CP190411 – General Site - Primary Care Clinic North

September 5, 2019 - ISSUE FOR BID

VOLUME 1

DIVISION 1 Specifications
(Front End / General & Special Conditions)

Architect & Interior Designer:
SIMON OSWALD ARCHITECTURE

Mechanical, Electrical, Plumbing & Fire Protection Engineers:
MCCLURE ENGINEERING

Structural Engineer:
KH ENGINEERING GROUP

Civil Engineer:
ENGINEERING SURVEYS & SERVICES, INC.
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CERTIFICATION PAGE

Project Title
General Site - Primary Care Clinic North
Bid Package 2 – Building & Site Paving
MU Project #CP190411
Columbia, Missouri

The following drawings and specifications have been prepared by me or under my direct supervision:

Drawings:
General Drawing Sheets G001 through G003
Architectural Drawing Sheets A201 through A901

Specifications:
Division 1 Specifications: all except as noted below
* Note: Divisions 1.B – 1.D by University
* Note: Divisions 1.E.8 and 1.E.9 by University
* Note: Division 1.J Geotech by ES&S
* Note: Divisions 1.E.7 & 01 9100 by CXE Group
* Note: Division 01 9119 by CXE Group/WJE
Division 4 Specifications: 04 2113 & 04 2200
Division 5 Specifications: 05 4523 – 05 5213
Division 6 Specifications: 06 1053 – 06 6200
Division 7 Specifications: 07 2100 – 07 9200
Division 8 Specifications: 08 1113 – 08 9119
Division 9 Specifications: 09 2216 – 09 9123
Division 10 Specifications: 10 1419 – 10 5300
Division 11 Specification: 11 5126
Division 12 Specifications: 12 2413 – 12 9300
Division 13 Specification: 13 4900

Name and license: William H. Oswald - MO #A-5419

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The following drawings and specifications have been prepared by me or under my direct supervision:

<table>
<thead>
<tr>
<th>Drawings</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>S001 GENERAL NOTES</td>
<td>03 3000 Cast-In-Place Concrete</td>
</tr>
<tr>
<td>S002 CONCRETE TYPICAL DETAILS</td>
<td>05 1200 Structural Steel Framing</td>
</tr>
<tr>
<td>S003 STRUCTURAL STEEL TYPICAL DETAILS</td>
<td>05 2100 Steel Joist Framing</td>
</tr>
<tr>
<td>S004 METAL STUDS TYPICAL DETAILS</td>
<td>05 3100 Steel Decking</td>
</tr>
<tr>
<td>S100 FOUNDATION PLAN</td>
<td>05 4000 Cold-Formed Metal Framing</td>
</tr>
<tr>
<td>S101 ROOF FRAMING PLAN</td>
<td></td>
</tr>
<tr>
<td>S102 ENTRY CANOPY PLANS &amp; DETAILS</td>
<td></td>
</tr>
<tr>
<td>S103 TRASH ENCLOSURE AND PATIO PLANS &amp; DETAILS</td>
<td></td>
</tr>
<tr>
<td>S300 Brace Frame Elevations</td>
<td></td>
</tr>
<tr>
<td>S301 Brace Frame Elevations</td>
<td></td>
</tr>
<tr>
<td>S500 SECTIONS &amp; DETAILS</td>
<td></td>
</tr>
<tr>
<td>S501 SECTIONS &amp; DETAILS</td>
<td></td>
</tr>
<tr>
<td>S502 SECTIONS &amp; DETAILS</td>
<td></td>
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</tbody>
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Other Documents:
- Structural Engineering Calculations

Name and license: Kathy J. Hagen - MO #PE-2000155328

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CERTIFICATION PAGE

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Drawings: Specifications:

FP101 FLOOR FIRE PROTECTION

Division 20 Specifications: 20 0000 – 20 2530
Division 21 Specifications: 21 0000 – 21 0030

Name and license: Eric Reuther, PE-2011015792

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<table>
<thead>
<tr>
<th>Drawings:</th>
<th>Specifications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P100 PLUMBING FOUNDATION PLAN</td>
<td>22 0000 Plumbing Work</td>
</tr>
<tr>
<td>P101 PLUMBING FLOOR PLAN</td>
<td>22 2000 Plumbing Piping Systems</td>
</tr>
<tr>
<td>P102 ROOF PLUMBING PLAN</td>
<td>22 3000 Drains and Cleanouts</td>
</tr>
<tr>
<td>P200 PLUMBING WASTE AND VENT RISER</td>
<td>22 4000 Plumbing Fixtures</td>
</tr>
<tr>
<td>P201 PLUMBING DOMESTIC WATER RISER</td>
<td>22 6000 Plumbing Equipment</td>
</tr>
<tr>
<td>P300 PLUMBING SCHEDULES</td>
<td>22 8000 Plumbing Specialties</td>
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CERTIFICATION PAGE

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Columbia, Missouri

The following drawings and specifications have been prepared by me or under my direct supervision:

**Drawings:**

- Mechanical Drawing Sheets M100 through M903

**Specifications:**

- Division 23 Specifications: 23 0000 – 23 8200
  - Note: Division 23 0800 by CXE Group
- Division 24 Specifications: 24 0000 – 24 4100
- Division 25 Specifications: 25 0000

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**Drawings:**
- Electrical Drawing Sheets E001 through E702

**Specifications:**
- Division 26 Specifications: 26 0000 – 26 5200
  - Note: Division 26 0800 by CXE Group
- Division 27 Specifications: 27 0000 – 27 5119
- Division 28 Specifications: 28 0000 – 28 3000

Name and license: Austin P. Strieker - MO #PE-2014032649

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The following drawings and specifications have been prepared by me or under my direct supervision:

**Drawings:**

<table>
<thead>
<tr>
<th>CIVIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE PLAN</td>
</tr>
<tr>
<td>C0.01</td>
</tr>
<tr>
<td>C0.02</td>
</tr>
<tr>
<td>C1.01</td>
</tr>
<tr>
<td>C2.01 - C2.03</td>
</tr>
<tr>
<td>C3.01</td>
</tr>
<tr>
<td>C4.01</td>
</tr>
<tr>
<td>C5.01 - C5.03</td>
</tr>
<tr>
<td>C6.01</td>
</tr>
<tr>
<td>L1.01</td>
</tr>
<tr>
<td>L1.02</td>
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**Specifications:**

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<tbody>
<tr>
<td>31 2000</td>
<td>Earth Moving</td>
</tr>
<tr>
<td>32 1216</td>
<td>Asphalt Paving</td>
</tr>
<tr>
<td>32 1313</td>
<td>Concrete Paving</td>
</tr>
<tr>
<td>32 1316</td>
<td>Decorative Concrete Paving</td>
</tr>
<tr>
<td>32 1373</td>
<td>Concrete Paving Joint Sealants</td>
</tr>
<tr>
<td>32 1380</td>
<td>Pavement Markings</td>
</tr>
<tr>
<td>32 8400</td>
<td>Irrigation</td>
</tr>
<tr>
<td>32 9200</td>
<td>Turf and Grasses</td>
</tr>
<tr>
<td>32 9300</td>
<td>Landscape Plants</td>
</tr>
<tr>
<td>33 0543</td>
<td>Underground Utilities</td>
</tr>
<tr>
<td>33 4100</td>
<td>Storm Utility Drainage Piping</td>
</tr>
</tbody>
</table>

**APPENDICES**

| 32 9200A | Hydraulic Mulch for Hydroseed |

**Other Documents:**

Storm Water Pollution Prevention Plan

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**Name and license:** Zachary Karis Thomas - MO #PE-2004017256

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# TABLE OF CONTENTS – VOLUME 1

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIVISION 1</strong></td>
<td><strong>GENERAL REQUIREMENTS</strong></td>
</tr>
<tr>
<td>Advertisement for Bids</td>
<td></td>
</tr>
<tr>
<td>1.B</td>
<td>Bidder's Statement of Qualifications</td>
</tr>
<tr>
<td>1.B.2</td>
<td>Supplier Diversity Compliance Evaluation</td>
</tr>
<tr>
<td>1.B.3</td>
<td>Application for Waiver</td>
</tr>
<tr>
<td>1.B.4</td>
<td>Affidavit for Affirmative Action</td>
</tr>
<tr>
<td>1.B.5</td>
<td>Certifying Supplier Diversity Agencies</td>
</tr>
<tr>
<td>1.B.6</td>
<td>Newspapers for Outreach to Diverse Suppliers</td>
</tr>
<tr>
<td>1.B.7</td>
<td>Affidavit of Supplier Diversity Participation</td>
</tr>
<tr>
<td>1.C</td>
<td>Information for Bidders</td>
</tr>
<tr>
<td>1.D</td>
<td>General Conditions</td>
</tr>
<tr>
<td>1.E</td>
<td>Special Conditions</td>
</tr>
<tr>
<td>1.E.1</td>
<td>Scheduling Specification</td>
</tr>
<tr>
<td>1.E.2</td>
<td>Roofing System Manufacturer's Certification</td>
</tr>
<tr>
<td>1.E.3</td>
<td>Contractor's Roofing/Flashing/Sheet Metal Guarantee</td>
</tr>
<tr>
<td>1.E.4</td>
<td>Shop Drawing and Submittal Log</td>
</tr>
<tr>
<td>1.E.5</td>
<td>Operating Instructions and Service Manual Log</td>
</tr>
<tr>
<td>1.E.6</td>
<td>Closeout Log</td>
</tr>
<tr>
<td>1.E.7</td>
<td>Commissioning Plan</td>
</tr>
<tr>
<td>1.E.8</td>
<td>Quality Assurance Log</td>
</tr>
<tr>
<td>1.E.9</td>
<td>Healthcare Construction Guideline</td>
</tr>
<tr>
<td>1.F</td>
<td>Index of Drawings</td>
</tr>
<tr>
<td>1.G</td>
<td>Prevailing Wage Rates</td>
</tr>
<tr>
<td>1.H</td>
<td>Alternates</td>
</tr>
<tr>
<td>1.J</td>
<td>Subsurface Investigation and Soil Analysis (Geotechnical Report)</td>
</tr>
<tr>
<td>01 9100</td>
<td>General Commissioning Requirements</td>
</tr>
<tr>
<td>01 9119</td>
<td>Building Enclosure Commissioning</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS – VOLUME 2

## DIVISION 02 - EXISTING CONDITIONS
(NO SPECIFICATIONS IN THIS DIVISION)

## DIVISION 03 - CONCRETE
- 03 3000 ... CAST-IN-PLACE CONCRETE ................................................................. 12

## DIVISION 04 - MASONRY
- 04 2113 ... BRICK MASONRY ................................................................................. 12
- 04 2200 ... CONCRETE UNIT MASONRY ................................................................. 13

## DIVISION 05 - METALS
- 05 1200 ... STRUCTURAL STEEL FRAMING ......................................................... 8
- 05 2100 ... STEEL JOIST FRAMING ................................................................. 4
- 05 3100 ... STEEL DECKING .................................................................................. 5
- 05 4000 ... COLD-FORMED METAL FRAMING .................................................. 8
- 05 4523 ... MEDICAL EQUIPMENT SUPPORT SYSTEMS .................................. 7
- 05 5000 ... METAL FABRICATIONS ................................................................. 7
- 05 5100 ... METAL STAIRS .................................................................................. 6
- 05 5213 ... PIPE AND TUBE RAILINGS ............................................................. 6

## DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES
- 06 1053 ... MISCELLANEOUS ROUGH CARPENTRY .......................................... 4
- 06 1600 ... SHEATHING ......................................................................................... 3
- 06 4116 ... PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS .............. 6
- 06 6200 ... RESIN PANEL SYSTEMS ................................................................. 4

## DIVISION 07 - THERMAL AND MOISTURE PROTECTION
- 07 1113 ... BITUMINOUS DAMPPROOFING ......................................................... 3
- 07 2100 ... THERMAL INSULATION ...................................................................... 3
- 07 2419 ... WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS) ......................................................... 8
- 07 2619 ... TOPICAL MOISTURE VAPOR MITIGATION SYSTEM ...................... 3
- 07 4213.13 ... FORMED METAL WALL PANELS ................................................. 8
- 07 4265 ... THERMAL AND AIR BARRIER WALL SYSTEM .............................. 9
- 07 5419 ... POLYVINYL-CHLORIDE (PVC) ROOFING ...................................... 11
- 07 5423 ... THERMOPLASTIC POLYOLEFIN (TPO) ROOFING ....................... 11
- 07 7100 ... ROOF SPECIALTIES ....................................................................... 7
- 07 7200 ... ROOF ACCESSORIES ...................................................................... 5
- 07 7253 ... SNOW GUARDS ............................................................................... 2
- 07 8413 ... PENETRATION FIRESTOPPING ....................................................... 6
- 07 9200 ... JOINT SEALANTS ........................................................................... 8

## DIVISION 08 - OPENINGS
- 08 1113 ... HOLLOW METAL DOORS AND FRAMES ........................................ 8
- 08 1416 ... FLUSH WOOD DOORS ................................................................... 6
- 08 3113 ... ACCESS DOORS AND FRAMES .................................................... 3
- 08 4113 ... ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS ........... 11
- 08 4229.23 ... SLIDING AUTOMATIC ENTRANCES ......................................... 10
- 08 5653 ... SECURITY WINDOWS WITH TRANSACTION DRAWER .............. 7
- 08 7100 ... DOOR HARDWARE .......................................................................... 15
- 08 7113 ... AUTOMATIC DOOR OPERATORS ............................................... 9
DIVISION 09 - FINISHES
09 2216 NON-STRUCTURAL METAL FRAMING ................................................................. 5
09 2900 GYPSUM BOARD ......................................................................................... 7
09 3013 CERAMIC TILING ....................................................................................... 7
09 3023 GLASS TILING .......................................................................................... 6
09 5113 ACOUSTICAL PANEL CEILINGS ................................................................. 6
09 5133.13 PERFORATED SUSPENDED WOOD CEILINGS .................................... 3
09 6513 RESILIENT BASE AND ACCESSORIES .................................................... 4
09 6516 RESILIENT SHEET FLOORING ................................................................. 5
09 6813 TILE CARPETING ....................................................................................... 5
09 7200 WALL COVERINGS .................................................................................... 4
09 9113 EXTERIOR PAINTING ............................................................................... 6
09 9123 INTERIOR PAINTING ................................................................................. 5

DIVISION 10 - SPECIALTIES
10 1419 DIMENSIONAL LETTER SIGNAGE .......................................................... 5
10 2113 TOILET COMPARTMENTS ....................................................................... 4
10 2600 WALL AND DOOR PROTECTION ............................................................. 4
10 2613 FRP PANELS ............................................................................................. 3
10 2623.11 DECORATIVE PROTECTION PANELS ............................................... 5
10 2800 TOILET, BATH AND LAUNDRY ACCESSORIES ................................... 6
10 4413 FIRE PROTECTION CABINETS ................................................................. 4
10 5129 SOLID PHENOLIC LOCKERS ................................................................. 5
10 5300 PREFABRICATED ROD SUPPORTED CANOPIES .................................... 3

DIVISION 11 - EQUIPMENT
11 5126 PHARMACY SHELVING SYSTEM ............................................................. 5

DIVISION 12 - FURNISHINGS
12 2413 ROLLER WINDOW SHADES .................................................................... 4
12 3500 MERCHANDISING DISPLAY UNITS ....................................................... 5
12 3623.13 PLASTIC-LAMINATE-CLAD COUNTERTOPS .................................... 4
12 3661 SIMULATED STONE COUNTERTOPS ....................................................... 3
12 9300 SITE FURNISHINGS ................................................................................. 3

DIVISION 13 - SPECIAL CONSTRUCTION
13 4900 RADIATION PROTECTION ......................................................................... 7

DIVISION 20 - FIRE SUPPRESSION
20 0000 BASIC MECHANICAL CONDITIONS ......................................................... 3
20 1000 BASIC MECHANICAL MATERIALS AND METHODS ................................ 2
20 1010 BASIC PIPING MATERIALS ................................................................. 9
20 1020 MISCELLANEOUS MATERIALS ............................................................. 4
20 1030 JOINTS AND CONNECTION METHODS .............................................. 3
20 1040 HANGERS, SHIELDS, SUPPORTS AND ANCHORS ............................ 4
20 1050 BASIC MECHANICAL METHODS – GENERAL ..................................... 5
20 1060 BASIC MECHANICAL METHODS – INSTALLATION ........................... 5
<table>
<thead>
<tr>
<th>Division</th>
<th>Section</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 1070</td>
<td>1070</td>
<td>BASIC MECHANICAL METHODS – RELATED WORK</td>
<td>4</td>
</tr>
<tr>
<td>20 1080</td>
<td>1080</td>
<td>TESTING, ADJUSTING AND BALANCING</td>
<td>2</td>
</tr>
<tr>
<td>20 1090</td>
<td>1090</td>
<td>BASIC MECHANICAL METHODS – IDENTIFICATION</td>
<td>5</td>
</tr>
<tr>
<td>20 2010</td>
<td>2010</td>
<td>ELECTRICAL REQUIREMENTS</td>
<td>3</td>
</tr>
<tr>
<td>20 2020</td>
<td>2020</td>
<td>DRIVES AND GUARDS</td>
<td>2</td>
</tr>
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<td>3</td>
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<td>INSULATION MATERIALS</td>
<td>3</td>
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<td>INSULATION MATERIAL SCHEDULES</td>
<td>4</td>
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<td>INSULATION APPLICATION</td>
<td>4</td>
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<td>2</td>
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<td>21 0010</td>
<td>0010</td>
<td>DESIGN</td>
<td>3</td>
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<td>21 0020</td>
<td>0020</td>
<td>SERVICE ENTRANCE</td>
<td>3</td>
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<td>21 0030</td>
<td>0030</td>
<td>WET PIPE SPRINKLER SYSTEM</td>
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</tr>
<tr>
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<td>3000</td>
<td>DRAINS AND CLEANOUTS</td>
<td>3</td>
</tr>
<tr>
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<td>7</td>
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<td>2</td>
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<td>0800</td>
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<td>12</td>
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<td>1</td>
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<td>2300</td>
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<td>2</td>
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<tr>
<td>23 7000</td>
<td>7000</td>
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<td>2</td>
</tr>
<tr>
<td>23 7300</td>
<td>7300</td>
<td>AIR HANDLING UNITS</td>
<td>5</td>
</tr>
<tr>
<td>23 8200</td>
<td>8200</td>
<td>TERMINAL UNITS</td>
<td>3</td>
</tr>
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ADVERTISEMENT FOR BIDS

Sealed bids for:

GENERAL SITE –
PRIMARY CARE CLINIC NORTH
UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI
PROJECT NUMBER: CP190411   CONSTRUCTION ESTIMATE $5,979,000 - $6,643,375

will be received by the Curators of the University of Missouri, Owner, at Campus Facilities, Planning, Design & Construction, Room L100 (Front Reception Desk), General Services Building, University of Missouri, Columbia, Missouri 65211, until 1:30 p.m., C.T., October 3, 2019 and then immediately opened and publicly read aloud.

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

Questions regarding the scope of work should be directed to Brad Stegemann with Simon Oswald Associates at (573)443-1407 or stegemann@soa-inc.com. Questions regarding commercial conditions should be directed to Pam Eugster at (573) 882-1444 or eugsterpj@missouri.edu.

A prebid meeting will be held at 1:00 p.m., C.T., September 12, 2019 in the General Services Bldg., Rm 194A, University of Missouri, Columbia, Missouri, followed by a walk-through at the site. All interested bidders are invited to attend this meeting. A walk-through of the project may be scheduled by contacting the Prebid Inspection Guide at (573) 882-2228.

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

A Diversity Participation goal of 10% MBE / 10% Combined WBE, DBE and 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) 882-1133.

Advertisement Date: September 5, 2019

Gary L. Ward
Vice Chancellor for Operations and Chief Operating Officer
University of Missouri
SECTION 1.A

BID FOR LUMP SUM CONTRACT

Date:____________________________

BID OF
(hereinafter called "Bidder") a corporation* organized and existing under laws of the State of __________

a partnership* consisting of ________________________________________________________,
an individual* trading as ____________________________________________________________,
a joint venture* consisting of ________________________________________________________.

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

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

1. Bidder, in compliance with invitation for bids for construction work in accordance with
Drawings and Specifications prepared by Simon Oswald Associates, Inc., entitled General Site -
Primary Care Clinic North – Bid Package 2 – Building & Site Paving project number CP190411,
dated September 5, 2019 having examined Contract Documents and site of proposed work, and
being familiar with all conditions pertaining to construction of proposed project, including availability
of materials and labor, hereby proposes to furnish all labor, materials and supplies to construct project
in accordance with Contract Documents, within time set forth herein at prices stated below. Prices
shall cover all expenses, including taxes not covered by the University of Missouri’s tax exemption
status, incurred in performing work required under Contract documents, of which this Bid is a part.

Bidder acknowledges receipt of following addenda:

Addendum No. ______________________ Dated ______________
Addendum No. ______________________ Dated ______________
Addendum No. ______________________ Dated ______________
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 develop
the site and construct the 27,800 square foot medical office building; all as indicated on the
Drawings and described in these Specifications for sum of:

__________________________________________

__________________________________________ DOLLARS ($ ____________ ).
b. Additive Alternate Bids:

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

(1) **Additive Alternate No. 1: Construction of Physical Therapy Suite and 30 parking spaces at southwest side of parking lot.**

The Bidder agrees to furnish all labor, materials, tools and equipment required for construction of rooms Open Therapy 1008, Toilet 1008A, PT Storage 1008B, Private Therapy 1008C, Private Therapy 1008D, Semi 1008E, Semi 1008F and Office 1008G. Additionally, the Bidder agrees to furnish all labor, materials, tools and equipment required for construction of 30 asphalt parking spaces at the southwest side of the parking lot all as indicated on the Drawings and described in these Specifications for sum of:

DOLLARS ($___________).

(2) **Additive Alternate No. 2: Construction of 8 Exam Rooms (1057 through 1063) and Corridors C1017 & C1018 at Northeast side of building.**

The Bidder agrees to furnish all labor, materials, tools and equipment required for construction of rooms Peds Exam 1057 through OB Exam 1064, Corridors C1017 and C1018 all as indicated on the Drawings and described in these Specifications for sum of:

DOLLARS ($___________).

(3) **Additive Alternate No. 3: Construction of 8 Exam Rooms (1040 through 1047) and Corridors C1012 & C1013 at northwest side of building. Construction of 28 parking spaces at west and north side of parking lot. Installation of Sound Masking System per specification 27 5119.**

The Bidder agrees to furnish all labor, materials, tools and equipment required for construction of rooms Exam 1040 through Exam 1047, Corridors C1012 and C1013. Additionally, the Bidder agrees to furnish all labor, materials, tools and equipment required for full installation of a Sound Masking System as indicated in the Drawings and described in Specification Section 27 5119. Additionally, the Bidder agrees to furnish all labor, materials, tools and equipment required for the construction of 28 asphalt parking spaces at the west and north sides of the parking lot as indicated on the Drawings and described in these Specifications for sum of:

DOLLARS ($___________).

(4) **Additive Alternate No. 4: Concrete Paving and concrete mow strip.**

The Bidder agrees to furnish all labor, materials, tools and equipment required to provide Concrete Paving in lieu of Asphalt Paving and to provide a concrete mow strip as indicated on the Drawings and described in these Specifications for sum of:

DOLLARS ($___________).
c. 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.

(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 and/or Alternate 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 and/or Alternates. 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 and any Alternate(s) accepted at time of award of Contract, except as expressed in written Change Orders duly executed and delivered by Owner's Representative.

FILL IN ONLY ONE PRICE PER LINE

(6) Topical Moisture Mitigation System, as defined in Division 7, per square foot.

(a) Base Bid quantity: 5,000 s.f.
Cost to add Topical Moisture Mitigation System to concrete floors scheduled to receive carpet tile or resilient sheet flooring with moisture readings of Relative Humidity range of 80% to 90%: $__________/s.f.

(b) Base Bid quantity: 5,000 s.f.
Cost to add Topical Moisture Mitigation System to concrete floors scheduled to receive carpet tile or resilient sheet flooring with moisture readings of Relative Humidity range of 90% to 100%: $__________/s.f.

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 substantially complete project on or before August 17, 2020.

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: Work of this contract must be substantially complete and accepted by the Owner on or before August 17, 2020. Refer to Special
Conditions.

5. SUBCONTRACTOR LIST:

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

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

<table>
<thead>
<tr>
<th>Work to be performed</th>
<th>Subcontractor Name, City, State</th>
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</thead>
<tbody>
<tr>
<td>Masonry</td>
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<tr>
<td>Alum. Storefront Systems</td>
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<tr>
<td>Roofing</td>
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<tr>
<td>Gypsum Board Systems</td>
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<td>Fire Protection</td>
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<tr>
<td>Plumbing</td>
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<tr>
<td>Mechanical</td>
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<tr>
<td>Electrical</td>
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</table>

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 Director of Facilities Planning & Development, UM, that a good faith effort has not been made by Contractor to achieve above stated goal may result
in rejection of bid.

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

MBE 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 of bids.

b. Bidder agrees that bid shall not be withdrawn for a period of ninety (90) 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."

9. BIDDER'S SIGNATURE

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

<table>
<thead>
<tr>
<th>Authorized Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printed Name</td>
<td>Title</td>
</tr>
<tr>
<td>Company Name</td>
<td></td>
</tr>
<tr>
<td>Mailing Address</td>
<td></td>
</tr>
<tr>
<td>City, State, Zip</td>
<td></td>
</tr>
<tr>
<td>Phone No.</td>
<td>Federal Employer ID No.</td>
</tr>
<tr>
<td>Fax No.</td>
<td>E-Mail Address</td>
</tr>
<tr>
<td>Circle one: Individual Partnership Corporation Joint Venture</td>
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</tr>
<tr>
<td>If a corporation, incorporated under the laws of the State of__________</td>
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</tr>
<tr>
<td>Licensed to do business in the State of Missouri? yes no</td>
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(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
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).

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

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

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

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

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

7. No default has been made in any contract complete or incomplete except as noted below:

   (a) Number of contracts on which default was made ___________________________

   (b) Description of defaulted contracts and reason therefor

8. (a) Have you or your company participated in any contract subject to an equal opportunity clause similar to that described in the General Conditions?

   Yes ______ No _____

   (b) Have you filed all required compliance reports?

   Yes ______ No _____
(c) Is fifty percent or more of your company owned by a minority?  
Yes _____  No _____

(d) Is fifty percent or more of your company owned by a woman?  
Yes _____  No _____

(e) Is fifty percent or more of your company owned by a service disabled veteran?  
Yes _____  No _____

(f) Is fifty percent or more of your company owned by a veteran?  
Yes _____  No _____

(g) Is your company a Disadvantaged Business Enterprise?  
Yes _____  No _____

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

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

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

   Incidence Rates (last 3 years): _____ / _____ / _____

12. List banking references.

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

(b) If not, upon request will you file a detailed confidential financial statement within three (3) days?  
Yes _____  No _____

Dated at ___________________________ this __________ day of _____________________ 20____

__________________________________________
Name of Organization

__________________________________________
Signature

__________________________________________
Printed Name

__________________________________________
Title of Person Signing

END OF SECTION
SUPPLIER DIVERSITY COMPLIANCE EVALUATION FORM

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

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

I. Project:

II. Name of General Contractor:

III. Name of Diverse Firm:
Address:
Phone No.: Fax No.:
Status (check one) MBE _____ WBE _____ Veteran_____ Service Disabled Veteran______ DBE______

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

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:  

SD/2
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.slmbc.org

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1. Diverse Firm: ____________________________________________
   Contact Name: ____________________________________________
   Address: ________________________________________________
   Phone No.: __________________ E-Mail: ______________________

   Status (check one)  MBE □  WBE □  Veteran □  Service Disabled Veteran □  DBE □
   If MBE, Certified as (circle one):  1) Black American  2) Hispanic American  3) Native American  4) Asian American

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

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

<table>
<thead>
<tr>
<th>Scope of Work</th>
<th>Bid/Contract Amount</th>
<th>Final Dollar Amount</th>
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</thead>
<tbody>
<tr>
<td>Base Bid</td>
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<tr>
<td>Alternate #1</td>
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<td>Alternate #6</td>
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</table>

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.3 If a bid bond is given as a bid security, the amount of the bond may be stated as an amount equal to at least five percent (5%) of the bid, including additive alternates, described in the bid. The bid bond shall be executed by the bidder and a responsible surety licensed in the State of Missouri with a Best’s rating of no less than A-1/XI.

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

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

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

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

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

15.2 List of Supplier Diversity Firms

15.2.1 The bidder shall submit as part of their bid a list of diverse firms performing as contractor, subcontractors, 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.

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

15.5 Certification by Bidder of Diverse Firms

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

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

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

15.6 Supplier Diversity Participation Waiver

15.6.1 The bidder is required to make a good faith effort to locate and contract with diverse firms. If a bidder has made a good faith effort to secure the required diverse firms and has failed, the bidder shall submit with the bid, the information requested in "Application for Supplier Diversity Participation Waiver." The Contracting Officer will review the bidder's actions as set forth in the bidder's "Application for Waiver" and any other factors deemed relevant by the Contracting Officer to determine if a good faith effort has been made to meet the applicable percentage goal. If the bidder is judged not to have made a good faith effort, the bid may be rejected. Bidder's 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 work day) of a request.

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

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

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

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

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

16.3 Upon award of the contract, the requirements of Article 10 of this document and Article 5 of the General Conditions of the Contract for Construction included in the contract documents will apply.
University of Missouri

General Conditions

of the

Contract

for

Construction

August 2018 Edition
# TABLE OF ARTICLES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GENERAL PROVISIONS</td>
<td>GC/1</td>
</tr>
<tr>
<td>1.1 Basic Definitions</td>
<td>GC/1</td>
</tr>
<tr>
<td>1.2 Specifications and Drawings</td>
<td>GC/3</td>
</tr>
<tr>
<td>1.3 Required Provisions Deemed Inserted</td>
<td>GC/4</td>
</tr>
<tr>
<td>2. OWNER</td>
<td>GC/4</td>
</tr>
<tr>
<td>2.1 Information and Services Required of the Owner</td>
<td>GC/4</td>
</tr>
<tr>
<td>2.2 Owner's Right to Stop the Work</td>
<td>GC/4</td>
</tr>
<tr>
<td>2.3 Owner's Right to Carry Out the Work</td>
<td>GC/4</td>
</tr>
<tr>
<td>2.4 Extent of Owner Rights</td>
<td>GC/4</td>
</tr>
<tr>
<td>3. CONTRACTOR</td>
<td>GC/5</td>
</tr>
<tr>
<td>3.1 Contractor's Warranty</td>
<td>GC/5</td>
</tr>
<tr>
<td>3.2 Compliance with Laws, Permits, Regulations and Inspections</td>
<td>GC/5</td>
</tr>
<tr>
<td>3.3 Anti-Kickback</td>
<td>GC/6</td>
</tr>
<tr>
<td>3.4 Supervision and Construction Procedures</td>
<td>GC/6</td>
</tr>
<tr>
<td>3.5 Use of Site</td>
<td>GC/7</td>
</tr>
<tr>
<td>3.6 Review of Contract Documents and Field Conditions by Contractor</td>
<td>GC/8</td>
</tr>
<tr>
<td>3.7 Cleaning and Removal</td>
<td>GC/8</td>
</tr>
<tr>
<td>3.8 Cutting and Patching</td>
<td>GC/9</td>
</tr>
<tr>
<td>3.9 Indemnification</td>
<td>GC/9</td>
</tr>
<tr>
<td>3.10 Patents</td>
<td>GC/9</td>
</tr>
<tr>
<td>3.11 Materials, Labor, and Workmanship</td>
<td>GC/10</td>
</tr>
<tr>
<td>3.12 Approved Equal</td>
<td>GC/11</td>
</tr>
<tr>
<td>3.13 Shop Drawings, Product Data and Samples</td>
<td>GC/11</td>
</tr>
<tr>
<td>3.14 Record Drawings</td>
<td>GC/12</td>
</tr>
<tr>
<td>3.15 Operating Instructions and Service Manual</td>
<td>GC/13</td>
</tr>
<tr>
<td>3.16 Taxes</td>
<td>GC/13</td>
</tr>
<tr>
<td>3.17 Contractor's Construction Schedules</td>
<td>GC/14</td>
</tr>
<tr>
<td>4. ADMINISTRATION OF THE CONTRACT</td>
<td>GC/14</td>
</tr>
<tr>
<td>4.1 Rights of the Owner</td>
<td>GC/14</td>
</tr>
<tr>
<td>4.2 Rights of the Architect</td>
<td>GC/15</td>
</tr>
<tr>
<td>4.3 Review of the Work</td>
<td>GC/15</td>
</tr>
<tr>
<td>4.4 Claims</td>
<td>GC/15</td>
</tr>
<tr>
<td>4.5 Claims for Concealed or Unknown Conditions</td>
<td>GC/16</td>
</tr>
<tr>
<td>4.6 Claim for Additional Cost</td>
<td>GC/16</td>
</tr>
<tr>
<td>4.7 Claims for Additional Time</td>
<td>GC/16</td>
</tr>
<tr>
<td>4.8 Resolution of Claims and Disputes</td>
<td>GC/17</td>
</tr>
<tr>
<td>4.9 Administrative Review</td>
<td>GC/17</td>
</tr>
<tr>
<td>5. SUBCONTRACTORS</td>
<td>GC/18</td>
</tr>
<tr>
<td>5.1 Award of Subcontracts</td>
<td>GC/18</td>
</tr>
<tr>
<td>5.2 Subcontractual Relations</td>
<td>GC/18</td>
</tr>
<tr>
<td>5.3 Contingent Assignment of Subcontract</td>
<td>GC/18</td>
</tr>
<tr>
<td>6. SEPARATE CONTRACTS AND COOPERATION</td>
<td>GC/18</td>
</tr>
<tr>
<td>7. CHANGES IN THE WORK</td>
<td>GC/19</td>
</tr>
<tr>
<td>7.1 Change Orders</td>
<td>GC/19</td>
</tr>
<tr>
<td>7.2 Construction Change Directive</td>
<td>GC/20</td>
</tr>
<tr>
<td>7.3 Overhead and Profit</td>
<td>GC/20</td>
</tr>
<tr>
<td>7.4 Extended General Conditions</td>
<td>GC/21</td>
</tr>
<tr>
<td>7.5 Emergency Work</td>
<td>GC/21</td>
</tr>
</tbody>
</table>
8. TIME .......................................................................................................................................................... GC/21
  8.1 Progress and Completion .......................................................................................................................... GC/21
  8.2 Delay in Completion ................................................................................................................................. GC/22
  8.3 Liquidated Damages ................................................................................................................................. GC/22

9. PAYMENTS AND COMPLETION ................................................................................................................ GC/23
  9.1 Commencement, Prosecution and Completion ......................................................................................... GC/23
  9.2 Contract Sum .......................................................................................................................................... GC/24
  9.3 Schedule of Values ................................................................................................................................. GC/24
  9.4 Applications for Payment ....................................................................................................................... GC/24
  9.5 Approval for Payment ............................................................................................................................. GC/25
  9.6 Decisions to Withhold Approval ............................................................................................................ GC/25
  9.7 Progress Payments ................................................................................................................................. GC/25
  9.8 Failure of Payment ................................................................................................................................. GC/26
  9.9 Substantial Completion ............................................................................................................................ GC/26
  9.10 Partial Occupancy or Use ..................................................................................................................... GC/26
  9.11 Final Completion and Final Payment .................................................................................................... GC/27

10. PROTECTION OF PERSONS AND PROPERTY ...................................................................................... GC/27
  10.1 Safety Precautions and Programs ......................................................................................................... GC/27
  10.2 Safety of Persons and Property ............................................................................................................ GC/28

11. INSURANCE & BONDS ............................................................................................................................ GC/28
  11.1 Insurance .............................................................................................................................................. GC/28
  11.2 Commercial General Liability ............................................................................................................. GC/28
  11.3 Licensed for Use Vehicle Liability ........................................................................................................ GC/29
  11.4 Workers’ Compensation Insurance ...................................................................................................... GC/29
  11.5 Liability Insurance General Requirements .......................................................................................... GC/29
  11.6 Builder’s Risk Insurance ....................................................................................................................... GC/30
  11.7 Bonds ................................................................................................................................................... GC/31

12. UNCOVERING AND CORRECTION OF THE WORK ................................................................................. GC/32
  12.1 Uncovering of the Work ....................................................................................................................... GC/32
  12.2 Correction of the Work ........................................................................................................................ GC/32
  12.3 Acceptance of Nonconforming Work ................................................................................................... GC/33

13. MISCELLANEOUS PROVISIONS ............................................................................................................. GC/33
  13.1 Written Notice ..................................................................................................................................... GC/33
  13.2 Rights and Remedies ............................................................................................................................. GC/33
  13.3 Tests and Inspections ............................................................................................................................ GC/33
  13.4 Nondiscrimination in Employment Equal Opportunity ....................................................................... GC/34
  13.5 Supplier Diversity Goal Program ........................................................................................................ GC/34
  13.6 Wage Rates ......................................................................................................................................... GC/35
  13.7 Records ............................................................................................................................................... GC/36
  13.8 Codes and Standards ............................................................................................................................ GC/37
  13.9 General Provisions ............................................................................................................................... GC/37
  13.10 Debarment and Suspension Certificate ............................................................................................. GC/38
14. TERMINATION OR SUSPENSION OF THE CONTRACT .................................................................................. GC/38

14.1 Termination by Owner for Cause........................................................................................................ GC/38
14.2 Suspension by the Owner for Convenience ......................................................................................... GC/39
14.3 Owner’s Termination for Convenience................................................................................................ GC/39
ARTICLE 1
GENERAL PROVISIONS

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

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

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

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

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

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

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

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

.1 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 Marinas.

.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 Service 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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.2 Owner's Right to Stop the Work

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

2.3 Owner's Right to Carry Out the Work

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

2.3.2 In the event the Contractor has not satisfactorily completed all items on the Punch List within thirty (30) days of its receipt, the Owner reserves the right to complete the Punch List without further notice to the Contractor or its
safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3
CONTRACTOR

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.5 Use of Site

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

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

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

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

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

3.6 Review of Contract Documents and Field Conditions by Contractor

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

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

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

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

3.7 Cleaning and Removal

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

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

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

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

3.9 Indemnification

3.9.1 To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, the Architect, Architect’s consultants, and the agents, employees, representatives, insurers and re-insurers of any of the foregoing (hereafter collectively referred to as the “Indemnities”) from and against claims, damages (including loss of use of the Work itself), punitive damages, penalties and civil fines unless expressly prohibited by law, loss 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 Indemnites 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 Indemnites 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 Indemnites 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
3.9 The obligations of the Contractor under Paragraph 3.9.1 shall not extend to the liability of the Architect, his agents or employees, arising out of the preparation and approval of maps, drawings, opinions, reports, surveys, Change Orders, designs, or Specifications.

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

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

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

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

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

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

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

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

3.11.7 Unless otherwise specifically noted, the Contractor shall provide and pay for supervision, labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

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

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

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

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

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

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

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

3.11.8.3 Substitutions may be rejected without explanation in Owner’s sole discretion and will be considered only under one or more of the following conditions:
.1 Required for compliance with interpretation of code requirements or insurance regulations then existing;
.2 Unavailability of specified products, through no fault of the Contractor;
.3 Material delivered fails to comply with the Contract Documents;
.4 Subsequent information discloses inability of specified products to perform properly or to fit in designated space;
.5 Manufacturer/fabricator refuses to certify or guarantee performance of specified product as required; or
.6 When in the judgment of the Owner or the Architect, a substitution would be substantially to the Owner's best interests, in terms of cost, time, or other considerations.

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

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

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

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

3.13 Shop Drawings, Product Data, Samples, and Coordination Drawings/BIM Models
3.13.1 Shop Drawings are drawings, diagrams, schedules and other data specifically prepared for the Work by the Contractor or a Subcontractor, sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

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3.13.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

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

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

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

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

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

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

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

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

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

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

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

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

3.14 Record Drawings

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

3.15 Operating Instructions and Service Manuals

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

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

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

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

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

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

(b) Belt sizes, types, and lengths.

(c) Wiring diagrams.

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

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

3.15.2 Submission

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

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

3.16 Taxes

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

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

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

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

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

3.17 Contractor’s Construction Schedules

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

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

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

.1 The schedule shall be prepared using Primavera P3, Oracle P6, Microsoft Project or other software acceptable to the Owner’s Representative.

.2 The schedule shall be prepared and maintained in CPM format, in accordance with Construction CPM Scheduling, published by the Associated General Contractors of American (AGC).

.3 Prior to submittal to the Owner’s Representative for review, Contractor shall obtain full buy-in to the schedule from all major subcontractors, in writing if so requested by Owner’s Representative.

.4 Schedule shall be updated, in accordance with Construction CPM Scheduling, published by the AGC, on a monthly basis at minimum, prior to, and submitted with, the monthly pay application or as requested by the Owner’s Representative.

.5 Along with the update the Contractor shall submit a narrative report addressing all changes, delays and impacts, including weather to the schedule during the last month, and explain how the end date has been impacted by same.

.6 The submission of the updated certifies that all delays and impacts that have occurred on or to the project during the previous month have been factored into the update and are fully integrated into the schedule and the projected completion date.

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

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

ARTICLE 4
ADMINISTRATION OF THE CONTRACT

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

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

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

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

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

4.1.6 The Owner does not allow smoking on University property.

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

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

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

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

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

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

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

4.5 Claims for Concealed or Unknown Conditions

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

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

4.6 Claim for Additional Cost

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

4.7 Claims for Additional Time

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

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.

.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.

.1 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.

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

7.3     Overhead and Profit
7.3.1 Overhead and Profit on Change Orders shall be applied as follows:
.1 The overhead and profit charged by the Contractor and Subcontractors shall be considered to include, but not limited to, job site office and clerical expense, normal hand tools, incidental job supervision, field supervision, payroll costs and other compensation for project manager, officers, executives, principals, general managers, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, time-keepers, and other personnel employed whether at the site or in principal or a branch office for general superintendent and administration of the Work.
.2 The percentages for overhead and profit charged on Change Orders shall be negotiated and may vary according to the nature, extent, and complexity of the Work involved but in no case shall exceed the following:
  15% To the Contractor or the Subcontractor of any tier for Work performed with their respective forces or materials purchased
  5% To the Contractor on Work performed by other than his forces
  5% To first tier Subcontractor on Work performed by his Subcontractor
.3 The Contractor will be allowed to add 2% for the cost of bonding and insurance to their cost of work. This 2% shall be allowed on the total cost of the added work, including overhead and profit.
.4 Not more than three mark-ups, not to exceed individual maximums shown above, shall be allowed regardless of the number of tier subcontractors. Overhead and profit shall be shown separately for each subcontractor of any tier and the Contractor.
.5 On proposals covering both increases and decreases in the amount of the Contract, the application of overhead and profit shall be on the net change in direct cost for the Contractor or Subcontractor of any tier performing the Work.
.6 The percentages for overhead and profit credit to the Owner on Change Orders that are strictly decreases in the quantity of work or materials shall be negotiated and may vary according to the nature, extent, and complexity of the Work involved, but shall not be less than the following:
  Overhead and Profit
  7.5% Credit to the Owner from the Contractor or Subcontractor of any tier for Work performed with their respective forces or materials purchased
  2.5% Credit to the Owner from the Contractor on Work performed by other than his forces
  2.5% Credit to the Owner from the first tier Subcontractor on Work performed by his Subcontractor of any tier

7.4     Extended General Conditions
7.4.1 The Contractor acknowledges that the percentage mark-up allowed on change orders for overhead and profit cover the Contractor’s cost of administering and executing the Work, inclusive of change orders that increase the contract time. Contractor further acknowledges that no compensation beyond the specified mark-up percentages for extended overhead shall be due or payable as a result of an increase in the Contract Time.
7.4.2 The Owner may reimburse the Contractor for extended overhead if an extension of the Contract Time is granted by the Owner, in accordance with Article 4.7.1 and the Owner determines that the extension of the Contract Time creates an inequitable condition for the Contractor. If these conditions are determined by the Owner to exist the Contractor may be reimbursed by unit prices contained in the Contractor's original bid and incorporated in the Construction Contract or by unit prices subsequently agreed upon.
7.4.3 If unit prices are subsequently agreed upon, the Contractor’s compensation shall be limited as follows:
.1 For the portion of the direct payroll cost of the Contractor’s project manager expended in completing the Work and the direct payroll cost of other onsite administrative staff not included in Article 7.3.1. Direct payroll cost shall include base rate salaries and wages plus the cost of fringe benefits required by agreement or custom and social security contributions, unemployment, payroll taxes and workers’ or workmen's compensation insurance and other customary and legally required taxes paid by the Contractor;
.2 Cost of Contractor’s temporary office, including temporary office utilities expense;
.3 Cost of temporary utilities required in the performance of the work;
.4 Profit not to exceed 5% of the total extended overhead direct costs;
7.4.4 All costs not falling into one of these categories and costs of the Contractors staff not employed onsite are not allowed.

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

ARTICLE 8
TIME

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

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

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

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

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

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

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

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

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

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

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

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

ARTICLE 9
PAYMENTS AND COMPLETION

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

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

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

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

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

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

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

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

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

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

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

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

9.2 Contract Sum

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

9.3 Schedule of Values

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

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

.1 Enough detail as necessary to adequately evaluate the actual percent complete of any line item on a monthly basis, as determined by the Owner's Representative.
.2 Line items, when being performed by a subcontractor or material supplier, shall correlate directly back to the subcontract or purchase order amount if requested by the Owner’s Representative.

9.4 Applications for Payment

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9.5 Approval for Payment

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

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

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

9.7 Progress Payments

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

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

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

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

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

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

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

9.8 Failure of Payment

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

9.9 Substantial Completion

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

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

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

9.10 Partial Occupancy or Use

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

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

9.11 Final Completion and Final Payment

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

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

1. Labor costs, prevailing wage rates, fringe benefits and material costs have been paid.

2. Subcontractors of any tier and manufacturers furnishing materials and labor for the project have fully completed their Work and have been paid in full.

3. The project has been fully completed in accordance with the Contract Documents as modified by Change Orders.

4. The acceptance by Contractor of its Final Payment, by check or electronic transfer, shall be and operate as a release of all claims of Contractor against Owner for all things done or furnished or relating to the Work and for every act or alleged neglect of Owner arising out of the Work.

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

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

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

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

GC/27

08/18
10.1 Safety Precautions and Programs

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

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

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

10.2 Safety Of Persons And Property

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

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

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

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

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

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, safeguards for safety and protection, including, but not limited to, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

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

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

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

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

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

ARTICLE 11
INSURANCE & BONDS

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

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

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

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

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

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

11.2.5 “The Curators of the University of Missouri” shall be endorsed as an “additional insured” under the CGL policy. The additional insured status must be conveyed by 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 Requirements
11.5.1 All insurance coverages procured by Contractor shall be provided by agencies and insurance companies acceptable to and approved by Owner. Any insurance coverage shall be provided by insurance companies that are duly licensed to conduct business in the State of Missouri as an admitted carrier. The form and content of all insurance coverage provided by Contractor are subject to the approval of Owner. All required insurance coverages shall be obtained and paid for by Contractor. Any approval of the form, content or insurance company by Owner shall not relieve the Contractor from the obligation to provide the coverages required herein.

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

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

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

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

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

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

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

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

11.5.10 By requiring the insurance set forth herein and in the Contract Documents, Owner does not represent or warrant that coverage and limits will necessarily be adequate to protect Contractor, and such coverages and limits shall not be deemed as a limitation on Contractor’s liability under the indemities 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, lightning, 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 be uncovered by the Architect or the Owner's Representative, at 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 require such Work to be uncovered. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner will be responsible for payment of such costs.

12.2 Correction of the Work
12.2.1 The Architect or Owner’s Representative shall have the right to reject Work not in strict compliance with the requirements of the Contract Documents. The Contractor shall promptly correct Work rejected by the Architect or the Owner's Representative for failing to conform to the requirements of the Contract Documents. The Contractor shall pay all claims, costs, losses and damages caused by or resulting from the correction, removal or replacement of defective Work, including but not limited to, all costs of repair or replacement of Work of others. The Contractor shall pay claims, costs, losses and damages caused by or resulting from the correction, removal 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.

GC/33
08/18
13.3 Tests and Inspections

13.3.1 Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules or regulations shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, and shall bear related costs of tests, inspections, and approvals. The Contractor shall give the Architect and the Owner's Representative timely notice of when and where tests and inspections are to be made so the Architect and/or the Owner's Representative may observe procedures.

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

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

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

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

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

13.4 Nondiscrimination in Employment Equal Opportunity

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

13.5 Supplier Diversity Goal Program

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

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

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

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

13.5.5 The Contractor and his subcontractors shall develop, implement, maintain, and submit in writing to the Director of Facilities Planning & Development, an affirmative action program if at least fifty (50) persons in the aggregate are employed under this contract. If less than fifty (50) persons in the aggregate are to be employed under this contract, the Contractor shall submit, in lieu of the written affirmative action program, a properly executed "Affidavit for Affirmative Action" in the form 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
provisions of Article 13.6 would be and is difficult to expense. The cost of Contractor's violation of the delays, of additional work for Owner's staff and legal Owner, including, but not limited to, cost of construction requirements of Article 13.6 result in additional costs to been completed. The liquidated damages and other 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

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

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

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

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

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

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

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

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

13.7 Records

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

13.8 Codes and Standards

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

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

13.9 General Provisions

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

13.9.2 This Contract shall be interpreted, construed, enforced and regulated under and by the laws of the State of Missouri. Whenever possible, each provision of this Contract shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Contract, or a portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without invalidating or affecting the remaining provisions of this Contract or valid portions of such provision, which are hereby deemed severable. Contractor and Owner further agree that in the event any provision of this Contract, or a portion thereof, is prohibited by law or found
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 Debarment and Suspension Certification
The contractor certifies to the best of its knowledge and belief that it and its principals are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency in accordance with Executive Order 12549 (2/18/86).

ARTICLE 14
TERMINATION OR SUSPENSION OF THE CONTRACT

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

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

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

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

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

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

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

14.2 Suspension by the Owner for Convenience

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

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

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

14.3 Owner’s Termination for Convenience

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

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

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

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

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

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

1. DEFINITIONS

a. "Drawings"

Drawings referred to in and accompanying Project Manual consist of Drawings prepared by and bearing name of below defined Architect, bearing September 5, 2019, entitled CP190411 General Site - Primary Care Clinic North – Bid Package 2 – Building & Site Paving.

b. Architect:
Simon Oswald Associates, Inc.
DBA SOA/Simon Oswald Architecture
2801 Woodard Drive, Suite 103
Columbia, MO 65202
(573) 443-1407

c. Mechanical, Plumbing, Fire Protection and Electrical Engineer:
McClure Engineering
1000 Clark Avenue
St. Louis, MO 63102
(314) 645-6232

d. Civil Engineer:
Engineering Surveys & Services
1113 Fay Street
Columbia, MO 65201
(573) 449-2646

d. Structural Engineer:
KH Engineering Group
15377 West 95th Street
Lenexa, KS 66219
(913) 825-9381

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

2. SPECIAL SCHEDULING REQUIREMENTS

a. Special scheduling requirements supplemental to the bid form.

Contractor shall perform all work in the designated by August 17, 2020.

Contractor shall conduct walk-through with Bid Package 1 – Site Mass Grading Contractor, Brown & Root Industrial Services and Owner's Representative for formal acceptance of existing conditions prior to start of on-site work.

Contractor shall coordinate all work with ongoing and/or completed construction of the roundabout and associated utility work at the intersection of St. Charles Road and Battle Avenue by a separate contract.

The trees shown on sheet C7.01 are shown for reference only and will be installed under separate contract between November 2020 and February 2021.
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:

   (1) Project consists of site development of approximately 2.8 acres of the 6.6 acres parcel and construction of a single story 27,800 square foot medical office building.

   (2) Site work shall consist of construction of parking lots on the south, west and north sides of the building, connecting drive aisles, sidewalks and three entrances onto Armstrong Drive, Battle Avenue and St. Charles Road respectively. Underground utilities, storm sewers, hydrodynamic separator, and a dry detention basin will have been installed under Bid Package 1 under separate contract.

   (3) Landscape work shall consist of shrubs and plants around the building and parking areas.

   (4) Architectural work of shall consist of masonry veneer of brick and decorative concrete masonry units on a thermal and air barrier wall system. The main roofing system shall be TPO membrane on rigid insulation while roofing for vestibule and canopy roof shall consist of PVC roofing.

   Interior flooring shall include carpet tile and sheet vinyl flooring. Wall finishes shall consist of paint, vinyl wallcovering, acoustical wall panels, porcelain tile, plastic laminate faced paneling. Ceilings shall consist of 2x2 acoustical panel ceilings as well as gypsum board ceilings and soffits. Interior cabinetry shall consist of both plastic laminate faced architectural cabinets. Countertops will be plastic laminate, solid surface and simulated stone. Doors shall be prefinished flush wood doors in both hollow metal and aluminum storefront frames. Interior windows shall include both hollow metal frames and aluminum storefront frames.

   Specialty items shall include lead lining at Radiology Suite. Additional specialties shall include folding panel partitions, toilet compartments, toilet and bath accessories, lockers, roller shades, pharmacy shelving units.

   (5) Structural work shall consist of single-story construction using open web steel bar joists and structural steel beams and columns. The roof is 1 1/8” steel decking. Per the geotechnical site report, the foundation system will consist of a continuous footing at exterior walls and shallow spread footings at column locations. Exterior wall construction will consist of brick or stone veneer on steel studs with a parapet around the perimeter of the roof.

   (6) Fire Protection work shall consist of automatic sprinkler system will be installed to provide 100% automatic sprinkler and hose stream coverage as required by NFPA 13. Systems shall be hydraulically calculated to produce desired density in various areas or rooms throughout the facility as required by NFPA 13.

   (7) Plumbing work shall consist of building domestic water service that will have two reduced pressure backflow preventers on it to provide some redundancy.

   Materials for domestic water piping shall be Type L copper. Domestic cold-water piping will be insulated with closed-cell insulation. Domestic hot water piping will be insulated with fiberglass.
The domestic hot water system will consist of a pair of natural gas hot water heaters. A water softener will be provided to serve the domestic hot water service on the building.

Plumbing fixtures are to be of high quality, hospital-grade, china.

(8) Mechanical work is as follows: The building will be served by two variable-volume roof top units with downstream air terminal units with electric reheat. The building will be split in half between the east & west half with each half served by one of the two units. The majority of the building will have a return air plenum with any pressure critical spaces exhausted. Each of the zones will be served by a VAV box with modulating SCR electric heat. Both of these air handling units will be provided with integrated filter housings. Units will consist of a DX cooling coil and gas heat section as illustrated on the flow diagram drawings. Units will be double-wall modular roof top units and each unit will have a relief fan that pulls air out of the return plenum to allow for economizer operation.

In order to meet the energy code requirements, a dedicated outside air unit with a total energy recovery wheel will be provided. This unit will deliver dehumidified air directly to each of the two VAV air handling units. A VAV air terminal unit will be provided at each air handling unit to ensure ventilation air quantities. Ventilation air will be able to setback at night when the pressure-critical spaces go unoccupied. The minimum airflows for these spaces will be reduced during unoccupied times while still maintaining a constant offset to achieve pressure control.

(9) Electrical work is as follows: The building will be provided with a new 1200A, 277/480V, three phase, four-wire electrical service from a new Boone Electric Cooperative pad mounted transformer located adjacent to the northeast corner mechanical/electrical room. The pad mounted transformer will be connected to a free standing, 1200A, remotely motor operated circuit breaker with LSIG capabilities.

The main circuit breaker will be connected to a main distribution panel that will consist of a 1200A, 277/480V, three phase, four-wire switchboard providing power to various 277/480V and 120/208V panelboards located throughout the building. Transient Voltage Surge Suppression (TVSS) shall be provided for the main switchboard and all 120/208V panelboards.

General ambient lighting will consist of LED lighting with a mix of recessed indirect basket-type 2x2’s, 2x4’s, and down lights. Target light levels will be in accordance with IES recommendations for maintained foot-candles.

4. LOCATION

Work shall be performed under this Contract at 7115 East St. Charles Road, Columbia, MO 65202.

5. NUMBER OF CONSTRUCTION DOCUMENTS

The Owner’s Representative will furnish the Contractor a copy of executed Contract.

6. SUBMITTALS

a. The Contractor shall submit for approval to the Architect, equipment lists and Shop Drawings, as expediently as possible. Failure of the Contractor to submit Shop Drawings in a timely manner will result in the Owner holding back Contractor payments. (See General Conditions)
b. The material and equipment lists shall be submitted and approved before any material or equipment is purchased and shall be corrected to as-built conditions before the completion of the project.

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

(1) The Contractor shall identify each submittal item with the following:
   (a) Project Title and Location
   (b) Project Number
   (c) Supplier’s Name
   (d) Manufacturer’s Name
   (e) Contract Specification Section and Article Number
   (f) Contract Drawing Number
   (g) Acrobat file name: Spec Section_Times Submitted-Spec Title: 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 Architect four (4) bound copies of all required Operating Instructions and Service Manuals for the Architect’s and the Owner’s sole use prior to completing 50% of the adjusted contract. Payments beyond 50% of the contract amount may be withheld until all Operating Instructions and Service Manuals are received as referenced in the accompanying Operating Instructions and Service Manual Log at the end of this section (1.E.4).

e. 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, fourteen (14) days advance notice to Owner’s Representative for purpose of verifying utility locations including, but not limited to, gas, telecommunications, electric, water, and sewer. 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.

(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 allowed except where prohibited in the contract documents. Parking or driving on sidewalks at the perimeter of the site is prohibited.

b. 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.

c. Utilities: Cost associated with using, obtaining and maintaining all utilities during construction through substantial completion shall be the Contractor's responsibility. Upon completion of the work such extensions shall be removed and any damage caused by use of such extensions shall be repaired to the satisfaction of the Owner's Representative, at no cost to the Owner.

The Owner will establish and hold the accounts for utilities and receive and pay for the monthly invoices. Utilizing a deductive change order, the utility costs through substantial completion will be the responsibility of the Contractor.

d. 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.

e. 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.

f. 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.

g. 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.

h. 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.

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

j. Artifacts Found During Construction: Contractor shall immediately notify the Owner’s Representative when artifacts are uncovered or found during the demolition or construction process. Artifacts include, but are not limited to, tools, drawings (construction or other), photographs, books and other objects/devices which may hold historical importance/significance. Do not remove or disturb the object(s) in question. Artifacts are not considered part of demolished materials and shall remain the property of the University of Missouri.
I. “Permit Required Confined Space” Entry Communication and Coordination
(See OSHA 1926 subpart aa – Construction Confined Space for the definition of “permit required confined spaces” - Note: OSHA does not apply to the University. However, the University will provide a list of all known “permit required confined spaces”)

The following are the known locations of “permit required confined spaces” currently identified within the project limits:

(1) Sanitary Sewer Manhole
(2) Storm Sewer Structures

The hazards or potential hazards in each “permit required confined space” or the reason it is a “permit required confined space”:

(1) Air quality, atmospheric hazards, elevated temperatures, access/egress.

Any precautions that the owner or previous contractors have implemented for the protection of employees in the “permit required controlled space”:

(1) Internal atmosphere testing, air quality monitor, ventilation, gas detector, proper personal protective equipment and confined space permit.

The above list of known confined spaces within the project limits may not be a complete listing. Each contractor shall survey the project to identify all confined spaces. 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” after evaluation by a competent person; or 3) during the course of construction a “permit required confined space” is created after evaluation by a competent person.

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

9. PROTECTION OF OWNER’S PROPERTY

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

b. Preserving and Protecting Existing Vegetation:

(1) Protection and compensation for damages:

(a) Trees and shrubs within work area designated to remain shall be protected from damage during construction by 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.

(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) Area within drip line of trees and shrubs shall be protected from work area by use of a standard 60" high woven plastic or woven wire fence mounted on standard steel posts set not more than 10' apart. Tree protection shall be removed during work in area of protection only when necessary to perform grading and other work required by Drawings and only as authorized by Owner's Representative.

(5) Only minimal grading or disturbance will be allowed to area within and adjacent to drip line of trees or shrubs designated to remain. Contractor shall obtain approval from Owner's Representative prior to starting any grading work in these areas. Unnecessary cutting of plant roots shall not be permitted. The Contractor shall stop work immediately and shall notify Owner's Representative immediately if root system is exposed or if any roots over 1 ½" in diameter are encountered. Roots exposed and/or damaged during construction shall be immediately cut off cleanly behind exposed or damaged area, and cut surface treated in accordance with established horticultural standards and covered with top soil.

(6) 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.

(7) Contractor shall repair tire ruts and other damages to existing lawn areas. Repairs shall match surrounding area.

10. SUBSTITUTIONS and EQUALS

a. Substitutions are defined in General Conditions article 3.11.8 for and Equals are defined General Conditions Article 3.12.

b. Use of materials, products or equipment other than those named and described in the Contract Documents are substitutions and/or equal. Substitutions and/or equals submitted during the bidding period shall be received by both the Architect and the Owner at least ten calendar days prior to the date for receipt of bids. To be considered, bidder's proposal shall include a complete description of the proposed substitution and/or equal and a comparison of significant qualities of the proposed substitution and/or equal with those specified including drawings, performance and test data, and other information necessary for an evaluation. The Architect's decision on the approval or disapproval of a proposed substitution and/or equal shall be final.

c. If the Architect and Owner approve a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approval made in any other manner.

d. No substitutions and/or equal will be allowed for the following items:
11. CODES AND STANDARDS

The Contractor shall comply with applicable codes and standards as listed in General Conditions. The following codes and standards shall also apply:

a. City of Columbia - Sewer Line Installation Standards - Department of Public Works

“All sanitary sewer construction shall be in accordance with the City of Columbia Specifications and Standards and in conformance with the rules and regulations of the Missouri Clean Water Commission.”

12. PERMITS

The Owner has hired a third-party Code Inspection Agency, George Butler & Associates (GBA), for this project. The Owner will secure a building permit and furnish to the Contractor prior to construction commencing on site. A temporary certificate of occupancy and certificate of occupancy process will be incorporated into this project.

a. The Owner will pay for all permit fees directly with the exception of the City of Columbia Right-of-Way Construction Permit for all work within the Right-of-Way. The Contractor shall coordinate the payment of permit fees with the Owner’s Representative.

13. SPECIALTIES (NOT USED)

14. PRE-BID INSPECTION

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

15. ROOF WARRANTY REQUIREMENT

a. The Contractor shall submit, before the first progress payment, a copy of University of Missouri Roof System Manufacturer’s Certification, which shall be manually signed by an authorized representative of Manufacturer of each proposed roofing system. Certification shall have original signature.

b. Following final inspection and acceptance of the roofing system(s) by the Owner and the roofing system manufacturer(s), the Contractor shall submit a manually signed standard warranty agreement provided and executed by the roofing system manufacturer for each roofing system provided. Standard warranty agreement(s) shall be of the duration specified in Division 7.

c. University of Missouri three (3) year Contractor’s Roofing/Flashing/Sheetmetal Guarantee shall be signed by the roofing contractor after final inspection and acceptance of each roofing system by Manufacturer and by Owner.

d. The Roofing contractor or subcontractor shall provide the Owner with an Application for a Roof Warranty.
16. MODIFICATIONS TO INFORMATION TO BIDDERS

a. Information to Bidders:

   (1) Referenced Information to Bidders, Page IFB/6.

   Add new Article 15.9.2 as follows:

   **15.9.2.1** Within 48 hours of the receipt of bids, the apparent low bidder shall submit to the 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.

17. MODIFICATION TO INFORMATION FOR BIDDERS: BIDDERS STATEMENT OF QUALIFICATIONS

a. Information For Bidders

   (1) Reference: Information for Bidders, Article 8.4

   Insert new Article 8.4 to read as follows:

   In addition to the Bidder’s Statement of Qualifications, the Bidder must also submit evidence and meet the following qualifications:

   The project requires the services of a prime contractor who has demonstrated success in completing process/power plant work in an operating plant environment with little or no interruption of plant operations.

   (a) MINIMUM QUALIFICATIONS

   (i) The schedule for the project is aggressive and requires a contractor with a successful track record of managing projects with average monthly expenditures of more than $1-million.

   (ii) Successful completion of one project of similar type and scope.

   (iii) Successful completion of at least three projects of $7-million or greater value. Submit references for the three most recent projects over $7-million in value.

   (vi) Successful and sustained track record of effectively utilizing project/schedule management software for at least the last two years.

   (b) QUALIFICATION SUBMITTALS

   (i) Submitted qualification packages should include the following information:

      • Project and Schedule
         - Management Experience managing projects with equal or greater schedule demands.
         - Demonstrated and consistent on-time completion success

      • Project Organization / Personnel
         - Key project team members and their resume
         - Project team roles and responsibilities of team members
         - Reporting/accountability procedures
         - Quality control program and procedures
• Organizational Support
  - Home office support
  - Labor and subcontractor relations
  - Submittal processing procedures
  - Material ordering/tracking/delivery Procedures
  - Cost accounting support
  - Financial stability/capacity
  - Record of mentoring and supporting Supplier Diversity Subcontractor Participation

(ii) Packages must include the following items:
• Corporate Organizational Charts
• Project Organizational Charts
• Summary of Similar Projects
• Client References
• Resumes – resumes for each key individual proposed for the project, include: position in the firm, project responsibility, education, license or registration and relevant experience over the last five years.
• Financial Statements and/or Evidence of Bonding Capacity
• Sample progress reports and schedules
• Brief Narratives indicating how the Contractor intends to manage this project, including subcontractors.

(c) QUALIFICATION PROCEDURE

(i) All qualification information and supporting materials must be submitted with your bid. Following the bid date, the Owner reserves the right to request additional information material to evaluate qualifications. Failure of the Contractor to demonstrate their ability to comply with these qualifications may be grounds for the Owner not recommending aware of the Contract.

18. MODIFICATIONS TO GENERAL CONDITIONS

  a. General Conditions:

     (1) Reference: General Conditions Article 11.2.1 Commercial General Liability.

     Delete in the first sentence of 11.2.1: “$2,000,000 per occurrence, $5,000,000 in general aggregate, $5,000,000 products and completed operations aggregate and $1,000,000 personal injury and advertising injury”

     and insert: “$2,000,000 per occurrence, $10,000,000 in general aggregate, $10,000,000 products and completed operations aggregate and $1,000,000 personal injury and advertising injury”

19. 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.

    Option 3: Contractor Schedule – Contractor is responsible for the schedule and he may provide
with in-house personnel or hire a third party scheduling consultant. See Contractor Schedule Specification included in these documents.

20. PROJECT COORDINATION

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

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

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

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

b. Coordination Drawings: Within forty-five (45) days of Notice to Proceed provide coordination drawings for the integration of the Work, including work first shown in detail on shop drawings or product data. Show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided, or function as indicated.

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

(2) Indicate required installation sequences.

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

c. The Owner has contracted with a third party construction photography firm, Multivista, to perform periodic photo documentation of the project. The Contractor shall participate in this process by coordinating the site visits of Multivista with the various milestones identified in the project schedule. Contractor to coordinate with the Owner's Representative on the communication to Multivista of forthcoming site visits and access to the site.

21. PROJECT PARTNERING (NOT USED)

22. VALUE ENGINEERING

a. After execution of the contract with the successful contractor, the Owner will entertain value engineering initiatives from the contractor. These initiatives may include modifications to the drawings and specifications. The Owner will not entertain modifications that affect the functions or characteristics of the project, including but not limited to: service life of systems or components, economy of operations, ease of maintenance, appearance, or design and safety standards.

b. Once a value initiative is recommended to the Owner’s Representative, the Owner’s Representative will determine if the proposal deserves further merit. If not, the Contractor will be notified the proposal has not been accepted. If the Owner’s Representative determines the proposal should be considered, a team will be assembled consisting of the Owner’s Representative, Architect, Contractor and other parties that may be necessary to appropriately review the initiative. The team will review the initiative and determine whether to proceed with a value engineering joint proposal. The Owner and Contractor must jointly agree to the merit of any value engineering initiative before the preparation of the value
engineering joint proposal. The Owner will not be liable for the failure to accept any value engineering initiative.

c. If the Owner and the Contractor jointly agree to the initiative, the Contractor shall prepare the value engineering joint proposal. The proposal shall contain, at a minimum, the following:

1. An itemized list of existing contract requirements recommended to be changed and proposed language for modification.

2. All construction documents and computations necessary for a thorough and expeditious evaluation.

3. A detailed estimate of the cost of performing the work under the existing contract and under the proposed changes, including the cost of implementing the changes.

4. Estimate of costs the Owner may incur related to the proposed changes such as maintenance and operating cost.

5. Changes to the project schedule.

6. Estimate of any other project cost that may be incurred to develop the recommended changes, including Owner’s professional fees.

d. The Contractor shall submit the value engineering joint proposal to the Owner’s Representative. The Contractor will be notified if the proposals have been accepted or if clarifications and/or negotiations are necessary.

e. If the proposal is rejected, the issue is dismissed and each party is responsible for their own cost incurred.

f. If the proposal is accepted in whole or in part, the Owner’s Representative will prepare a Change Order to implement the proposal in the project.

1. The net savings for the proposal will be calculated by subtracting from the total construction cost savings, the Owner’s cost associated with the proposal including professional fees. The Owner will be the sole judge of the acceptability of a proposal, and the estimated net savings from the adoption of all or any part of the proposal. The Owner reserves the right to disregard the contract bid prices and/or the Contractor’s breakdown of cost, if, in the Owner’s judgment, such prices do not represent a fair measure of the value of the work to be performed or deleted.

2. Savings resulting solely from the elimination or reduction in quantity of a bid item will not be considered as a value engineering initiative.

3. Value Engineering initiatives will only be considered by the Owner within the first 150 days of the contract.

4. For those initiatives accepted by the Owner, the Contractor will be paid 50 percent of the net savings.

5. Upon acceptance of a value engineering joint proposal, any restriction imposed by the Contractor on its use or on disclosure of the information shall become void, and the Owner thereafter shall have the right to use all or any part of the proposal without obligation or compensation of any kind to the Contractor.
23. BUILDING SYSTEM COMMISSIONING AND QUALITY ASSURANCE

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

b. The contractor shall designate a competent person to act as the contractor's commissioning coordinator/quality assurance coordinator. The Project Manager is allowed to serve as the commissioning coordinator/quality assurance coordinator. The commissioning coordinator/quality assurance coordinator is responsible for planning, scheduling, coordinating, conducting and verifying all commissioning activities/quality assurance activities required by the commissioning plan/quality assurance log and ensuring all building systems are complete, operable and ready for use by the Owner. At a minimum, building ventilation systems, chilled/hot water generation systems, hydronic distribution systems, power distributions systems and fire detection and alarm systems, as applicable.

c. The Owner has hired a third-party Commissioning Agent, CxE Group, for this project. The Contractor shall participate in this Commissioning process as outlined in the Building System Commissioning requirements included in sections 1.E.7 Commissioning Plan, 01 9100, 01 9119, 23 0800 and 26 0800 of this project manual.

d. The Contractor shall provide all personnel and equipment required to complete the quality assurance activities and reporting, and coordinate with Owner as noted in the Quality Assurance Log. The requirements of the Quality Assurance Log shall be completed in their entirety before substantial completion and submitted as referenced in the Closeout Log.

24. MECHANICAL, ELECTRICAL, PLUMBING (MEP) PRE-INSTALLATION MEETING(S)

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

25. COST BREAKOUT FOR OWNER’S ACCOUNTING PURPOSES (NOT USED)

26. PROJECT MANAGEMENT/COMMUNICATION REQUIREMENTS

a. The Contractor shall be represented at the site by both a competent full-time Project Manager and a full-time, competent superintendent with no other assigned duties or responsibilities from the beginning of the work until its final acceptance, unless otherwise permitted by the Owner’s Representative. The superintendent for the Contractor for the general building work shall exercise general supervision over all subcontractors of any tier engaged on the work with decision-making authority of the Contractor.

b. The Contractor shall use a current industry standard (Primavera, Microsoft Project, etc.) project scheduling software which provides as a minimum: Critical paths, milestones,
estimated and actual start and completion dates, scheduled vs. actual progress, and detailed task and subtask breakdown. The following schedules shall be provided as a minimum and kept current: Overall project schedule, four- (4-) week look-ahead, and two- (2-) week look-ahead.

c. The Contractor shall furnish on-site Internet access for use by his Project Manager and superintendent and for use by the Owner’s Representative. The contractor shall utilize the Owner’s secure information sharing system, Projex4, for submittals, construction payment process, change orders, RFI’s/ASI’s, O&M manuals and all other project manual requirements as directed by the Owner’s Representative. Field staff are also required to utilize this software as directed by the Owner’s Representative.

The Contractor shall furnish on site job trailer with conference room and office for use by the Owner’s Representative.

d. The Contractor shall provide his on-site superintendent with a handheld cellular telephone.

27. SAFETY PRECAUTIONS AND PROGRAMS

a. The Bidder’s Statement of Qualifications includes a requirement that the Bidder provide its Worker’s Compensation Experience Modification Rates (EMR) and Incidence Rates for the three recent years. The Bidder shall also include the EMR and Incidence Rates of listed major subcontractors on the Bid for Lump Sum Contract. If the EMR exceeds 1 or the Incidence Rate exceeds 13, the Contractor or major subcontractor shall take additional safety measures including, but not limited to, developing a site specific safety plan and assigning a Safety Manager to the Project to perform inspections on a schedule as determined acceptable by the Owner with written reports to be submitted to the Owner. The Owner reserves the right to reject a Bidder or major subcontractor whose rates exceed these stated rates.

b. The contractor shall provide Emergency Contact Information for the Contractor’s on-site staff and home office management as well as contact information for all major subcontractor personnel. This information shall contain business and personal phone numbers for each individual for contact during or after hours in case of an emergency. This information shall be submitted within 15 days of the Notice to Proceed.

28. CONSTRUCTION WASTE MANAGEMENT

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

b. Include the following material to be salvaged or recycled during the course of the project and any additional items:
1) Cardboard
2) Clean wood
3) Beverage containers
4) Concrete
5) Slurry wall materials
6) Bricks and masonry
7) Asphalt
8) Metals from framing, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze
9) Mechanical and electrical equipment
10) Building components which can be removed relatively intact from existing construction
11) Packaging materials
12) Glass
13) Scraps from new gypsum wall board
14) Carpet and pad
15) Acoustical ceiling panels
16) Plastics

29. 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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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 that the critical milestone and end dates spelled out in the contract are achieved.
   b) Related Documents
      Drawings and general provisions of the Contract, including General Conditions’ Article 3.17 shall apply to this Section.
   c) Stakeholders
      A Stakeholder is anyone with a stake in the outcome of the Project, including the University, the University Department utilizing the facility, the Design Professionals, the Contractor and subcontractors.
   d) Weather
      (1) Contractor acknowledges that there will be days in which work cannot be completed due to the weather, and that a certain number of these lost days are to be expected under normal weather conditions in Missouri.
      (2) Rather than speculate as to what comprises “normal” weather at the location of the project, Contractor agrees that it will assume a total of 44 lost days due to weather over the course of a calendar year, and include same in its as planned schedule. For projects of less than a calendar year, lost weather days should be prorated for the months of construction in accordance with the following schedule.
      (3) Anticipated weather days for allocation/proration only. For projects lasting 12 months or longer, the 44 days per year plus whatever additional months are included will constitute normal weather.

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<tr>
<th>Jan – 5 days</th>
<th>Feb – 5 days</th>
<th>Mar – 4 days</th>
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<td>May – 3 days</td>
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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 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 subcontractors plan for performing the contract work.
         Contractor shall review each major subcontractor’s schedule with the sub and obtain the subcontractor’s concurrence with the schedule, prior to submitting to the University.
      (3) Schedule Updates.
         (a) Schedule Updates will be conducted once a month, at a minimum. Actual Start and Finish dates should be recorded regularly during the month. Percent Complete, or Remaining Duration shall be updated as of the data date, just prior to Contractor’s submittal of the update data.
(b) Contractor will copy the previous months schedule and will input update information into the new monthly update version.

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

(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 including the following, in addition to Contractor’s work.
      (1) Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by the following:
         (a) Requirements for phased completion and milestone dates.
         (b) Work by separate contractors.
         (c) Work by the Owner.
(d) Coordination with existing construction.
(e) Limitations of continued occupancies.
(f) Uninterruptible services.
(g) Partial occupancy prior to Substantial Completion.
(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.
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UNIVERSITY OF MISSOURI
ROOF SYSTEM MANUFACTURERS CERTIFICATION
(Revised 12/94)

TO: ______________________________________  Title ___________________________
Project No. __________________
Location __________________

Our technical staff has examined the Architect/Engineer’s Drawings, Specifications and required warranty for the roofing work on this project. We do not wholly endorse the building design or any materials or services not part of our advertised roofing system.

CERTIFICATION

We hereby certify that:

1. All materials we will furnish and deliver to the project shall be of good merchantable quality, shall meet or exceed the Specifications required and shall, if properly applied by one of our approved roofing applicator firms in accord with our instructions, provide a sound weather/watertight roofing system.

2. Upon completion of the installation in accord with the Drawings and specifications and our recommended installation procedures, we shall issue a total system warranty specified in the project Specifications.

3. The Drawings and Specifications follow the recommendations of our roofing manual for this type of roofing system with:

   No exceptions.

   The following exceptions: (The roofing system will be approved for this project if the following changes are made to the Contract Documents. The bid provided with this Document includes the required changes).

   NOTE: Exceptions may cause Owner to reject bid.

   Exceptions are as follows:

   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

4. The Warranty will be issued for the following proposed roofing system:

   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

   ROOFING SYSTEM MANUFACTURER: ________________________________________________

   Authorized Signature: ___________________________________________________________

   Title: ______________________________________  Date ___________________________

   Telephone Number: ( ) __________________

   Fax Number: ( ) ________________________
WHEREAS (NAME AND ADDRESS OF COMPANY) herein referred to as Roofing Contractor, certify that they have furnished and installed all roofing, flashing, sheet metal and related components in accordance with the Contract Documents and as required by the Roofing System Manufacturer=s installation instructions on the facility described below:

Facility: ____________________________________________

Owner: University of Missouri-(CAMPUS) (CAMPUS ADDRESS)

Date of Full Completion: ________________

Approximate Area of Roof: ________________

Type of Roofing Material: __________________________

Manufacturer’s Specification Number: ________

Thickness and Type of Roof Insulation: __________________________

NOW, THEREFORE, Roofing Contractor guaranties to the Owner, subject only to the exclusions stated hereinafter, that all roofing, flashing and sheetmetal work is fully and integrally watertight and is free from faults and defects in material or workmanship, and is guaranteed for a period of three (3) years from date of full completion of work.

EXCLUSIONS: This guarantee does not cover, and Roofing Contractor shall not be liable for the following:

1. Damage to the roofing system caused by fire, lightning, tornado, hurricane or hailstorm.

2. Damage to roofing system caused by significant settlement, distortion or failure of roof deck, walls, or foundations of building, excepting normal building expansion and contraction is not a part of this exclusion.

3. Abuse by the Owner and/or third parties.

REPAIRS: Owner shall promptly notify Roofing Contractor, in writing, of the need for repair of roofing, flashing, or sheet metal:

1. Roofing Contractor, within eight (8) hours after receipt of such notice, shall make emergency repairs at its expense, as required to render the facility watertight.

2. Within five (5) days after receipt of such notice, Roofing Contractor shall at its expense correct any faults or defects in material or workmanship.

3. Should needed repairs not be covered by this guarantee, Roofing Contractor, after having obtained Owner’s written consent, shall make such repairs at Owner’s expense. Following said repairs, this guarantee shall thereafter remain in effect for the unexpired portion of the original term. If Owner does not so consent or repairs are made by others than the Roofing Contractor, this guarantee shall terminate for those parts of the roof affected by the repair.

4. In the event that Owner has notified the Roofing Contractor of the need for repairs and (i) Roofing Contractor does not immediately make repairs, or (ii) Roofing Contractor disclaims responsibility
for the repairs and Owner disagrees, or (iii) Owner considers Roofing Contractor=s quoted cost for repairs not covered by this guarantee to be unreasonable and, an emergency condition exists which requires prompt repair to avoid substantial damage or loss to Owner, then, Owner may make such temporary repairs as he finds necessary and such action shall not be a breach of the provisions of this guarantee.

ANNUAL INSPECTIONS: Roofing Contractor shall inspect roof installation prior to each of the three anniversary dates from date of full completion of the work.

1. Inspection team to include Roofing Contractor, Roof Manufacturer, and Owner=s Representative.
2. Inspection of total roof system will be included in the annual inspections.
3. All defects in total roof system will be corrected by the Roofing Contractor within 30 days of inspection.
4. Roof manufacturer will certify by a written report that roof inspection has been completed, defects are acknowledged, and will warrant any repairs.
5. All corrective work completed by Roofing Contractor shall be warranted as approved by the Roofing Manufacturer.

ROOF MODIFICATION: Should Owner require work to be done on roof of said facility including modifications, alternations, extensions or additions to roof and including installation of vents, platforms, equipment, bracings or fastenings, Owner shall notify Roofing Contractor and give Roofing Contractor an opportunity to make recommendations as to methods necessary to safeguard against damage to roofing covered by this guarantee. Failure of Owner to give Roofing Contractor such opportunity or failure to follow methods recommended by Roofing Contractor shall render this guarantee null and void to the extent such failure should result in damage to roofing covered by this guarantee.

NOTICES: Notification of Roofing Contractor by Owner, shall be fulfilled by sending notice to Roofing Contractor.

IN WITNESS WHEREOF, we set our hands this _____ day of ___________, 20___.

By:________________________________________________________

Title:____________________________________________________

For Roofing Contractor

Name:____________________________________________________

Address:__________________________________________________

Phone:___________
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<th>SPECIFICATION / SUBMITTAL DESCRIPTION</th>
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### MEDICAL EQUIPMENT SUPPORT SYSTEMS
- Delegated-Design Submittal for Cold-formed steel framing
- Product Test Reports-Steel sheet
- Product Test Reports-Expansion anchors
- Product Test Reports-Power-actuated anchors
- Product Test Reports-Mechanical fasteners
- Product Test Reports-Vertical deflection clips
- Product Test Reports-Misc structural clips and accessories

### METAL FABRICATIONS
- Delegated-Design Submittal
- **05 5000**
- **05 5100**
- Shop Drawings-Steel Shapes
- Shop Drawings-Metal Ladders
- Shop Drawings-Metal Bollards
- Shop Drawings-Loose Steel Lintels
- Delegated Design Submittal

### METAL STAIRS
- Delegated-Design Submittal
- **06 1053** MISCELLANEOUS ROUGH CARPENTRY
- **06 1600** SHEATHING
- **06 4116** PLASTIC - LAMINATE - FACED ARCHITECTURAL CABINETS
- **06 6200** RESIN PANEL SYSTEMS
- **07 2100** THERMAL INSULATION
- **07 2419** WATER/DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM

### Products
- **05 4523**
- **05 5000**
- **05 5100**
- **06 1053**
- **06 1600**
- **06 4116**
- **06 6200**
- **07 2100**
- **07 2419**

**General Site - Primary Care Clinic North**
Bid Package 2 - Building Site Paving
MU Project #CP190411

SDSL - Page 2 of 17
SHOP DRAWING AND SUBMITTAL LOG
<table>
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<td>ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS</td>
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General Site - Primary Care Clinic North
Bid Package 2 - Building Site Paving
MU Project #CP190411

SDSL - Page 5 of 17
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Bid Package 2 - Building Site Paving
MU Project #CP190411

SDSL - Page 6 of 17
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Bid Package 2 - Building Site Paving
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**General Site - Primary Care Clinic North**

Bid Package 2 - Building Site Paving

MU Project #CP190411

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General Site - Primary Care Clinic North
Bid Package 2 - Building Site Paving
MU Project #CP190411

SDSL - Page 14 of 17
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Bid Package 2 - Building Site Paving
MU Project #CP190411
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Shop Drawings
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Manufacturer's Maintenance Manual

28 0000 ELECTRONIC SAFETY AND SECURITY

28 0500 COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

28 2300 VIDEO SURVEILLANCE

28 3000 ELECTRONIC DETECTION AND ALARM

31 3116 TERMITE CONTROL

31 2000 EARTH MOVING

32 1216 ASPHALT PAVING

32 1313 CONCRETE PAVING

32 1316 DECORATIVE CONCRETE PAVING

32 1373 CONCRETE PAVING JOINT SEALANTS

Civil

General Site - Primary Care Clinic North
Bid Package 2 - Building Site Paving
MU Project #CP-150411
## SHOP DRAWING AND SUBMITTAL LOG

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### Additional Submittals

- **Product Data**
- **Samples for Verification**
- **Pavement Joint-Sealant Schedule**
- **Qualification Data**
- **Product Certificates**
- **Product Test Reports**
- **Preconstruction Compatibility and Adhesion Reports**

#### 32 1380 - Pavement Markings
- **Product Data**

#### 32 8400 - Irrigation
- **Product Data**
- **Wiring Diagrams**
- **Delegated-Design Submittal**
- **Coordination Drawings**
- **Qualification Data**
- **Zoning Chart**
- **Controller Timing Schedule**
- **Field Quality-Control Reports**

#### 32 9200 - Turf and Grasses
- **Qualification Data**
- **Certification of Grass Seed**
- **Product Certificates**
- **Pesticides and Herbicides**
- **Product Specs and Certifications for Hydrosed**
- **Maintenance Data**

#### 32 9300 - Landscape Plants
- **Product Data**
- **Samples for Verification**
- **Qualification Data**
- **Product Certificates**
- **Pesticides and Herbicides**
- **Sample Warranty**

#### 33 4100 - Storm Utility Drainage Piping
- **Product Data for each product listed**
- **Shop Drawings**
- **Field Quality-Control Reports**
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## OPERATING INSTRUCTIONS AND SERVICE MANUAL LOG

**Project:** General Site - Primary Care Clinic North

**Project Number:** CP190411

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**Project:** General Site - Primary Care Clinic North  
**Project Number:** CP190411

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## OPERATING INSTRUCTIONS AND SERVICE MANUAL LOG

### Project: General Site - Primary Care Clinic North

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### Project: General Site - Primary Care Clinic North

**Project Number:** CP190411

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# CLOSEOUT LOG

## Project: General Site - Primary Care Clinic North

### Project Number: CP190411

### Contractor:

<table>
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<tr>
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## CLOSEOUT LOG

**Project:** General Site - Primary Care Clinic North  
**Project Number:** CP190411  
**Contractor:**

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Commissioning Plan—Construction Phase

Summary

The Commissioning Plan—Construction Phase is developed in draft form for the specific project during the design phase. During the design phase, the plan provides direction for the development of the site-specific commissioning specifications by the design team. During the construction phase, the plan provides direction for the commissioning tasks during construction. The plan focuses on providing support for the specifications and provides forms for the application of the commissioning process.

Table of Contents

1. Overview..................................................................................................................................................5
   1.1 Abbreviations and Definitions...........................................................................................................5
   1.2 Purpose of The Commissioning Plan .................................................................................................5
   1.3 Commissioning Scope.........................................................................................................................6
   1.4 Commissioned Systems .......................................................................................................................6

2. General Building Information .............................................................................................................7

3. Construction/Cx Team Data (primary parties) ..................................................................................7

4. Roles and Responsibilities...................................................................................................................10
   4.1 Locations of Role Descriptions .........................................................................................................10
   4.2 Team Members ................................................................................................................................10
   4.3 General Management Plan ..............................................................................................................10
   4.4 General Descriptions of Roles .........................................................................................................10

5. Commissioning Process ......................................................................................................................11
   5.1 Commissioning Scoping Meeting .....................................................................................................11
   5.2 Final Commissioning Plan—Construction Phase ............................................................................11
   5.3 Site Observation ..............................................................................................................................11
5.4 Meetings .................................................................................................................................11
5.5 Management Protocols .........................................................................................................12
5.6 Progress Reporting and Logs ................................................................................................13
5.7 Initial Submittals and Documentation ...................................................................................14
  5.7.1 Standard Submittals ........................................................................................................14
  5.7.2 Special Submittals, Notifications and Clarifications .......................................................14
5.8 Prefunctional Checklists, Tests and Startup ........................................................................14
  5.8.1 Start-up Plan ....................................................................................................................15
  5.8.2 Execution of Checklists and Startup ..............................................................................15
  5.8.3 Sampling Strategy for CxA Observation of Prefunctional Checkout and Startup ..........16
  5.8.4 Deficiencies and Non-Conformance ...........................................................................16
  5.8.5 Phased Commissioning ...............................................................................................16
  5.8.6 TAB ..............................................................................................................................16
  5.8.7 Controls Checkout Plan ...............................................................................................16
5.9 Development of Functional Test and Verification Procedures ..............................................17
  5.9.1 Overview .......................................................................................................................17
  5.9.2 Scope of Testing ............................................................................................................17
  5.9.3 Development Process ....................................................................................................17
  5.9.4 Testing Plan Overview ...............................................................................................18
5.10 Execution of Functional Testing Procedures .......................................................................18
  5.10.1 Overview and Process ...............................................................................................18
  5.10.2 Deficiencies and Retesting .......................................................................................18
  5.10.3 Facility Staff Participation ..........................................................................................18
  5.10.4 Phased Testing ..........................................................................................................18
  5.10.5 Sampling ....................................................................................................................18
5.11 O&M manuals and Warranties ..........................................................................................18
  5.11.1 Standard O&M Manuals .........................................................................................18
  5.11.2 Commissioning Record ...........................................................................................19
5.12 Training and Orientation of Owner Personnel ......................................................................19
5.13 Warranty Period ..................................................................................................................20

6. Written Work Products ...........................................................................................................20

7. Schedule ................................................................................................................................21
  7.1 General Issues ..................................................................................................................21
  7.2 Project Schedule ...............................................................................................................22
Commissioning Plan—Construction Phase

Project: MUHC CP190411
Primary Care Clinic North

Contact: ____________________________
Date: ____________________________

Plan Approved: ____________________________
Contractor Signature Title Date

Plan Approved: ____________________________
Owner Signature Title Date

1. Overview

1.1 Abbreviations and Definitions
The following are common abbreviations used in this document.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tr>
<td>A/E-</td>
<td>Architect and design Engineers</td>
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<td>CC-</td>
<td>Controls Contractor</td>
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<td>MU CPM-</td>
<td>Construction Project Manager (Owner)</td>
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<td>FPT-</td>
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<td>MC-</td>
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<td>Testing Coordinator</td>
</tr>
<tr>
<td>TAB-</td>
<td>Test and balance contractor</td>
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</table>

1.2 Purpose of the Commissioning Plan
The purpose of the construction phase commissioning plan is to:

1. Provide direction for the development of the Cx specifications by A/E, during the latter part of the design phase.

2. Provide direction for the commissioning process during construction, particularly providing resolution for issues and providing details that cannot be, or were not, fully developed during design, such as scheduling, participation of various parties, actual lines of reporting and approvals, coordination, etc.

This plan does not provide a detailed explanation of required testing procedures. The detailed testing requirements and procedures are found in the Specifications. Additionally, this plan does not provide extensive narrative on all commissioning concepts, as may be provided in other commissioning guides.
1.3 Commissioning Scope

Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner’s operational needs. This is achieved by beginning in the design phase, documenting the design intent and continuing through construction, acceptance and the warranty period with actual verification of performance.

Commissioning during the construction of this project is intended to achieve the following specific objectives:

According to the Contract Documents:

- Review the Owner’s Project Requirements (design intent) to ensure clear direction is provided and the Basis of design document developed by the design team for completeness.
- Ensure that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
- Verify and document proper performance of equipment and systems.
- Ensure that O&M documentation left on site is complete.
- Obtain documentation that the Owner’s operating personnel are adequately trained for inclusion in final commissioning report.

1.4 Commissioned Systems

The following marked systems will be commissioned in this project. Refer to specifications section 01 91 00 section 1.10 for additional details. All general references to equipment in this document refer only to equipment that is to be commissioned.

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<td>2. Energy Recovery Units</td>
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<td>3. Computer Room AC units w/ Remote Air Cooled Condensing</td>
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<td>5. Variable Volume Fan Terminal Units</td>
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<td>6. Variable Frequency Drives</td>
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2. **General Building Information**

Project:  MUHC CP190411 – Primary Care Clinic North  
Location:  7115 East St. Charles Road, Columbia, MO  65202  
Building Type (office, court, etc.):  Primary Care Medical Facility  
Square Footage:  27,800 sq.ft.  
Number of stories:  One  

Const. Period:  

3. **Construction/Cx Team Data (primary parties)**

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<th>Team Member</th>
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<th>Business address &amp; e-mail address</th>
<th>Phone Numbers (217 unless noted)</th>
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<td>Missouri University Health Care</td>
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<td>Ph:</td>
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<td></td>
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<tr>
<td>Commissioning</td>
<td>CxE Group LLC</td>
<td>20 Edwardsville Prof. Park, Ste A</td>
<td>Ph: 618-659-9601</td>
</tr>
<tr>
<td>Authority</td>
<td></td>
<td>Edwardsville, IL 62025</td>
<td>Fax: 618-659-9589</td>
</tr>
<tr>
<td>Project Manager</td>
<td>Bob Towell</td>
<td><a href="mailto:btowell@cxegroup.com">btowell@cxegroup.com</a></td>
<td>Ph: 618-307-5882</td>
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<tr>
<td></td>
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<td>Cell: 314-591-6543</td>
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<tr>
<td>Project Engineer</td>
<td>Robert Haskell</td>
<td><a href="mailto:rhaskell@cxegroup.com">rhaskell@cxegroup.com</a></td>
<td>Ph: 618-307-5883</td>
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<tr>
<td></td>
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<td>Cell: 217-251-8330</td>
</tr>
<tr>
<td>Architect</td>
<td>Simon Oswald</td>
<td>2801 Woodard Drive, Suite 103</td>
<td>Ph: 573-443-1407</td>
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<tr>
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<td>Architecture</td>
<td>Columbia, MO  65202</td>
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<tr>
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<tr>
<td>Civil Engineer</td>
<td>Engineering Surveys and Services</td>
<td>1113 Fay Street</td>
<td>Ph: 573-449-2646</td>
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<tr>
<td>Team Member</td>
<td>Company &amp; Contact Names</td>
<td>Business address &amp; e-mail address</td>
<td>Phone Numbers (217 unless noted)</td>
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</tr>
<tr>
<td>Structural Engineer</td>
<td>KH Engineering Group, P.A.</td>
<td>15377 West 95th Street Lenexa, KS 66219</td>
<td>Ph: 913-825-9381</td>
</tr>
<tr>
<td>Construction Manager</td>
<td></td>
<td></td>
<td>Ph: Fx:</td>
</tr>
<tr>
<td>Project Principal</td>
<td></td>
<td></td>
<td>Ph: Cell:</td>
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<tr>
<td>Project Manager</td>
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<tr>
<td>Site Manager</td>
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<tr>
<td>Jobsite Office</td>
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<tr>
<td>Electrical Contractor</td>
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<tr>
<td>Project Manager</td>
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<tr>
<td>Site Superintendent</td>
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<tr>
<td>Mech. Contractor</td>
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<tr>
<td>Project Principle</td>
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<tr>
<td>HVAC Site Super.</td>
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<tr>
<td>Startup Manager</td>
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<td>Ph: Cell:</td>
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<tr>
<td>TAB Contractor</td>
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<td>Ph:</td>
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<tr>
<td>Project Manager</td>
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<td></td>
<td>Ph:</td>
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<tr>
<td>Air Side Technician Water Side Tech.</td>
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<tr>
<td>Controls Contractor</td>
<td></td>
<td></td>
<td>Ph: Fax:</td>
</tr>
<tr>
<td>Team Member</td>
<td>Company &amp; Contact Names</td>
<td>Business address &amp; e-mail address</td>
<td>Phone Numbers (217 unless noted)</td>
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<tr>
<td>Account/Project Manager</td>
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<td>Ph: Cell:</td>
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<tr>
<td>Project Engineer</td>
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<tr>
<td>Controls Electrician</td>
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<td>Cell:</td>
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<tr>
<td><strong>Water Treatment</strong></td>
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<tr>
<td>Site Manager</td>
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<td>Ph: Cell:</td>
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<tr>
<td><strong>Plumbing Contractor</strong></td>
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<tr>
<td>Project Manager</td>
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<td>Ph: Cell:</td>
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<tr>
<td>Site Superintendent</td>
<td></td>
<td></td>
<td>Ph:</td>
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</table>
4. Roles and Responsibilities

4.1 Locations of Role Descriptions
Descriptions and explanations of the roles and responsibilities of those in the commissioning process are found in the following places in the Contract Documents:

List of team members: Cx Plan, 4.2
Management plan outline: Cx Plan, 4.3
General roles: Cx Plan, 4.4
Specific responsibilities:

Information for all parties: Cx Plan 5; Specifications Section 01\(^1\)
MU CPM: Cx Plan 5; Specifications

Section 01\(^1\)

Mechanical contractor, TAB, controls contractor, subs and mfr’s: Specifications Sections 01\(^1\), 23
Electrical contractor, subs and mfr’s: Specifications Sections 01\(^1\), 26
Commissioning authority: Specifications Section 01\(^1\)
A/E: A/E contract, Specifications Section 01\(^1\)

\(^1\)Specifications Section 01 includes: 01 9100, 01 9119.

4.2 Team Members
The members of the commissioning team consist of the Commissioning Authority (CxA), the Construction Project Manager (MU CPM), the General Contractor (GC or Contractor), the Architect and design engineers (particularly the mechanical engineer), the Mechanical Contractor (MC), the Electrical Contractor (EC), the TAB representative, the Controls Contractor (CC), and any other installing Subcontractors or suppliers of equipment. If known, the Owner’s building or plant operator/engineer is also a member of the commissioning team.

4.3 General Management Plan
The Owner has retained the services of a Commissioning Authority (CxA) under a separate contract from other subcontractors. In general, the CxA coordinates the commissioning activities and reports to the MU CPM. The CxA’s responsibilities, along with all other contractors’ commissioning responsibilities are detailed in the specifications. The Specifications will take precedence over this Cx Plan. All members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents. Refer to the management protocols section below.

4.4 General Descriptions of Roles
General descriptions of the commissioning roles are as follows:

CxA: Coordinates the Cx process, assists in writing test procedures, oversees and documents performance tests
5. **Commissioning Process**

This section sequentially details the commissioning process by commissioning task or activity.

### 5.1 Commissioning Scoping Meeting

A commissioning scoping meeting is planned and conducted by the CxA. In attendance are the respective representatives of the GC, MU CPM, CxA, A/E and the mechanical, electrical, controls, and TAB subs. At the meeting commissioning parties are introduced and the commissioning process reviewed, management and reporting lines determined. The flow of documents, how much submittal data the CxA will receive, etc. is also discussed. The Cx Plan is reviewed, process questions are addressed, lines of reporting and communications determined and the work products list discussed. Also covered are the general list of each party’s responsibilities, who is responsible to develop the startup plan for each piece of equipment and the proposed commissioning schedule. The outcome of the meeting is increased understanding by all parties of the commissioning process and their respective responsibilities. The meeting provides the CxA additional information needed to finalize the Cx Plan, including the commissioning schedule.

Prior to this meeting the CxA is given, by the GC, all drawings and specifications and the construction schedule by trade. The CxA keeps notes from the meeting and distributes them to each team member.

### 5.2 Final Commissioning Plan--Construction Phase

The CxA finalizes the draft Cx Plan using the information gathered from the scoping meeting. The initial commissioning schedule is also developed along with a detailed timeline. The timeline is fine-tuned as construction progresses. In particular, 30 days prior to startup of the primary equipment, the CxA meets with the GC and develops a detailed commissioning schedule. The commissioning plan is approved by the GC.

### 5.3 Site Observation

The CxA, and MU CPM if applicable, makes periodic visits to the site, as necessary, to witness equipment and system installations.

### 5.4 Miscellaneous Meetings

The CxA attends selected planning and job-site meetings in order to remain informed on construction progress and to update parties involved in commissioning. The MU CPM and GC provide the CxA with information regarding substitutions, change orders and any Architect’s Supplemental Instructions (ASI) that may affect commissioning equipment, systems or the commissioning schedule. The CxA may review construction meeting minutes, change orders or ASIs for the same purpose.
Later during construction, necessary meetings between various commissioning team parties will be scheduled by the CxA, through the MU CPM, as required.
5.5 **Miscellaneous Management Protocols**

The following protocols will be used on this project.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>For requests for information (RFI) or formal documentation requests:</td>
<td>The CxA goes through GC or A/E.</td>
</tr>
<tr>
<td>For minor or verbal information and clarifications:</td>
<td>The CxA goes direct to the informed party, with all communications copied to MU CPM.</td>
</tr>
<tr>
<td>For notifying contractors of deficiencies:</td>
<td>The CxA documents deficiencies through the GC, but may discuss deficiency issues with contractors prior to notifying the GC.</td>
</tr>
<tr>
<td>For scheduling functional tests or training:</td>
<td>The CxA may provide input for and do some coordination of training and testing, but does not do any scheduling.</td>
</tr>
<tr>
<td>For scheduling commissioning meetings:</td>
<td>The CxA schedules and notifies attendees directly in coordination with the GC and MU CPM</td>
</tr>
<tr>
<td>For making a request for significant changes:</td>
<td>The CxA has no authority to issue change orders.</td>
</tr>
<tr>
<td>For making small changes in specified sequences of operations:</td>
<td>The CxA may <em>not</em> make changes to specified sequences without approval from the A/E.</td>
</tr>
<tr>
<td>Subcontractors disagreeing with requests or interpretations by the CxA shall:</td>
<td>Try and resolve with the CxA first. Then work through GC who will work with CxA directly or through the MU CPM to resolve the situation.</td>
</tr>
</tbody>
</table>

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5.6 **Progress Reporting and Logs**

At the beginning of construction, the CxA provides the MU CPM with monthly commissioning progress reports. Thirty (30) days prior to the startup of the first piece of major equipment, the frequency of progress reports is increased to twice per month, until startup is completed. Thirty (30) days before functional testing of equipment begins, weekly progress reports are required until functional testing and all non-conformance issues are resolved. The MU CPM may adjust the reporting frequency as needed. The progress reports contain: an update of the schedule with list of requested schedule changes and new items added to the schedule, a list of new and outstanding deficiencies, a description of commissioning progress corresponding to the plan, etc. The CxA keeps a log of all commissioning-related issues that require current or future attention. The CxA will keep a record tracking the status of documentation and testing for each piece of equipment and system (e.g., installer, party responsible for startup, approval dates for checklist and testing forms, their completion, training, O&M documentation review, etc.).

The CxA regularly communicates with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling issues through memos, progress reports, etc.

The CxA will keep all commissioning materials in an organized notebook.
5.7 Initial Submittals and Documentation

5.7.1 Standard Submittals
The CxA provides all Subs responsible for commissioned equipment with commissioning documentation requirements for their respective equipment and systems through the MU CPM. This data request typically coincides with the normal A/E submittal process. At minimum, this equipment data includes installation and start-up procedures, O&M data, performance data and control drawings. The CxA reviews and approves submissions relative to commissioning issues expressed in the contract documents, not for general contract compliance (which is the A/E’s responsibility), unless specifically directed by the owner to do so. The CxA will track document requests and received documents to facilitate compilation of the final O & M documentation review. CxA recommendations are provided to the A/E, owner or MU CPM as directed.

5.7.2 Special Submittals, Notifications and Clarifications
The Subs, GC or A/E notify the CxA of any new design intent or operating parameter changes, added control strategies and sequences of operation, or other change orders that may affect commissioned systems. The controls contractor provides the CxA a full points list with details requested by the CxA. Thirty (30) days prior to performing owner-contracted tests, the Subs provide the CxA full details of the procedures. As the phases of the TAB are completed, the draft TAB report is provided to the CxA with full explanations of approach, methods, results, data table legends, etc. The final TAB report is provided to the CxA upon completion.

These submittals to the CxA do not constitute compliance for submittals for the O&M manuals. Documentation requirements for the O&M manuals are discussed in Section 5.11, herein.

The CxA may request additional design narrative from the A/E and from the controls contractor depending on completeness of the documentation provided with the bid documents. The CxA may submit written RFI’s to contractors through the MU CPM, or address them directly for clarifications, as needed.

5.8 Prefunctional Checklists, Tests and Startup
Prefunctional checklists (PFC) are important to ensure that the equipment and systems are installed and operational and that functional performance testing may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout by the Contractor. No sampling strategies are used. In general, the prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

Prefunctional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., oil levels OK, fan belt tension, labels affixed, gages in place, sensor calibration, etc.). However, some prefunctional checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three phase pump motor of a chiller system). The word prefunctional refers to before functional testing. Prefunctional checklists augment and are combined with the manufacturer’s start-up checklist.

Contractors typically already perform some, if not many, of the prefunctional checklist items the commissioning authority will recommend. However, few contractors document in writing the execution of these checklist items. This project requires that the procedures be documented in writing by the installing technician. The CxA does not witness much of the prefunctional check listing, except for testing of larger or more critical pieces of equipment and some spot-checking.
5.8.1 Start-up Plan
The CxA assists the commissioning team members responsible for startup in developing detailed start-up plans for all equipment. The parties responsible for each part of startup and initial checkout are identified and start-up plans are developed.

A. The following procedures will be used for this project: (the CxA is responsible for the plan development):

1. The Contractor shall develop prefunctional checklists and procedures with the assistance of the CxA. These checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.

2. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form may have more than one trade responsible for its execution.

3. The Subcontractor responsible for the purchase of the equipment develops the full startup plan by combining the CxA's checklists with the manufacturer's detailed startup and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.

4. The full start-up plan shall at a minimum consist of the following items:
   a. The prefunctional checklists.
   b. The manufacturer’s standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
   c. The manufacturer’s normally used field checkout sheets.

5. The Contractor shall submit the full startup plan to the CxA for review and approval.

6. The CxA shall review and evaluate the procedures and the format for documenting them, noting any procedures that need to be revised or added.

5.8.2 Execution of Checklists and Startup
Four weeks prior to startup, the contractors schedule startup and initial checkout with the MU CPM and CxA. The startup and initial checkout are directed and executed by the Contractor. The CxA, and MU CPM if necessary, observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, when a sampling strategy is used. For components of equipment, (e.g., VAV boxes), the CxA observes a sampling of the prefunctional and start-up procedures.

To document the process of startup and checkout, the site technician performing the line item task initials and dates each paragraph of procedures in the “Start-up Plan” and checks off items on the prefunctional and manufacturer field checkout sheets, as they are completed. Only individuals having direct knowledge of a line item being completed shall check or initial the forms.

The Subs and vendors execute the checklists and tests and submit a signed copy of the completed start-up and prefunctional tests and checklists to the CxA. The CxA may review prefunctional checklists in progress, as necessary. On smaller equipment or projects, the checklists (which all contain more than one trade’s responsibility), may be passed around to the Subs to fill out. For larger projects, each trade may need a full form and the CxA will consolidate them later.
5.8.3 Sampling Strategy for CxA Observation of Prefunctional Checkout and Startup

The following table provides a tentative list of the equipment and how much of the prefunctional checkout and startup work will be witnessed by the commissioning authority.

<table>
<thead>
<tr>
<th>Equipment or System</th>
<th>Fraction To Be Observed by CxA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaged roof top units</td>
<td>100%</td>
</tr>
<tr>
<td>Pumps, VFD’s</td>
<td>50%</td>
</tr>
<tr>
<td>Pipe flushing</td>
<td>At beginning and end</td>
</tr>
<tr>
<td>Terminal units</td>
<td>20 boxes</td>
</tr>
<tr>
<td>Building automation system</td>
<td>Observe portion of checkout and calibration, 100% testing</td>
</tr>
<tr>
<td>TAB work</td>
<td>Observe selected TAB</td>
</tr>
<tr>
<td>Other misc. equipment</td>
<td>As necessary</td>
</tr>
</tbody>
</table>

5.8.4 Deficiencies and Non-Conformance

The Subs clearly list any outstanding items of the initial start-up and prefunctional procedures that were not completed successfully at the bottom of the procedures form or on an attached sheet. The procedures form and deficiencies are provided to the CxA within two days of test completion. The CxA works with the Subs and vendors to correct and retest deficiencies or uncompleted items, involving the MU CPM and others as necessary. The installing Subs or vendors correct all areas that are deficient or incomplete according to the checklists and tests. The CxA recommends approval of the startup and initial checkout of each system to the MU CPM.

5.8.5 Phased Commissioning

This project will not require startup and initial checkout to be executed in phases.

5.8.6 TAB

The TAB contractor submits the outline of the TAB plan and approach to the CxA and the controls contractor eight weeks prior to starting the TAB. Included in the approach, is an explanation of the intended use of the building control system. The CxA reviews the plan and approach for understanding and coordination issues and may comment, but does not “approve.” The controls contractor reviews the feasibility of using the building control system for assistance in the TAB work. The TAB submits weekly written reports of discrepancies, contract interpretation requests and lists of completed tests to the CxA and MU CPM. This facilitates quicker resolution of problems and will result in a more complete TAB before functional testing begins.

TAB work will not begin until the control system has been pre-functionally tested and selective functional tests have been performed and approved by the CxA.

5.8.7 Controls Checkout Plan

The controls contractor develops and submits a written step-by-step plan to the CxA which describes the process they intend to follow in checking out the control system and the forms on which they will
document the process. The controls contractor will also meet with the TAB contractor prior to the start of TAB and review the TAB plan to determine the capabilities of the control system for use in TAB. The controls contractor will provide the TAB with any necessary unique instruments for setting terminal unit boxes and instruct TAB in their use (handheld control system interface for use around the building during TAB, etc.). The controls contractor shall also provide a technician qualified to operate the controls to assist the TAB contractor in performing TAB.

All CxA-required controls prefunctional checklists, calibrations, start-up and selected functional tests of the system shall be completed and approved by the CxA prior to TAB. The controls contractor shall execute the tests and trend logs assigned to them in sections 01 91 00 and 23 08 00 and remain on site for assistance for mechanical system functional tests as specified in the same sections.

5.9 Development of Functional Test and Verification Procedures

5.9.1 Overview

Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure set point). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system’s sequences of operation and components are verified to be responding as the sequences state. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor.

5.9.2 Scope of Testing

The specification “Functional Performance Testing” Sections 01 0900 part 3.6 provide functional testing scope and process description. If specific testing requirements were not included in the bid documents and original specifications, they should be developed for this project for each piece of commissioned equipment.

5.9.3 Development Process

Before test procedures are written, the CxA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences, and parameters. Using the testing parameters and requirements in Sections 23 08 02 and 26 08 02, the CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. The Contractor shall assist the Subs or vendor responsible to execute a test and the CxA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CxA shall provide a copy of the test procedures to the Contractor who shall review the tests for feasibility, safety, equipment, and warranty protection. The CxA may submit the tests to the A/E for review if requested. Blank copies of the procedures are input into the O&M manuals for later use by operations staff.

Functional testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system’s trend log capabilities or by stand-alone data loggers. The CxA follows the Specifications when given and uses judgment where needed to determine which method is most appropriate. According to the Specifications, not all pieces of identical equipment receive in-depth testing. The CxA reviews owner-contracted, factory or required owner acceptance tests and determines what further testing may be required to comply with the Specifications. Redundancy is minimized.
5.9.4 Testing Plan Overview
To provide the contractors with a better idea of where functional testing lies in the schedule, what issues are preventing the start of testing, which contractors are needed for each test and how much time might be expected from them, a Functional Testing Plan Overview, may be used. This form is filled out after most equipment has been started up and when functional testing dates are not too far off. The form is provided to the Contractors to assist in moving more efficiently to functional testing.

5.10 Execution of Functional Testing Procedures

5.10.1 Overview and Process
The CxAs schedules functional tests through the MU CPM, GC and affected Subs. For any given system, prior to performing functional testing, the CxA waits until the prefunctional checklist has been submitted with the necessary signatures, confirming that the system is ready for functional testing. The CxA oversees, witnesses and documents the functional testing of all equipment and systems according to the Specifications and the Cx Plan. The Subs execute the tests. The control system is tested before it is used to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems and finally to interlocks and connections between systems. Refer to Section 6 for details on functional testing scope.

5.10.2 Deficiencies and Retesting
The CxA documents the results of the test. Corrections of minor deficiencies identified are made during the tests at the discretion of the CxA. The CxA records the results of the test on the procedure or test form. Deficiencies or non-conformance issues are noted and reported to the MU CPM. Subs correct deficiencies, notify the CxA, and certify the correction. Retesting is scheduled by the CxA through the MU CPM. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between CxA or MU CPM and the Sub. For areas in dispute, final authority, besides the Owner’s, resides with the PM. The CxA recommends acceptance of each test to the MU CPM. The MU CPM gives final approval on each test. A record, listing all tests and their status will be kept.

5.10.3 Facility Staff Participation
The Owner’s facilities operating staff are encouraged to attend and participate in the testing process. The CxA will notify the MU CPM, who will then notify the facility staff when the commissioning events will occur.

5.10.4 Phased Testing
Refer to Section 01 09 00 Part 3.5 for details regarding testing the equipment or systems in phases.

5.10.5 Sampling
Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. The Specifications specify the sampling strategies that are used on this project, if used.

5.11 O&M Manuals and Warranties

5.11.1 Standard O&M Manuals
The CxA reviews the O&M manuals, documentation and redline as-builts for systems that were commissioned to verify compliance with the Specifications. The CxA recommends approval and
acceptance of these sections of the O&M manuals to the MU CPM. The CxA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated.

5.11.2 Commissioning Record
The CxA will compile, organize and index the commissioning data, as detailed in Specifications Section 01 09 00 part 3.8B, by equipment into labeled, indexed and tabbed, three-ring binders and deliver it to the GC, to be included with the O&M manuals. The correspondence, meeting minutes and progress reports, miscellaneous notes, etc. kept in the Commissioning Record Book during construction will not be retained into this record and the O&M manuals.

5.12 Training and Orientation of Owner Personnel
Owner training and orientation on equipment and systems provided by the Contractor is accomplished in three general steps using three forms.

1. **Overall Plan.** After reviewing the specifications, the Owner fills out a table listing all the equipment for which training or orientation will be provided. This table lists, among other things, the type and number of trainees, rigor of training desired by the Owner, the primary responsible subcontractor, the trainer’s company and columns for tracking training agendas. The Owner provides this table to the Contractor and CxA for reference.

2. **Specific Training Agendas.** For each piece of equipment or system for which training is provided, the Owner will provide information regarding the scope of training and the intended audience, for reference by the trainer in developing the training agenda.

   The Contractor will have the trainer provide an Agenda describing the subjects covered, duration of each subject and the methods that will be used in the training, along with the name and qualifications of the trainer(s). The trainer returns this Agenda to the Contractor, who submits it to the Owner. The Owner reviews the Agenda; make comments; approves the Agenda subject to the comments; and submit back to the Contractor. The Contractor provides the approved Agenda to the trainer to use during the training. The trainer provides a copy of the Agenda to each trainee.

3. **Training Record.** For each piece of equipment, prior to training, the Contractor provides each trainer with a training and orientation record. On this form, the trainer documents each training session (duration and general subjects covered). The trainer signs for the session and obtains the signature of each trainee. The trainer also checks off subjects covered on the Agenda. When the training is complete, the Contractor provides a copy of the record, and the trainer’s Agenda, to the Owner and CxA. The Owner reviews and makes final approval. The CxA may witness any of the training sessions.

5.12.1 Special Training and Orientation
The following checked orientation and trainings will be completed by the CxA and A/E according to the specifications:

- **Recommissioning.** The commissioning authority will provide instruction on the use of blank functional test forms for periodic recommissioning of equipment and systems, per the specification.
- **Architect.** The architect will provide a general overview of the facility, its use, special features, tenant and public considerations, etc.
- **Mechanical Design Engineer.** The mechanical designer will provide an overview of the major systems and equipment in the facility, including for each system: the design intent, why the
system was chosen, an overview of its operation, and interactions with other systems, any special areas to be aware of, issues regarding future expansion and remodeling, etc.

Electrical Design Engineer. The electrical designer will provide an overview of the major electrical systems and equipment in the facility, particularly the lighting control systems, fire alarm, security and emergency power, focusing on the design intent, why the system was chosen, an overview of its operation, and interactions with other systems, any special areas to be aware of, issues regarding future expansion and remodeling, etc.

5.13 Warranty Period
During the warranty period, seasonal testing and other deferred testing required is completed according to the Specifications. The CxA coordinates this activity. Tests are executed and deficiencies corrected by the appropriate Subs, witnessed by facilities staff and the CxA. Any final adjustments to the O&M manuals and as-builts due to the testing are made. Refer to specification section 01 91 00 part 3.10 for seasonal testing details for this project. In addition the CxA will return to the project approximately 10 months into the 12 month warranty period. During this visit(s) the CxA will review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. The CxA will also interview facility staff and identify problems or concerns they have operating the building as originally intended. The CxA will make suggestions for improvements and for recording these changes in the O&M manuals. The CxA will identify areas that may come under warranty or under the original construction contract. The CxA will also assist facility staff in developing reports and documents and requests for services to remedy outstanding problems.

6. Written Work Products
The written work products from all parties are described and listed in table form. The table describes each product, who is responsible for producing it, the general due date, the parties who receive it and who approves it, etc.

6.1 Summary Report
A final summary report by the CxA will be provided to the A/E or MU CPM. The report shall include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas: 1) Equipment meeting the equipment specifications, 2) Equipment installation, 3) Functional performance and efficiency, 4) Equipment documentation and design intent, and 5) Operator training. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection, trend log, etc. where the deficiency is documented. The functional performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.

Appendices shall contain acquired sequence documentation, logs, deficiency lists, site visit reports, findings, unresolved issues, communications, etc. Prefunctional checklists and functional tests (along with blanks for the operators) and monitoring data and analysis will be provided in a separate labeled binder.
The commissioning plan, the prefunctional checklists, functional tests and monitoring reports will not be part of the final report, but will be stored in the Commissioning Record in the O&M manuals.

7. Schedule

7.1 General Issues

The following sequential priorities are followed:

1. Equipment is not “temporarily” started (for heating or cooling), until pre-start checklist items and all manufacturers’ pre-start procedures are completed and moisture, dust and other environmental and building integrity issues have been addressed.

2. Functional testing is not begun until prefunctional and start-up and TAB is completed, for a given system (this does not preclude a phased approach).

3. The controls system and equipment it controls are not functionally tested until all points have been calibrated and pre-functional testing completed.

4. TAB is not performed until the controls system has been sufficiently functionally tested and approved by the CxA for TAB work.

5. TAB is not performed until the envelope is completely enclosed and ceiling complete, unless the returns are ducted.
7.2 Project Schedule

The initial commissioning schedule is summarized in Table 7-1.

**Table 7-1. Initial Commissioning Schedule Summary**

<table>
<thead>
<tr>
<th>Task / Activity</th>
<th>Estimated Start Date</th>
<th>Estimated End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial scoping meeting and final plan</td>
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<td></td>
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<tr>
<td>Submittals obtained and reviewed</td>
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<td></td>
</tr>
<tr>
<td>Begin construction site visits/inspections</td>
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<tr>
<td>Prefunctional forms developed and distributed</td>
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<tr>
<td>Startup and initial checkout plans</td>
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<tr>
<td>Startup and initial checkout executed</td>
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<tr>
<td>TAB Water</td>
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<tr>
<td>Functional performance tests</td>
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<tr>
<td>O&amp;M documentation review and verification</td>
<td></td>
<td></td>
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<tr>
<td>Training and training verification</td>
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<td></td>
</tr>
<tr>
<td>Final commissioning report</td>
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<tr>
<td>Seasonal testing</td>
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</table>
# CP190411 Primary Care Clinic North Quality Assurance List

<table>
<thead>
<tr>
<th>Commissioning Items by CSI Division</th>
<th>Verified by:</th>
<th>Date compl</th>
<th>Coord Initial</th>
<th>Documentation Required</th>
<th>Owner Witness Required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Building System Quality Assurance</strong></td>
<td></td>
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<tr>
<td>Quality Assurance Agent - Conduct pre-installation meetings per specifications.</td>
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<td>Perform Building Enclosure Performance Testing Section of specifications</td>
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<td><strong>Cast-In-Place Concrete</strong></td>
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<td>Provide a Copy Of Field Cured Concrete Cylinder Test Report to Owner's Rep Prior to Stripping Any Load Bearing Formwork</td>
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<td></td>
<td></td>
<td>Test Report From Independent Testing Lab</td>
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<tr>
<td>Sampling and testing shall be done in accordance with contract documents</td>
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<td></td>
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<td></td>
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<tr>
<td><strong>Brick Masonry</strong></td>
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<td>Build Mockup as specified</td>
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<td>Inspection Report</td>
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<tr>
<td><strong>Structural Steel Framing</strong></td>
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<td>Perform Field Quality Control section of specifications</td>
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<td></td>
<td></td>
<td>Test Report</td>
<td>✓</td>
</tr>
<tr>
<td>Provide welder qualification report for each welder on site</td>
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<td></td>
<td>Welder Qualifications</td>
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<td>Test Report</td>
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<td>Perform Field Quality Control section of specifications</td>
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<td><strong>66200</strong> Resin Panel Systems</td>
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<td>Commissioning Items by CSI Division</td>
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<td>Submit results of capillary moisture test for each new section of work prior to proceeding</td>
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<td><strong>75419</strong> Polyvinyl-Chloride (PVC) Roofing</td>
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<td>Conduct a preinstallation conference at project site per specifications</td>
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<td>Perform Field Quality Control section of spec.</td>
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<td>Conduct a preinstallation conference at project site per specifications</td>
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<tr>
<td>Perform Field Quality Control section of spec.</td>
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<td>field report</td>
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<td><strong>78413</strong> Penetration Firestopping</td>
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<tr>
<td>Do not enclose firestopping with other construction until inspection has been completed.</td>
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<td></td>
<td></td>
<td>Inspection Report</td>
</tr>
<tr>
<td>Perform Field Quality Control Section of specifications</td>
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<td>Test Report</td>
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<tr>
<td><strong>79200</strong> Joint Sealants</td>
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<tr>
<td>Perform Adhesion Tests per Field Quality Control section of specifications</td>
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<td>field report</td>
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<tr>
<td><strong>81113</strong> Hollow Metal Doors and Frames</td>
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<tr>
<td>Inspect Fire Labels on doors and frames</td>
<td></td>
<td></td>
<td></td>
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<td>itemized list of doors</td>
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<tr>
<td><strong>81416</strong> Flush Wood Doors</td>
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<tr>
<td>Inspect Fire Labels on doors and frames</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inspection Report</td>
</tr>
<tr>
<td><strong>84113</strong> Aluminum- Framed Entrances and Storefronts</td>
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<td>Build Mockups as specified</td>
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<td></td>
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<td>Inspection Report</td>
</tr>
<tr>
<td>Perform Field Quality Control section of specifications. Invite 3rd party commissioner</td>
<td></td>
<td></td>
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<td>field report</td>
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</table>

8/25/2019 COM 4 of 16
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<th>Coord Initial</th>
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<th>Owner Witness Required</th>
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<td>Perform Maintenance Service section of specifications</td>
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<td>Date compl</td>
<td>Coord Initial</td>
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<td>Owner Witness Required</td>
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<td><strong>84229</strong></td>
<td>Sliding Automatic Entrances</td>
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<td>Sign-in Sheet ✔</td>
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<td><strong>85663</strong></td>
<td>Security Windows</td>
<td>Perform Demonstration section of specifications,</td>
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<td>Sign-in sheet ✔</td>
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<td><strong>87100</strong></td>
<td>Door Hardware</td>
<td>Perform Maintenance Service section of specifications</td>
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<td>Transmittal and Sign in sheet ✔</td>
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<tr>
<td></td>
<td></td>
<td>Verify and test all electric strikes and door positioning hardware for proper operation</td>
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<td>Test Report ✔</td>
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<td>Verify door closures comply with ADA requirements</td>
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<td>Test Report ✔</td>
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<td><strong>87113</strong></td>
<td>Automatic Door Operators</td>
<td>Provide factory training per specifications</td>
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<td>Sign in sheet ✔</td>
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<tr>
<td><strong>92900</strong></td>
<td>Gypsum Board</td>
<td>Verify fire rating compliance is maintained, including all wall penetrations</td>
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<td>Inspection Report ✔</td>
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<td>Commissioning Items by CSI Division</td>
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<td>Firm</td>
<td>Date compl</td>
<td>Coord Initial</td>
<td>Documentation Required</td>
<td>Owner Witness Required</td>
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<tr>
<td>93013 Ceramic Tiling</td>
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<td>Meeting Minutes</td>
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<tr>
<td>Hold Preinstallation meetings as specified</td>
<td></td>
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<tr>
<td>Provide Extra Material as specified</td>
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<td>96513 Resilient Base and Accessories</td>
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<td>Provide Extra Material as specified</td>
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<td>Obtain written certification that adhesive is approved by mfr. for specific tile.</td>
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<td>written certification</td>
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<td>Perform pH, Chloride (moisture) and bond tests per manufacturer. Do not proceed until all manufacturing requirements are met.</td>
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<td>test reports</td>
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<tr>
<td>Roll tile immediately after placement and again one hour later with a 100 lb roller.</td>
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<td>Inspection Report</td>
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<td>Name</td>
<td>Firm</td>
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<td>99113 Exterior Painting</td>
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<td>Periodically Check Wet Film Thickness To Assure Conformance With Manufacturer’s Requirements To Achieve Dry Film Thickness</td>
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<td>Transmittal</td>
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<td>Periodically Check Wet Film Thickness To Assure Conformance With Manufacturer’s Requirements To Achieve Dry Film Thickness</td>
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<td>102623 Decorative Protection Panels</td>
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<td>Test Report</td>
</tr>
<tr>
<td></td>
<td>Perform Field Quality Control section of specifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Commissioning Items by CSI Division</td>
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<td>Firm</td>
<td>Date compl</td>
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<td>Documentation Required</td>
<td>Owner Witness Required</td>
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<tr>
<td><strong>200000</strong> Basic Mechanical Conditions</td>
<td></td>
<td></td>
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<tr>
<td>Pull Pressure vessel permits as required by State of Missouri statute</td>
<td></td>
<td></td>
<td></td>
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<td>Pressure vessel permit</td>
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<tr>
<td><strong>201050</strong> Basic Mechanical Methods - General</td>
<td></td>
<td></td>
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<tr>
<td>Perform Cleaning of Piping Systems section of specifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Flush Report and Bacteria test results</td>
<td>✔</td>
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<tr>
<td>Perform Leak Testing of Refrigerant Piping Section of specifications</td>
<td></td>
<td></td>
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<td>Test Report</td>
<td>✔</td>
</tr>
<tr>
<td>Perform Pressure Testing Section of specifications</td>
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<td></td>
<td></td>
<td></td>
<td>Test Report</td>
<td>✔</td>
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<tr>
<td>Train End Users on the operation of all equipment they will use.</td>
<td></td>
<td></td>
<td></td>
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<td>Sign-in sheet</td>
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<tr>
<td><strong>201080</strong> Testing, Adjusting, and Balancing</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Ensure pre-test requirements as specified in paragraph C have been completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Report</td>
<td>☐</td>
</tr>
<tr>
<td>Hold PreBalancing Conference as specified</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Meeting Minutes</td>
<td>✔</td>
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<tr>
<td>Mark equipment settings including central positions, value indicators, fan speed control levers, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inspection Report</td>
<td>☐</td>
</tr>
<tr>
<td>Notify Owner's Representative 14 days prior to the scheduled date for balancing the system.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>written notification</td>
<td>☐</td>
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<td>Date compl</td>
<td>Coord Initial</td>
<td>Documentation Required</td>
<td>Owner Witness Required</td>
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<tr>
<td><strong>202534</strong>&lt;br&gt;Insulation Application Ductwork&lt;br&gt;Ensure mechanical fasteners installed as specified</td>
<td></td>
<td></td>
<td></td>
<td>Inspection Report</td>
<td>✓</td>
<td></td>
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<tr>
<td><strong>210014</strong>&lt;br&gt;Fire Protection System - Acceptance&lt;br&gt;Perform Acceptance section of specifications</td>
<td></td>
<td></td>
<td></td>
<td>NFPA 13 Documentation</td>
<td>✓</td>
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<tr>
<td><strong>Fire Protection System - Testing</strong>&lt;br&gt;Perform Testing section of specifications</td>
<td></td>
<td></td>
<td></td>
<td>NFPA 13 Documentation</td>
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<tr>
<td><strong>210030</strong>&lt;br&gt;Wet Pipe Sprinkler System&lt;br&gt;Furnish Extra Heads as required by NFPA 13</td>
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<td></td>
<td></td>
<td>Transmittal</td>
<td>✓</td>
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<tr>
<td><strong>222000</strong>&lt;br&gt;Plumbing Piping Systems&lt;br&gt;Flush Clean and Test as specified and to meet code</td>
<td></td>
<td></td>
<td></td>
<td>Test and flush reports. Bacteria test results</td>
<td>✓</td>
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<tr>
<td><strong>224000</strong>&lt;br&gt;Plumbing Fixtures&lt;br&gt;Adjust and Test All Fixtures. Clean and flush all floor drains and verify positive drainage, free of blockage</td>
<td></td>
<td></td>
<td></td>
<td>test report</td>
<td>✓</td>
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<tr>
<td><strong>226000</strong>&lt;br&gt;Plumbing Equipment&lt;br&gt;Provide Pressure vessel permit for gas fired water heater if required by state</td>
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<td>Pressure vessel permit</td>
<td>✓</td>
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</tbody>
</table>

8/25/2019
COM 9 of 16
<table>
<thead>
<tr>
<th>Commissioning Items by CSI Division</th>
<th>Verified by:</th>
<th>Firm</th>
<th>Date compl</th>
<th>Coord Initial</th>
<th>Documentation Required</th>
<th>Owner Witness Required</th>
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<tr>
<td>Provide startup and training of water softener</td>
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<td>start-up report and sign in sheet</td>
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<td>232300   Miscellaneous Piping</td>
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<td>written test reports</td>
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<td>Test Natural gas piping per specifications</td>
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<tr>
<td>237300   Air Handling Units</td>
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<td></td>
<td></td>
<td></td>
<td>Sign-in Sheet</td>
<td>✓</td>
</tr>
<tr>
<td>Provide Training. Include 3rd party commissioners</td>
<td></td>
<td></td>
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<tr>
<td>238200   Terminal Units</td>
<td></td>
<td></td>
<td></td>
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<td>Report</td>
<td>✓</td>
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<tr>
<td>Start up unit heaters and Radiator panels</td>
<td></td>
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<tr>
<td>243100   Sheetmetal Ductwork</td>
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<td></td>
<td></td>
<td></td>
<td>test report</td>
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<tr>
<td>test for duct leakage per &quot;Testing&quot; section of spec. Ducts shall meet leakage requirement prior to testing and balancing. Leakage Class at least 4.</td>
<td></td>
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<tr>
<td>243300   Air Distribution Accessories</td>
<td></td>
<td></td>
<td></td>
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<td>test report</td>
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<tr>
<td>Demonstrate Proper Operation of All Fire Dampers per NFPA-90A.</td>
<td></td>
<td></td>
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<td>243400   Fans</td>
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<td>Startup Report and Sign in sheet</td>
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<td>Commissioning Items by CSI Division</td>
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<tr>
<td><strong>250000</strong> Control Systems</td>
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<td>Test Report</td>
</tr>
<tr>
<td>Check and record amp draw on supply transformers of I/O panels</td>
<td></td>
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<tr>
<td>Ensure shipping material has been removed from thermostats and other control devices</td>
<td></td>
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<tr>
<td>Post laminated control diagram in mechanical room</td>
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<tr>
<td>Verify power to all EMCS panels and equipment is complete</td>
<td></td>
<td></td>
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<tr>
<td><strong>260063</strong> Electrical - Motors</td>
<td></td>
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<td>Inspection Report</td>
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<tr>
<td>Ensure motors meet efficiency requirements</td>
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<td><strong>260090</strong> Electrical-Testing and Adjusting</td>
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<td>Sign-in Sheet</td>
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<td>Perform Instructions of Owners Representative section of spec.</td>
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<tr>
<td><strong>260526</strong> Grounding and Bonding for Electrical Systems</td>
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<td>test reports</td>
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<tr>
<td>Conduct grounding tests per specifications</td>
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<tr>
<td><strong>260573</strong> Arc Flash Hazard Analysis, Short Circuit and Selective Coordination</td>
<td></td>
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<td></td>
<td>Inspection Report</td>
</tr>
<tr>
<td>Factory certified technician to set electronic overcurrent devices to approved coordination study setpoints</td>
<td></td>
<td></td>
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<tr>
<td>Commissioning Items by CSI Division</td>
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</tr>
</tbody>
</table>

**Place arcflash labels on equipment as specified**
- **Inspection Report**
- **☑**

**Train owners representatives in setting of overcurrent devices**
- **Sign-up Sheet**
- **☑**

---

**260900**

**Instrumentation and Control for Electrical Systems**

Provide factory training Per testing and Checkout section of specifications

- **Sign in sheet**
- **☑**

---

**262213**

**Dry-Type Transformers**

Perform testing including megger testing

- **test report**
- **☑**

---

**262400**

**Switchboards and Panelboards**

Verify labels and indexes.

- **Inspection Report**
- **☑**

---

**262923**

**Variable Frequency Drives**

Start-up of VFD's shall be by factory rep. Perform all checks per manufacturer's written start-up checklist

- **field report, certification**
- **☑**

---

**264100**

**Facility Lightning Protection**

Provide periodic and final inspections as required by LPI-177 in order to obtain UL Master Label

- **field report, certification, and Master Label**
- **☑**

---
<table>
<thead>
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<th>Owner Witness Required</th>
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<tbody>
<tr>
<td><strong>265200</strong> Emergency Lighting</td>
<td></td>
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<tr>
<td>Illuminate emergency lights for 90 minutes on battery power.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Test Report</td>
<td>✓</td>
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<tr>
<td><strong>275119</strong> Self-Contained Sound-Masking Equipment</td>
<td></td>
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<tr>
<td>Perform Operating and Maintenance Instructions and Demonstrations sections of specifications</td>
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<td></td>
<td></td>
<td>Sign in sheet</td>
<td>✓</td>
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<tr>
<td><strong>285000</strong> Electronic Detection and Alarm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pre test checklist</td>
<td>✓</td>
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<tr>
<td>Pretest fire alarm system</td>
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<tr>
<td>Provide factory training</td>
<td></td>
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<td>Sign in Sheet</td>
<td>✓</td>
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<tr>
<td>Test each system for continuity</td>
<td></td>
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<tr>
<td>Test system operation of pull stations horns/strobes by factory trained representative</td>
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<td></td>
<td></td>
<td></td>
<td>Written certification of fire alarm system per NFPA</td>
<td>✓</td>
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<tr>
<td>Verify battery power available</td>
<td></td>
<td></td>
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<tr>
<td><strong>311000</strong> Site Clearing</td>
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<tr>
<td>Provide temporary fencing around drip lines of trees remaining</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
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<tr>
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</tbody>
</table>

### 312000
**Earth Moving**
- At least 72 hours prior to excavating, contact owner's representative to arrange for utility locates.
- Backfill shall not be placed until work to be covered has been inspected by Owners Representative.
- Conduct site compaction tests per contract documents. Help 3rd party testing agency perform Field Quality Control section of specifications.
- Ensure all excavated areas are properly barricaded for personnel protection.

### 321216
**Asphalt Paving**
- Perform Field Quality Control section of specifications
- Test Report

### 321313
**Concrete Paving**
- Perform Field Quality Control section of specifications
- Test Report

### 321380
**Pavement Markings**
- Perform Field Quality Control section of specifications
- Test Report

### 328400
**Irrigation**
- Perform Demonstration section of specifications
- Sign in sheet
<table>
<thead>
<tr>
<th>Commissioning Items by CSI Division</th>
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<tbody>
<tr>
<td>Perform Field Quality Control section of specifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Test Report</td>
<td>✓</td>
</tr>
<tr>
<td>Perform Startup Service section of specifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Startup Report</td>
<td>✓</td>
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</tbody>
</table>

**330543**
Underground Utilities

| | | | | | Transmittal | ✓ |

| | | | | | Test Report | ✓ |

**331113**
Facility Water Distribution Piping

| | | | | | Bacteris Test Certification | ✓ |

| | | | | | Survey or GPS points and/or Survey Report | ✓ |

| | | | | | Test Report | ✓ |

**331313**
Facility Sanitary Severs

| | | | | | Test Report | ✓ |

**334100**
Storm Utility Drainage Piping

<p>| | | | | | Flush Report | ✓ |</p>
<table>
<thead>
<tr>
<th>Commissioning Items by CSI Division</th>
<th>Verified by:</th>
<th>Firm</th>
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<th>Coord Initial</th>
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<th>Owner Witness Required</th>
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<tbody>
<tr>
<td>Perform Field Quality control section of specifications and check inverted.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Test Report</td>
<td>✓</td>
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</table>
Construction Management Checklist for Energizing Utilities
(Contractor to initial each item upon completion and provide completed form to the Owner's Representative prior to energizing utility)

Water – turned on to the first valve past Energy Management's last valve.

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

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

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

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

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

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

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

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

___ Review all piping and equipment being turned on for proper installation and completed testing.
___ Pressure test completed in piping being turned on.
___ Insulation must be installed.
___ Meter installed, working and connected to Metasys.
___ Building pump and automatic isolation/control valve must be installed and under control.
___ If chillers are installed, automatic loop pump isolation must be installed.
___ Control valves must be installed and automatically controlled on all loads.
___ Contractor has method to communicate “Services On” to other contractor personnel and Owner’s personnel.

2/6/2005
PLEASE SEE FOLLOWING WEBSITE FOR CHECKLIST FORMS:

https://www.cf.missouri.edu/cf/pdc/commissioning-forms
# 1.E.9

**Healthcare Construction Guideline**  
SEPT 2017 Edition

## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TRAINING REQUIREMENTS</td>
<td>2</td>
</tr>
<tr>
<td>2. EMERGENCY PHONE NUMBERS &amp; CONTACT INFORMATION</td>
<td>2</td>
</tr>
<tr>
<td>3. CONTRACTOR IDENTIFICATION BADGE</td>
<td>2</td>
</tr>
<tr>
<td>4. GENERAL SAFETY REQUIREMENTS FOR HEALTH CARE PROJECTS</td>
<td>3</td>
</tr>
<tr>
<td>5. CONSTRUCTION-RENOVATION-MAINTENANCE RISK ASSESSMENT (CRMRA)</td>
<td>3</td>
</tr>
<tr>
<td>6. CRM INFECTION CONTROL RISK MITIGATION CRITERIA (CRMICRMC)</td>
<td>4</td>
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<tr>
<td>7. CONSTRUCTION OF DUST BARRIER WALLS</td>
<td>4</td>
</tr>
<tr>
<td>8. VENTILATION AND NEGATIVE AIR PRESSURE REQUIREMENTS</td>
<td>4</td>
</tr>
<tr>
<td>9. INTERIM LIFE SAFETY MEASURES ASSESSMENT (ILSM)</td>
<td>7</td>
</tr>
<tr>
<td>10. NOISE AND VIBRATION CONTROL MANAGEMENT</td>
<td>7</td>
</tr>
<tr>
<td>11. ABOVE CEILING WORK PERMIT</td>
<td>7</td>
</tr>
<tr>
<td>12. LOCK OUT/TAG OUT PERMIT</td>
<td>8</td>
</tr>
<tr>
<td>13. UTILITY SYSTEMS SHUTDOWN &amp; SERVICE PERMIT</td>
<td>8</td>
</tr>
<tr>
<td>14. HOT WORK &amp; PERMIT</td>
<td>8</td>
</tr>
<tr>
<td>15. EXTERIOR CONSTRUCTION SITE REQUIREMENTS</td>
<td>9</td>
</tr>
<tr>
<td>16. REQUIRED FORMS, PERMITS, POSTINGS AND DOCUMENTATION</td>
<td>10</td>
</tr>
<tr>
<td>17. PROJECT CLEANING AND BARRIER REMOVAL PROCESS</td>
<td>10</td>
</tr>
<tr>
<td>18. APPROVED EQUIPMENT AND PRODUCT INFORMATION</td>
<td>11</td>
</tr>
<tr>
<td>19. HEALTH CARE CONSTRUCTION CLEANING DEFINITIONS</td>
<td>13</td>
</tr>
</tbody>
</table>
Section 1 Training Requirements
The purpose of the training requirements for contractors is to ensure that construction project work in and around the healthcare environment is managed in such a way to minimize health and safety risks associated with construction activities and that contractors know and understand their responsibilities.

Required Training
1. Contractor project managers, superintendents and subcontractor foremen will be required to attend the following training:
   - Minimum of One (1) hour training related to “Infection Control & Dust Barriers” and “Healthcare Construction Training for Contractors”.
2. Contractor project managers, superintendents and subcontractor foremen have the responsibility for ensuring that contractor employees are knowledgeable of the training requirements and direct their employees and project work accordingly.
3. Contractors will be required to utilize the MU Hospital online eMeditrack system for initiating work requests of various types, examples may include infection control barriers, utility outage, various permits required.
4. Contractors are required to report in and sign in and out at the designated location per building location each work day upon arrival and exit of the work location.

Training Agenda
At a minimum the topics to be covered in the training include the following:
2. Contractor Training Requirements.

Documentation
1. All employees who receive training will be required to sign their name on a training acknowledgement form stating that they have been oriented to the training requirements.
2. Healthcare Safety and Infection Control Requirements will be in the project contract documents for further review as required.
3. COMPLIANCE VIOLATIONS: Contractors/Vendors who violate the requirements of this Guideline are subject to disciplinary action and removal from the project.

Section 2 Emergency Phone Numbers & Contact Information
Telephone contacts should be used by the contractor for emergency situations which may arise during the construction project. Contact Plan will be identified and coordinated at the project Pre-Construction Meeting by the owner’s representative.

Section 3 Contractor Identification Badge
Contractors working in and around the MUHC facilities will be required to display and wear the “Contractor Identification Badge” and in accordance with the information displayed below. It is the responsibility of the contractor to provide the computer and color printer for reproduction of badges required. Consult the Owner’s Representative for the electronic file.

Contractor ID Badge
1. Contractor is to issue badges to employees as required. (Contractor to validate employee with proof of ID).
2. Contractor to edit the information, print in color, cut out the badges, fold in the center and insert. Contractor will provide badge holders.
3. Contractor shall keep a roster/log of badged employees by trade/subcontractor at the project jobsite for reference by the Owners Representative.
4. All badges to be collected and returned to PD&C at the end of the project.
5. Any orientation required will be discussed at the pre-construction meeting with the Owner’s Representative.
6. Contractor employees are to wear the badge on the upper chest facing forward unless approved otherwise for safety reasons.
7. All contractor superintendent and foreman shall attend “Healthcare Construction Training” and affix issued “T” sticker in the circle area on badge as shown. This will show evidence that the employee has completed training.
8. The Badge document will be provided to the Contractor to make copies and distribute as required. See Page HCG 12.

**Section 4 General Safety Requirements for Health Care Projects**

The General Contractor and its Subcontractors are responsible for understanding, planning and implementing the following requirements in the management of the project.

1. Make sure shoes/boots and clothing are free of excessive dirt/debris before entering and leaving the construction area.
2. If you leave any dust/dirt or tracks in the occupied area of the healthcare facility, you must stop and clean them up immediately by using a HEPA filtered vacuum and/or a clean dampened floor mop with a UMTH hospital approved furnished cleaning solution.
3. Assure that all construction material, supplies and tools are cleaned and covered with a clean covering material while transporting through the healthcare facility.
4. Ensure that the carts and wheels on tool and supply carts as well as trash/demolition waste carts are properly wiped clean before leaving the construction area. Cleaning/wiping solutions are provided by the hospital and must be approved per direction of the Owner’s Representative.
5. Staff and patients **ALWAYS** have priority and the “Right of Way” in the elevators and corridors.
6. Never use aerosol sprays or cleaning solvents that could dispense fumes, odors or cause potentially allergenic reactions or medical problems to susceptible patients, staff or visitors.

**Section 5 Construction-Renovation-Maintenance Risk Assessment (CRMRA)**

The “Construction-Renovation-Maintenance Risk Assessment” (CRMRA) planning process establishes criteria to be used and measures to be taken for the protection of patients, healthcare workers, visitors and contractors, from construction/renovation activities which could lead to infections or compromise existing life safety systems in the healthcare facility.

Once the Contractor is selected, they will be required, and the Subcontractors as applicable to participate in the “CRMRA” planning process for orientation of project requirements and help in identifying any additional project needs or risks prior to any contract construction work commencing.

The owner’s representative will work with the contractor to coordinate and facilitate these CRMRA planning activities with MUHC engineering services, infection control department and others as required during the duration of the project.

**Section 6 Construction – Renovation – Maintenance Infection Control Risk Mitigation Criteria**

The “Construction-Renovation-Maintenance Infection Control Risk Mitigation Criteria” (CRMIRCMC) is a process to evaluate construction projects for required interventions during construction in order to minimize Hospital Acquired Infections (HAI’s), and controlling dispersal of air and/or water-borne infectious agents concealed within the building components.

All construction activities shall be defined and managed in such a way that occupant’s exposure to dust, moisture and their accompanying hazards is limited.

1. **Construction–Renovation-Maintenance Infection Control Risk Mitigation Criteria** and the **Construction–Renovation-Maintenance Infection Control Risk Mitigation Permit** which will be used for all MUHC construction and renovation projects.
2. **Any work required outside the main project limits will require a NEW Infection Control Risk Assessment.**
3. The owner’s representatives and Contractor will work together to coordinate the assessment and determine the requirements and permit.
4. The owner’s representative will ensure that all required infection control interventions and needed life safety measures required for the project are in place by the contractor prior to starting work. (i.e. barrier walls, tacky mats, required exits, etc.)
5. The contractor shall follow all requirements to support the “Construction – Renovation- Maintenance Infection Control Risk Mitigation Criteria”.
6. The contract documents and CRM IC Permit will provide requirements specific to the project.
7. **Work outside of construction limits.** Prior to contractor performing any work outside of construction limits, the owner’s representative must be notified.

8. Contractors that violate the requirements of the “Construction – Renovation- Maintenance Infection Control Risk Mitigation Criteria/Permit” will be removed from the project.

**Section 7 Construction of Dust Barrier Walls**

Infection control is the number one health concern in a construction project. Infection can occur when workers are not cautious about keeping dust, bacteria, mold, etc. from becoming airborne during the construction process. For these reasons, barrier walls are built to isolate dust and fumes in the construction site to separate the patient care and public areas of the healthcare facility.

**Dust Barriers Walls and Contamination Reduction**

1. A signed copy of the “CRM Infection Control Construction Permit” shall be kept at the job site at all times. Large AND small projects may have several “CRM Infection Control Construction Permits” issued as project phases, needs and assessments evolve.

2. Barriers are required to contain the ceiling envelope, chases, interstitial spaces, etc.

3. When access and exiting to the construction site can only be accomplished through a public area, the interior space of the construction site must be cleaned once every 8 – hour shift to control excessive dust and ventilation filtering issues. Debris shall be removed daily.

4. A temporary fire resistant 6 mil. polyethylene dust barrier is required to control dust while the rigid barrier is being constructed as well as at the end of the job during removal of the rigid barrier.

5. Contractors are responsible to ensure that barrier systems and walls are properly constructed, penetrations sealed and maintained for effectiveness for the duration of the project. Anytime polyethylene is used in a control barrier, it must be fire resistant, 6 mil. See “Approved Equipment and Product Information”.

6. Once barrier walls are built they are required to be cleaned or wiped down prior to the start of work.

7. Barrier doors and exits from the construction site must be installed with a closer and kept in good working order with positive latching.

8. Keep doors closed except when in use in order to minimize migration of dust and to maintain negative air pressure relationships.

9. Doors must have a seal/door sweep installed at the undercut and weather stripping around the metal frame to control the migration of dust from the construction site.

10. Doors in barrier walls which are not in use by the contractor to the public spaces must be sealed off and taped around the door, frame and threshold undercut, in order to minimize migration of dust and to maintain negative air pressure requirements.

11. If an elevator, dumb waiter, pneumatic tube system, stairway, linen chute, or any other chased or open type building system is located within the construction site, a barrier wall system will be required to be built around the open building system from deck to deck and properly sealed at top, bottom and sidewalls.

12. **Upon completion of barriers and prior to beginning work,** the contractor shall notify the owner’s representative and healthcare construction compliance manager to coordinate an inspection and verify that the barrier wall meets requirements and that acceptable negative air pressure is being achieved.

**Special Notes:**

1. See “Barrier Wall Design Details” for additional requirements.

2. See section in this manual on “Ventilation and Negative Air Pressure Requirements” for additional requirements when building dust barrier systems and walls.

3. See section in this manual on “Approved Equipment and Product Information”.

**Section 8 Ventilation and Negative Air Pressure Requirements**

The first step is building of dust barrier walls to isolate the construction site from patient care and public areas of the healthcare facility to protect patients and the public from construction related dust, fumes and other activities. The effectiveness of barrier walls is minimal unless the construction site is also under negative air pressure. (i.e. air must flow from clean or public spaces into the dirty or construction site).

The following are the “Ventilation and Negative Air Pressure Requirements” which contractors shall strictly follow in the management and construction of their projects.

**Negative Air Pressure Requirements**
1. The contractor shall provide all necessary "Negative Air HEPA Filtered Ventilation Units" required for the negative air requirements of the construction area.
2. See section in this manual on "Approved Equipment and Product Information" for more information.
3. The contractor will work with the owner’s representative to determine best methods and equipment set up requirements for the project.
4. The contractor shall run the “Negative Air HEPA Filtered Ventilation Unit” in the work zone location prior to starting any barrier wall construction or work.
5. “Negative Air HEPA Filtered Ventilation Units”, may be connected to normal or emergency power and shall run continuously, 24/7. Critical areas of the healthcare facility may require the HEPA filtered ventilation units to be connected to emergency power only.
6. A secondary method to maintain negative air pressure is by using the hospitals exhaust system attached to the “Negative Air HEPA Filtered Ventilation Units”. This process and installation must be approved by the owner’s representative.
7. **Pre-Filters shall be changed at least twice weekly during demolition and drywall sanding and a minimum of once a week during other times.** This frequency requirement may be relaxed for lower risk projects and on prior approval from the owner’s representative.
8. The contractor shall furnish and install the negative air-monitoring device to monitor daily negative air pressure -.01 inches of water column. See section in this manual on "Approved Equipment and product Information".
9. The contractor shall record daily on the “Negative Air Pressure and Filter Change Log” the air pressure reading in the construction area to insure that appropriate negative air pressure is being maintained.
10. See “Negative Air Pressure and Filter Change Log” form at the end of this section.

**Barrier Walls and Negative Air Ventilation**

**Special Infection Control Requirements and Interventions for Contractors When Working In (Surgical OR’s, Sterile Processing, Bone Marrow Transplant)**

Construction activities can lead to increased Aspergillus counts in the air and increased risk for Aspergillus infections in high risk patients. In an effort to minimize and contain dust, and lessen the possibility of microbial contamination during renovation work in high risk special care units, Interventions are typically initiated and maintained until the completion of the project. The owner’s representative, MUHC infection control and engineering services departments will be involved in contractor orientation for project work procedures in high risk special care units.

Special work scheduling in these special care units may be a requirement of the project and contractor.
**Negative Air Pressure and Filter Change Log**

**Project Name:** ________________________________

**Location:** ____________________________________

Contractor to complete the **Negative Air Pressure and Filter Change Log** daily at the start of each work shift and maintain completed forms in the project safety file for future review. Post this log inside construction site entrance for use and review.

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### Pressure Relationship Illustration

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Negative</th>
<th>Better</th>
<th>Minimum</th>
<th>Even</th>
<th>Positive</th>
</tr>
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<tbody>
<tr>
<td>-.0</td>
<td>20</td>
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<tr>
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<td>0</td>
<td>+.0</td>
<td>+.0</td>
<td>20</td>
</tr>
</tbody>
</table>

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HCG - 6
Section 9  Interim Life Safety Measures Assessment (ILSM)

Interim Life Safety Measures (ILSM) are a series of administrative actions that must be taken to compensate temporarily for the hazards posed by existing NFPA Life Safety Code 101, 2014 edition deficiencies, other building code issues or construction activities. Examples of when construction activities require ILSM’s to be implemented are as follows:

1. Fire alarm system, detection, and/or sprinkler system are impaired or disabled.
2. Normal exits or exit routes and/or exit lighting have been compromised.
3. Re-routing of traffic due to construction activities.
4. Temporary narrowing of the corridor.
5. Deficiencies in fire and/or smoke separations and systems caused by construction activities. (Changes to wall, door, dampers, penetrations, etc.)
8. Hot work.

Whenever an “Interim Life Safety Measure” is identified for implementation during the construction project, there will typically be measures or actions required by both the MUHC engineering services department as well as the contractor.

The contractor has the responsibility prior to the beginning of work and throughout the project to become familiar with the ILSM in order to plan and identify what construction related activities will require an evaluation of ILSM’s as noted in the ILSM. The “Interim Life Safety Measures Evaluation” is a required team effort.

Section 10  Noise and Vibration Control Management

Construction related noise and vibration control and mitigation measures are to be implemented when the contractor is working in and around healthcare facilities. The contractor shall work with the owner’s representative to develop means and methods for controlling excessive noise and vibration during construction.

Section 11  Above Ceiling Work Permit

All contractors who need access above ceilings in the public areas of the healthcare facility and outside the approved construction site shall be required to obtain an “Above Ceiling Work Permit” from the owner’s representative prior to disrupting or lifting out ceiling tiles. The contractor shall notify the owner’s representative fourteen (14) days prior to the need for ceiling access in order to process and evaluate any special requirements of the permit.

General Requirements for Working above Ceilings (“Above Ceiling Permit Required”)

1. The Construction-Renovation-Maintenance Infection Control Risk Mitigation Permit issued for the work activity will note specifics required for Barrier Types.
2. Any cable and wiring pulls through the healthcare facility which will require a ceiling disturbance must be approved in advance by obtaining an “Above Ceiling Work Permit”.
3. Ceiling tiles must not be left displaced by the contractor if he walks away from the area unless the area has been contained by an approved “Dust Barrier”.
4. If a ceiling tile is damaged by the contractor he should notify the owner’s representative to acquire a new tile for replacement.
5. All debris shall be cleaned up by the contractor daily when working in cabling and electrical closets.
6. Pulling of communication cables in a patient care or other critical care areas will require special scheduling. Consult with the owner’s representative for coordination.
7. When cables must be pulled in an active patient care unit, a dust partition must be used at the site of entry and exit of the cable.
8. The dust partition may be attached to the false ceiling because taking it to deck may interfere with the work.
9. The site of entry and exit of the cable or other above ceiling work must be HEPA vacuumed (ceiling tiles and pipes) before the work begins.
Section 12  Lock Out/Tag out Permit
The contractor shall give a minimum fourteen (14) working days notice to the owner’s representative for shutdown work on electrical systems or other critical utility systems which could significantly impact the healthcare facilities operations, the contractor will be required to plan these “Lock Out/Tag Out” activities ten (14) days in advance. Major utility shutdowns may require weeks of notice and planning. The contractor shall work with the owner’s representative to identify these time planning requirements.

Section 13  Utility Systems Shutdown & Service Permit
The “Utility Systems Shutdown & Service Permit” is to be used when work on an existing utility system may cause a disruption within the MUHC facility.

“Utility Systems” shall be defined as any system that would hinder the delivery of patient care and hospital operations should the system be interrupted for any reason. Planning for this work usually requires a contingency plan by the healthcare facility management department to address any failure of the utility system.

Utility Shutdown
Any and all utility or system connections, shut-off, or interruptions must be scheduled with the owner’s representative prior to commencement of the work. This work shall be defined as a “Utility Shutdown” and notice shall be made to the owner’s representative to coordinate the request and facilitation.

Utility Service - (System must be worked live or energized)
In addition to utility system connection, shut-off, or interruption, the contractor must also schedule any work on existing utility systems that either do not require interruption or cannot be interrupted to accomplish the work. This type of work shall be defined as “Utility Service” and notice shall be made to the owner’s representative.

The contractor shall give up to 14 working days’ notice to the owner’s representative in order to properly plan and coordinate required activities.

All permits are to be posted at the job site location for the duration of the permit. When complete the contractor shall file the permits in the contractor job safety file for future review as may be required.

Section 14  Hot Work & Permit
Hot work shall be defined as welding, brazing, cutting soldering, grinding, or other activities which produce sparks or use flame which are capable of initiating fires or explosions.

All contractors performing construction, renovation and installation work for MUHC facilities are required to follow the requirements and provisions of NFPA 51B and the owner’s representative procedures related to “Hot Work” and obtaining a “Hot Work Permit”.

The following are the requirements for a contractor to obtain a “Hot Work Permit”.

1. Contractors shall contact the owner’s representative two (2) days, forty eight (48) hours in advance to request a hot work permit. A request for complex projects which requires extensive planning on behalf of the owner’s representative may require a longer notice period.
2. All hot work sites are inspected by the owner’s representative using the requirements printed on the “Hot Work Permit”.
3. The owner’s representative will issue a “Hot Work Permit” tag to be attached in the vicinity of the actual hot work being performed. Upon completion, the hot work tag shall be returned to the owner’s representative.
4. “Hot Work Permits” will be issued for only one shift unless other arrangements have been made with owner’s representative. All permits expire 30 minutes prior to the end of the shift.
5. If hot work cannot be completed within one work shift, the contractor is responsible for obtaining approval for a revised permit extension from the owner’s representative. The contractor is responsible for meeting all the safety requirements required by the permit for any and all extensions granted.
6. The contractor shall be responsible for supplying a trained worker for the requirement of a fire watch during the actual hot work. The fire watch’s only responsibility will be as a fire watch.
7. A fire watch shall be provided for 30 minutes following the completion of work, including during lunch and breaks by the contractor.

8. The contractor shall provide at a minimum a ten pound (10) ABC fire extinguisher that has a current, valid inspection tag.

9. A copy of the “Hot Work Permit” shall be kept in the general contractors project file for future review as may be required.

10. The contractor shall upload completed Hot Work Permits to the owner’s electronic construction document program (Projex 4) in the Hot Work Permit folder for the project not less than on a weekly basis or as instructed by the owner’s representative.

Section 15 Exterior Construction Site Helicopter Landings

Any contractor doing construction work or activities on the hospital grounds, property or on the roof of the buildings is required to follow the guidelines regarding construction activities during helicopter landings on the helipad. The contractor shall coordinate with the owner’s representative roof access, roof protection, keying, roof and safety precautions to be taken when working close to the roof edge regarding helicopter landings and contractor responsibilities during this time. In addition, the placement of vertical installations such as tall lighting poles and the use of project cranes or hoisting on the hospital property might affect the “Final Approach and Take Off” of medical center ambulance helicopters. It is essential that the contractor plans these types of activities with the owner’s representative prior to the beginning of work.
Section 16 Required Forms, Permits, Postings and Documentation

Note: Refer to the sections in the “Healthcare Construction Requirements” manual for detailed information on each form and permit approval procedure.

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Notice</th>
<th>Form Approval</th>
<th>Job Site Posting</th>
<th>Contractor Safety File</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRM Infection Control Construction Permit</td>
<td>Before Starting</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Above Ceiling Permit</td>
<td>14 Days</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Utility Systems Shutdown &amp; Service Permit</td>
<td>14 Days</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Fire Protection System Impairment Permit</td>
<td>14 Days</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hot Work Permit</td>
<td>2 Days</td>
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<td>Lock Out/Tag Out Permit</td>
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<td>✓</td>
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<td>CRM Interim Life Safety Measures Assessment</td>
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<td>Negative Air Pressure Log</td>
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<td>Violations and “Notice To Contractor”</td>
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<td>Required Construction Jobsite Signage</td>
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<td>Contractor &amp; Employee Training Acknowledgment</td>
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<tr>
<td>Contractor Safety Meeting Minutes</td>
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</tbody>
</table>

The contractor will be required to furnish and install a “Project Safety Information” bulletin board on their project site for posting of required safety information. Small, short duration projects may have this requirement waived by the owner’s representative.

LEGEND  CRM = Construction-Renovation-Maintenance

Section 17 Project Cleaning and Barrier Removal Process

The following is the typical sequence prior to the removal of barrier walls.

With the barrier in place and with the “Negative Air HEPA Filtered Ventilation Unit” running, the contractor will HEPA vacuum all horizontal and vertical surfaces.

1. Clean the covers that are isolating the HVAC ducts.
2. Clean the outside of the negative air HEPA machine and its exhaust duct.
3. The contractor shall notify the owner’s representative to schedule a walk-through of the clean space for inspection and approval prior to removal of the barrier wall.
4. Following all job site cleaning and flushing of plumbing, the contractor can begin the barrier cleaning process.
5. During construction or removal of barrier walls, fire resistant polyethylene barriers must be put into place to help control any construction or demolition dust of the barrier wall system.

6. MUHC must approve removal of any Infection Control or other barriers. Prior to removal of the temporary fire resistant polyethylene barrier, it shall be vacuumed with a HEPA vacuum to eliminate any dust attached to the plastic. The polyethylene barrier is then wiped down with the use of damp cleaning cloths and using a hospital furnished approved infection control cleaning solution. The contractor shall roll or fold the polyethylene in on itself creating as little dust as possible prior to transporting out of the building in a covered cart.

7. Remove the covers or caps from any and all HVAC system supply, return and exhaust ducts and restore the HVAC system.

8. The "Negative Air HEPA Filtered Ventilation Unit" is removed from the project site once the HVAC system is verified is operating properly.

If Air Sampling Is Required

When construction/renovation is done and completed in or near a high risk assessment critical care unit (i.e. Burn Unit, Operating Rooms, Intensive Care, etc.) there may be a requirement to do air sampling after the negative air system has been removed and the building HVAC system has been restored. This will be a requirement only if the infection control department determines the need at the end of the project and prior to occupancy.

Section 18 Approved Equipment and Product Information

“NEGATIVE AIR HEPA FILTERED VENTILATION UNIT”, HEPA filter equipped negative air machines that provide rough in filters, primary filters and a HEPA final filter. Rating of 300 to 2000 cubic feet per minute, (CFM). HEPA filters must be a minimum 99.97% efficient @ 0.3 microns. Differential pressure alarm required if not installed in another fashion to monitor construction site negative air of – 0.01 water column. Or approved equal.

- MICRO Trap Corporation, Models MT 1000 or Model MT 2000. 1300 W. Steel Road, No. 2 Morrisville, PA 19067 (215) 295-8208 or (877) 646-8208.
- ABATEMENT Technologies, Inc. Model HEPA-AIRE PAS2400HC Portable Air Scrubber or Model PAS1200HC 605 Satellite Blvd. Suite 300 Suwanee, GA 30024 (800) 634-9091

“HEPA VACUUM”, A shop style vacuum with a HEPA filter cartridge at 99.97% filtration @ 0.3 microns. Or approved equal.

- ABATEMENT Technologies Inc. Model V1300H Hip Mounted HEPA Vacuum, designed for use on scaffolding and mobile conditions such as ceiling tile type cleaning. Lightweight at 6.4 lbs. 605 Satellite Blvd. Suite 300 Suwanee, GA 30024 (800) 634-9091.

“ADHESIVE WALK OFF MATS”, 24” x 36” Tacky Mat. Peel up dirty layer and dispose to reveal a new, fresh clean tacky mat.

- Tacky walk off mat No. 5838 24” x 36”, 60 tacky mats to a unit. Four units per case. 3M Company, St. Paul, MN 55144 (888) 364-3577. Or approved equal.

“NEGATIVE AIR PRESSURE INDICATOR”, Manometer.

- Model “Mark II Model No. 25 inclined-vertical Manometer. Dwyer Instruments Inc. PO Box 373, Michigan City, IN 46361 (219) 879-2000.
- MICRO Trap Corporation, Model Tri/Mon, digital recording manometer for tracking differential pressure. 1300 W. Steel Road, No. 2 Morrisville, PA 19067 (215) 295-8208 or (877) 646-8208.
“PORTABLE WORK ENCLOSURE”, For temporary fire resistant polyethylene dust barrier. System components supplier of zip poles, door opening access zippers, dust sealing system parts, etc.

- Zip Wall, LLC. 37 Broadway, Arlington, MA 02474 (800) 718-2255. Or approved equal.


Example of Badge for Contractor use -

Protocol for Hospital Contractor Badges:

Contractor to issue badges to employees as necessary. (Need to show proof of ID)

Contractor to edit the information, print in color, cut out the badges, fold in the center and insert in badge holders.

Contractor shall keep a log of badged employees on site for reference by MU as necessary.

All permits to be collected and returned to MU at the end of the project.

Any orientation required will be discussed at the preconstruction meeting with the Owner’s Representative.
SECTION 19 Health Care Construction Cleaning Definitions

Construction Clean
1. Remove tools & equipment from the work area.
2. Remove all bulk trash from the work area.
3. Thoroughly sweep all floor surfaces in the work area utilizing a dust compound (floor sweep) material.
4. Dry wipe all horizontal & vertical surfaces in the work area. Surfaces to include but not limited to walls, window sills, doors & door frames, base trim, casework (inside & out), fixtures, and wall-mounted equipment.
5. Sweep all floor surfaces utilizing a dust mop.
6. Wet mop all floor surfaces.

Thorough Clean
1. To be implemented only after Construction Clean procedures have been completed.
2. Wet wipe all horizontal and vertical surfaces utilizing a MUHC – Infection Control Department approved germicidal disinfectant. Surfaces to include but not limited to walls, window sills, doors & door frames, base trim, casework (inside & out), all fixtures, and wall-mounted equipment.
3. Wet mop all floor surfaces utilizing a MUHC Infection Control Department approved germicidal disinfectant.

Terminal Clean
1. To be implemented only after Through Clean procedures have been completed.
2. Cleaning procedures shall be conducted by MUHC trained Environmental Services, Sterile Processing or Surgical Services staff only.
3. Thoroughly clean and disinfect surfaces on the ceiling such as diffusers, light fixtures, and ceiling mounted devices & equipment.
4. Thoroughly clean and disinfect all equipment in the work area.
5. Thoroughly clean and disinfect all flooring including moving equipment & furnishings to allow access to all floor surfaces.
6. Move all portable equipment and furnishings away from the walls. Wet wipe and disinfect all wall surfaces and wall mounted equipment.
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### SECTION 1.F
### INDEX OF DRAWINGS

Drawings referred to in and accompanying Project Manual consist of the following sheets dated September 5, 2019.

#### GENERAL
<table>
<thead>
<tr>
<th>Sheet</th>
<th>of 122</th>
<th>G001</th>
<th>COVER SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet</td>
<td>2</td>
<td>G002</td>
<td>LIFE SAFETY PLAN &amp; CODE ANALYSIS</td>
</tr>
<tr>
<td>Sheet</td>
<td>3</td>
<td>G003</td>
<td>ADDITIVE ALTERNATES OVERALL PLANS &amp; SUMMARY</td>
</tr>
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</table>

#### CIVIL
<table>
<thead>
<tr>
<th>Sheet</th>
<th>of 122</th>
<th>C0.01</th>
<th>COVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet</td>
<td>5</td>
<td>C0.02</td>
<td>CIVIL NOTES</td>
</tr>
<tr>
<td>Sheet</td>
<td>6</td>
<td>ALTA1</td>
<td>ALTA SURVEY</td>
</tr>
<tr>
<td>Sheet</td>
<td>7</td>
<td>ALTA2</td>
<td>ALTA SURVEY</td>
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<tr>
<td>Sheet</td>
<td>8</td>
<td>ALTA3</td>
<td>ALTA SURVEY</td>
</tr>
<tr>
<td>Sheet</td>
<td>9</td>
<td>C1.01</td>
<td>SITE PLAN</td>
</tr>
<tr>
<td>Sheet</td>
<td>10</td>
<td>C2.01</td>
<td>GRADING AND DRAINAGE PLAN</td>
</tr>
<tr>
<td>Sheet</td>
<td>11</td>
<td>C2.02</td>
<td>GRADING AND DRAINAGE PLAN</td>
</tr>
<tr>
<td>Sheet</td>
<td>12</td>
<td>C2.03</td>
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<td>14</td>
<td>C4.01</td>
<td>EROSION CONTROL PLAN</td>
</tr>
<tr>
<td>Sheet</td>
<td>15</td>
<td>C5.01</td>
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<tr>
<td>Sheet</td>
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<td>SITE DETAILS</td>
</tr>
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<td>17</td>
<td>C5.03</td>
<td>SITE DETAILS</td>
</tr>
<tr>
<td>Sheet</td>
<td>18</td>
<td>C6.01</td>
<td>EROSION CONTROL &amp; STORM SEWER DETAILS</td>
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<tr>
<td>Sheet</td>
<td>19</td>
<td>L1.01</td>
<td>LANDSCAPE PLAN</td>
</tr>
<tr>
<td>Sheet</td>
<td>20</td>
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<td>LANDSCAPE DETAILS</td>
</tr>
</tbody>
</table>

#### STRUCTURAL
<table>
<thead>
<tr>
<th>Sheet</th>
<th>of 122</th>
<th>S001</th>
<th>GENERAL NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet</td>
<td>22</td>
<td>S002</td>
<td>CONCRETE TYPICAL DETAILS</td>
</tr>
<tr>
<td>Sheet</td>
<td>23</td>
<td>S003</td>
<td>STRUCTURAL STEEL TYPICAL DETAILS</td>
</tr>
<tr>
<td>Sheet</td>
<td>24</td>
<td>S004</td>
<td>METAL STUD TYPICAL DETAILS</td>
</tr>
<tr>
<td>Sheet</td>
<td>25</td>
<td>S100</td>
<td>FOUNDATION PLAN</td>
</tr>
<tr>
<td>Sheet</td>
<td>26</td>
<td>S101</td>
<td>ROOF FRAMING PLAN</td>
</tr>
<tr>
<td>Sheet</td>
<td>27</td>
<td>S102</td>
<td>ENTRY CANOPY PLANS &amp; DETAILS</td>
</tr>
<tr>
<td>Sheet</td>
<td>28</td>
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<td>TRASH ENCLOSURE AND PATIO PLANS &amp; DETAILS</td>
</tr>
<tr>
<td>Sheet</td>
<td>29</td>
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<td>BRACE FRAME ELEVATIONS</td>
</tr>
<tr>
<td>Sheet</td>
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<td>S500</td>
<td>SECTIONS &amp; DETAILS</td>
</tr>
<tr>
<td>Sheet</td>
<td>32</td>
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</tr>
<tr>
<td>Sheet</td>
<td>33</td>
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</tr>
</tbody>
</table>

#### ARCHITECTURAL
<table>
<thead>
<tr>
<th>Sheet</th>
<th>of 122</th>
<th>A201</th>
<th>FLOOR PLAN - DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet</td>
<td>25</td>
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<td>FLOOR PLAN - NOTES &amp; TAGS</td>
</tr>
<tr>
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<td>26</td>
<td>A203</td>
<td>REFLECTED CEILING PLAN</td>
</tr>
<tr>
<td>Sheet</td>
<td>27</td>
<td>A204</td>
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</tr>
<tr>
<td>Sheet</td>
<td>28</td>
<td>A205</td>
<td>EQUIPMENT PLAN - FORREFERENCE ONLY</td>
</tr>
<tr>
<td>Sheet</td>
<td>29</td>
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<td>BUILDING ELEVATIONS</td>
</tr>
<tr>
<td>Sheet</td>
<td>30</td>
<td>A302</td>
<td>BUILDING ELEVATION - ROOF SCREENS</td>
</tr>
<tr>
<td>Sheet</td>
<td>31</td>
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</tr>
<tr>
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<td>32</td>
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</tr>
</tbody>
</table>
# MECHANICAL/PLUMBING/FIRE PROTECTION (CONTINUED)

<table>
<thead>
<tr>
<th>Sheet</th>
<th>of 122</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>M903</td>
<td>HVAC CONTROL DETAILS</td>
</tr>
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</tr>
<tr>
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<td>P100</td>
<td>PLUMBING FOUNDATION PLAN</td>
</tr>
<tr>
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</tr>
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</tr>
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<td>P201</td>
<td>PLUMBING DOMESTIC WATER RISER</td>
</tr>
<tr>
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<td>P300</td>
<td>PLUMBING SCHEDULES</td>
</tr>
</tbody>
</table>

# ELECTRICAL

<table>
<thead>
<tr>
<th>Sheet</th>
<th>of 122</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>E001</td>
<td>ELECTRICAL SYMBOLS AND ABBREVIATIONS</td>
</tr>
<tr>
<td>104</td>
<td>E100</td>
<td>SITE PLAN - ELECTRICAL</td>
</tr>
<tr>
<td>105</td>
<td>E201</td>
<td>FIRST FLOOR PLAN - LIGHTING</td>
</tr>
<tr>
<td>106</td>
<td>E202</td>
<td>ELECTRICAL LIGHTING - ROOF</td>
</tr>
<tr>
<td>107</td>
<td>E301</td>
<td>FIRST FLOOR PLAN - POWER</td>
</tr>
<tr>
<td>108</td>
<td>E302</td>
<td>ROOF PLAN - POWER</td>
</tr>
<tr>
<td>109</td>
<td>E303</td>
<td>FIRST FLOOR PLAN - HVAC POWER</td>
</tr>
<tr>
<td>110</td>
<td>E304</td>
<td>ELECTRICAL LIGHTNING PROTECTION</td>
</tr>
<tr>
<td>111</td>
<td>E401</td>
<td>ENLARGED PLANS - ELECTRICAL</td>
</tr>
<tr>
<td>112</td>
<td>E501</td>
<td>FIRST FLOOR PLAN - SYSTEMS</td>
</tr>
<tr>
<td>113</td>
<td>E502</td>
<td>FIRST FLOOR PLAN - LOW VOLTAGE CABLE AND SYSTEMS</td>
</tr>
<tr>
<td>114</td>
<td>E601</td>
<td>RISERS AND SCHEDULES</td>
</tr>
<tr>
<td>115</td>
<td>E602</td>
<td>LOW VOLTAGE SYSTEMS RISER DIAGRAMS</td>
</tr>
<tr>
<td>116</td>
<td>E603</td>
<td>LUMINAIRE SCHEDULE AND LIGHTING DETAILS</td>
</tr>
<tr>
<td>117</td>
<td>E604</td>
<td>MECHANICAL-ELECTRICAL EQUIPMENT INTERFACE</td>
</tr>
<tr>
<td>118</td>
<td>E605</td>
<td>ELECTRICAL PANEL SCHEDULES</td>
</tr>
<tr>
<td>119</td>
<td>E606</td>
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</tr>
<tr>
<td>120</td>
<td>E607</td>
<td>LIGHTING CONTROL MATRIX</td>
</tr>
<tr>
<td>121</td>
<td>E701</td>
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<td>E702</td>
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</tr>
</tbody>
</table>

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Annual Wage Order No. 25  
Boone County  

Effective 8/28/2018

These are the wage rates applicable to this project in accordance with 13.6.1 of the general conditions. Overtime provisions are specified under 13.6.13

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<td>Asbestos Worker (H&amp;F) Insulator</td>
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<td>Bricklayer</td>
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<td>Carpenter, Pile Driver, Millwright, Lather, Linoleum Layer</td>
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<td>Cement Mason, Plasterer</td>
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<td>Electrician (Inside Wireman)</td>
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<td>Electrician (Outside-Line Construction/Lineman)</td>
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<td>Ironworker</td>
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<td>Laborer, 1st Semi Skilled Laborer, 2nd Semi Skilled Laborer</td>
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<td>Plumber, Pipefitter</td>
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<td>Roofer/Waterproofer</td>
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<td>Sheet Metal Worker</td>
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<td>Sprinkler Fitter - Fire Protection</td>
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<td>Truck Driver</td>
<td>$36.00</td>
</tr>
</tbody>
</table>
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SECTION 1.H ALTERNATES

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

1. Additive Alternate No. 1: Construction of Physical Therapy Suite and 30 parking spaces at southwest side of parking lot:

   a. **Base Bid**: The scope of work includes all labor, materials, tools and equipment required to provide the shelled construction of rooms Open Therapy 1008, Toilet 1008A, PT Storage 1008B, Private Therapy 1008C, Private Therapy 1008D, Semi 1008E, Semi 1008F and Office 1008G all as indicated on the Drawings and described in these Specifications.

   Under the base bid, VAV 1-105, VAV 1-107, VAV 1-115, VAV 2-109, and EAV 3-105 shall not be provided. Additionally, the diffusers downstream of VAV 1-103, VAV 1-114, and VAV 2-108 within the Alternate areas will not be provided. Return diffusers, return ductwork, and transfer ductwork shall not be provided in the Alternates or transferring between the Alternates and the rest of the building. The ductwork from VAV 1-105, VAV 1-107, EAV 3-101, and EAV 3-105 that enter the area for Alternate 1 shall be stubbed through the wall and capped for future use. Temporary exhaust fan EF-4 shall be provided to exhaust air from Alternate 1 (temporary exhaust fan EF-5 shall be provided to exhaust air from Alternate 2 and Alternate 3).

   Under the base bid, the domestic hot water loop shall be piped as shown on the plans. The fixtures within the Alternates shall not be supplied or connected to the domestic hot water or the domestic cold water piping. The under slab sanitary piping shall be provided but both lines in the Alternate areas and taps of the main line(s) shall be capped for future connection with fit out of shell space. All the roof drains, overflow drains, and vent piping to be provided as shown.

   The building shall be fully sprinkled, the area for Alternates 1 included. The Alternate area shall have upright heads.

   Under the base bid, provide utility strip lighting in the Alternate areas as shown on drawing E401. Coordinate switch locations with architectural shell drawings. Provide 1 switch per area. Circuit the lighting as follows:

   **Alternate 1**: Circuit 12 panel HPP2

   For base bid power and low voltages systems, provide rough-in at exterior wall locations only. Rough-in is to include box with conduit stub to the ceiling space for future circuiting.

   Provide power to EF-4 from panel as noted on the ME Interface on drawing E604. All other HVAC connections in the Alternate areas are excluded from the base bid.

   b. **Alternate 1 Bid**: The scope of work includes all labor, materials, tools and equipment required for construction build out of rooms Open Therapy 1008, Toilet 1008A, PT Storage 1008B, Private Therapy 1008C, Private Therapy 1008D, Semi 1008E, Semi 1008F and Office 1008G. Refer to Architectural Drawings for additional clarification. Additionally, the Bidder agrees to furnish all labor, materials, tools and equipment required for construction of 30 asphalt parking spaces at the southwest side of the parking lot all as indicated on the Drawings and described in these Specifications. Refer to Civil Engineers Drawings for additional clarification.

   Under Alternate 1, VAV 1-105, VAV 1-107, and EAV3-105 and all associated supply, return, and transfer ductwork shall be provided as shown on the plans. Ductwork from VAV 1-103 EAV 3-101 that enters the Alternate 1 area shall be provided as shown on the plans.

   All plumbing fixtures in Alternate 1 shall be piped to the domestic hot, domestic cold, sanitary, and vent piping systems.

   Alternate 1 shall be fully sprinkled with concealed heads as described on the plans and in division 21 of the specifications.

   Provide lighting fixtures, devices, circuiting, and low voltage systems as shown on the plans. Include connections and circuiting to VAV 1-105 and VAV 1-107.
2. **Additive Alternate No. 2: Construction of 8 Exam Rooms (1057 through 1063) and Corridors C1017 & C1018 at Northeast side of building**

   a. **Base Bid:** The scope of work includes all labor, materials, tools and equipment required for the shelled construction of rooms Peds Exam 1057 through OB Exam 1064, Corridors C1017 and C1018 all as indicated on the Drawings and described in these Specifications. Additionally, doors 1057 and door 1061 shall be provide as temporary access to the shelled space as indicated on sheet G003 and A202A.

   Under the base bid, VAV 1-105, VAV 1-107, VAV 1-115, VAV 2-109, and EAV 3-105 shall not be provided. Additionally, the diffusers downstream of VAV 1-103, VAV 1-114, and VAV 2-108 within the Alternate areas will not be provided. Return diffusers, return ductwork, and transfer ductwork shall not be provided in the Alternates or transferring between the Alternates and the rest of the building. The ductwork from VAV 1-105, VAV 1-107, EAV 3-101, and EAV 3-105 that enter the area for Alternate 1 shall be stubbed through the wall and capped for future use. Temporary exhaust fan EF-5 shall be provided to exhaust air from Alternate 2 and Alternate 3 (Temporary exhaust fan EF-4 shall be provided to exhaust air from Alternate 1).

   Under the base bid, the domestic hot water loop shall be piped as shown on the plans. The fixtures within the Alternates shall not be supplied or connected to the domestic hot water or the domestic cold water piping. The under slab sanitary piping shall be provided but both lines in the Alternate areas and taps of the main line(s) shall be capped for future connection with fit out of shell space. All the roof drains, overflow drains, and vent piping shall be provided as shown.

   The building shall be fully sprinkled, the area for Alternate, 2, included. The Alternate area shall have upright heads.

   Under the base bid, provide utility strip lighting in the Alternate areas as shown on drawing E401. Coordinate switch locations with architectural shell drawings. Provide 1 switch per area. Circuit the lighting as follows:

   Alternate 2: Circuit 10 panel HPP1

   For base bid power and low voltages systems, provide rough-in at exterior wall locations only. Rough-in is to include box with conduit stub to the ceiling space for future circuiting.

   Provide power to EF-5 from panel as noted on the ME Interface on drawing E604. All other HVAC connections in the alternate areas are excluded from the base bid.

   b. **Alternate Bid:** The scope of work includes all labor, materials, tools and equipment required for the build out construction of rooms Peds Exam 1057 through OB Exam 1064, Corridors C1017 and C1018 all as indicated on the Drawings and described in these Specifications. Doors 1057 and 1061 provided under base bid are installed at permanent location of Exam Rooms.

   Under Alternate 2 VAV 2-108 and VAV 2-109 and all associated supply, return, and transfer ductwork shall be provided as shown on the plans.

   All plumbing fixtures in Alternate 2 shall be piped to the domestic hot, domestic cold, sanitary, and vent piping systems.

   Alternate 2 shall be fully sprinkled with concealed heads as described on the plans and in division 21 of the specifications.

   Provide lighting fixtures, devices, circuiting, and low voltage systems as shown on the plans. Include connections and circuiting to VAV 2-108 and VAV 2-109.
3. **Additive Alternate No. 3: Construction of 8 Exam Rooms (1040 through 1047) and Corridors C1012 & C1013 at northwest side of building. Construction of 28 parking spaces at west and north side of parking lot. Installation of Sound Masking System per specification 27 5119**

a. **Base Bid:** The scope of work includes all labor, materials, tools and equipment required to for shelled construction of rooms Exam 1040 through Exam 1047, Corridors C1012 and C1013 all as indicated on the Drawings and described in these Specifications. Additionally, doors 1043 and door 1047 shall be provide as temporary access to the shelled space as indicated on sheet G003 and A202A.

Under the base bid, VAV 1-105, VAV 1-107, VAV 1-115, VAV 2-109, and EAV 3-105 shall not be provided. Additionally, the diffusers downstream of VAV 1-103, VAV 1-114, and VAV 2-108 within the Alternate areas will not be provided. Return diffusers, return ductwork, and transfer ductwork shall not be provided in the Alternates or transferring between the Alternates and the rest of the building. The ductwork from VAV 1-105, VAV 1-107, EAV 3-101, and EAV 3-105 that enter the area for Alternate 1 shall be stubbed through the wall and capped for future use. Temporary exhaust fan EF-5 shall be provided to exhaust air from Alternate 3.

Under the base bid, the domestic hot water loop shall be piped as shown on the plans. The fixtures within the alternates shall not be connected to the domestic hot water or the domestic cold water piping. The under slab sanitary piping shall be provided but both lines in the Alternate areas and taps of the main line(s) shall be capped for future connection with fit out of shell space. All the roof drains, overflow drains, and vent piping shall be provided as shown.

The building shall be fully sprinkled, the area for Alternate and 3 included. The alternate area shall have upright heads.

Under the base bid, provide utility strip lighting in the Alternate areas as shown on drawing E401. Coordinate switch locations with architectural shell drawings. Provide 1 switch per area. Circuit the lighting as follows:

Alternate 3: Circuit 17 panel HPP2

For base bid power and low voltages systems, provide rough-in at exterior wall locations only. Rough-in is to include box with conduit stub to the ceiling space for future circuiting.

Provide power to - EF-5 from panel as noted on the ME Interface on drawing E604. All other HVAC connections in the Alternate areas are excluded from the base bid.

b. **Alternate Bid:** The scope of work includes all labor, materials, tools and equipment required for construction of rooms Exam 1040 through Exam 1047, Corridors C1012 and C1013. Additionally, the Bidder agrees to furnish all labor, materials, tools and equipment required for construction of 28 asphalt parking spaces at the west and north sides of the parking lot as indicated on the Drawings and described in these Specifications. Doors 1043 and 1047 provided under base bid are installed at permanent location of Exam Rooms.

Under Alternate 3 VAV 1-114 and VAV 1-115 and all associated supply, return, and transfer ductwork shall be provided as shown on the plans.

All plumbing fixtures in Alternate 3 shall be piped to the domestic hot, domestic cold, sanitary, and vent piping systems.

Alternate 3 shall be fully sprinkled with concealed heads as described on the plans and in division 21 of the specifications.

Provide lighting fixtures, devices, circuiting, and low voltage systems as shown on the plans. Include connections and circuiting to VAV 1-114 and VAV 1-115.

Furnish and install Self-Contained Sound Masking System per specification section 27 5119 and as shown on sheet A203.
4. **Additive Alternate No. 4: Concrete Paving and Concrete mow strip:**

   a. **Base Bid:** Parking lot is asphalt paving as shown on the Drawings and described in these Specifications. Base Bid does not include concrete mow strip adjacent to building perimeter.

   b. **Alternate Bid:** The scope of work includes all labor, materials, tools and equipment required for Concrete Paving in lieu of Asphalt Paving and to provide a concrete mow strip as indicated on the Civil Engineering Drawings and described in these Specifications

   END OF SECTION
Ms. Pamela Eugster  
University of Missouri  
General Services Building  
Columbia, MO 65211

Dear Ms. Eugster:

The purpose of this letter is to provide supplemental information to the Subsurface Investigation and Soil Analysis report dated April 5, 2019 for the above referenced project.

The design parameters provided in the report, section 9.3 Seismic Loading, are based on the 2015 International Building Codes. Since the University of Missouri has adopted the 2018 International Building Codes, the following seismic parameters may be used. These parameters are based on the 2018 International Building Codes and are site specific.

1. Site Class                      C
2. Mapped Spectral Response, Short Periods (Ss)  0.167
3. Mapped Spectral Response, Short Periods (S1)  0.093
4. Site Coefficient as a Function of Ss (Fa)  1.3
5. Site Coefficient as a Function of S1 (Fv)  1.5

I trust that this letter provides you with the information that was requested. We appreciate the opportunity to assist you on this project and stand ready to provide additional assistance during the design phase and through construction with a full range of construction oriented engineering, surveying, and laboratory services. If we can be of further assistance, please do not hesitate to contact us.

Prepared by,

Cullan A. Even, EI

cc: email: Eugster  
Projex
SUBSURFACE INVESTIGATION AND SOIL ANALYSIS

UMHC
Primary Care Clinic - North

PREPARED FOR:
UNIVERSITY OF MISSOURI
GENERAL SERVICES BUILDING
COLUMBIA, MISSOURI 65211
ATTN: PAMELA EUGSTER

APRIL 5, 2019

PREPARED BY:
Engineering Surveys & Services
1113 FAY STREET
COLUMBIA, MISSOURI 65201
(573) 449-2646
April 5, 2019

Ms. Pamela Eugster
University of Missouri
General Services Building
Columbia, MO 65211

RE: Geotechnical Investigation
Primary Care Clinic - North
Columbia, Missouri

Dear Ms. Eugster:

We have conducted a subsurface investigation and evaluated subsurface conditions for the referenced project. The following report includes the results of the investigation and evaluation and our recommendations regarding foundation design, pavement design and construction considerations.

We appreciate the opportunity to assist you on this project and anticipate inquiries during the design phase. We stand ready to assist during the design phase and through construction with a full range of construction oriented engineering, surveying, and laboratory services. If we can be of further assistance, please do not hesitate to contact us.

Prepared by,

Cullan A. Even, EI

Reviewed by,

Randy A. Lee, PE, RG

cc: email: Eugster
Projex
# TABLE OF CONTENTS

TABLE OF CONTENTS ........................................................................................................................... I
1 EXECUTIVE SUMMARY ................................................................................................................. 1
2 PROJECT SCOPE ........................................................................................................................... 2
3 DESCRIPTION OF THE SITE AND PROJECT .................................................................................. 2
  3.1 Site Location ............................................................................................................................... 2
  3.2 Project Description ....................................................................................................................... 2
  3.3 Site Description, Topography, and Drainage ............................................................................... 2
4 VICINITY MAP ............................................................................................................................... 3
5 GEOLOGY OF AREA ...................................................................................................................... 3
  5.1 General ........................................................................................................................................ 3
  5.2 Loess .......................................................................................................................................... 4
  5.3 Pleistocene Glacial Deposits ....................................................................................................... 4
  5.4 Pennsylvanian Deposits .............................................................................................................. 4
  5.5 Mississippian Limestone and Dolomite ...................................................................................... 4
6 FIELD INVESTIGATION ................................................................................................................. 4
  6.1 Drilling ........................................................................................................................................ 5
7 LABORATORY INVESTIGATION .................................................................................................. 5
8 SUBSURFACE CONDITIONS .......................................................................................................... 5
  8.1 General ....................................................................................................................................... 5
  8.2 Description of Subsurface Materials ......................................................................................... 6
  8.3 Utilities ...................................................................................................................................... 6
9 ENGINEERING ANALYSIS AND RECOMMENDATIONS ............................................................. 6
  9.1 General ...................................................................................................................................... 6
  9.2 Groundwater ............................................................................................................................... 7
  9.3 Seismic Loading ......................................................................................................................... 7
  9.4 Site Grading ............................................................................................................................... 7
9.5 Foundation Recommendations .............................................................................................................. 8
  9.5.1 Shallow Foundations with Slab-on-Grade ..................................................................................... 8

9.6 Radon .................................................................................................................................................... 9

9.7 Retaining Walls .................................................................................................................................... 9

9.8 Floor Slab Design .................................................................................................................................. 10

9.9 Pavement Design and Recommendations .......................................................................................... 11

10 CONSTRUCTION CONSIDERATIONS ........................................................................................... 12

10.1 Site Preparation .................................................................................................................................... 12

10.2 Utility Trenches .................................................................................................................................... 12

10.3 Site Excavation .................................................................................................................................... 12

10.4 Slab Subgrade Preparation ................................................................................................................... 13

10.5 Foundation Excavation and Construction ............................................................................................. 13

10.6 Construction Fill and Backfill .............................................................................................................. 13

10.7 Climatic Considerations ..................................................................................................................... 14

11 WARRANTIES AND LIMITATIONS ................................................................................................... 14

12 APPENDIX ............................................................................................................................................ 15

12.1 Symbols and terms ................................................................................................................................. 16

12.2 Summary of laboratory test results .................................................................................................... 17

12.3 Plan of boring locations ....................................................................................................................... 18

12.4 Boring logs .......................................................................................................................................... 19
1 EXECUTIVE SUMMARY

A subsurface investigation has been performed for the new Primary Care Clinic north location in Columbia, Missouri. The project site is located in the north-east portion of the City of Columbia, Missouri. The site is bordered to the north by Armstrong Dr., to the south by E. St. Charles Dr., to the east by Battle Ave. and to the west by the wooded property line of Lake of the Woods Golf Course.

The proposed project consists of the construction of a 27,000 square foot single story steel framed health care building with associated parking and utilities. Finished floor elevation is expected to be 828 feet. The building is expected to be constructed on a shallow foundation system with a continuous footing around the perimeter and column footings supporting interior column loads. The structure may be supported by a shallow foundation system with net allowable bearing pressures of 2,500 and 2,000 psf for isolated and continuous footings, respectively. Total settlement is expected to be on the order of one inch or less, with most of the settlement occurring during construction.

A total of ten (10) soil borings were completed during this investigation. The boring logs and boring location plan are included in the Appendix of this report. The borings indicate that the subsurface profile throughout the project site is fairly consistent, with soils comprised of varying amounts of silt, clay, and sand. Historically, the land has been used for agricultural purposes and is void of any structures. Currently, the property is relatively flat with approximately 20 feet of elevation relief from the northeast to the southwest where the only trees on the site can be found. Groundwater was encountered in all of the borings and may affect construction. All of the groundwater appeared to be perched groundwater that has become trapped within the sand and gravel lenses encountered within the soil. Groundwater has been encountered in similar projects in the area which required over excavation and placement of engineered fill.

Three parking lots are proposed with one each located northeast, northwest, and southwest of the building. Three new access drives will be constructed to access the clinic from Armstrong Dr., Battle Ave., and St. Charles Rd. A CBR value of 3 can be used for pavement design. We recommend the use of heavy-duty concrete for driveways, approaches, and access to the dumpster enclosure. Light-duty pavement can be used for parking areas. Recommendations for pavement, building slab, and retaining walls are provided later in this report.

The exploration and analysis of the soil properties are considered to be in sufficient detail and scope to form a reasonable basis for design. The recommendations submitted are based on the results of our geotechnical investigation and analysis, and the preliminary design concepts provided by Simon Oswald Associates, Inc. This summary should be used in combination with the complete report for design considerations. Additional information and details on the investigation and recommendations, not mentioned in this summary, are contained within the report.
2 PROJECT SCOPE

The scope of the investigation included a reconnaissance of the site, a review of all available subsurface data in the vicinity, a subsurface investigation consisting of ten soil borings to depths ranging from 9.5 to 24.5 feet, laboratory soil testing, and an engineering analysis and evaluation of the foundation materials present at the site.

The purpose of the investigation was to determine the types of subsurface materials present at the site likely to be encountered or affected by the proposed construction; to determine the general engineering characteristics of the various materials; to determine the seismic site class according to the 2015 International Building Code; to determine the potential risk of radon levels being above acceptable limits; and to provide a basis for recommendations regarding bearing capacity and compressibility of the foundation and subgrade materials.

3 DESCRIPTION OF THE SITE AND PROJECT

3.1 SITE LOCATION
The site of the Primary Care Clinic is located in the north-east portion of the city of Columbia, Missouri. The site is bordered to the north by Armstrong Dr., to the south by E. St. Charles Dr., to the east by Battle Ave. and to the west by the wooded property line of Lake of the Woods Golf Course. Specifically, the site is located in the east 1/4 section of Section 2, Township 48 North, Range 12 West (see vicinity map).

3.2 PROJECT DESCRIPTION
The proposed project consists of the construction of a single story multi-office health care building with associated parking and utilities. The facility will utilize slab-on-grade construction with a structural steel frame of columns, beams, and joist. The exterior walls will be cold-formed metal framing with masonry veneer and some metal wall panels. The building is expected to be constructed on a shallow foundation system with a continuous footing around the perimeter and column footings supporting interior column loads. The building will be rectangular in shape with approximate dimensions of 200 feet by 150 feet, and oriented in the northwest to southeast direction, located east of the property center. Three parking lots are proposed with one each located northeast, northwest, and southwest of the building. Three new access drives will be constructed to access the clinic from Armstrong Dr., Battle Ave., and St. Charles Rd.

3.3 SITE DESCRIPTION, TOPOGRAPHY, AND DRAINAGE
The 6.8 acre project site has been modified by man. A review of historic maps indicates that the property has historically been used for agricultural purposes. Currently, the site is vacant of existing structures and there is no indication of the presence of structures in the past.

The site can best be described as nearly level, with minor variations in elevation. The ground surface elevation declines gently toward the southwest. There is approximately 20 feet of vertical relief across
the site with approximately 5 feet of vertical relief within the proposed building footprint. Site drainage is handled by infiltration and runoff into nearby streams.

4 Vicinity Map

5 Geology of Area

5.1 General
The following summary of geologic information is from A. G. Unklesbay found in Geology of Boone County, 1952. Boone County, Missouri lies near the southern terminus of the Dissected Till Plains Physiographic Providence. The geology of the area is characterized by dissected Pleistocene age glacial drift that unconformably overlays Mississippian aged limestone.
5.2 **LOESS**
A clayey silt to silty clay blanketed Boone County at one time. Over large areas, especially in the northwestern and eastern parts of the county, the cover of loess has been removed by erosion. This material is present in varying amounts at the project site. These soils are typically variable in strength and consolidation characteristics. Loess is a windblown soil with variable proportions of clay, silt and fine sand. Shear strength and compressibility of loess is generally low to moderate, but may vary dependent upon site specific conditions.

5.3 **PLEISTOCENE GLACIAL DEPOSITS**
Almost all of Boone County was covered by glacial material in recent geologic time. Glacial till is typically a heterogeneous mixture of silty or sandy clay with fine sand to boulder sized inclusions in the soil matrix. Pockets, or “lenses”, of nearly clean sand may also be found in this till. These soils are typically moderately to highly overconsolidated and exhibit high shear strengths and low compressibility under low to moderate foundation loads. This material was present over the entire site. Drilling was terminated in this stratum at all boring locations.

5.4 **PENNSYLVANIAN DEPOSITS**
Pennsylvanian rock composed of mainly shale with some sandstone, coal, and minor amounts of interbedded limestone occurs erratically in the Columbia area. These deposits are thickest where they unconformably overlie depressions and valleys in the underlying Mississippian surface. These deposits were not encountered in any of the borings.

5.5 **MISSISSIPPIAN LIMESTONE AND DOLOMITE**
Underlying the Pennsylvanian deposits is Mississippian aged bedrock. The principal bedrock formation is the Meramecian limestone and dolomite. The limestone and dolomite generally have a fine crystalline structure and is medium to massively bedded in the region. The inclusion of chert is not common, but does occur. This formation typically exhibits high shear strength and low compressibility characteristics. The Meramecian formation can be heavily characterized by karst features, including pinnacles, caves, sinkholes, and filled sinks. A review of available data indicates the nearest known sinkhole activity is approximately five miles from the project site. None of the borings were extended to this material.

Future sinkhole activity is difficult to predict. Sinkholes and caves in this area are in various stages of development and can appear at any time. Activities of man, both on the site and off, can alter surface drainage and other site conditions. These activities could accelerate the development of caves and sinkholes in areas with no evidence of this activity. None of the borings were extended to this stratum.

6 **FIELD INVESTIGATION**
Field investigations consisting of a site reconnaissance, a review of subsurface records for the area and the drilling of ten soil borings performed on March 20, 2019. The field investigation and the site
reconnaissance were performed in accordance with procedures outlined in ASTM D420. A review of geotechnical investigations by this firm for two nearby public schools was done prior to this investigation.

Drilling was monitored by an engineer from this firm. The engineer provided technical direction, logged the borings, performed field tests including torvane and pocket penetrometer, and prepared and transported the samples to the laboratory for testing.

Boring locations were selected based on preliminary site plans prepared by this firm. Locations were marked by a survey crew from this firm. Boring elevations are assumed correct to within ± 0.2 feet. Field observations are detailed in the boring logs included in the Appendix of this report.

6.1 **DRILLING**

Ten borings were advanced to depths ranging from 9.5 to 24.5 feet using 4 inch, solid stem continuous flight augers equipped with a drag-type drill bit. All drilling was powered by a track mounted Geoprobe© drill rig. Boring locations are shown on the boring plan included in the Appendix of this report. Disturbed samples were obtained from auger cuttings or using a split-barrel sampler in accordance with ASTM D1586. Undisturbed samples were obtained using 3-inch O.D. thin-walled sampling procedures in accordance with ASTM D1587.

7 **LABORATORY INVESTIGATION**

In conjunction with the field investigation, a laboratory investigation was conducted on the sampled materials to determine the engineering properties needed to analyze and predict foundation and subgrade performance. The laboratory investigation included supplementary visual classification, water content tests, unconfined compressive strength tests, dry unit weight measurements and Atterberg limit tests. All tests were performed by this firm in accordance with appropriate ASTM procedures and within an ACOE validated laboratory. Results may be found in the Appendix of this report.

Laboratory tests performed on soil samples retrieved during the field investigation provided a range of results. The natural moisture contents of the soils were found to range from 10 to 27 percent. The dry density of the undisturbed samples ranged from 94 to 110 pounds per cubic foot (pcf). The cohesion, as measured in the unconfined compression test, was found to range from a low of 0.4 tons per square foot (tsf) to a high of 1.9 tsf. The Atterberg liquid limits ranged from 32 to 46 percent while the plastic limits ranged from 9 to 19 percent, giving plasticity indices from 21 to 34. This indicates the tested soils have a moderate plasticity.

8 **SUBSURFACE CONDITIONS**

8.1 **GENERAL**

The materials encountered during the subsurface investigation were visually classified according to ASTM D2488. These materials were further classified using the results of the Atterberg limit testing and the
Unified Soil Classification System. The materials encountered during the field investigation are described in detail in the Boring Logs included in the Appendix of this report. The stratification lines represent approximate boundaries, and the transition may be gradual.

8.2 DESCRIPTION OF SUBSURFACE MATERIALS
The subsurface conditions were fairly consistent throughout the project site. Borings encountered native, clay rich soils with varying amounts of silt and sand within the proposed building footprint, adjacent parking lots, and detention area. Generally, the upper six inches consisted of topsoil with a mixture of organic material. Underlying the topsoil at all ten boring locations was silty clay and clayey silt soils with varying amounts of sand. These soils were described as tan, brown and gray in coloration, firm to stiff in consistency, and moist. Borings B1 and B2 were terminated in this stratum consisting of silt and clay.

Underlying the silty clay and clay rich soils in borings B3 thru B10 were clay rich soils with varying amounts of sand and gravel. Gravel was encountered as shallow as 6 feet in boring B9 and as deep as 13.5 feet in boring B10. These soils were described as tan, reddish brown, and gray in coloration, firm to stiff in consistency, and moist to wet. Borings B4, B5, B7, and B10 were terminated in this stratum.

In borings B3, B6, B8, and B9, sand lenses were encountered at depths ranging from 6.0 feet at boring B9 to 18.0 feet at boring B3. Perched groundwater was present in the sand lenses and is discussed in further detail in section 9.2 Groundwater of this report.

Bedrock in the area consists of Pennsylvanian aged shale and sandstone and Mississippian aged limestone and dolomite. Estimated depth of bedrock is between 25 and 50 feet in the area and were not encountered during this investigation in any of the boring locations.

8.3 UTILITIES
No underground utilities were marked within the proposed building footprint, the parking lots, or the detention basin at the time of the field investigation. All marked utilities were located in the right-of-way for the three roads that border the property to the north, south, and east. There was a storm sewer manhole located near the northwest corner of the property, however, the size and location of the storm line was not determined at the time of this investigation.

9 ENGINEERING ANALYSIS AND RECOMMENDATIONS

9.1 GENERAL
The engineering analysis and recommendations which follow are based upon the results of a geotechnical investigation, analysis, and the preliminary design information for the proposed building. If the project scope is altered appreciably or differing geotechnical conditions are encountered than those noted in the Boring Logs, a review of the changes or conditions is recommended to determine their impact upon design.
Shallow spread footings may be used to support the proposed structure. It is recommended that a qualified geotechnical engineer observe all bearing surfaces immediately after excavation and prior to concrete placement to verify the suitability of the bearing surface and bearing material.

9.2 GROUNDWATER

Groundwater was encountered in several of the borings and may affect construction. All of the groundwater appeared to be perched groundwater that has become trapped within the sand and gravel lenses encountered within the soil and ranged in depth from 6 to 17 feet below existing grade at borings B6 and B8, respectively.

Based on the proposed finished floor elevation of 828.0 feet, perched groundwater may be encountered during footing excavation. If perched groundwater is encountered, we recommend over excavating the water bearing material and replacing with engineered fill or lean concrete back to bottom of footing elevation.

Perched groundwater is not expected to be encountered during site grading activities based on the most recent grading plan. However, the exact location of the groundwater surface should be expected to fluctuate depending on normal seasonal variations in precipitation and other climatic conditions, surface runoff, permeability of onsite soils, continuity of pervious material, and other factors. Should groundwater be encountered during grading activities, we recommend that the material be sufficiently dried and recompacted as engineered fill. If the moisture cannot be reduced to satisfy moisture specifications then the material should be removed and replaced.

9.3 SEISMIC LOADING

In the design of the proposed structures the following seismic parameters may be used. These parameters are based on the 2015 International Building Codes and are site specific.

1. Site Class C
2. Mapped Spectral Response, Short Periods (Ss) 0.167
3. Mapped Spectral Response, Short Periods (S1) 0.093
4. Site Coefficient as a Function of Ss (Fa) 1.2
5. Site Coefficient as a Function of S1 (Fv) 1.7

9.4 SITE GRADING

Site grading will primarily consist of cut and fill to provide a level building pad, create positive drainage in the parking lots, and meet ADA accessibility slope requirements. The site grading is expected to include cuts and fills of no more than 10 feet. Additional excavation will be required for foundation and utility construction. It is recommended that any unsuitable material encountered during excavation be removed from the site.

Engineered fill for regrading the building pad should meet the requirements stated in the Construction Fill and Backfill section of this report. The fill placed within the upper 12 inches of subgrade under the floor slab should consist of low volume change (LVC) material consisting of crushed aggregate material
containing sufficient fines to develop a moisture density relationship. The 6 inches of capillary break mentioned in section 9.8 of this report shall not be included in the 12 inches of granular LVC.

Construction should not begin until all cuts have been completed and fill placed within the plan area of the proposed structure. Prior to the start of construction, it is recommended that all vegetation and topsoil be removed from the construction area of the site.

Following completion of excavation and stripping, and prior to slab-on-grade construction, it is recommended that the slab subgrade be proof-rolled with a rubber-tired piece of construction equipment such as a fully loaded, tandem-axle dump truck to help identify any soft or unsuitable areas. Areas identified as unsuitable should be overexcavated and reconstructed with engineered fill.

Site grading will be dependent on weather conditions. The soils are sensitive to moisture changes caused by atmospheric conditions and precipitation. Clay and silt rich soils can be subject to high rates of erosion and loss of shear strength with increases in moisture content. Moisture content changes can also lead to volumetric changes in the soils. The first few inches of exposed soil will be most affected by changing conditions. The site contractor should take steps to minimize erosion of the site and prevent precipitation from ponding on the ground surface immediately following stripping and up to establishment of ground cover or turf. Earthwork operations may be delayed by heavy precipitation at the site.

9.5 FOUNDATION RECOMMENDATIONS
Preliminary design indicates that the building will be rectangular in shape and have approximate dimensions of 200 by 150 feet in plan in a northwest/southeast direction. Finished floor elevation is expected to be 828 feet. Column and wall loads are not anticipated to exceed 120 kips and 3,000 plf, respectively.

A perimeter foundation drainage system is recommended to discharge accumulated moisture away from the structure. The perimeter drainage system should consist of a perforated pipe bedded and backfilled with free draining aggregate. The free draining aggregate zone should be wrapped in geotextile filter fabric with an apparent opening size (ASTM D 4751) of 70 to 100 and minimum trapezoid tear strength (ASTM D 4533) of 50 pounds. The free draining aggregate should be covered with at least 2 feet of compacted low permeability clay soil. Downspouts and gutters should not be designed to flow into the foundation drain system. If continuous foundations or grade beams are “bank poured” the foundation drain may be eliminated.

Trees or other vegetation whose root systems have the ability to remove excessive moisture from the subgrade and foundation soils should not be planted next to the structures.

9.5.1 Shallow Foundations with Slab-on-Grade
For the structure to include a slab-on-grade, all topsoil and organic material should be removed from within the building footprint. The building pad should then be graded by cut and fill methods using suitable engineered fill as described in the Construction Fill and Backfill section of this report. The placement of engineered fill should extend outside of the exterior foundation line by at least one half the depth of footings. It is recommended that a unit price be negotiated into the construction documents to address any unsuitable material that may be encountered.
The structure may be supported by a shallow foundation system with net allowable bearing pressures of 2,500 and 2,000 psf for isolated and continuous footings, respectively. Foundations can be designed to bear on properly compacted engineered fill. Continuous footings should be a minimum of 18 inches wide and designed to act as grade beams. It is recommended for a shallow foundation system, the exterior footings bear at an approximate elevation of 36 inches below adjacent finished grade. Total settlement is estimated to be on the order of one inch or less with approximately one-half inch of differential settlement. Most of the settlement should occur during construction. No rock excavation is anticipated in the construction of a shallow foundation system.

9.6 RADON
The US Environmental Protection Agency lists Columbia as having moderate indoor radon screening levels, between 2 and 4 pCi/L. This rating is based on indoor radon measurements; geology; aerial radioactivity; soil permeability; and foundation type. Geology, soil permeability and anticipated foundation type are addressed here.

Radon is produced by the radioactive decay of uranium. Significant uranium deposits are not known to exist in the Columbia area. Radon is often associated with clastic shale and coal formations, which are found in the project area.

The subsurface profile includes low to moderate permeability clay and silt. With reduced permeability, deep cracks are less likely to form due to loss of moisture. Deep cracks and high permeability can contribute to the presence of radon in a structure.

Radon is most commonly encountered in basements. It is heavier than air and can accumulate in higher concentrations in basement construction. The planned project does not include any basement construction.

It is our professional opinion that the geological conditions of the project site, along with the absence of proposed basements, are such that radon is not likely to exceed acceptable levels in completed buildings.

9.7 RETAINING WALLS
Any walls subject to unbalanced earth pressure should be designed for earth pressures equal to or greater than those provided on the following table. For the granular or cohesionless backfill values to be valid the “Structural Backfill” zone must extend 45° from vertical from the heel of the retaining structure’s foundation. These load distributions do not include a factor of safety or include the influence of hydrostatic pressures on the wall. Surcharge loads above the top of the wall due to vehicles, equipment, structures, or sloped backfill should be considered in the design as well.
The following chart is based on these conditions.

- Equivalent Fluid Pressures are based on a wet unit soil weight of 120 pcf and a cohesionless (aggregate) unit weight of 140 pcf.
- No groundwater is acting on the wall.
- For active earth pressure, wall must rotate at base, top lateral movement should be between 0.002 and 0.004 times the height of the wall (H).
- Surcharge pressure (S) acts at H/2 above the base.
- Backfill is compacted to a minimum of 95% of Maximum Dry Density (ASTM D698).
- Ignore passive pressure in the frost zone.

### EARTH PRESSURE COEFFICIENTS

<table>
<thead>
<tr>
<th>Earth Pressure Conditions</th>
<th>Coefficient for Backfill Type</th>
<th>Equivalent Fluid Pressure (psf)</th>
<th>Surcharge Pressure P1 (psf)</th>
<th>Earth Pressure P2 (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active (Ka)</td>
<td>Cohesionless or Granular – 0.30</td>
<td>42</td>
<td>(0.30)S</td>
<td>(42)H</td>
</tr>
<tr>
<td></td>
<td>Low Plasticity Clays (LL&lt;50) – 0.42</td>
<td>50</td>
<td>(0.42)S</td>
<td>(50)H</td>
</tr>
<tr>
<td></td>
<td>High Plasticity Clays (LL&gt;50) – 0.52</td>
<td>60</td>
<td>(0.52)S</td>
<td>(60)H</td>
</tr>
<tr>
<td>At-Rest (Ko)</td>
<td>Cohesionless or Granular – 0.46</td>
<td>65</td>
<td>(0.46)S</td>
<td>(65)H</td>
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<td></td>
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<td>70</td>
<td>(0.59)S</td>
<td>(70)H</td>
</tr>
<tr>
<td></td>
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<td>82</td>
<td>(0.69)S</td>
<td>(82)H</td>
</tr>
<tr>
<td>Passive (Kp)</td>
<td>Cohesionless or Granular – 3.4</td>
<td>475</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Low Plasticity Clays (LL&lt;50) – 2.4</td>
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</tr>
<tr>
<td></td>
<td>High Plasticity Clays (LL&gt;50) – 1.9</td>
<td>230</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

A maximum toe pressure of 2,000 psf may be used for design on properly placed engineered fill soils. A coefficient of friction 0.4 may be used to calculate sliding resistance.

Shallow temporary below grade excavations should be stable long enough to allow for construction of the foundation and walls of the proposed structure. All excavations should be benched, sloped or shored in accordance with OSHA guidelines. Some sloughing may occur due to weathering and freeze/thaw cycles. Long term excavation slopes and deep excavations should be analyzed prior to construction to insure that adequate stability is achieved.

### 9.8 FLOOR SLAB DESIGN

Floor slab loads are estimated to be 150 psf or less. In consideration of this, the floor slabs may be designed using a modulus of subgrade of 200 pounds per cubic inch (pci).

We recommend that the floor slab thickness be a minimum of 5 inches and that the slab subgrade include a capillary break (3/4" to 1" “clean” aggregate) that is a minimum of 6 inches thick overlying a minimum of 12 inches of aggregate LVC material as mentioned in section 9.4 of this report. A minimum 6 mil
thickness polyethylene vapor barrier should be installed beneath the slab to improve its performance. In addition, it is recommended that the slab be reinforced with a minimum of 6 by 6-inch woven wire mesh.

Prior to placement of the drainage layer of aggregate and if a cohesive soil is used for the slab subgrade, the upper 8 inches of the entire slab soil subgrade should be scarified, moisture conditioned to within 0 to +4 percent of optimum moisture content and recompacted as engineered fill. The drainage aggregate should be compacted by a vibratory plate or smooth roller when placed.

Construction and saw joints are recommended for all slabs-on-grade. Saw and construction joints should be installed such that the panels are nearly square but do not exceed a length to width ratio of 1.4 to 1.0. Maximum panel size depends on several factors including the amount of cement in the mix, the maximum coarse aggregate size, and slab thickness.

Several precautions are normally used to insure adequate long-term performance of the slab on grade. These precautions include the installation of a precipitation removal system involving the use of gutters, downspouts, and landscaping; not allowing water to pond next to the proposed structure during or after construction; and not allowing the subgrade soil to become inundated or desiccated prior to or during the time required for construction of the floor slab.

9.9 PAVEMENT DESIGN AND RECOMMENDATIONS

The pavement associated with the project is expected to include parking areas for cars and light trucks as well as access drives, passenger drop off areas and a trash collection area. Because the access drives, passenger drop off areas and trash collection area carry a higher traffic volume and heavier vehicles, it is recommended that the pavement in these areas be designed to be more durable than the pavement in the parking areas. It is preferred that the access drives, drop off areas and trash collection area (heavy duty areas) be constructed with Portland cement concrete. Recommendations for both asphalt and Portland concrete are provided. Rigid pavements should be reinforced, at a minimum, with 1/2-inch epoxy coated dowel bars for transverse joints.

The following pavement design recommendation has taken into account site specific traffic estimates, geotechnical information, and subgrade modification or reinforcement. A California Bearing Ratio (CBR) value of 3 was used to develop the following pavement design recommendations for the parking lot.

HEAVY DUTY

Portland Cement Concrete

8” Portland Cement Concrete (4,000 psi mix)
6” MoDOT Type 1 crushed stone base

Asphaltic Cement Concrete

2” Type ’BP-2’ Asphaltic Concrete Surface Course
5” MoDOT Plant Mix Bituminous Course
7” MoDOT Type 1 crushed stone base
STANDARD DUTY

Portland Cement Concrete
4" Portland Cement Concrete (4,000 psi mix)
6" MoDOT Type 1 crushed stone base

Asphaltic Cement Concrete
2" Type 'BP-2' Asphaltic Concrete Surface Course
2" MoDOT Plant Mix Bituminous Course
6" MoDOT Type 1 crushed stone base

10 CONSTRUCTION CONSIDERATIONS

10.1 SITE PREPARATION
Site preparation will require clearing trees, grubbing, and clearing of topsoil. All vegetation from clearing and grubbing activities should be removed from the site.

It is recommended that a representative of the geotechnical engineer be present during fill placement and compaction to assure that adequate compaction is achieved and that proper methods are employed. All areas that will receive fill should be proof-rolled with a piece of heavy, rubber-tired equipment, such as a loaded tandem axle dump truck, in the presence of the geotechnical engineer.

10.2 UTILITY TRENCHES
All utility trenches should be backfilled in accordance with appropriate controlled engineered fill specifications. All trench excavations should be made with sufficient working space to permit the placing, inspection, and completion of all work including backfill construction. It is recommended that a representative of the geotechnical engineer be present during fill placement and compaction to assure that adequate compaction is achieved and that proper methods are employed.

10.3 SITE EXCAVATION
General site excavation may be accomplished using earthwork equipment such as dozers, excavators, and scrapers. No rock was encountered during the investigation and is not expected during the project work. However, it is recommended that a unit price for rock removal be established in the contract documents to address any erratic boulders that may be encountered.

In areas where the excavation side wall cannot be sloped to meet OSHA requirements, some form of shoring system will be required. Shoring systems may consist of trench boxes, soldier piles and lagging and sheet piles. The same design parameters presented in the retaining wall section may be used for design of the shoring system.
10.4 **SLAB SUBGRADE PREPARATION**

The subgrade soils should not be permitted to dry excessively or become inundated prior to or during construction of the floor slab. If subgrade soils are found to be unsuitable or become disturbed by nature or construction activities, these areas should be excavated to a solid base and then regraded with controlled engineered fill.

10.5 **FOUNDATION EXCAVATION AND CONSTRUCTION**

Foundation bearing surfaces should be free of loose soil and standing water, and should be level. Foundation concrete should be placed the same day the foundation is excavated. Deleterious materials or isolated soft spots within the foundation should be overexcavated to suitable base and filled to design bearing elevation with lean concrete.

10.6 **CONSTRUCTION FILL AND BACKFILL**

Engineered fill is defined as soil or granular fill containing sufficient fines to establish a moisture/density relationship. Engineered fill should be free of frozen soil, organics, rubbish, large rocks, wood, or other deleterious material. Cohesive soils should be uniformly compacted to at least 95 percent of the “Standard” maximum dry density and be within -2 to +4 percent of optimum moisture content as described by ASTM D698. Granular fill, such as MoDOT 1007 Type 1/5, should be compacted to at least 95% of the maximum dry density as determined by the Standard Proctor, ASTM D698. The moisture content should be high enough to provide for proper compaction but low enough to prevent undue pumping. Should the results of the in-place density tests indicate that the specified compaction limits have not been achieved, the area represented by the test should be reworked and retested as required until the specified limits are reached. Proposed fill should be analyzed by the geotechnical engineer as soon as borrow sources are identified to determine suitability and conformance with the following recommendations.

Soil classified as MH, OH, OL, or PT (high plasticity soils and organic soils) by the Unified Soil Classification System (ASTM D 2487) should not be imported for use as engineered fill. Soils that classify as CH should be analyzed and approved by a qualified geotechnical engineer prior to use on site. Limestone screenings or “waste lime” is not recommended for use as fill on this site.

The fill material should be placed in layers, not to exceed eight inches in loose thickness, and should be wetted or dried as required to secure specified compaction. Effective spreading equipment should be used on each lift to obtain a uniform lift thickness prior to compaction. Each layer should be uniformly compacted by means of suitable equipment of the type required by the materials composing the fill. Material that is too wet to permit proper compaction may be stockpiled or spread and permitted to dry assisted by disk ing, harrowing, or pulverizing until the moisture content is reduced to a satisfactory value. The fill layers should be placed in horizontal lifts. Fill placed on slopes greater than 5H:1V should be benched into the slope. Rocks and stones that exceed the thickness of the 8 inch loose lift layer should be removed and disposed of off the immediate construction site.

Fill and subgrade construction should not be started on foundation soil, partially completed fill, or subgrades that contain frost or ice. Fill should not be constructed of frozen soil. Frozen soil should be removed prior to placing fill material.
10.7 CLIMATIC CONSIDERATIONS
The on-site soils are relatively sensitive to changes in atmospheric conditions and precipitation. These soils are predominantly clay and silt, and are subject to high rates of erosion, rapid loss of shear strength upon wetting, and shrink-swell behavior with changes in moisture content. The greatest impact of climatic conditions will occur within the first few inches of exposed soil surface. The contractor should take positive measures to limit erosion of the site following stripping and up to establishment of ground cover or turf. Earthwork operations may be delayed by heavy precipitation at the site.

11 WARRANTIES AND LIMITATIONS
This report has been prepared for the exclusive use of the University of Missouri and their consultants for the specific project discussed, in accordance with generally accepted soils engineering practices common to the east Missouri area. No other warranties, expressed or implied, are made.

This investigation and report do not constitute a guarantee of subsurface conditions, groundwater conditions, excavation characteristics or construction conditions. We recommend that excavation conditions across the site be evaluated during construction relative to this interpretation of subsurface conditions. Variations in subsurface conditions may occur that require evaluation or revision of geotechnical design parameters or recommendations. If the scope of the project is altered or differing geotechnical conditions are encountered, it would be advisable to review and update our recommendations in consideration of those findings or variations.

Recommendations contained in this report are based on subsurface conditions and proposed designs provided as of this date. The above study and recommendations are applicable only for the conditions and locations described, and for the specific project mentioned. Use of the data contained herein by others may require interpretation or analysis that was not contemplated by our investigation and analysis. The use of this data and any interpretations or conclusions developed by others are the sole responsibility of those firms or individuals.

Factors affecting design and construction often become apparent during detailed design or actual construction that were not anticipated in the pre-design or early design phases. Engineering Surveys and Services is available during design and construction to assist in evaluating these factors and their impact on these geotechnical recommendations.
SYMBOLS AND TERMS

SAMPLE TYPES

Auger  Shelby  Split  Giddings  No  NX  Core  Roller Bit  Concrete  Down  Hole
Tube   Spoon   Tube   Recovery  Boring   (Tri-Cone)  Corer     Hammer

ABBREVIATIONS

⊙  Unconfined Compression (1)
●  Water Content (2)
+  Plastic (PL) & Liquid (LL) Limit (2)
USCS  Unified Soil Classification System
PI  Plasticity Index
ATD  At Time of Drilling
RQD  Rock Quality Designation
SS  Split Spoon – 1 3/8” I.D., 2” O.D.
ST  Shelby Tube – 3” O.D.
PA  Power Auger
HA  Hand Auger
AS  Auger Sample
S  Cuttings Sample
TV  Hand-Held Torvane

DEFINITIONS

Blows per ft.—Indicates blows per 12 inches of sampler penetration when driven by a
140-pound hammer falling freely 30 inches. The Standard Penetration Resistance is the number of blows for the last 12 inches of penetration of
the split-spoon sampler.

NOTES

(1)  Shear Strength Data plotted on cohesion scale of Boring Logs.
(2)  Classification and Index Properties plotted on Water Content Scale of Boring Logs.
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<th>SAMPLE NO.</th>
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<th>NATURAL DRY DENSITY (PCF)</th>
<th>LL PL PI</th>
<th>ATTERBERG LIMITS</th>
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### SOIL DESCRIPTION

**TYPE, COLOR, MOISTURE & OTHER**

- **CLAYEY SILT**: Tan, moist, firm
- **CLAYEY SILT**: Gray with tan, moist, firm
- **CLAYEY SILT**: Tan and gray, moist, hard, manganese stains

**LOCATION**: Boring Locations

**SURF. ELEV.**: 825.5’

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**Completion Depth**: 9.5’

**Depth to Water ATD**: Not Encountered

**Date**: 20 March 2019

**Engineering Surveys & Services**

Columbia, Missouri
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Completion Depth: 21.5’
Depth to Water ATD: Not Encountered

Date: 20 March 2019
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<th>Unit Dry wt. lb./cu.ft.</th>
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Completion Depth: **19.5’**
Depth to Water ATD: **Not Encountered**
Date: **20 March 2019**
CLAYEY SILT: Tan, moist, firm

CLAYEY SILT: Gray with some tan, damp, hard

CLAYEY SILT: Gray and tan, damp, stiff, with gravel

SILTY SANDY CLAY: Tan, moist, stiff, with gravel

SILTY SANDY CLAY: Gray, damp, hard

Completion Depth: 24.5'

Depth to Water ATD: Not Encountered
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<td>3</td>
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Completion Depth: 19.5’  
Depth to Water ATD: 12.0’ and 17.0’  
Date: 20 March 2019
**CLAYEY SANDY SILT:** Brown, moist, firm

**SANDY SILT:** Gray, damp, hard, with lignite

**SILTY SAND:** Tan, wet, soft

**SILTY SILTY CLAY:** Brown, moist, firm, with gravel

**SILTY SANDY CLAY:** Brown, wet, stiff, with gravel
<table>
<thead>
<tr>
<th>DEPTH, FT.</th>
<th>SAMPLE TYPE</th>
<th>SOIL DESCRIPTION</th>
<th>TYPE, COLOR, MOISTURE &amp; OTHER</th>
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<tr>
<td>4</td>
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Completion Depth: 9.5’  Depth to Water ATD: Not Encountered
Date: 20 March 2019
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<th>WATER CONTENT, % LIMIT</th>
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Completion Depth: 19.5’  
Depth to Water ATD: 17.0’
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<th>DEPTH, FT.</th>
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<th>PLASTIC LIMIT</th>
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<td>SANDY SILT: Gray and tan, moist, firm, with gravel</td>
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Completion Depth: 9.5’  
Depth to Water ATD: 6.0’  
Date: 20 March 2019
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<th>UNIFIED CLASSIFICATION</th>
<th>COHESION, TON/SQ.FT.</th>
<th>PLASTIC LIMIT CONTENT, %</th>
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<td>2</td>
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<td>Clayey Sandy Silt: Tan, moist, firm</td>
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Completion Depth: 15.0’  
Depth to Water ATD: Not Encountered  
Date: 20 March 2019
PART 1 - GENERAL

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

1.2 SUMMARY
A. The goal of the Commissioning program is to help produce a properly operating building on schedule with more satisfied building occupants, while minimizing construction problems and energy waste.

B. The Owner has included the quality improvement process known as Commissioning for this project to help improve product quality, reduce total project costs, and facilitate the delivery process. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the Owner’s Project Requirements (design intent) and the Owner’s operational needs.

1. The Commissioning effort will be focused on the energy using and building enclosure systems.

D. The Owner has retained the services of a Commissioning Authority (CxA) under a separate contract from other subcontractors. Although this specification includes general requirements for commissioning, this Section is intended as a summary of responsibilities of the commissioning team.

E. Related Sections include the following:
1. Mechanical Division Sections for requirements specific to the Work of each of those Sections, including Section 23 08 00.
2. Electrical Division Sections for requirements specific to the Work of each of those Sections, including Section 26 08 00.
3. Building Enclosure Commissioning Section 01 91 19 for requirements specific to the Work of each of those Sections.

1.3 COMMISSIONING TEAM
A. The Commissioning Process is a team effort involving the Owner, Designer (A/E), Contractor, Subcontractors, material suppliers, equipment manufacturers, and Commissioning Authority.

B. Members Appointed by Contractor(s): Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the Team.

C. Members Appointed by Owner:
1. Commissioning Authority (CxA): The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
2. Representatives of the facility user and operation and maintenance personnel.
3. Architect and engineering design professionals.

D. General Team Responsibilities: The Contractor and related subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
1. Review the Owner’s Project Requirements and Basis of Design documentation.
2. Schedule and participate in periodic commissioning team coordination meetings.
3. Provide information to the CxA for developing construction-phase commissioning plan.
4. Provide necessary documentation to the CxA, including shop drawings, installation manuals, change orders, requests for information (RFI's), testing reports, etc.

5. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.

6. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA.

7. Maintain as-built records of the installed systems on a daily basis.

8. Complete installation checklists for each item of equipment and each system to be commissioned. Copies of the installation checklists shall be maintained on the project site for periodic review by the Owner and CxA.

9. Implement functional performance testing for each item of equipment and each system in accordance with approved testing procedures.

10. Participate in maintenance orientation and inspection.

11. Provide training sessions for Owner’s operation and maintenance personnel.

12. Provide technicians who are familiar with the construction and operation of installed systems and who shall assist in development of specific test procedures and participate in testing of installed systems, subsystems, and equipment.

1.4 DESCRIPTION

A. The commissioning process shall encompass and coordinate the system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training.

B. Specific commissioning objectives include:
   1. Review the Owner’s Project Requirements (design intent) to ensure clear direction is provided and the Basis of Design document developed by the design team for completeness.
   2. Ensure that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
   3. Verify and document proper performance of equipment and systems.
   4. Ensure that O&M documentation is complete.
   5. Obtain documentation from Owner that operating personnel are adequately trained.

C. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
   1. Verify that applicable equipment and systems are installed according to the manufacturer’s recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing Contractors.
   2. Verify and document proper performance of equipment and systems.
   3. Verify that O&M documentation is complete.
   4. Obtain documentation from Owner that operating personnel are adequately trained.
   5. Document the successful achievement of the commissioning objectives listed above.

D. The commissioning process does not take away from or reduce the responsibility of the system designers or installing Contractors to provide a finished and fully functioning product.

E. Abbreviations: The following are common abbreviations used in the Commissioning Specifications. Definitions are found in Part 1.9.
1. The terms “General Contractor”, and “Contractor” are synonymous.

2. The terms “Construction Project Manager (Owner)” and “Contracting Officer” are also synonymous. Abbreviations:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>A/E-</td>
<td>Architect and Design Engineers</td>
</tr>
<tr>
<td>CxA-</td>
<td>Commissioning Authority</td>
</tr>
<tr>
<td>CC-</td>
<td>Controls Contractor</td>
</tr>
<tr>
<td>CPM-</td>
<td>Construction Project Manager (the Owner’s representative)</td>
</tr>
<tr>
<td>Cx-</td>
<td>Commissioning</td>
</tr>
<tr>
<td>EC-</td>
<td>Electrical Contractor</td>
</tr>
<tr>
<td>FPT-</td>
<td>Functional Performance Test</td>
</tr>
<tr>
<td>GC-</td>
<td>General Contractor (prime)</td>
</tr>
<tr>
<td>MC-</td>
<td>Mechanical Contractor</td>
</tr>
<tr>
<td>PFC-</td>
<td>Pre-functional Checklist</td>
</tr>
<tr>
<td>Subs-</td>
<td>Subcontractors to General</td>
</tr>
<tr>
<td>TC-</td>
<td>Testing Coordinator</td>
</tr>
<tr>
<td>TAB-</td>
<td>Test and Balance Contractor</td>
</tr>
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</table>

1.5 QUALITY ASSURANCE

A. The following references have been used in the development of the commissioning process:

3. Building Commissioning Association checklists and testing procedures.
4. Other sources appropriate to this contractor.

1.6 COORDINATION

A. Commissioning Team: The members of the commissioning team consist of the Commissioning Authority (CxA), the Construction Project Manager (CPM), the General Contractor (GC or Contractor), the Architect and design engineers (particularly the mechanical engineer), the Mechanical Contractor (MC), the Electrical Contractor (EC), the TAB representative, the Controls Contractor (CC), and any other installing Subcontractors or suppliers of equipment. If known, the Owner's building or plant operator/engineer is also a member of the commissioning team.

B. Management: The CxA has been hired by the Owner. The CxA directs and coordinates the commissioning activities and the reports to the CPM. All team members work together to fulfill their contracted responsibilities and to meet the objectives of the Contract Documents.

C. Scheduling:

1. The CxA will work with the CPM and GC according to established protocols to schedule the commissioning activities. The CxA will provide sufficient notice to the CPM and GC for scheduling commissioning activities. The GC will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

2. The CxA shall provide the initial schedule of primary commissioning events at the commissioning scoping meeting. As construction progresses more detailed schedules shall be developed by the CxA. The Commissioning Plan shall provide a format for detailed schedules.

1.7 COMMISSIONING PROCESS

A. Commissioning Plan: The “final” Commissioning Plan shall be developed by the CxA including specific scheduling of required testing procedures for commissioned equipment and systems. The Commissioning Plan shall provide guidance in the execution of the commissioning process. Within 30 days after the initial commissioning scoping meeting the CxA shall update the plan which is then considered the “final” plan. The Specifications will take precedence over the Commissioning Plan in
the event of conflicting requirements between the two.

B. Commissioning Process: The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.

1. Commissioning during construction begins with a scoping meeting conducted by the CxA where the commissioning process is reviewed with the commissioning team members.

2. Additional meetings will be required throughout construction, scheduled by the CxA with necessary parties attending, to plan, scope, coordinate, schedule future activities, and resolve problems.

3. Equipment documentation is submitted to the CxA during normal submittals, including detailed startup procedures.

4. The CxA shall work with the Contractor to develop startup plans and startup documentation formats and shall provide the Contractor with prefunctional checklists to be completed, during the startup process.

5. In general, the checkout and performance verification proceeds from simple to complex: from component level to equipment to systems and intersystem levels with prefunctional checklists being completed before functional testing.

6. The Contractor shall execute and document the prefunctional checklists and perform startup and initial checkout according to the plan. The CxA shall document that the checklists and startup were completed according to the approved plans and procedures. The CxA may witness the start-up of selected equipment.

7. The CxA shall develop specific equipment and system functional performance test procedures with the assistance of the Contractor.

8. Portions of the Direct Digital Control (DDC) System may need to be commissioned before equipment can be started up and Test and Balance work begin.

9. The Contractor shall execute the testing procedures, with the assistance of and documented by the CxA to satisfy the commissioning requirements.

10. **NOTE:** Test and Balance work must be completed before functional testing. Contractor shall include and show adequate time in the schedule for test and balance activities.

11. The Contractor shall correct items of non-compliance in material, installation or setup at the Contractor’s expense and the system shall be retested.

12. The CxA, in addition to the Engineer of Record, shall review the O&M documentation for completeness.

13. The CxA shall obtain documentation for inclusion in the final Cx Report that Owner provided training was completed as required. (**NOTE:** Owner training shall be conducted only after all equipment/system functional testing has been completed.)

14. Commissioning shall be completed before Substantial Completion.

15. The Contractor shall perform deferred (seasonal) testing as specified and required with verification by CxA.

1.8 RELATED WORK

A. General commissioning requirements are identified within this specification section.

B. Specific commissioning requirements are given in the following sections of these specifications. All the following sections apply to the Work of this section.

C. 23 08 00 – Commissioning of HVAC Systems

D. 26 08 00 – Commissioning of Electrical Systems
E. 01 91 19 – Building Enclosure Commissioning

1.9 RESPONSIBILITIES

A. The responsibilities of various parties in the commissioning process are provided in this section. The responsibilities of the Plumbing Contractor, Mechanical Contractor, the Controls Contractor and the TAB Contractor are in Division 20 to 25, and those of the Electrical Contractor in Division 26.

B. All Parties: Attend commissioning scoping meeting and additional meetings as necessary.

C. Mechanical and Electrical Engineers (Of The A/E):

1. Construction and Acceptance Phase:
   a. Provide Basis of Design documentation for all commissioned systems for inclusion in the commissioning plan and final report.
   b. Perform normal submittal review and construction observation as contracted. On-site observation should be completed just prior to system startup.
   c. Attend commissioning scoping meetings and other selected commissioning team meetings.
   d. Participate in the resolution of system deficiencies identified during commissioning, according to the contract documents.
   e. Prepare and submit the final as-built design intent and operating parameters documentation for inclusion in the O&M manuals. Review and approve the O&M manuals.

2. Warranty Period: Participate in the resolution of non-compliance, non-conformance and design deficiencies identified during commissioning during warranty period commissioning.

D. Commissioning Authority (CxA): The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving non-conformance or deficiencies, but ultimately that responsibility resides with the General Contractor and the A/E. The primary role of the CxA is to develop and coordinate the execution of a testing plan and observe and document performance that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools and labor to start, checkout and functionally test equipment and systems. The CxA shall report directly to the Construction Project Manager (Contracting Officer).

1. Construction and Acceptance Phase:
   a. Coordinate and direct the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
   b. Coordinate the commissioning work, and with the GC and CPM, ensure that commissioning activities are being scheduled into the master schedule.
   c. Plan and conduct a commissioning scoping meeting and other commissioning meetings.
   d. Review and evaluate the preparation of the O&M manual data by the Contractor.
   e. Review and evaluate submittals applicable to systems being commissioned for compliance with commissioning needs.
   f. Request and review additional information required to perform commissioning tasks, including O&M materials, Contractor startup and checkout procedures.
   g. Before initial startup, assist the Contractor in gathering and reviewing the control sequences and interlocks and assist the Contractor in writing detailed testing procedures.
   h. Evaluate prefuctional test results and checklist completion by reviewing the Contractor’s
prefunctional checklist reports and by selected site observation and spot-checking.

i. Perform site visits, as necessary, to observe component and system installations. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.

j. Approve prefunctional tests and checklist completion by reviewing prefunctional checklist reports and by selected site observation and spot checking.

k. Assist the Contractor writing the performance test procedures for equipment and systems. This may include Direct Digital control system trending, stand-alone data logger monitoring and/or manual functional testing.

l. Analyze any functional performance trend logs and monitoring data to verify performance.

m. Witness and approve manual functional performance tests performed by installing Contractors. Coordinate retesting as necessary until satisfactory performance is achieved.

n. Maintain a master deficiency and resolution log and a separate testing record. Provide the Construction Project Manager with written progress reports and test results with recommended actions.

o. Obtain written verification of training from Owner for inclusion in final commissioning Report.

p. Review the O&M manuals.

q. Provide a final commissioning report.

2. Warranty Period: Coordinate and supervise required seasonal or deferred testing and deficiency corrections.

E. Construction Project Manager (CPM, Owner’s Representative):

1. Provide the Owner’s Project Requirements (OPR) documentation to the CxA and Contractor for use in developing the commissioning plan; systems manual; operation and maintenance training plan; and testing plans and checklists.

2. Provide the Basis of Design (BoD) documents, prepared by Architect/Engineer and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

3. Construction and Acceptance Phase:

   a. Provide Owner’s Project Requirements (design intent) documentation for inclusion in the commissioning plan and final report.

   b. Manage the contract of the A/E and of the GC.

   c. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and field training sessions.

   d. Provide final approval for the completion of the commissioning work.

4. Warranty Period: Ensure that any seasonal or deferred testing and any deficiency issues are addressed.

F. General Contractor (GC):

1. Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities, including representatives from related subcontractors.

2. Construction and Acceptance Phase:
a. Facilitate the coordination of the commissioning work by the CxA and ensure that commissioning activities are being scheduled into the master schedule.
b. Participate in construction-phase coordination meetings.
c. Include the cost of commissioning in the total contract price.
d. Furnish a copy of all construction documents, addenda, change orders, approved submittals and shop drawings related to commissioned equipment to the CxA.
e. In each purchase order or subcontract written, include requirements for submittal data, O&M data, commissioning tasks, and training.
f. Ensure that all Subs execute their commissioning responsibilities according to the Contract Documents and schedule.
g. A representative shall attend a commissioning scoping meeting and other necessary meetings scheduled by the CxA to facilitate the Cx process.
h. Prepare O&M manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
i. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
j. Before initial startup, gather and review the current control sequences and interlocks and with the CxA write detailed testing procedures.
k. Develop prefunctional checklists, perform prefunctional testing and document testing results with the necessary assistance and review from the CxA.
l. Provide necessary assistance and review of the functional performance test procedures written by the CxA for commissioned equipment and systems. This may include Direct Digital control system trending, stand-alone data logger monitoring or manual functional testing.
m. Provide functional testing of commissioned equipment and systems.
n. Review TAB execution plan with CxA.
o. Provide sufficient functional testing of the HVAC control system and evaluate its use for TAB, before TAB is executed with assistance from CxA. TAB provided by owner or third party.
p. Provide all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to the contract documents.
q. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
r. Review test procedures with CxA for equipment installed by factory representatives.
s. Certify that Work is complete, and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
t. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

3. Warranty Period:
   a. Ensure that Subs execute seasonal or deferred functional performance testing, witnessed by the CxA, according to the specifications.
   b. Ensure that Subs correct deficiencies and make necessary adjustments to O&M manuals.
and as-built drawings for applicable issues identified in any seasonal testing.

G. Equipment Suppliers:
   1. Provide all requested submittal data, including detailed startup procedures and specific responsibilities of the Owner to keep warranties in force.
   2. Assist in equipment testing per agreements with Subs.
   3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor.
   4. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
   5. Review test procedures for equipment installed by factory representatives.

1.10 DEFINITIONS

ACCEPTANCE PHASE: Phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occur.

APPROVAL: Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.

ARCHITECT/ENGINEER (A/E): The prime consultant (Architect) and sub-consultants who comprise the design team, generally the HVAC mechanical engineer and the electrical engineer.

BASIS OF DESIGN (BoD) DOCUMENT: A document, prepared by the Architect/Engineer, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. This document includes narrative descriptions of related systems and subsystems, and provides an overview of how the building is intended to operate.

COMMISSIONING AUTHORITY (CxA): The CxA directs and coordinates commissioning activities.

COMMISSIONING PLAN: An overall plan developed before or after bidding that provides the structure, schedule and coordination planning for the commissioning process.

CONSTRUCTION PROJECT MANAGER (CPM): The contracting and managing authority for the Owner over the design and/or construction of the project, a staff position. (Owner's Representative)

CONTRACT DOCUMENTS: The documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, Cx Plan, etc.).

CONTRACTOR: The prime Contractor (Construction Manager) for this project. Generally, refers to all the GC’s Subcontractors as well. Also referred to as the Contractor or Construction Manager in some contexts.

CONTROL SYSTEM: The central building energy management control system.

DATA LOGGING: Monitoring flows, currents, status, pressures, etc. of equipment using standalone data loggers separate from the control system.

DEFERRED FUNCTIONAL PERFORMANCE TESTS: FPTs that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow the test from being performed.

DEFICIENCY: A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).

DESIGN INTENT: A dynamic document that provides the explanation of the ideas, concepts and criteria that are considered to be very important to the Owner.

DESIGN NARRATIVE OR DESIGN DOCUMENTATION: Sections of either the Design Intent or Basis of Design.
FACTORY TESTING: Testing of equipment on-site or at the factory by factory personnel with an Owner’s representative present.

FUNCTIONAL PERFORMANCE TEST (FPT): Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods – Functional testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. FPTs are performed after prefunctional checklists and startups are complete.

GENERAL CONTRACTOR (GC): The prime Contractor (Construction Manager) for this project. Generally, refers to all the GC’s Subcontractors as well. Also referred to as the Contractor or Construction Manager in some contexts.

INDIRECT INDICATORS: Indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed.

MANUAL TEST: Using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).

MONITORING: The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.

NON-COMPLIANCE: See Deficiency.

NON-CONFORMANCE: See Deficiency.

OVERWRITTEN VALUE: Writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50 deg. F. to 75 deg. F. to verify economizer operation) – See also “Simulated Signal”.

OWNER-CONTRACTED TESTS: Tests paid for by the Owner outside the GC’s contract and for which the CxA does not oversee – These tests will not be repeated during functional tests if properly documented.

OWNER’S PROJECT REQUIREMENTS – A written document prepared by the Owner that details the functional requirements of the Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.

PHASED COMMISSIONING: Commissioning that is completed in phases (by floors, for example) due to the size of the structure or other scheduling issues in order to minimize the total construction time.

PREFUNCTIONAL CHECKLIST (PFC): A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment – Prefunctional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation. However, some prefunctional checklist items entail simple testing of the function of a component, a piece of equipment or system. Prefunctional checklists augment and are combined with the manufacturer’s startup checklist.

SAMPLING: Functionally testing only a fraction of the total number of identical or near identical pieces of equipment – Refer to Part 3.6 for details.

SEASONAL PERFORMANCE TESTS: FPTs that are deferred until the system(s) will experience conditions closer to their design conditions.

SIMULATED CONDITION: Condition that is created for the purpose of testing the response of a system.

SIMULATED SIGNAL: Disconnecting a sensor and using a signal generator to send an amperage, resistance or pressure to the transducer and DDC system to simulate a sensor value.


STARTUP: The initial starting or activating of dynamic equipment, including executing prefunctional checklists.

SUBS: The Subcontractors to the GC who provide and install building components and systems.
TEST PROCEDURES: The step-by-step process, which must be executed to fulfill the test requirements.

TEST REQUIREMENTS: Requirements specifying what modes and functions, etc. shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents (Sections 23 08 02, 26 08 02, etc.).

TRENDING: Monitor using the Base Complex Direct Digital Control system.

VENDOR: Supplier of equipment.

WARRANTY PERIOD: Warranty period for entire project, including equipment components – Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

1.11 SYSTEMS TO BE COMMISSIONED

A. The following systems will be commissioned in this project; refer to appropriate specification sections for specific requirements.

   A. Plumbing Systems:
      1. Water heating systems - heat exchangers, pumps, tempering valves, storage tanks, controls.

   B. Mechanical Systems:
      1. Air handling unit - heating and cooling
      2. Energy recovery units, total energy wheels
      3. Computer room air conditioning units w/remote air-cooled condensing units
      4. Exhaust fans
      5. Variable-air-volume fan terminal units
      6. Variable frequency drives
      7. Unit heaters
      8. Cabinet unit heaters
      9. Direct digital control systems
     10. Ductwork systems, including fire and smoke dampers
     11. Air quality monitoring

C. Electrical Systems:
   1. Lighting controls and systems (building interior and exterior)
   2. Daylighting controls

D. Building Enclosure: see Section 01 91 19

PART 2 – PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Contractor for the equipment being tested. Two-way radios shall be provided by the Contractor where appropriate.

B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents shall be included in the base bid price to the Contractor and left on-site.

C. Data logging equipment and software required to test equipment will be provided by the CxA but shall
not become the property of the Owner.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall. Have a certified calibration within the past year to an accuracy of 0.5 deg. F. and a resolution of +0.1 deg. F. Pressure sensors shall have an accuracy of +2.0 percent of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer’s recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

PART 3 - EXECUTION

3.1 MEETINGS

A. Scoping Meeting: The CxA will schedule, plan and conduct a commissioning scoping meeting with the entire construction commissioning team in attendance.

B. Miscellaneous Meetings: Other meetings will be planned and conducted by the CxA as construction progresses. These meetings will cover coordination, deficiency resolution and planning.

3.2 REPORTING

A. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and testing as described in later sections.

B. A final summary report by the CxA will be provided to the Owner’s Representative.

3.3 SUBMITTALS

A. The Commissioning Authority will review approved submittals of all equipment to be commissioned as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures. The Commissioning Authority will notify the CPM of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

B. The CxA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the specifications.

3.4 STARTUP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

A. The following procedures apply to all equipment and systems to be commissioned.

B. General: The prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

C. Startup and Initial Checkout Plan: The CxA shall assist the Contractor in developing detailed start-up plans for all commissioned equipment and systems. The primary role of the CxA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. Parties responsible for prefunctional checklists and startup shall be identified in the commissioning scoping meeting and in the checklist forms.

1. The Contractor shall develop prefunctional checklists and procedures with the assistance of the CxA. These checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.

2. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form may have more than one trade responsible for its execution.

3. The Subcontractor responsible for the purchase of the equipment develops the full startup plan by combining the CxA's checklists with the manufacturer's detailed startup and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the
checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.

4. The full start-up plan shall at a minimum consist of the following items:
   a. The prefunctional checklists.
   b. The manufacturer’s standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
   c. The manufacturer’s normally used field checkout sheets.

5. The Contractor shall submit the full startup plan to the CxA for review and approval.

6. The CxA shall review and evaluate the procedures and the format for documenting them, noting any procedures that need to be revised or added.

D. Sensor and Actuator Calibration:

1. All field-installed temperature, relative humidity, CO2 and pressure sensors and gauges, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described below. Alternate methods may be used, if approved by the Owner. All test instruments shall have had a certified calibration within the last 12 months. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.

2. All procedures used shall be fully documented on the prefunctional checklists or other suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.

E. Sensor Calibration Methods:

1. All Sensors: Verify that all sensor locations are appropriate and away from causes of erratic operation. Verify that sensors with shielded cable are grounded only at one end. For sensor pairs that are used to determine a temperature or pressure difference, make sure they are reading within 0.2 deg. F. of each other for temperature and within a tolerance equal to 2 PERCENT of the reading of each other for pressure. Tolerances for critical applications may be tighter.

2. Sensors without Transmitters - Standard Application. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gauge or direct digital system (DDC) is within the tolerances in the table below of the instrument-measured value. If not, install offset in DDC, calibrate or replace sensor.

3. Sensors with Transmitters - Standard Application. Disconnect sensor. Connect a signal generator in place of sensor. Connect ammeter in series between transmitter and DDC control panel. Using manufacturer’s resistance-temperature data, simulate minimum desired temperature. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the DDC. Record all values and recalibrate controller as necessary to conform to specified control ramps, reset schedules, proportional relationship, reset relationship, and P/I reaction. Reconnect sensor. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gauge or DDC) is within the tolerances in the table below of the instrument-measured value. If not, replace sensor and repeat. For pressure sensors, perform a similar process with a suitable signal generator.

F. Tolerances, Standard Applications:

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Required Tolerance (+/-)</th>
<th>Sensor</th>
<th>Required Tolerance (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling coil, chilled and condenser water temps</td>
<td>0.2 C.</td>
<td>Flow rates, water</td>
<td>4% of design</td>
</tr>
</tbody>
</table>
### GENERAL COMMISSIONING REQUIREMENTS

**Bid Package 2 – Building & Site Paving**

### MU Project #CP190411

<table>
<thead>
<tr>
<th>Component</th>
<th>Setting</th>
<th>Monitoring</th>
<th>% of Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX liquid and suction temps</td>
<td>0.2 C.</td>
<td>Relative humidity</td>
<td>4% of design</td>
</tr>
<tr>
<td>AHU wet bulb or dew point</td>
<td>0.2 C.</td>
<td>CO₂ monitor</td>
<td>0.1 % pts</td>
</tr>
<tr>
<td>Hot water coil and boiler water temp</td>
<td>1.0 C.</td>
<td>CO monitor</td>
<td>0.01 % pts</td>
</tr>
<tr>
<td>Outside air, space air, duct air temps</td>
<td>0.2 C.</td>
<td>Natural gas flow &amp; oil rate</td>
<td>1% of design</td>
</tr>
<tr>
<td>Combustion flue temps</td>
<td>2.5 C.</td>
<td>Steam flow rate</td>
<td>3% of design</td>
</tr>
<tr>
<td>Watt-hour, voltage and amperage</td>
<td>1% of design</td>
<td>Air flow rate</td>
<td>5% of design</td>
</tr>
<tr>
<td>Pressures, air, water and gas</td>
<td>3% of design</td>
<td>Barometric pressure</td>
<td>2.5mm of Hg</td>
</tr>
</tbody>
</table>

### G. Valve and Damper Stroke Setup And Check:

1. **DDC Readout:** For all valve and damper actuator positions checked, verify the actual position against the DDC readout.

2. **Set pumps or fans to normal operating mode:** Command valve or damper closed, visually verify that valve or damper is closed, and adjust output zero signal as required. Command valve or damper open, verify position is full open and adjust output signal as required. Command valve or damper to a few intermediate positions. If actual valve or damper position doesn’t reasonably correspond, replace actuator.

3. **Closure for heating coil valves (NO):** Set heating set point 2.0 deg. C. above room temperature. Observe valve open. Remove control air or power from the valve, and verify that the valve stem and actuator position do not change. Restore to normal. Set heating set point to 2.0 deg. C. below room temperature. Observe the valve close.

### H. Execution of Prefunctional Checklists and Startup:

1. **Four weeks prior to startup,** the Contractor shall schedule startup and checkout with the Construction Project Manager and CxA. The performance of the prefunctional checklists, startup and checkout shall be directed and executed by the Contractor.

2. **The CxA shall observe,** at minimum, the procedures for each piece of primary equipment. In no case will the number of units witnessed be less than four on any one building, nor less than 20% of the total number of identical or very similar units.

3. **For lower-level components of equipment,** (e.g., VAV boxes, sensors, controllers), the CxA shall observe a sampling of the prefunctional and start-up procedures. The sampling procedures are identified in the commissioning plan.

4. **The performance of the prefunctional checklists,** startup and checkout are directed and executed by the Sub or vendor. When checking off prefunctional checklists, signatures may be required of other Subs for verification of completion of their work.

5. **The Subs and vendors shall execute startup and provide the CxA with a signed and dated copy of the completed startup and prefunctional checklists.**

6. **Only individuals that have direct knowledge and have witnessed that a line item task on the prefunctional checklist was actually performed** shall initial or check off that item.

### I. Deficiencies, Non-Conformance and Approval In Checklists And Startup:

1. **The Contractor shall clearly list any outstanding items of the initial startup and prefunctional checklist that were not completed successfully.** Provide startup forms, prefunctional checklists, and any outstanding deficiencies to the CPM and CxA within 2 days of completion.

2. **The CxA shall work with the Subs and vendors to correct and retest deficiencies or uncompleted items.** The installing Subs or vendors shall correct all areas that are deficient or incomplete in the checklists and startup in a timely manner and shall notify the CxA as soon as outstanding items have been corrected. When satisfactorily completed, the CxA shall recommend approval of the
execution of the checklists and startup of each system to the CPM using a standard form.

3. The Contractor shall be responsible for resolution of deficiencies identified by the CxA.

3.5 PHASED COMMISSIONING

A. The project may require startup and initial checkout to be executed in phases. This phasing shall be planned and scheduled in a coordination meeting of the CxA, CPM, and the Contractor. Results will be added to the master and commissioning schedule.

3.6 FUNCTIONAL PERFORMANCE TESTING

A. This sub-section applies to all commissioning functional testing for all divisions.

B. Objectives and Scope: The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.

C. In general, each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part and full load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low pressure, no flow, equipment failure, etc., shall also be tested.

D. Development of Test Procedures. Before test procedures are written, the CxA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences, and parameters. Using the testing parameters and requirements in Sections 23 08 02 and 26 08 02, the CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. The CxA shall assist the Subs or vendor responsible to execute a test and the Contractor in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CxA shall provide a copy of the test procedures to the Contractor who shall review the tests for feasibility, safety, equipment, and warranty protection. The CxA may submit the tests to the A/E for review if requested.

E. The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form.

F. Representative test formats and examples (not designed for this facility) are found in Sections 23 and 26. The test procedure forms developed by the CxA shall include (but not be limited to) the following information:

1. System and equipment or component name(s)
2. Equipment location and ID number
3. Unique test ID number, and reference to unique prefunctional checklist and start-up documentation ID numbers for the piece of equipment
4. Date
5. Project name
6. Participating parties
7. Instructions for setting up the test
8. Required pre-test field measurements
9. Special cautions, alarm limits, etc.
10. Specific step-by-step procedures to execute the test in a clear, sequential and repeatable format
11. Acceptance criteria of proper performance with a Yes/No check box to allow for clearly marking
whether or not proper performance of each part of the test was achieved.

12. A section for comments
13. Signatures and date block

G. Test Methods:

1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by standalone data loggers. The Contractor, Owner and CxA shall determine which method is most appropriate for tests that do not have a method specified.

2. Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.

3. Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a hair blower rather than overwriting the value or by altering the appropriate setpoint to see the desired response. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.

4. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.

5. Altering Set Points: Rather than overwriting sensor values, and when simulating conditions is difficult, altering set points to test a sequence is acceptable.

6. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification is completed during prefunctional testing.

7. Setup: Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Contractor executing the test shall provide all necessary materials, system modifications, etc., to produce the necessary flows, pressures, temperatures, etc., necessary to execute the test according to the specified conditions. At completion of the test, the Contractor shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.

8. Sampling: Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity. A small size or capacity difference, alone, does not constitute a difference. No sampling is allowed in prefunctional checklist execution.

A common sampling strategy referenced in the Specifications as the "xx% Sampling—by% Failure Rule" is defined by the following example.

\[ \text{xx} = \text{the percent of the group of identical equipment to be included in each sample.} \]
\[ \text{yy} = \text{the percent of the sample that if failing, will require another sample to be tested.} \]

The example below describes a 20% Sampling—10% Failure Rule.

a. Randomly test at least 20% (xx) of each group of identical equipment. In no case test less than three units in each group. This 20%, or three, constitute the "first sample."

b. If 10% (yy) of the units in the first sample fail the functional performance tests, test another
20% of the group (the second sample).

c. If 10% of the units in the second sample fail, test all remaining units in the whole group.

d. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the Contractor to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units.

H. Coordination and Scheduling:

1. The Contractor shall provide sufficient notice to the CxA and CPM regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The CxA will schedule functional tests through the Contractor and CPM. The CxA shall witness and document the functional testing of all equipment and systems. The Contractor shall execute the tests.

2. In general, functional testing is conducted after prefunctional testing and startup has been satisfactorily completed. The control system shall be sufficiently tested and approved by the CxA and the CPM before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing shall be completed before functional testing of air-related or water-related equipment or systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems shall be checked.

3. Problem Solving: The CxA shall recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the Contractor.

3.7 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

A. Documentation: The CxA shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, the CxA shall provide these forms to the Contractor for review and approval. The Contractor shall include the filled-out forms with the O&M manual data.

B. Non-Conformance:

1. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the Contractor and CPM on a standard non-compliance form.

2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution shall be documented on the procedure form.

3. The test shall be repeated until satisfactory performance is achieved.

4. As tests progress and a deficiency is identified, the CxA shall discuss the issue with the Contractor.

a. When there is no dispute on the deficiency and the Contractor accepts responsibility to correct it:

1) The CxA shall document the deficiency and the Contractor’s response and intentions and they go on to another test or sequence. After the day’s work, the CxA shall submit all the non-compliance reports to the CPM for signature. A copy shall be provided to the Contractor and CPM. The Contractor shall correct the deficiency, sign the statement of correction at the bottom of the noncompliance form certifying that the equipment is ready to be retested and shall send it back to the CxA.

2) The Contractor shall reschedule the test and the test shall be repeated.

b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:

1) The deficiency shall be documented on the non-compliance form with the Contractor’s
response and a copy given to the CPM and to the Contractor.

2) Resolutions shall be made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive and acceptance authority is with the CPM.

3) The CxA shall document the resolution process.

4) Once the interpretation and resolution have been decided, the Contractor shall correct the deficiency, sign the statement of correction on the non-compliance form and provide it to the CxA. The Contractor shall reschedule the test and the test shall be repeated until satisfactory performance is achieved.

5. Cost of Retesting
   a. The cost to retest a prefunctional or functional test shall be solely the responsibility of the Contractor.
   b. Refer to the sampling section of Part 3.6 in this specification for requirements for testing and retesting identical equipment.

6. The Contractor shall respond in writing to the CxA and CPM weekly or at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.

7. The CxA shall retain the original non-conformance forms until the end of the project.

8. Any required retesting by the Contractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.

C. Failure Due to Manufacturer Defect.
   If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CPM. In such case, the Contractor shall provide the Owner with the following:
   1. Within one week of notification from the CPM, the Contractor or manufacturer’s representative shall examine all other identical units making a record of the findings. The findings shall be provided to the CPM within two weeks of the original notice.
   2. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
   3. The CPM shall determine whether a replacement of all identical units or a repair is acceptable.
   4. Two examples of the proposed solution shall be installed by the Contractor and the CPM shall be allowed to test the installations for up to one week, upon which the CPM will decide whether to accept the solution.
   5. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Approval: The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CxA and by the CPM, if necessary. The CxA shall evaluate each test and report to the CPM using a standard form. The CPM shall give final approval on each test using the same form and provide signed copies to the CxA and the
3.8 OPERATION AND MAINTENANCE MANUALS

A. Standard O&M Manuals:

1. The specific content and format requirements for the standard O&M manuals are detailed in Division 1. Special requirements for the Controls Contractor and the TAB Contractor are found in Division 23.

2. A/E Contribution. The A/E will include in the beginning of the O&M manuals a separate section describing the systems including:
   a. The design intent narrative prepared by the A/E and provided as part of the bid documents, updated to as-built status by the A/E.

3. CxA Review: Prior to substantial completion, the CxA shall review the O&M manuals, documentation and red line as-builts for systems that were commissioned to verify compliance with the O&M documentation of the specifications. The CxA will communicate deficiencies in the manuals to the CPM or A/E as requested. This work does not supersede the A/E’s review of the O&M manuals according to the A/E’s contract. Upon a successful review of the corrections, the CxA shall recommend approval and acceptance of these sections of the O&M manuals to the CPM. The CxA shall also review each equipment warranty and verify that all requirements to keep the warranty valid are clearly stated.

B. Commissioning Record in O&M Manuals:

1. The CxA is responsible to compile, organize and index the following commissioning data by equipment into labeled, indexed and tabbed, three-ring binders and electronic PDF file and deliver it to the GC, to be included with the O&M manuals. One physical copy and one electronic PDF copy on CD or thumb drive of the manuals will be provided. The format of the manuals shall be:

   Tab I-1 Commissioning Plan
   Tab I-2 Final Commissioning Report (see (B.2) below)
   Tab 01 System Type 1 (chiller system, packaged unit, boiler system, etc.)
   Sub-Tab A Design narrative and criteria, sequences, approvals for Equipment 1
   Sub-Tab B Startup plan and report, approvals, corrections, blank prefunctional checklists
   Colored Separator Sheets—for each equipment type (fans, pumps, chiller, etc.)
   Sub-Tab C Functional tests (completed), trending and analysis, approvals and corrections, training plan, record and approvals, blank functional test forms and a recommended recommissioning schedule.

   Tab 02 System Type 2......repeat as per System 1

2. Final Report Details. The final commissioning report shall include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas: 1) Equipment meeting the equipment specifications, 2) Equipment installation, 3) Functional performance and efficiency, 4) Equipment documentation and design intent, and 5) Operator training. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection, trend log, etc. where the deficiency is documented. The functional performance and efficiency section for each piece of equipment shall include a brief
description of the verification method used (manual testing, DDC trend logs, data loggers, etc.) and include observations and conclusions from the testing.

3. Other documentation will be retained by the CxA.

3.9 TRAINING OF OWNER PERSONNEL

A. The GC shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed. Additional training requirements are spelled out in Sections 23 08 00 and 26 08 00. Training shall be conducted after system/equipment functional testing has been completed. Provide documentation required by this Section, and Sections 23 08 00 and 26 08 00.

B. The CPM shall decide how rigorous the training should be for each piece of commissioned equipment. The CPM shall communicate the results to the Contractor who has training responsibilities.

C. The Contractor shall submit a written training plan to the CPM and CxA for review and approval prior to training. The plan shall cover the following elements:
   1. Equipment (included in training)
   2. Intended audience
   3. Location of training
   4. Objectives
   5. Subjects covered (description, duration of discussion, special methods, etc.)
   6. Duration of training on each subject
   7. Instructor for each subject
   8. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
   9. Instructor and qualifications

B. For the primary HVAC equipment, the Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training.

C. The Contractor shall develop an overall training plan for the commissioned systems and coordinate and schedule training with the CPM and CxA. The Owner shall develop criteria for determining that training was satisfactorily completed, including attending some of the training, etc. The Owner shall indicate approval of training to the CxA using a standard form. The CPM also signs approval form.

D. At one of the training sessions, the Contractor shall make a presentation discussing the use of the blank functional test forms for re-commissioning equipment.

E. Videotaping and/or digital video recording of the training sessions shall be provided by the Contractor with tapes and/or DVDs cataloged and added to the O&M manual data.

D. The Contractor shall at the first training session present the overall system design concept and the design concept of each equipment section. This presentation shall include a review of all systems using the simplified system schematics (one-line drawings) including chilled water systems, condenser water or heat rejection systems, heating systems, fuel oil and gas supply systems, power generation and cogeneration systems, supply air systems, exhaust system and outside air strategies.

E. The CxA shall be responsible for assembling written verification of the training of Owner personnel for commissioned equipment. The specific training requirements of Owner personnel are specified in this Section, and Sections 23 08 00 and 26 08 00.

3.10 DEFERRED TESTING

A. Unforeseen Deferred Tests: If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may
be delayed upon approval of the CPM. These tests will be conducted in the same manner as the seasonal tests as soon as possible.

B. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design), i.e. condensers, boilers, etc. shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate Subs with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and as-builts due to the testing will be made.

3.11 WRITTEN WORK PRODUCTS

A. The commissioning process generates a number of written work products described in various parts of the specifications. The Commissioning Plan shall list all the formal written work products, describe briefly their contents, who is responsible to create them, their due dates, who receives and approves them and the location of the specification to create them. In summary, the written products are as follows:

<table>
<thead>
<tr>
<th>Product</th>
<th>Developed By</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Final commissioning plan</td>
<td>CxA</td>
</tr>
<tr>
<td>2. Equipment documentation submittals</td>
<td>Contractor</td>
</tr>
<tr>
<td>3. Sequence clarifications</td>
<td>Contractor and A/E as needed</td>
</tr>
<tr>
<td>4. Prefunctional checklists</td>
<td>CxA with assistance by Contractor</td>
</tr>
<tr>
<td>5. Startup and initial checkout plan</td>
<td>Contractor &amp; CxA (compilation of existing documents)</td>
</tr>
<tr>
<td>6. Startup and initial checkout forms filled out</td>
<td>Contractor</td>
</tr>
<tr>
<td>7. Final TAB report</td>
<td>Contractor and TAB</td>
</tr>
<tr>
<td>8. Unresolved issues log (deficiencies)</td>
<td>CxA</td>
</tr>
<tr>
<td>9. Functional test forms</td>
<td>CxA with assistance by Contractor</td>
</tr>
<tr>
<td>10. Filled out functional tests</td>
<td>Contractor</td>
</tr>
<tr>
<td>11. O&amp;M manuals</td>
<td>Contractor</td>
</tr>
<tr>
<td>12. Verification of Owner training</td>
<td>Contractor</td>
</tr>
<tr>
<td>13. Final commissioning report</td>
<td>CxA</td>
</tr>
<tr>
<td>14. Misc. approvals</td>
<td>CPM</td>
</tr>
</tbody>
</table>

END OF SECTION 01 09 00
PART 1 - GENERAL

1.1 WORK INCLUDED

A. Commissioning requirements common to all Building Enclosure-Related Sections, including but not limited to the following technical sections:
   1. Brick Masonry
   2. Decorative Concrete Masonry Units
   3. Thermal Insulation
   5. Fluid-Applied Membrane Air Barriers
   6. Formed Metal Wall Panels
   7. Thermal and Air Barrier Wall System
   8. PVC Roofing or TPO Roofing
   9. Joint Sealants
   10. Aluminum-Framed Entrances and Storefronts
   11. Glazing (Exterior)

B. Validation of proper and thorough installation of Building Enclosure components.

C. Building enclosure component and system performance verification.

D. Documentation of tests and installations.

E. Coordination and requirements for field mock-ups, trial installation and Performance Testing events.

F. Preparation and coordination of Building Enclosure Commissioning Report.

1.2 GENERAL DESCRIPTION

A. The University of Missouri (UM) Health System has elected to implement the Building Enclosure Commissioning (BECx) Process, as detailed in this document, as a supplement to the quality control process for the proposed CP190411-Primary Care Clinic North project. As the Building Enclosure Commissioning Provider (BECxP) for the project, it is the responsibility of Wiss, Janney, Elstner Associates, Inc. (WJE) to implement the BECx Process and along with the Commissioning Team to ensure that the final product meets the Owner’s Project Requirements (OPR).

B. The design intent of this building enclosure is to provide a combination of systems for below grade, facade and roof assemblies that separately and collectively conform to MU’s Design Standards. The enclosure should meet all serviceability requirements to the specified levels, as specified by the individual Building Enclosure (BE) technical sections in Divisions 03 through 09, to eliminate uncontrolled rainwater; control condensation potential; provide thermal insulation continuity; limit air infiltration/ exfiltration, and any other specified serviceability requirements. All enclosure materials should be proven products and assemblies that are technically sound, durable and serviceable over the design life of the enclosure.

C. Building Enclosure Commissioning (BECx) facilitates a quality oriented process to verify that all building enclosure components are installed and perform collectively according to the building enclosure design intent and that the installation is adequately tested and that the specified performance is verified and documented. It serves as a tool to identify deficiencies in the building enclosure during the preconstruction and construction phases in an effort to advance the building enclosure components from initial installations, through installation of the separate components on the structure, to a fully integrated, weather-tight assembly prior to occupancy, thereby reducing impact on the building end user.
D. The BECxP shall work with the Contractor and Contractor’s Quality Assurance and Quality Control Plan and personnel to oversee the BECx processes and performance testing. The BECxP will observe tests as deemed appropriate. All required testing, unless otherwise specified in Part 3 or in the individual BE technical sections (03 to 09), will be performed by an independent third-party testing agency retained by the Owner.

E. The BECxP will be contracted by the Owner for commissioning services. The Contractor shall coordinate and assist the BECxP to complete the scope of work outlined in this specification section.

F. Commissioning does not relieve the installing contractors of their own internal, self-testing and/or quality control procedures.

1.3 SCOPE

A. This Section includes building enclosure commissioning procedures, including below grade systems, exterior facade enclosure, and roofing or other construction that protects climate-controlled interior spaces from unconditioned spaces and the exterior environment, as follows:

1. Above grade building enclosure construction, including exterior opaque walls, fenestration, and doors including sheathing, framing, insulation, air barrier, vapor barrier (as required) and cladding.
2. Roofing, including roofing system, roofing insulation, hatches, and other roof openings and penetrations.
3. Below grade and terrace waterproofing systems and sub-drainage.
4. The aforementioned items including continuity between all sections (where applicable).

B. Materials, Product and Assembly Performance Testing as required by individual sections, and/or as outlined in Part 3 of this specification. All performance values shall be as described within each relevant section of the Project Specification.

C. Record Documents related to BECx.

1.4 RELATED DOCUMENTS

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

B. Commissioning Specifications: See Division 01 Section 01 9100 - General Commissioning Requirements for general requirements for MEP commissioning including definitions, means and methods for conducting the commissioning process, commissioning team members, Owner’s responsibilities, Contractor’s responsibilities, and Commissioning Authority’s responsibilities.

C. Individual Building Enclosure Specification Sections: Individual building enclosure technical sections (Divisions 03-09) stipulate requirements for material testing, and warranties for the material, product or assembly specified in the Section. Installation, product testing, and assembly testing are stipulated in each section and/or Part 3 of this section.

1.5 DEFINITIONS AND ABBREVIATIONS

A. Action Item (AI): Any issue that requires a response, completion, corrective or additional work, or any other action related to the construction. Examples include a Contractor’s Request for Information (RFI), a Design Professional’s Field Directive, a clarification request, or a documented deficiency in the Work. Action Items must be categorized and assigned to the appropriate party for remedial action.

B. Action List (AL): This is a list that is maintained and updated by the BECxP that includes all Action Items that relate to BECx activities, including a summary description of each AI (including photographs where
appropriate), the date that each AI was first documented, the appropriate party responsible for remedial action, the date corrective action was performed, and a brief summary of the remediation.

C. Building Enclosure Commissioning (BECx): The process of facilitating the quality installation of the building enclosure materials, components, and systems in accordance with the contract documents and satisfy the requirements of the building enclosure design intent.

D. Building Enclosure Commissioning Provider (BECxP): The Party retained by the Owner, Wiss, Janney, Elstner Associates, Inc. (WJE), will oversee the BECx process, develop and stipulate many of the BECx requirements, manage the BECx process, and validate that building enclosure systems are designed, installed and tested to meet the Owner’s requirements and/or contract documents provided by the Design Professional.

E. Building Enclosure Commissioning Report: The final deliverable from the BECx process, and provides the information needed to understand and maintain the facility’s building enclosure. It should be the repository of all updates and corrections as they occur.

F. Building Enclosure Commissioning Team (BECxT): The group of Parties involved in the BECx process for any given system. This project group is comprised of representatives from:

1. Owner (PM) and his/her consultants.
2. General Contractor and/or Construction Manager (GC or Contractor/CM)
3. Design Professional (design architect and design engineers).
4. Building Enclosure Commissioning Provider (BECxP).
5. Test Technician (TT) (either as trade quality control or BECxP).
6. Building enclosure subcontractor and their sub-subcontractors (BESC).
7. Specialty subcontractors.
8. Any other installing subcontractors or suppliers of materials or systems.

G. Commissioning (Cx): The process of ensuring that all building systems perform interactively according to the design intent, the systems are efficient and cost effective and meet the Owner’s Project Requirements.

H. Projecx4: This is an internet hub for the collaboration on Cx and BECx information.

I. Contract Documents: The documents governing the responsibilities and relationships between Parties involved in the design and construction of this project including (but not necessarily limited to):

1. Agreements/Contracts.
3. Addenda.

J. Construction Documents: Refers generally to the Contract Documents that dictate the details of construction (all but item 1. and 4. above).

K. Construction Phase: Phase of the project during which the facility is constructed. During this phase the Contractor and subcontractors complete the installation and field testing requirements.

L. Contractor: As used herein, ‘Contractor’ is a general reference to the installing Party and can therefore refer to the Design-Builder, subcontractors, or vendors as inferred by its usage.

M. Deficiency: A condition in the installation or function of a material, assembly, or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the Design Intent).

N. Design Professional: Architect or Engineer-of-record.
O. Field Testing Authorized Representative: On-site testing of Building Enclosure materials, components and systems conducted by an authorized Manufacturer’s Technical Representative and/or independent Testing Agency.

P. Manufacturer’s Technical Representative: An individual in direct employ of the manufacturer of the applicable material, component, or system who is technically qualified in the judgment of BECxP to perform the applicable work for which the reference is made.

Q. Party: Entity legally responsible for portion of work.

R. Point of Contact (POC): General reference to the key individual within each Party.

S. Project Phases: Phases of the project including the Pre-Construction Phase, The Construction Phase, and The Warranty Phase, including Post-Occupancy Evaluation to be completed at the Owner’s discretion by the appropriate members of the BECx Team for this project.

T. Substantial Completion: As defined in the Owner-Contractor agreement. This milestone will coincide with the end of the Construction Period and the acceptance of the Property, or portions thereof, by the Owner. This milestone also coincides with the start of the warranty period.

U. Testing Agency: An independent agency for each of the materials, components, or systems to be tested or evaluated for compliance with the requirements of the contract documents. The Testing Agency will be contracted by the Owner.

V. Warranty Phase: Beginning on the date of Substantial Completion and continuing through the Warranty Period of each Building Enclosure material, component, and system

1.6 REFERENCE STANDARDS


C. Reference standards as identified in the individual Building Enclosure technical sections of this specification.

1.7 DOCUMENTATION

A. The Contractor shall provide a letter, signed by the Contractor and all relevant subcontractors stating that each acknowledges in writing that the Owner regards the new building enclosure to be an important and performance-sensitive single element of the project. In support of this requirement, the Contractor must also acknowledge that they are solely responsible for the quality and coordination of all building enclosure materials, components and systems such that they result in a fully integrated, weather-tight building enclosure that is in compliance with the Contract Documents and satisfies the building enclosure design intent.

B. The Owner shall provide to the BECxP (and maintain) two sets of current contract documents for review and comment at the earliest possible time prior to the onset of construction. BECxP shall perform a constructability review and provide comments related to the durability, performance and BE conformance with the Owner Project Requirements for consideration by the Owner’s Representative, Design Professional and Contractor.

C. The Contractor shall provide to the BECxP the following per the procedures specified herein, in other BE Technical Sections of the specification (Divisions 03-09), and Division 01:
1. Shop Drawings and Product Data: Provide shop drawings and submittal data for materials, products, systems and equipment that will be part of the BECx process.

   a. The Contractor shall forward to the BECxP one electronic copy of Shop Drawings and Product Data concurrent with distribution to the Design Professional. BECxP shall review and provide comments to the Owner and Design Professional, who will then review and incorporate the BECxP comments at their discretion and return to the Contractor. The Contractor shall then copy BECxP with the reviewed submittal with Design Professional submittal review stamp.

   b. Any action taken by the Design Professional or Contractor based in whole or in part on the comments and recommendations provided by BECxP as part of its submittal review shall be the sole responsibility of the Design Professional or Contractor.

2. Letters of Compatibility: The Contractor shall submit letters from manufacturers stating that materials proposed for use are permanently chemically and adhesively compatible with adjacent materials proposed for use.

3. Warranties: The Contractor shall submit manufacturer warranty and ensure forms have been completed in the Owner’s name and registered with the manufacturer.

4. Factory/Laboratory Test Reports: The Contractor shall provide any factory or laboratory testing documentation or certified test reports required by the specifications. These shall be provided prior to acceptance and installation of the specific item.

5. Schedule Updates: The Contractor shall issue periodic updates to the construction schedule monthly. Contractor shall use schedule to notify BECxT of scheduled tests and milestone installation events. Contractor shall coordinate with BECxP for meetings as appropriate prior to and during construction.

6. Action Item Response: Respond to Action Items to which BECxT members assign the Contractor responsibility within ten (10) business days of issue.

7. Testing Agency Reports: Provide all documentation of work of independent testing agencies required by the specification. These shall be provided prior to approval by the Design Professional and installation of the specific item.

D. Record Drawings: The Contractor shall maintain at the site an updated set of record or ‘As-Built’ documents reflecting actual installed conditions and all approved changes and modifications to the contract documents. The Contractor shall provide access to the BECxP to review the As-Built and Record Drawings. The Record Drawings shall be maintained concurrently with construction.

1.8 COORDINATION MANAGEMENT PROTOCOLS

A. Unless otherwise defined and agreed to by the parties to the contract documents for this project, coordination responsibilities and management protocols relative to BECx are defined below, subject to further refinement during the Construction Phase BECx pre-construction meeting.

1. Submittals and Shop Drawings: The BECxP shall review submittals and shop drawings in accordance with paragraph 1.7.C.1 above.

2. Deficiencies identified by the BECxP: When the BECxP identifies a deficiency, the Contractor shall make a good faith assessment of responsible parties. Those parties shall be notified of the perceived deficiency. This communication is for information only and is not a direction to resolve the deficiency. Contractor may accept responsibility and resolve the deficiency voluntarily. If Contractor contests either the deficiency or responsibility for that deficiency, Contractor shall respond to that affect in writing to the project team for review. It is the responsibility of the Owner to resolve items for which the BECxP and Contractor may be in disagreement

3. Scheduling Coordination: Contractor shall review the BE technical specifications, identify required BECx items (including field test requirements, specified test standards, mock-ups, product submissions, milestone installations, and similar) and provide a schedule to the BECxP with anticipated dates for each. It is the responsibility of the Contractor to provide adequate time from submission of each BECx requirement to response from the BECxP, and resolution of any identified deficiencies without unnecessary deleterious impact on the project schedule.

4. Notification of Completion Milestones: Contractor shall notify the Owner and BECxP at least two weeks prior to an anticipated BECx activity of BECx milestone (such as installation of a new facade
component). Contractor and BECxP shall then coordinate the scheduling of the activity between all required parties as applicable. Notification shall be via e-mail.

5. Action List: BECxP maintains a categorized Action List that tracks the BECx related action items. All content of the Action List will be available to all parties who have credentials on the portal. Any party with credentials may post an Action Item. Any party that is copied on an email resulting from an Action Item posting may respond to it and contribute to the dialogue.

1.9 CONTRACTOR'S RESPONSIBILITIES

A. As defined in this Section and in the individual BE technical sections, including but not limited to the following:

1. Review and distribute submittals. Review and comment on BECxP comments on the submittals.
2. Integrate commissioning activities into the master construction schedule with input from the BECxP.
3. Attend the routine BECx meetings and update the BECxT on the status of open action items in the Action List.
4. Coordinate and Chair pre-construction/pre-installation and construction-phase coordination meetings.
5. Provide summary and schedule of field quality control tests and inspections required by the Contract Documents to BECxP.
6. Participate in BECx Kickoff meeting.
7. Participate in testing coordination meetings.
8. Coordinate with the BECxP for construction testing and submit laboratory and field quality control testing, field checklists and inspection reports on building enclosure construction to the BECxP. Perform out of sequence work as require to facilitate field tests.
9. Provide powered scaffold, aerial lifts, hose, water supply, communication system and manpower to perform tests
10. Perform internal quality control procedures and document procedures prior to notifying the BECxP that systems are ready for testing.
11. Submit maintenance data for products, assemblies, and components to the BECxP.
12. Provide test data, inspection reports, and certificates to BECxP.
13. Review and respond to AI in a timely manner (typically within ten (10) business days).
14. Assist and coordinate all mockup and field performance testing as outlined in this Section and in the individual BE technical sections (03 to 09), whether the Contractor or other party is identified as responsible for the testing.

1.10 DESIGN PROFESSIONAL'S RESPONSIBILITIES

A. As defined in this Section and in the individual BE technical sections, including but not limited to the following:

1. Review submittals, including BECxP comments.
2. Attend the routine BECx meetings.
3. Attend preconstruction/preinstallation meetings and construction-phase coordination meetings.
4. Participate in BECx Kickoff meeting.
5. Respond to AI items and BECx Site Visit Report issues that require design interpretation or clarification.
6. Provide recommendations for resolution to items for which the BECxP and Contractor may be in disagreement.

1.11 BECxP RESPONSIBILITIES

A. Review submittals.

B. Conduct BECx Kickoff meeting.
C. Participate in and outline the commissioning process Functional Performance Test procedures.

D. Witness building enclosure component testing, milestone installations, and perform periodic site visits to document that work observed at the time of the periodic site visits is being performed in general compliance with the project specifications and Part 3.

E. Conduct routine BECx meetings to review progress on AI list and resolve issues affecting the building enclosure.

1.12 OWNER RESPONSIBILITIES

A. Review and comment on BECxP review comments, reports and/or issues logs.

B. Attend BECx meetings.

C. Provide resolutions to items for which the BECxP and Contractor may be in disagreement.

D. Provide independent third-party testing agency for functional performance testing of building enclosure, or conduct testing as outlined in Part 3.

1.13 PERFORMANCE TESTING (BUILDING ENCLOSURE)

A. Quality Assurance and Control: Specific BECx quality-assurance and quality-control requirements for individual Building Enclosure and materials, methods, and assemblies are specified in the BE Technical Sections relating to those activities. Specified commissioning tests, inspections, and related actions are specified in Part 3 of this section, do not limit Contractor’s other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.

B. The objective of Functional Performance Testing is to demonstrate that each Building Enclosure system, and system-to-system interfaces meet or exceed the performance requirements of the Contract Documents and the building enclosure design intent.

C. Costs associated with re-testing caused by failure of the building enclosure tests shall be the responsibility of the Contractor.

D. Costs associated with returning to the site due to test areas not being ready for testing despite being identified as ready for testing by the Contractor shall be the responsibility of the Contractor.

E. Costs associated with not notifying the BECxP of cancelled tests at least 24 hours in advance of the scheduled test shall be the responsibility of the Contractor.

F. Contractor shall provide assistance, coordination and scheduling of field performance testing in accordance with the following requirements:

1. Complete testing prior to installation of interior insulation (including SPF), gypsum wall board and interior finishes or systems that may impede the completion of the tests.

2. Complete roofing testing after trades no longer are required to access roof and after materials are no longer stored on roof. Roof areas to be clean, fully exposed, completely dry, and free of any debris or stored materials to perform testing. Contractor to create and repair up to five inspection openings to facilitate testing.

3. Contractor to provide powered scaffold, aerial lifts, hose, water supply, communication system and manpower to perform tests.

4. Contractor shall perform out-of-sequence work as required facilitating system tests and comply with BECx field testing schedule and milestones.

5. Contractor to arrange for field tests to take place with manufacturer’s technical representative present.
6. Contractor to repair test locations for all destructive test locations and to repair inspection openings for roofing testing.

G. Initial Building Enclosure Performance Testing should be conducted as soon as possible during the construction phase so that adjustments to material selection, fabrication methods, or installation practices may be identified and implemented for the remaining construction to minimize negative impacts to overall project cost, schedule, and quality.

H. Fenestration test specimens to include the perimeter sealant joints.

I. The owner reserves the right to perform additional quality control testing not specified here. The cost of this testing shall be paid by the owner.

1.14 DEFICIENCIES IDENTIFIED DURING BE FUNCTIONAL PERFORMANCE TESTING

A. Non-Conformance. Non-conformance deficiencies identified during Periodic Site Visits or Functional Performance Testing shall be resolved as follows:

1. The BECxP/Testing agent will record the results of the review / functional performance tests. All deficiencies or non-conformance issues shall be noted as Action Items and reported to the Contractor.

2. Corrections of identified minor deficiencies may be made during the review / tests at the discretion of the BECxP. In such cases the deficiency and associated resolution will be documented in the database.

3. Every effort will be made by the BECxP to expedite the review / testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.

4. As reviews / tests progress and a deficiency is identified, the BECxP will discuss the issue with the Contractor for follow-up and resolution.

   a. When there is no dispute with respect to the deficiency and the Contractor accepts responsibility to correct it:

      1) The BECxP shall document the deficiency and the Contractor's response. A copy/email of the deficiency shall be generated and provided to the Contractor. The Contractor corrects the deficiency, completes the Action Item response certifying that the issue is resolved and/or the product, material or assembly is ready to be retested and notifies the Project Team.

      2) The Contractor reschedules the test and the test is repeated. This process is repeated until the test result(s) meets or exceeds the requirements of the contract documents and, at the discretion of the Owner’s Representative, the remedial action taken will be implemented on a project-wide basis where applicable. The Contractor is responsible for all retest costs incurred by the BECxP, test agency, Owner and Design Professional.

   b. If there is a dispute about a deficiency:

      1) The deficiency shall be documented as an Action Item with the Contractor’s response and the Contractor will be notified. The Contractor will track this issue under the construction contract dispute resolution provisions.

      2) Final interpretive authority is with the Owner. Final acceptance authority is with the Owner or Design Professional.

      3) The BECxP documents the resolution to the Action Item.

      4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, and responds to the Action Item indicating completion. The Contractor reschedules the review / test and the review / test is repeated until satisfactory performance is achieved. The Action Item is then considered as closed.
B. Failure: As defined in each BE Technical Sections (Divisions 03-09) and/or Part 3. In event of test failure the Contractor shall provide the Owner and BECxP with the following:

1. Installer/Manufacturer’s response in writing as to the cause of the failure and proposed resolution.
2. Installer/Manufacturer shall implement their proposed resolution on a representative sample of the product.
3. The Contractor is to coordinate and schedule re-testing at their own cost. Re-testing shall be performed by the same Testing Agency that performed the initial testing unless alternate Testing Agency is approved by the owner. This process is repeated until the test result(s) meets or exceeds the requirements of the contract documents and, at the discretion of the Owner, the remedial action taken will be implemented on a project-wide basis where applicable.
4. The Owner will determine whether a replacement of all identical units is required or if a repair is acceptable.
5. Upon acceptance, the responsible Party shall replace or repair all identical items at their expense and shall extend the warranty accordingly.
6. For each failed test, one additional test area shall be selected by the BECxP, the Owner, and the Design Professional for testing.

C. Cost of Retesting and/or Additional Testing:

1. Contractor is responsible for the cost of all re-tests and additional testing and compensation of time for independent third-party testing agency, BECxP and Design Professional related to all additional work necessitated by re-testing or additional testing of specimens, if contractor or subcontractors are responsible for the deficiency. If not responsible, cost recoveries for retesting will be negotiated with Contractor.

1.15 COMMISSIONING REPORT CONTENT

A. Commissioning Report

1. Maintenance Schedule: Contractor will provide a summary table that indexes the building enclosure component requiring maintenance and indicates the frequency each component will require repair or replacement (i.e. replacement of sealants, gaskets, IGUs, repair of paints or coatings). Contractor will provide subcontractors with an Excel spreadsheet that will be completed by each applicable subcontractor and returned to the Contractor.
2. Maintenance Information: Contractor shall provide Maintenance Information for each entry containing the following:

   a. Product Data Sheet: Provide a summary of performance data.
   b. Extended Warranty Information: Include all warranties for products, equipment, components, and sub-components whose duration exceeds one year. Include warranties on components with the system they are a part of. Reference all specific operation and maintenance procedures that must be performed to keep the warranty valid.
   c. Sources of Material: Include reference to contact information where specific materials can be obtained.
   d. Installation and Maintenance Instructions: For each material, component or system.

B. Construction Documentation

1. Coordinate with requirements in Division 01.
2. Record Drawings: Contractor shall provide an index of all record drawings with drawing number, title, and electronic file name(s) including electronically referenced drawings.
3. Record Specifications: Contractor shall provide a detailed index of the record specification. Include sections and major items in the specification all indexed to the appropriate page number.
4. Approved Product Data and Shop Drawings:
   a. Contractor shall provide an index of all product data and shop drawings. This shall list all BE materials, components or systems with the associated submittal number.
b. Contractor shall organize and compile only approved product data and shop drawings. Providing these in a filing format is acceptable provided all files are identified and organized for easy access.

c. Inclusion of any of this information in previous sections of the Commissioning Report does not allow exclusion in this section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 BUILDING ENCLOSURE PERFORMANCE TESTING

A. In coordination with the Contractor, the BECxP will evaluate in-service performance of building enclosure assemblies and construction, and submit reports.

1. Independent third-party testing agency to provide testing as scheduled at the end of this Section or each BE Section (03-09).
2. Carry out testing in accordance as described in this specification section.

3.2 FIELD TEST SCHEDULE

A. Test schedule may not include all testing required in Technical Sections (03 to 09). Contractor is responsible for any tests included in the Technical Sections and as defined in the following Source/Field Quality Control Testing Schedule:
<table>
<thead>
<tr>
<th>Specification Section</th>
<th>Test Name</th>
<th>Test Purpose/Description/Notes</th>
<th>Test Method</th>
<th>Failure Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>07 4265 – Thermal and Air Barrier Wall System</td>
<td>Exterior wall air barrier</td>
<td>Verify performance of moisture barrier system and flashing to resist water penetration</td>
<td>ASTM C1715</td>
<td>Penetration of water beyond innermost plane of drainage system/flashings</td>
</tr>
<tr>
<td></td>
<td>Thermo roofing membrane</td>
<td>Verify adhesion of air barrier to each type of substrate</td>
<td>ASTM D541</td>
<td>Per manufacturer’s test data</td>
</tr>
<tr>
<td></td>
<td>Exterior joint sealants</td>
<td>Verify adhesion of sealant to substrate</td>
<td>ASTM C1521, Method A</td>
<td>Per manufacturer’s test data</td>
</tr>
<tr>
<td></td>
<td>TPO roofing membrane</td>
<td>Verify adhesion of sealant to substrate</td>
<td>ASTM C1521, Method A</td>
<td>Per manufacturer’s test data</td>
</tr>
<tr>
<td></td>
<td>Storefront assembly and surrounding interface</td>
<td>Verify adequate thickness of waterproofing using a wet mil thickness gauge</td>
<td>NA</td>
<td>Per manuf. minimum thickness requirements</td>
</tr>
<tr>
<td></td>
<td>Joint Sealants</td>
<td>Verify adequate thickness of waterproofing using a wet mil thickness gauge</td>
<td>NA</td>
<td>Per manuf. minimum thickness requirements</td>
</tr>
<tr>
<td>07 5423 – TPO Roofing</td>
<td>Storefront assembly and surrounding interface</td>
<td>Verify water penetration resistance of storefront and perimeter interface (in conjunction with ASTM E1105).</td>
<td>ASTM E783</td>
<td>No water at 8 psf</td>
</tr>
<tr>
<td></td>
<td>Exterior joint sealants</td>
<td>Verify water penetration resistance of storefront and perimeter interface (in conjunction with ASTM E783).</td>
<td>ASTM E783</td>
<td>No water at 8 psf</td>
</tr>
</tbody>
</table>

Resp. party: 3rd party testing agency

Field Sampling Rate: 3x each at 10, 50, and 100% completion for each substrate