Section B by the applicable methods specified in this section. The materials shall not be used until approved by the Owner's Representative.
- B. Plant Mix Bituminous (PMB) materials will be tested by the methods of test of the American Association of State Highway and Transportation Officials (AASHTO) designated in the applicable specification. If an AASHTO method of test procedure is not available, the equivalent American Society for Testing and Materials (ASTM) method will be used.
- C. Mineral aggregates will be tested by one or more of the following methods of test of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).
- D. Results of single extraction and sieve tests shall not be used as the sole basis for acceptance or rejection of the PMB. Any variation from the job-mix formula in the grading of the aggregate or in the bituminous content greater than the tolerances shown above shall be investigated and the conditions causing the variation corrected.

Characteristic	Method of Test	
	AASHTO	ASTM
Amount of Material Finer than 75 µm (No. 200)		
Sieve in Aggregate	T 11	C 117
Unit Weight of Aggregate	T 19	C 29
Sieve Analysis, Fine and Coarse Aggregates	T 27	C 136
Sieve Analysis of Mineral Filler	T 37	D 546
Abrasion of Coarse Aggregate, Los Angeles Machine	T 96	D 131
Plastic Fines in Graded Aggregates and Soils by use of the Sand Equivalent Test	T176	D2419

E. The PMB will be tested for asphalt content by Method of Test for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures, AASHTO Designation T 164 (ASTM Designation D 2172). The PMB will be tested for compliance with aggregate grading requirements by Method of Test for Mechanical Analysis of Extracted Aggregate, AASHTO Designation T 30.

F. If the PMB is produced in a mixing plant having automatic controls and a print-out system, and the controls are in proper calibration, asphalt content compliance will be determined from recorded data. Hot bin analysis together with batch weight read-out data will be used to determine composition compliance.

1.05 PLACEMENT LIMITATIONS

A. PMB shall be placed only when the specified density can be achieved. Precautions shall be taken at all times to compact the PMB.

1.06 WEATHER LIMITATIONS

A. PMB shall not be placed (1) when either the air temperature or the temperature of the surface on which the mixture is to be placed is below 50 F (10 C) for the surface course or below 40 F (5 C) for subsurface courses, (2) on any wet or frozen surface, (3) when weather conditions prevent the proper handling or finishing of the mixture, or (4) between December 1 and March 1 except when authorized by the Engineer. The Contractor shall conduct operations in such a manner that all binder course asphaltic concrete is covered with surface course asphaltic concrete prior to December 1. Temperatures are to be obtained in accordance with MoDOT Test Method T20.

1.07 TRAFFIC CONTROL

A. Traffic shall be directed through the project with such signs, barricades, devices, flagmen, and pilot vehicles as may be necessary to provide maximum safety for the public and the workmen with minimum interruption of the work.

1.08 SAFETY

A. The Contractor shall be solely responsible for safety precautions at all times during the progress of the work. As appropriate, workmen shall be furnished with hard hats, safety shoes, sturdy gloves, respirators, and any other safety apparel that will reduce the possibility of accidents. The Contractor shall insure that all Occupational Safety and Health Act requirements are observed.

2.00 MATERIALS

2.01 PLANT MIX BITUMINOUS CONCRETE AND BASE

A. The PMB shall be Plant Mixed Bituminous Pavement BP-1 or BP-2 and base used for paving and shall conform to the most current edition of the Missouri Department of Transportation (MoDOT) Specifications; Section 401.

B. Emulsified asphalt for tack coat shall be SS-1, SS-1h, CSS-1, or CSS-1h diluted one part water to one-part emulsified asphalt. Before dilution the emulsified asphalt shall comply with the requirements of AASHTO

Specification M 140 or M 208 (ASTM Specification D 977 or D 2397).

2.02 MINERAL AGGREGATE

- A. Mineral aggregate shall be crushed stone, crushed slag, crushed gravel, stone, or slag screening, sand, mineral filler, or a combination of two or more of these materials. Other mineral aggregates, such as uncrushed gravel or sand, may be specified for base course PMB if local experience has demonstrated their ability to produce satisfactory PMB.
- B. Coarse and final aggregates shall comply with the quality requirements, except soundness, of ASTM Designation D 692 and ASTM Designation D 1073 respectively. Coarse aggregate failing to comply with abrasion requirements may be used if experience has demonstrated it to be satisfactory.
- C. Mineral filler shall comply with ASTM Designation D 242.
- D. Combinations of aggregates having a history of polishing shall not be used in surface courses.

2.03 BP-1, BP-2 OR BASE: The Engineer will approve a job-mix formula for each PMB.

- A. Mineral aggregate and bituminous combined in a mixing plant to meet the specifications set forth by MoDOT for the specified type of grade.

2.04 PREPARING THE PLANT MIX BITUMINOUS (PMB)

- A. The PMB shall be heated at the mixing plant to a temperature at which it can be applied uniformly to the aggregate.
- B. Coarse and fine aggregates shall be stored separately at the mixing plant in a manner that will prevent intermingling. Stockpiles shall be built in a manner that will prevent segregation of aggregate sizes. If the aggregate tends to segregate during handling it shall be supplied and stockpiled in two or more sizes.
- C. When it is necessary to blend aggregates from one or more sources to produce the combined gradation, each source or size of aggregate shall be stockpiled individually. Aggregate from the individual stockpiles shall be fed through separate bins to the cold elevator feeders. They shall not be blended in the stockpile.
- D. Cold aggregates shall be fed carefully to the plant so that surpluses and shortages will not occur and cause breaks in the continuous operation.
- E. The aggregate shall be dried and heated to provide a paving mixture temperature in conformance with placing conditions, but not to exceed 325°F.
- F. Heated and dried aggregates shall be screened and stored in sizes that may easily be recombined into a gradation meeting the requirements of the job-mix formula.
- G. The heated and dried aggregates shall not contain enough moisture to cause the PMB to slump, or the aggregate to segregate during hauling and placing.
- H. Mixing time shall be the shortest time that will produce a satisfactory PMB. Prolonged exposure to air and heat in the pugmill hardens the asphalt film on the aggregate. Mixing time, then, should be the shortest time required to obtain uniform distribution of aggregate sizes and thorough coating of aggregate particles with asphalt.
- I. For batch plants wet mixing time shall not exceed 50 seconds.
- J. For continuous mix plants, the mixing time will be computed by the following formula:

$$\text{Mixing time, seconds} = \frac{\text{Pugmill dead capacity, kg (lb.)}}{\text{(a) Pugmill output, kg/s (lb/s)}}$$

- K. Mixing time shall not exceed 60 seconds.

2.05 PREPARING AREA TO BE PAVED

- A. The area to be paved shall be substantially true to line and grade. It shall be dry, firm, and properly prepared before paving operations begin. All loose dirt and foreign material shall be removed.

2.06 PLACEMENT OF PLANT MIX BITUMINOUS TYPE BP-1, BP-2 OR BASE

- A. The BP-1, BP-2 surface course or base shall be placed while at a temperature of not less than 275°F, but not more than 330°F. Machine laid, the BP-1 or BP-2 pavement or base will be placed uniformly without intermittent operation of the paver. Leveling and spot welding may be required to obtain a continuous smooth surface. The final compaction shall be uniform and thorough, accomplished by using a roller as specified by the Asphalt Institute Standards and Missouri Highway Commission Standard Specifications.
- B. BP-1, BP-2 or base shall not be placed if the un-compacted thickness of the mat is less than 3" when either the air temperature or the temperature of the surface to be paved is below 50°F, on any wet or frozen surface, and when weather conditions prevent the proper handling or finishing of the BP-1, BP-2 or base.
- C. BP-1, BP-2 or base shall be compacted immediately after placing. Using steel-wheeled tandem roller, steel three-wheeled roller, vibrating roller or a pneumatic tired roller for initial, intermediate, and final rolling. Final rolling shall eliminate marks from previous rolling. Use vibrating plate compactor or hand tamper to compact areas too small for a roller. Compacted base and surface courses shall have a density equal to or greater than 92% of a laboratory specimen prepared by the method for BP-1, BP-2 or base specified.
- D. The Owner shall perform all the tests required by the Owner's Representative to ensure that the BP-1, BP-2 pavement or base is constructed of proper thickness, and density.

2.07 COMPACTING THE PLANT MIX BITUMINOUS (PMB)

- A. The PMB shall be compacted immediately after placing. Initial rolling with a steel-wheeled tandem roller, steel three-wheeled roller, vibratory roller, or a pneumatic-tired roller shall follow the paver as closely as possible. If needed, intermediate rolling with a pneumatic-tired roller shall be done immediately behind the initial rolling. Final rolling shall eliminate marks from previous rolling. In areas too small for the roller, a vibrating plate compactor or a hand tamper shall be used to achieve thorough compaction.
- B. When placing PMB adjacent to a concrete curb and gutter, each lift shall butt-joint tightly against the concrete.

3.00 CONSTRUCTION REQUIREMENTS

3.01 PAVING TECHNIQUE

- A. The PMB shall be placed and compacted at a minimum depth as directed by the Resident Inspector, graded and compacted to the correct grade. The PMB shall be uniformly compacted by rolling as specified by Asphalt Institute Standards and Missouri Department of Transportation (MoDOT) Standard Specifications.
- B. Compaction. After the PMB has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. Rolling shall begin as soon after spreading the PMB as it will bear the weight of the roller without undue displacement. The type and number of rollers furnished shall be sufficient to obtain the required compaction while the PMB is in a workable condition. A pneumatic tire roller shall be used as the initial or intermediate roller on any course placed as a wedge or leveling course. All rolling shall be completed prior to the surface temperature of the PMB decreasing to 175°F.
 - 1. A dual drum vibratory roller of a type specifically designed for the compaction of PMB may be used for initial rolling. A dual drum vibratory roller meeting the requirements for a steel wheel roller and operating in the static mode may be used as the finish roller. Except for projects involving small quantities of PMB, a single vibratory roller shall not be used as both the initial roller and final roller. The roller shall be equipped with a dual amplitude system and shall have a minimum frequency of 1500 vibrations per minute. The roller shall also be equipped with a speedometer that accurately

indicates roller speed in maximum increments of either 2 mile per hour or 50 feet per minute. The roller controls shall include a device that prevents the roller from traveling in excess of 22 miles per hour when the roller is in a vibratory mode. If satisfactory compaction is not being obtained, the contractor shall cease using the vibratory roller.

2. Rollers shall move at a slow but uniform speed with the drive roll or wheels nearest the paver. Rolling shall begin at the sides and proceed longitudinally parallel to the road center line, each trip overlapping one half the roller width, gradually progressing to the crown of the road. When paving in echelon or abutting a previously placed lane, the longitudinal joint shall be rolled first followed by the regular rolling procedure. On super-elevated curves the rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel to the center line. Alternate trips of the roller shall be terminated in steps to prevent the formation of surface irregularities. The alternate stops shall be stepped in such manner that any excess water will drain quickly. Lateral or diagonal rolling may be permitted to remove high spots, provided the rolling is done in such manner and at such time that shoving, or cracking will not result.
3. Any displacement occurring as a result of starting, stopping, or changing direction of a roller, or from other causes, shall be avoided. Areas of displacement shall be corrected at once by the use of rakes and addition of fresh PMB when required. Care shall be exercised in rolling not to displace the line and grade of the edges of the asphaltic concrete. If necessary to prevent adhesion of the PMB to the rollers, the wheels and rolls shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved material. Excess liquid will not be permitted. Diesel fuel, fuel oil, or other detrimental products shall not be used as wetting agents. Along forms, curbs, headers, walls, and other places not accessible to the roller, the PMB shall be thoroughly compacted with hot hand tampers, smoothing irons, or with mechanical tampers. A trench roller shall be used on depressed areas inaccessible to regular width equipment.
4. Any PMB that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh, hot PMB, which shall be compacted to conform with the surrounding area. Any area showing an excess or deficiency of asphalt cement shall be removed and replaced.
5. Except as otherwise specified, rolling shall be continued until all roller marks are eliminated and a minimum density of 92 percent of a laboratory specimen made in the proportions of the job-mix formula in accordance with AASHTO T 245, is attained. The applicable density will be determined by the engineer to correspond with the mix design test method. Density will be determined by nuclear methods in accordance with MoDOT Test Method T41 or by a specific gravity method.
6. Joints. Transverse joints shall be formed by any method that will produce a dense, vertical section for use when laying is resumed. The joint formed when the fresh PMB is placed shall be dense, well sealed, and the grade, line, and surface texture of the succeeding surface shall conform to that of the joined surface. If deemed necessary by the engineer, the transverse joint shall be painted with a light coating of asphaltic material. Hand manipulation of the PMB is to be minimized to avoid segregation of the surface texture. Placing of PMB shall be as nearly continuous as possible and the roller shall not pass over the unprotected end unless laying of additional PMB is to be delayed for sufficient time to permit the PMB to become chilled.
7. Longitudinal joints shall be formed by the use of an edging plate fixed on both sides of the finishing machine. These plates shall be adjustable, and the outside plate shall be set at an angle of approximately 45 degrees with the surface of the roadbed and in a position that will lightly compact the PMB. The inside plate, or that placing material for the longitudinal joint, shall be normal to the roadbed. When placing the first lane, if the mixture at the longitudinal joint tends to slump, it shall be set up to a vertical edge by light compaction with the back of a rake. Care shall be taken to obtain a well bonded and sealed longitudinal joint by placing the PMB in a manner insuring maximum compaction at this point. If it is deemed necessary by the engineer in properly sealing the longitudinal joint, a light coating of asphaltic material shall be applied to the exposed edge before the joint is made. Irregularities in the outside edge alignment shall be corrected by removing or adding PMB before the surface is compacted.

substantially free from waves or irregularities. The final riding surface, except on medians and similar areas, shoulders, and temporary bypasses shall not vary from a 10-foot straightedge, applied parallel to the centerline, by more than 1/8 inch. At transverse construction joints, the surface of all other layers shall not vary from the 10-foot straightedge by more than 1/4 inch. Surfaces exceeding these tolerances shall be re-rolled, replaced, or otherwise corrected in a manner satisfactory to the Owner's Representative.

1. The surface of the PMB after compaction shall be smooth and true to the established crown and grade. Any PMB showing an excess of asphalt cement or that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with satisfactory PMB, which shall be immediately compacted to conform with the surrounding area.
- D. Testing Pavement: During construction, the Owner will make compaction tests at his/her expense a minimum of three compaction tests or every 5,000 square feet, per compacted lift, as directed by the Owner's Representative or as necessary to ensure that the course is being constructed of proper thickness and compaction. The Owner will be required to cut samples of the compacted PMB from any course at locations designated by the engineer. Samples may be obtained by drilling 4-inch diameter cores. Each cored sample shall consist of four cores. All samples shall be taken the full depth of the layer to be tested and shall consist of an undisturbed portion of the compacted PMB. The surface from which samples have been taken shall be restored by the contractor within 48 hours using an approved commercial or "cold patch" HMA acceptable to the Owner's Representative. The Owner may use a nuclear density machine for compaction testing instead of the core sampling.

3.02 CLEAN-UP

- A. Upon completion of paving work, remove all debris resulting from paving operations, clean or repair any adjacent work damaged by paving operations and leave entire premises in neat and clean conditions.

3.03 SHOP DRAWINGS

- A. If the Contractor feels it is advisable due to weather or site conditions to use a PMB or application procedure other than the specified one, he shall submit the alternate PMB design in writing. He shall receive the Owner's Representative approval prior to commencing of the paving operations.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321236.17 – ASPHALT BASED PAVEMENT SEALER

1.00 GENERAL

- A. This work shall consist of the application of asphalt based sealer to an existing surface. The asphalt-based sealer shall consist of high solids polymer modified asphalt emulsion sealer. The Contractor shall follow the manufacturer's requirements for a two coat or three coat system.

2.00 MATERIALS

2.01 MATERIAL SPECIFICATIONS

- A. The asphalt-based sealer shall meet or exceed the requirements of ASTM Specifications D-1010 and D-2939, D-466, D-140 and D-8099.

2.02 APPLICATION RATE

- A. The asphalt-based sealer shall be of proper consistency at all times so as to provide a two-coat system with an application rate of 50 square feet per gallon per coat or three coat system with an application rate of 70 square feet per gallon.
- B. The first coat shall be dry to the touch before the second coat is applied. The second coat should be dry within 24 hours before a third coat is applied if applicable. No traffic shall be allowed on the surface until the final coat has been cured.

3.00 CONSTRUCTION

3.01 CONSTRUCTION REQUIREMENTS

A. Surface Preparation

1. The pavement must be sound, clean, and free from loose material. The pavement must be free of dirt, dust, clay, sand, and all vegetation. Particular attention must be given to the treatment and removal of petroleum residues. All holes, crumbled areas, failed areas and cracks shall be repaired before sealing. Immediately prior to applying the asphalt-based sealer, the contractor shall clean the surface. A pickup sweeper must be used unless otherwise approved by the Owner's Representative. Manholes, valve boxes, drop inlets and other service entrances shall be protected from the asphalt-based sealer by a method approved by the Owner's Representative.

B. Application Equipment

1. The asphalt-based sealer shall be applied by a pressurized spray application equipment or a self-propelled squeegee equipment. Pressurized spray equipment shall be capable of spraying pavement sealer at the application rate specified. Equipment shall have continuous agitation or mixing capabilities to maintain homogenous consistency of pavement sealer mixture throughout the application process. Self propelled squeegee equipment shall have at least two squeegee or brush devices (one behind the other) to assure adequate distribution and penetration of sealer into the bituminous pavement. Hand squeegees and brushes shall be acceptable in areas where practicality prohibits the use of mechanized equipment.
2. The first coat of asphalt-based sealer shall be applied by self-propelled squeegee equipment.

C. Weather Limitation

1. The asphalt-based sealer shall not be applied if either the pavement or air temperature is below 50° F and falling. The asphalt-based sealer shall not be applied if rain is imminent within 24 hours of application.

D. Traffic Control

1. Suitable methods shall be used to protect the sealed pavement from all types of traffic until

sufficiently cured to accept traffic. The length of time before traffic is permitted to use the surface depends on the mixture characteristics and weather conditions.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321313 -RIGID PAVEMENT

1.00 GENERAL

- A. The Contractor shall furnish all labor, materials, tools, equipment, and services necessary to construct a concrete pavement or repair in conformance with the lines, grades, and thickness, as shown on the drawings and as specified herein.

1.01 RELATED WORK

- A. Laboratory and Field-Testing Requirements: Testing Laboratory Services will be retained by the Contractor.
- B. Subgrade Preparation: Section 312300 - Excavating, Filling and Grading.
- C. Concrete Materials, Quality, Mixing, Design and Other Requirements: Section 033100 - Portland Cement Concrete.

1.02 WEATHER LIMITATIONS

- A. Placement of concrete shall be as specified under paragraphs Cold Weather and Hot Weather of Section 033100 - Portland Cement Concrete.

1.03 SUBMITTALS

- A. In accordance with Section Division 1 - General Requirements, furnish the following:
1. Manufacturers' Certificates and data certifying that the following materials conform to the requirements specified:
 - a. Expansion joint filler.
 - b. Hot poured sealing compound.
 - c. Dowels and dowel baskets.
 - d. Curing materials.
 2. Data and Test Reports - Select Subbase Material:
 - a. Job-mix formula.
 - b. Source, gradation, liquid limit, plasticity index, percentage of wear and other tests as specified and in referenced publications.

1.04 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only:
- B. American Society for Testing and Materials (ASTM):
1. C94-84. Ready-Mixed Concrete.
 2. C143078 ...Slump of Portland Cement Concrete.

2.00 PRODUCTS

2.01 GENERAL

- A. Concrete shall be Class A, air-entrained as specified in the Portland Cement Concrete Section, with the following exceptions:

<u>Type</u>	<u>Maximum Slump*</u>
Vehicular Pavement	3" - 4" (Machine Finish) 4" - 5" (Hand Finish)

*For concrete to be vibrated: Slump as determined by ASTM C143.

Tolerances as established by ASTM C94.

2.02 REINFORCEMENT

- A. The type, amount and locations of steel reinforcement shall be as shown and specified. Welded wire fabric shall conform to AASHTO M55. Dowels shall be plain steel bars conforming to AASHTO M31 or M42.

2.03 AGGREGATE BASE

- A. The type and amount of aggregate base to be placed under concrete pavement shall be as shown on the drawings.

2.04 FORMS

- A. Forms shall be of metal or wood, straight and suitable for the work involved in cross-section, depth, and strength to resist springing during depositing and consolidating the concrete. Wood forms should be at least 2" thick. Forms shall not be used if they vary from a straight line more than 1/8" in any 10' long section in either a horizontal or vertical direction. Wood forms shall also be free from warp, twist, loose knots, splits, or other defects. Approved flexible or curved forms shall be used for radius forming.

2.05 CONCRETE CURING MATERIALS

- A. Concrete curing materials shall conform to one of the following:
1. Burlap conforming to AASHTO M182 having a weight of 7 ounces or more per square yard when dry.
 2. Impervious sheeting conforming to AASHTO M171.
 3. Liquid membrane curing compound conforming to AASHTO M148, Type 2, and shall be free of paraffin or petroleum.

2.06 EXPANSION JOINT FILLERS

- A. Material shall be a non-extruding and resilient bituminous type and conform to AASHTO M 213.

2.07 JOINT SEALER

- A. Material shall be hot poured elastic type and conform to AASHTO M 173.

3.00 EXECUTION

3.01 SUBGRADE PENETRATION

- A. The subgrade shall be constructed, prepared, and finished as specified in the Section 02315 - Excavating, Filling and Grading. The complete subgrade shall be tested for grade and cross-section with a template. The subgrade shall be maintained in a smooth, compacted condition in conformance with the required section and established grade until the succeeding operation has been accomplished.

3.02 SETTING FORMS

- A. Base Support: The foundation under the forms shall be compacted and true to grade so that the form when set will be uniformly supported for its entire length at the grade as shown. Imperfections or variations in the foundation grade shall be corrected by filling or cutting and compacting.
- B. Form Setting: Set forms sufficiently in advance of the placing of the concrete to permit the performance and approval of all operation required with and adjacent to the form lines. Set forms to true line and grade and hold rigidly in place by the use of stakes, clamps, spreaders, and braces in such a manner that the forms and joints are free from play or movement in any direction. Forms shall conform to line and grade with an allowable tolerance of 1/8" when checked with a straightedge and shall not deviate from true line by more than 1/4" at any point. Forms shall not be removed until removal will not result in damaged concrete or at such time to facilitate finishing. Forms shall be cleaned and oiled each time they are used.
- C. Alignment and grade elevations of the forms shall be established and controlled as specified in the General Requirements. Necessary corrections to forms shall be made immediately before placing concrete. When any form has been disturbed or any subbase thereunder has become unstable, the form shall be reset and rechecked before placing concrete.

3.03 EQUIPMENT

- A. Equipment and tools necessary for handling materials and performing all parts of the work shall be approved by the Owners Representative prior to commencement of work. Maintain this equipment and tools in satisfactory working condition at all times.

3.04 PLACING REINFORCEMENT

- A. Reinforcement shall be free from dirt, oil, rust, scale, or other substances that prevent the bonding of the concrete to the reinforcement. Reinforcement shall be accurately and securely fastened in place with suitable supports and ties and shall be approved by the Owners Representative before the concrete is placed. No reinforcement shall be placed within 2" of an exposed surface. The type, amount and position of the reinforcement shall be as shown on the drawings.

3.05 PLACING CONCRETE - GENERAL

- A. Remove debris and other foreign material from between the forms before placing concrete. Approval of the Owners Representative shall be obtained before placing concrete. Before the concrete is placed, the subbase shall be uniformly moist, but without puddles of water. Concrete from mixer to final place of deposit shall be conveyed by method which will prevent segregation or loss of ingredients and be deposited in such a manner as to require as little handling as possible. Necessary hand spreading shall be done with shovels, not rakes. While being placed, the concrete shall be spaded or vibrated and compacted with suitable tools so that the formation of voids or honeycomb pockets is prevented. The concrete shall be especially well spaded or vibrated and tamped against the forms and along all joints. Over-vibration or manipulation causing segregation will not be permitted. Concrete shall be placed continuously between joints without bulkheads. A construction joint shall be installed whenever the placing of concrete is suspended for more than 30 minutes and at the end of each day's work. Workmen or construction equipment coated with foreign material shall not be permitted to walk or operate in the concrete during placement and finishing operations.

3.06 PLACING CONCRETE FOR VEHICULAR PAVEMENT

- A. Concrete shall be deposited into the forms as close as possible to its final position. The placing of concrete shall be rapid and continuous between construction joints. Concrete shall be struck off and thoroughly consolidated by a finishing machine, vibrating screed or by hand-finishing and the surface finished to the exact elevation and crown as shown. When the forward motion of the vibrating screed is stopped, the vibrator shall be shut off. Concrete shall be deposited as near the joints as possible without disturbing them but shall not be dumped onto a joint assembly. Adjacent lanes shall not be placed without approval by the Resident Engineer.

3.07 CONCRETE FINISHING - GENERAL

- A. Finishing operations shall be started immediately after placement of the concrete. Finishing shall be by the machine method or the hand method. The sequence of operations, unless otherwise indicated, shall be as follows: Consolidating, floating, straight edging, troweling, texturing, and edging of joints. Finishing equipment and tools shall be maintained clean and in an approved condition and shall be as specified in Section 3.1 - Portland Cement Concrete.

3.08 JOINTS - GENERAL

- A. Joints shall be placed where shown and conform to the details as shown and shall be perpendicular to the finished grade of the concrete surface. Joints shall be straight and continuous from edge of gutter to back of curb.

3.09 CONTRACTION JOINTS

- A. Joints shall be cut to depth as shown with a grooving tool or jointer of a radius as shown or by sawing with a blade producing the required width and depth. Finish edges of all joints with an edging tool having the radius as shown. Score pedestrian pavement with a standard grooving tool or jointer.

3.10 EXPANSION JOINTS

- A. Form expansion joints by means of a preformed expansion joint filler material of the thickness as shown. Material shall be full depth of concrete, cut and shaped to the cross-section as shown, except those top edges of joint filler shall be below the finished concrete surface where shown to allow for sealing. Anchor with approved devices to prevent displacing during placing and finishing operations. Edges of joints shall be rounded with an edging tool. Expansion joints without dowels shall be formed about structures and features that project through, into, or against any site work concrete construction, using joint filler of the type, thickness and width as shown, and installed in such a manner as to form a complete, uniform separation between the structure and the site work concrete item.

3.11 CONSTRUCTION JOINTS

- A. Locate longitudinal and transverse construction joints between slabs of vehicular pavement as shown. Place transverse construction joints of the type shown, where indicated and whenever the placing of concrete is suspended for more than 30 minutes. Use a butt-type joint with dowels in curb and gutter if the joint occurs at the location of a planned joint. Use keyed joints with tie bars if the joint occurs in the middle third of the normal curb and gutter joint interval. In forming construction joints, care shall be taken to form a definite groove at the top, to the depth and width shown, to provide a recess for joint sealing material and to prevent any overhang onto concrete already in place. Install keyed joints and reinforcement as shown.

3.12 FORM REMOVAL

- A. Forms shall remain in place at least 24 hours after the concrete has been placed. Remove forms without injuring the concrete. Bars or heavy tools shall not be used against the concrete in removing the forms. Any concrete found defective after form removal shall be repaired promptly.

3.13 SEALING JOINTS

- A. At the end of the curing, joints shall be carefully cleaned and filled with joint sealer as shown. The concrete at the joint shall be surface dry and the ambient temperature shall be above 50 degrees F at the time of application. The joint sealer shall not spill over the joint onto adjacent surface. Refill joints where necessary before final acceptance.

3.14 CURING OF CONCRETE

- A. Cure concrete by one of the following methods appropriate to the weather conditions and local construction practices, against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready to install before actual concrete placement begins. Provide protection as necessary to prevent cracking of the pavement due to temperature changes during the curing period. If any selected method of curing does not afford the proper curing and protection against concrete cracking, the damaged pavement will be removed and replaced, and another

method of curing shall be employed as directed by the Owner Representative.

- B. Burlap Mat: Minimum of 2 layers kept saturated with water for the curing period. Mats shall overlap each other at least 6".
- C. Impervious Sheeting: Waterproof paper, polyethylene-coated burlap, or polyethylene sheeting may be used. Polyethylene shall be at least 4 mils in thickness. The entire exposed concrete surface shall be wet with a fine spray of water and then covered with the sheeting material. Sheets shall overlap each other at least 12". Sheeting shall be securely anchored.
- D. Liquid Membrane Curing: Apply pigmented membrane-forming curing compound in 2 coats at right angles to each other at a rate of 200 square feet per gallon for both coats. The concrete shall not be allowed to dry before the application of the membrane. Joints designated to be sealed shall be cured by inserting moistened paper or fiber rope or covering with waterproof paper prior to application of the curing compound, in a manner to prevent the curing compound from entering the joint. Any area covered with curing compound and damaged during the curing period shall be resprayed immediately.

3.15 CLEANING

- A. After completion of the curing period, remove the curing material (other than liquid membrane) sweep the concrete clean, and after removal of all foreign matter from the joints, seal joints as herein specified. Clean the entire concrete of all debris and construction equipment as soon as curing and sealing of joints has been completed.

3.16 PROTECTION

- A. The contractor shall protect the concrete against all damage prior to final acceptance by the Owner. Remove concrete containing excessive cracking, fractures, spalling or other defects and reconstruct the entire section between regularly scheduled joints, when directed by the Owner Representative, and at no additional cost to the Owner. Exclude traffic from vehicular pavement until the concrete is at least 7 days old, or for a longer period of time if so directed by the Owner Representative.

3.17 FINAL CLEANUP

- A. Remove all debris, rubbish, and excess material from the site.

END OF SECTION

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DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 321713 - PARKING BLOCKS

1.00 GENERAL

1.01 SCOPE OF WORK

- A. Furnishing and installing Parking Blocks (Wheel Stops) in conformity with the drawings.
- B. Drawings and General Provisions of contract, including General and Special Conditions, apply to this section.

1.02 SUBMITTALS

- A. Manufacturer's specifications and/or catalog data listing geometry and materials for new Parking Blocks.
- B. Other information as the Owner's Representative may request.

2.00 PRODUCTS

2.01 MATERIALS

- A. Parking Blocks to be reused shall be stockpiled in a location approved by the Owner's Representative.
 - 1. If, in the opinion of the Owner's Representative, existing parking blocks are deteriorated or damaged, the Contractor will supply Parking Blocks for replacement.
- B. New Parking Blocks shall be precast Portland Cement Concrete conforming to the following:
 - 1. Concrete mix: Minimum 5,000 psi, 28-day strength, air entrained to 5 - 7 percent.
 - 2. Use rigid molds, constructed to maintain precast units' uniform in shape, size, and finish. Maintain consistent quality during construction.
 - 3. Embed a minimum of two (2), #4 bars longitudinally in each unit. Drill or sleeve for two ½" rebar or pipe.
 - 4. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
 - 5. Minor patching is acceptable, provided appearance is not impaired.
 - 6. Size:
 - a) Nominal Size: 6 inches high, 8 inches wide at base, and 7 feet long.
 - b) Profile: Manufacturer's Standard having a rectangular cross section with sloped vertical faces and square ends.

2.02 ANCHOR BARS

- A. Anchor bars shall be ½" rebar or pipe and shall be 2' – 0" in length.

3.00 EXECUTION

3.01 GENERAL

- A. Care will be taken in removal, handling, storing, and resetting of parking blocks.

- B. The Contractor at no extra cost to the Owner shall replace parking blocks, damaged or broken in removal or reinstallation.
- C. Parking Blocks removed and not noted to be reset, shall be removed from the site by the Contractor.

3.02 INSTALLATION

- A. Installation of Parking Blocks shall be in accordance with the drawings.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321723 - PAVEMENT MARKINGS

1.00 GENERAL

1.01 SCOPE OF WORK

- A. Painting pavement marking of all types.
- B. Drawings and General Provisions of contract, including General and Special Conditions, apply to this section.

1.02 WORK INCLUDED

- A. Cleaning and preparation of surfaces to receive paint striping with a high-pressure water sprayer. Cleaning shall be limited to only those surfaces to be striped.
- B. Paint in parking lines, safety zones, handicap zones, loading zones, no parking zones, in parking lots indicated on drawings.
- C. Protecting adjacent surfaces from paint drips, spatters and over spray.
- D. Protecting wet paint from vehicular and pedestrian traffic.

2.00 PRODUCTS

2.01 PAINT

- A. Paint for traffic applications shall be Acrylic Latex Pavement Marking Material conforming to MODOT 1048.90 without glass beads for white and yellow paint. The material shall have a no-track time of 10 minutes or less and applied at 16 mils wet film thickness at 70 ±F (21 ± 1 C).
- B. Paint for parking lot striping shall be chlorinated rubber conforming to TT-P-115F, epoxy pavement marking material without glass beads (per subsection A) or approved equal.
- C. Paint shall be manufactured by Pratt and Lambert, Glidden, Cook, Pittsburgh, Benjamin Moore, or approved equal.
- D. Paint type must be compatible with the surfaces to be painted.

2.02 COLORS

- A. Colors of paint shall be applied per the following color code:
 - 1. White: Parking space lines, stop bars, curbs, cross walks and directional arrows.
 - 2. Yellow: Loading zones, safety zones, no parking zones, curbs, and median edges.
 - 3. Blue: Access parking stalls.
 - 4. Red: Fire Lanes.

2.03 MATERIALS

- A. Materials shall include standard commercial grade masking materials, scrapers, cleaning solvents, and other materials required for the work.
- B. Use only materials specified by the manufacturer's direction label on container.

2.04 CERTIFICATION

- A. The contactor shall furnish a manufacturer's certification to the engineer for each lot furnished, certifying that the material supplied conform to all requirements specified. The certification shall include or have attached typical results of all required tests. Acceptance of the material will be based on the manufacturer's certification and upon results of such tests as may be performed by the engineer. The certification shall show the quantity and lot number it represents.

2.05 DELIVERY AND STORAGE

- A. Deliver materials to the site in original containers with seals unbroken and labels intact. The pavement marking material shall be shipped to the job site in strong, substantial containers. The manufacturer shall include the MSDS with each shipment. The manufacturer's name and address, name of the product, lot number and/or batch number, color, tare weight, manufacturing date, and date of expiration.
- B. Protect all paint from freezing.
- C. Paint shall not be settled, caked, or thickened in the container, and shall be readily stirred with a paddle to a smooth consistency.
- D. The Contractor shall ensure that all colors match the color selected by the Owner's Representative prior to application.

3.00 EXECUTION

3.01 EQUIPMENT FOR TRAFFIC APPLICATIONS AND PARKING LOTS

- A. The application equipment shall have a system capable of spraying both yellow and white pavement marking material in the proportions recommended by the manufacturer.

3.02 PROTECTION

- A. Prior to beginning cleaning or painting operations, Contractor shall protect all items or surfaces not included in area to be painted. Protection shall include vehicles, equipment, and structures, which shall be kept free of paint spatters, over spray or damage.
- B. Contractor shall provide fencing, barricades, signage, and other devices to protect all painted areas from pedestrian and vehicular traffic until sufficient drying time has been achieved.

3.03 SURFACE PREPARATION FOR TRAFFIC APPLICATIONS AND PARKING LOTS

- A. The pavement surface on which the pavement marking is placed shall be free of all debris, laitance and other contaminants that may hinder the adhesion of the system to the surface. Whenever grinding, scarifying, sandblasting, shot blasting or other operations are performed, the debris generated must be contained through vacuum type equipment or equivalent. The pavement surface shall not be left scarred with an image that might mislead traffic. Any excess damage or scarring of the pavement shall be repaired at the contractor's expense.
- B. Removal and cleaning work shall be conducted in such a manner as to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owner.
- C. Care shall be taken on bituminous and Portland cement concrete surface when performing removal and cleaning work to prevent damage to transverse and longitudinal joints.
- D. After all cleaning operations are completed, the pavement surface shall be power broomed and then blown with compressed air to remove residue and debris resulting from the cleaning work. All such debris must be properly contained and disposed of as approved by the engineer.

- E. Limits of Work: Cleaning and surface preparation work shall be confined to the area specified for the application of the pavement marking materials; or the surface area of existing pavement markings that are specified for removal on the plans, or as directed by the engineer.
 - 1. Surface preparation work includes cleaning for lines.
 - 2. When lines are cleaned, the area of preparation shall be the width of the new pavement marking, or existing line, plus one inch (25mm) on each side of the line.
- F. Surface Preparation on Asphalt Surfaces: On new bituminous pavement cleaning operations shall not begin until after the asphalt mat has reached ambient temperature.

3.04 JOB CONDITIONS

- A. Painting shall be done immediately after final surfacing as practical unless instructed otherwise by the Owner's Representative.
- B. Adequate illumination shall be available.
- C. Surfaces to receive paint shall be examined carefully for defects, which might prevent satisfactory striping results.
 - 1. Do not paint over rust, scale, grease, oil, fuel, dust, moisture, or conditions otherwise detrimental to paint adhesion.
 - 2. Grease, oil, or fuel on any surface shall be removed before painting.
 - 3. Work shall not proceed until such defects are corrected.
- D. Contractor shall examine areas to be painted and notify Owner's Representative in writing of conditions that might delay timely completion of the work.

3.05 WEATHER CONDITIONS

- A. Painting shall not be performed when the ambient temperature is less than 55° F, while the surface is damp, or in rainy weather.
- B. The surface must be five degrees or more above the dew point temperature during painting operations and while paint is drying.
- C. Avoid painting while surfaces are exposed to direct sunlight.

3.06 PARKING LOT STRIPING APPLICATION

- A. Areas to be painted shall receive one coat of paint not less than 16 mils thickness wet.
 - 1. In locations requiring multiple coats, prior coat shall be dry to manufacturer's recommendations before applying succeeding coat.
- B. Finished work shall be uniform, of approved color, free of runs, drips, defective brushing, spraying, and clogging.
 - 1. Lines and symbols shall be neat and well defined.
 - 2. Only skilled applicators may be employed to apply paint.
 - 3. Application techniques shall be approved by Owner's Representative.

3.07 QUALITY CONTROL

- A. Remove paint splatter from adjacent areas or areas not designated to receive paint.
- B. Contractor shall repair or touch up any surfaces if exposed to vehicular and pedestrian traffic, to the satisfaction of the Owner's Representative, at no additional cost to the Owner.
- C. When color, dirt, stains, existing paint, etc., show through the final coat, the surface shall be repainted until the film is uniform in finish, coverage, color, and appearance.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 323700 - RIP RAP

1.00 GENERAL

1.01 DESCRIPTION OF WORK:

- A. This work shall consist of rip rap placement at locations shown on the plans or as directed by the Owner's Representative.
- B. Construction of the rip rap shall conform to the typical sections, lines, grades and thickness as shown on the drawing.

1.02 TESTING AND INSPECTION:

Acceptance of quality and size of material may be made by visual inspection at the jobsite or place of manufacture.

2.00 MATERIALS

2.01 STONE:

- A. Stone for rip rap shall be sound, durable and free from cracks or other structural defects. It shall not contain any soapstone, shale or other material easily disintegrated. It shall be in blocks at least 6 inches in size for all dimensions and can be as thick as the depth of blanket specified on the plans.
- B. All stone shall conform to the specifications set forth by the Missouri Department of Transportation for rip rap.

2.02 FILTER FABRIC:

- A. Filter fabric for rip rap shall not have any defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage, which shall be cause for rejection. Fabric sewn to lap areas shall be stitched at a rate of 4 stitches per inch with high-strength polyester, polypropylene, or kevlar thread.
- B. Subgrade preparation, as deemed by the Owner's Representative, and securing pins will be incidental to the filter fabric item.

3.00 PROCEDURE

3.01 CONSTRUCTION REQUIREMENTS:

- A. Unless otherwise approved, the slope upon which rip rap is to be placed shall conform to the sections shown on the plans.
- B. Filter fabric shall be laid first at all areas where rip rap is to be placed.
- C. Filter fabric shall be turned down and buried 2 feet at all exterior limits, except where a stone filled key trench is provided below natural ground. It shall be placed with long dimension parallel to centerline of channel unless otherwise specified by the Owner's Representative. Overlaps should be placed so that any upstream strip of fabric will overlap the downstream strip, and the upslope roll should overlap the downslope roll.
- D. A bedding layer of aggregate shall be laid on top of the filter fabric. The bedding layer shall be of a gradation CA-6, unless otherwise specified by the Owner's Representative.
- E. The slopes shall be compacted to a uniform density as required for adjacent material. The rip rap shall be started in a trench below the toe of the slope shown on the plans and shall progress upward. The finished surface shall present a uniform appearance true to line, grade and section.

- F. All rip rap shall not be placed or dropped by a height of more than 1 foot. Stone shall be placed in such a manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids providing maximum interlocking of stones and shall be constructed to the lines and grades shown.

END OF SECTION

DIVISION 33 – UTILITIES

SECTION 334100.00.A2 - HDPE/PVC STORMWATER PIPING

1.00 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all materials (including couplers, wyes, tees, elbows, reducers, etc.), install and place in satisfactory operating condition the HDPE/PVC stormwater piping and appurtenances as shown on the drawings and described in the specifications.

1.02 SUBMITTALS

- A. Product Data: Include the following:
1. Product literature
 2. Manuals
 3. Complete product description
 4. Affidavits of compliance with referenced standards and codes.
 5. Manufacturer's warranty
 6. A list of all deviations from drawings and specifications.

1.03 QUALITY ASSURANCE

- A. The Contract Documents represent the minimum acceptable standards for materials specified in this section on this project. All materials shall conform fully in every respect to the requirements of the respective parts and sections of the drawings and specifications. If not named, the material which is a "standard product" with that manufacturer shall be modified, redesigned from the standard mode and shall be furnished with special features, accessories, materials of construction or finishes as may be necessary to conform to the quality mandated by the technical and performance requirements of the specification.
- B. Reference Standards: Comply with all applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. Occupational Safety and Health Act (OSHA)
 2. American Society of Testing and Materials (ASTM)
 - a ASTM D1056: Specification for Flexible Cellular Materials, Sponge, or Expanded Rubber.
 - b ASTM D1248: Specification for Polyethylene Plastics Molding and Extrusion Materials.
 - c ASTM D3350: Specification for Polyethylene Plastics Pipe and Fittings Materials.
 - d ASTM D2321: Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe
 3. American Society of Civil Engineers (ASCE)
 4. American National Standards Institute (ANSI)
 5. American Association of State Highway and Transportation Officials
 - a AASHTO M252: Specification for Corrugated Polyethylene Drainage Tubing, 3- to 10-inch Diameter.
 - b AASHTO M294: Specification for Corrugated Polyethylene Pipe, 12-to 36-Inch Diameter.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare all equipment according to the following:

MU #CP241342
MECO #473-070

VARIOUS LOCATIONS
FY24 SUMMER PAVING PROJECT – ASPHALT & CONCRETE

334100.00.A2/1

1. Ensure that all the material is protected.
2. Package all the material to protect from damage while in transport, loading, and unloading.

B. Storage:

1. Carefully prepare for storage and label all materials after they have been inspected.
2. Store materials to permit easy access for inspection and identification. Support all material off of the ground, if necessary, and protect steel members and package material from corrosion and deterioration as per manufacturer's instructions.

C. Handling: Handle all material as per manufacturer's instructions.

D. Inspect all materials against reviewed shop drawings at the time of delivery.

E. Materials damaged or not meeting the requirements of the reviewed shop drawings shall be immediately returned for replacement or repair.

1.05 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's Representative written permission.

1.07 COORDINATION

A. Coordinate Work on this section with interfacing and adjoining Work for proper sequencing of each installation.

2.00 PRODUCTS

2.01 HDPE/PVC Pipe

A. The stormwater drainage pipe shall be N-12 or N-12HC high density polyethylene; corrugated; smooth interior wall pipe. All pipe diameter shall meet requirements of AASHTO M294 Type S. Four through 15" diameters shall meet the requirements of AASHTO M252 with the addition that the pipe shall have a smooth interior liner.

B. Material shall meet ASTM D1248 Type III, Category 4, Grade P33, Class C; or ASTM D3350 Cell classification 324420C.

C. Pipe shall be joined with coupling bands or external snap couplers covering at least two full corrugations on each end of the pipe. Standard (non-gasketed) connections shall meet the soil-tightness requirements of the AASHTO Standard Specification for Highway Bridges, Section 26, paragraph 26.4.2.4(e). Silt-tight (gasketed) connections shall incorporate a closed-cell synthetic expanded rubber gasket meeting the requirements of ASTM D1056 Grade 2A2. Gaskets shall be installed on the connection by the pipe manufacturer.

D. Fittings shall conform to AASHTO M252 or AASHTO M294. Fabricated fittings shall be welded on the interior and exterior at all junctions.

E. Pipe and fitting material shall be high density polyethylene meeting the requirements of ASTM D3350 Cell Classification 324420C; or ASTM D 1248 Type III, Class C, Category 4, Grade P33.

F. Minimum conveyance factors shall be based on a Manning "n" value of 0.010 and shall be as shown in Table

1.

Table 1: Conveyance Factors

Nominal Diameter (in)	Conveyance Factor	Nominal Diameter (in)	Conveyance Factor
4	2.5	18	136.4
6	7.3	24	293.9
8	15.7	30	532.9
10	28.5	36	866.6
12*	46.3	42	1307.2
15*	83.9	48	1866.4

G. Coupling Bands and Fittings:

1. Coupling bands shall cover at least one full corrugation on each section of pipe. When gasketed coupling bands are required, the gasket shall be made of closed-cell synthetic expanded rubber meeting the requirements of ASTM D1056, Type 2. Gaskets shall be installed on the coupling band by the pipe manufacturer. All coupling bands shall meet or exceed the soil-tightness requirement of the AASHTO Standard Specification for Highway Bridges, section 23, paragraph 23.3.1.5.4.(e). Pipe fittings shall conform to AASHTO M252 or AASHTO M294. Fittings approved by the Engineer are also acceptable.

3.00 EXECUTION

3.01 LINE AND GRADE

- A. The Contractor shall maintain line and grade, as noted in plans and/or recommended manufacturer's specifications, to set his own benchmarks and the pipe locations.
- B. Unless otherwise shown on the Drawings, all gravity drain pipe shall be laid straight between changes in alignment and at a uniform grade between changes in grade.

3.02 EXCAVATION

- A. Excavation work shall be performed in a safe and proper manner, with suitable precautions being taken against hazards of every kind. Excavations shall provide adequate working space and clearances for the work to be performed herein.
- B. Mechanical excavation of the trench shall be to 4" below the invert of the pipe. The trench bottom shall be dry when excavated, then filled with granular material to the pipe spring line or 6" over the top of pipe as reflected in the plans. The granular material shall be prepared to receive the pipe barrel and bell holes (if the pipe has bells) shall be excavated to relieve the bell from bearing.
- C. Where a firm foundation is not encountered in the trench bottom due to soft, spongy or other unsuitable soil, unless other special construction methods are called for on the Drawings, all such unsuited soil under the pipe and for the width of the trench shall be removed and replaced with granular backfill without additional cost to the Owner.

3.03 BACKFILL

- A. Except as noted on the Drawings, specified herein or specified by the pipe manufacturer, backfill material to 12" above the haunch of the pipe may be natural earth removed from the trench, which, in the opinion of the Engineer, is suitable for backfilling. This backfill shall be free of cinders, ashes, refuse, vegetation, or organic matter, frozen earth, debris, and large pieces of fragments of inorganic or inert matter. Suitable earthen backfill shall be carefully deposited in uniform 4" layers (loose measure) simultaneously on both sides of the pipe, in such a manner that injurious side pressures to the pipe do not occur; then carefully and uniformly tamped in place, so as to eliminate the possibility of lateral displacement of the pipe. Where suitable natural

earth backfill is not available from the trench excavation, a suitable off-site earth backfill or a selected granular material may be substituted. When using a granular backfill material, said granular shall be topped to grade with a 12" thick layer of clay soil and the exposed ends shall be similarly sealed with a suitable clay soil to prevent leaching through the granular material.

3.04 PIPE INSTALLATION

- A. Installation shall be in accordance with ASTM D2321 and as recommended by the pipe manufacturer. Backfill shall be ASTM D2321 Class I, II, or III soils, or USCS material corresponding to these ASTM designations. Backfill material shall be placed in 6-inch lifts and compacted to 95% minimum dry density per ASTM D698.
- B. Pipe shall be protected during handling against impact shocks. Pipe shall be kept clean at all times and no pipes shall be used in the work that do not conform to the appropriate specifications.
- C. The Contractor shall keep the trench free from water while the pipe is being placed and until the joint has been sealed to the satisfaction of the Owner's Representative. The laying of pipes in finished trenches shall be started at the outlet and with the spigot ends pointing in the direction of flow. The pipes shall be lowered so as to avoid unnecessary handling in the trench.
- D. As each length of pipe is laid, the mouth of the pipe shall be properly protected to prevent the entrance of earth or the bedding material. All pipe shall be laid with ends abutting and true to line and grade. They shall be carefully centered so that when laid in the work, they will form a drain with a smooth uniform invert.
- E. Preparatory to making pipe joints, the joint material on both the bell and spigot ends shall be thoroughly cleaned and coated with the proper lubricant or cement to facilitate assembly. The spigot end shall be inserted in the bell and pressure applied until the pipe is properly sealed.

3.05 DEWATERING

- A. To maintain the trench reasonably dry so that the drain pipe can be properly laid to line and grade and so the pipe joints can be made satisfactorily, the Contractor shall pump from the trench all water of any nature that collects therein. Such pumping shall be performed only to the extent necessary and in such a manner that the trench will not be jeopardized by "piping" stresses that result in a "blow-up" or erosion of the trench bottom. In general, such pumping shall be done from a sump dug in the trench at the work. However, the completed portion of drain downstream of the work may be used as a collector for the water as a sump for the pump if such procedure does not interfere with proper installation and jointing of the pipe. However, any segment of the drain used as a collector for water in the trench shall be flushed thoroughly after completion.

3.06 SHEETING AND SHORING

- A. Except where banks are cut back on a stable slope, excavation for structures and trenches shall be properly and substantially sheeted, braced and shored as necessary to prevent caving or sliding to provide protection for the workmen and the work, and to provide protection for existing structures and facilities. Sheeting, bracing and shoring shall be designed and built to withstand all loads that might be caused by earth movement or pressure, and shall be rigid, maintaining its shape and position under all circumstances.
- B. Trench sheeting shall not be pulled unless the pipe strength is sufficient to carry trench loads based on the trench width to the back of the sheeting. Trench sheeting shall be pulled after backfilling.

3.07 DISPOSAL OF EXCESS EXCAVATED MATERIALS

- A. Except as otherwise permitted, all excess excavated materials shall be disposed of by the Contractor.
- B. The disposal of waste and excess excavated materials, including hauling, handling, leveling and surfacing, shall be a subsidiary obligation of the Contractor and no separate payment will be made therefore.

END OF SECTION