

SOUTH CAMPUS VIVARIUM RETROFIT UNIVERSITY OF TEXAS M.D. ANDERSON CANCER CENTER

Bidding and Construction

Project Manual Volume 1 of 1

**Perkins+Will Project No: 185090.000
June 22, 2011**

**P E R K I N S
+ W I L L**

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Houston, TX 77002

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Project Manual

for

The University of Texas MD Anderson Cancer Center
Houston, Texas

South Campus Vivarium Retrofit

MD ANDERSON PROJECT : 10-0576

AE PROJECT : 185090.000

PROJECT DELIVERY METHOD : Competitive Sealed Proposals (CSP)

Bidding and Construction – 22 June, 2011

OWNER'S REPRESENTATIVE

Layne Slavin
Senior Facilities Project Manager

MD Anderson Cancer Center

6900 Fannin
Ninth Floor - FHB 9.1028 *713-563-4139*
Houston, TX 77030 *Fax 713-563-4143*

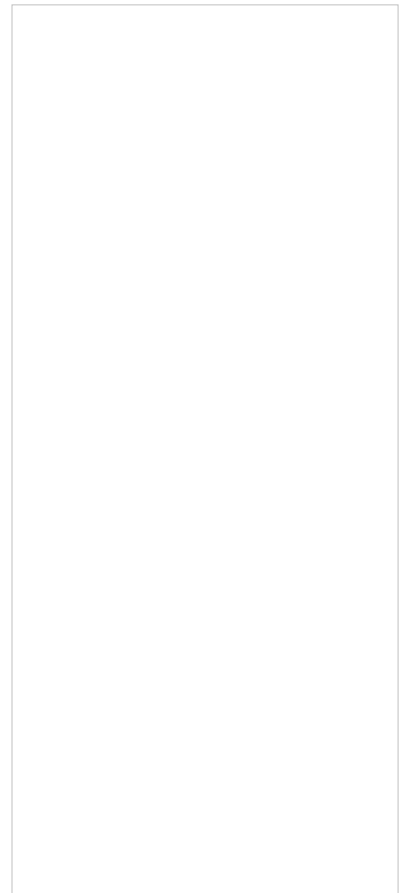
PROJECT ARCHITECT

Ed Cordes, AIA
1001 McKinney St, Suite 1300 *713-366-4000*
Houston, TX 77002 *Fax 713-528-3339*

PROJECT ARCHITECT/ENGINEER'S CONSULTANTS

MEP Engineers
Shah Smith & Associates *713-780-7563*
2825 Wilcrest, Suite 350 *Fax 713-780-9209*
Houston, TX 77042

Structural Engineers
Rogers Moore Engineers, LLC *713-430-5806*
2411 Fountainview, Suite 222 *Fax 281-582-5955*
Houston, TX 77057



*Telecommunication
4b Technology Group
12600 Northborough Dr.
Suite 290
Houston, TX 77067*

*832-249-9379
Fax 832-249-9756*

*Code/Life Safety
Rolf Jensen & Associates
8827 W. Sam Houston Pkwy N.
Suite 150
Houston, Texas 77040*

*281-640-7100
Fax 281-640-7101*

DOCUMENT 00 01 07 - PROFESSIONAL SEALS PAGE

The following Documents and Specifications have been furnished by the Owner for this Project, and were not prepared by or under the direct supervision of the Architect or any of the Architect's consultants:

OWNER

University of Texas
MD Anderson Cancer Center
Research & Education Facilities Lab Design and Construction
6900 Fannin, Ninth Floor - FHB 9.1028
Houston, Texas 77030
Telephone: 713-563-4139
Contact: M. Layne Slavin, Senior Facilities Project Manager
Electronic Mail: mlslavin@mdanderson.org

CONTRACTING REQUIREMENTS

00 01 01 Project Title Page
2010 Uniform General and Supplementary General Conditions for the
University of Texas System Building Construction Contracts.
00 25 00 Owner's Special Conditions
Attachment "A" – Minimum Wage Rate Determination

GENERAL REQUIREMENTS SUBGROUP

DIVISION 01 - GENERAL REQUIREMENTS

01 31 00 Project Administration
01 32 00 Project Planning and Scheduling
01 35 16 Alteration Project Procedures

01 35 25 Owner Safety Requirements
Attachment "A" Maintaining Indoor Air Quality During Construction
and Maintenance Activities Policy
01 45 00 Project Quality Control
01 77 00 Project Closeout Procedures
01 91 00 General Commissioning Requirements

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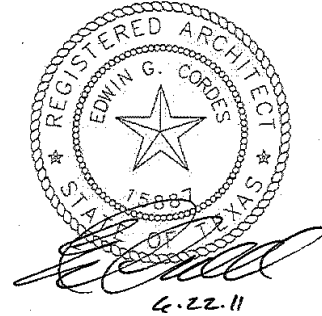
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and Maintenance Activities Policy
01 45 00 Project Quality Control
01 77 00 Project Closeout Procedures
01 91 00 General Commissioning Requirements

The following Documents and Specification Sections have been prepared by or under the direct supervision of the Architect:

ARCHITECT

Perkins+Will – Houston

1001 McKinney, Suite 1300
Houston, Texas 77002
Telephone: 713-366-4000
Contact: Ed Cordes, Principal-in-Charge
Electronic Mail: edwin.cordes@perkinswill.com



DOCUMENTS & SPECIFICATIONS

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07 21 00 Thermal Insulation
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08 14 16 Flush Wood Doors
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Perkins+Will
185090.000

SOUTH CAMPUS VIVARIUM RETROFIT
Issued for Bidding and Construction
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The following Specification Sections have been prepared by or under the direct supervision of the Structural Engineer:

STRUCTURAL ENGINEER

Rogers Moore Engineers, LLC
2411 Fountainview, Suite 222
Houston, Texas 77057
Telephone: 713-430-5806
Contact: Elaine K. Rogers, P.E., Principal-in-Charge
Electronic Mail: erogers@rogersmoorellc.com

Walter P. Moore and Associates, Inc.
TBPE Firm Registration No. 1856



ASSOCIATE STRUCTURAL ENGINEER

Walter P. Moore and Associates
1301 McKinney, Suite 1100
Houston, Texas 77010
Contact: Matthew J. Brightman, P.E., Principal-in-Charge
Electronic Mail: mbrightman@walterpmoore.com

GENERAL REQUIREMENTS SUBGROUP

Division 01 - GENERAL REQUIREMENTS

01 45 29 Structural Testing Laboratory Services

SPECIFICATIONS

DIVISION 03 - CONCRETE

03 30 00 Concrete

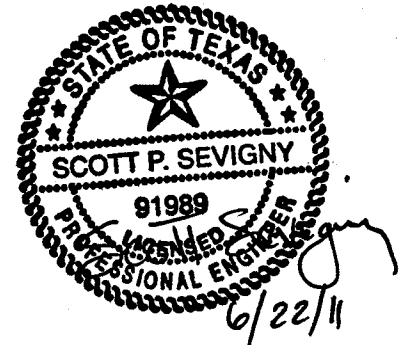
DIVISION 05 - METALS

05 12 00 Structural Steel Framing
05 31 13 Steel Floor Decking
05 31 33 Steel Form Decking
05 40 00 Cold-Formed Metal Framing

The following Specification Sections have been prepared by or under the direct supervision of the Mechanical, Electrical and Plumbing Engineer:

MECHANICAL and PLUMBING ENGINEER

Shah Smith & Associates
2825 Wilcrest Drive, Suite 350
Houston, Texas 77042
Telephone: 713-780-7563
Contact: Scott Sevigny, Mechanical Engineer
Electronic Mail: ssevigny@shahsmith.com



SPECIFICATIONS

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- 20 01 00 Basic Fire Suppression, Plumbing and HVAC Requirements
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- 23 21 13 Hydronic Piping
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25 08 10	BAS Commissioning (Retrofit Projects)
25 11 10	BAS Basic Materials Interface Devices and Sensors (Retrofit Projects)
25 11 19	BAS Operator Interfaces (Retrofit Projects)
25 14 10	BAS Field Panels (Retrofit Projects)
25 15 10	BAS Software And Programming (Retrofit Projects)
25 30 10	BAS Communication Devices (Retrofit Projects)

The following Specification Sections have been prepared by or under the direct supervision of the Mechanical, Electrical and Plumbing Engineer:

ELECTRICAL ENGINEER

Shah Smith & Associates
2825 Wilcrest Drive, Suite 350
Houston, Texas 77042
Telephone: 713-780-7563
Contact: Jim Willcockson, P.E.
Electronic Mail: jwillcockson@shahsmith.com



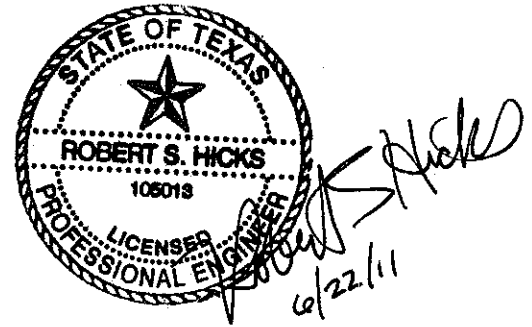
DIVISION 26 – ELECTRICAL

26 01 00	Basic Electrical Requirements
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26 05 20	2-Hour Fire-Rated Circuit System
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26 05 33	Raceways, Conduits, and Boxes
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26 08 00	Electrical Systems Commissioning
26 08 13	Electrical Systems Prefunctional Checklists and Start-Ups
26 08 16	Electrical Systems Functional Performance Tests
26 09 23	Lighting Control Devices
26 22 13	Non-K-Factor Dry-Type Transformers
26 24 16	Panelboards
26 27 26	Wiring Devices
26 28 13	Fuses, 600 Volt
26 28 17	Motor and Circuit Disconnects
26 43 13	Transient Voltage Surge Suppressors
26 51 00	Lighting Fixtures

The following Specification Sections have been prepared by or under the direct supervision of the Code/Life Safety Consultant:

CODE/LIFE SAFETY CONSULTANT

Rolf Jensen & Associates, Inc.
Texas Registered Engineering Firm F-2107
8827 W. Sam Houston Pkwy. North
Houston, Texas 77040
Telephone: 281.640.7100
Contact: Robert S. Hicks, P.E.
Electronic Mail: rhicks@rjagroup.com



SPECIFICATIONS

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

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DIVISION 05	METALS	REVISION
05 12 00	Structural Steel Framing	
05 31 13	Steel Floor Decking	
05 31 33	Steel Form Decking	
05 40 00	Cold-Formed Metal Framing	
05 50 00	Metal Fabrications	
05 51 00	Metal Stairs	
05 52 13	Pipe and Tube Railing	

DIVISION 06	WOOD, PLASTICS AND COMPOSITES	REVISION
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06 40 00	Architectural Woodwork	
06 61 16	Solid Surfacing Fabrications	
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DIVISION 07	THERMAL AND MOISTURE PROTECTION	REVISION
07 21 00	Thermal Insulation	
07 81 00	Applied Fireproofing	
07 84 13	Penetration Firestopping	
07 84 46	Fire-Resistive Joint Systems	
07 92 00	Joint Sealants	

DIVISION 08	OPENINGS	REVISION
08 11 13	Hollow Metal Doors and Frames	
08 14 16	Flush Wood Doors	
08 31 13	Access Doors	
08 71 11	Finish Hardware	
08 81 00	Glass and Glazing	

DIVISION 09	FINISHES	REVISION
09 22 16	Non-Structural Metal Framing	
09 29 00	Gypsum Drywall	

DIVISION 09	FINISHES	REVISION
09 30 00	Tile	
09 51 00	Acoustical Ceilings	
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09 91 00	Painting	
09 97 00	Special Coatings	

DIVISION 10	SPECIALTIES	REVISION
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10 28 13	Toilet and Bath Accessories	
10 44 00	Fire Extinguisher Cabinets and Accessories	
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10 90 00	Animal Monitoring System	
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DIVISION 11	EQUIPMENT	REVISION
11 06 00	Laboratory Equipment – Owner Furnished Owner Installed	
11 53 13	Laboratory Fume Hoods	
11 53 43	Laboratory Service Fittings	

DIVISION 12	FURNISHINGS	REVISION
12 35 53	Laboratory Casework	

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DIVISION 22	PLUMBING	REVISION
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22 10 30	Plumbing Specialties	
22 40 00	Plumbing Fixtures	
22 45 00	Emergency Shower and Eye Wash Equipment	
22 60 53	Laboratory Vacuum and Gas Piping	
22 62 21	Laboratory Vacuum Pump Systems (Rotary Claw)	

DIVISION 23	HEATING, VENTILATING, AND AIR CONDITIONING	REVISION
23 05 13	Variable Frequency Drives	
23 05 90	Contractor Coordination with Testing, Adjusting and Balancing	
23 05 93	System Testing, Adjusting and Balancing	
23 07 13	Ductwork Insulation	

DIVISION 23	HEATING, VENTILATING, AND AIR CONDITIONING	REVISION
23 09 10	Laboratory Tracking Systems and Constant Volume Air Valves	
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23 21 30	Hydronic Specialties	
23 31 00	Ductwork	
23 33 00	Ductwork Accessories	
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23 37 00	Air Outlets and Inlets	
23 82 16	Duct Mounted Air Coils	
23 82 19	Fan Coil Units	

DIVISION 24	RESERVED – Not Used	REVISION
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25 00 10	Building Automation Systems (BAS) General (Retrofit Projects)	
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26 22 13	Non-K-Factor Dry-Type Transformers	
26 24 16	Panelboards	
26 27 26	Wiring Devices	
26 28 13	Fuses, 600 Volt	
26 28 17	Motor and Circuit Disconnects	
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28 30 00	Fire Alarm and Smoke Detector Systems	

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DIVISION 30	RESERVED - Not Used	REVISION
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DIVISION 31	EARTHWORK – Not Used	REVISION
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DIVISION 33	UTILITIES – Not Used	REVISION
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DIVISION 34	TRANSPORTATION – Not Used	REVISION
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END OF SECTION 00 01 10

SECTION 00 25 00 – OWNER’S SPECIAL CONDITIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
- C. The Contractor's attention is specifically directed, but not limited, to the Uniform General and Supplementary General Conditions for University of Texas System Building Construction Contracts (UGC) for other requirements.
- D. Attachment "A" (To Owner's Special Conditions) – Minimum Wage Rate Determination. Pursuant to the UGC, the attached schedule identifies the Prevailing Wage Rate determination as applicable to the Project location.

1.02 SUMMARY

- A. Terms and conditions set forth in this document are for the Contractor only, and are valid regardless of the project delivery method. For Construction Manager at Risk or Design/Build, the final version of the document shall be confirmed by the Owner, and included by the Construction Manager or Design/Build Contractor in the Guaranteed Maximum Price Proposal. For projects for which the construction phase is divided into multiple stages, these Owner's Special Conditions shall be reviewed, updated as warranted, and resubmitted with GMP Proposal associated with that stage of the construction work.

1.03 REFERENCE STANDARDS

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All materials, installation and workmanship shall comply with all applicable requirements and standards.
 - 1. Texas Medical Center Architectural Standards and Texas Medical Center Stormwater Management Design Guidelines are applicable to all Projects located within the Texas Medical Center.
 - 2. Owner's underwriter requirements are applicable to all Projects.

1.04 DEFINITIONS

- A. The term "Owner's Project Manager" as used throughout the Contract Documents means an individual authorized by the Owner to administer the Project.

- B. Outage - A temporary disruption of normal operation or use of utilities, sidewalks, parking areas, driveways or facility access.
- C. Planned Utility Outage - An event that can be foreseen and has a plan of action in place to accomplish specific tasks during a utility outage.
- D. Utility - Any service provided by an outside source or manufactured in house (gas, water, electricity, fire suppression water, telecommunications, data systems, building automation systems, fire alarm systems, etc.) which facilitates building operations.
- E. The terms "outage" and "shutdown" are used interchangeably throughout the Contract Documents.
- F. Work Day - A day in which work is planned, excluding weekends and holidays.
- G. The terms "work day" and "business day" are used interchangeably throughout the Contract Documents.
- H. Normal working hours are considered as work being performed between 6:00 A.M. and 6:00 P.M. Monday through Friday, excluding holidays.
- I. The terms "normal hours" and "regular hours" are used interchangeably throughout the Contract Documents.
- J. Weather Day – A "weather day" is a day on which the Contractor's current schedule indicates Work is to be done, and on which inclement weather occurs and resultant site conditions or inaccessibility to the site prevent the Contractor from performing five hours of Work associated with the Project's critical activities during normal working hours.

1.05 OWNER'S RIGHT OF OCCUPANCY

- A. The Owner may occupy or use all or any portion of the Work following Substantial Completion, or at any earlier stage of completion. Should the Owner wish to use or occupy the Work, or part thereof, prior to Substantial Completion, the Owner's Project Manager will notify the Contractor in writing and identify responsibilities for security, maintenance, and insurance.
- B. Work performed on the premises by third parties on the Owner's behalf does not constitute occupation or use of the Work by the Owner for purposes of this Article.
- C. All Work performed by the Contractor after occupancy, whether in part or in whole, shall be at the convenience of the Owner so as to not disrupt Owner's use of, or access to occupied areas of the project.
- D. Contractor shall follow the Planned Utility Outage Procedure specified within this section when performing Work affecting any occupied facility.

1.06 MINIMUM WAGE RATE DETERMINATION

- A. The Contractor shall comply with all requirements of Texas Government Code Chapter 2258, Prevailing Wage Rates.

- B. Wage rates identified in Attachment "A" (To Owner's Special Conditions) are titled "Prevailing Wage Determination, Houston-Galveston Area", dated December 31, 2009. [EXCEPTION: Job Order Contracts – The relevant wage rates identified in Attachment "A" as part of the UGC JOC Program is titled "Prevailing Wage Determination, Harris-Galveston Counties, Galveston, Houston, and MD Anderson", dated 09/01/2003].
- C. The Owner may verify wage rate compliance in the field by interviewing workers. The Contractor shall assist the Construction Inspector (CI) with this task, including providing translation for non-English speaking workers.

1.07 WEATHER DAYS

- A. Weather days are excusable delays. When weather conditions at the site prevent work from proceeding, immediately notify the Owner's Project Manager for confirmation of the conditions. At the end of each calendar month, submit to the Owner's Project Manager a list of Weather Days occurring in that month along with documentation of the impact on critical activities. Based on confirmation by the Owner's Project Manager, any time extension granted will be issued by Change Order. If the Contractor and Owner cannot agree on the time extension, the Owner may issue a Unilateral Change Order for fair and reasonable time extension.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.02 BUILDERS RISK ENDORSEMENTS

- A. For Coverage of Existing Building Structures:
 - 1. Contractor shall include an endorsement on the Builders Risk Insurance policy to provide coverage for the existing building structure(s), including its/their contents, as described below. Coverage shall be in the amount equal to either \$5 million or the estimated replacement value of the existing building structure and its contents, whichever is less.
 - 2. The purpose of this coverage is to fund the \$5 million deductible under the Owner's existing property insurance policy which addresses the risk and possible cost of claims to repair damage to existing structure(s) (this purpose should be explained to the Builders Risk Insurance carrier when requesting the quote). The existing building structure(s) to be covered is the **SOUTH CAMPUS VIVARIUM RETROFIT** building, and its estimated building replacement value is **\$14,000,000.00**.
- B. Soft Costs, Loss of Rents, Gross Earnings:
 - 1. Contractor shall provide an alternate price to include an endorsement on the Builders Risk Insurance policy to provide the following additional coverage:
 - a. Period of Indemnity [ENTER 365 DAYS OR TIME PERIOD ON THE WORKSHEET]
 - b. Maximum Deductible: 14 Calendar Days

2.03 TEMPORARY FIELD OFFICE STRUCTURES, FURNISHINGS AND EQUIPMENT

- A. The Contractor shall coordinate and direct the Work of the Project from the Site.
- B. The Contractor shall provide and maintain at least one (1) temporary field office that is adequately staffed, furnished, and equipped.
- C. All arrangements for temporary field offices shall be as agreed upon with the Owner's Project Manager. Costs for temporary field office(s) shall be included in the Contractor's Schedule of Values Breakdown and included with the Contractor's regular monthly Progress Payment.
- D. Conference areas shall include at least one (1) primary area suitable for up to fifteen (15) persons to participate in Project progress and coordination meetings. The walls of this conference area are to serve as display surfaces for maintaining current prints of Project schedules and work placement plans.
- E. The Contractor shall provide and maintain temporary field office(s) until Final Completion and shall remove temporary field office(s) only after obtaining concurrence from the Owner.

2.04 TOILET FACILITIES

- A. Contractor shall provide toilet facilities from Notice to Proceed until Final Completion that comply with OSHA regulations and as required herein. Toilet facilities shall comply with all applicable State and local regulations. Quantity, type, and location of facilities shall be subject to acceptance by Owner.
- B. Contractor shall service, clean, and sanitize toilet facilities at least daily and as frequently as necessary to maintain them in a safe, clean, and sanitary condition. Contractor shall maintain at the Site, a record of the servicing, cleaning, and sanitizing of the facilities for the duration of the Project.
- C. The use of toilet facilities installed under this Project and/or existing campus facilities is not allowed unless prior written approval has been obtained from Owner.
 - 1. If Owner authorizes the use of specific campus toilet facilities, Contractor shall assure all persons employed on the Project use only authorized toilet facilities. Contractor shall post notices and take such precautions as may be necessary to assure compliance.
- D. Toilet Facilities: Portable field toilet facilities shall conform to ANSI Z4.3 and shall comply with the following:
 - 1. There shall be a toilet paper holder and an adequate supply of toilet paper. If the facility is intended for use by female workers, there shall be a disposal receptacle for sanitary napkins.
 - 2. The toilet facility shall afford the user privacy and protection from weather and from falling objects.
 - 3. There shall be a self-closing door that can be locked from inside the toilet facility.
 - 4. The toilet facility shall be illuminated by natural or artificial light and adequately ventilated.

5. A sign shall indicate if the toilet facility is intended for use by males only or by females only.
6. Toilet facilities shall be located so as to be conveniently accessible to employees working on the Site, but not so close to the Work location as to cause a nuisance to those employees or any adjacent areas.

2.05 PROJECT FENCING

- A. The Contractor and Subcontractors shall confine their activities to the Site and in no way obstruct any other part of the campus or utilize any campus facilities for any purpose.

2.06 PROJECT COMMUNICATIONS PLAN

- A. Depending upon the project, the Owner may develop a Project Communications Plan to inform the Owner's faculty, employees, patients, visitors, and others concerning construction activities affecting them. Contractor shall participate and support this effort as required by Owner. Typical support by Contractor may include attendance at communications meetings, preparation of graphic and narrative construction impact updates, and the furnishing of targeted signage.

2.07 TEMPORARY WATER

- A. The Contractor shall provide temporary lines for all water required during the Project and shall make arrangements with the Owner's Administrative Facilities and Campus Operations Department for water service. This shall include all means of conveying and the necessary metering devices. In lieu of temporary connections, with the Owner's approval, the Contractor may make permanent connections and such may serve for the construction period.
- B. In the event water is not available at the Site from the Owner's existing distribution system, the Contractor shall negotiate with the local distributor for water and pay all fees and rates required by the local water utility.

2.08 TEMPORARY MECHANICAL SERVICES

- A. If temporary heating, cooling, ventilation or humidity control equipment is required for protection of the Work or for implementation of indoor air quality measures, the Contractor shall provide Owner-approved equipment and proper operation such that no Work shall be damaged or life safety compromised.
- B. All equipment and filters shall be maintained in good operation and all filters and controls shall be changed as a result of damage or expiration to ensure acceptable air quality. If necessary, all equipment must have current certifications.
- C. After the permanent mechanical equipment has been installed and connected to the local chilled water and steam distribution systems, the equipment may be operated by the Contractor to heat or cool the building if acceptable to the Owner. Contractor must flush and clean all new mechanical piping systems before connecting to local systems.

- D. During operation of the mechanical equipment, prior to achieving Substantial Completion, the Contractor shall keep the mechanical equipment in good operating condition, properly maintained, including cleaning and changing of all filters. New, non-construction filters shall be installed prior to the Owner's acceptance of the mechanical equipment. The warranty period shall start for the respective equipment as delineated in the UGC.

2.09 REMOVAL OF TEMPORARY FACILITY

- A. When a temporary facility is no longer needed for the proper conduct of the Work, the Contractor shall completely remove it from the Project and shall repair or replace any material, equipment, or finished surface damaged in doing so.

2.10 PROJECT PARKING

- A. Contractor is responsible for securing adequate parking for Contractor's employees. Parking of Contractor's vehicles at the Site shall be coordinated through the Owner's Parking Offices and any required or necessary parking fees or permits are the sole responsibility of the Contractor.

PART 3 - EXECUTION

3.01 PARTNERING

- A. The Owner desires to create a cohesive team for this project, to include all primary parties. The Contractor and its primary Subcontractors shall join the Owner and the rest of the Project Team in project "Partnering" as a means of achieving success. The Partnering process is entirely voluntary and the Owner and Contractor shall equally share all costs with no impact to the Construction Contract price. The results of the workshop are not legally binding, but do represent a commitment by the parties to work together cooperatively toward common goals.

3.02 CONTRACTOR SITE ACCESS AND LIMITS OF CONSTRUCTION

- A. All Project personnel shall confine and limit their work and use of the Site to those areas within the defined limits of construction. All public and University rules, laws and requirements shall be obeyed and enforced by the Contractor. No tools, construction vehicles, or construction material other than those in transit, shall be permitted beyond the Site limits of construction, including Owner's existing mechanical, plumbing, and electrical rooms, equipment rooms, and storage rooms.
- B. All campus roads, drives, and fire lanes as well as all sidewalks and pedestrian routes, other than those specifically indicated to be in the Contractor's area of control, must be kept open at all times. The Contractor shall proactively schedule and obtain security clearance for all significant material deliveries, vehicle traffic, street closures, cranes, concrete trucks, etc., through and around the campus and Site.

3.03 ON-GOING CAMPUS OPERATIONS

- A. The Project is surrounded by and/or adjacent to continuously functioning campus facilities, including patient care, academic, and research efforts. The Contractor shall make every effort to avoid disruptions to ongoing campus activities and to maintain a safe environment for patients, students, faculty, and staff in the areas adjacent to the Project.

- B. The Contractor shall obtain all Owner's in-house approvals and permits. Operation of utilities and building systems must not be interrupted except when scheduled and approved in advance through established channels. The Contractor should be always mindful and proactive with regard to containment of noise, fumes, dust and debris.

3.04 CONTRACTOR'S RESPONSIBILITY OF THE PROJECT WORKFORCE

- A. The Contractor is responsible for the actions of the entire Project workforce, including, but not limited to, subcontractors' and suppliers' employees, whenever they are on the campus. The Contractor shall submit a plan for identifying and controlling all workers, and for management of personnel records, including payroll records. Identification badges for workers, busing of workers from remote parking lot(s), written and verbal reminders to workforce of appropriate behavior and avoidance of campus facilities, and publishing of established access and egress routes for vehicular and pedestrian traffic are required, as a minimum, in order to maintain control of the work force.
 - 1. Unacceptable behavior on the part of a worker anywhere on campus, including parking lots, the Site, and the accessing route(s) through the Site and through the campus, or failure to obtain parking permits, or traffic violations while on campus may lead to cancellation of any Owner provided parking. Identifiable offending worker(s) shall be permanently removed from the Project.
 - 2. Harassment of any person, whether a patient, student, faculty, staff, or visitor to the campus, is strictly forbidden. Harassment includes any action such as jeering, whistling, calling-out, staring, snickering, making rude or questionable comments, or similar behavior. Identifiable offending worker(s) will be removed from the Project.

3.05 SECURITY

- A. The Contractor is responsible for security of the Project. The University of Texas Police Department will not provide security for the Contractor's areas unless under Project-specific agreement and terms of compensation.
- B. The Contractor shall secure the Site at nights and weekends, or when no work is being performed, to prevent the entry of unauthorized personnel. Locks shall be of an approved type and have special keying as required by the Owner. Keys for all door locks shall be made available to The University of Texas Police Department. All doors accessing the construction site shall be properly latched and have closers to maintain closed doors at all times. All doors accessing the construction site shall have MD Anderson standard construction signage, provided by Owner's Project Manager, to ensure that only authorized construction personnel access the site.
- C. The Contractor shall not retain the services of outside guard or law enforcement services in connection with Work on campus without the specific prior written approval of the Chief of The University of Texas Police Department.

3.06 PROTECTION OF WORK

- A. The Contractor shall properly and effectively protect all materials and equipment furnished during and after installation. Building materials, Contractor's equipment, etc., may be stored on the premises, but the placing of it shall be within the construction fence. When any room in the building is used as a shop, store room, etc., the Contractor shall be held responsible for any repairs, patching, or cleaning arising from such use. Contractor shall protect and be responsible for any damage to Contractor's Work or material, from the date of the agreement until the final payment is made, and shall make good without cost to the Owner, any damage or loss that may occur during this period. The Contractor shall handle all material as directed, so that the Architect/Engineer's representative may inspect it. All material affected by weather shall be covered and protected to keep it free from damage while being transported to the Site and while stored on the Site.
1. During the execution of the Work, open ends of all piping and conduit, and all openings in equipment shall be closed when Work is not in progress, and shall be capped and sealed prior to completion of final connections, so as to prevent the entrance of foreign matter.
 2. All heating, ventilating, plumbing and electrical equipment shall be protected during the execution of the Work. All ductwork and equipment shall be sealed with heavy plastic and tape to prevent build-up of items such as dust, mold, and debris.
 3. All ductwork and air handling mechanical equipment shall be wiped down with a damp cloth immediately before installation to ensure complete removal of accumulated dusts and foreign matter.
 4. All plumbing fixtures shall be protected and covered so that no one can use them. All drains shall be covered until placed in service to prevent the entrance of foreign matter.
 5. Contractor shall protect trees and shrubs within the Site assigned to be saved and maintained, with strong open slat fences at least six (6) feet high, completely surrounding them, all maintained in sound condition until the Owner gives the Contractor permission for removal. Contractor shall not remove, cut, or trim any trees or shrubs without the Owner's written approval, unless specifically identified on the approved Construction Documents.

3.07 PLANNED UTILITY OUTAGE PROCEDURE

- A. The Contractor shall not activate or de-activate any campus system, or component of any such system, without express written direction from the Owner.
- B. Contractor must schedule and obtain approval for any necessary outage of campus utilities a minimum of fifteen (15) work days in advance through the Owner's Project Manager using the Owner provided "Contractor's Request for Utility Shutdown" forms. All outages shall be performed outside the normal working hours and as determined by the Owner's Project Manager.
- C. The Owner reserves the right to delay or suspend shutdowns or outages to more convenient times at no additional cost.

3.08 NOISE CONTROL

- A. Contractor shall coordinate equipment locations and timing or sequence of work operations so as to avoid conflict with the Owner's continuing use of adjacent buildings and/or avoid any interference with Owner's scheduled meetings, events, or business activities.

3.09 TEMPORARY SHORING

- A. Contractor shall provide all temporary shoring required for the installation of Work. Contractor assumes all responsibility for this work and shall repair any damage caused by improper supports or failure of shoring in any respect. Any provisions that are installed to assure the stability of adjacent structures, trees, roadways, or infrastructure, shall be in accordance with the plans provided by the Contractor.

3.10 CUTTING, PATCHING, AND INSTALLATION OF SLEEVES

- A. If cutting and/or patching of holes or openings is required for the execution of the Work, the Contractor shall consult with the Architect/Engineer prior to the commencement of any cutting and/or patching. Contractor shall leave all chases, holes, or openings straight, true, and of proper size as may be necessary for the proper installation of Work.
 - 1. No excessive cutting of the structure shall be permitted, nor shall any piers or other structural members be cut without the written approval of the Architect/Engineer. After such Work has been installed, the Contractor shall carefully fit around, close up, repair, patch, and point-up as directed to the entire satisfaction of the Architect/Engineer.
 - 2. All cutting and patching for utility penetrations shall be done carefully, with proper tools by qualified workers, without additional cost to the Owner. The Contractor shall build into the Work, as indicated on the Plans and/or Specifications, any and all items furnished by others. Cutting and repairing of work in place, as a result of negligence by the Contractor, shall be paid for by the party at fault.
 - 3. The Work performed within each Section of the Specifications, unless otherwise indicated in the Plans and/or Specifications, includes all cutting, patching, and digging for work in that trade section required for proper accommodations of work of other trades. Execute such work with competent workers skilled in trade required for restoration. Contractor shall arrange and pay for cutting and patching required for installation of Contractor's Work.
 - 4. Contractor shall seal penetrations through all rated partitions, walls and floors with U.L. tested assemblies to provide and maintain a rating equal to or greater than the partition, wall or floor. In addition, Contractor shall seal penetrations through all floors to provide and maintain a watertight installation.

3.11 ASBESTOS ABATEMENT

- A. In the event the Contractor encounters material reasonably believed to be asbestos at the Site, the Contractor shall immediately stop work in the area affected and report the condition to the Owner. If in fact the material is asbestos and has not been abated, the Contractor shall not resume the non-asbestos-related Work in the affected area until the asbestos has been abated.

- B. The abatement action may be performed in any of three ways, as the Owner may decide. The Owner may perform the abatement by Owner's own forces, or the Owner may contract with a third party to perform the abatement, or the Contractor may perform the abatement by an appropriate means acceptable to the Owner such as performing the Work through Contractor's own employees if they are appropriately certified or by hiring an abatement subcontractor.
- C. If the Contractor is to perform the abatement, the Owner and the Contractor will negotiate a change order in accordance with the contract terms relative to extra work. In such a case, the Owner specifically agrees that the cost of any special comprehensive general liability insurance that may be required relative to the abatement Work will be considered a direct cost of the extra work, on which, like the other direct costs, the Contractor will be allowed to add the applicable markup per the UGC.

3.12 CONTRACTOR LICENSURE

- A. Contractor shall ensure that a Master Plumber licensed with the State of Texas directly supervises all plumbing Work. At least one plumber holding a State of Texas journeyman license shall be present at each Site during any plumbing Work.
- B. Contractor shall ensure that Contractor's mechanical subcontractor is licensed with the State of Texas to install all HVAC Work.
- C. Contractor shall ensure that a Master Electrician licensed with the State of Texas directly supervises all electrical Work. At least one electrician holding a State of Texas journeyman license shall be present at each Site involving Electrical Work.

3.13 SAFETY PRECAUTIONS AND PROGRAMS

- A. MD Anderson Environmental Health and Safety (EH&S) has the authority to take intervening action in the event it deems patient, visitor, or staff of MD Anderson are in danger. Contractor shall adhere to requirements stated in Section 01 35 25 - Owner Safety Requirements.
- B. Contractors shall familiarize themselves with, receive required training on, and abide by all policies and procedures of MD Anderson and any governmental body [i.e. NFPA, OSHA, EPA, TDLR (Texas Department of Licensing and Regulation), TCEQ (Texas Commission on Environmental Quality), etc.] having authority to control the manner and/or methods of completing the tasks contained in the Contract.

3.14 TEST, ADJUST, AND BALANCE

- A. Owner may hire a Test, Adjust, and Balance firm. If Owner directly hires a Test, Adjust, and Balance firm, Contractor shall support the firm's efforts to perform work as required.

3.15 MISCELLANEOUS

- A. All gas lines that are involved with the Project must have ends capped with proper cap and sealant, even if valves are locked off.
- B. Contractor shall install temporary equipment in such a manner that finish work will not be damaged by smoke, falling mortar, concrete, or other causes. Location and arrangement of temporary equipment shall be subject to the approval of the Owner's Project Manager.

C. Change Room Facilities:

1. Where workers are required to change clothes and wear special protective clothing to work with toxic or dangerous substances, an appropriate facility for decontamination, separate from other sanitary and washing accommodations shall be provided. In these cases, change room facilities shall be duplicated and storage shall be provided for protective clothing in one room and for personal clothing in the other.
2. Protective clothing and personal clothing shall not come into contact with each other or be stored in the same facilities. Protective clothing and work clothing, which may have become wet by the process of decontamination, must be stored in a separate, well-ventilated area.
3. Change rooms shall be gender separated and provided with inside and outside locking mechanisms.

3.16 SITE AND AREA MAINTENANCE

- A. A thorough cleanup of the Site and the Site's surroundings is required no less than once per week or more often as directed by the Owner. Contractor shall be responsible to ensure that the debris and trash resulting from site operations are removed from the building and the property on a daily basis. Solid debris, such as brick bats, mortar and plaster droppings, may not be dumped on the grounds about the Site. All combustible material including scrap from lumber, crating, excelsior, paper, and similar types of trash shall be removed from the building site on a daily basis. Trash shall not to be allowed to accumulate.
- B. The Contractor shall not allow food to be consumed or food wastes to accumulate at the Site in an effort to eliminate pests and insects.
- C. Contractor shall be required to clean all streets of mud, dirt, dust, debris, and construction material produced during Contractor's construction activities on a daily basis. Contractor shall repair any damage to existing streets, parking, facilities, and any other area of the Site, including areas used for lay down or storage.

3.17 OPERATING AND MAINTENANCE MANUALS

- A. Certain requirements of the UGC are supplemented by Section 01 77 00 – Project Closeout Procedures.

3.18 RECORD DOCUMENTS

- A. Certain requirements of the UGC are supplemented by Section 01 77 00 – Project Closeout Procedures.

3.19 SHOP DRAWINGS AND SUBMITTALS

- A. Certain requirements of the UGC are supplemented by Section 01 31 00 – Project Administration.

END OF SECTION 00 25 00

ATTACHMENT "A"
(to Owner's Special Conditions)
MINIMUM WAGE RATE DETERMINATION

The University of Texas System is the contracting agency for this construction project. The following statute requires the contracting agency to specify the generally minimum rates of wages in contracts that are bid.

Government Code 2258
"Construction of Public Works in State and
Municipal or Political Subdivisions; Prevailing
Wage Rates to be maintained"
and
The Uniform General and Supplementary General Conditions
for University of Texas System Building Construction Contracts

Pursuant to the requirements of this statute, we have determined that the following rates of wages are paid to various classifications of workers in the locality of this project.

Total hourly compensations to each worker must equal or exceed the minimum wage rates stated in the following attachment. Contributions by a worker toward health, pension, vacation, and the like are part of the worker's pay; contributions by the employer are not. Any dollar amounts shown in columns for health, pension, and vacation may be paid either in cash or in kind. Workers in classifications where rates are not identified shall be paid not less than the general minimum rate of "laborer" for the various classifications of work therein listed.

All hours of work over 40 hours per week are overtime and will be compensated at the rate of 1 and ½ times the regular wage.

Trainees/helpers, where not otherwise specified above, may be compensated at a rate determined mutually by the worker and employer, commensurate with the experience and skill of the worker but a rate not less than 60% of the journeyman's wage or less than the Laborers (General) rate. At no time shall a journeyman supervise more than two of apprentices, trainees or helpers. All apprentices/trainees/helpers shall be under the direct supervision of a journeyman working as a crew.

ATTACHMENT "A"
PREVAILING WAGE DETERMINATION
HOUSTON-GALVESTON AREA

The University of Texas System
Office of Facilities Planning and Construction

Date: December 31, 2009
Construction Type: Building
Area: Houston-Galveston

Building Construction Trade Classification	Prevailing Wage Rate (1)
Carpenter	\$14.38
Concrete Finisher	\$14.63
Drywall/Ceiling Installer	\$14.00
Electrician	\$16.00
Elevator Mechanic	\$23.61
Fire Proofing Installer	\$13.88
Flooring Installer	\$13.63
Glazier	\$9.00
Heavy Equipment Operator	\$13.25
Ironworker	\$17.00
Laborer	\$10.00
Light Equip Operator/Driver	\$13.88
Mason/Bricklayer	\$18.00
Painter	\$14.25
Pipefitter	\$14.87
Piping/Ductwork Insulator	\$15.00
Plumber	\$18.06
Roofer	\$11.00
Sheetmetal Worker	\$17.75
Sprinkler Fitter	\$15.40
Tile Setter	\$13.50
Waterproofer	\$13.63

- (1) Wages shown are for entry level, minimum wages for each classification and do not include fringe benefits**

Unlisted classifications needed for work not included within the scope of the classifications listed may not be added after award. The job classifications are not inclusive of all possible trades on the construction project.

It is the responsibility of the contractor to classify the worker in accordance with the published classifications, and demonstrate that workers are paid commensurate with determined rates.

ATTACHMENT "B"
(to Owner's Special Conditions)
PROJECT SIGN LAYOUT



NAME OF PROJECT — 2 1/2" Univers LT Std - 75 Black*

ARCHITECT/ENGINEER — 2" Univers LT Std - 65 Bold*
Name of Firm — 2" Univers LT Std - 45 Light*

GENERAL CONTRACTOR — 2" Univers LT Std - 65 Bold*
Name of Contractor — 2" Univers LT Std - 45 Light*

**THE
UNIVERSITY OF
TEXAS
SYSTEM** — 1 1/4" Univers LT Std - 65 Bold

**DEPARTMENT OF
CAPITAL PLANNING
& MANAGEMENT** — 1 1/4" Univers LT Std - 65 Bold

* Adjust letter size as required for length

Submit a one-quarter scale shop drawing of the sign complete with all lettering to the owner for approval before construction. The sign shall be constructed of 3/4" thick A-C Grade exterior plywood. The sign shall receive two coats of an approved white semi-gloss exterior enamel on all surfaces before lettering. The owner will designate the colors for the lettering on the shop drawing.

SECTION 01 10 00 - SUMMARY OF WORK

PART 1 – GENERAL

1.1 SECTION INCLUDES:

- A. Work covered by Contract Documents.
- B. Contract Method.
- C. Starting Work.
- D. Work by Others.
- E. Contractor's Use of Premises.
- F. Partial Owner Occupancy.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Architect Identification: The Contract Documents, dated 10 March 2011, were prepared for the Project by Perkins+Will, 1001 McKinney, Suite 1300, Houston, Texas 77002; telephone 713-366-4021; facsimile 713-528-3339.
- B. This centralized rodent vivarium retrofit is a core facility supporting all M.D. Anderson research programs on the South Campus. This project is to renovate vacant shell or decommissioned vivarium and mechanical space to expand a centralized core vivarium and imaging facilities on the South Campus. The project is located within the Smith Research Building (SRB) and the Physical Plant Building (PPB), which are adjacent to and connected to the existing South Campus Vivarium.
- C. The Work of this Contract comprises the general construction (renovation and expansion) of the existing core SRB Rodent Housing Space in the M.D. Anderson South Campus Vivarium (SCV).
 - 1. The first critical component of the project is to renovate and expand, and equip animal housing and procedure areas in the vacant vivarium space in the Smith Research Building (approx. 12,000 sq. ft.), which will increase the capacity of the SCV by approx. 7,920 cages of mice. This will complete the build-out of additional animal housing and procedure space to add capacity for approx. 7,920 more mouse cages, equivalent to approx. 26,900 animals (60% increase in overall capacity). The project will include the following facilities: high density rodent housing rooms, general use rodent procedure rooms, storage rooms, housekeeping rooms, locker room, pass-through material transfer station, multi-use office area, SRB multiuse office suites and a Cesium Irradiator Room.
 - 2. The second component of this project is to renovate and expand the animal housing and procedure, genetically engineered mouse, and small animal imaging facilities in the South Campus Vivarium (6,500 sq. ft.). This will complete the build out of the Animal Housing and Procedure Facility to add capacity for 3,530 more mouse cages (approx 12,000 animals). This area will have the following facilities: large, high density rodent housing rooms, large multi-use rodent invasive procedure rooms, two general use rodent procedure rooms, storage & house-keeping, small animal clinic, genetically

engineered mouse facility, specialized procedure room and a small rodent housing room.

- a. The Contract Documents describe the essential elements sufficiently to determine the scope of the Project.
- b. Provide all items required for complete operating systems including items not necessarily shown in these Contract Documents, but that can be reasonably inferred as being required for a complete operating system.
- c. The Drawings and Specifications indicate the basic quality of material and quality of construction required for the overall project.

1.3 CONTRACT METHOD:

- A. Construct the Work under a general construction contract for a single lump sum.

1.4 USE OF PREMISES

- A. Contractor shall have limited use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited to areas indicated or approved by the Owner, and by Owner's right to perform work or to retain other contractors on portions of Project.
 1. Allow for Owner occupancy and use by the public of, and to and from, the existing building.
- B. Make each entity engaged in work on the project aware that the present buildings house operating facilities that must continue in operation during the construction period, except as the Architect and Owner may otherwise direct. Continue function of plumbing, heating, ventilating, electrical, fire alarm, and telephone systems with a minimum of interruptions in service. Do not block any required fire exits.
- C. Confine operations at site to areas permitted by Law, Ordinances, Permits, and Contract Documents.
- D. Do not unreasonably encumber site with materials or equipment.
- E. Assume full responsibility for protection and safekeeping of products stored on premises.
- F. Move any stored products which interfere with operations of Owner or other contractors.
- G. Obtain and pay for use of additional storage or work areas needed for operations.
- H. Limit use of site for work and storage as follows:
 1. Do not use completed paving areas for storage without Owner's approval.
 2. Do not store materials where trees are located.
 3. Restrict Work and storage to areas indicated on Drawings or approved by Owner.
 4. Access site in areas approved by Owner.
 5. Restrict parking to areas approved by Owner.
 6. Do not perform operations that would interrupt or delay Owner's daily operations.
- I. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials

1.5 PROTECTION OF WORK AND PROPERTY

- A. The Contractor shall maintain adequate protection of the Work from damage and shall protect the Owner's and adjacent property from injury or loss arising from the Work. Contractor shall provide and maintain at all times any OSHA-required danger signs, guards, and obstructions necessary to protect the public and construction personnel from any dangers inherent with or created by the Work in progress.
 - 1. All federal, state, and city rules and requirements pertaining to safety, and all EPA standards, OSHA standards, and NESHAP regulations pertaining to asbestos as required shall be complied with.
- B. Twenty-four (24) Hour Call: The Contractor shall have personnel on call 24 hours per day, for emergencies during the course of the Project. The Owner shall be provided with a 24- hour emergency contact number of Contractor's personnel. Contractor shall be able to respond to any emergency call and have personnel on-site within two (2) hours after contact. Numbers to be made available to the Owner shall include home, office and mobile numbers for the following:
 - 1. Contractor's project manager.
 - 2. Contractor's field superintendent.
 - 3. Owner or company officer of Contractor.

1.6 PARTIAL OWNER OCCUPANCY:

- A. The Owner reserves right to use and occupy in whole or any part of the improvements which have been completed sufficiently to permit use and occupancy without delaying Contractor's work. Use and occupancy by Owner shall not, however, be construed as an acceptance of Work of any part, and any claim which Owner may have against Contractor shall not be deemed to have been waived by occupancy. Refer to General Conditions Article I. and IX. for Beneficial Occupancy requirements.
 - 1. For each partial use and occupancy prior to Beneficial Occupancy, Owner agrees to obtain written consent of Contractor, secure endorsement from insurance carriers, and consent of Surety.
 - 2. Prior to each use and occupancy, Owner and Contractor shall make mutually acceptable arrangements for security, protection and insurance for people and property; warranties; and operation, maintenance and payment for utilities and services for each such partial use and occupancy.

1.7 OWNER'S OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.8 OWNER-FURNISHED CONTRACTOR-INSTALLED PRODUCTS

- A. Owner's and Contractor's Responsibilities:
 - 1. Contractor shall provide support systems to receive Owner's equipment as well as plumbing, mechanical, and electrical connections.

2. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
3. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
4. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
5. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
6. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
7. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
8. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
9. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
10. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
11. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.
12. Contractor shall install and otherwise incorporate Owner-furnished items into the Work.

1.9 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using CSI/CSC's "MasterFormat 2004" 50-Division format and numbering system.
 1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the Table of Contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.10 PROVISIONS FOR ELECTRONIC MEDIA

- A. Website:

1. Construction Documents and Reference Documents for this project will be kept on a website created by Newforma.
2. Refer to the Website for constant changes and updates. Ensure use of current documents and information at all times, and verify most recent version of each document.
3. Coordinate use of website and provide access as required to subcontractors and suppliers. Obtain access information from Architect.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION 01 10 00

SECTION 01 31 00 - PROJECT ADMINISTRATION

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

- 1.1.1. The Contractor's attention is specifically directed, but not limited, to the Uniform General and Supplementary General Conditions for University of Texas System Building Construction Contracts (UGC) for other requirements.

1.2. SUMMARY

- 1.2.1. This Section provides Project administrative and procedural requirements for the Contractor to supplement requirements defined in the UGC.

1.3. DEFINITIONS

- 1.3.1. Refer to the UGC for Contract definitions used throughout the Contract Documents.

1.4. NOTICE TO PROCEED

- 1.4.1. The Owner may issue a formal Notice to Proceed (NTP) with Construction, which will establish the start date, the Substantial Completion date, and the Final Completion date of the Work for contractual purposes.

1.5. CONTRACT SUBSTANTIAL COMPLETION

- 1.5.1. In order to obtain an inspection for Substantial Completion, the Contractor shall fulfill all requirements as specified in the UGC and Section 01 77 00 - Project Closeout Procedures.
- 1.5.2. The Owner may elect to accept the Project as a whole, or in segments as completed. When the Owner accepts the project, the Owner will issue a letter or certificate of Substantial Completion acceptance to the Contractor, defining continuing responsibilities of the parties and establishing date(s) for the completion of punch list items.

1.6. SUBCONTRACTS

- 1.6.1. Refer to the UGC for requirements not identified in this Section. Contractor shall furnish to the Owner a list of all first tier subcontractors to the Owner as subcontracts are executed. The Contractor agrees to bind every subcontractor and every subcontractor agrees to be bound by all the terms and conditions of the Contract Documents for the benefit of the Owner and the Architect/Engineer.

1.7. PREVAILING WAGE RATE

- 1.7.1. The Contractor must comply with all aspects of the UGC. Contractor shall require all workers to complete a "Worker Wage Rate Notification Form" before starting Work on the Project. The Contractor shall maintain certified payrolls, for the Contractor and all subcontractors, at the jobsite throughout construction.
- 1.7.2. The Owner's Project Manager may verify wage rate compliance in the field by interviewing workers, or otherwise. The Contractor shall assist the Owner's Project Manager with verification of wage rate compliance, including provisions for non-English speaking workers.

1.8. FLOW OF COMMUNICATIONS

- 1.8.1. Refer to the UGC for requirements not identified in this Section.
- 1.8.2. The Architect/Engineer is responsible for document control and general Project administration and is the key contact for written communications. The Owner's written instructions to the Contractor will generally be issued through the Architect/Engineer. On Design/Build projects, the construction management staff may provide this service if approved by the Owner.
- 1.8.3. All subcontractor correspondence shall be routed through the Contractor. All written Contractor correspondence shall be directed to the Architect/Engineer, with simultaneous copies to the Owner's Project Manager, Owner's Construction Inspector, and the OFPC Representative, if applicable. The actual parties for this Project will be confirmed at the Pre-Construction Conference.
- 1.8.4. The Owner's Project Manager and the Owner's Construction Inspector are the Owner's primary representatives for the Project. The Owner's Construction Inspector is the key contact for verbal communications and Site issue coordination.
- 1.8.5. The Owner's Project Manager and the Owner's Construction Inspector are the only parties authorized to direct changes in the Work, and issue written and/or oral instructions directly to the Contractor.
 - 1.8.5.1. All ORAL instructions must be issued by the Owner's Construction Inspector and/or the Owner's Project Manager, or in their presence, and shall be promptly confirmed in writing by the Contractor. Any oral instructions or discussions with subcontractors in the absence of the Contractor are not contractual and are not binding on either party.
- 1.8.6. Per the UGC, the Architect/Engineer may issue clarification and other information not affecting the Contract cost or time by means of an Architect/Engineer's Supplemental Instruction form, (ASI), or similar clarification form, which will be sequentially numbered. Both the Architect/Engineer and the Contractor shall maintain a separate ASI register.
- 1.8.7. All subcontractor Requests for Information (RFI) shall be submitted by and under cover of the Contractor, who is to carefully review and ensure the completeness and appropriateness of the question, sequentially number each, and submit to the Architect/Engineer with copies to the Owner's Project Manager, Owner's Construction Inspector, and Institution representative (if requested). The Contractor and Architect/Engineer shall maintain separate RFI logs.
- 1.8.8. All Project correspondence shall include the University of Texas MD Anderson Cancer Center (MD Anderson) Project Number and Project Name in the title or reference.
- 1.8.9. Contractor shall process Pay Estimates, Requests for Information, Changes, and Submittals as shown in the Owner's Pre-Construction Conference Brochure.
- 1.9. CHANGED CONDITIONS
 - 1.9.1. Refer to the UGC for requirements not identified in this Section. If the Contractor finds conditions at the Site to be materially different from that indicated in the Contract Documents, Contractor shall notify the Architect/Engineer, the Owner's Construction Inspector, and the Owner's Project Manager immediately in writing and prior to disturbing such conditions.

1.10. PROJECT CHANGES

- 1.10.1. All changes shall be administered per the UGC.
- 1.10.2. Upon authorization by the Owner, the Owner or Architect/Engineer will prepare and issue all changes to the Contract affecting cost, scope and/or time as a formal Change Order to the Contract on the standard University of Texas MD Anderson Cancer Center Change Order form. The Change Order may include separate change issues, identified as Change Proposals and Field Orders.
- 1.10.3. Upon authorization by the Owner, Change Proposals may be issued to the Architect/Engineer for pricing by the Contractor. Contractor shall submit pricing to the Owner within twenty-one (21) calendar days and pricing shall be indicated on the standard Owner "Change in Work Cost Analysis" ("Cost Analysis") form provided in the Pre-Construction Conference Brochure. Contractor may not include a Change Proposal within a Change Order unless the Owner has accepted the Change Proposal.
 - 1.10.3.1. The Contractor shall summarize all costs for each change at each level of subcontractor and supplier by preparing the "Cost Analysis" form, and shall provide each subcontractor's cost summary on separate "Cost Analysis" forms as backup. Additional support documentation from both the Contractor and Contractor's subcontractors is encouraged, but such will not replace use of the standard form.
 - 1.10.3.2. When the Contractor believes it is entitled to a time extension, Contractor shall so state as part of Contractor's response to the Change Proposal, including a justification for a time extension. Owner may grant time extensions only if a Change Proposal affects the activities on the Longest Path of an Owner approved Project Schedule; i.e., when the Work impacts the "Contract Substantial Completion Date".
 - 1.10.3.3. If the Owner's Project Manager and Contractor cannot mutually agree upon a fair and reasonable cost and time settlement, the Owner's Project Manager may: 1) Reject the quotation and void the Change Proposal, 2) Issue instructions to the Contractor to proceed on a time and material basis for a price to be determined later not to exceed a fixed maximum dollar and time, or 3) Issue a Unilateral Change Order.
 - 1.10.3.4. The Owner's Construction Inspector and/or Owner's Project Manager may issue Field Orders directly to the Contractor for minor changes to the Contract, which can be negotiated in the field. Pricing backup is at the discretion of the Owner's Construction Inspector, but pricing backup is required for any Field Order, the pricing backup is to be outlined on the "Cost Analysis" form. When the Owner and Contractor have signed the Field Order, the Work is authorized and the Field Order may be included in the next Change Order.
- 1.10.4. Request for payment for Change Order work may be submitted only after the Change Order has been fully executed.

1.11. CLAIMS FOR ADDITIONAL COST

- 1.11.1. Contractor shall timely and officially certify all claims for additional cost and shall specifically comply with all provisions of the UGC to be considered valid. Note that only the Contractor can make a claim for additional cost under the terms of the Contract Documents.

1.12. TIME EXTENSIONS OTHER THAN CHANGE PROPOSALS

- 1.12.1. Refer to the UGC for requirements.

1.13. LIQUIDATED DAMAGES

- 1.13.1. If assessed, Owner may withhold liquidated damages from progress payments beginning with the first payment after the adjusted Contract completion date and continuing through any subsequent progress payments until all Work of the Contract is complete. Owner may assess liquidated damages by deducting the liquidated damages from the Contract price or Guaranteed Maximum Price (GMP) Proposal through a unilaterally written deductive Change Order.

1.14. SITE USE ISSUES

- 1.14.1. Refer to the UGC and to Owner's Special Conditions for site use requirements not identified in this Section. The Contractor shall manage, coordinate, and direct the Work from the Site.
- 1.14.2. The Contractor is responsible for actions of the entire workforce whenever the workforce is at the Site, or passing through campus to the Site. Harassment of any kind toward any person will not be tolerated; offending workers will be removed from the Project immediately and permanently.
- 1.14.3. The Contractor shall provide and submit a program plan for worker orientation, identification of workers, and control of access to the Site. Any and all workers on the Project shall participate in this program before beginning Work on the Project. The program plan shall include, as a minimum:
 - 1.14.3.1. An overview of the Contractor's plan for instruction of Site rules and regulations to all employees who participate on the Project, including but not limited to safety, restricted use of Owner's facilities, parking conduct/behavior, dress, sanitary facilities, security, etc.
 - 1.14.3.2. Employee identification badges with a photograph of the employee, the employer, and employee's name. Badges shall be provided for all employees and produced by a system on Site. This identification shall be worn at all times while on the Site. Lack of an authorized identification badge shall be grounds for removal from the Site.
 - 1.14.3.3. A detailed written plan indicating how the Contractor proposes to control pedestrian and vehicular traffic into and out of the Site. Contractor shall provide a separate plan for normal working hours, nights, after normal hours, weekends, holidays, etc. This plan may be incorporated into the Contractor's staging plan.

1.15. HISTORICALLY UNDERUTILIZED BUSINESS (HUB) PLAN

- 1.15.1. Refer to the UGC and Exhibit H of the Agreement for HUB requirements not identified in this Section.
- 1.15.2. The Contractor agrees to the Good Faith Effort procurement of historically underutilized businesses in accordance with the Historically Underutilized Business Plan (HUB) included in the Contract.
- 1.15.3. No subcontractor may be changed or added without the Owner's written consent.

PART 2 - PRODUCTS

2.1 SCHEDULING REQUIREMENTS

- 2.1.1 Refer to the UGC and Section 01 32 00 – Project Planning and Scheduling for detailed scheduling requirements not identified in this Section.

2.2 SHOP DRAWINGS AND SUBMITTALS

- 2.2.1 Refer to the UGC for requirements not identified in this Section.
- 2.2.2 Submittal Procedures: Contractor shall transmit each item using Owner's standard form. Contractor shall identify the project by Owner's assigned project number, Contractor, Subcontractor and supplier. Contractor shall identify pertinent drawing sheet and detail number and specification section number as appropriate. Contractor shall deliver submittals to Owner and Architect/Engineer as determined in the Pre-Construction Conference.
- 2.2.3 The Contractor shall include a Material Safety Data Sheet (MSDS) for any and all materials incorporated into the Project.
 - 2.2.3.1 Contractor shall attach one copy of the MSDS to the submittal and shall keep one copy in a separate three-ring binder at the site. Contractor shall organize the three-ring binder by the appropriate section of the specifications.
- 2.2.4 The Contractor shall assign an identifying number to each submittal following a format to be established at the Pre-Construction Conference. The same number with a numerical or alphabetical suffix will be used to identify re-submittals.
- 2.2.5 Submittal Product Data: Contractor shall collect and organize manufacturer's product data into a single submittal for each element of construction or system. Contractor shall include printed product data such as manufacturer's installation instructions, compliance with recognized trade association standards and testing agency standards, catalog data sheets, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where product data must be specially prepared because standard printed data is not suitable for use, Contractor shall submit as Shop Drawings.
- 2.2.6 Shop Drawings: Contractor shall submit newly prepared information and drawn to accurate scale. Contractor shall highlight, encircle, or otherwise indicate deviations from the Contract Documents. Contractor shall not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is acceptable as Shop Drawings.
 - 2.2.6.1 Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Contractor shall include at least the following information:
 - 2.2.6.1.1 Dimensions.
 - 2.2.6.1.2 Identification of products and materials included.
 - 2.2.6.1.3 Compliance with specified standards.
 - 2.2.6.1.4 Notation of coordination requirements.
 - 2.2.6.1.5 Notation of dimensions established by field measurement.

- 2.2.6.1.6 Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 36" x 48".
- 2.2.7 The Architect/Engineer and the Contractor shall maintain separate registers showing the number and a brief identification of each submittal. The separate registers must show dates of actions on the submittal such as receipt, forwarding to another office, and approval status.
- 2.2.8 The burden of timeliness to complete the submittal process is on the Contractor. The Contractor shall allow sufficient time within the Project Schedule for the Architect/Engineer and Owner to review and approve all submittals, including time for all re-submittals on any unaccepted/rejected submittals.
- 2.2.9 The Contractor shall carefully examine all data submitted for approval and shall certify that the data has been carefully reviewed and found to be correct with respect to the Contract Documents.
- 2.2.9.1 Any deviation from the Contract Documents shall be conspicuously noted on the submittal and the transmittal cover sheet. Contractor's failure to conspicuously note deviations will void any action taken on the submittal.
- 2.2.9.2 All manufacturer's data contained within the submittal shall have all inapplicable features crossed out or deleted in a manner that will clearly indicate exactly what is to be furnished.
- 2.2.9.3 Equipment of larger sizes than shown, even though of a specified manufacturer, will not be acceptable unless it can be demonstrated that ample space exists for proper installation, operation, and maintenance.
- 2.2.9.4 Should the Architect/Engineer, on initiating Architect/Engineer's review, find the submittal unstamped or uncertified, non-responsive and/or incomplete, Architect/Engineer shall return the submittal to the Contractor immediately. Such returned documents will not be recognized as having been an official submittal.
- 2.2.10 The Owner will not be responsible for payment of any item that has not been submitted and approved through the established submittal process.
- 2.2.11 The exact number of submittal copies required for distribution will be determined at the Pre-construction Conference. The Contractor should anticipate providing electronic copies and a minimum of twelve (12) hard copies of each submittal in addition to those needed by the Contractor or Contractor's subcontractors. Contractor shall set aside two (2) of the approved copies returned to the Contractor for subsequent turn over to Owner at Project Closeout. Contractor shall also submit approved submittals to Owner in original electronic file format as described in Section 01 77 00 – Project Closeout Procedures.
- 2.2.12 Samples: As required by individual Sections of the Contract Documents, Contractor shall submit full-size, fully fabricated samples cured and finished as specified and physically identical with the material or product proposed. Samples shall include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
- 2.2.12.1 Contractor shall mount, display, or package samples in the manner specified to facilitate review by Owner and Architect/Engineer. Contractor shall prepare samples to match the Architect/Engineer's sample, which shall include at least the following information:

- 2.2.12.1.1 Generic description of the Sample.

- 2.2.12.1.2 Sample source.
- 2.2.12.1.3 Product name or name of manufacturer.
- 2.2.12.1.4 Compliance with recognized standards.
- 2.2.12.1.5 Availability and delivery time.

2.2.12.2 Contractor shall submit samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual product delivered and installed.

2.2.12.3 When variation in color, pattern, texture or other characteristics are inherent in the material or product represented, Contractor shall submit no less than three (3) multiple units that show approximate limits of the variations.

2.2.13 Refer to individual Technical Specification Sections for additional submittal requirements.

2.3 SUBSTITUTION OF MATERIALS, LABOR AND EQUIPMENT

2.3.1 Refer to the UGC for requirements not identified in this Section.

2.3.2 The specified products used in preparing the Contract Documents establish minimum qualities. Substitutions must be at least equal to the minimum qualities for consideration by Owner as an acceptable substitution. The burden of proof of equality rests with the Contractor. The Owner retains sole authority for acceptance of substitutions.

2.3.3 Contractor shall clearly and boldly mark all substitutions as such on the transmittal cover sheet for the submittals. Contractor shall submit all substitutions within ninety (90) days of the Notice to Proceed for Construction.

2.3.4 The Contractor shall allow a minimum of six (6) weeks for review of each substitution by the Architect/Engineer and/or Owner in addition to the requirements identified in Section 2.2 above.

2.3.5 When requested by the Architect/Engineer, the Contractor shall provide a sample of the proposed substitution item. Owner may require Contractor to provide samples of both the specified item and the proposed item for comparison.

2.3.6 Owner may base acceptance of materials and equipment on the supplier/ manufacturer's published data and may be tentative subject to the submission of complete shop drawings and/or specifications indicating compliance with the Contract Documents. Owner's acceptance of materials and/or equipment under this provision shall not be construed as authorizing any deviation from the Contract Documents, unless specifically directed in writing from the Owner and/or Architect/Engineer.

2.3.6.1 Contractor shall be solely responsible for all additional costs resulting from the acceptance of any substitution. Additional costs include direct and indirect costs that are not presented at the time of the substitution request and costs that become known after the approval of the substitution.

2.3.7 Should the Owner accept a substitution and should the substitute prove defective or otherwise unsatisfactory for the service intended within the guarantee period, Contractor shall replace the substitute with the material or equipment specified in the Contract Documents at no additional cost to the Owner.

2.4 INITIAL APPLICATION FOR PROGRESS PAYMENT

- 2.4.1 Refer to the UGC and Section 01 32 00 – Project Planning and Scheduling for requirements not identified in this Section.
- 2.4.2 The Contractor may submit a request for a progress payment once per month. Such request shall be presented on the University of Texas MD Anderson Cancer Center Application for Payment and Schedule of Values (refer to Attachment No. 1 and No. 2) forms supplemented by columnar continuation sheets, which represent updates to the original Contract Price or GMP Schedule of Values.
- 2.4.3 The Contractor shall keep Project accounting records on the basis of generally accepted accounting principles in accordance with cost accounting standards issued by the Federal Office of Management and Budget Cost Accounting Standards Board and organized by each Application for Payment period.
- 2.4.4 Prior to the submission of the first Application for Payment and within twenty-one (21) calendar days of issuance of the Notice to Proceed with Construction, the Contractor shall submit the following documents to the Architect/Engineer, Owner's Project Manager, and Owner's Construction Inspector for review, using the Owner's Standard Schedule of Values format.
 - 2.4.4.1 Contract Price or GMP Schedule of Values: Contractor shall submit a single document itemizing the breakdown of the Contract Price/GMP, including general conditions, contingencies and allowances using the Owner Standard Schedule of Values format. The Contractor shall submit a draft breakdown at least twenty-one (21) calendar days prior to the initial Application for Payment and such submittal shall be a condition precedent to the processing of the first payment application. The Contractor shall submit subsequent draft copies of the Schedule of Values at least seven (7) calendar days prior to formal submission of each monthly payment.
 - 2.4.4.1.1 The Schedule of Values breakdown shall follow the trade divisions of the specifications and shall be itemized by submittal, floor, area, elevation or other building systems, as a minimum. The breakdown shall include a labor and material breakdown for each line item and be of such detail as may be required by the Owner and/or Architect/Engineer, but in general shall limit each line item to less than \$100,000.
 - 2.4.4.1.2 No adjustment to the original detailed breakdown of a Contract line item shall be made once accepted by the Owner and Architect/Engineer. Once accepted, the breakdown will form the basis for all periodic payments.
 - 2.4.4.1.2.1 Contracts with Construction Manager at Risk or Design/Build Agreements may adjust the detailed breakdown of a General Conditions line item if the total invoices for a General Conditions line item exceeds one hundred percent (100%). A corresponding amount shall be deducted from another General Condition line item(s) or the Construction Phase Fee to pay for the General Conditions' line item overage.
 - 2.4.4.1.3 Contractor shall not use subcontractor invoices/pay applications in lieu of a single Schedule of Values from the Contractor.
 - 2.4.4.1.4 The breakdown shall anticipate future Change Orders and make provisions for incorporating all changes into the Schedule of Values listing. If issued, Change Orders shall be identified separately and shall itemize the GMP Change Orders, Change Proposals and/or Field Orders, which are

incorporated into each Change Order for payment on a line-item basis as required by this section.

2.4.4.1.4.1 Payments shall not be made for work contained in unexecuted Change Orders.

2.4.4.1.5 Contracts with Guaranteed Maximum Price proposals shall repeat the process outlined in this section every time a subcontract is added to the monthly Schedule of Values for payment.

2.4.4.2 Work Progress Schedule: Refer to Section 01 32 00 – Project Planning and Scheduling for all Project schedule requirements.

2.4.4.3 Shop Drawing/Submittal Schedule: Contractor shall provide the Owner and Architect/Engineer with a Submittal Schedule of all items requiring submittal review showing the items' anticipated submission dates and late finish dates for completion of the review process. The Submittal Schedule shall be incorporated with the Work Progress Schedule, and each will be updated monthly and submitted to the Architect/Engineer and Owner with each draft payment request.

2.4.4.4 Equipment List/Matrix: Section 01 91 00 – General Commissioning Requirements requires a matrix of all operable devices and building system components be submitted to the Owner. This matrix may be incorporated into equipment documentation required in Operating and Maintenance Manuals as indicated in Section 01 77 00 – Project Closeout Procedures.

2.4.4.5 The Contractor is encouraged to integrate these documents to the extent practical to avoid duplication, both in initial setup and ongoing updates to each.

2.4.5 When the Owner and Contractor agree to the Schedule of Values line item amounts, the Contractor shall submit eight (8) copies of the formal payment application to the Architect/Engineer, utilizing the University of Texas MD Anderson Cancer Center form, with original signatures of an officer of the contracting firm and original notarization. The Contractor shall furnish a certificate designating a person(s) who has authority to sign pay applications on behalf of the firm if such is not an officer of the firm.

2.4.5.1 The Contractor shall provide attachments to each month's payment request per the UGC. Contractor should verify the number of copies of each attachment with Owner prior to submission.

2.4.5.1.1 Six (6) copies of the monthly HUB Progress Assessment report (Attachment H to Exhibit H).

2.4.5.1.2 Four (4) copies of the updated Submittal Schedule.

Four (4) copies of all invoices required by the Contract.

2.4.5.1.3 Three (3) copies of the wage rate notification form for each member of the workforce not previously submitted.

2.4.5.1.4 Copies of an appropriately updated Work Progress Schedule as specified in Section 01 32 00 – Project Planning and Scheduling.

2.4.5.1.5 Documentation of partial Release of Liens and Claims in accordance with the value of the monthly Application for Payment.

2.4.5.2 The formal payment requests with attachments shall be organized and distributed according to the flow chart included in the Pre-Construction Brochure.

2.4.6 The formal monthly pay applications shall be first certified by the Architect/Engineer and then submitted to the Owner's Project Manager for signature and processing. The Contractor can expect receipt of payment within thirty (30) calendar days after the Owner's Project Manager receives the formal Pay Application.

2.5 MONTHLY APPLICATION FOR PROGRESS PAYMENTS

2.5.1 Refer to the UGC and Section 01 77 00 – Project Closeout Procedures, for requirements not identified in this Section.

2.5.2 For regular monthly applications for payment, the Contractor shall submit for review and approval a draft payment request to the Owner's Project Manager and the Architect/Engineer no less than seven (7) calendar days prior to formal submission. The Contractor shall be prepared to review the draft copy at the project Site with the Owner and the Architect/Engineer. Failure to comply with the requirements outlined in Section 2.4 above shall relieve the Owner from Owner's obligation to make payments on any and all line items until the Contractor meets all requirements.

2.5.2.1 Payments cannot exceed the Contract, work in-place, or subcontract amounts as depicted on Schedule of Values line items.

2.5.2.2 All as-built drawings shall be reviewed to ensure updates are current.

2.5.2.3 Retainage shall not be used to cover "punch-list" work items.

2.5.3 Requests for payments in association with release of, or reduction in, retainage or completion of Work have additional requirements as outlined in the UGC and Section 01 77 00 – Project Closeout Procedures.

2.6 PROCUREMENT OF SUBCONTRACTS – CM-R AND DB AGREEMENTS ONLY

2.6.1 The Construction Manager at Risk (CM-R) or Design/Build Contractor (DB) shall provide a written Bid/Proposal Package Strategy (B/PPS) for procuring subcontracts including self-performance Work (other than General Conditions), prior to the approval of the Guaranteed Maximum Price, but no later than twenty (20) calendar days prior to the first advertisement for proposals. The B/PPS shall be a written plan submitted to and reviewed by the Owner and the Architect/Engineer.

2.6.1.1 The plan shall identify bid packages that are most advantageous to the Project and align with the CM-R/DB's HUB Good Faith Effort (Exhibit H) by providing at least three (3) qualified respondents (including the CM-R/DB). Each bid package shall include the UGC, Owner's Special Conditions, the Owner's Division 1 Specifications, Drawings and Specifications and any other Owner requirements included in the CM-R/DB Agreement pertaining to the scope of work covered in the packages.

2.6.1.2 The B/PPS shall conspicuously identify any and all work that the CM-R/DB will submit a bid/proposal for, but will not perform with CM-R/DB's own forces (i.e. subcontract to someone else if determined to be "best value").

2.6.1.3 The B/PPS shall include the following for each bid package contemplated:

2.6.1.3.1 Anticipated scope of work to be procured.

2.6.1.3.2 Anticipated selection criteria and questions.

- 2.6.1.3.3 Self-perform work proposals to be submitted by the CM-R/DB.
- 2.6.1.3.4 Proposed advertising dates.
- 2.6.1.3.5 Proposed pre-proposal/HUB/ROCIP meetings.
- 2.6.1.3.6 Proposed Receipt, review and award dates.
- 2.6.1.3.7 Anticipated notice to proceed dates.
- 2.6.1.4 The CM-R/DB shall update the B/PPS monthly as a minimum or whenever conditions change or proposed dates are revised.
- 2.6.2 For CM-R contracts, Texas Education Code 51.782 mandates: "A construction manager-at-risk shall publicly advertise, in the manner prescribed by the institution, and receive bids or proposals from trade contractors or subcontractors for the performance of all major elements of the work other than general conditions work. A construction manager-at-risk may seek to perform major elements of the work itself if the construction manager-at-risk submits its bid or proposal for that work in the same manner as all other trade contractors or subcontractors and if the board determines that the construction manager-at-risk's bid or proposal provides the best value for the institution."
- 2.6.3 The goal of the Project Team shall be to have all work procured through advertised competitive proposals, however, if a "minor procurement" condition arises during the process, the following procurement guidelines may be used by the CM-R/DB, with Owner approval, for procurement of work:
 - 2.6.3.1 Less than \$15,000.00: No requirements
 - 2.6.3.2 Between \$15,000.01 and \$50,000.00: Obtain three (3) informal proposals
 - 2.6.3.3 Greater than \$50,000.00: Advertised competitive proposals
- 2.6.4 This specification does not pertain to Change Orders to existing subcontracts.
- 2.6.5 Work may be divided into reasonable lots; however, material or labor acquired through purchase order/vendor type agreements are subject to the entire Project (i.e. concrete material shall be procured as a unit price times an estimated total project quantity provided by the CM-R/DB to equal a total construction cost). Work shall not be incrementally divided for the purpose of circumventing the procurement guidelines.
- 2.6.6 The CM-R/DB may establish selection criteria for each phase of work for review by the Project Team. Criteria shall be qualifications based and consistent with the information needed by the CM-R/DB to make a proper evaluation and selection. The CM-R/DB shall establish a selection matrix including cost, criteria, weighting and ranking procedures for evaluation. The CM-R/DB shall work with the Project Team to tailor the selection criteria to be project and scope specific, and ensure that the questions are proper and relevant to the goals of the Project. The CM-R/DB shall follow the Good Faith Effort (HUB) requirements identified in Exhibit H of the Agreement, including attachments to be completed by first tier subcontractors. However, HUB participation/status cannot be used as criteria for determining "best value", only for determining if the respondent is responsive.
 - 2.6.6.1 The CM-R/DB shall establish clear criteria and questions so that those reading the Request for Proposals will understand how they will be evaluated.

- 2.6.6.2 If criteria are not included in the advertisement for proposals, the proposal shall be considered a lump sum bid, and the CM-R/DB shall award the work to the lowest qualified, responsive bidder.
- 2.6.6.3 After selection criteria have been established, the CM-R/DB shall publicly advertise the work in general circulations and trade associations in accordance with Texas Education Code 51.782 for CM-R, Article 5 of the current Agreement for DB and Texas Administrative Code 111.14 – “HUB” for both CM-R and DB. This advertisement shall include, at a minimum, the following:
 - 2.6.6.3.1 Owner Project Number and Owner Project Name.
 - 2.6.6.3.2 Institution/Campus name.
 - 2.6.6.3.3 CM-R/DB name and address.
 - 2.6.6.3.4 CM-R/DB contact name and phone number.
 - 2.6.6.3.5 Location for viewing plans and specifications.
 - 2.6.6.3.6 Date, time and location of Pre-proposal/HUB/ROCIP meeting.
 - 2.6.6.3.7 Date, time deadline(s), and location for receiving proposals.
 - 2.6.6.3.8 Instructions to respondents for submitting proposals.
 - 2.6.6.3.9 Selection criteria, questions and submittal requirements.
- 2.6.7 At the time and location identified in the advertisement, the CM-R/DB shall hold a Pre-proposal/HUB/ROCIP meeting for all potential subcontractors with the Project Team and Owner’s HUB Coordinator. The CM-R/DB shall review as a minimum:
 - 2.6.7.1 The general scope of the Project and the specific scope of work included in this package.
 - 2.6.7.2 Instructions to respondents for submitting proposals.
 - 2.6.7.3 Selection criteria and questions.
 - 2.6.7.4 HUB Good Faith Effort requirements (Exhibit H).
 - 2.6.7.5 Project Safety requirements.
 - 2.6.7.6 OCIP requirements (if applicable).
 - 2.6.7.7 Project Schedule requirements.
 - 2.6.7.8 Payment procedures and requirements, including retainage.
 - 2.6.7.9 Commissioning and Close-out requirements.
- 2.6.8 If the CM-R/DB identifies any self-performance in the B/PPS (work to be performed by CM-R/DB’s own employees), the CM-R/DB shall submit a proposal to the Owner at the advertised time and location in a manner so as not to compromise the competitive process.
 - 2.6.8.1 Regardless of the work or method of accepting proposals, all CM/DB self-performance proposals shall be:

- 2.6.8.1.1 Estimated and submitted by a separate estimating team that is not associated with the CM/DB's pre-construction and/or construction team;
 - 2.6.8.1.2 Submitted in a sealed envelope;
 - 2.6.8.1.3 The final proposal price and not subject to change for any reason prior to recommendation of subcontract award.
- 2.6.9 The CM-R/DB shall accept all proposals at the advertised location until the advertised deadline. Upon receipt, the Owner's Project Manager will initial the proposal to indicate the time and date received. Any proposals received after the deadline shall not be considered by the CM-R/DB, and shall be returned to the respondent unopened.
 - 2.6.9.1 Fax proposals will not be accepted unless the Owner, prior to the initial advertisement for proposals, approves a detailed plan by the CM-R/DB of care and custody.
- 2.6.10 After compiling, reviewing and verifying the costs and scope associated with all proposals, the CM-R/DB shall provide a "bid tabulation" matrix and a proposed Schedule of Values (refer to Attachment No. 2) for review by the Project Team.
 - 2.6.10.1 The "bid tabulation" matrix shall compare all equivalent scope proposals to the CM-R/DB's estimate.
 - 2.6.10.2 Each matrix shall indicate the CM-R/DB estimate(s) for each scope of work and identify the respective cost savings/over-runs.
 - 2.6.10.3 The CM-R/DB may use values/quantities from CM-R/DB's own estimate to provide full scope comparisons between each respondent, however, these "plug" numbers shall be clearly identified in the matrix to the Project Team and be used only to compare the various proposals.
 - 2.6.10.4 The proposed updated Schedule of Values shall summarize all executed and recommended "best value" subcontracts to provide a current status of the Guaranteed Maximum Price Proposal.
 - 2.6.10.5 Once the proposals are compiled into a "bid tabulation" matrix and the proposed Schedule of Values has been updated, the CM-R/DB shall request a meeting with the Project Team to review the proposals.
- 2.6.11 The CM-R/DB shall lead the proposal review meeting by reviewing the scope of work, the proposals received, any exclusions or conditions, identify any non-qualified respondents and any other problems that may have occurred during the process.
 - 2.6.11.1 The CM-R/DB shall confirm that the respondents are qualified, meet the established selection criteria (if applicable), and identify the amount of the proposals.
 - 2.6.11.2 The CM-R/DB shall identify the "best value" and the current status of the buy-out savings to the Project Team. If the "best value" causes the CM-R/DB to exceed the Cost of Work line item, including contingencies in the GMP the CM-R/DB shall acknowledge that the overage will be deducted from the CM-R/DB's Construction Phase Fee.
- 2.6.12 Once the "best value" respondent has been identified by the CM-R/DB, without exception by the Owner, the CM-R/DB shall finalize negotiations with the selected "best value" respondent.

2.6.12.1 The CM-R/DB shall identify and confirm with the Owner's Project Manager the competitive proposal "plug" numbers CM-R/DB intends to use in CM-R/DB's negotiations. "Plug" numbers may be established through the CM-R/DB's own estimate (if submitted to the Owner's Project Manager before the advertised deadline) or values included in other non-selected respondent competitive sealed proposals.

2.6.12.2 If the CM-R/DB cannot reach an agreement with the selected respondent, the CM-R/DB shall notify the Owner's Project Manager that CM-R/DB intends to begin negotiations with the second "best value" respondent.

2.6.12.3 The CM-R/DB shall issue a letter to the Owner indicating that CM-R/DB intends to write a subcontract to the selected "best value" respondent (including self-perform work), identifying the following:

2.6.12.3.1 The bid package number.

2.6.12.3.2 The base bid from the selected respondent and any alternates included in the proposal.

2.6.12.3.3 The total value of the proposed subcontract with a description of any changes from bid day values.

2.6.12.3.4 Drawings and/or specifications related to the subcontract.

2.6.12.3.5 Additional scope items added to the subcontract (as previously agreed to by the Owner) and their value.

2.6.12.3.6 Current status of the GMP identifying current savings/overages.

2.6.12.3.7 A copy of the bid tabulation matrix.

2.6.12.3.8 A copy of the executed subcontract or purchase order, etc. is required prior to any request for payment by the CM-R/DB for applicable work.

2.6.12.4 If the Owner objects to the "best value" identified by the CM-R/DB, the Owner may conduct an evaluation of the selection process and/or results.

2.6.12.4.1 If, after evaluation, the Owner disagrees with the CM-R/DB "best value" recommendation, the Owner may instruct the CM-R/DB to either re-bid the scope of work or use the Owner's "best value" selection.

2.6.12.4.2 If the value of the Owner's selection causes an increase in the Contract Sum, the increase will be the responsibility of the Owner.

2.6.12.5 The CM-R/DB shall provide one (1) complete copy of all recommendation letters and proposals to the Owner's Project Manager for record, as they occur until final payment.

2.6.13 For additional bid packages, the CM-R/DB shall repeat the steps identified in this section as many times as identified in the current B/PPS for the entire Project.

2.7 DAILY REPORT

2.7.1 The Contractor shall provide the Architect/Engineer, Owner's Project Manager and Owner's Construction Inspector with a report detailing Contractor's daily activities on the Project using a format acceptable to Owner. All tests that Contractor performs and all work reports required of subcontractors shall be attached to the Contractor's daily report.

2.7.1.1 The report shall include, as a minimum, the following information as it relates to the day's activities on the Site: subcontractors on the Site (including number of employees for each subcontractor); equipment; areas of work and type of work performed; material received; tests performed; any injuries and/or accidents; total number of employees on the Site (including Contractor); any oral instructions received; any material damage; any change in personnel; and anything else that might impact quality or schedule.

2.7.2 Contractor shall submit these reports to the Owner's Project Manager and Owner's Construction Inspector on a daily basis.

2.8 AS-BUILT DRAWINGS AND RECORD DOCUMENTS

2.8.1 Contractor shall continuously annotate "As-Built" drawings, specifications, Operating and Maintenance manuals, shop drawings, and submittals to reflect actual record conditions, addenda, issuance of Change Orders and clarifications, and actual dimensional records for underground and other services. Refer to Section 01 77 00 – Project Closeout Procedures for detailed instructions.

2.8.2 Contractor is required to maintain current documentation in order to process pay applications. The Owner's Project Manager and the Architect/Engineer will review the status of such documentation monthly, at a minimum.

2.8.3 Refer to Section 01 91 00 –General Commissioning Requirements for requirements regarding the Commissioning and Closeout Manual tracking of these documents.

PART 3 – EXECUTION

3.1 PRE-CONSTRUCTION CONFERENCE (WITH OR WITHOUT A PARTNERING WORKSHOP)

3.1.1 Architect/Engineer will prepare a Pre-Construction Brochure using the standard Owner Pre-Construction Brochure, as an overview of administrative procedures for the Project. A review of the Brochure, including this Section, identification of key Project personnel, diagrams illustrating documentation routing, Owner's sample administrative forms, and other information will be conducted at the Pre-Construction Conference.

3.1.2 Upon mutual agreement, a Partnering Workshop may be held with or near the time of the Pre-Construction Conference. The Contractor shall pay for the Pre-Construction Conference and/or Partnering Workshop in total and the Owner will reimburse the Contractor for fifty percent (50%) of the mutually agreed-upon costs (100% of the costs will be reimbursed to the Contractor as part of the General Conditions in the GMP for CM-R and DB contracts).

3.1.2.1 The Pre-Construction Conference and/or Partnering Workshop is intended to provide further understanding among the parties, to establish mutual goals for the Project, and to develop strategies for achieving those goals.

3.1.3 The Owner will schedule a Pre-Construction Conference to generally coincide with issuance of Notice to Proceed with Construction. The Pre-Construction Conference agenda will cover broad Project issues followed by detail review of administrative procedures.

3.1.3.1 The UGC requires the Contractor to comply with the Owner's administrative requirements as outlined herein and as reviewed at the Pre-Construction Conference.

- 3.1.3.1.1 For projects with Guaranteed Maximum Price contracts the Owner may require a Pre-Construction meeting prior to Notice to Proceed with Construction.
 - 3.1.3.1.2 For projects with Guaranteed Maximum Price contracts and multiple bid packages, the Owner may schedule additional Pre-Construction Conferences to include any subcontractors added to the Project after the initial Pre-Construction Conference.
 - 3.1.4 Attendance is required at the conference by all appropriate representatives of the Contractor, mechanical, electrical, plumbing subcontractors, and any additional subcontractors (proposed or engaged), whose scope of work represents five percent (5%) or more of the total construction cost. The Contractor shall request all HUB subcontractors also be represented. Each firm is to be represented by personnel directly involved in the Project, including Project Managers and Project Superintendents or labor foremen, as a minimum.
 - 3.1.4.1 Project representatives of the Contractor and all other parties directly involved with the processing or executing of Project submittals, changes and/or payments should attend the Pre-Construction Conference.
 - 3.1.5 Prior to the scheduled time of the Pre-Construction Conference, the Contractor shall provide the Architect/Engineer a written outline of all involved firms, Contractor's key personnel, including mailing address and phone numbers to be incorporated into a Project Directory and included in the Pre-Construction Brochure.
 - 3.1.6 The Architect/Engineer will provide to the Contractor, a minimum of eight (8) copies of the Pre-Construction Brochure prior to the scheduled date of the Pre-Construction Conference. The Contractor shall review the contents of the Pre-Construction Brochure with Contractor's key Project personnel and those of Contractor's subcontractors in preparation for the Pre-Construction Conference.

3.2 OWNER'S MONTHLY PROJECT PROGRESS MEETINGS

- 3.2.1 In addition to specific coordination meetings, pre-installation contractor meetings for each element of Work, and other Project meetings for other purposes, the Owner may schedule and conduct a Project Progress Meeting at least once each month with the timing generally coinciding with preparation of payment request and submission of the updated Project Schedule.
- 3.2.2 The Contractor shall coordinate with Contractor's subcontractors so that each entity then involved in planning, coordination, or performance of Work will be properly represented at each meeting.
 - 3.2.2.1 Prior to the monthly Project Progress Meeting, the Contractor shall convene a similar progress meeting with Contractor's subcontractors to review each of the subcontractor's present and future needs including interface requirements, utility outages required, sequences, deliveries, access, Site utilization, temporary facilities and services, hours of work, hazards and risks, housekeeping, change orders, and documentation of information for payment requests in order to be fully prepared to discuss all pertinent issues with the Owner. The Contractor shall notify the Owner and Architect/Engineer in advance of such meetings with subcontractors.
- 3.2.3 Owner's monthly Project Progress Meetings may include review of Contractor's updated Project Schedule and forecast of operations for the coming period, coordination issues, anticipated utility outages, status of requested change proposals and other cost impact

issues, status of the commissioning process, status of the HUB Plan, and other Project issues.

3.2.4 The Contractor and Architect/Engineer shall provide separate tracking logs for submittals, RFIs, ASIs, and changes in a package for each primary meeting participant. On Design/Build contracts, a single set of tracking logs may be utilized if accepted in advance by the Owner.

3.2.5 The Owner's Project Manager will chair the Project Progress Meetings. The Contractor shall be specifically prepared to discuss the following at each Project Progress Meeting:

3.2.5.1 Project Schedule Update Reports as required in Section 01 32 00 – Project Planning and Scheduling.

3.2.5.2 Status of "action" items from the previous Project Progress Meeting.

3.2.5.3 Status of buyout on Guaranteed Maximum Price projects.

3.2.5.4 Current status of product submittals and shop drawings, requests for information (RFI), and Architect/Engineer's clarifications (ASI).

3.2.5.5 Status of Project changes and other items of significance, which could affect progress.

3.2.5.6 Status of the commissioning process for the Project.

3.2.6 In addition to the monthly Project Progress Meeting, the Owner may also schedule bi-monthly, weekly, or other Project meetings at various stages of the Project as conditions may dictate. However, the complete report requirements noted above will apply only to the monthly Project Progress Meetings.

3.3 UTILITY OUTAGES

3.3.1 The Contractor shall notify the Owner's Construction Inspector and the Owner's Project Manager, in writing, of any planned utility outages in accordance with Owner's Special Conditions.

3.3.2 A standard form for processing a request for utility shutdown or any other campus disruption is included in the Pre-Construction Brochure. The Contractor shall utilize this form, with attachments as necessary, in requesting an outage.

3.3.3 The Contractor shall not turn services on or off, without prior written authorization from Owner. Unless directed otherwise, the Owner will turn services on and off.

3.4 TESTING

3.4.1 Refer to the UGC and Section 01 45 00 – Project Quality Control for additional requirements.

3.4.2 Where specific testing is specified in a technical section of the Specifications or indicated in the Contract Documents, the Contractor shall bear the costs of all tests unless the Contract specifically states that it is to be paid for by the Owner.

3.5 INSPECTIONS

3.5.1 Refer to the UGC and Section 01 45 00 – Project Quality Control for inspection requirements not identified in this Section.

- 3.5.2 The Contractor shall provide sufficient, safe and proper facilities at all reasonable times for observation and/or inspection of the Work by the Owner and Owner's consultants. This shall include any and all equipment necessary for access to various aspects of the Work.

3.6 FINAL ACCEPTANCE AND PAYMENT

- 3.6.1 The Contractor shall notify the Architect/Engineer and Owner's Project Manager and Owner's Construction Inspector, in writing that the Work will be ready for final acceptance verification on a definite date, a minimum of ten (10) calendar days prior to such proposed date.
- 3.6.2 In addition to requirements noted for Substantial Completion in the UGC and Section 01 77 00 – Project Closeout Procedures, final payment and/or release of remaining retainage requires submission of the following:
- 3.6.2.1 Consent of Surety.
 - 3.6.2.2 Release of Liens and Claims.
 - 3.6.2.3 Affidavit of payment of Debts and Claims.
 - 3.6.2.4 Final Historically Underutilized Business Plan.
 - 3.6.2.5 Completed and signed EPA Notice Of Termination.
 - 3.6.2.6 Closeout of Owner's Contingency Allowance and/or Owner's Special Cash Allowance to a zero (\$0) balance.

3.7 ONE-YEAR WARRANTY

- 3.7.1 If informed of a defect, the Contractor shall remedy the defect at Contractor's own cost and respond in writing to the Owner's Project Manager and the notifying party within ten (10) calendar days indicating the action taken to resolve the defect. Refer to the UGC.
- 3.7.2 The Contractor shall attend any and all meetings to resolve warranty issues. The Contractor will provide a tracking log of all warranty issues and Contractor's resolution.
- 3.7.3 The Contractor shall participate in an end-of-warranty Project review with the Owner, as scheduled by the Owner's Project Manager, at a time prior to termination of the warranty period.
- 3.7.4 Per the UGC, unless directed otherwise in writing by the Owner, all warranties shall use the date of Substantial Completion as the start date for that particular warranty.
- 3.7.4.1 If any equipment and/or system is completed prior to the date of Substantial Completion, Contractor shall provide, at Contractor's own cost, for the necessary warranty extension required by the UGC.
 - 3.7.4.2 Contractor shall deliver all equipment to the Owner in an "as-new" condition. If equipment is put into service for the convenience of the Contractor, the Contractor shall, at Contractor's own expense, maintain, service and refurbish the equipment to "as-new" condition prior to delivery to the Owner.
- 3.7.5 Provisions described herein shall also apply to those items having warranties greater than one-year.

END OF SECTION 01 31 00

Attachment No. 1 – Application for Payment Example
(Obtain an Electronic Version of This Form From Owner's Project Manager)

☐ **Yes** ☐ **No**

**THE UNIVERSITY OF TEXAS
M.D. ANDERSON CANCER CENTER**

APPLICATION FOR PAYMENT - CONSTRUCTION MANAGER AT RISK

APPLICATION FOR PARTIAL PAYMENT No. (ENTER No.) PROJECT No. (ENTER No.)

FOR THE PERIOD: (ENTER BEGINNING DATE) TO: (ENTER ENDING DATE) INCLUSIVE.

NAME OF PROJECT: (ENTER PROJECT NAME)

CM-R NAME & ADDRESS: (ENTER CM-R NAME & ADDRESS)

TO BE COMPLETED BY THE CONSTRUCTION MANAGER AT RISK

	PRE-CONSTRUCTION SERVICES	+	CONSTRUCTION SERVICES (GMP)	=	TOTAL CONTRACT AMOUNT
1 Original Contract Amount:	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>
2 Approved Change Order Extras:	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>
3 Accepted Change Order Deductions:	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>
4 Current Contract Amount:	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>
5 Total Completed To Date:	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>
6 Less Total Retainage Held To Date:	<u>N/A</u>		\$ <u>0</u>		\$ <u>0</u>
7 Total Net Earned Amount:	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>
8 Less Previous Payments:	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>
9 Current Payment Due For Each Part:	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>
10 Balance To Finish, Including Retainage: (line 4 less line 7)	\$ <u>0</u>		\$ <u>0</u>		\$ <u>0</u>

AFFIDAVIT

Insurance: I, agent for the Construction Manager-at-Risk, do hereby certify that all insurances as required by law, and by the specifications, are in full force and effect as of this date.

Claims & Liability: I, agent for the Construction Manager-at-Risk, do furthermore certify that all current invoices and obligations have been paid in full, and there are no claims or liabilities against this contract.

Signature of CM-R

CONSTRUCTION MANAGER AT RISK'S NOTARIZED SIGNATURE

STATE OF TEXAS
COUNTY OF _____
(STAMP SEAL BELOW)

Personally before me, the undersigned authority, this day appeared (PRINTED NAME OF CM-R AGENT) who being by me duly sworn, on his oath says that the account hereto attached, in the amount of (ENTER AMOUNT) is, within the knowledge of affiant, just true, and correct; that it is due and that all just and lawful offsets, payments, and credits have been allowed.

Sworn to and subscribed before me, (CONTRACTOR SIGNATURE) this _____ day of _____, 20____.

Signature of CONTRACTOR

Notary Public (NOTARY SIGNATURE) (ENTER NAME OF COUNTY) County, Texas
Signature of Notary

**CONSTRUCTION SERVICES CERTIFICATE: TO BE COMPLETED BY THE PROJECT ARCHITECT/ENGINEER
TO THE BOARD OF REGENTS OF THE UNIVERSITY OF TEXAS SYSTEM, AUSTIN, TEXAS and the M.D. Anderson Cancer Center, Houston Texas**

This is to certify that _____, Construction Manager-at-Risk
for the Project _____ is entitled to payment
for Construction Services of this Certificate in the amount of \$ _____

Architect/Engineer _____

Reviewed and Approved on _____ By: _____
Date Signature of AE

PRE-CONSTRUCTION SERVICES : TO BE COMPLETED BY THE UTMDACC PROJECT MANAGER

Current Payment For Pre-Construction Services \$ _____

Reviewed and Approved on _____ By: _____
Date Signature of PM

CONSTRUCTION SERVICES : TO BE COMPLETED BY THE UTMDACC PROJECT MANAGER

CM-at-Risk has submitted an updated Project Schedule: CM-at-Risk has updated the Record Drawings:

This Pay Application includes a current Release of Retainage: if "Yes", CM-at-Risk has included a "Consent of Surety":

Current Payment For Construction Services \$ _____

Reviewed and Approved on _____ By: _____
Date Signature of PM

Attachment No. 2 – Schedule of Values Example
(Obtain an Electronic Version of This Form From Owner's Project Manager)

The U.T.M.D.A.C.C. Schedule of Values - Contractor's Estimate Continuation Sheet (8 1/2" x 11" Sheet ONLY)															
Project No.:							Project Address:								
Project Name:							Application For Payment Number:								
Construction Manager Name:							Application Period: From _____ To _____								
A	B	C		D	E	F	G	H	I	J		K	L	M	N
Spec. Section / Bid Package	Description of Work / Subcontractor / Supplier / Vendor / Specification Section	Initial Proposed Line Item Values	Additional Services / GMP Change Order Values	Actual Subcontract Amount at Buyout	Delta (Proposed to Actual)	Subcontract, Purchase Order or Vendor No.	Detailed Breakdown of Contract Line Items	Total Amount Previously Requested & Percent		Current Application		Total Amount Completed To Date & Percent	Retainage (5%)		
										Total Amount This Period & Percent					
Column Equations		C	C - D				D'	L'	H / G	L - H	J / G	H + J	L / G	L x 5%	
Pre-Construction Services															
Programming (20% If Applicable)		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	N/A	
Schematic Design (20%)		\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	0%	\$ -	0%	\$ -	0%		
Design Development (20%)		\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	0%	\$ -	0%	\$ -	0%		
GMP Development (10%)		\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	0%	\$ -	0%	\$ -	0%		
Construction Documents (20%)		\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	0%	\$ -	0%	\$ -	0%		
Bidding/Proposals (10%)		\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	0%	\$ -	0%	\$ -	0%		
Additional Services		\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	0%	\$ -	0%	\$ -	0%		
Pre-Construction Services Subtotal		\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	0%	\$ -	0%	\$ -	0%		
Construction Services															
General Conditions															
On-Site Project Management Staff															
Project Scheduler		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Project Executive		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Superintendent(s)		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Office Engineer(s)		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Project Manager(s)		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Project Expeditor(s)		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Project Support Staff		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Assistant Superintendent(s)		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Safety Coordinator/Assistant(s)		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Out-of-State Project Specific Travel*		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Bonds and Insurance															
Builder's Risk Insurance		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
General Liability Insurance		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Payment and Performance Bonds		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Other Project Insurance as Required by Contract		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Temporary Project Utilities															
Dumpsters		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Project Water		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Project Electricity		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Temporary Toilets		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Monthly Telephone / Internet Service		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Temporary Fire Protection		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Street Rental and Barricades		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Telephone / Internet System Installation		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Fencing and Covered Walkways		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Temporary Water Distribution and Meters		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Temporary Electrical Distribution and Meters		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Site Erosion Control (BMP) and Project Entrance(s)		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Field Offices & Office Supplies															
Partnering Costs		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
First Aid Supplies		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Job Photos/Videos		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	
Reproduction Services		\$ -	\$ -	\$ -	\$ -	N/A	\$ -	\$ -	0%	\$ -	0%	\$ -	0%	\$ -	

SECTION 01 32 00 - PROJECT PLANNING AND SCHEDULING

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

- 1.1.1. The Contractor's attention is specifically directed, but not limited, to the Uniform General and Supplementary General Conditions for University of Texas System Building Construction Contracts (UGC) for other requirements.

1.2. SUMMARY

- 1.2.1 **Time is an essential part of this Contract. Therefore the timely and successful completion of the Work requires careful planning and scheduling of all activities inherent in the completion of the Project.**
- 1.2.2 Contractor must develop the Project Schedule to allow for a minimum amount of Float for the Project during Pre-Construction and/or Construction Services. Contractor must format the Project Schedule in a manner that facilitates reporting of progress and trends, identification of all critical paths, identification of each activity's predecessor(s) and successor(s), risks and opportunities, projection of upcoming activities, and forecasting of Project milestones.
- 1.2.3 The Owner must be able to reasonably rely on the Contractor's Project Schedule for projected activity dates in order to make accurate commitments to design professionals, contractors, vendors, user group(s), campus administration, and other parties as necessary.
- 1.2.4 **Owner's acceptance of the Project Schedule and any subsequent update of the Project Schedule are acceptance of the format and extent of detail of the Project Schedule only. Owner's acceptance does not indicate approval of the Contractor's means or methods, or of any change to the contract terms including, without limitation, any required contract Milestone Activities.**
- 1.2.5 This Specification applies to all Project delivery methods, regardless of contract type, whether the contracting firm, referred to as the Contractor, is a General Contractor, Construction Manager-at-Risk (CM-R), or Design/Build (DB) Contractor.
 - 1.2.5.1 All references to Pre-Construction Services in this Specification shall apply to requirements for CM-R and DB contract types only.

1.3. DEFINITIONS

- 1.3.1. The term "Project Schedule", as used throughout the Contract Documents, shall refer to the schedule for the Project as developed, monitored, and maintained, by the Contractor's Project Scheduler, and as used by the Project Team during Pre-Construction and/or Construction Services.
- 1.3.2. The term "Project Team", as used throughout the Contract Documents, shall refer to the Owner, Architect, Design Consultants, Engineer, User, Contractor, Owner's Service Providers, and Subcontractors (as applicable) that are contracted and/or specifically assigned to the Project.
- 1.3.3. The term "Owner's Planning and Scheduling Specialist", as used throughout the Contract Documents, shall refer to the Owner's scheduling specialist representative, with all correspondence to be addressed to:
 - 1.3.3.1. M.D. Anderson Cancer Center
Capital Planning and Management, Mail Box 703
1515 Holcombe Boulevard, Suite 1010

- 1.3.4. The term "Data Date", as used throughout the Contract Documents, shall refer to the date of the Project Schedule update.
- 1.3.5. The term "Total Float" (Float), as used throughout the Contract Documents, shall refer to the number of calendar days an activity on the Longest Path can be delayed without delaying the Substantial Completion date.
 - 1.3.5.1. Negative Float indicates that the Project is late, while Positive Float is the property of the Project and does not belong to any one party (Refer to the UGC).
- 1.3.6. The term "Longest Path", as used throughout the Contract Documents, shall refer to the sequence of activities that determines the longest duration for the Project when the Float is greater than zero.
 - 1.3.6.1. The term "Critical Path", as used throughout the Contract Documents, shall refer to the sequence of activities that determines the longest duration for the Project when the Float is equal to or less than zero.

1.4. CONTRACTOR RESPONSIBILITY

- 1.4.1. The Contractor is responsible for planning, management, coordination, and scheduling of all activities from a Notice to Proceed for Pre-Construction and Construction to Final Completion of the Project within the time allotted by the Agreement.
- 1.4.2. The Contractor is responsible for keeping the Owner and the Project Team fully informed of schedule status and upcoming activities throughout the Project via the Project Schedule.
- 1.4.3. The Contractor is solely responsible for the schedule and status of all activities related to Pre-Construction, procurement of materials and subcontractors, construction, testing, inspection, commissioning, and Project turnover to the Owner. The Contractor shall integrate the schedule and status of Owner furnished services such as test, adjust, and balance. Contractor shall schedule completion of activities and proactively submit for Owner's review and approval, all documentation related to commissioning, including, but not limited to, the following. (Refer to Section 01 91 00 – Project Commissioning and Section 01 77 00 – Project Closeout Procedures for additional requirements.)
 - 1.4.3.1. Commissioning Plan.
 - 1.4.3.2. Equipment List/Matrix.
 - 1.4.3.3. Submittal Schedule.
 - 1.4.3.4. Format, content, and tab structure for Operating and Maintenance Manuals and submittal of binders.
 - 1.4.3.5. Request for Start-Up/Functional Performance Test Form.
 - 1.4.3.6. Prefunctional Checklists.
 - 1.4.3.7. Functional Performance Test Procedures.
 - 1.4.3.8. Integrated System Test Procedures.
 - 1.4.3.9. Additional Commissioning and Closeout Manual documentation.

- 1.4.4. The Contractor shall provide adequate and reasonable Project planning in sufficient detail throughout all Project phases, as applicable for all aspects of Contractor's Work, to ensure completion of all activities within the Contract Time.
- 1.4.5. The Contractor's Pre-Construction and Construction project management personnel shall actively participate in the planning and development of the Project Schedule and shall be prepared to review such development and progress with the Owner, Architect/Engineer, and any other members of the Project Team so that the planned sequences and procedures are clearly understood by all parties.
- 1.4.6. The Contractor shall plan for appropriate activity durations to allow for thorough review, procurement, submittal, installation, inspection, testing, and commissioning, of all Work and/or systems in order to confirm Contract compliance, including Work relying on Owner participation or coordination.

PART 2 – PRODUCTS

2.1 QUALIFICATIONS OF THE PROJECT SCHEDULER

- 2.1.1 The Contractor shall assign a Project Scheduler who shall be responsible for the Project Schedule throughout Pre-Construction and Construction Services.
- 2.1.2 The Contractor's Project Scheduler shall have at least an undergraduate degree in a construction related field, and continuous experience on similar size and type of project(s) within the past five (5) years, including at least two (2) years with the specified scheduling software.
 - 2.1.2.1 In lieu of a degree, the Contractor's Project Scheduler may have at least five (5) years continuous experience on similar size and type of project(s) with the specified scheduling software.
- 2.1.3 The Contractor's Project Scheduler shall be an integral part of the Project Team during Pre-Construction Services and shall be on-site full-time for Construction Services until at least Substantial Completion of the Work.
 - 2.1.3.1 The Contractor's Project Scheduler may have additional responsibilities such as Senior Project Manager, Project Manager, Superintendent, Assistant Project Manager, Assistant Superintendent, Project Engineer, etc.
 - 2.1.3.2 If the Contractor's Project Scheduler is outsourced, the Contractor shall assign an on-site contact for all Project Schedule related issues.
- 2.1.4 All Contractor personnel involved in the preparation, updating, and reporting of the Project Schedule shall possess adequate construction scheduling knowledge related to the Project, Critical Path Method (CPM) knowledge, and a general understanding of the specified software.

2.2 REQUIRED SCHEDULING SOFTWARE

- 2.2.1 Regardless of Project size or type, Contractor shall develop and maintain the Project Schedule using the latest version of Microsoft Project available as of the effective date of the Contract.

2.3 NAMING THE PROJECT SCHEDULE

2.3.1 The Contractor shall title the initial Owner approved Project Schedule, the Baseline Project Schedule: BPS1. Contractor may not “reset” the Baseline Project Schedule unless the Owner approves the reset.

2.3.1.1 If the Owner approves the Contractor’s request to “reset” the Baseline Project Schedule, the new Baseline Project Schedule shall be titled sequentially (i.e. BPS1, BPS2, BPS3, etc.).

2.3.2 Subsequent updates to the Baseline Project Schedule shall be named by the last two (2) digits of the year and the month (Example: a March 2004 Baseline Project Schedule title would be “BPS2-0403”).

2.4 PROJECT SCHEDULE DEVELOPMENT REQUIREMENTS

2.4.1 The Contractor shall assign a standard “Activity Code” using a custom field, to every activity or task; organized by at least the Project phase, stage, location, building, floor, area, elevation, or system, etc., (i.e. work breakdown structure) including the following primary Activity Codes:

<u>Activity Code & Description</u>	
CP	Contract Procurement
PP	Programming/Pre-Project Planning
SD	Schematic Design
DD	Design Development
CD	Construction Documents
BOR	U.T. System Board of Regents
GMP	Guaranteed Maximum Price
TH	THECB Approval
SP	Subcontractor Bidding / Procurement

<u>Activity Code & Description</u>	
C	Construction
GC	General Conditions
SU	Submittals
FD	Fabricate and Delivery
CI	Contractor Inspections
OI	Owner Inspections
Cx	Commissioning
TAB	Test, Adjust, and Balance
OP	Owner Provided - Contractor Installed

2.4.2 The Contractor shall assign a standard “Resource Code” to every Contractor, Subcontractor, Supplier, Fabricator, Installer, Design Consultant, Owner, and any other party responsible for the accomplishment of an activity, including, but not limited to, the following primary Resource Codes (as applicable):

<u>Resource Code & Description</u>	
AE	Architect / Engineer
Carp	Carpet
Casf	Casework Fabricator
Casi	Casework Installer
Cocw	Concrete Formwork
Conf	Concrete Finishing
Ctil	Ceiling / Acoustical Tile
Door	Doors & Frames
Dryw	Drywall / Light Gauge Stud Installer
Elec	Electrical
Elev	Elevator
Falm	Fire Alarm Systems
Fire	Fire Protection Systems
Ftil	Floor Tile
Furn	Furnishings

<u>Resource Code & Description</u>	
Omat	Owner’s Material Testing Firm
Otab	Owner’s Air Testing & Balance Firm
Ownr	Owner
Pain	Paint & Wall Coverings
Pier	Piers / Piles / Caissons
Plas	Plaster / EIFS
Plum	Plum
Rebf	Reinforcing Steel Fabricator
Rebi	Reinforcing Steel Installer
Roof	Roofing
Sign	Signs
Site	Sitework
Stee	Steel Erector
Stef	Steel Fabricator
Mstf	Miscellaneous Steel Fabricator

<u>Resource Code & Description</u>	
Glas	Glass / Glazing
Hard	Hardware
Hvac	HVAC
Insu	Insulator
Irri	Irrigation & Landscaping
Labc	Laboratory Casework Fabricator
Labi	Laboratory Casework Installer
Lbeq	Laboratory Equipment
Masn	Masonry

<u>Resource Code & Description</u>	
Msti	Miscellaneous Steel Installer
Stut	Site Utilities
Tele	Telephone / Communication Systems
Terz	Terrazzo
Toia	Toilet Accessories
Toip	Toilet Partitions
Watp	Waterproofing / Damp proofing
Wodf	Wood Framer
Wods	Wood Framing Supplier

2.4.2.1 The Contractor shall use additional Owner approved Resource Codes, as applicable.

2.4.3 The Contractor shall use additional Secondary Task and Resource Codes, as necessary, to monitor, provide status, and report the Project Schedule.

2.4.4 The Contractor shall assign a unique "Work Breakdown Structure" (WBS Code) and "Task Name" to every activity. The WBS Code and Task Name must be meaningful, easily understandable by the Project Team, similar to like activities at differing locations, and as shown on the Contractor's Schedule of Values.

2.4.4.1 A Task Name shall start with a verb to indicate what is to be done and shall end with a location (Example: Install metal studs - 3rd floor Bldg B).

2.4.4.2 A "Milestone" Task shall refer to any major event or phase, or any other important point in the Project, including the following Tasks:

<u>Milestone Task & Description</u>
<ul style="list-style-type: none"> • NTP for Pre-Construction Services • Authorize Architect/Engineer Start • Submit for Owner Review • Joint Review for Owner Comments • Approve Schematic Design • Authorize Architect/Engineer Start • Submit for Owner Review • Joint Review for Owner Comments • Approve Design Development • FPCC Meeting Deadline • BOR Approval • Submit Construction Application • Approve Construction Application • Submit GMP • Approve GMP

<u>Milestone Task & Description</u>
<ul style="list-style-type: none"> • Authorize Architect/Engineer Start • Submit for Owner Review(s) • Joint Review(s) for Owner Comments • Approve Construction Documents • NTP for Construction Services • Partnering/Preconstruction Meeting • Establish Site Controls /Mobilize • Complete Primary Foundations • Structural Top-Out • Building Dry-In • Systems Commissioning • Substantial Completion • Final Completion • Operational Occupancy

2.4.4.3 A “Detailed” Task shall refer to a single Work event in the Project. The following table contains examples of Detailed Tasks for scheduling:

<u>Detailed Task - Example</u>	<u>Detailed Task - Example</u>
<ul style="list-style-type: none"> • Site Mobilization <p>Material</p> <p>Approval/Procurement</p> <ul style="list-style-type: none"> • Door Frames Shop Drawings • Contractor/AE review • Fabrication • Door Frame Delivery • Light Fixtures Submittal • Contractor/Architect/Engineer Review • Fabrication • Light Fixture Delivery • Sprinkler Shop Drawings/Calculations • Contractor/Architect/Engineer Review • Fabrication • Initial Equipment Delivery • Millwork Shop Drawings/Laminate Samples • Contractor/Architect/Engineer Review • Fabrication • Initial Millwork Delivery <p>Construction</p> <ul style="list-style-type: none"> • Layout/Top Track • MEP/Sprinkler Overhead Rough-In • Door Frames/Wall Framing • MEP In-Wall Rough-In • In-Wall Inspection • Corrections • Cover Walls • Tape and Float • Frame Ceilings • Furr-Downs/Recessed Light Coves • Furr Down/Ceiling Drywall Cover • Ceramic Tile • Plumbing Fixtures - Toilet Rooms • Prime/One-Coat Paint 	<ul style="list-style-type: none"> • Toilet Partitions • Ceiling Grid • Curtaintrack Blocking • Light Fixtures/Grilles/Sprinkler Drops/Smoke Detectors • Overhead Inspections • Overhead Corrections • Ceiling Cover • Light Coves • Sheet Vinyl Flooring • Millwork • Cast Plastic • Toilet Accessories • Dark Room Equipment • Plumbing Fixtures - Millwork • Doors • Hardware • Glass & Glazing/Blinds • Curtaintrack • Biosafety Cabinets/Fume Hoods • Darkroom Equipment • Lockers • Final Paint Coat/Wallcovering • MEP Trim • Film Illuminators • TV Support Brackets • Appliances • Carpet Flooring • Resilient Base • Wall Protection • Final Clean • Pre-Final Inspections • TAB • Start-up and Testing • Corrections

2.4.4.4 A “Summary” Task (i.e. Hammock) shall refer to a grouping (or a summary) of Milestone and/or Detailed Tasks in the Project Schedule.

2.5 PROJECT SCHEDULING METHOD REQUIREMENTS

2.5.1 "Retained Logic" is the required mode of Project Schedule processing.

2.5.2 The estimated Activity Duration of an activity shall be expressed in calendar days.

2.5.2.1 During Pre-Construction Services and Construction Services, the Project Team shall determine the maximum duration for any activity.

2.5.2.2 During Construction, the minimum duration for any Owner milestone inspection activity (i.e. concealed space, above ceiling, substantial and final completion) shall be at least three (3) work days per inspection and re-inspection, or as approved by the Project Team.

2.5.2.3 Estimated remaining Activity Durations shall be stated in work days, as of the Data Date of every Project Schedule update.

2.5.3 Except for the Notice to Proceed for Construction (Preconstruction for CM-R and DB contracts) and the Final Completion Date Milestone, activities shall not have "open ends".

2.6 PROJECT SCHEDULE ANALYSIS REQUIREMENTS

2.6.1 The Contractor shall use the CPM technique to determine the overall Project duration through the analysis of the durations of each of the activities, their schedule dependencies, and their resultant Float.

2.6.2 For CM-R and DB contracts, the Project Schedule shall include at least **20%** Float from the Notice To Proceed for Pre-Construction Services to the Substantial Completion date.

2.6.3 The Project Schedule shall include at least **10%** Float from the Notice To Proceed for Construction Services to the Substantial Completion date as identified by the Owner in the Notice To Proceed.

2.6.4 Float shall be shown as an activity within the Project Schedule. It should be the last activity prior to the Substantial Completion date Milestone.

2.7 COORDINATION WITH OTHER DOCUMENTS AND WORK

2.7.1 The Contractor shall coordinate the Project Schedule with the Contractor's Submittal Schedule and Schedule of Values, as required by the UGC and Section 01 31 00 - Project Administration (i.e. the Work breakdown structure shall be arranged, numbered, and described consistently across the various documents).

2.7.1.1 Cost and/or resource loading of the Project Schedule are allowed.

2.7.1.1.1 If the Contractor elects to cost-load the Project Schedule, the Contractor shall provide a separate Schedule of Values in the format required by the Owner in Section 01 31 00 - Project Administration.

PART 3 – EXECUTION

3.1 PLANNING AND SCHEDULING WORKSHOP

3.1.1 Within thirty (30) calendar days after a Notice To Proceed, the Contractor shall schedule and conduct a Planning and Scheduling Workshop with at least the Contractor's Project Scheduler, Project Manager, Superintendent, the Owner's Project Manager and Owner's

Planning and Scheduling Specialist (if applicable), the Architect/Engineer, Owner's representatives, and any available Subcontractors prior to submitting the Project Schedule to the Owner.

3.1.1.1 The Contractor shall schedule and coordinate the workshop with the Owner at least ten (10) calendar days prior to the Planning and Scheduling Workshop. The Contractor shall submit a complete draft Project Schedule to the Owner at least five (5) calendar days prior to the Planning and Scheduling Workshop.

3.1.1.2 The Contractor shall review the draft Project Schedule with the Project Team, including a verbal description of the logic and sequencing of activities, method for determining estimated Activity Durations and corresponding resources required, and any activities involving Owner participation and/or approval.

3.1.2 For CM-R and DB projects, Contractor shall schedule and conduct at least two (2) Planning and Scheduling Workshops. The first shall be within thirty (30) calendar days after a Notice to Proceed with Pre-Construction Services and the second shall be within thirty (30) calendar days after a Notice to Proceed with Construction Services for each "major" Guaranteed Maximum Price (GMP) Proposal executed.

3.1.3 Contractor's attendance at the Planning and Scheduling Workshop(s) and Owner's acceptance of the Baseline Project Schedule is a condition precedent to the Contractor submitting initial and any subsequent progress payments.

3.2 BASELINE PROJECT SCHEDULE SUBMITTAL

3.2.1 The Baseline Project Schedule shall be submitted to the Owner with the required Float within sixty (60) calendar days from the effective date of the Notice To Proceed for Pre-Construction and/or Construction Services (or as approved by the Owner in the Project Planning Scheduling Workshop).

3.2.1.1 A Baseline Project Schedule that does not have at least the minimum amount of Float at submission will result in the Contractor forfeiting all claims to Project Schedule extensions and/or delays as a result of Contract changes and/or excusable delays as described in the UGC.

3.2.1.1.1 If conditions arise prior to submission of the Baseline Project Schedule that are beyond the Contractor's control, the Contractor shall include an Executive Summary with the Baseline Project Schedule to justify the reduction in Float.

3.2.1.2 For CM-R and DB projects, the Baseline Project Schedule shall include identified Milestone and/or Summary Tasks for the remaining Work that has not been approved in an executed GMP Proposal for Construction Services.

3.2.1.2.1 When the Owner has approved the "full" scope of the Project (i.e. the last GMP Change Order has been executed), the Contractor shall coordinate with the Owner to "reset" the Baseline Project Schedule.

3.2.2 The Contractor shall submit one (1) electronic copy of the entire Baseline Project Schedule and one (1) paper copy of the following Baseline Project Schedule reports to the Owner within ten (10) calendar days when the "full" scope of the Project as been approved:

3.2.2.1 Graphic Time-Scaled Report or Gantt Chart: A graphic time-scaled view including all activities, early start and finish dates, estimated durations and Float sorted by Activity Code.

3.2.2.2 Milestone Activity Report: A listing of every Milestone Task and critical path sorted by early start date.

3.2.2.3 Detailed Activity Report: A listing of every Detailed Task sorted by early start date including a fully completed predecessor and successor column.

3.2.3 When the Owner has approved the initial Project Schedule, it shall be referred to as the Baseline Project Schedule, and shall be used for all future Project Schedule updates and reports as "BPS1."

3.2.3.1 For CM-R and DB projects, the Project Schedule shall include Milestone and Summary Tasks until thirty (30) calendar days prior to the submittal of a GMP Proposal for Construction Services. The Project Schedule shall also include Detailed Tasks for at least the first ninety (90) calendar days of Construction Services when submitted with the GMP Proposal.

3.3 UPDATING THE PROJECT SCHEDULE

3.3.1 When the Owner has approved the Baseline Project Schedule, the Contractor shall update the Project Schedule for Pre-Construction and Construction Services at least once per calendar month and submit reports at least seven (7) calendar days prior to the Owner's monthly Project Progress Meeting.

3.3.1.1 Project Schedule updates shall be based on actual Work progress, current logic, and remaining durations.

3.3.1.2 The Owner will determine which meeting will be designated as the Owner's monthly Project Progress Meeting.

3.4 MONTHLY PROJECT SCHEDULE REPORTS

3.4.1 The Data Date for all Project Schedule Update Reports shall be current within five (5) calendar days of submission to the Owner.

3.4.2 Contractor shall submit a Total Float usage log with Contractor's monthly Project Schedule Update Reports that identifies the number of days lost or gained each month.

3.4.3 Owner retains the authority, which shall not be unreasonably withheld, to approve or reject Contractor's utilization of Total Float. If Contractor desires to utilize a portion or all of the Total Float, Contractor must submit a written request with its monthly Total Float usage log to the Owner seeking Owner's written approval of utilization of Total Float.

3.5 SUBMITTING MONTHLY PROJECT SCHEDULE REPORTS

3.5.1 The Contractor shall submit one (1) electronic schedule back-up in ".mpp" format and one (1) paper copy of the Project Schedule to the Owner.

3.6 FORMATING PROJECT SCHEDULE REPORTS

3.6.1 Electronic copies shall be submitted on compact discs and as attachments to electronic mail.

3.6.1.1 All electronic Project Schedule submittals shall be "backups" created in the specified software and included on the website if required, within one (1) calendar day of required completion.

3.7 PROJECT SCHEDULE SLIPPAGE

3.7.1 If the Project Schedule indicates schedule slippage for two (2) consecutive calendar months or if the Owner notifies the Contractor of a determination that the Work is behind schedule,

- the Contractor shall develop a "Recovery Plan" to make immediate revisions to the work force, work-hours, shifts, material deliveries, or any other aspects of the Work.
- 3.7.2 The Contractor shall submit the "Recovery Plan" to the Owner, as required in the UGC, clearly describing all changes in the Project Schedule or work enacted and/or planned in order to ensure completion by the Contract Substantial Completion date.
- 3.7.2.1 The Owner has the right to review and comment on any "Recovery Plan" activities that include Owner participation or affect any Owner consultants or outside contractors.
- 3.7.3 When the Owner approves the "Recovery Plan", the Contractor shall incorporate the proposed revision into the Baseline Project Schedule.

3.8 PROJECT SCHEDULE CHANGES

- 3.8.1 If the Owner or Architect/Engineer issues a Change Proposal, the Contractor shall submit a proposed revision for all proposed Contract changes that affect the Substantial Completion date or remaining Float with the Change in Work Cost Analysis Form.
- 3.8.1.1 Proposed revisions shall be accompanied by a narrative listing of the affected activities including a statement of the expected overall impact of the change proposed.

3.9 EXCUSABLE DELAYS AND TIME EXTENSIONS

- 3.9.1 Excusable delays shall be administered per the UGC.
- 3.9.2 If an excusable delay extends the Contract Substantial Completion date, the Owner may extend the Contract time by the number of excusable calendar days lost on the Project Schedule or take other actions as appropriate under terms of the Agreement.
- 3.9.2.1 Change Proposal pricing that does not impact the Substantial Completion date or does not include a proposed revision prior to approval by the Owner shall not include a time extension.
- 3.9.3 Once the Owner accepts a time extension and authorizes the Contractor to proceed with the Contract change, the proposed revision shall be incorporated into the Baseline Project Schedule.

END OF SECTION 01 32 00

SECTION 01 35 16 – ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.02 SUMMARY

- A. Basic and supplemental requirements for Work that alters existing facility components, systems or equipment.

1.03 REFERENCE STANDARDS

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the Contract Documents.

1.04 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.
- C. Demolish: Completely remove and legally dispose of off-site.
- D. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- E. Remove and Salvage: Detach items from existing construction and deliver them to Owner [ready for reuse].
- F. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- G. Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner [ready for reuse]. Include fasteners or brackets needed for reattachment elsewhere.
- H. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.

- I. Existing to Remain: Existing functional items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- J. Sensitive Area: The following areas are considered "Sensitive" by MD Anderson Cancer Center:
 - 1. Sensitive Areas listed apply to human and animal occupancies.
 - 2. Additional areas may also be considered Sensitive as determined by MD Anderson Cancer Center for a particular project. The Contractor shall coordinate with the Owner's Project Manager prior to any installation Work to identify Sensitive Areas not listed.
 - a. Operating Rooms
 - b. Invasive Procedure Rooms
 - c. Bone Marrow Transplant / Protective Environment Areas
 - d. Intravenous Procedure Rooms (Chemotherapy)
 - e. Intensive Care
 - f. Inpatient Recovery Rooms
 - g. Sterile Supply Storage
 - h. Sterile Processing
 - i. Pharmacy I V Admixture
 - j. Pharmacy Drug Preparation
 - k. Pharmacy Drug Storage
 - l. Food Preparation, Storage, Serving
 - m. Data Centers
 - n. Electrical Equipment Rooms
 - o. Telecommunication Rooms
 - p. Potable Water Storage Tanks
 - q. Any Room Containing Imaging Equipment that May be Damaged Due to Water Leakage (MRI, Cat Scan, Etc.)
 - r. Animal Holding Rooms
 - s. Animal Procedure Rooms
 - t. Laboratory Clean Rooms

1.05 QUALITY ASSURANCE

- A. Perform remodeling, alteration, demolition, cutting, patching, removal, refinishing, relocation, and disposal work in accordance with Federal, State, and local health and safety standards, codes, ordinances, and the University of Texas MD Anderson Cancer Center Institutional Safety Policies. Where conflicts occur, comply with the more restrictive requirements.
- B. Perform remodeling, alteration, demolition, cutting, patching, removal, refinishing, and relocation work in such a manner as to preserve the aesthetic and structural integrity of materials and construction.
- C. When the Contractor determines that it is unavoidable to locate new fan coil units, drainage piping, or waste piping above a Sensitive Area, the Contractor shall notify the Owner's Project Manager in writing and obtain a clear direction to proceed prior to any installation of Work.
- D. When the Contractor determines that an existing penetration cannot be sealed due to accessibility, constructability or any other condition, the Contractor shall notify the Owner's Project Manager in writing and obtain a clear direction to proceed prior to any installation of Work.
- E. When the Contractor determines that an existing fan coil unit cannot be relocated beyond the perimeter of a Sensitive Area, the Contractor shall notify the Owner's Project Manager in writing and obtain a clear direction to proceed prior to any installation of Work.
- F. Portions of the existing remaining medical vacuum and gas systems affected by Work within this Project shall be re-certified in strict accordance with NFPA 99.

1.06 SUBMITTALS

- A. Submit schedule for all proposed shut-downs prior to start of Work. The Contractor shall notify the Owner's Construction Inspector and the Owner's Project Manager, in writing, of any planned utility outages in accordance with Owner's Special Conditions.
- B. Work with noise-producing equipment is subject, at all times, to Owner's approval of entire procedure. Submit a schedule of all such operations to the Owner's Project Manager at least two weeks in advance of need and secure approval of the Owner before proceeding.

1.07 NEW AND EXISTING PENETRATIONS

- A. All new and existing penetrations through rated partitions and floor slabs within the Project boundary shall be sealed to provide a fire/smoke rating equal to or greater than the rating of the floor slab.
- B. All new and existing penetrations through floor slabs within the Project boundary shall be sealed watertight.

1.08 EXISTING COMPONENTS ABOVE SENSITIVE AREAS

- A. All existing sanitary waste, sanitary vent and storm drainage piping located within the ceiling or exposed above a Sensitive Area shall be provided with heavy-duty joint connections having a minimum 15 psi pressure rating and meeting the performance criteria of Factory Mutual 1680.3.

- B. All existing piping located within the ceilings or exposed above a Sensitive Area receiving cooling coil condensate, ice machine drainage or conveying contents having temperatures below 55 degrees F shall be insulated and vapor sealed to prevent condensation.
- C. Existing fan coil units located within the ceiling or exposed above a Sensitive Area shall be relocated to a position beyond the Sensitive Area.

1.09 JOB CONDITIONS

- A. Visit the Project Site to determine by inspection all existing conditions, including access to the Site, the nature of structures, objects, and materials to be encountered, and all other facts concerning or affecting the Work. Information on the Drawings showing existing conditions does not constitute a guarantee that other items may not be found or encountered.
- B. Obvious existing conditions, installations, and obstructions affecting work of this Section shall be taken into consideration as necessary work and included as part of work of this Section, the same as though completely shown or described.
- C. Seal off areas in which work is in progress from the occupied portions of the building to prevent entry of dust and noise into occupied portions of the building. Take all necessary measures to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level.
 - 1. Where Work occurs immediately adjacent to occupied portions of the building, construct dust-proof partitions of nominal 3-5/8 inch metal studs with 5/8-inch Type X drywall, full height on both sides. Tape joints on the occupied side at non-fire rated partitions. Tape both sides full height at fire rated partitions. Fill partition cavity with sound-deadening insulation.
 - 2. Equip partitions with dustproof doors and security locks.
- D. If temporary closures block required exits, provide closures with acceptable openings equipped with gasketed, self-closing doors that open in the direction of exit as approved by authorities having jurisdiction.
- E. Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to remodeling work.
 - 1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to occupied portions of building.
 - 2. Erect temporary covered passageways as required by authorities having jurisdiction.
 - 3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
 - 4. Protect from damage existing finish work that is to remain in place and becomes exposed during remodeling operations.
 - 5. Protect floors with suitable coverings when necessary.
 - 6. Cover and protect furniture, equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.

7. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
 8. Remove protections at completion of work.
- F. Furnish and maintain temporary types of protection as necessary to adequately protect and prevent accidental injury to the public, Owner's personnel and personnel employed at the work. Take all necessary precautions to keep trespassers out of work areas. Properly secure work areas from entry when work is not in progress.
 - G. Conduct demolition and removal operations and the removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

1.10 TEMPORARY ELEVATOR USE

- A. Designated existing elevators may be used by construction personnel and for materials. Coordinate use with Owner. Provide protective coverings for finish surfaces of cars and entrances.

1.11 EXISTING UTILITIES AND CONDITIONS

- A. The location and description of utilities and conditions shown on Drawings are indicated from information available and are approximate only. Verify existing utilities and conditions.
- B. Protect existing utilities and conditions from damage. Repairs to utilities and conditions damaged during the Work shall be the responsibility of the Contractor and shall be made promptly at no additional cost to the Owner.
- C. Maintain existing utilities in operation at all times except where specific permission is given by Owner's Project Manager. Support and protect all exposed piping and utilities during demolition and utility rough-in.
- D. All outages of utilities, sidewalks, parking areas, driveways or facility access shall be scheduled in advance with Owner in accordance with Owner's Planned Utility Outage Procedure as specified within Section 00 25 00 – Owner's Special Conditions.
- E. Notify the Owner's Project Manager and all concerned parties prior to disconnecting and terminating abandoned utilities.

1.12 REMOVAL OF EXISTING CONSTRUCTION

- A. Where permanently disconnecting domestic water, medical vacuum, medical gas, natural gas, treated water, drainage, vent, or other piping serving removed fixtures, inlets, outlets or equipment, remove all associated piping back to remaining active mains.

- B. All existing floor drains that will not remain in service after Project completion shall be isolated from the remaining active building drainage and vent system. Floor drain bodies remaining within slabs shall be sealed watertight. Slab shall be finished to allow specified application of flooring or to match surface of the adjacent finished area. Completed patching of the slab shall prevent the passage of water and provide a structural integrity and fire rating equal to or greater than the existing slab. Remove all associated piping serving decommissioned floor drains located in suspended slabs back to remaining active mains.
- C. All existing wall penetrations that will be unused due to removal of piping shall be permanently sealed to maintain the fire rating of the wall or floor.
- D. All existing floor penetrations that will be unused due to removal of piping shall be permanently sealed to maintain the fire rating of the floor and to provide a watertight seal.
- E. All existing supports serving removed piping, duct, conduit and equipment shall be removed.
- F. Carefully remove and store all items indicated or required to be reused.
- G. Perform demolition and removal work completely and remove debris from the Site. Use such methods as required to complete the Work within the limitations of governing regulations.
 - 1. Proceed with demolition and removal work in a systematic manner, from the top to the bottom in areas indicated.
 - 2. Remove debris in covered carts to limit air pollution.
 - 3. Locate demolition equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.
 - 4. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- H. Cutting:
 - 1. Structural Elements: If not specifically shown, but removal or alteration is required, perform such removal or alteration only upon written approval of the Architect/Structural Engineer. Do not damage or alter any structural element of the existing building. Where drilling or fastening to post-tensioned reinforced concrete construction is required, X-ray existing structure to determine tendon locations and potential for tendon tension release before proceeding. Notify Architect/Structural Engineer in each instance when conflict occurs. Architect/Structural Engineer will determine corrective action required. Do not proceed until corrective action has been received.
 - 2. Concrete: Saw cut where exposed to view. Jack hammering with electric or pneumatic equipment is acceptable only with scheduled approval of Owner.
 - 3. Masonry: Cut back masonry to joint lines and remove old mortar allowing space for repairs.
 - 4. Ceramic, Structural Clay Tile, and Quarry Tile: Saw cut to natural joint lines; remove so that repairs or continuations of new work will be relatively imperceptible.
 - 5. Resilient Tiles: Remove in whole units to natural breaking points and/or straight joint lines with no damaged or defective existing tiles remaining where joining new construction.

6. Plaster: Cut back to sound plaster on straight lines, and back bevel edges of remaining plaster. Trim and prepare existing lath for tying of new lath.
 7. Woodwork: Cut back to a joint or panel line.
 8. Existing Doors, Frames, and Sash: Remove in such manner as to facilitate filling in of openings or installation of new work, as required by the Drawings.
 9. Cutting for Access to Mechanical and Electrical Systems: Removal of existing ceilings and the removal, cutting, and patching and replacement of existing walls and floors as may be necessary for access to valves, piping, conduit, and tubing by mechanical and electrical trades shall be included and performed as an obligation of, and as directed by the Contractor and accepted by the Owner.
- I. Patching, Repairing, and Finishing Existing Work:
1. Perform in compliance with the applicable requirements of the Specification technical Section covering the work to be performed and the requirements of this Section.
 - a. All holes and damaged areas exposed to view in ceilings, walls, and floors of all finished spaces shall be repaired. Repaired construction shall match existing adjacent construction and finish, unless otherwise indicated or specified.
 - b. Minor surface abrasions, small nail holes, cracks, aged checked natural wood finish and other similar deterioration not visible, when viewed under finished lighting conditions, from a distance of 6 inches will not be required to be repaired if the base material is sound and suitable to receive the scheduled finishes, if any.
 - c. Interior penetration holes in walls and ceilings of unfinished spaces and spaces not exposed to view shall be grouted and sealed with accepted materials to equal the sound seal and fire resistance rating of original construction.
 - d. Penetration holes through exterior walls above grade shall be grouted and sealed as required to produce a weather tight seal.
 - e. Penetration holes through exterior walls below grade shall be grouted and sealed to produce a watertight seal.
 2. Concrete: Edges of existing concrete shall be kept damp for 24 hours and scrubbed with neat portland cement grout just before new concrete is placed; in lieu thereof, an accepted epoxy concrete adhesive may be used. Finish shall match existing adjoining work. Unless otherwise specified, all concrete for patching shall be 3,000 psi concrete. Reinforcing bars and dowels shall be provided where required. Where installation of concrete is impracticable, the openings shall be filled with dry packed non-shrink grout as directed.
 3. Masonry: Patch with sound whole units to match existing. Joints shall match adjoining surfaces.
 4. Lath: Lath areas to be patched as required, install as required for new lath, and wire-tie to existing lath at edges at 6 inch (15.2 cm) intervals. Lap lath 3 inch (7.6 cm) minimum.
 5. Plaster: Dampen edges of existing plaster. Plaster patching shall be 3 coat work of type, thickness, and finish to match the existing work.

6. Damages: Promptly repair damages to adjacent facilities caused by demolition and removal operations at no additional cost to the Owner.
7. Painting and Finishing:
 - a. Preparation: Prepare patched areas as required for new work. Wash areas to be repainted with neutral soap or detergent, thoroughly rinse, and sand when dry. Feather remaining paint edges smooth with sandpaper.
 - b. Painting and Finishing: Conform to the applicable provisions of Painting Section. Prepare and build up bare areas and patches in existing painted surfaces with proper primer and intermediate coats, sand smooth and flush with adjoining surfaces. Paint all areas scheduled to be painted and/or repainted as specified in Painting Section of the Specifications, except the first or primer coat may be omitted on existing painted surfaces.
- J. Disposal of Debris: Clean up all material, debris, and rubbish resulting from remodeling work, remove from the building and Site, and legally dispose of. Leave all areas of work in "broom clean" condition.
 1. All debris shall be transported out of the building in covered carts with no materials extending above the cart rim.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B. Matching Existing Work: Except where otherwise specifically indicated or specified as a definite change, the finish materials and appearance of the new work shall match the existing contiguous materials and finishes in all respects. Repairs and/or continuations of existing work shall be relatively imperceptible in the finished work when viewed under finished lighting conditions from a distance of 6 feet (1.8 meters).

PART 3 - EXECUTION

3.01 SEQUENCING AND SCHEDULING

- A. Schedule Work so as to impose a minimum of hardship on the present operation of the facilities and the performance of the work of other trades.
- B. Maintain existing utilities indicated to remain; keep in service and protect against damage during demolition and removal operations.
- C. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by Owner. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities.

3.02 POST DEMOLITION CONFERENCE

- A. Coordinate, schedule and conduct post demolition meetings prior to installation of new Work.

1. Purpose: Communicate existing conditions revealed by demolition that are not identified on Contract Drawings. Determine scope, cost and schedule impacts and obtain a clear direction to proceed.
2. Attendees: Contractor, Owner's Project Manager, Architect/Engineer.

3.03 INSTALLATION

- A. Check Drawings carefully and thoroughly investigate existing building construction.
- B. Protect work to remain from damage. Use barricades, tarpaulins, temporary walls, plywood, planking, masking, and other suitable means and methods as accepted.
 1. Restore accidental or careless damage to work to remain in place to a condition as good as or better than existed before work was commenced and at no additional cost to the Owner.
- C. Provide all shoring and bracing necessary to positively protect existing elements of the building. Use material adequate to support anticipated loads with a properly calculated margin of safety. Provide for transfer of stresses to successively lower construction.
- D. All work must be staged and performed so that disruption to occupied areas is minimized and so that these areas are available and suitable for their intended use during normal hours of operation. Any work that would incur excessive noise, dust, or disruption must be scheduled in advance with the Owner's Project Manager.
- E. Carefully remove and replace items of existing construction indicated to remain upon completion of the Contract, but which require removal to complete the work. Match condition of construction prior to the start of the Work unless otherwise required. Carefully remove items indicated for relocations in new Work, or to be retained by Owner, to avoid damage, thoroughly clean, and reinstall as indicated or store as directed.
- F. Items of salvable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the Project Site as they are removed. Storage or sale of removed items on the Project Site will not be permitted.
 1. Remove and dispose of all demolition materials, equipment and debris off premises, unless identified for salvage on the drawings. Deliver salvaged items to a location within a 5 mile radius of UTMDACC as directed by the Owner's Project Manager. Protect and store all items identified for reuse. Contractor assumes no salvage value for items removed and not reused in the Project.

END OF SECTION 01 35 16

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SECTION 01 35 25 – OWNER SAFETY REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
- C. For projects enrolled under the Owner Controlled Insurance Program (OCIP), this Section supplements Section 01 35 23 Project Safety Requirements, with additional Owner requirements for work within existing facilities or for work in areas controlled by the Owner.

1.02 SUMMARY

- A. The control of Project Safety by the Contractor is an essential element of performing work at The University of Texas MD Anderson Cancer Center (MD Anderson). The Contractor shall, at all times, provide adequate resources, equipment, training, and documentation to assure a safe work environment at the Project site and to instill a culture for safety in the behavior of all supervisors and workers. Every worker shall understand that safety and health issues always take precedence over all other considerations, and that identifying, reporting, and correcting unsafe acts and conditions are the responsibility of everyone at the Project site.
- B. MD Anderson is dedicated to providing a safe healing and work environment for all patients, visitors, staff, students, guests, and Contractors.
- C. The details of this document should be considered as supplemental requirements. The Contractor shall develop, implement, maintain, and submit to the Owner a written Project Safety Program that meets or exceeds all Federal, State, and Local standards and regulations pertaining to construction activities. The Contractor and every Subcontractor shall comply with the rules and guidelines outlined in this guideline. In any circumstances where this section differs with or conflicts with any standard or statutory requirement, the more stringent requirement shall apply. Contractors may use a company-wide safety program in lieu of the Project specific safety program as long as it meets or exceeds the requirements listed in these guidelines.
- D. The Owner reserves the right to have any manager, supervisor or worker employed by the Contractor or Subcontractor removed from the Project for disregard of Project Safety requirements.
- E. The Owner reserves the right to deduct from the Contract any safety related expenses that the Owner incurs, as a result of the Contractor's, or any Subcontractor's, disregard for Project safety.

1.03 REFERENCE STANDARDS

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

1.04 DEFINITIONS

- A. The term "Owner's Designated Representative" or "MD Anderson Representative", as used throughout the document, shall refer any of the Owner's Project management team, insurance carrier representative(s), Owner's designated agent, or campus representative(s).
- B. The term "Contractor" as used throughout the Contract Documents shall refer to the party having a direct contractual agreement with the Owner to provide services. This term is to apply whether Contractor is known as a Prime Contractor, General Contractor, Construction Manager, or Design/Build Contractor.
- C. The term "Subcontractor" as used throughout the Contract Documents shall refer to any on-site Subcontractor, regardless of tier.

1.05 EMERGENCY / IMPORTANT CONTACT INFORMATION

- A. Consult with your MD Anderson Representative regarding the correct emergency contact information for the facility in which you are working. Each facility may have a different emergency call procedure.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

PART 3 - EXECUTION

3.01 ASBESTOS CONTAINING MATERIAL

- A. Environmental Health and Safety must review all Job sites prior to the start of a Project to determine the presence of Asbestos Containing Material (ACM).
- B. All suspect materials shall be considered asbestos-containing material until identified otherwise by an EPA approved method of analysis for identifying asbestos-containing material.
- C. Any Contractor personnel needing to disturb any suspected asbestos containing building materials shall first contact their MD Anderson Representative. It is then the responsibility of the MD Anderson Representative to contact Environmental Health and Safety to determine if there is any Asbestos Containing Materials present.
- D. Contract personnel coming into contact with known or suspected asbestos containing materials (ACM) will:
 - 1. Avoid any physical contact or other actions that may damage or otherwise disturb the material.
 - 2. Submit all requests for sampling suspected asbestos containing materials through your MD Anderson Representative. If the material has not been previously identified as containing asbestos, Environmental Health & Safety personnel will sample the materials, obtain analysis, and report results to the requester.

3.02 BLOODBORNE PATHOGENS

- A. Contractors shall instruct their employees in the concept of Standard Precautions and document training in accordance with OSHA 29 CFR Section 1910.1030.
- B. The Contractor must take every effort to prevent exposure to blood and/or body fluids while in the hospital.

- C. Patient care and research areas are considered to have the potential for exposure and special instructions may be given by the nursing or research staff on how to avoid potential contamination. Contact your MD Anderson Representative to determine if an exposure potential exists for all areas in which you will be working.
- D. Contractors shall not handle bags or containers identified as containing potentially infectious materials. Contractors may contact Environmental Health and Safety at 713-792-2888 for additional questions.
- E. For Smithville / Bastrop, Contractors may contact Environmental Health and Safety with additional questions at:
 - 1. Smithville Office Phone: 512-237-9522, 9536
 - 2. Bastrop Office Phone: 512-332-5232

3.03 CELLULAR PHONE AND RADIO USE

- A. The use of the following devices in PMA locations should be used with caution (beyond six feet of physiological monitoring systems):
 - 1. Cellular Phones
 - 2. Computers with wireless capabilities
 - 3. Two-way pagers
 - 4. Wireless handheld devices
- B. Definitions:
 - 1. Cellular Phone – Telephone that uses a frequency range of 800 - 1910 MHz to transmit voice and data to a remote cell and up to 625mW of power.
 - 2. Close Proximity - within twenty (20) feet for two-way radios and within three (3) feet for cell phones and others of a physiological monitoring system.
 - 3. Non PMA Area - an area of M.D. Anderson facility outside of the defined PMA Areas.
 - 4. Physiological monitoring area (PMA)- An area of M.D. Anderson facility where patients are likely to require the use of a physiological monitoring (e.g., Electrocardiograph, electroencephalographs, pulse oximetry, cardiac output, invasive pressure, etc) for care or treatment.
 - 5. PMA Locations: Bone Marrow Unit (G11), Cardiac Unit (P12), Cardio-Pulmonary Clinic (R8), Diagnostic Imaging (G3, R3, B3, ACB4-ACB7), Emergency Center (R1, P1, P2), Endoscopy Clinic (R5), Intensive Care Unit (G7), Operating Rooms (G5, ACB4), Pediatric Unit (G9, R7), Post Anesthesia Care Unit (G3, G5, ACB4, P3 Pod B), Rehab and Patient Therapy (P8), and the Telemetry Unit (P7).
 - 6. Wireless Communication Devices - Cellular telephones and two way radios are the only devices currently defined as having caused interference to medical devices.
 - 7. Two Way Radios – “Walkie-talkies” which use a frequency range of 29 - 1000 MHz to transmit voice between two locations up to 5 watts of power.
 - 8. Wireless Handheld Devices – Commonly known as PDA (Personal Digital Assistant). Devices that provide a range of personal information management, voice communication, data communication, and computing capabilities, that relies on wireless technology to transfer or retrieve data. May include Palm Pilot, Pocket PC, Blackberry, Smartphone, or similar devices with operating frequency of 800 to 1900 MHz.

- C. If allowed to be turned on, the volume of radios and cellular telephones must be turned down to minimize disruption to patients and operations.

3.04 CONDUCT

- A. The use or consumption of alcoholic beverages or controlled substances is strictly forbidden on any Institution owned or controlled property.
- B. Contractor shall not permit any person to operate a motor vehicle or heavy equipment while taking prescription or non-prescription medication that may impair their ability to operate safely.
- C. MD Anderson is a NO SMOKING Institution. No smoking or use of tobacco products is allowed on any Institutional property. There are no designated smoking areas. Anyone found smoking will be immediately removed from the jobsite.
- D. Contractor personnel shall be courteous to all tenants, business invitees, patients, visitors, and employees.
- E. Unacceptable behavior on the part of the workers anywhere on campus, including parking lots, the project site, the accessible route(s) through the site or through the campus may lead to the identifiable Contractors being removed from the project.
- F. Personal grooming, personal hygiene and language by Contractors must be constructed in a professional manner at all times. Use of foul and off-color language will not be tolerated and can result in Contractor removal from jobsite.
- G. Shirts must have sleeves of at least 3 inches, measured from the armpit seam. All buttoned shirts must be buttoned to at least the third button from the top. T-shirt styles may be approved if they are part of a company uniform or contain no political or offensive language or images. For additional guidance, see Section 3.26 Personal Protective Equipment.
- H. Pants that are excessively loose, torn, ragged or with dragging cuffs will not be permitted. Shorts are not allowed.
- I. No clothing, accessories, or hardhat stickers that display offensive, derogatory or inflammatory wording or graphics shall be worn on the worksite.
- J. All clothing must be in good repair and free of any large holes or major damage. All clothing must be clean and sanitary at the start of each work shift and periodically cleaned to prevent tracking dust and debris out of the construction area.
- K. Workers clothing must be clean of visible dusts and dirt when outside of the Project site.
- L. No radios or music shall be allowed on the Project including headphone systems. Personnel must be able to hear alarms and warnings in the immediate area. (This does not pertain to the use of two-way hand held communication equipment or phones).
- M. No tools or equipment will be loaned by Owner to Contractors to assist them in completing Projects.
- N. Contractor personnel shall not tape back lock/latch mechanisms nor prop open any exterior door, security door, stairwell door, or fire / smoke door. Personnel may not disconnect any electronic security device or defeat lock systems.

3.05 CONFINED SPACES

- A. MD Anderson does not provide any confined space entry support such as sampling, entry permits, rescue personnel, rescue equipment, etc., for contractor personnel.

- B. Contractors are responsible for ensuring all of their employees are trained on the recognition and significance of confined space entry procedures in accordance with 29 CFR 1910.146.
- C. It will be the responsibility of the Contractor performing the work inside the confined space to provide the necessary equipment to assess the hazards within the space and prepare the space for entry and to meet the precautions of the entry permit.
- D. Contractor shall provide all emergency rescue equipment and personnel as required by 29 CFR 1910.146, as applicable.
- E. The Contractor conducting the work inside a permit-required confined space shall follow, at a minimum, all applicable OSHA requirements.

3.06 CONSTRUCTION SAFETY SITE INSPECTIONS

- A. All construction sites will be subject to periodic inspections by Environmental Health and Safety representatives. The inspector(s) will be looking for life safety, environmental, construction safety, and indoor air quality deficiencies. Once noted, the inspector will notify the MD Anderson Representative responsible for the site. The inspector may also notify the Contractor Representative on site.
- B. All noted deficiencies shall be immediately corrected.
- C. The inspector will be enforcing IAQ measures found in the "Maintaining Indoor Air Quality During Construction and Renovation" policy / procedures and other requirements set forth in the MD Anderson construction specifications for that Project. (See Attachment A).
- D. A job or activity will be suspended if an imminent danger to patients, animals, visitors, employees, Contractor personnel or facilities is observed.

3.07 CONTRACTOR DAILY SIGN-IN AND WORK NOTIFICATION - HOUSTON

- A. Contractors must follow any specific check-in procedures for the facilities in which they will be working. Your MD Anderson representative will inform you of these procedures.
- B. All Contractors/vendors must wear an MD Anderson-issued ID badge at all times while on property owned or under the control of the Institution. Badge must be worn and be visible at all times. Contact your MD Anderson Representative for assistance in obtaining an ID badge.

3.08 CONTRACTOR DAILY SIGN-IN AND WORK NOTIFICATION – SMITHVILLE / BASTROP

- A. Contractors/Vendors hired by the Facilities Management Division must register their activities with Facilities Management before commencing work.
- B. Contractors coordinate with Project Managers for access to the campus. Contractors must submit a Construction Schedule to Physical Plant Management.
- C. Physical Plant informs Facilities Management of contractors schedule as well as the badge numbers issued to that contractor. Facilities Management will issue badges to contractor for their use while on the property. Contractors are responsible for distributing the badges as needed.
- D. Contractor/vendor registration is performed in the Physical Plant Building.
- E. All Contractors/vendors must wear an MD Anderson-issued ID badge at all times while on property owned or under the control of the Institution.
- F. Contractors/vendors who fail to register with Physical Plant Management are subject to removal from the property by the UT Police.

3.09 CONTRACTOR INJURIES AND INCIDENTS

- A. Contractors shall make prior provisions for the treatment of minor injuries.
- B. Contractor is responsible for cleaning up all blood and body fluids and debris from accidents.
- C. Contractor employees requiring immediate medical treatment should be taken to the emergency room of a local hospital. MD Anderson does not provide medical treatment to Contractors engaged in projects.
- D. If an injured worker cannot be moved and assistance is needed, contact the Houston or local Fire Department (911) for an ambulance.
- E. An injury requiring treatment beyond minor Job Site First Aid, shall be reported immediately to your MD Anderson Representative or Designee and Monitoring Services 713-792-2888 (All Houston Locations) and UTPD Smithville/Bastrop at 512-332-5371 or 512-237-9411
- F. A copy of the incident / accident report must be provided in a timely manner to your MD Anderson Representative. A preliminary report must be made within 24 hours of the end of the next working day.
- G. All incidents that result in property damage must be reported to your MD Anderson Representative.

3.10 CONTRACTOR SAFETY ORIENTATION

- A. All Contractor personnel are required to complete the MD Anderson Construction Safety and Infection Control Orientation Training given by the Environmental Health and Safety Office before beginning work at the Institution. This training may be in the form of videos or an in-class presentation. Videos can be requested through the EH&S department or your MD Anderson Representative and are available in both English and Spanish.
- B. Completion of orientation is required to obtain an MD Anderson hardhat sticker and emergency contact card.
- C. The Contractor may be required to attend orientation again for refresher, and review any changes if deemed necessary by the Owner.
- D. The Contractor's MD Anderson Representative must contact the Environmental Health and Safety Office to make arrangements for the orientation session.
- E. It is the responsibility of the Contractor to ensure that the information given in the orientation session is understood by all workers (i.e., Spanish or other language translation).

3.11 ELECTRICAL SAFETY

- A. Refer to Section 3.24 on Lock Out / Tag Out requirements.
- B. All electrical power tools, equipment and extension cords shall be inspected daily before use. Defective items shall be immediately removed from service for repair or replacement.
- C. NOTICE: RED OUTLETS are for power requirements provided by the Emergency Generator System and shall NOT be used by Contractor personnel.
- D. Ground Fault Circuit Interrupters (GFI's) shall be in use between any permanent receptacle and any Contractor equipment.
- E. Temporary power panels shall have GFI protected circuits built into the panel.
- F. The GFI shall be tested for function before plugging in any Contractor equipment.

- G. Electrical power tools shall be grounded, or double insulated, or battery powered. The cord on the tool must be free of defects.
- H. Battery powered portable hand tool battery charging stations are not to be plugged into hallway or exit stairs outlets or other areas so as not to create a trip hazard.
- I. Extension cord sets shall be the "heavy duty" three-wire grounded type (14 gauge or larger), and must be rated for the particular application in which it is to be used.
- J. Three-wire flat type extension cords are NOT permitted.
- K. Defective cord ends must be replaced with a UL rated repair end; Contractor must follow the manufacturer instructions for repair installation.
- L. Damage to the cord jacket shall not be taped over and must be repaired per manufacturer's recommendations.
- M. Extension cords shall be routed overhead whenever possible or otherwise protected against damage or tripping hazard by being securely taped to the floor or secured by other acceptable means and approved by the MD Anderson Representative.
- N. Running/hanging extension cords through ceiling spaces is not permitted. Special permission from Environmental Health and Safety is required for any variation from this requirement.
- O. Extension cords must be used as designed by the manufacturer. Avoid using extension cords in a manner to cause damage to the electrical system or cause personal injury.
- P. All electrical shutdowns and electrical "taps" must be coordinated through the Project Manager or MD Anderson Representative for that Project.
- Q. Contractors are absolutely not allowed to turn on/off any electrical source breakers or switches without permission from the respective MD Anderson Facilities Management representative for that building/space. This should be accomplished through a Utility Shutdown Request submitted by the Project Manager or MD Anderson Representative.
- R. Existing and new electrical equipment must be protected at all times from humidity, liquid material splashes, activities inducing to vapor formation and condensation.
- S. No liquid materials shall be handled in electrical rooms, electrical equipment areas or areas adjacent to electrical equipment locations.
- T. In the event that the Contractor must handle liquid materials in the vicinity of electrical equipment locations, the Contractor must inform the Owner and seek written approval, prior to bringing those liquid materials to the above-mentioned locations.

3.12 EXCAVATIONS

- A. All excavation shall have the following prerequisites:
 - 1. Discussion with the appropriate MD Anderson Representative or site owner/property manager of as-built locations of all underground utilities in the vicinity;
 - 2. Where applicable, a phone call for utility "locates" shall be completed seventy-two (72) hours in advance. "Potholing" and hand excavation shall be required within three horizontal feet of "located" centerlines.
 - 3. All excavations must follow the applicable OSHA guidelines and requirements as related to design and protection of excavations.
 - 4. All trench excavations should be backfilled or plated at the end of each shift.

5. When an excavation cannot be backfilled or plated in the same day it is created, a highly visible hard and sturdy barricade such as a wooden fence or wooden railings shall be erected. Excavation protections in areas of traffic must comply with local, state, or federal safety standards.
 6. Means of access into excavations shall be removed or physically barricaded at the end of each workday.
 7. Excavations in areas of public access shall be secured with a temporary "hard" barricade such as solid fencing or wooden railings to prevent entry. These excavations and protection plans must be approved by the Environmental Health and Safety Office.
- B. Where applicable, all required engineer stamped excavation plans must be readily available at all excavations for review by MD Anderson Representative(s). Certificates of soil testing shall also be made available.

3.13 FALL PROTECTION AND PREVENTION

- A. Work in areas not protected by a standard guardrail system OR present a fall hazard greater than six (6) feet shall require compliance with all current applicable OSHA Fall Protection requirements and/or ANSI/WCA I-14.1 Window Cleaning Safety Standard.
- B. The Contractor shall ensure that all workers exposed to fall hazards have been properly trained and equipped by their employer.
- C. No worker or equipment shall be allowed to perform work directly above another worker unless adequate overhead protection is provided.
- D. Covers or fencing of sufficient design shall be placed over holes, roof and floor openings or drop offs to prevent personnel or equipment from penetrating the opening.
- E. Covers or fencing shall be physically secured and clearly marked with warning message, such as "Danger", "Hole", or "Cover! Do Not Remove".
- F. If a cover is too small for a warning message, it shall be painted bright orange or red.
- G. All puncture and impalement exposures shall be covered or eliminated as soon as they are created. Exposed ends of rebar are to be covered with material that is designed to prevent impalement of a 250-pound body from a fall of four (4) feet.

3.14 FIRE PREVENTION

- A. All combustible materials shall only be stored in approved areas as designated by the MD Anderson Representative.
- B. MD Anderson is a NO SMOKING facility. No smoking or use of tobacco products is allowed on any Institutional property. There are no designated smoking areas. Anyone found smoking will be immediately removed from the jobsite.
- C. Contractor shall coordinate the covering and uncovering of smoke/heat detectors with Owner's Environmental Health and Safety Department (713-792-2888) prior to starting work or upon discovery of such devices as work progresses. Covering smoke detectors with tape, rubber gloves, or any other method that can agitate or damage a detector is prohibited.
- D. Contractor is subject to fines by the Cities of Houston, Bastrop/Smithville Fire Marshal or Fire Department Inspector if they are found to negligently activate fire alarm devices.

- E. For large or high dust generating Projects, the Contractor shall coordinate with their Project Manager or MD Anderson Representative to arrange for the replacement of smoke detectors with heat detectors. Environmental Health and Safety must approve all changes to any fire alarm or suppression systems.
- F. Combustible scrap, trash, and debris shall be removed from the Project site on a daily basis, or, more frequently as required.
- G. Contractor shall not tape back door lock/latch mechanisms nor prop open any exterior door, security door, stairwell door, or fire / smoke door. Lock cores shall not be removed. Coordinate changing lock cores to the designated construction core lock with your MD Anderson Representative.
- H. Flammable products shall be limited to one days supply inside the building. Flammable products shall be stored outside the building or in approved UL Rated flammable storage cabinets. Flammable liquids shall be in approved safety cans or cans designed for their use.
- I. No internal combustion engines or portable propane heating devices are allowed in any Institutional buildings unless approved by the Owner. Coordination of how gasoline will be transported through buildings and stairwells must be coordinated with your MD Anderson Representative.
- J. Absolutely no gasoline will be allowed inside MD Anderson owned buildings. For temporary use outdoors, only approved metal safety cans will be permitted.
- K. Compressed flammable gas cylinders (i.e acetylene) shall not remain inside the building overnight and must be removed from the premises at the conclusion of each workday. Oxygen cylinders must also be removed from the premises at the end of each workday. Gas bottles are not allowed to be stored in areas that are used as Contractor offices.
- L. The Contractor shall also have the Material Safety Data Sheets (MSDS) for each gas used available within 15 minutes when requested. .
- M. Compressed flammable gas cylinders, while on the project site, shall be secured by chain or other suitable method to prevent tipping or falling over. All safety caps shall be securely installed when tanks are not in use.
- N. When working in the ceiling space or on rated fire/smoke rated walls and structures, all holes and penetrations for wires, conduits, piping, etc. shall be sleeved and sealed with a UL approved fire caulking / sealing compound at the end of each workday. Any holes that must remain overnight must be sealed with an equivalent temporary fire proofing material as approved by the MD Anderson Representative.
- O. Work on fire sprinkler and detection systems shall continue until the system operation is fully restored. No impairments will be allowed to extend beyond approved periods of time or during times when the site is unattended.
- P. Shutdown of any fire suppression or detection systems/devices shall be coordinated through the Owner's Designated Representative. Unauthorized shutdown or disabling of life safety systems shall be grounds for immediate removal from the jobsite.
- Q. All Contractors are required to supply and maintain a minimum of one currently tagged ABC fire extinguisher, 10 pound (Class 2-A) or greater. The use of a M. D. Anderson owned fire extinguisher will not be permitted. Requirements are as follows:
 - 1. Indoors - Within 100 feet of any Class-A hazard, within 25 feet of any hot work and one for every 3000 square feet of floor space.
 - 2. Outdoors – between 25 - 50 feet of any hot work.

- R. All Contractor employees shall be trained on the proper use and handling of fire extinguishers.
- S. If a Project involves multiple locations on a single floor or on multiple floors, additional multi-purpose fire extinguishers are required.
- T. The Owner may require additional extinguishers as dictated by the risk of each project or project area.

3.15 FIRE REPORTING AND EVACUATION PLAN

- A. Contractor shall establish a designated emergency evacuation assembly area for all Projects prior to starting work. Contractor shall train all employees on assembly area locations and how to get to each area.
- B. For areas that do not allow a clear view of egress route, the Contractor must post easy to understand maps, that are clearly visible to all workers and visitors, of the proper exit paths as required by OSHA and NFPA.
- C. In the event of a fire alarm, all work is to stop, all sources of ignition or hazardous work shall be immediately halted and all personnel are to proceed to the door of the construction site and wait for further instructions.
- D. In the event of a smoke, fire, or emergency incident the following procedures should be followed:
 - 1. RACE – Rescue, Alarm, Confine, Evacuate/Extinguish
 - a. Rescue: rescue Patients, Visitors, Employees
 - b. Alarm: a fire alarm pull station should be activated as quickly as possible or call 911.
 - c. Confine: confine the fire or smoke by closing all doors to the area.
 - d. Evacuate/Extinguish: extinguish the fire after you have performed the above operations but only if you can do it safely.
- E. When reporting a fire by phone:
 - 1. The caller should provide their name, the location of the fire, and a brief description of the incident. The caller should not hang up until emergency services personnel instruct them to do so.
 - 2. The caller should be prepared to guide the Fire Alarm Response Team and Emergency Responders to the fire location.
- F. All Contractor personnel shall report to their designated assembly area immediately. Contractor must coordinate the Designated Assembly Area with their MD Anderson Representative prior to the beginning of the project.

3.16 GENERAL SITE CONDITIONS – LIFE SAFETY

- A. Contractors will comply with all OSHA and NFPA life safety requirements as related to emergency exiting and lighting for construction areas.
- B. For areas that do not allow a clear view of egress route, the Contractor must post easy to understand maps, that are clearly visible to all workers and visitors, of the proper exit paths as required by OSHA and NFPA. Contractor should coordinate the creation of these maps with their MD Anderson Representative.

- C. Contractors are required to maintain any required temporary signs directing to exit routes. These signs shall be externally or internally illuminated by lighting that is either on emergency power or of the luminescent "glow-in-the dark" type.
- D. All temporary lighting and bulb protective devices shall be maintained and in good working condition. Wiring for temporary lighting shall be removed at the conclusion of the Project scope.
- E. All emergency exit doors must be maintained and in good working order. Paths to exits must remain clear at all times.
- F. Depending on the size of the project site and number of Contractors working in the site, a Contractor may be required to maintain at least two clearly marked exits per NFPA 101 and 241 requirements.
- G. All exits must be clearly marked with the words "EXIT" or "EMERGENCY EXIT". Doors that the Contractor does not want to use for daily access may be marked with the words "EMERGENCY EXIT ONLY".
- H. Lock all entry doors/gates to the project site. Due to life safety requirements, chains and/or pad locks will not be permitted on any door. Contact your M.D. Anderson Representative for the proper lock cores and keys.
- I. If a combination key pad is installed on a jobsite, the door must also be equipped with a construction core to ensure emergency personnel maintain access to the site. Key pads without a construction core will not be permitted. Contractor must also ensure that the combination to the key pad is not posted on the wall or door of the site. If this occurs, the combination must be changed immediately.

3.17 HAZARD COMMUNICATION (HAZCOM)

- A. The Contractor shall provide training and maintain documentation that their personnel and Subcontractors have received proper training in Hazard Communications under the provisions of OSHA's requirements in 29 CFR 1910.1200 and/or 1926.59.
- B. A printed, legible copy of the Material Safety Data Sheet (MSDS) shall be made available within 15 minutes of a request for each chemical used on the job site.

3.18 HAZARDOUS WASTE AND WORK IN HAZARDOUS LOCATIONS

- A. Owner chemical, biological or radioactive materials (hazardous substances and equipment) must be moved or secured prior to beginning work in any area. Contractor shall coordinate the removal of these items with their MD Anderson Representative.
- B. The Contractor's MD Anderson Representative will coordinate any pre-site assessments with Environmental Health and Safety, the laboratory principle investigator, clinic representative or laboratory manager to prevent disturbing experiments/animals or creating accidents.
- C. All Contractors must have permission from their MD Anderson Representative and the laboratory manager or clinic representative before entering laboratory or hospital clinical work areas.
- D. Disposal of all hazardous wastes generated by Contractor activities is the responsibility of the Contractor. All wastes must be removed from the premises.
- E. Absolutely no chemicals, trash, paint, paint brush rinse, shop vacuum contents, excess materials, sand, dirt, etc. may be disposed of in storm sewers/drains or sanitary drains.
- F. Contractor must prevent dirt from entering exterior storm drains by adding appropriate silt protection screen material to all exterior drains that may be impacted by the project.

- G. Contractor must follow all requirements set forth in the Storm Water Pollution Prevention Plan (SWPPP) as indicated in the appropriate Project Specification (Section 01 57 23). Consult the Environmental Health and Safety Office (713-792-2888) for questions regarding environmental permitting and plans.
- H. All hazardous waste, fuel, oils, and chemicals stored outdoors must have adequate secondary containment to prevent discharge onto the ground or in storm or sanitary sewer drains. All containers must be stored to prevent theft or unauthorized access. All containers outdoors must also be protected from weather elements and secured from public access.
- I. Contractor shall ensure that adequate spill protection equipment and supplies are readily available during all equipment refueling activities.

3.19 HOT WORK PERMITS

- A. A valid and signed Hot Work Permit must be obtained anytime all work being implemented involves the use of any incendiary or heating devices such as:
 - 1. Electric Arc Welding
 - 2. Oxygen Acetylene Welding
 - 3. Tig/Mig Welding
 - 4. Cutting/Soldering
 - 5. Propane Torch
 - 6. High Heat Producing Sources
 - 7. Spark Producing Activities
 - 8. Gasoline or Propane Powered Equipment used Indoors
- B. All Smithville/Bastrop hot work applicants must go to Physical Plant Management and fill out a blank Hot Work Permit. Instructions on how to properly fill out the permit are available.
- C. Permits to work on ANY medical gas systems must be obtained from the Facilities Department responsible for that area prior to work.
- D. Hot Work Permits shall be completed by the Contractor 24 hours in advanced and once approved, posted in the vicinity of any burning or welding operations that are to be completed inside or near a building or enclosure. Permits may be issued for up to three (3) days duration only when the work operation is to be continuous in a single area and so approved by the Owner.
- E. Hot work applicants must contact the designated Facilities Building Manager or your MD Anderson Representative for specific hot work permitting requirements for the facility in which they are working.
- F. Responsibilities of the Contractor:
 - 1. It is the responsibility of the contractor, vendor, and/or UTMDACC personnel to read, understand, and acknowledge sections I, II, and III of the Hot Work Permit.
 - 2. It is the responsibility of the contractor, vendor, and/or UTMDACC personnel to acknowledge and abide by all precautions stated in section III of the Hot Work Permit.
 - 3. It is the responsibility of the contractor, vendor, and/or UTMDACC personnel to complete and sign the appropriate sections of the Hot Work Permit 24 hours prior to the start date of the work to be performed.

4. Projects that are to begin on Saturday, Sunday, or Monday must have Hot Work Permit request form completed by the preceding Friday.
5. Contractors are responsible for ensuring all of their authorized and affected employees are trained on the significance of Welding, Cutting, and Brazing procedures in accordance with OSHA regulations 29 CFR 1910.252 - 1910.255.
6. At the end of any cutting operation or at the end of the day, all fuel gas cylinders must be removed from the facility. Fuel gas cylinders WILL NOT be allowed to remain in the facility overnight.
7. Anti-flashback arrestors shall be installed at the base of all Oxy-Acetylene cutting torches or at the pressure regulator gauges where the hoses are attached, unless the torch is equipped with a built-in arrestor. Only friction strikers shall be used to light and re-light Oxy-Acetylene torches.
8. Fire Watchers shall be posted at every operation that produces sparks, flames or sufficient heat to create an ignition. Watchers shall be trained in the use of extinguishers, shall keep other people from entering exposure areas, and shall not be assigned other duties until the rekindling ("smolder watch") possibility is over. Additional fire watch personnel shall be posted in all areas in which hot work sparks, slag, heat, etc. go beyond the sight of the primary fire watch.
9. Except in a fabrication shop or in front of a properly guarded grinding wheel, the person performing the work may not act as a watcher. When sparks, slag, or fire may fall to a different level, a separate watcher shall monitor each level directly below the work (including exterior locations).
10. Heaters for welding electrodes shall have a manufacturer's label that certifies the purpose of the unit. Job-built heaters shall be prohibited.
11. The remains of welding electrodes shall be picked up and disposed of as soon as each electrode is expended. No welding electrode shall be permitted to fall and remain in the work area.
12. All temporary fabrication areas shall be approved by the Facility Manager prior to starting work.

3.20 HURRICANE / SEVERE WEATHER PLANS FOR CONSTRUCTION SITES

- A. Construction sites may be required to have a Hurricane/Severe Weather Plan special to that site. Consult with your MD Anderson Representative for applicability, as some departments may require this Plan for small projects.
- B. A copy of the Hurricane/Severe Weather Plan must be submitted to your respective MD Anderson Representative prior to starting work.
- C. The Texas Medical Center (TMC) Emergency Preparedness Office or Campus Director (Smithville/Bastrop) will issue warning levels in the event of possible flooding or hurricanes. Contractors are urged to learn more about the TMC warning system by contacting their MD Anderson Representatives.

3.21 IDENTIFICATION (ID) BADGES

- A. It is the policy of The University of Texas MD Anderson Cancer Center to issue an identification (ID) badge to each employee and to all Temporary Agency and Contractor personnel.
- B. All badge requests must be processed by the MD Anderson department (i.e., PCF, REF, CPM, AFCCO, etc.) that is issuing the contract for work.

- C. ID badges must be worn at all times in a highly visible manner while on property owned or under the control of the Institution.
- D. Contractors are responsible for returning any badges for personnel that will no longer be providing services to the Institution within one week after termination or conclusion of Project.
- E. The badge must be clearly visible to someone facing the wearer.
- F. A fee may be required to replace a lost Contractor badge. Lost identification badges that have programmed electronic access must be reported to the contracting department representative (i.e. Project Manager) immediately.
- G. Personnel not wearing proper identification may be subject to immediate removal from the jobsite.

3.22 INTERIM LIFE SAFETY MEASURES (ILSM) GUIDELINE

- A. Interim Life Safety Measures (ILSM) – Is a series of administrative actions required to temporarily compensate for significant hazards posed by existing National Fire Protection Association 101, 2009 Life Safety Code (LSC) deficiencies or construction activities.
- B. All Contractors are required to abide by any ILSM requirements that may be implemented by the Owner due to a temporary deficiency/hazardous condition and must be continuously enforced through Project completion or until the deficiency is corrected. Each Contractor shall be responsible for ensuring all personnel on site are aware of the Interim Life Safety Measures implemented.
- C. Contractors may be required to keep daily logs of the condition of their jobsites.

3.23 LADDER SAFETY

- A. Ladders must be inspected prior to each use. Defective ladders shall be immediately removed from service and removed from the job site.
- B. Ladders shall be used only in accordance with the manufacturer's labeled instructions.
- C. Stepladders shall be used only in the fully open position with spreaders locked in place. Using a folded stepladder leaned against a support is prohibited.
- D. Employees shall not stand on the top platform, the step below the top platform or the back stretchers.
- E. Do not sit on, or straddle the top platform.
- F. Stepladders shall not be used for access to platforms or other elevated areas – an extension ladder is required.
- G. Extension ladders must be properly positioned and locked in place.
- H. Extension ladders used for access to elevated areas shall extend at least three feet beyond the supporting structure.
- I. Extension ladders must be secured to the supporting structure or be held at the base by another employee.
- J. Job built ladders shall conform to applicable ANSI Standards AND shall be limited to use in excavations or concrete form work only. These types of ladders must be inspected daily.
- K. At the end of each workday, remove and store, or secure from use all portable and job-built ladders that provide ground access to any elevated platform or structure so as to prevent unauthorized access.

- L. Chaining ladders to equipment or mechanical, electrical, or plumbing fixtures or piping is prohibited. Ladders must be stored in a manner to prevent blocked fire exits or escape routes. Ladders must not block access to equipment or facilities.
- M. Portable stepladders and extension ladders shall be rated class I-A.
- N. Ladders that have multiple sections that can be manipulated to form multiple surfaces and angles are not allowed.
- O. Aluminum ladders are prohibited.
- P. All exceptions to these requirements must be approved by MD Anderson Environmental Health and Safety.

3.24 LOCK OUT / TAG OUT

- A. It is the policy of The University of Texas MD Anderson Cancer Center that its employees and Contractors are protected from all energy sources during maintenance and repair activities.
- B. Each facility has a Lock Out/Tag Out program. Contractors whose work will involve the Lock Out/Tag Out process shall comply with the provisions of the respective Facilities Management program and procedures. If there is a difference between the Contractor's program and the Institution's program, the more stringent procedure shall prevail.
- C. Lock Out/Tag Out procedures may be specific to each type of equipment or device. Consult with the Facility Maintenance Department for specific procedures.
- D. Contractors are responsible for ensuring all of their authorized and affected employees are trained on the significance of Lock Out/Tag Out procedures in accordance with 29 CFR 1910.147 and must follow these requirements.
- E. Only the authorized employee or Contractor who applied a device is allowed to remove his/her lock out or tag out device from each energy-isolating device so energy can be restored to the equipment. MD Anderson personnel may add locks or tags to tagged-out devices – Contractors are not allowed to remove these locks or tags.
- F. Never remove another person's tag/lock. Unauthorized removal of tags/locks will be grounds for immediate and permanent removal from the jobsite.
- G. If tags/locks remain on equipment, contact the appropriate personnel or department for resolution to the removal process.

3.25 MAINTAINING INDOOR AIR QUALITY (IAQ) DURING CONSTRUCTION AND RENOVATION ACTIVITIES

- A. It is critical to our patient's health that proper controls are in place to ensure indoor air quality is maintained during construction and renovation activities. These activities disturb existing dust and/or create new dust, which causes the release of Aspergillus and other mold spores into the air. These spores can result in serious complications, and potentially death, for immuno-compromised individuals.
- B. The guideline covers all Contractors involved in building maintenance, construction, renovation and/or repair and applies to all areas of the Institution.
- C. An Indoor Air Quality (IAQ) Permit may be required for every Project, no matter the duration. The permit explains the requirements needed to maintain the best possible air quality outside the work site.

- D. This permit shall be posted at the site and shall remain posted until the completion of the Project.
- E. EH&S will perform periodic inspections, verify that the proper controls are in place and will periodically monitor sites with instruments used to measure applicable indoor air quality (IAQ) parameters.
- F. Contractor must follow the requirements of the Indoor Air Quality Permit and the Maintaining Indoor Air Quality During Construction and Renovation Policy.
- G. See Attachment A for the "Maintaining Indoor Air Quality During Construction and Renovation Policy" for the requirements that must be followed for each Project. This policy is a guide to the minimum protective measures that are to be in place prior to start of all Projects.

3.26 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- A. The minimum OSHA requirements for Personal Protective Equipment (PPE) shall be required of ALL persons on the Project site. Each Contractor/Subcontractor shall provide their workers with all required PPE. The Contractor is responsible to ensure that PPE is inspected and maintained in proper condition.
- B. Safety Hard Hats: When required, every person in the Project shall wear a hard hat that meets the minimum OSHA requirements.
- C. When required, hardhats are to be worn and maintained in accordance with the manufacturer's recommendations. "Cowboy" style hard hats shall not be allowed, including ANSI approved hats. Hard hats that display noticeable wear or damage shall be replaced or repaired per manufacturer's specifications.
- D. Eye Protection: When required, every person on the Project shall wear eye protection. Additional face protection may be required when work operations create airborne particles, chips, or sparks. Eye protection and face protection shall meet the minimum OSHA requirements. .
- E. Shoes: When required, every worker on the Project shall wear shoes that have soles with a resistance to punctures, leather or leather equivalent uppers that cover the entire foot and ankle and offer resistance to scrapes and cuts. Sandals, open-toed shoes, dress loafers, high-heels, fabric shoes and all athletic style shoes (including those with ANSI markings) are prohibited.
- F. When required, exterior toe and metatarsal cover shall be used when activities involve impact exposures to the feet (ie; jackhammering, water blasting, concrete demolition etc), unless the shoe has this protection built into the footwear.
- G. Clothing: When required, sleeve length shall cover the ball of the shoulder. Shirts shall not have noticeable holes, be long enough to be tucked into pants and be free of profanity, objectionable, or obscene messages. Pants shall be full length and without excessive holes.
- H. Hearing Protection: When required, employees shall be provided with hearing protection against the effects of noise exposures from machines, equipment or surrounding operations generating sound levels that exceed OSHA hearing protection requirements. Employees required to use hearing protection shall be tested and trained in the use and limitations of such protection.
- I. Hand Protection: When required, employees handling materials or equipment with potential hand injury hazards shall be provided with appropriate hand protection.

- J. Harnesses, Lifelines, and Lanyards: When required, employees working in areas where there is an exposure to falls of heights greater than six (6) feet, regardless of work activities (i.e. steel erection, leading edge work, scaffold use, and brick masonry) shall be protected by measures that are equal to or better than fall restraint/arrest systems.
- K. Respiratory Protection: When required, employees shall be provided with respirators when it is necessary to protect them from inhalation of toxic or harmful gases, vapors, mists, fumes, and dust.
- L. When required, employees required to use respiratory protective equipment shall be medically qualified and thoroughly trained in the use and limitations of such equipment. Employer must demonstrate compliance with OSHA 29 CFR 1910.134.
- M. Other PPE: When required, employees working in areas where there is a possible danger to other parts of the body not listed above shall be protected by the appropriate PPE for that body part.

3.27 ROOF WORK

- A. All roof work must be approved by the Administrative Facilities Campus Operations (AFCO) - Chief Engineer at the campus you are working at prior to project start.
- B. All roof access to T. Boone Pickens Tower must be approved prior to access. This area contains multiple radio transmitters and receivers that emit harmful radio and microwaves. All personnel accessing this area must have attended the required training. Contact the building owner for training requirements.
- C. Contractor is responsible for ensuring that they are able to immediately contact emergency forces during an emergency event by providing cell phones, radios, or access to working phones within MD Anderson facilities. Contractor shall ensure personnel working on the jobsite know the address of the building.
- D. Any roof repairs that are performed around fresh air intakes shall be scheduled with Facilities Operations Group (713-563-9977) prior to any planned work. Contractor is required to provide fume control devices when performing roof repair, replacement, or installation to prevent odors from being transmitted inside the facility.
- E. Some areas of roofs may be restricted due to potentially hazardous exhaust from laboratories or processes. Contractor must obtain approval from their MD Anderson Representative before proceeding with entering any roof areas.
- F. Contractors are required to comply with all applicable OSHA Fall Protection requirements.
- G. Contact Facilities Operations Group Campus Operations (713-563-9977 or 713-563-1143) regarding proper davit use and tie-off areas.
- H. All roof work involving heated materials or open flames must have a valid hot work permit.
- I. The Contractor shall have a 20 pound ABC Fire Extinguisher on the roof and immediately available for use. Institutional fire extinguishers will not be loaned. Additional extinguishers must be provided as needed.
- J. All fire extinguishers must have current annual certification tags and in working order.
- K. All open flames must be continuously supervised.
- L. A 1-hour fire watch must be provided after any heated materials or open flames have been used during roof work. Fire watch personnel must perform a "touch test" to determine any residual hot spots. A laser thermometer is recommended. Fire watches could be up to two hours in duration.

- M. All propane bottles must be removed from the premises daily. Do not store propane cylinders in mechanical or roof spaces.
- N. All roofing materials shall be secured at the end of each workday to prevent disruption by wind and rain.

3.28 SANITATION AND HOUSEKEEPING

- A. Contractors and Subcontractors are responsible for ensuring that Project sites are effectively cleaned.
- B. "Effectively Cleaned" shall address all of the following issues:
 - 1. Place all construction waste, trash, and debris in a designated receptacle. Glass bottles shall not be permitted in the Project site. Trash must be removed on a daily basis as to prevent accumulation and attraction for pests. Contractor must have an approved method for removing trash from the jobsite (i.e., dumpsters, trucks, etc.) before starting work.
 - 2. Eating is not allowed on the jobsite. Limited amounts of soft drinks and water will be allowed but must be removed on a daily basis as to prevent attraction of insects or rodents.
 - 3. Contractor may only use PUBLIC restroom facilities assigned by their MD Anderson Representative. Contractors may not use staff restrooms.
 - 4. Any waste, trash, and/or debris created by the Contractor shall be cleaned (ie; sweeping, vacuuming, dust mopping, large debris removal etc.) at the end of the day to prevent accumulation of dirt and combustibles on the jobsite.
 - 5. Contractors are NOT allowed to use sinks or drains to clean materials or paint brushes.
 - 6. All holes and penetrations to the outside of the building must be sealed with an appropriate material as to prevent water, insects and rodents from entering the building.
 - 7. All windows must remain closed unless permission is granted by Environmental Health and Safety. All windows or penetrations used for ventilation purposes shall be protected from water, insect/rodent, and dust intrusion by use of protective covers and screen wire materials.
 - 8. Stack (or restack) all whole and scrap materials in locations that do not obstruct a clear pathway nor create a risk for toppling onto a person passing by the area.
 - 9. Place all hoses, cords, cables, and wires in locations that prevent them from damage and do not create tripping hazards.
 - 10. Restore all signs, barricades, fire extinguishers, guardrails, gates, etc. to proper locations and condition.
 - 11. Properly store and secure all flammable and combustible liquids and gases in proper containment or flammable storage cabinets.
 - 12. Collect and place all cut-off or waste pieces of rolling stock, as they are created, into waste or scrap containers. No rolling stock shall be permitted to fall and remain in the work area.
 - 13. Used shot strips from powder-actuated tools shall be properly maintained and disposed of in accordance with manufacturer's recommendations.

14. All puncture and impalement exposures shall be covered or eliminated as soon as they are created. Exposed ends of rebar are to be covered with material that is designed to prevent impalement of a 250-pound body from a fall of four (4) feet.
15. All work surfaces shall be maintained in level and smooth condition as to prevent rolling carts from catching and possibly falling over while in transit. Appropriate temporary fill materials shall be installed as warranted.
16. All wheeled equipment shall have non-marking wheels or tape shall be used over wheels when moving through non-project areas to prevent marking and damage to floor surfaces. Tape should be removed if adequate traction is required to perform a task. Tape can be removed once in job-site area.
17. Contractors shall only use their trash dumpsters or dumpsters designated by their MD Anderson Representative.

3.29 SITE POSTINGS

- A. Contractor shall securely post the required warning signs (as required by the Owner and OSHA) for the Project area(s).
- B. All signs must be approved by your MD Anderson Representative. Consult your MD Anderson representative regarding facility specific informational signs.
 1. Signs that warn of impending danger (i.e., CONSTRUCTION AREA – DO NOT ENTER)
 2. Signs that communicate the level of personal protective equipment that is required (i.e., HARD HATS AND SAFETY GLASSES REQUIRED)
 3. All necessary permits (i.e., Hot Work Permits, Indoor Air Quality Permit, ILSM and/or other State/Local Regulatory Agency Permits as required by law).
- C. These postings must consist of the required color, size, and character size lettering and/or symbols as required by OSHA and/or State/Local regulations.
- D. Signs must be made from a sturdy material that resists tearing and fading. Laminated signs are acceptable for indoor postings.
- E. All exterior Projects must contain the above noted required postings in all locations that warrant these warning signs and postings.
- F. A single location such as a plywood Project board is acceptable for posting required permits and project information signage. Any required permits should be protected from the elements by covering them in a laminate or waterproof material.
- G. Contractor shall install and maintain any additional signs, barricades, warning devices, and traffic warnings.

3.30 SCAFFOLDING

- A. All scaffold systems (any temporary elevated platform (supported or suspended) and its supporting structure (including its point of anchorage), used for supporting employees or materials or both) - shall follow the manufacturer instructions and adhere to all applicable OSHA requirements per each type of scaffolding device.
- B. Contractor shall be required to receive permission from MD Anderson Facility – Administrative Facilities and Campus Operations before erecting any suspension or stationary scaffolding system on roofs or attaching lines to roof davits. Consult with the MD Anderson Representative for approval before beginning any work.

- C. All ground-supported scaffolds shall bear a safety tag that indicates the safety status of the scaffold. The Contractor shall designate a universal Project system for tagging scaffolding that is to be used by any or all personnel.
- D. Training and documentation shall be required for all workers on the Project who will erect, maintain, dismantle, or use the scaffolding. A designated competent person must ensure scaffold use requirements are maintained and inspected at the beginning of each work shift as per OSHA requirements. Contractor shall maintain documentation to support this requirement.
- E. Contractor will ensure proper fall protection for employees is required and followed per OSHA requirements when using scaffolding and aerial lift.
- F. Mudsills and surrounding areas at the base of ground-supported scaffolds shall be maintained in a well-dressed and level condition. Scaffold feet shall be installed on all legs and the maximum number of diagonal braces shall be included in every scaffold section.
- G. Every work level shall be fully planked and toe board shall be included along open sides. Overhead protection shall be constructed where walk-through passages are allowed.
- H. Brakes shall be secure at all times on rolling scaffolds, except when being moved. Workers shall not be allowed on the platform when the scaffold is being moved.
- I. Rolling scaffolds shall not be used on uneven or unstable surfaces. Wheels shall be non-marking or temporarily covered with tape to prevent damage to floor surfaces when being moved through non-project areas.

ATTACHMENTS

“A” - Maintaining Indoor Air Quality During Construction and Maintenance Activities Policy

END OF SECTION 01 35 25

ATTACHMENT "A"

MAINTAINING INDOOR AIR QUALITY DURING CONSTRUCTION AND MAINTENANCE ACTIVITIES POLICY

Volume IV

Book F Environmental Health and Safety

Chapter 4 Construction Safety

Policy Number IV.F.4.02

Last Revised by EH&S: 04/18/07

PURPOSE	The purpose of this policy is to provide guidance for maintaining indoor air quality during activities such as construction, renovation, modernization, and structural repairs - particularly, to prevent Aspergillus and other mold spores from being generated or released into the air. These spores can result in serious complications, and potentially death, for immuno-compromised individuals.	
POLICY STATEMENT	It is the policy of The University of Texas MD Anderson Cancer Center (MD Anderson) to manage all construction, renovation, modernization, and structural repairs in a manner designed to minimize the potential for the spread of infections due to degraded air quality or environmental contamination.	
SCOPE	This policy covers all employees and contractors involved in construction, renovation, modernization, structural repairs and/or repair. This policy applies to all areas of the Institution.	
DEFINITIONS	<p>Bioaerosols: Microscopic live particulates such as spores, pollen, bacteria, and viruses.</p> <p>Construction, Renovation, Modernization, and Structural Repair Activities: Activities that disturb existing building features, which can cause or create the release of potentially harmful dusts or bioaerosols.</p> <p>Designee: Person(s) appropriately trained and able to demonstrate competency in assessing and determining appropriate infection control requirements.</p> <p>HEPA Filter: High-Efficiency Particulate Air (HEPA) filter.</p> <p>Infection Control Risk Assessment (ICRA): Using a risk assessment tool to determine the minimum level of controls used during a project to control potentially harmful dusts and bioaerosols.</p> <p>Pre-Construction Risk Assessment (PCRA): A comprehensive risk assessment tool that must be completed before a project starts. Major areas of review are Infection Control, Interim Life Safety Measures (ILSM), Utility Disruptions, Noise and Vibration.</p>	
RESPONSIBILITY	1.1	It is the responsibility of all MD Anderson personnel, contractors, and vendors to abide by the requirements of this policy to ensure a safe patient care, research, and work environment. Corrective actions shall be taken immediately when deficiencies are discovered.
	1.2.	The Environmental Health and Safety Department (EH&S), Infection Control, or designee may perform periodic inspections of the work site to monitor compliance with this policy.

ATTACHMENT "A"

MAINTAINING INDOOR AIR QUALITY DURING CONSTRUCTION AND MAINTENANCE ACTIVITIES POLICY

EXCEPTIONS	2.1	Any exception to this established policy is at the discretion of the Institutional Safety Committee. Procedural exceptions may be granted through Environmental Health and Safety or Infection Control (IC).
PERFORMANCE REQUIREMENTS	3.1	Activities that disturb existing building features, possibly causing or creating the release of potentially harmful dusts or bioaerosols, must be conducted in accordance with the required precautions listed in the implementation section of this policy.
	3.2	Prior to commencing Construction, Renovation, Modernization, and Structural Repair Activities, a Pre-Construction Risk Assessment (PCRA) must be obtained from the Environmental Health and Safety department or designee.
	3.3.	Project management shall provide personnel and equipment at all times while working on site for the purpose of containment and clean-up of dust and particulates in and around the work area. Equipment may include dust mops, wet mops, adhesive walk-off ("tacky") mats, buckets, HEPA-filtered vacuums, and clean rags for removing fine dust inside and outside the site and from equipment.
IMPLEMENTATION – (SEE MATRIX)	4.1	Use the infection control risk assessment (ICRA) matrix to determine the appropriate precautions that must be used.
	4.2	See matrix.

REFERENCES:

Joint Commission for Accreditation of Health Care Organizations, Environment of Care Standard EC.8.30

AIA, Guidelines for Design and Construction of Hospital and Health Care Facilities

Centers for Disease Control and Prevention, Guidelines for Environmental Infection Control in Health Care Facilities.

Approved by (Name):	Title:	Date:
Joseph Savala	Associate Vice President, Facilities Administration	04/18/2007
Matthew Berkheiser	Director, Environmental Health and Safety	04/18/2007
Jim Mathis	Program Director, Safety	04/18/2007
Bryan Galloy	Program Manager, Safety	04/18/2007

ATTACHMENT "A"
**MAINTAINING INDOOR AIR QUALITY DURING CONSTRUCTION AND
 MAINTENANCE ACTIVITIES POLICY**

INFECTION CONTROL RISK ASSESSMENT

Instructions on how to determine the appropriate indoor air quality measures for your project/activity	
Step 1	Determine the Risk Area using the Risk Areas Defined table (TABLE A)
Step 2	Determine the Activity Type on the left side of the Matrix table (ie, small, medium, large; TABLE B), then compare the project activity type to the risk area to determine the Class of Indoor Air Quality controls that are to be implemented
Step 3	Then select the appropriate Class of controls to be used on the project (LIST C)

TABLE -A-			
Risk Areas Defined			
RISK AREA 1	RISK AREA 2	RISK AREA 3	
<u>LOW RISK</u>	<u>MEDIUM RISK</u>	<u>HIGH RISK</u>	
Office areas not adjacent to high risk areas	Cancer Prevention Center	Admissions areas	BMT Patient Unit
Dock and Service Corridors	Place of Wellness	Inpatient units	Operating rooms
Physical Plant spaces	Kitchen(s)	Emergency Center	Sterile Processing
Boiler room		Mays Clinic – (Ambulatory Care Building)	Intensive Care units (ICU, PACU & MICU)
		Cafeteria	Pharmacy
		Laboratory Medicine	Pharmacy mixing areas
		Physical Therapy	Research labs
		Occupational Therapy	Laboratories involved with production of products for patient infusion
		All outpatient clinics	Waiting rooms
		Office areas adjacent to high risk areas	Proton Therapy Center
		Radiation Oncology	
		Sterile animal areas	
		Animal ORs	

Note: The current nature, adjacency to other areas, and use of a space may change the risk group determination and should be reviewed prior to start of planning and work.

ATTACHMENT "A"
**MAINTAINING INDOOR AIR QUALITY DURING CONSTRUCTION AND
 MAINTENANCE ACTIVITIES POLICY**

INFECTION CONTROL RISK ASSESSMENT

TABLE -B-			
Matrix			
Project Activity Types:	RISK AREA I <u>Low</u> Risk Areas <i>See risk area definition</i>	RISK AREA II <u>Medium</u> Risk Areas <i>See risk area definition</i>	RISK AREA III <u>High/Extreme</u> Risk Areas <i>See risk area definition</i>
<u>Small/Minor:</u> Inspections above ceiling that create minimal to no dust, minor repair, painting, (no patching), minor electrical work, plumbing, similar work with little or no drilling, cutting, or other dust-raising activity, opening into chases and concealed spaces. Normal maintenance activity.	Class I Precautions <input type="checkbox"/>	Class I Precautions <input type="checkbox"/>	Class I Precautions <input type="checkbox"/>
<u>Medium Scale Projects:</u> Installation of electrical and computer cabling, working in chases and concealed spaces, working above ceiling, replacing finishes, carpet removal, wall covering removal, cutting plaster and drywall, sanding and other dust making activity within a room or other controlled area, opening ceiling tiles (more than 16 square feet consecutive). Usually one to three shifts.	Class I Precautions <input type="checkbox"/>	Class II Precautions <input type="checkbox"/>	Class III Precautions <input type="checkbox"/>
<u>Large/Major Scale Projects:</u> Removing floor coverings, sanding plaster walls, wall demolition and construction, duct work, major ceiling work, major demolition of areas, particularly those open to patient care areas, work on HVAC systems that release dust. Usually more than three days work.	Class II Precautions <input type="checkbox"/>	Class III Precautions <input type="checkbox"/>	Class III Precautions <input type="checkbox"/>

ATTACHMENT “A”
MAINTAINING INDOOR AIR QUALITY DURING CONSTRUCTION AND
MAINTENANCE ACTIVITIES POLICY

INFECTION CONTROL RISK ASSESSMENT

LIST -C-
Recommended Infection Control Precautions, by Class

Class I Precautions

Indoor air quality permit posted at jobsite entrance, when required.
Control of Debris: use covered container to remove debris through internal hospital paths. Cover must be dust tight and secured to container, not just laid on top.
Protect patient care areas from activity, or enclose work area (close doors). Replace ceiling tiles promptly.
Minimize dust and dirt, clean or have area cleaned when work is complete and when dust or dirt builds up. Vacuum with HEPA filter type vacuum, and/or damp mop areas when work is complete.
Direct questions about work to Environmental Health and Safety.
Other precautions as assigned.

Class II Precautions

Indoor air quality permit required and posted at jobsite entrance
Protect patient care areas from activity by closing doors, or enclosing area with approved (6 mil minimum) fire retardant polyethylene plastic or equivalent. Replace ceiling tiles prior to removal of enclosures.
Use water spray mist to minimize dust when applicable (ie, cutting sheetrock).
Close off HVAC system openings (exhaust and supply) with plastic or equivalent. If exhaust must be maintained, use a “clean air” machine (HEPA-filter equipped), or powered HEPA filters in exhaust path, or exhaust directly to outside.
Use dust mats or tacky mats at entrances <u>inside</u> site (not to be used in public access hallways because of trip hazard). Wet mops areas during and after construction to remove and control dust and dirt with suitable cleaning agents.
Control of Debris: use covered container to remove debris through internal hospital paths. Cover must be dust tight and secured to container, not just laid on top.
Temporary barriers or containment vestibule— stationary (6 mil fire retardant polyethylene or drywall) or mobile containment (control cube).
Direct questions about work to Environmental Health and Safety.
Debris and supply routing pre-determined through PCRA evaluation.
Other precautions as assigned.

Class II Precautions: At Job Completion

Replace all ceiling tiles, or re-close ceiling.
Wipe down all horizontal surfaces (except floor and ceiling). Wet mop or extract floor with hospital approved disinfectant. If appropriate, vacuum all areas with HEPA filters on vacuum.
Clean the HVAC system diffusers as the enclosure is being removed, and operate system for 24 hours prior to final cleaning of job site.
Maintain all enclosures as practical until post-job cleaning complete. Use vacuum with HEPA filters during removal of barriers, as practical.
Schedule final cleaning of area by MD Anderson Housekeeping.
Other precautions as assigned.

ATTACHMENT "A"

MAINTAINING INDOOR AIR QUALITY DURING CONSTRUCTION AND MAINTENANCE ACTIVITIES POLICY

INFECTION CONTROL RISK ASSESSMENT

LIST -C-
Recommended Infection Control Precautions, by Class
Class III Precautions
Indoor air quality permit required and posted at jobsite entrance
Isolate the HVAC systems to minimize a route for dust movement. If exhaust is used to maintain the area negative in pressure to outside areas, the exhaust must go to the outside when possible. If existing exhaust systems are to be used, they must be non-recirculating exhausts. A pressure negative to the air in the patient care units must be maintained during construction activity, when feasible.
Use a "clean air" machine (HEPA-filter equipped), both to re-circulate air in the job site to reduce airborne dust, and to exhaust air from the job site, to maintain a pressure negative to the air outside the job site, so leakage will be into the job site. The same machine may be used for both purposes, if it has suitable capacity.
Provide construction separations that are fire resistive, and dust tight, constructed of sheet rock or limited combustion plywood. Enclose work areas prior to any demolition work or opening any walls or ceilings. If work is being done in public areas, use control unit technology (similar to units developed to remove asbestos in areas that could not be closed down) and "clean air" machines to maintain a pressure in the enclosure negative to the air outside the enclosure, with the exhaust going through a HEPA filter prior to releasing into the air in the patient care area.
Debris must be removed in tightly closed containers, with solid lid, or plastic taped into place. The debris removal containers should be vacuumed or wet-wiped prior to removal from the site, to remove all surface dust and dirt.
Create a construction ante-room where all clothing, tools, equipment, and other materials being removed are vacuumed or wet-wiped prior to being taken off site through the hospital patient care areas. The ante-room should be as clean as a patient care area. Cart wheels should also be cleaned, and run over a tacky mat, or similar method to assure no dust is tracked out via wheels. All persons must walk across the tacky mats to clean their feet. Any person who has dust, dirt, or materials on their clothing must vacuum it prior to leaving the ante-room areas. Tacky mats will be maintained to keep the surface tacky, and to replace or remove layers when they become dirty. The ante-room will be wet mopped frequently (several times a day in usual construction activity), or similar methods will be used to satisfy Environmental Health and Safety or Infection Control staff.
Seal all holes, penetrations, and openings in the construction barriers and walls which are part of the construction separation with appropriate materials. Sealed holes in fire rated separations must be equivalent in fire rating. Other holes must be sealed with tape and plastic, or similar materials which are strong enough to withstand the pressure differential without leakage.
When required, personnel working in the area must either change clothing prior to leaving the job site, or use shoe covers and cover clothing prior to leaving the area.
Direct questions about work to Environmental Health and Safety.
Debris and supply routing predetermined through the PCRA Evaluation.
Containment vestibule – stationary or mobile – (for work outside site).
Other precautions as assigned.

ATTACHMENT "A"
**MAINTAINING INDOOR AIR QUALITY DURING CONSTRUCTION AND
MAINTENANCE ACTIVITIES POLICY**

INFECTION CONTROL RISK ASSESSMENT

LIST -C-
Recommended Infection Control Precautions, by Class

Class III Precautions: At Job Completion

Maintain barriers and "clean air" machines (HEPA-filter equipped), in place as much as practical until final cleaning is complete. Removal of barrier materials should be accompanied by vacuuming using a vacuum with HEPA filters.
Clean HVAC system diffusers as closure being removed, and operate system for 24 hours prior to final cleaning of job and removal of barriers (to the extent practical based on the system). If necessary, allow the HVAC to blow into the site with the "clean air" machine catching the output of the supply, and the machine feeding the air to the returns.
Site must be thoroughly cleaned by damp-wiping all horizontal surfaces with a hospital approved disinfectant.
Schedule final cleaning of area by MD Anderson Housekeeping.
Other precautions as assigned.

END OF ATTACHMENT "A"

SECTION 01 45 00 - PROJECT QUALITY CONTROL

PART 1- GENERAL

1.1. RELATED DOCUMENTS

- 1.1.1. The Contractor's attention is specifically directed, but not limited, to the Uniform General and Supplementary General Conditions for University of Texas System Building Construction Contracts (UGC) for other requirements.

1.2. SUMMARY

- 1.2.1. This Section provides administrative and procedural requirements for Contractor quality control on the Project.
- 1.2.2. Specific quality-control requirements for individual construction activities are specified in the Sections that govern those activities. Requirements in those Sections may also cover production of manufactured products.
- 1.2.3. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures to fully comply with the Contract Document requirements in all regards.
- 1.2.4. Provisions of this Section do not limit the requirements for the Contractor to provide quality-control services required by the Contract Documents or the Authority Having Jurisdiction.
- 1.2.5. The following quality issues are addressed in detail in this Section:
 - 1.2.5.1. (1.3) Quality Control
 - 1.2.5.2. (1.4) Quality Assurance
 - 1.2.5.3. (1.5) Contractor Employed Testing Agency
 - 1.2.5.4. (1.6) Testing
 - 1.2.5.5. (1.7) Inspections
 - 1.2.5.6. (1.8) Preinstallation Meetings
 - 1.2.5.7. (1.9) Mock-ups

1.3. QUALITY CONTROL

- 1.3.1. Quality Control shall be the sole responsibility of the Contractor, unless specifically noted otherwise. The Contractor shall be responsible for all testing, coordination, start-up, operational checkout, and commissioning of all items of Work included in the Project, unless specifically noted otherwise. All costs for these services shall be included in the Contractor's cost of work.
- 1.3.2. The Contractor shall assign one employee to be responsible for Quality Control. This individual may have other responsibilities, but may not be the Contractor's Project superintendent or the Contractor's Project manager.

1.4. QUALITY ASSURANCE

- 1.4.1. The Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification,

monitoring and any other procedures deemed necessary by the Owner to verify compliance with the Contract Documents.

1.4.1.1. The Owner's quality assurance testing and inspection program is separate from Owner's commissioning program, as defined in Section 01 91 00 –General Commissioning Requirements.

1.4.2. The Contractor shall cooperate with and provide assistance to the Owner related to Owner's quality assurance procedures. Contractor shall provide to Owner ladders, lifts, scaffolds, lighting, protection, safety equipment and any other devices and/or equipment (including operators if required) deemed necessary by the Owner to access the Work for observation/inspection.

1.4.3. Owner may employ independent testing agencies to perform certain specified testing, as Owner deems necessary. The Contractor shall integrate Owner's independent testing services within the Baseline Project Schedule and with other Project activities.

1.4.4. Owner's employment of an independent testing agency does not relieve the Contractor of the Contractor's obligation to perform the Work in strict accordance with requirements of the Contract Documents.

1.5. TESTING AGENCY

1.5.1. The Contractor shall employ and pay for services of an independent testing agency to perform all specified testing requiring an independent agency, unless specifically noted otherwise.

1.5.2. Contractor's employment of an independent testing agency does not relieve the Contractor of the Contractor's obligation to perform the Work in strict accordance with requirements of the Contract Documents.

1.5.3. The Contractor Employed Testing Agency:

1.5.3.1. The testing agency must have the experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in the types of tests and inspections to be performed.

1.5.3.2. The testing agency shall comply with requirements of ASTM E 329, ASTM E 543, ASTM E 548, ASTM C 1021, ASTM C 1077, ASTM C 1093, and other relevant ASTM standards.

1.5.3.3. The testing agency's laboratory must maintain a fulltime engineer on staff to oversee and review the services. The engineer must be licensed in the State of Texas.

1.5.3.4. The testing agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.5.4. The Contractor shall not employ the same testing entity engaged by the Owner for the Project, without the Owner's written approval.

1.6. TESTING

1.6.1. Where specific testing is specified in a technical section of the Specifications or indicated in the Contract Documents, the Contractor shall bear all costs of such tests unless the Owner has expressly agreed in writing to pay for the tests.

- 1.6.2. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by the Owner unless otherwise indicated in the Contract Documents. Should the test return unacceptable results, the Contractor shall bear all costs of retesting and reinspection as well as the cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.
- 1.6.3. The Owner's Construction Inspector will schedule the Owner's testing services. The Contractor must assist the Owner's Construction Inspector to facilitate timeliness of such testing services.
- 1.6.4. The Owner may engage additional consultants for testing, air balancing, commissioning, or other special services. The activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements. The Contractor must cooperate with persons and firms engaged in these activities.
 - 1.6.4.1. The Contractor shall self-perform various tests to verify performance and/or operation of various systems. Test reports that document the tests shall be consecutively numbered and defined by scope and extent of the test. Copies of the test report forms can be obtained from the Owner. The following Owner test report forms are examples of forms that shall be used for this purpose and shall not be altered in any manner:
 - 1.6.4.1.1. Pipe Test Report.
 - 1.6.4.1.2. Duct Test Report.
 - 1.6.4.1.3. Equipment or System Start-up/Request for Inspection.
 - 1.6.4.1.4. Contractor's Request for Utility Shutdown.
 - 1.6.4.1.5. Domestic Water Sterilization and Flushing Report.

1.7. INSPECTIONS

- 1.7.1. All of the Work is subject to inspection and verification of correct operation prior to 100% payment of the line item(s) pertaining to that aspect of the Work.
- 1.7.2. The Contractor shall incorporate adequate time for performance of all inspections and correction of noted deficiencies into the Work Progress Schedule for the Project.
- 1.7.3. During the course of construction, the Owner, Architect/Engineer, and/or other Owner representatives may visit the Site for observation of the Work in place. The Contractor shall provide all necessary personnel and/or equipment for safe access to the Work to be inspected or observed, regardless of frequency. This requirement shall extend to all Owner personnel and their representatives. Some of these inspections will be informal and some will require formal notification by the Contractor.
- 1.7.4. The Contractor shall provide a system of tracking all field reports, describing items noted, and resolution of each item. The Owner will review this printed report on a monthly basis, or as necessary.
- 1.7.5. The following are typical Project inspections:
 - 1.7.5.1. Informal Daily Reviews of Project conditions by the Owner's Construction Inspector and/or members of the Project Team. When considered appropriate, results of these reviews will be documented via Observation Reports or Memorandum.

- 1.7.5.2. Concealed Space Inspections shall be formally scheduled in advance by the Contractor through the Owner's Construction Inspector by submitting written notification at least five (5) calendar days prior to the inspection. Subject areas include partitions, structural walls, chases, crawl spaces, ceiling spaces, and any other Work, which will be difficult or impossible to examine once concealed in the final construction.
- 1.7.5.2.1. Contractor shall not enclose partitions, structural walls, chases, crawl spaces, ceiling spaces, and any other Work which will be difficult or impossible to examine once concealed in the final construction until Contractor has received written approval from Owner's Construction Inspector.
- 1.7.5.3. Progress Inspections for piping, ductwork, and other systems shall be scheduled by the Contractor through the Owner's Construction Inspector as appropriate portions, or sections, of the Work are completed. This is in addition to "system-wide" performance verification and tests. The Contractor shall schedule and document the tests using the standard Owner Pipe Test and Duct Test report forms. The Contractor shall conduct the tests and the Owner's Construction Inspector will witness and approve the results.
- 1.7.5.3.1. The Contractor shall coordinate their intended "apportioning" of systems tests with the Owner's Construction Inspector immediately following formal submission of their Work Progress Schedule so that all parties are aware of the intended Work and inspection sequence.
- 1.7.5.4. Overhead and Above Ceiling Inspections are similar in nature and requirements to the Concealed Space Inspections. Ceilings that are fixed in place, such as gypsum board or plaster, constitute a Concealed Space Inspection. Ceilings that are of "lay-in" type or where no finish ceiling is scheduled are considered an "overhead" inspection. Contractor shall include Overhead and Above Ceiling Inspections on the Work Progress Schedule. Contractor shall provide written inspection request notice to the Owner's Construction Inspector and Architect/Engineer at least five (5) calendar days in advance.
- 1.7.5.4.1. No finish ceiling material shall be installed until all overhead punchlist items have been resolved to the satisfaction of the Owner.
- 1.7.5.4.2. Completed Work in place necessary for an Overhead Inspection shall include all required infrastructure and appurtenances, inclusive of, but not limited to the following.
- 1.7.5.4.2.1. Installation of ceiling grid or framework.
- 1.7.5.4.2.2. Installation and operation of all above ceiling electrical Work, including light fixtures.
- 1.7.5.4.2.3. Installation of all HVAC and plumbing Work above ceiling with installation and connection of terminal units and air devices.
- 1.7.5.4.2.4. Installation of fire sprinkler heads.
- 1.7.5.4.2.5. Completion and Owner approval of all required tests for above ceiling Work.
- 1.7.5.5. Inspections of Building Systems and Equipment are intended to confirm acceptable operation. Contractor shall formally schedule inspections through the Owner's Construction Inspector and Architect/Engineer utilizing Owner's Inspection Request Form. Refer to Section 01 91 00 –General Commissioning Requirements and to

Technical Specifications for additional requirements pertaining to system start-up, commissioning, operation, demonstration, and acceptance.

- 1.7.6. The Contractor shall perform a thorough checkout of operations with the manufacturer's representatives prior to requesting the formal inspection by the Owner. Contractor must notify the Owner's Construction Inspector, in advance, as to when the manufacturer's representative is scheduled to arrive at the Site.
- 1.7.7. Inspection and documented approval of individual equipment and/or system(s) must be accomplished prior to requesting Substantial Completion Inspection for any area affected by said equipment and/or system.
- 1.7.8. For "building-wide" and/or life safety systems, such as emergency lighting, emergency power, uninterruptible power supply systems, fire alarm, fire sprinkler systems, smoke evacuation systems, toxic gas monitoring, captured exhaust systems, etc., the formal start-up inspection shall be completed prior to requesting Substantial Completion Inspection for any area of the Project.
 - 1.7.8.1. The manufacturer's representatives and the installing contractor shall demonstrate both operation and compliance to the Owner's agents and consultants. If coordinated and scheduled appropriately by the Contractor, these equipment and/or systems inspections may also serve to provide the required Owner training, if approved in advance by the Owner.
 - 1.7.8.2. The Contractor is responsible for requesting that the Owner's Construction Inspector and Architect/Engineer arrange for the inspection of materials, equipment, and Work prior to assembly or enclosure that would make the materials, equipment, or Work inaccessible for inspection and at other times as may be required.
- 1.7.9. For any requested inspection, the Contractor shall complete prior inspections to ensure that items are ready for inspection and acceptance by the Owner and/or Architect/Engineer. The Contractor shall be responsible for any and all costs incurred by Owner and/or Owner representatives, including consultants, resulting from a review or inspection that was scheduled prematurely.
- 1.7.10. The Contractor shall coordinate the Work and schedule the inspections in advance so as not to delay the Work. All major inspections shall be indicated on the Work Progress Schedule for advance planning. Contractor shall allow a minimum of five (5) calendar days to confirm schedule of requested inspections with Owner and Owner's representatives.

1.8. PREINSTALLATION MEETINGS

- 1.8.1. The Contractor shall coordinate and conduct meetings to review the installation of major systems/equipment on the Project. As a minimum, Contractor shall schedule and conduct the Preinstallation Meeting(s) for the Work of each major building system. The Preinstallation Meeting(s) shall be convened following approval of system submittals and prior to commencement of system installation Work.
- 1.8.2. The purpose of the Preinstallation Meeting(s) is for the Contractor and all applicable subcontractors and/or suppliers and/or factory representatives to discuss all aspects of the installation of the particular system. Contractor shall direct special attention to the scheduled order of Work and any impact on or by any other building systems. Contractor shall develop a strategy acceptable to the Owner for start-up, inspection and acceptance, based on Contractor's Prefunctional Checklists, so that all parties are aware of what is expected and/or acceptable.

- 1.8.3. The Contractor shall ensure attendance of the installing subcontractor, manufacturer and/or supplier (if appropriate), supporting subcontractors involved in the installation, and any other parties involved in the phase of Work to be reviewed. Contractor shall notify the Owner and Architect/Engineer in writing at least five (5) calendar days in advance of the Preinstallation Meeting(s).
- 1.8.4. Each party shall be prepared to discuss in detail the staging, installation procedure, quality control, testing/inspection, safety and any other pertinent items relating to the Work being reviewed. Submittal approval shall be a prerequisite of the Preinstallation Meeting(s). At this meeting(s), Contractor shall review and discuss the Commissioning Plan, test procedures, scheduling, and logistics. Contractor shall bring the following to the Preinstallation Meeting(s), as a minimum, for review and discussion:
 - 1.8.4.1. Portion of the Initial Equipment List/Matrix applicable to the system under discussion.
 - 1.8.4.2. Draft of the Prefunctional Checklists.
 - 1.8.4.3. Current work schedule data pertaining to the beginning, start-up, inspection, and turnover phases anticipated for the particular system.
 - 1.8.4.4. Copy of all approved submittals for the system.
- 1.8.5. The Contractor shall take minutes of the Preinstallation Meeting(s) and distribute to all attending parties.
- 1.8.6. Whether required in the Technical Specifications or not, a Preinstallation Meeting(s) shall be conducted for the following Work, if included in the Project:
 - 1.8.6.1. Concrete.
 - 1.8.6.2. Masonry.
 - 1.8.6.3. Large Steel Fabrications.
 - 1.8.6.4. Waterproofing.
 - 1.8.6.5. Roofing.
 - 1.8.6.6. Exterior Glazing (including storefront and curtain wall).
 - 1.8.6.7. Door Hardware.
 - 1.8.6.8. Audio / Visual Equipment.
 - 1.8.6.9. Air Handling Units.
 - 1.8.6.10. Medical Gas Systems.
 - 1.8.6.11. All Other Mechanical and Electrical Systems.
- 1.9. MOCK-UPS
 - 1.9.1. Before installing portions of the Work requiring mock-ups, Contractor shall build mock-ups for each form of construction and finish required, using materials indicated for the completed Work.

- 1.9.2. Build mock-ups in location and of size indicated or, if not indicated, as directed by Architect/Engineer. The mock-up may be work in place that is intended to remain, unless otherwise directed by the Owner.
- 1.9.3. Notify Architect/Engineer and Owner five (5) calendar days in advance of dates, times, and locations of when and where mock-ups will be constructed.
- 1.9.4. Demonstrate the proposed range of aesthetic effects and workmanship. Demonstrate anticipated repairs in the mock-up, such as for stone veneer.
- 1.9.5. Obtain Architect/Engineer's and Owner's approval of mock-ups before starting work, fabrication, or construction.
- 1.9.6. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.
- 1.9.7. Demolish and remove mock-ups when directed by Owner, unless otherwise indicated.
- 1.9.8. As a minimum, Contractor shall prepare a mock-up for the following Work, if applicable to the Project. Owner may define additional mock-ups at the Pre-bid or Preconstruction Meeting.
 - 1.9.8.1. Exterior wall system to include: substructure, masonry/stone veneer, plaster, architectural concrete and windows.
 - 1.9.8.2. Roof system.
 - 1.9.8.3. Interior laboratory room; utilities serving laboratory casework.
 - 1.9.8.4. Interior patient care and prevention room.
 - 1.9.8.5. Interior wall finishes.
 - 1.9.8.6. Ceramic tile.
 - 1.9.8.7. Finished flooring.
 - 1.9.8.8. Plumbing battery for multiple-use toilet rooms.
 - 1.9.8.9. Medical gas headwalls.

PART 2- PRODUCTS (NOT USED)

PART 3- EXECUTION (NOT USED)

END OF SECTION 01 45 00

SECTION 01 45 29 – STRUCTURAL TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SCOPE OF WORK

- A. The Owner's Testing Laboratory: An independent testing laboratory will sample and test materials as they are being installed for compliance with acceptance criteria as specified and report and interpret the results. The laboratory shall monitor and report on the installation of constructed work and shall perform tests on the completed construction as required to indicate Contractor's compliance with the various material specifications governing this work. The owner shall be responsible for paying the testing laboratory for these services.
- B. The Contractor shall not engage the same testing laboratory for construction services as the Owner has for quality assurance testing, unless agreed to by the Owner.

1.03 SPECIAL INSPECTIONS

- A. The Owner's Testing Laboratory or a separate agency shall serve as a Special Inspector to provide Special Inspection services for the items listed below. The scope of such services for each item shall be as defined in the International Building Code - 2009 or as defined in the local building code of the jurisdiction wherein the project is located. These inspections are mandatory for conformance to the legal requirements of the building code and shall be in addition to the inspections and tests otherwise defined in this specification.
 - 1. Reinforcing Steel Placement
 - 2. Concrete Work
 - 3. Bolts to be Installed in Concrete and Their Installation to allow for higher allowable tension values
 - 4. Inspection of Structural Steel, Bolting, and Welding Material
 - 5. Welding of Structural Steel
 - 6. High-Strength Bolting
- B. Qualifications of Special Inspector: The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the Building Official, for inspection of the particular type of construction or operation being inspected. The Special Inspector shall meet the legal qualifications of the building code having jurisdiction.
- C. Duties and Responsibilities of the Special Inspector:
 - 1. The special inspector shall observe the work assigned to ascertain that, to the best of his/her knowledge, it is in conformance with the approved design drawings and specifications.

2. The special inspector shall furnish inspection reports to the Building Official, the Architect/Engineer, and the Owner. All discrepancies shall be brought to the immediate attention of the Architect/Engineer, Contractor, and Owner. A report that the corrected work has been inspected shall be sent to the Building Official, the Architect/Engineer, and the Owner.
3. The special inspector shall submit a final signed report stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance to the approved plans and specifications and the applicable workmanship provisions of the building code.

1.04 QUALIFICATIONS OF TESTING LABORATORY

- A. The Testing Laboratory shall meet the basic requirements of ASTM E329 and shall submit to the Owner, Architect, and Engineer evidence of current accreditation from the American Association for Laboratory Accreditation, the AASHTO Accreditation Program or the "NIST" National Voluntary Laboratory Accreditation Program.
- B. The Testing Laboratory shall be an Approved Agency by the Building Official of the city wherein the project is located to perform Special Inspections and other tests and inspections as outlined in the applicable building code.
- C. Tests and inspections shall be conducted in accordance with specified requirements, and if not specified, in accordance with the applicable standards of the American Society for Testing and Materials or other recognized and accepted authorities in the field.
- D. Qualifications of Welding Inspectors
 1. Inspectors performing visual weld inspection shall meet the requirements of AWS D1.1 Section 6.1.4. Welding inspection shall be supervised and the inspection reports signed by an inspector with current certification as an AWS Certified Welding Inspector (CWI)
 2. Inspectors performing nondestructive examinations of welds other than visual inspection (MT, PT, UT, RT) shall meet the requirements of AWS D1.1, Section 6.14.6.

1.05 AUTHORITIES AND DUTIES OF THE LABORATORY

- A. Attending Preconstruction Conferences: The Owner's Testing Laboratory shall receive from the Owner and review the project plans and specifications with the Architect and Engineer immediately upon receipt and prior to the start of construction. The Laboratory shall attend preconstruction conferences with the Architect, Engineer, Project Manager, General Contractor, and Material Suppliers as required to coordinate materials inspection and testing requirements with the planned construction schedule and shall participate in such conferences throughout the course of the project.
- B. Cost Proposal: The Testing Laboratory's proposal to the Owner shall contain unit price stipulations for specified tests and inspections and on an hourly basis for personnel. A total estimated price shall also be submitted.
- C. Cooperation with Design Team: The Laboratory shall cooperate with the Architect, Engineer, and Contractor and provide qualified personnel promptly on notice.
- D. The Laboratory shall perform the required inspections, sampling, and testing of materials as specified under each section and observe methods of construction for compliance with the requirements of the Contract Documents and the applicable building code.

- E. Inspections Required by Government Agencies: The Testing Laboratory shall perform inspections and submit reports and certifications as required by government agencies having jurisdiction over the aspects of the project covered by this specification.
- F. Notification of Deficiencies in the Work: The Laboratory shall notify the Architect, Engineer, and Contractor within 24 hours of discovery by telephone or e-mail, and then in writing of observed irregularities and deficiencies of the work and other conditions not in compliance with the requirements of the Contract Documents.
- G. Reports:
1. Information on Reports: The Laboratory shall submit copies of reports of inspections and tests promptly and directly to the parties named below. The reports shall contain at least the following information:
 - a. Project Name
 - b. Date report issued
 - c. Testing Laboratory name and address
 - d. Name and signature of inspector
 - e. Date of inspection and sampling
 - f. Date of test
 - g. Identification of product and Specification section
 - h. Location in the project
 - i. Identification of inspection or test
 - j. Record of weather conditions and temperature (if applicable)
 - k. Results of test regarding compliance with Contract Documents
 2. Copies: The Laboratory shall send signed copies of test and inspection reports to the following parties:
 - a. 2 copies to the Owner or his representative
 - b. 2 copies to the General Contractor
 - c. 1 copy to the Architect
 - d. 1 copy to the Engineer of responsibility
 3. Certification: Upon completion of the job, the Laboratory shall furnish to the Owner, Architect, and Engineer of Record, a statement signed by a licensed professional engineer that, to the best of their knowledge, required tests and inspections were made in accordance with the requirements of the Contract Documents.
- H. Accounting: The Testing Laboratory shall be responsible for separating and billing costs attributed to the Owner and costs attributed to the Contractor.

- I. Monitoring Product and Material Certifications: The Testing Laboratory shall be responsible for monitoring the submittals of product and material certifications from manufacturers and suppliers as specified in the Specifications and shall report to the Owner, Architect, and Engineer when those submittals are not made in a timely manner.
- J. Limitations of Authority: The Testing Laboratory is not authorized to revoke, alter, relax, enlarge upon, or release any requirements of the Specifications or to approve or accept any portion of the work or to perform any duties of the General Contractor and his Subcontractors.

1.06 CONTRACTOR'S RESPONSIBILITY

- A. Cooperation with Design Team: The Contractor shall cooperate with laboratory personnel, provide access to the work, and to manufacturer's operations.
- B. Furnishing Samples and Certificates: The Contractor shall provide to the laboratory certificates and representative samples of materials proposed for use in the work in quantities sufficient for accurate testing as specified.
- C. Furnishing Casual Labor, Equipment and Facilities: The Contractor shall furnish casual labor, equipment, and facilities as required for sampling and testing by the laboratory and otherwise facilitate the required inspections and tests.
- D. Advance Notice: The Contractor shall be responsible for notifying the Testing Laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests. Failure to sufficiently notify may result in additional costs incurred by the Testing Laboratory that may be back-charged to the Contractor by the Owner.
- E. Payment for Substitution Testing: The Contractor shall arrange for and pay for any additional samples and tests above those required by the Contract Documents as requested by the Contractor for his convenience in performing the work.
- F. Payment for Retesting: The Contractor shall be liable to the Owner for the cost for any additional inspections, sampling, testing, and retesting done by the Owner's Testing Laboratory as required when initial tests indicate work does not comply with the requirements of the Contract Documents.
- G. Payment by Contractor: The Contractor shall furnish and pay for the following items if required:
 - 1. Soil survey of the location of borrow soil materials, samples of existing soil materials, and delivery to the Contractor's Testing Laboratory.
 - 2. Samples of concrete aggregates and delivery to the Contractor's Testing Laboratory.
 - 3. Concrete mix designs as prepared by his concrete supplier.
 - 4. Site-situated storage boxes for concrete cylinders
 - 5. Concrete coring, tests of below strength concrete, and load tests, if ordered by the Owner, Architect, or Engineer.
 - 6. Certification of reinforcing steel mill order.
 - 7. Certification of structural steel mill order.
 - 8. Certification of portland cement, lime, fly ash.
 - 9. Certification of welders and preparation of Welding Procedure Specifications.

10. Tests, samples, and mock-ups of substitute material where the substitution is requested by the Contractor and the tests are necessary in the opinion of the Owner, Architect or Engineer to establish equality with specified items.
 11. The making and testing of concrete cylinders for the purpose of evaluating strength at time of form stripping or for post-tensioning or the time spent evaluating the in situ strength of concrete using the Maturity Method.
 12. Any other tests when such costs are required by the Contract Documents to be paid by the Contractor.
- H. Notification of Source Change: The Contractor shall be responsible for notifying the Owner, Architect, Engineer, and Owner's Testing Laboratory when the source of any material is changed after the original tests or inspections have been made.
- I. Tests for Suspected Deficient Work: If in the opinion of the Owner, Architect, or Engineer any of the work of the Contractor is not satisfactory, the Contractor shall furnish and pay for all tests that the Owner, Architect, or Engineer deem advisable to determine its proper construction. The Owner shall pay all costs if the tests prove the questioned work to be satisfactory.

1.07 PAYMENT OF TESTING LABORATORY

- A. The Owner will pay for the initial Laboratory services for testing of materials for compliance with the requirements of the Contract Documents. The Contractor will be liable to the Owner for the cost for testing and retesting of materials that do not comply with the requirements of the Contract Documents and shall furnish and pay for the testing and inspection of other items as specified in these Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 SCOPE OF WORK

- A. The work to be performed by the Testing Laboratory shall be as specified in this Section of the Specification and as determined in meetings with the Owner, Architect, and Engineer.

3.02 REINFORCING STEEL

- A. Mechanical Tension Splices: The Owner's Testing Laboratory shall provide 100% visual inspection of mechanical tension splices on the project. Inspection shall verify compliance with specifications and conformance with the manufacturer's recommendations for installation after consulting with the manufacturer, who is to be present for the first installation of the splice on the project. The Laboratory shall additionally conduct monotonic tension tests in accordance with ASTM A1034 of mechanical tension splices of the type as specified on the structural drawings. It is not necessary that the specimens to be tested are production splices, however, the specimens to be tested shall have been made by the Contractor's personnel under field conditions. The rate of testing shall be as follows:
1. Two specimens for the first 50 splices (or fraction thereof for small jobs) at the beginning of the job. Splices not meeting tension requirements shall be retested at Contractor's expense until all splices meet the tension requirements.
 2. One specimen for every 100 (or fraction thereof) additional splices occurring on the job. Any splices not meeting tension requirements shall be retested at Contractors expense until all splices have passed the test.

3. A minimum of one test specimen shall also be selected from transition splices (splices of one bar size to another bar size), if any.
- B. Compression Butt Splices: The Owner's Testing Laboratory shall provide 100% visual inspection of compression butt splices on the job. Inspection shall verify splice conformance with the requirements for end bearing splices as set forth in ACI 318 Building Code Requirements for Reinforced Concrete as well as the manufacturer's instructions.
- C. Reinforcing Steel Field Inspection: The Owner's Testing Laboratory or designated Special Inspector shall inspect 100 % of reinforcement before each concrete pour to verify the information noted below. Inspection reports shall be prepared and distributed in accordance with the local building code and as specified in this specification.
1. Primary and secondary, longitudinal reinforcement has correct size and number in proper layers.
 2. Longitudinal reinforcement has correct length and lap.
 3. Ties and stirrups are of correct size, spacing, and number and have the proper termination-hook geometry.
 4. Unscheduled face reinforcement in beams are provided and are of correct size, number and spacing and have the proper end terminations.
 5. Proper hooks are provided at bar ends as detailed.
 6. Reinforcement is properly supported and braced to formwork to prevent movement during concreting operation.
 7. Reinforcement has proper cover.
 8. Sufficient spacing between reinforcement for concrete placement.
 9. Dowel reinforcement is of proper size, at proper spacing, and has proper lap length and embedment length.
 10. Welded wire reinforcement is composed of flat sheets, has proper wire gage and spacing, is properly supported, and is properly lapped with a length of one square plus two inches.
 11. Proper Construction/Control/Expansion joint spacing and reinforcement.
 12. Reinforcement around embedded items is erected according to details.
 13. Welded reinforcement has been done according to AWS requirements. Review the Welding Procedure Specification (WPS) submitted by the contractor for any reinforcing steel other than ASTM A 706 that is proposed to be welded for consistency with acceptable welding practices and the AWS.
- D. Welded Reinforcing: Continuous inspection of the welding of reinforcing bars to ensure compliance with the requirements of AWS shall be done for the following items:

3.03 CONCRETE MATERIALS AND POURED IN PLACE CONCRETE

- A. Concrete Mix Designs: The Owner's Testing Laboratory shall review the submitted mix designs for conformance to the specifications and for suitability for use in the project. The Testing Laboratory shall attend the Mix Design Conference and the Pre-Concrete Conference as noted in the Cast-in-Place Concrete Specification.
- B. Job Site Inspection: The scope of the work to be performed by the inspector on the jobsite shall be as follows:
 - 1. Prior to Concrete Placing
 - a. Spread Footings
 - 1) Verify footing dimension.
 - 2) Verify top of footing elevation.
 - 3) Verify that forms are plumb and straight, braced against movement, and lubricated for removal.
 - 4) Inspect reinforcement per REINFORCING STEEL section.
 - 2. On-Site Concrete Material Testing and Inspection
 - a. Verify that the Contractor is following appropriate concreting practices consistent with any extreme environmental conditions at the point of placement in the structure as defined below.
 - b. Inspect concrete upon arrival to verify that the proper concrete mix number, type of concrete, concrete strength, and that it is meeting job specifications, is being placed at the proper location. Report concrete not meeting the specified requirements and immediately notify the Contractor, Batch Plant Inspector, Architect, Engineer, and Owner.
 - c. Inspect plastic concrete upon arrival at the jobsite to verify proper batching. Observe mix consistency and adding of water as required to achieve target slumps in mix designs. Record the amount of water added and note if it exceeds that allowed in the mix design. The responsibility for adding water to trucks at the job site shall rest only with the Contractor's designated representative. The Contractor is responsible that all concrete placed in the field is in conformance to the Contract Documents.
 - d. Obtain concrete test cylinders as specified below.
 - e. Perform tests to determine slump, concrete temperature, unit weight, and air entrainment as specified below. The slump tests shall be made on concrete taken from the same location from which the concrete for the test cylinders is obtained.
 - f. Record information for concrete test reports as specified below.
 - g. Pick up and transport to Laboratory, cylinders cast the previous day.
 - 3. During concrete placing, provide continuous monitoring to:
 - a. Verify that the concrete is not over 90 minutes old at the time of placement.
 - b. Verify that Hot-Weather or Cold-Weather techniques are being applied as required.
 - c. Verify that concrete deposited is uniform and that vertical drop does not exceed six feet and is not permitted to drop freely over reinforcement causing segregation.

- d. Verify that there are no cold joints.
 - e. Verify that the concrete is properly vibrated.
 - f. Verify that the finishing of the concrete surface is done according to specifications.
 - g. Verify that sawcut control joints on slab-on-grades are cut within 12 hours of placement.
 - h. Verify that the formwork has remained stable during the concreting operation.
 - i. Inspect bolts embedded in concrete prior to and during concrete placement for proper grade, size and length and verification they have been properly installed to the specified embedment.
4. Post-Installed Anchors in Concrete: Provide inspection of post-installed anchor installations at the frequency noted in the specifications and in accordance with the published, currently valid, Evaluation Service Report (ESR) for each anchor product.
- a. Periodic Inspection: Verify initial installation of post-installed anchors in concrete for each individual installer with each individual anchor product in accordance with the requirements stated below for each type of anchor. Periodically inspect anchor installation after the initial verification.
 - b. Continuous Inspection: Verify each installation of post-installed anchors in concrete in accordance with the requirements stated below for each type of anchor.
 - c. All Post-Installed Anchors: Verify that the anchor is installed in accordance with manufacturer's printed installation instructions as well as the following design requirements.
 - 1) concrete type, concrete strength and concrete thickness are in accordance with design drawings
 - 2) anchor manufacturer and product, including material, is in accordance with design drawings or approved substitution
 - 3) anchor diameter, length and installed embedment depth
 - 4) drill bit type and diameter
 - 5) anchor edge distance and spacing
 - 6) hole diameter and depth
 - 7) hole cleaning procedure and cleanliness
 - 8) anchor maximum tightening torque
 - d. Adhesive Anchors: In addition to the requirements for All Post-Installed Anchors, verify adhesive identification and expiration date.
 - e. The installation of all adhesive anchors shall be continuously inspected when anchors are subject to sustained tension loads, such as anchors for shelf angles and as noted on the drawings, or when anchors are installed in an upwardly inclined condition.
5. After Concrete Floor Placing and Finishing
- a. Verify that the curing process is according to specifications and that any curing compound used is applied in accordance with manufacturer's recommendations.

b. Floor Flatness and Levelness Measuring

- 1) The Testing Service providing Services for the Owner shall measure the floor for flatness and levelness according to ASTM E 1155.
- 2) Measurement of the finished concrete surface profile for any test section shall be made when requested by the Owner's Representative at his option. Notwithstanding, measurements shall be made within 24 hours after completion of finishing operations. For structural elevated floors measurement shall also be made prior to removal of forms and shores. The Contractor shall be notified immediately after the measurements of any section are complete and a written report of the floor measurement results shall be submitted within 72 hours after finishing operations are complete.
- 3) The concrete surface profile shall be measured using equipment manufactured for the purpose such as a Dipstick Floor Profiler as manufactured by the Edward W. Face Company in Norfolk, Virginia, F-Meters manufactured by Allen Face & Company in Norfolk, Virginia, optical, or laser means or other method specified in ASTM E 1155.
- 4) Each floor test section and the overall floor area shall conform to the two-tiered measurement standard as specified herein.
 - a) Minimum Local Value (MLV). The minimum local F_F/F_L values represent the absolute minimum surface profile that will be acceptable in any one floor test section.
 - b) Specified Overall Value (SOV). The specified overall F_F/F_L values represent the minimum values acceptable for all combined floor test sections representing the overall floor.
- 5) For purposes of this specification a floor test section is defined as the smaller of the following areas:
 - a) The area bounded by column and/or wall lines.
 - b) The area bounded by construction and/or control joint lines.
 - c) Any combination of column lines and/or control joint lines.
 - d) Test sample measurement lines within each test section shall be multidirectional along two orthogonal lines as defined by ASTM E 1155.
 - e) The precise layout of each test section shall be determined by the Owner's Testing Laboratory and shall be submitted for Architect/Engineer review and approval.

c. Testing of Concrete Floor Slabs for Acceptability to Receive an Adhesive-Applied, Low-Permeable Floor Covering

- 1) The following tests shall be performed by the Owner's Testing Laboratory as a part of quality assurance testing to insure that the proper moisture condition and alkalinity of the substrate has been achieved prior to installing adhesive-applied, low-permeability floor coverings such as vinyl composition tile (VCT), linoleum, sheet vinyl, vinyl-backed carpet, rubber, athletic flooring, synthetic turf, wood, acrylic terrazzo, thin-set tile, epoxy overlays and adhesives, et.al.
- 2) Moisture Vapor Emission Rate: Perform testing according to ASTM F 1869 to determine if the moisture emission rate from the floor is below the flooring manufacturer's maximum recommended value but not greater than 5lbs/1000sq.ft./24h.
- 3) Relative Humidity Determination Test: As an alternate to the Moisture Vapor Emission Rate Test, and if agreed to by the Contractor, Architect and Owner, perform testing according to ASTM F 2170 to determine if the relative humidity of the concrete slab is below the flooring manufacturer's maximum recommended value but not greater than 75%.

- 4) Alkalinity Testing: Perform testing in accordance with ASTM F 710-03, paragraph 5.3, to determine if the pH level of the concrete slab surface is below the flooring manufacturer's maximum recommended value but not greater than 10. Perform one test per 1000 sq. ft. with a minimum of three tests within the total area being tested.
6. The job site inspector shall report any irregularities that occur in the concrete at the job site or test results to the Contractor, Architect, Owner, and Engineer.
- C. Concrete Test Cylinders: The Owner's Testing Laboratory shall mold and test concrete test cylinders as described below.
 1. Cylinder Molding and Testing: Cylinders for strength tests shall be molded and Laboratory cured in accordance with ASTM C31 and tested in accordance with ASTM C39. Cylinders may be either 6" in diameter by 12" or 4" in diameter by 8", however, the diameter of the cylinder shall be at least three times the nominal maximum size of the coarse aggregate in the mix tested. All of the cylinders for each class of concrete shall be of the same dimension for all sets of that class.
 2. Field Samples: Field samples for strength tests shall be taken in accordance with ASTM C172.
 3. Frequency of Testing: Each set of test cylinders shall consist of a minimum of four standard test cylinders. A set of test cylinders shall be made according to the following minimum frequency guidelines:
 - a. One set for each class of concrete taken not less than once a day.
 - b. All Other Concrete: A minimum of one set for each 150 cubic yards or fraction thereof.
 - c. No more than one set of cylinders at a time shall be made from any single truck.
 - d. If the total volume of concrete is such that the frequency of testing as specified above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.
 - e. The above frequencies assume that one batch plant will be used for each pour. If more than one batch plant is used, the frequencies cited above shall apply for each plant used.
 4. The cylinders shall be numbered, dated, and the point of concrete placement in the building recorded.
 5. For concrete specified on the drawings to reach the required strength at 28 days, break one cylinder of the set at seven days, two 6" by 12" cylinders or three 4" by 8" cylinders at 28 days, and one kept in reserve for testing at the Engineers direction.
 6. For concrete specified on the drawings to reach the required strength at 56 days, break one cylinder at the set at seven days, one cylinder at 28 days, two 6" by 12" cylinders or three 4" by 8" cylinders at 56 days, and one kept in reserve for testing at the Engineers directions.

7. Cylinder Storage Box: The Contractor shall be responsible for providing a protected concrete cylinder wooden storage box at a point on the job site mutually agreeable with the Testing Laboratory for the purpose of storing concrete cylinders until they are transported to the Laboratory. The box shall be constructed and equipped to maintain the environment specified for initial curing in ASTM C31.
8. Transporting Cylinders: The Owner's Testing Laboratory shall be responsible for transporting the cylinders to the Laboratory in a protected environment such that no damage or ill effect will occur to the concrete cylinders including loss of moisture, freezing temperatures or jarring.
9. Information on Concrete Test Reports: The Owner's Testing Laboratory shall make and distribute concrete test reports after each job cylinder is broken. Such reports shall contain the following information:
 - a. Truck number and ticket number
 - b. Concrete Batch Plant
 - c. Mix design number
 - d. Accurate location of pour in the structure
 - e. Strength requirement
 - f. Date cylinders made and broken
 - g. Technician making cylinders
 - h. Concrete temperature at placing
 - i. Air temperature at point of placement in the structure
 - j. Amount of water added to the truck at the batch plant and at the site and whether or not it exceeds the amount allowed by the mix design
 - k. Slump
 - l. Unit weight
 - m. Air content
 - n. Cylinder compressive strengths with type of failure if concrete does not meet Specification requirements. Seven day breaks are to be flagged if they are less than 60% of the required 28 day strength. 28 day breaks are to be flagged if either cylinder fails to meet Specification requirements.
10. Standards for Tests of Concrete :
 - a. Slump Tests: Slump Tests (ASTM C143) shall be made at the beginning of concrete placement for each batch plant and for each set of test cylinders made. The slump test shall be made from concrete taken from the end of the concrete truck chute. The concrete shall be considered acceptable if the slump is within plus or minus 1 inch of the slump noted on the mix design submittal form for that class of concrete.

- b. Air Entrainment: Air entrainment tests (ASTM C231 or C173, C173 only for lightweight concrete) shall be made at the same time slump tests are made as cited above.
- c. Concrete Temperature: Concrete temperature at placement shall be measured (ASTM C1064) at the same time slump tests are made as cited above.
- d. Unit Weight Test: ASTM C138

11. Evaluation and Acceptance of Concrete:

- a. Strength Test: A strength test shall be defined as the average strength of two cylinder breaks from each set of cylinders tested at the time indicated above.
- b. Quality Control Charts and Logs: The Owner's Testing Laboratory shall keep the following quality control logs and charts for each class of concrete containing more than 2,000 cubic yards. The records shall be kept for each batch plant and submitted on a weekly basis with cylinder test reports:
 - 1) Number of strength tests made to date.
 - 2) Strength test results containing the average of all strength tests to date, the high test result, the low test result, the standard deviation, and the coefficient of variation.
 - 3) Number of tests under specified strength.
 - 4) A histogram plotting the number of strength test cylinders versus compressive strength.
 - 5) Quality control chart plotting compressive strength test results for each test.
 - 6) Quality control chart plotting moving average for strength where each point plotted is the average strength of three previous test results.
 - 7) Quality control chart plotting moving average for range where each point plotted is the average of 10 previous ranges.
- c. Acceptance Criteria: The strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:
 - 1) The average of all sets of three consecutive strength tests equal or exceed the required f'_c .
 - 2) No individual strength test falls below the required f'_c by more than the greater of 10% of f'_c or 500 PSI.
- d. If either of the above requirements is not met, the Testing Laboratory shall immediately notify the Engineer by telephone. Steps shall immediately be taken to increase the average of subsequent strength tests.

D. Investigation of Low Strength Concrete Test Results:

- 1. Cost of Investigations for Low Strength Concrete: The Contractor shall reimburse the Owner for the costs of investigations of low strength concrete, as defined above.
- 2. Scope of Investigations: See Specification Section 03300, Cast-In-Place Concrete, for the investigations that may be required by the Engineer. The Owner's Testing Laboratory will conduct these investigations.

E. Causes for Rejection of Concrete: The Contractor shall reject concrete delivered to the site for any of the following reasons:

1. Wrong class of concrete (incorrect mix design number).
 2. Environmental Conditions: Environmental condition limits shall be as follows unless appropriate provisions in concreting practices have been made for cold or hot weather:
 - a. Cold Weather: Air temperature must be 40°F and rising or the average daily temperature cannot have been lower than 40°F for 3 consecutive days unless the temperature rose above 50°F for at least one-half of any of those 24 hour periods.
 - b. Hot Weather: Environmental conditions must be such that cause an evaporation rate from the concrete surface of 0.2 lb./sq. ft./hr. or less as determined by Figure 2.1.5 in ACI 305R-91.

Concrete may be placed at other environmental condition ranges only with approval of the job inspector for the Owner's Testing Laboratory or other duly appointed representative.
 3. Concrete with temperatures exceeding 95°F shall not be placed in the structure.
 4. Air contents outside the limits specified in the mix designs.
 5. Slumps outside the limits specified.
 6. Excessive Age: Concrete shall be discharged within 90 minutes of plant departure or before it begins to set if sooner than 90 minutes unless approved by the Laboratory job inspector or other duly appointed representative.
- F. Concrete Batch Trip Tickets: Concrete batch trip tickets shall be collected and retained by the Contractor. Compressive strength, slump, air, and temperature tests shall be identified by reference to a particular trip ticket. Tickets shall contain the information specified in ASTM C94. Each ticket shall also show the amount of water that may be added in the field for the entire batch that will not exceed the specified water cement ratio for the design mix. The Contractor and Owner's Testing Laboratory shall immediately notify the Architect/Engineer and each other of tickets not meeting the criteria specified.

3.04 STRUCTURAL STEEL

A. Contract Obligations:

1. Owner Responsibility: The Owner shall pay for initial shop and field inspections and tests as required during the fabrication and erection of the structural steel.
2. Testing Laboratory Responsibility: The inspection by the Owner's Testing Laboratory of the Fabricator's work shall be in sequence, timely, and performed in such a manner so that corrections can be made without delaying the progress of the work. Inspections shall be performed by qualified technicians with a minimum of two years experience in structural steel testing and inspection. See "Qualifications of Testing Laboratory" section for special requirements for welding inspectors. The Testing Laboratory shall provide test reports of inspections. All test reports shall indicate types and locations of defects found during inspection, the measures required and performed to correct such defects, statements of final approval of welding and bolting of shop and field connections, and other fabrication and erection data pertinent to the safe and proper welding and bolting of shop and field connections. In addition to the parties listed in this Specification the Fabricator and Erector shall receive copies of the test reports.

3. Rejection of Material or Workmanship: The Owner, Architect, Engineer, and Testing Laboratory reserve the right to reject any material or workmanship not in conformance with the Contract Documents at any time during the progress of the work. However, this provision does not allow waiving the obligation for timely, in sequence inspections.
- B. Field Inspections: The Owner's Testing Laboratory shall provide the following inspections in the field:
1. Obtain the planned erection procedure, and review with the Erectors supervisory personnel.
 2. Check the installation of base plates for proper leveling, grout type, and grout application.
 3. Check structural steel and cold-formed steel deck as received in the field for possible shipping damage, workmanship, and identification marking to conform to AISC 360 for structural steel and as specified ASTM standards for other steel and steel deck.
 4. Verify that surveys are occurring as specified to check plumbness and frame alignment as erection progresses. Review the submitted survey report.
 5. Periodically inspect the steel frame for such items as bracing and stiffening details, member locations, and joint details at each connection for compliance with approved construction documents.
 6. Inspect 100% of the column compression and base joints for verification that gaps in contact bearing do not exceed 1/16 inch. Gaps greater than 1/16 inch but less than 1/4 inch shall be reported to the Owner and Engineer for assessment. All gaps greater than 1/4 inch shall be shimmed with non-tapered mild steel shims.
 7. Endeavor to guard the Owner against the Contractor cutting, grinding, reaming, or making any other field modification to structural steel without the prior approval of the Engineer. Report any noted unauthorized modifications to the Owner and Engineer.
- C. Weld Inspection and Process Monitoring: The Owner's Testing Laboratory shall make the following inspections of the welds and welding processes. Welds performed in the fabricating shop may be inspected in the field unless continuous monitoring of the welding process is herein specified or if access in the field due to other work or shop finishes makes field inspection impractical:
1. Approve Welding Procedure Specifications submitted by the Contractor. Approve any changes submitted by the Contractor to any WPS that has already been approved. Obtain the Welding Procedure Qualification Record (WPQR) for each successful WPS qualification.
 2. Verify welder qualifications either by certification and/or by retesting. Obtain welder certificates.
 3. Verify welding electrodes to be used and other welding consumables as the job progresses.
 4. Periodically observe joint preparation, assembly practice, welding techniques including preheating and sequence, and the performance of welders with sufficient frequency to assure compliance with code and contract document requirements. Check preheating to assure conformance with AWS D1.1, Section 5.6. Verify procedure for control of distortion and shrinkage stresses.

5. Periodically provide visual inspection of the root pass of partial and complete joint penetration welds.
6. Visually inspect 100 % of welds for proper size, length, location, and weld quality in accordance with AWS D1.1 requirements. Unless specifically noted otherwise, all welding shall be considered statically loaded nontubular connections
7. Visually inspect 100% of the welding or other attachment method of steel deck to the structure and at sidelaps.
8. Visually inspect 100% of completed shear connectors in each beam and perform bend tests as required according to inspection procedures outlined in AWS D1.1. In addition, perform field bend tests on an additional 2% of completed shear connectors in each beam but not less than one connector per beam
9. Visually inspect 100% of the welds of anchors to embedded plates that are to be cast into concrete elements.
10. In addition to the inspections above, perform the following:
 - a. Continuously monitor and observe joint preparation, assembly practice, welding techniques including preheating and sequence, and the performance of welders for 100% of complete and partial joint penetration welds, multipass fillet welds, and single-pass fillet welds greater than 5/16 inch. Check preheating to assure conformance with AWS D1.1, Section 5.6. Verify procedure for control of distortion and shrinkage stresses.
 - b. Periodically monitor welding of single-pass fillet welds that are less than or equal to 5/16 inch.
 - c. Periodically monitor the method of attaching the steel floor and roof decking to the structural frame.
 - d. Periodically monitor the welding of headed studs to floor beams.
11. Weld Verification Testing Scope:
 - a. Perform nondestructive examination services using a qualified technician with the necessary equipment to perform the following:
 - 1) Nondestructive examination conducted in accordance with the specific requirements for the item being examined including radiographic (RT), ultrasonic (UT), magnetic particle (MT), or dye-penetrant inspection (PT). Nondestructive inspection procedures shall conform to AWS D1.1.
 - 2) Interpret, record, and report results of the nondestructive tests.
 - 3) Mark for repair, any area not meeting Specification requirements. Correction of rejected welds shall be made in accordance with AWS D1.1.
 - 4) Re-examine repair areas and interpret, record, and report the results of examinations of repair welds.
 - 5) Verify that quality of welds meet the requirements of AWS D1.1..
 - b. Fillet welds. provide the following:
 - 1) MT test a minimum of 10% of the length of each fillet weld exceeding 5/16".
 - 2) Periodic MT testing of representative fillet welds 5/16" and less but need not exceed 10% of all such welds, except as provided in (3) below.

- 3) Increase MT testing rate for welders having a high rejection rate as required to ensure acceptable welds.
 - c. Acceptance Criteria
 - 1) Visual, MT, PT shall be per AWS D1.1 Table 6.1.
 - 2) UT testing shall be per AWS D1.1 6.13.1 and Table 6.2.
 - d. The costs of repairing defective welds and the costs of retesting by the Testing Laboratory providing services for the Owner shall be borne by the Contractor. If removal of a backing strip is required by the Testing Laboratory to investigate a suspected weld defect, such cost shall be borne by the Contractor.
- D. High-Strength Bolting Inspection and Testing: The Owner's Testing Laboratory shall perform the following inspections and test for connections joined with high-strength bolting. Bolting performed in the shop may be inspected in the field unless continuous monitoring of the bolting operation is herein specified:
- 1. Observe preinstallation verification testing of the pretensioning method to be used in accordance with the requirements of the "Specification for Structural Joints Using ASTM A325 and A490 Bolts".
 - 2. Daily check the calibration of impact wrenches used in field bolted connections.
 - 3. Inspect bolt installation for 100% of high strength bolted connections according to inspection procedures outlined in the "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
 - 4. Perform Arbitration Testing and Inspection according to procedures outlined in the "Specification for Structural Joints using ASTM A325 or A490 Bolts" when a disagreement exists between the Testing Laboratory and the Fabricator as to the minimum tension of installed bolts that have been inspected according to paragraph above.
- 3.05 NON-SHRINK GROUT FOR BASE PLATES, BEARING PLATES AND PRECAST WALL PANELS
- A. Compressive Strength Tests (by the Owner's Testing Laboratory): Compressive strength of grout shall be determined by testing grout cubes according to the requirements of ASTM C109 - Modified. Test one set of three cubes at 1 day, and one set of three cubes at 28 days.
 - B. Frequency of Testing: One set of cubes (6 cubes) shall be made for every ten base plates and bearing plates or fraction thereof but not less than one set for each day's operation. One set of cubes shall be made for each day's operation of grouting wall panels.

END OF SECTION 01 45 29

SECTION 01 77 00 - PROJECT CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

- 1.1.1. The Contractor's attention is specifically directed, but not limited, to the Uniform General and Supplementary General Conditions for University of Texas System Building Construction Contracts (UGC) for other requirements.

1.2. SUMMARY

- 1.2.1. The following Project closeout procedures are addressed in this Section:

- 1.2.1.1. (1.4) General Description of Closeout Requirements
- 1.2.1.2. (1.5) Requirements for Substantial Completion
- 1.2.1.3. (1.6) Provisions for Release of Retainage
- 1.2.1.4. (1.7) Requirements for Final Acceptance
- 1.2.1.5. (1.8) Required Project Record Documents
- 1.2.1.6. (3.1 & 3.2) Project Cleaning

1.3. DEFINITIONS

- 1.3.1. The term "Project Closeout" is hereby defined to include requirements near the end of the Contract Time, in preparation for Substantial Completion acceptance, occupancy by Owner, release of retainage, final acceptance, final payment, and similar actions evidencing completion of the Work. Specific additional requirements for individual units of work are specified in the Technical Specifications.
- 1.3.2. The term "Time" of closeout is directly related to completion and acceptance, and therefore may be either a single time period for the entire Project, or a series of time periods for individual portions or phases of the Project that have been certified as substantially complete at different dates.

1.4. GENERAL DESCRIPTION OF CLOSEOUT REQUIREMENTS

- 1.4.1. This Section is based on completion and acceptance of the entire Project during a single time period.
 - 1.4.1.1. If the Project is to be accepted in phases, whether by originally specified Project scope or by subsequent agreement between the parties, then Project Closeout requirements shall pertain to each separately accepted portion or phase of the Project; unless by written notice the Owner allows for these requirements to be done singularly upon anticipated acceptance of the final phase.
- 1.4.2. RECORD DOCUMENTS for Project Closeout include, but are not necessarily limited to the following documents, which are required at Substantial Completion:
 - 1.4.2.1. As-Built Record Drawings.
 - 1.4.2.2. As-Built Record Specifications.

- 1.4.2.3. Operating and Maintenance Manuals.
- 1.4.2.4. Record Approved Submittals and Samples.
- 1.4.2.5. Certification of No Asbestos Products Incorporated in Project.
- 1.4.2.6. Completed Punch Lists.
- 1.4.3. REQUIRED DOCUMENTS for final payment to be released include final versions of all of the above and the following:
 - 1.4.3.1. Final Release of Claims & Liens.
 - 1.4.3.2. Affidavit of payment of Debt and Claims.
 - 1.4.3.3. Consent(s) of Surety.
 - 1.4.3.4. Completed SWPPP documents and Notice of Termination.
 - 1.4.3.5. Final Historically Underutilized Business Plan.
 - 1.4.3.6. Completed Commissioning and Closeout Manual.

1.5. REQUIREMENTS FOR SUBSTANTIAL COMPLETION

- 1.5.1. Prior to requesting Architect/Engineer and Owner to schedule a Substantial Completion inspection (for either the entire Work or portions thereof as agreed to by the Owner and Contractor), Contractor shall complete the following and list known exceptions in the request.
 - 1.5.1.1. For the progress payment request coincident with the period of time anticipated for Substantial Completion, Contractor's payment request should reflect a minimum of 95% completion for all applicable Work.
 - 1.5.1.2. Contractor must submit to Architect/Engineer and Owner a complete copy of the Contractor's most current punch list covering the portion(s) of the Project claimed as substantially complete.
 - 1.5.1.2.1. Such punch list shall indicate dates of Contractor re-checks and schedule for completion of work items remaining.
 - 1.5.1.2.2. All items remaining outstanding on the Contractor's punch list shall include a projected date of completion and/or correction with an explanation of why such item is not presently completed.
 - 1.5.1.3. Contractor must submit to Architect/Engineer and Owner for review the full set of marked-up as-built record drawings and marked-up as-built record specifications as described later in this Section.
 - 1.5.1.4. Contractor must submit to Architect/Engineer and Owner for review the preliminary copies of Owner's Operating and Maintenance Manuals as described later in this Section.
 - 1.5.1.5. Contractor must provide access to Contractor's copy of the Commissioning and Closeout Manual for review by Owner and Architect/Engineer. The Commissioning and Closeout Manual must be up-to-date before the Contractor requests the Substantial Completion inspection.

- 1.5.1.6. Contractor must submit the certification statement that no asbestos containing materials have been used or incorporated into the Project. Contractor must use Owner's sample letter format.
- 1.5.1.7. Contractor must obtain and submit releases enabling Owner's full and unrestricted use of the Project and access to services and utilities, including (where applicable) operating certificates, and similar releases.
- 1.5.1.8. Contractor must deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.
- 1.5.2. If Owner intends to occupy Project upon Substantial Completion acceptance, Contractor shall make provisions for final changeover of locks with the Owner's personnel. Upon written directive from Owner and for the convenience of the Contractor in completing punch list activity, Owner may waive the final changeover of locks until final acceptance.
- 1.5.3. Contractor must complete instructing and training Owner's personnel for all systems and equipment serving the areas claimed as substantially complete, for which Owner training was not completed in association with system demonstrations and inspections. Refer also to Section 01 91 00 – General Commissioning Requirements.
- 1.5.4. Contractor must complete the initial clean up requirements as described later in this Section for the entire portion of the Project claimed as substantially complete. Contractor must touch up and otherwise repair and restore marred exposed finishes.
- 1.5.5. SUBSTANTIAL COMPLETION INSPECTION PROCEDURE
 - 1.5.5.1. Refer to the UGC and Section 01 45 00 – Project Quality Control.
 - 1.5.5.2. The Contractor shall ensure the Work is ready for inspection and/or reinspection. If the Work is found not to be as stated in the Contractor's punchlist or the items have not been substantially corrected/completed, the inspection will be terminated. All costs incurred by the Owner and Architect/Engineer for scheduling and attending the terminated inspection(s) shall be the responsibility of the Contractor and excluded from the Cost of Work.

1.6. PROVISIONS FOR RELEASE OF RETAINAGE

- 1.6.1. Refer to the UGC.
- 1.6.2. Release of any retainage, or reduction in amount of retainage withheld, is strictly at the discretion of the Owner, regardless of Contractor compliance with requirements. All of the requirements noted for Substantial Completion acceptance must be completed prior to application for final release of Contract retainage. In addition, Contractor shall meet the following requirements:
 - 1.6.2.1. Contractor must submit affidavits of final release of claim and lien from each subcontractor and supplier who provided materials and/or labor to the Project.
 - 1.6.2.2. Contractor must submit affidavit that all bills for the Project have been paid, or will be paid within thirty (30) calendar days of Contractor's receipt of payment.
 - 1.6.2.3. Contractor must submit Consent of Surety to Release of Retainage.

1.7. REQUIREMENTS FOR FINAL ACCEPTANCE

1.7.1. Prior to requesting Architect/Engineer and Owner to schedule Final Inspection for the Project, Contractor shall complete the following:

- 1.7.1.1. Contractor must submit a draft payment request showing 100% completion for each line item on the Schedule of Values. Contractor must submit with this draft the final releases and supporting documentation not previously submitted and accepted. Contractor must include Certificates of Insurance when applicable. The Final Payment, including final release of retainage, will not be released until all Work (including punch list items) has been completed, all requirements met, a Project closeout audit performed (if deemed necessary) and a Final Change Order has been processed if required to resolve final cost or closeout audit issues, including deletion of any remaining Contract allowances.
- 1.7.1.2. Contractor must submit a copy of Architect/Engineer's Substantial Completion punch list including evidence that each item has been completed or otherwise resolved.
- 1.7.1.3. Contractor must submit final meter readings for utilities, and similar data as of time of Substantial Completion or when Owner took possession of and responsibility for corresponding elements of the Work.
- 1.7.1.4. Contractor must submit final record as-built drawings and specifications and two (2) copies of all approved submittals and Operating and Maintenance Manuals as described later in this Section. This includes specific warranties, maintenance agreements, product certifications and similar documents. The Architect/Engineer and Owner must approve record closeout documentation in writing prior to issuance of final payment.
- 1.7.1.5. Contractor must transmit the completed Commissioning and Closeout Manual to the Owner. The Commissioning and Closeout Manual shall be complete, acknowledging receipt of all attic stock, spare parts, training/demonstration, test reports and any other requirements of the Contract Documents.
- 1.7.1.6. Contractor must complete final cleaning requirements including touch-up of marred surfaces.
- 1.7.1.7. Contractor must submit the final payment request including the following documentation:
 - 1.7.1.7.1. Release of Liens and Claims.
 - 1.7.1.7.2. Affidavit of payment of Debts and Claims.
 - 1.7.1.7.3. Consent of Surety.
 - 1.7.1.7.4. Completed SWPPP documents and Notice of Termination.
 - 1.7.1.7.5. Final Historically Underutilized Business Plan.
 - 1.7.1.7.6. Completed and signed Notice of Termination.
- 1.7.1.8. Contractor must revise and submit evidence of final and continuing insurance coverage complying with applicable insurance requirements.

1.7.2. FINAL ACCEPTANCE INSPECTION PROCEDURE

- 1.7.2.1. When the Contractor has completed the Work required in the Substantial Completion punch list and has complied with the close-out requirements in this Section and elsewhere in the Contract Documents, then the Contractor must provide written notice to the Architect/Engineer and Owner that the Project is ready for Final Inspection. Refer to the UGC for additional requirements.
- 1.7.2.2. All Owner and Architect/Engineer costs for travel and time for additional inspections at either Substantial Completion or Final Acceptance which are required either by failure of the Contractor to complete the noted punch list items, or by erroneous notices that the Work is ready for such inspections, shall be the responsibility of the Contractor. Owner may issue a unilateral deductive Change Order for these costs.

1.8. REQUIRED PROJECT RECORD DOCUMENTS

1.8.1. AS-BUILT RECORD DOCUMENTS

- 1.8.1.1. Contractor may not use record documents for construction purposes. Contractor must protect record documents from deterioration and loss in a secure location. Contractor must provide access to record documents for Owner and/or Architect/Engineer's reference or review during normal working hours.
- 1.8.1.2. Contractor must furnish as-built record drawings made from the Architect/Engineer's Contract Drawings, or subsequent updates thereof, annotated as noted below with actual as-built conditions.
 - 1.8.1.2.1. As-built drawing information must be professionally drafted.
 - 1.8.1.2.2. As-built drawings must show all changes in the Work relative to the original Contract Documents; and must show additional information of value to Owner's records but not indicated in the original Contract Documents.
- 1.8.1.3. As-built record documents must include marked-up copies of Contract Drawings and Specifications, including newly prepared drawings if applicable or necessary to achieve the Owner's intended result, and shop drawings including all changed conditions issued through addenda and/or change orders.
 - 1.8.1.3.1. Contractor must include marked-up product data submittals, field records for variable and concealed conditions such as excavations and foundations, and miscellaneous record information on Work that was schematically recorded only schematically or not recorded at all.
- 1.8.1.4. Certain individual sections of the Technical Specifications indicate specific requirements, which may clarify requirements of this Section. When a conflict may be perceived to exist, the more restrictive (i.e.: more expensive) requirement will prevail. There is no intent, however, to require more sets of as-built drawings than is indicated herein.
- 1.8.1.5. The Contractor shall bear all costs associated with obtaining the Architect/Engineer's original Contract Documents, and subsequent updated plots thereof, drafting as-built information, reproduction, or other related work.
 - 1.8.1.5.1. Contractor shall ensure that all as-built changes are of good drafting quality, performed by a person skilled in drafting and knowledgeable of the conventions of the trades involved.

- 1.8.1.5.2. Contractor may utilize Contractor's staff or seek outside assistance, including the Architect/Engineer, for this drafting work provided the contractual requirements pertaining to quality, format, and content are met.

1.8.1.6. MAINTENANCE OF AS-BUILT DRAWINGS DURING CONSTRUCTION

- 1.8.1.6.1. During progress of the Work, Contractor shall maintain a blueline set of Contract Drawings along with the specifications and the shop drawings in the construction office. Contractor must update these drawings weekly, at a minimum, with mark-ups of actual installations that vary from the work as originally shown. Contractor shall include all drawings issued as addenda, clarifications, and/or change orders.

- 1.8.1.6.1.1. Contractor must mark-up whatever drawing is most compatible for showing actual physical condition, fully and accurately and must reference all other appearances of this work to the updated sheet. Contractor must include cross-references to the official change number on the updated sheet and all additional sheets where the work is shown.

- 1.8.1.6.1.2. Contractor must mark-up with erasable colored pencil in a legible and professional manner, using separate colors where feasible to distinguish between changes for different categories of work at the same general location.

- 1.8.1.6.1.3. Contractor must mark-up important additional information, which was either shown schematically only or omitted from the original drawings. Contractor must give particular attention to information on concealed work that would be difficult to identify or measure and record at a later date.

- 1.8.1.6.1.4. Contractor must record alternative numbers, change order numbers and similar identification for any change.

- 1.8.1.6.1.5. Contractor must require each person preparing mark-ups to initial and date the mark-ups and indicate the name of their firm.

- 1.8.1.6.2. The Contractor shall maintain and have available for review in conjunction with the regular Project Progress Meetings, a current set of the marked-up as-built blueline drawings and specifications marked with "as-constructed" information. Availability for review and acceptability of both the format and the content, is a prerequisite condition for certification of the monthly pay requests by the Owner and Architect/Engineer.

1.8.2. SUPPLEMENTAL DRAWINGS

- 1.8.2.1. The use of shop drawings as supplements to the As-Built Record Drawings is required for all items in which the larger scale employed on the shop drawings is needed to show the work in sufficient detail for Owner's future use. When marked-up shop drawings are included in the As-Built Record documents, Contractor must mark-up and cross-reference on the Contract Drawings at the corresponding location.

- 1.8.2.1.1. Use of such shop drawings is particularly applicable to ductwork and electrical shop drawing layouts. Use of shop drawing supplements is acceptable provided the following conditions are met:

- 1.8.2.1.1.1. The applicable supplemental sheet must be placed in the set directly behind the Contract Drawing, which it supplements, with appropriate reference notes on both the applicable Contract Drawing and all other affected drawings.
- 1.8.2.1.1.2. Contractor must retain a copy for inclusion with the record product submittals.
- 1.8.2.1.1.3. The supplemental document must be identified as a "Supplementary Record As-Built Drawing" and must be numbered with an extension to the Contract Drawing it supplements in a manner acceptable to the Owner.

1.8.3. PREPARATION OF FINAL AS-BUILT RECORD DRAWINGS

- 1.8.3.1. In association with Contractor's request for Substantial Completion inspection, Contractor must submit the marked-up site copy of the as-built drawings to the Architect/Engineer and Owner for review.
 - 1.8.3.1.1. Following the Architect/Engineer's review of the marked-up as-built drawings and supplemental drawings, and upon the Architect/Engineer's acceptance that the marked-up information is accurate and complete, the Contractor shall proceed with preparation of a full set of professionally drafted As-Built Record Drawings in electronic format made from Architect/Engineer's Contract Drawing files.
 - 1.8.3.1.2. Contractor shall submit final as-built record drawings to Owner in Owner's designated version of AutoCAD.
- 1.8.3.2. All drawings shall bear the official Project name and number. Further, each drawing, including supplemental drawings, shall also bear a stamp to the effect of "Record As-Built" along with the Contractor's certification that such is an accurate reflection of actual as-built conditions. Contractor shall sign and date each certification in a format that is acceptable to the Owner.
 - 1.8.3.2.1. All drawings shall be the same size as the original Contract Documents.
 - 1.8.3.2.2. Once the final As-Built Record Drawings are complete, the Contractor shall transmit them to the Owner within sixty (60) calendar days after Final Completion.
 - 1.8.3.2.3. Contractor shall ensure that all drawings issued as addenda, clarifications and/or change orders are incorporated into the as-built record drawing set and fully shown on the applicable Contract Drawing. If supplemental sheets are used, Contractor must follow the requirements outlined above for supplemental shop drawing sheets.

1.8.4. AS-BUILT RECORD SPECIFICATIONS

- 1.8.4.1. During progress of the Work, Contractor must maintain and update one record copy of specifications at the jobsite, including addenda, change orders and similar modifications issued during construction, indicating all significant variations between the actual Work and the text of original specifications.

- 1.8.4.1.1. Contractor must give particular attention to substitutions, selection of options, and similar information on work where the exact products used are not clearly identified or readily discernable in the original specifications. When applicable, Contractor must cross-reference related record drawing information and product data.
- 1.8.4.1.2. It is not necessary to re-type an entire section if modified, but it is mandatory that all changes to specified materials, installation, warranty, etc. be clearly and fully marked within the applicable specification section in a manner acceptable to the Architect/Engineer and the Owner. Contractor should review with the Owner and document an acceptable procedure early in the construction phase.
- 1.8.4.1.3. Contractor must neatly transcribe and post all as-built marked-up information to a "clean" copy of the Project Specifications, ensuring that similar types of information are annotated in like fashion throughout the Project Specifications.
- 1.8.4.2. In association with Contractor's request for Substantial Completion inspection, Contractor must submit the marked-up site copy of the specifications to the Architect/Engineer and Owner for review.
- 1.8.4.3. Once the marked-up specifications are found acceptable by the Architect/Engineer, based on the Architect/Engineer's belief that the marked-up information is accurate and complete, the Architect/Engineer will proceed with preparation of As-Built Record Specifications.
 - 1.8.4.3.1. The Architect/Engineer will prepare the As-Built Record Specifications based upon the Contractor's mark-up specifications using Owner's designated version of Microsoft Word with changes tracked in red-lined format.
- 1.8.4.4. After the Architect/Engineer has completed the As-Built Record Specifications, the Architect/Engineer will submit both the marked-up site copy of the specifications and the As-Built Record Specifications to the Owner in both electronic (doc and pdf) and paper format.

1.8.5. OPERATING AND MAINTENANCE MANUALS

- 1.8.5.1. Contractor shall organize maintenance-and-operating manual information into suitable sets of manageable size, and bind into individual binders properly tabbed and indexed. Contractor shall provide equipment data electronically in a spreadsheet or database format provided by Owner.
- 1.8.5.2. Within thirty (30) calendar days of the Notice to Proceed with Construction, Contractor shall submit to Owner the proposed format, content and tab structure for all Operating and Maintenance Manuals for the Owner's review and approval. The tab structure for Operating and Maintenance Manuals shall follow specification division format as accepted by the Construction Specification Institute. After the Owner approves the proposed format, content, and tab structure for the Operating and Maintenance Manuals, Contractor shall create and deliver to Owner tabbed binders within twenty-one (21) calendar days. Contractor shall transmit to Owner the content of the Operating and Maintenance Manuals in a timely manner as the Work progresses.
- 1.8.5.3. Contractor shall make revisions and corrections to format and content as reasonably requested by Owner. Contractor shall submit to Owner each individual

Operating and Maintenance Manual document within fifteen (15) calendar days of the document's availability to facilitate inspections and testing by Contractor and Owner.

- 1.8.5.3.1. Operating and Maintenance Manual documents must include, but are not limited to, approved submittals, manufacturer's operating and maintenance instructions, brochures, shop drawings, performance curves and data sheets annotated to indicate equipment actually furnished (e.g. identifying impeller size, model, horsepower, etc), procedures, wiring and control diagrams, records of factory and field tests and device/controller settings and calibration, program lists or data compact discs, maintenance and warranty terms and contact information, spare parts listings, inspection procedures, emergency instructions, and other Operating and Maintenance documentation that may be useful to Owner.
- 1.8.5.3.2. The material and equipment data required by this Section must include all data necessary for the proper installation, removal, normal operation, emergency operation, startup, shutdown, maintenance, cleaning, adjustment, calibration, lubrication, assembly, disassembly, repair, inspection, trouble-shooting, and warranty service of the equipment or materials.
- 1.8.5.4. Contractor must bind the Operating and Maintenance Manual documents in heavy-duty, 3-ring vinyl-covered binders including pocket folders for folded sheet information. Contractor must mark binder identification on both the front and spine of each binder.
 - 1.8.5.4.1. Contractor must submit the Operating and Maintenance documents on bindable 8-1/2" x 11" sheets or on sheets that are bindable and foldable multiples of 8-1/2" x 11". The bindable edge shall be the left 11" edge.
 - 1.8.5.4.2. Contractor may request waivers to the size requirement for specific instances. Contractor's waiver request must be in writing to the Architect/Engineer and Owner. Contractor's waiver request must include a justification for seeking the waiver.
- 1.8.5.5. Contractor must provide two (2) complete paper copies of each bound Operating and Maintenance Manual to the Owner.
- 1.8.5.6. Contractor must provide an electronic version of the complete and final Operating and Maintenance Manuals to Owner in original electronic file format on compact disc or DVD. Contractor must also provide one electronic pdf file of each bound Operating and Maintenance Manual that represents each Manual's content. The electronic pdf file must match the Operating and Maintenance Manual content and organizational structure.
- 1.8.5.7. The requirements of this Section are separate, distinct and in addition to product submittal requirements that may be established by other Sections of the Specifications. Owner's manuals, manufacturer's printed instructions, parts lists, and other submittals required by other Sections of the Specifications may be included in the Operating and Maintenance Manuals provided that they are approved and are formatted in a manner consistent with the requirements of this Section.
 - 1.8.5.7.1. Test data and Commissioning data included in the Operating and Maintenance Manuals need not be duplicated in the Commissioning and

Closeout Manual and vice versa. Test data not pertaining to a particular device or piece of equipment (such as domestic water pipe pressure test reports) must be inserted in the Commissioning and Closeout Manual.

- 1.8.5.8. Equipment is defined as any mechanism, mechanical, electrical or electronic device, or any combination thereof, which is made up of two (2) or more working parts to perform a particular function.
- 1.8.5.9. When an item of equipment is a packaged unit furnished by one manufacturer and the package as furnished contains proprietary items of equipment obtained from other sources, Contractor must include copies of equipment data for each item of such equipment as if each item of equipment had been separately furnished.
- 1.8.5.10. For general guidance only, the following are examples of equipment, material, and systems for which operating and maintenance data is required:

Architectural	Mechanical	Electrical
Doors and Windows	Piping, Valves, and Fittings	Cable, Wire, and Connectors, 600 volt
Overhead Coiling Doors and Grilles	Motors	Wiring Devices
Automatic Door Openers	Fire Protection Systems	Motor Control Centers
Door Hardware	Plumbing Equipment	Distribution Panelboards
Finish Materials	Plumbing Specialties	Branch Circuit Panelboards
Loading Dock Equipment	Liquid Nitrogen System	Electronic Grade Panelboards
Laboratory Casework and Furnishings	Gas Systems	Packaged Electric Generating Plant
Fume Hoods	Fuel Oil Systems	Automatic Transfer Switches
Access Flooring	Reverse Osmosis System	Standby Power Generator Switchgear
Environmental Rooms	Hydronic Specialties	Switchboards
Biological Safety Cabinets	Steam and Steam Condensate Specialties	Switchgear
Sterilizers, Washers and Dryers	HVAC Pumps	Power Factor Correction Capacitors
Audio-Visual Equipment	Chemical Treatment Systems	Transformers
Window Treatment	Chillers	Busway – 600 Volt and Below
Radiation Protection	Boilers	Surge Protective Devices
Conveying Systems	DX Air-Conditioning Systems	Lighting Fixtures
Irrigation Systems	Heat Exchangers	Lighting Control Systems
	Humidifiers	Fire Alarm System
	Terminal Heat Transfer Units	Power Status and Monitoring System
	Modular Air Handling Units	Paging System
	Custom Air Handling Units	Security System
	Fans	
	Filters	
	Ductwork	
	Air Terminal Units	

Architectural	Mechanical	Electrical
	Air Outlets and Inlets	
	Variable Speed Drives	
	Building Automation System	

1.8.5.11. The UGC requires that a preliminary copy of all Operating and Maintenance Manuals, in addition to as-built record documents, be furnished prior to the Substantial Completion inspection. The Contractor shall accumulate and package the documentation and submit the preliminary copy to the Architect/Engineer for review.

1.8.5.12. The Contractor's submission of a preliminary copy of all Operating and Maintenance Manuals to the Architect/Engineer for review is a precondition for scheduling of a Substantial Completion inspection. The Contractor's final submission of these Operating and Maintenance Manuals in an acceptable format (based on review of preliminary copies by the Architect/Engineer) is a precondition for scheduling of a Final Acceptance inspection, release of remaining contract retainage, and application for Final Payment.

1.8.5.13. Equipment Data to be Included in Operating and Maintenance Manuals

1.8.5.13.1. Description of Equipment. Refer also to the equipment list requirements of Section 01 91 00 – General Commissioning Requirements. Contractor shall prepare a form for each item of equipment on 8-1/2" x 11" paper using the Owner's format or using a format approved by the Owner. Contractor must include the description of the equipment and following additional information in the Operating and Maintenance Manuals.

1.8.5.13.1.1. A complete description of each equipment item in the following order: basic descriptive terminology first, followed by modifying words describing the model, size and weight, flow rate, amperage, voltage, material, etc., as applicable, plan designation, if any, and package serial number.

1.8.5.13.1.2. Part Number. Manufacturer's and supplier's part number.

1.8.5.13.1.3. Quantity. Total quantity of this equipment item installed under this Contract.

1.8.5.13.1.4. Specification Paragraph Reference. State the specification section, paragraph, and page number under which the item of equipment was procured.

1.8.5.13.1.5. Source. Manufacturer's name and address and supplier's name and address.

1.8.5.13.1.6. Serial Number. Complete manufacturer's serial number(s) or other identity symbol(s) as applicable.

1.8.5.13.1.7. Location. State the name of the system and/or sub-system in which each like item of equipment is installed and state the physical location of each like item of equipment by identifying the columnar grid intersections, as shown on the Drawings,

near which the item is located and also state the room or space title as applicable. The location of item must correspond to Owner's wayfinding codes listing in Owner's space management database, consisting of building identification code (or color zone), floor level, and room number.

- 1.8.5.13.2. Parts Lists. Contractor must clearly identify every part in the item of equipment with the proper manufacturer's name, part nomenclature and number, local source, and list price.
- 1.8.5.13.3. Recommended Spare Parts. Contractor must furnish a list of recommended spare parts for each equipment item that Owner will likely need within a 12-month period to support and operate that item of equipment. The quantities of spare parts recommended must be based upon the quantity of like equipment items installed under the Contract Documents. Contractor must prepare the recommended spare parts list for each equipment item on 8-1/2" x 11" paper and must include the following information for each part in columns.
 - 1.8.5.13.3.1. Part Description. Complete descriptive nomenclature plus manufacturer's complete model and part number, and list price cost for each part.
 - 1.8.5.13.3.2. Quantity Per Assembly. Quantity of listed part that occurs in the item of equipment.
 - 1.8.5.13.3.3. Quantity of Equipment Items. Quantity of like equipment items installed under this Contract.
 - 1.8.5.13.3.4. Shelf Life. Storage life of part, in months, if the part has limited life.
 - 1.8.5.13.3.5. Recommended Quantity. Quantity of parts that Owner will need to support the installed quantity of equipment in which the part appears for a period of twelve (12) months.
 - 1.8.5.13.3.6. Source for Part. Name, address, website address, and phone number of the nearest supplier for the part.
- 1.8.5.13.4. Contractor's Purchase Order. Contractor must furnish a copy of Contractor's purchase order for the equipment. The furnished copy need only show the quantity ordered, part number, equipment description and name and address of the vendor who supplied the item
- 1.8.5.13.5. Normal Operating Instructions. Contractor must furnish normal operating instructions with sufficient detailed information to permit a journeyman mechanic to adjust, start-up, operate and shut down the equipment. Special start-up precautions must be noted as well as other action items required before the equipment is put into service.
- 1.8.5.13.6. Emergency Operating Procedures. Contractor must furnish a detailed description of the sequence of action to be taken in the event of a malfunction of the unit, either to permit a short period of continued operation or emergency shutdown to prevent further damage to the unit and to the system in which it is installed.

- 1.8.5.13.7. Preventive Maintenance. Contractor must furnish detailed information to cover routine and special inspection requirements, including but not limited to, field adjustments, inspections for wear, adjustment changes, packing wear, lubrication points, frequency and specific lubrication type required, cleaning of the unit and type solvent to use, and such other measures as are applicable to preventive maintenance program.
- 1.8.5.13.8. Calibration. Contractor must furnish detailed data on what to calibrate, how to calibrate, when to calibrate and procedures to enable checking the equipment for reliability or indications as well as data for test equipment, special tools and the location of test points.
- 1.8.5.13.9. Scale and Corrosion Control. Contractor must furnish detailed information covering the prevention of and removal of scale and corrosion.
- 1.8.5.13.10. Trouble Shooting Procedures. Contractor must furnish detailed information and procedures for detecting and isolating malfunctions and detailed information concerning probable causes and applicable remedies.
- 1.8.5.13.11. Removal and Installation Instructions. Contractor must furnish detailed information concerning the logical sequence of steps required to remove and install the item including instructions for the use of special tools and equipment.
- 1.8.5.13.12. Disassembly and Assembly Instructions. Contractor must furnish detailed illustrations and text to show the logical procedure and provide the instructions necessary to disassemble and assemble the unit properly. The text shall include all checks and special precautions as well as the use of special tools and equipment required to perform the assembly or disassembly.
- 1.8.5.13.13. Repair Instructions. Contractor must furnish detailed repair procedures to bring the equipment up to the required operating standard including instruction for examining equipment and parts for needed repairs and adjustments, and tests or inspections required to determine whether old parts may be reused or must be replaced.
- 1.8.5.13.14. System Drawings. Contractor must furnish detailed drawings, where applicable, that clearly show wiring diagrams, utility service diagrams, control diagrams, system schematics, pneumatic and fluid flow diagrams, etc., which pertain to the unit function. System drawings must show major pieces of equipment, such as chillers, boilers, heat exchangers, pumps, air handlers, tanks, switchgear, etc., as meaningful to the Project. Fluid flow and direction and valves with their valve tag identification numbers must be clearly noted on drawings. Drawings must show modifications to another manufacturer's standard unit when it is incorporated into the assembly or package unit.
 - 1.8.5.13.14.1. System diagrams must be provided on multiples of 8-1/2" x 11" format, folded to fit within the Operating and Maintenance Manuals. The outer (exposed) face of the folded drawing must include identification of the system and the specification section that governs its installation and operation.

- 1.8.5.13.14.2. The requirements of this paragraph are separate, distinct, and in addition to similar requirements that may be established by other Sections. Where such system diagrams are required for submittal by other specification sections, the same diagrams will be acceptable for inclusion herein, so long as the diagrams used were approved during the submittal phase and are reproduced for clarity and to fit the size format of the Operating and Maintenance Manuals.
- 1.8.5.13.14.3. The Contractor must provide diagrammatic drawings for each installed system that indicate placement of the system in relation to the building, and the physical location of each item or equipment installed within the system. Each installed item of equipment shown on the drawing must be identified by the equipment item model and/or serial/part number.
- 1.8.5.13.14.4. System drawings may, for purpose of clarity, be prepared upon a major subsystem basis.
- 1.8.5.13.14.5. The drawings may be prepared upon several drawings having referenced match lines.
- 1.8.5.13.15. Special Tools and Test Equipment: Contractor must furnish a detailed list of the special tools and test equipment needed to perform repair and maintenance for each equipment item. The list must contain the special tool and test equipment part number, size, quantity, price, manufacturer's name and address, and local supplier's name and address.
- 1.8.5.13.16. Warranties and Guarantees: Contractor must bind, within the tabbed section for each system, equipment item, or material, an executed copy of the specified warranty/guarantee with warranty effective dates covering that particular system, equipment item, or material.
- 1.8.5.13.16.1. Contractor must include both the manufacturer's warranty as specified and the installing contractor's guarantee for workmanship and system operation.
- 1.8.5.13.16.2. This copy of the particular warranty/guarantee is in addition to original signature copies of all Project warranties and guarantees bound together separately. Contractor shall transmit this binder to the Owner when complete.
- 1.8.5.13.16.3. Contractor must provide in a separate tabbed section of the Operating and Maintenance Manuals a grouping of all Project warranties and guarantees as required by various specification sections and other conditions of the Contract. Contractor must include all specific warranties on manufactured items and installed systems as noted above, in addition to Contractor's Project warranty and applicable guarantees from all subcontractors and suppliers covering defects in workmanship or manufacture.
- 1.8.5.13.16.4. As clarification, it is intended that the Contractor provide the Owner with a separate binder containing all original Project warranties and guarantees. Contractor must also provide a copy of the appropriate warranty in the same section as the equipment (or system) data furnished in individual tabbed

sections of the Operating and Maintenance Manuals for convenient reference.

- 1.8.5.13.17. Training of Owner Personnel: Contractor must furnish documentation of Owner's personnel training regarding operation of particular systems within the tabbed section for that particular system. Contractor must include identification of parties receiving training and date(s) of such training.

1.8.6. RECORD PRODUCT SUBMITTALS

- 1.8.6.1. During progress of the Work, Contractor must maintain approved copies of each product data submittal and shop drawing. Contractor must mark up significant variations in the actual Work in comparison with submitted information. Contractor must include both variations in product as delivered to the Site and variations from manufacturer's instructions and recommendations for installation.
- 1.8.6.1.1. Contractor must maintain during the course of the Project, a separate binder with one copy of all MSDS sheets for any and all products incorporated into the Project. Contractor must include this binder in the record submittal documents.
- 1.8.6.2. Contractor must give particular attention to concealed products and portions of the Work that are not clearly identified in the original submittal or cannot otherwise be readily discerned at a later date by direct observation. Contractor must cross reference to change orders and mark-up of record drawings and specifications.
- 1.8.6.3. Upon completion of as-built revisions, Contractor must submit two (2) complete sets of all approved submittals to Architect/Engineer for review and subsequent transmittal to Owner. Contractor must organize and group files in sturdy file boxes with tabbed dividers for each separate specification division. Contractor must include a complete table of contents. In addition, Contractor must submit all Record Product Submittals to Owner in its original electronic file format on compact disc or DVD. Contractor may scan material into electronic file format when necessary.
- 1.8.6.4. These record submittal requirements are in addition to inclusion of similar material as supplementary as-built drawings or technical data for the Operating and Maintenance Manuals.

1.8.7. RECORD SAMPLE SUBMITTAL

- 1.8.7.1. Immediately prior to date(s) of Substantial Completion, Contractor must arrange for Architect/Engineer and Owner's representative to meet with Contractor at the Site to determine which (if any) of the submitted samples or mock-ups maintained by Contractor during progress of the Work are to be transmitted to Owner for record purposes.
- 1.8.7.2. Contractor must comply with Architect/Engineer's and/or Owner's instructions for packaging, identification marking, and delivery to Owner's designated location at the Site or other location as directed by Owner.
- 1.8.7.3. Contractor must dispose of other samples in the manner specified for disposal of surplus and waste materials, unless otherwise indicated or directed by Architect/Engineer and/or Owner.

1.8.8. COMMISSIONING AND CLOSEOUT MANUAL

- 1.8.8.1. The Contractor shall incorporate all Commissioning and closeout documentation and/or verification documents not included in the Operating and Maintenance Manuals, into a separate Commissioning and Closeout Manual for transmittal to the Owner at the conclusion of the Project. The Commissioning and Closeout Manual is intended to be a consolidation of documentation/verification for the Project commissioning and closeout process. By updating the Commissioning and Closeout Manual throughout the Project, the documentation process can be expedited and monitored.
- 1.8.8.2. The Commissioning and Closeout Manual shall include, but is not limited to, the following.
 - 1.8.8.2.1. Commissioning documentation as described in Section 01 91 00 General Commissioning Requirements.
 - 1.8.8.2.2. Closeout Documentation Matrix. A spreadsheet listing of system/equipment documentation that Contractor must submit to Owner as required by the Technical Specification requirements and containing columns for submittal dates, approval (if required) dates, and Owner's signature or initials for acknowledgement. The Closeout Documentation Matrix is subject to Owner's approval.
 - 1.8.8.2.3. Paint/Finish Schedule.
 - 1.8.8.2.3.1. Contractor must include a schedule of all paints, flooring, finishes, etc. used on the Project.
 - 1.8.8.2.3.2. Contractor must provide manufacturer, model number, color formula, location on Project, purchase source and any other information helpful to the Owner's maintenance personnel.
 - 1.8.8.2.4. Spare Parts, Attic Stock and Keys Checklists.
 - 1.8.8.2.5. Elevator Checklist.
 - 1.8.8.2.6. Electrical Test Reports (including factory tests and settings).
 - 1.8.8.2.7. Miscellaneous Equipment Test Reports (including factory tests and settings).
 - 1.8.8.2.8. HVAC Calibration Reports (including duct testing reports).
 - 1.8.8.2.9. Fire Alarm Test Reports.
 - 1.8.8.2.10. Piping Test Reports.
 - 1.8.8.2.11. Sewer Video Log.
 - 1.8.8.2.12. Demonstration / Training Reports.
 - 1.8.8.2.13. Millwright's Alignment Report: Contractor must include a report of the coupled mechanical equipment after the equipment has been set and installed.
 - 1.8.8.2.14. Code-required Certifications as described within Technical Specifications.

- 1.8.8.2.15. Miscellaneous Record Documents. Contractor must provide categories of requirements resulting in miscellaneous work records including, but not be limited to, the following.
 - 1.8.8.2.15.1. Required field records on excavations, foundations, underground construction, wells and similar work.
 - 1.8.8.2.15.2. Accurate survey showing locations and elevations of underground lines, including invert elevations of drainage piping.
 - 1.8.8.2.15.3. Surveys establishing lines and levels of building.
 - 1.8.8.2.15.4. Plant treatment records (wood, soil, etc).
 - 1.8.8.2.15.5. Certifications received in lieu of labels on products and similar record documentation.
 - 1.8.8.2.15.6. Batch mixing and bulk delivery records.
 - 1.8.8.2.15.7. Testing and qualification of tradesmen.
 - 1.8.8.2.15.8. Documented qualification of installation firms.
 - 1.8.8.2.15.9. Load/performance testing.
 - 1.8.8.2.15.10. Final inspection and deficiency corrections.
- 1.8.8.3. The Owner may provide a preliminary handbook with sample forms and matrix for use by the Contractor in development of the Commissioning and Closeout Manual. Each Project may require the Contractor to revise and/or create forms for Project specific equipment. The Contractor must review each form for approval with the Owner before using the Contractor's form.
- 1.8.8.4. The Contractor shall maintain and provide two (2) copies of the Commissioning and Closeout Manual. Contractor shall transmit one copy to the Owner's Construction Inspector for use during the Project. The Contractor shall keep the other copy and shall update both copies as the Work progresses. The Owner's Construction Inspector will initial the Closeout Documentation Matrix to acknowledge receipt of various documentation, spare parts, attic stock, etc.
 - 1.8.8.4.1. Contractor must insert the accumulated documentation into the Commissioning and Closeout Manual in tabbed formatting according to the table of contents for each Project.
 - 1.8.8.4.2. Contractor must bind the documentation in heavy-duty 3-ring vinyl-covered binders including pocket folders for folded sheet information. Contractor must mark identification on both the front and spine of each binder.
 - 1.8.8.4.3. Contractor must provide an electronic version of the completed Commissioning and Closeout Manual to Owner in original electronic file format on compact disc or DVD. In addition, Contractor must provide one electronic pdf file for each bound Commissioning and Closeout Manual that includes each Manual's content. Contractor must organize data to match the Commissioning and Closeout Manual tab structure.

- 1.8.8.5. The Contractor shall prepare the initial Closeout Documentation Matrix early in the Project to ensure tracking of this process throughout the Project.
- 1.8.8.6. The Commissioning and Closeout Manual is not intended to impose duplication of closeout documentation. Those items and/or data that are incorporated into the Operating and Maintenance Manuals need not be included in the Commissioning and Closeout Manual.

1.8.9. Equipment and system submittals as required elsewhere in the Contract Documents.

PART 2- PRODUCTS (NOT USED)

PART 3- EXECUTION

3.1. PROJECT CLEANING AT SUBSTANTIAL COMPLETION

- 3.1.1. The Contractor must maintain the Project and the Site in a clean and orderly condition throughout the course of construction. In addition to continuous Project cleaning, the following requirements are related to Project closeout.
- 3.1.2. Special cleaning for specific units of Work may also be specified in other Sections of Project Specifications.
- 3.1.3. Contractor must perform an initial cleaning of the Work consisting of cleaning each surface or unit of Work to normal "clean" condition expected for a first-class building cleaning and maintenance program.
- 3.1.4. Contractor must comply with manufacturer's instructions for cleaning of all system components, equipment, and materials incorporated into the Project.
- 3.1.5. Contractor must perform the following "initial" final cleaning immediately prior to the time the Contractor requests Substantial Completion inspection.
 - 3.1.5.1. Contractor must remove labels that are not required as permanent labels.
 - 3.1.5.2. Contractor must clean exposed hard-surfaced finishes, including glass, metals, stone, concrete, painted surfaces, plastics, tile, wood, special coatings, and similar surfaces, to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Contractor must restore reflective surfaces to original condition.
 - 3.1.5.3. Contractor must remove debris and surface dust from limited-access spaces including plenums, shafts, and similar spaces.
 - 3.1.5.4. Contractor must clean concrete floors in non-occupied spaces, wet-mop and broom clean.
 - 3.1.5.5. Contractor must clean fixtures of all dust and debris. Contractor must replace lamps in accordance with Technical Specifications after final Project cleaning.
 - 3.1.5.6. Contractor must remove crates, cartons and other flammable waste materials or trash from the Site. Contractor must provide Owner with a finished Project that is free of concealed garbage, trash and rodent infestation. If concealed garbage, trash and rodent infestation are revealed, or odors from them occur, Contractor shall remove and correct at the Contractor's expense. Contractor must restore property to its original condition where no improvements are shown.

- 3.1.5.7. Contractor must clean leave free from rubbish, loose plaster, mortar drippings, extraneous construction materials, dirt and dust spaces which are generally unfurnished such as elevator shafts, electrical closets, pipe and duct shafts, chases, furred spaces, and similar spaces.
- 3.1.5.8. Contractor must remove rubbish by way of chutes, taken down on hoists, or lowered in receptacles. Contractor shall not remove rubbish or waste by dropping or throwing from one level to another within or outside the building(s).
- 3.1.5.9. Contractor must ensure that Contractor does not mark, soil or otherwise deface finished surfaces. If Contractor marks, soils, or otherwise defaces finished surfaces, Contractor shall bear all costs for cleaning and restoring such surfaces to their originally intended condition.

3.2. PROJECT CLEANING AT FINAL ACCEPTANCE

- 3.2.1. The following "final" cleaning is to be accomplished immediately prior to the time the Contractor requests Final Acceptance inspection:
 - 3.2.1.1. Contractor must clean transparent materials, including mirrors and window/door glass, to a polished condition, removing substances that are noticeable as vision-obscuring materials.
 - 3.2.1.2. Contractor must turn the work over in immaculate condition inside and outside including the premises.
 - 3.2.1.3. Contractor must clean all work on the premises including walks, drives, curbs, paving, fences, grounds and walls. Contractor must provide a clean shine on slick surfaces. Contractor must removal of smudges, marks, stains, fingerprints, soil, dirt, paint, dust, lint, labels, discolorations and other foreign materials.
 - 3.2.1.4. Contractor must clean all finished surfaces on interior and exterior of Project (again) including floors, walls, ceilings, windows, glass, doors, fixtures, hardware and equipment. Contractor must final wax and polish all natural finish metal on interior or exterior surfaces. Contractor must clean and apply finish (including wax) to all floors as recommended by the manufacturer.
 - 3.2.1.5. In addition to the cleaning specified above and the more specific cleaning required in various Sections of the Specifications, Contractor must prepare the building(s) for occupancy by a thorough cleaning throughout, including washing (or cleaning by approved methods) surfaces on which dirt or dust has collected, and by washing glass on both sides. Contractor must wash exterior glass using a window-cleaning contractor specializing in such work.
 - 3.2.1.6. Contractor must remove temporary buildings and structures, fences, scaffolding, surplus materials and rubbish of every kind from the site of the work. Contractor must repair these areas to be compatible with the surrounding construction finished condition.

END OF SECTION 01 77 00

SECTION 01 91 00 –GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- 1.1.1. The Contractor's attention is specifically directed, but not limited to, the Uniform General and Supplementary General Conditions for University of Texas System Building Construction Contracts (UGC) for other requirements.
- 1.1.2. Specifications throughout all Divisions of the Project Manual, which pertain to operable and non-operable equipment and/or building systems, are directly applicable to this Section, and this Section is directly applicable to them.

1.2. SUMMARY

- 1.2.1. This Section establishes general and administrative requirements pertaining to commissioning of equipment, devices, and building systems installed on renovation and new construction projects delivered under various contracting methodologies. Technical requirements for commissioning of particular systems and components are established in the Contract Documents.
- 1.2.2. It is of primary concern that all operable systems installed in the Project perform in accordance with the Contract Documents and the specified Owner's operational needs. During Commissioning, the Contractor systematically demonstrates to the Owner that the operable systems are properly performing in strict accordance with the Contract Documents.
- 1.2.3. Commissioning requires cooperation and involvement of all parties throughout the construction process. The Contractor shall deliver a successful Commissioning process. Successful Commissioning requires that installation of all building systems complies with Contract Document requirements and that full operational check-out and necessary adjustments are performed prior to Substantial Completion, with the exception of deferred tests approved in advance by Owner.
- 1.2.4. Commissioning will encompass and coordinate traditionally separate functions of system documentation, installation checkout, Prefunctional Checklists and start-up, control system calibration and point-to-point checkout, testing, adjusting, and balancing, Functional Performance Tests, and Integrated System Tests, Contractor demonstration to the Owner, and training of Owner. Commissioning is intended to achieve the following specific objectives of the Contract Documents.
 - 1.2.4.1. Verify and document proper installation and intended performance of equipment, systems, and integrated systems.
 - 1.2.4.2. Ensure that operating and maintenance and Commissioning documentation requirements are complete.
 - 1.2.4.3. Provide Owner with functional buildings and systems that meet the Contract Document requirements at Substantial Completion.

1.3. DEFINITIONS

- 1.3.1. Building Automation System: System and components associated with the Building Automation System.
- 1.3.2. Commissioning: A systematic process confirming that building systems have been installed, properly started, and consistently operated in strict accordance with the Contract Documents,

that all systems are complete and functioning in accordance with the Contract Documents at Substantial Completion, and that Contractor has provided Owner adequate system documentation and training. Commissioning includes deferred and/or seasonal tests as approved by Owner.

- 1.3.3. Commissioning Consultant: Owner or Owner's consultant who performs technical reviews of Contract Documents, observes completion of construction, verifies equipment and system start-up by Contractor or Subcontractor, observes Prefunctional Checklists and Functional Performance Tests of systems, and Integrated System tests for compliance with the Contract Documents, tracks deficiencies, and recommends solutions. Commissioning Consultant does not have authority to alter design or installation procedures without the written approval of Owner.
- 1.3.4. Commissioning Plan: Document prepared by Contractor and approved by Owner that provides the structure, schedule, and coordination plan for the Commissioning process from the construction phase through the warranty period. The Commissioning Plan must satisfy the Owner's Test Requirements.
- 1.3.5. Commissioning Team: Working group made up of representative(s) from the Architect/Engineer, Contractor, Test, Adjust, and Balance Firm, Building Automation System vendor, specialty manufacturers and suppliers, and Owner. Contractor will provide ad-hoc representation of subcontractors on the Commissioning Team as required for implementation of the Commissioning Plan.
- 1.3.6. Datalogging: Monitoring flows, current, status, pressures, etc. of equipment using stand-alone dataloggers or the Building Automation System as acceptable to Owner.
- 1.3.7. Deferred Tests: Functional Performance or Integrated System Tests performed after Substantial Completion due to partial occupancy, partial equipment acceptance, seasonal requirements, design, or other Site conditions that prohibit the test from being performed prior to Substantial Completion.
- 1.3.8. Deficiency: Condition of a component, piece of equipment, or system that is not in compliance with the Contract Documents.
- 1.3.9. Factory Testing: Testing of equipment at the factory, by factory personnel with an Owner's representative present, if deemed necessary by Owner.
- 1.3.10. Functional Performance Test: Test of dynamic function and operation of equipment and systems executed by Contractor. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, life safety conditions, power failure, etc. Systems are run through all specified sequences of operation. Components are verified to be responding in accordance with Contract Documents. Functional Performance Tests are executed after start-ups and Prefunctional Checklists are complete.
- 1.3.11. Functional Performance Test Procedures: Commissioning protocols and detailed test procedures and instructions in tabular and script-type format that fully describe system configuration and steps required to determine if the system is performing and functioning properly. Contractor prepares these procedures to document Functional Performance Tests.
- 1.3.12. Integrated System Test: Test of dynamic function and operation of multiple systems. Integrated System Tests are tested under various modes, such as fire alarm and emergency situations, life safety conditions, power failure, etc. Systems are integrally operated through all specified sequences of operation. Components are verified to be responding in accordance with Contract Documents. Integrated System Tests are executed after Functional Performance Tests are complete and prior to Substantial Completion. Integrated

System Tests provide verification that the integrated systems will properly function according to the Contract Documents.

- 1.3.13. Integrated System Test Procedures: Commissioning protocols and detailed test procedures and instructions in tabular and script-type format that fully describe system configurations and steps required to determine if the interacting systems are performing and functioning properly. Contractor prepares these procedures to document Integrated System Tests.
- 1.3.14. Indirect Indicators: Indicators of a response or condition without direct physical linkage, such as a reading on a control system display reporting a damper to be 100 percent closed.
- 1.3.15. Manual Test: Use of hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing trend data to make the "observation").
- 1.3.16. Overwritten Value: Writing over a sensor value in control system to see response of a system (e.g., changing outside air temperature value from 52°F to 72°F to verify economizer operation). See also "Simulated Signal".
- 1.3.17. Prefunctional Checklist: A list of static inspections and material or component tests that verify proper installation of equipment (e.g., belt tension, oil levels, labels affixed, gages in place, sensors calibrated, etc.). The word Prefunctional refers to before Functional tests. Prefunctional Checklists must include the manufacturer's start-up checklist(s). Contractor shall sign Prefunctional Checklists as complete and submit with the Request for Start-Up/Functional Performance Test Form.
- 1.3.18. Simulated Condition: Condition created to test component(s) and system(s) responses. (e.g., applying heat to space temperature sensor to monitor response of a terminal unit).
- 1.3.19. Simulated Signal: Disconnecting a sensor and using a signal generator to send voltage, amperage, resistance or pressure to transducer and/or direct digital control system to simulate a value to the Building Automation System to test the system and component response.
- 1.3.20. Start-up: The activities where equipment is initially energized, tested and operated. Start-up is completed prior to Functional Performance Tests.
- 1.3.21. Test, Adjust, and Balance Firm: The Owner may engage a Test, Adjust, and Balance Firm directly. Test, Adjust, and Balance responsibilities are contained in Technical Specifications and in the Test, Adjust, and Balance Firm's contract.
- 1.3.22. Test Requirements: Requirements specifying what systems, modes and functions, etc. must be tested. Test requirements are not detailed test procedures. Test requirements and acceptance criteria are specified in the Contract Documents.
- 1.3.23. Trending: Data collection of monitoring points using the Building Automation System or dataloggers.

1.4. COORDINATION

1.4.1. Commissioning Team:

1.4.1.1. Members appointed by Owner:

- 1.4.1.1.1. Owner's Project Manager and any other designated representatives of Owner's staff.

1.4.1.1.2. Commissioning Consultant (if hired by Owner).

1.4.1.1.3. Architect/Engineer.

1.4.1.1.4. Test, Adjust, and Balance Firm.

1.4.1.2. Members appointed by Contractor:

1.4.1.2.1. Individuals, each having authority to act on behalf of the entity they represent, explicitly organized to implement the Commissioning process through coordinated actions.

1.4.1.2.2. Representatives of Contractor, including but not limited to, Project Manager and Commissioning coordinator, subcontractors, installers, and equipment suppliers. Owner must approve Contractor's Commissioning coordinator.

1.4.2. Scheduling:

1.4.2.1. Contractor shall integrate all Commissioning activities into the Project Schedule. All parties will address scheduling problems and make necessary notifications in a timely manner to expedite the Commissioning process.

1.4.2.2. Contractor shall provide the initial schedule of primary Commissioning activities at the Pre-Commissioning Meeting. Prior to the first Start-up or Prefunctional Checklist test occurring, Contractor shall have incorporated and integrated all Commissioning activities into the Project Schedule with appropriately linked predecessors and successors.

1.5. ROLES AND RESPONSIBILITIES

1.5.1. Roles and responsibilities of Commissioning Team members are provided in this Section to clarify the Commissioning process.

1.5.2. Owner's Role and Responsibilities:

1.5.2.1. Review Architect/Engineer's Technical Specifications containing Commissioning requirements.

1.5.2.2. Provide Owner's Test Requirements to Contractor.

1.5.2.3. Approve Contractor's Commissioning Plan and Contractor's schedule of Commissioning activities.

1.5.2.4. Assign Owner's representatives and schedule them to participate in Commissioning activities, including the following:

1.5.2.4.1. Commissioning Team meetings.

1.5.2.4.2. Review and approve Commissioning Plan, Prefunctional Checklists, Functional Performance Test Procedures, Functional Performance Tests, Integrated System Test Procedures, Integrated System Tests, Deferred Tests, Trending, and other Commissioning documents.

1.5.2.4.3. Attend Contractor's training sessions in operation and maintenance of systems and equipment.

1.5.2.4.4. Observe Contractor's demonstration of system and equipment operation.

1.5.3. Architect/Engineer's Role and Responsibilities:

- 1.5.3.1. Specify control sequences of operation within the Contract Documents.
- 1.5.3.2. Attend Commissioning Team meetings.
- 1.5.3.3. Review Commissioning Plan, Prefunctional Checklist, Functional Performance Test Procedures, Functional Performance Test, Integrated System Test Procedures, Integrated System Tests, Deferred Tests, Trending, and other Commissioning documents.
- 1.5.3.4. Review Commissioning training plan.
- 1.5.3.5. Review Test, Adjust, and Balance plan.
- 1.5.3.6. Coordinate resolution of Deficiencies and approve technical requirements for correction of deficiencies identified during Commissioning, Deferred Tests, and during the warranty period.
- 1.5.3.7. Review Operating and Maintenance Manuals.

1.5.4 Contractor's Role and Responsibilities:

- 1.5.4.1 Produce for Owner's approval the Commissioning Plan, Prefunctional Checklist, Functional Performance Test Procedures, Integrated System Test Procedures, Request for Start-Up/Functional Performance Test Form, Equipment List/Matrix of all devices, systems and equipment supplied, and other Commissioning documents. Contractor must incorporate Owner's Test Requirements within the Commissioning Plan.
- 1.5.4.2 As the Project progresses, add specific checklists, test procedures, schedules, recorded results, action lists, signoff sheets and other documents for the Commissioning and Closeout Manual. Administer updates to the Commissioning and Closeout Manual with the intent that all Commissioning Team members will have up-to-date documentation as the Commissioning progresses.
- 1.5.4.3 Provide a qualified individual, subject to Owner's approval, experienced in construction and Commissioning of building systems to organize, schedule, conduct, and document the Commissioning Plan and the Commissioning process. The Contractor shall assign this individual to act as the Contractor's Commissioning Coordinator. The Contractor's Commissioning Coordinator may have additional duties such as MEP Coordinator, but not as Project Manager or Superintendent. In the event that Contractor chooses to subcontract its Commissioning obligations, then Contractor must submit the subcontractor's qualifications and personnel to Owner for Owner's approval.
- 1.5.4.4 Furnish and install systems that meet all requirements of the Contract Documents. Perform construction inspections, Start-ups, Prefunctional Checklists, Functional Performance Tests, and Integrated System Tests in accordance with the Contract Documents and Commissioning Plan. Correct any deficiencies identified during these processes.
- 1.5.4.5 Ensure that Commissioning activities are incorporated into the Project Schedule.
- 1.5.4.6 Submit inspection and Start-up documentation to Owner in accordance with this Section – 01 99 00 General Commissioning Requirements, Section 01 45 00 – Project Quality Control, Section 01 77 00 – Project Closeout Procedures, Technical Specifications, and the Commissioning Plan.

- 1.5.4.7 Cooperate with Owner's representative(s), provide access to Work and provide adequate labor, resources, and time for Commissioning.
- 1.5.4.8 Furnish copies of all shop drawings and submittals, manufacturers' literature, maintenance information, and any other information required for the Commissioning process. Contractor must submit to Owner installation and checkout materials actually shipped inside equipment and actual field checkout sheet forms used by factory or field technicians. Cross-reference Section 01 31 00 – Project Administration and Section 01 77 00 – Project Closeout Procedures (Operating and Maintenance Manuals) for additional required documentation.
- 1.5.4.9 Schedule and conduct pre-installation meetings and pre-commissioning meetings with subcontractors and equipment suppliers related to Commissioning. Contractor must invite Architect/Engineer and Owner to attend the pre-installation meetings and pre-commissioning meetings.
- 1.5.4.10 Provide qualified personnel, including subcontractors as required, to fully perform the testing and operational demonstrations required by the Contract Documents and the Commissioning Plan, including any deferred tests or re-testing related to warranty work.
- 1.5.4.11 Correct deficiencies identified during any stage of the Commissioning process.
- 1.5.4.12 Provide training to Owner. Coordinate subcontractor/vendor participation in training sessions.
- 1.5.4.13 Perform Deferred Tests and make necessary amendments to Operating and Maintenance Manuals and as-built drawings for applicable issues identified during the Deferred Tests.
- 1.5.4.14 Contractor shall be responsible for the following activities, and may contract with a Building Automation System vendor for these activities.
 - 1.5.4.14.1 Provide on-site technician skilled in software programming and hardware operation to exercise sequences of operation and to correct controls deficiencies identified during Commissioning. Contractor must provide final as-builts reflecting correction of controls deficiencies identified during Commissioning.
 - 1.5.4.14.2 Provide instrumentation, computer, software and communication resources necessary to demonstrate compliance with the Contract Documents and the Commissioning Plan during the Prefunctional Checklist, Functional Performance Tests and Integrated System Tests of Building Automation System equipment.
 - 1.5.4.14.3 Attend pre-commissioning meetings and Commissioning meetings including seasonal, post occupancy, or deferred Commissioning meetings and activities as deemed appropriate to the Owner. Prepare training plans with Commissioning Team and perform training as specified in Contract Documents and Commissioning Plan.
 - 1.5.4.14.4 Maintain comprehensive system calibration and checkout records. Submit records to Commissioning Team.
 - 1.5.4.14.5 Set up, capture, analyze, and report trend logs as requested by Owner to substantiate proper systems operation.

1.5.5 Test, Adjust, and Balance Firm's Role and Responsibilities:

- 1.5.5.1 Attend pre-commissioning meetings and Commissioning Team meetings including seasonal, post occupancy, or deferred Commissioning meetings and activities as deemed appropriate to the Owner.
- 1.5.5.2 Submit Test, Adjust, and Balance Plan and forms describing methodology for performance of Test, Adjust, and Balance procedures specific to this Project to Owner for review.
- 1.5.5.3 Cooperate with Contractor and Contractor's Building Automation System vendor, if any, during Commissioning.
- 1.5.5.4 Re-balance any Deficiency identified during Commissioning.
- 1.5.5.5 Provide Test, Adjust, and Balance report to Contractor before Contractor begins Functional Performance Tests.

1.6 EQUIPMENT DOCUMENTATION REQUIREMENTS

1.6.1 Equipment List / Matrix:

- 1.6.1.1 Contractor shall submit a complete listing of all equipment, devices, and systems, with certain information as herein noted, within twenty-one (21) calendar days of issuance of the Notice to Proceed with Construction and at least seven (7) calendar days prior to submission of the first application for payment. This listing shall be referred to as the Equipment List/Matrix. Refer to Attachment "A" for an example of the Equipment List/Matrix.
- 1.6.1.2 Contractor shall coordinate Contractor's response to this requirement with Contractor's preparation of the Project Schedule, Submittal Schedule, Schedule of Values, and list of all equipment. Refer to Section 01 32 00 – Project Planning and Scheduling and Section 01 31 00 – Project Administration.
 - 1.6.1.2.1 To the extent practical, Contractor should minimize redundant efforts in favor of a single, organized approach to all documentation required for Project equipment, systems, and devices.
- 1.6.1.3 The Equipment List/Matrix shall be formatted as a computerized spreadsheet with capability for printing various selected data columns (ranges) to meet documentation requirements at various stages of construction, and for different purposes as required by various Technical Sections. The Equipment List/Matrix shall be updated as the Project progresses and submitted periodically as requested by Owner. Provide Owner with an electronic version (Microsoft Excel 2003 or later) of the final approved Equipment List/Matrix at or before project closeout.
- 1.6.1.3.1 Contractor may elect to combine the Submittal Schedule and Equipment List/Matrix into one computerized spreadsheet (with multiple tabbed sheets) that Contractor updates as the Project progresses.
- 1.6.1.4 The Equipment List/Matrix shall identify all operable devices and equipment grouped by the Construction Specification Institute (CSI) Master Format under the system they are primarily categorized under. When sorted by the column for system identification, the resulting printout must identify all system components, regardless of whether they are mechanical, electrical, or otherwise.

1.6.1.5 Contractor shall submit the Equipment List/Matrix in its entirety prior to the first pre-commissioning meeting. The Equipment List/Matrix shall include the following data, as a minimum, for each device, and shall provide for additional columns containing subsequent data requirements as follows.

1.6.1.5.1 Specification section.

1.6.1.5.2 Room Number: Owner's Wayfinding Codes from Owner's Space Management database referring to room number or building location.

1.6.1.5.3 Equipment Plan Designation: Equipment Naming Convention (equipment acronym and sequential number) from Contract Documents.

1.6.1.5.4 Owner's asset number from Owner's maintenance database.

1.6.1.5.5 Description: Further detail including more definitive description and identification of duplicate assets, if available.

Service: Building area or type or system that the equipment serves.

1.6.1.5.6 Product submittal reference number(s) and projected time of original submission of device or system.

1.6.1.5.7 Product submittal approval date.

1.6.1.5.8 Name of installing Subcontractor.

1.6.1.6 Contractor shall provide the final Equipment List/Matrix for each device or system as an attachment to the Contractor's submission of the Request for Start-Up/Functional Performance Test Form for requesting Start-up and Functional Performance Test of particular devices or systems. The final Equipment List/Matrix shall include all data noted above; including any necessary corrective updates to the data, and shall also provide the following new data in distinct columns:

1.6.1.6.1 Equipment manufacturer's representative (Vendor).

1.6.1.6.2 Equipment manufacturer's representative (Vendor) phone number.

1.6.1.6.3 Equipment manufacturer, model number, and serial number.

1.6.1.6.4 Vendor's P.O. number.

1.6.1.6.5 Date of initial equipment or device start-up by the Contractor.

1.6.1.6.6 Substantial Completion date.

1.6.1.6.7 Manufacturer's warranty start date.

1.6.1.6.8 Manufacturer's warranty duration period.

1.6.1.6.9 Functional Performance Test approval date.

1.6.1.6.10 Integrated Systems Test approval date.

1.6.2 Request for Start-Up/Functional Performance Test Form:

- 1.6.2.1 Contractor must use Owner's Request for Start-Up/Functional Performance Test Form to request: (1) to initially energize or operate equipment and systems; and (2) an inspection of any system or system component for readiness prior to Functional Performance Tests. Contractor must complete the appropriate section of Owner's Request for Start-Up/Functional Performance Test Form.
- 1.6.2.1.1 Request for Start-up. Contractor must certify that: (1) electrical and mechanical connections have been installed and are safe for initial Start-up; (2) Contractor has complied with Owner's outage notifications; and (3) Start-up will not harm Owner's daily routine operations.
- 1.6.2.1.2 Request for Functional Performance Test. Contractor must certify that the Contractor has verified that the installation, Start-up, Prefunctional Checklists, and initial operation of the system or component are in accordance with the Contract Documents and the Commissioning Plan including manufacturer's instructions, manufacturer's requirements for maintenance of warranty, and verification that the system is ready for Functional Performance Tests. Contractor must certify that the manufacturer's representative has verified that the installation, start-up, and initial operation of the system or component are in accordance with the manufacturer's published recommendations.
- 1.6.2.2 Contractor shall attach to the Request for Start-Up/Functional Performance Test Form the applicable Prefunctional Checklist(s) completed and signed by Contractor, evidencing Contractor's own thorough inspection of the system and completion of start-up activities required by the Contract Documents and the Commissioning Plan.
- 1.6.2.3 Contractor must obtain Owner's signature on the Request for Start-Up/Functional Performance Test Form prior to proceeding with the Start-up or Functional Performance Test.

1.8 PREFUNCTIONAL CHECKLIST

- 1.8.1 Contractor shall provide a Prefunctional Checklist for each system to Owner and Architect/Engineer for review.
- 1.8.1.1 The Prefunctional Checklist shall identify in columnar format each device, location, test method, control sequence of operation reference, device code reported, and other data as appropriate.
- 1.8.1.2 Contractor shall provide a draft version of each Prefunctional Checklist at a pre-installation meeting for the system. Based on discussions at a preinstallation meeting and subsequent as-built conditions, Contractor shall amend and revise each Prefunctional Checklist as appropriate prior to requesting system inspection from the Owner.
- 1.8.1.3 Contractor shall provide the final approved Prefunctional Checklist as an attachment to the Request for Start-Up/Functional Performance Test Form.
- 1.8.2 In addition to the Request for Start-Up/Functional Performance Test Form, Contractor shall review the installation and Contract Documents for each system and shall provide written confirmation of the following.
- 1.8.2.1 All required test reports and/or certifications have been submitted and accepted by Owner. If required, Contractor must provide certification of acceptance from manufacturer's representative.

- 1.8.2.2 Evidence that Architect/Engineer has approved all shop drawings and product data submittals for each component device.
- 1.8.2.3 All valve charts, wiring diagrams, control schematics, electrical panel directories, etc. have been submitted, approved, and installed in accordance with the Contract Documents.
- 1.8.2.4 All tabulated data has been submitted for each system and/or device.
- 1.8.2.5 Each component device has been installed in accordance with applicable codes, the Contract Documents, and manufacturer's written recommendations.

1.9 COMMISSIONING AND CLOSEOUT MANUAL

- 1.9.1 Contractor shall incorporate all Commissioning and closeout documentation and/or verification into a Commissioning and Closeout Manual for the Owner as specified in Section 01 77 00 – Project Closeout Procedures.
- 1.9.2 The Commissioning and Closeout Manual submitted to Owner must contain all documentation related to the Commissioning process, including but not limited to: Prefunctional Checklists, calibrations, all related correspondence, Functional Performance Test Procedures and results, Integrated Systems Test Procedures and results, Deficiency reports, data trends, punchlists, and signoffs.

PART 2 - PRODUCTS

2.1. TEST EQUIPMENT

- 2.1.1. Contractor shall provide all specialized tools, test equipment and instruments required to execute start-up, checkout, and testing of equipment.
- 2.1.2. All specialized tools, test equipment and instruments required to execute start-up, checkout, and testing of equipment shall be of sufficient quality and accuracy to test and/or measure system performance within specified tolerances. A testing laboratory must have calibrated test equipment within the previous twelve (12) months. Calibration shall be NIST traceable. Contractor must calibrate test equipment and instruments according to manufacturer's recommended intervals and whenever the test equipment is dropped or damaged. Calibration tags must be affixed to the test equipment or certificates readily available.

PART 3- EXECUTION

3.1. PRE-COMMISSIONING MEETING

- 3.1.1. Contractor shall submit the Commissioning Plan to Owner at least ninety (90) calendar days prior to initial installation of materials or equipment that will undergo Start-up and Functional Performance Tests, or as otherwise approved by Owner.
 - 3.1.1.1. Contractor shall allow a minimum of twenty-one (21) calendar days after Owner's receipt of the Commissioning Plan for Owner to submit initial review comments to Contractor.
 - 3.1.1.2. Contractor shall incorporate Owner's initial review comments and resubmit the revised Commissioning Plan to Owner within fourteen (14) calendar days of receipt of Owner's initial review comments.

- 3.1.1.3. Contractor shall allow in the Project Schedule an additional fourteen (14) calendar days for Owner's approval of the resubmitted Commissioning Plan that incorporates Owner's initial review comments.
- 3.1.2. Upon obtaining Owner's approval of the Commissioning Plan, Contractor shall schedule, plan, and conduct a Pre-Commissioning Meeting with all parties involved in the Commissioning process. This meeting should include the major subcontractors, specialty manufacturers/suppliers, Architect/Engineer, Test, Adjust, and Balance Firm, and Owner's representatives as participants.
- 3.1.3. Contractor shall prepare for the Pre-Commissioning Meeting by creating drafts of the following documents with input from the Owner.
 - 3.1.3.1. Approved Commissioning Plan including the Equipment List/Matrix and the Closeout and Documentation Matrix and defined in Section 01 77 00 – Project Closeout Procedures.
 - 3.1.3.2. Project Schedule incorporating Commissioning activities.
 - 3.1.3.3. Prefunctional Checklists.
 - 3.1.3.4. Functional Performance Test Procedures.
 - 3.1.3.5. Integrated System Test Procedures.
- 3.1.4. Contractor shall conduct the Pre-Commissioning Meeting and review all aspects of the Commissioning Plan. All documentation will be discussed and all test procedures and forms reviewed for approval with the Owner. Contractor shall prepare an outline noting responsibilities of the various parties involved in the Commissioning process for review at this meeting.
- 3.1.5. The Commissioning Plan shall be reviewed with all attendees and the scope of work discussed. Contractor should be prepared to distribute copies of the pertinent sections to the various subcontractors involved in the Commissioning process.
- 3.1.6. Contractor shall present Commissioning target dates for the Project. These dates and durations shall be incorporated in the Project Schedule in accordance with Section 01 32 00 – Project Planning and Scheduling.
- 3.1.7. Contractor shall provide updates to the Project Team on the Commissioning process during all Project Progress Meetings.
- 3.2. REPORTING
 - 3.2.1.1. Contractor shall provide status reports to Owner at frequencies directed by Owner.
 - 3.2.1.2. Contractor shall communicate at least monthly with all members of the Commissioning Team, keeping them apprised of Commissioning progress and scheduling changes.
 - 3.2.1.3. Contractor shall submit non-conformance and Deficiency reports to Owner within five (5) calendar days of the non-conformance or Deficiency occurrence.
 - 3.2.1.4. Contractor shall provide final Commissioning documentation to Owner in accordance with Section 01 77 00 – Project Closeout Procedures, which will become part of the Commissioning and Closeout Manual.

3.3. INITIAL START-UP

3.3.1. Start-up of Independent Devices:

- 3.3.1.1. Prior to Start-up, Contractor shall not energize or activate, or allow to be energized or activated, any operable device until Contractor has verified to Contractor's own satisfaction that all Contract Document requirements for the operable device have been met, other than the requirements relating to operational checkout.
- 3.3.1.2. Contractor may energize and/or start-up independent devices for operational check-out and testing only after Contractor and manufacturer's representative and/or engineering technician (if required by the Contract Documents) have inspected and accepted the installation. The installation must not vary from provisions of the applicable Specifications and the manufacturer's written recommendations for Start-up.
- 3.3.1.3. When Start-up of equipment or systems have the potential to impact Owner's daily operations, Contractor must provide advance notice to Owner prior to Start-up. Contractor may not proceed with Start-up without the Owner's written approval.

3.3.2. Start-up of Building Systems:

- 3.3.2.1. Contractor shall not energize or activate any building system until the following conditions have been met:
 - 3.3.2.1.1. Contractor has verified that all wiring and support components for equipment are complete and have been tested in accordance with the technical specifications and/or the manufacturer's written recommendations.
 - 3.3.2.1.2. Contractor has verified that each component device has been checked for proper lubrication, vibration isolation, drive rotation, belt tension, control sequence, or other conditions that may cause damage.
 - 3.3.2.1.3. Contractor has verified that all tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer and are in compliance with applicable Contract Documents.
 - 3.3.2.1.4. Contractor has provided the Owner and Architect/Engineer with a written seven (7) calendar day notice of intent to start-up the system for operational check-out. The Request for Start-Up/Functional Performance Test Form without attachments shall be used for this notification.
- 3.3.2.2. Contractor shall perform Start-up under supervision of the responsible manufacturer's representative in accordance with manufacturer's instructions and specification requirements.
- 3.3.2.3. Contractor shall coordinate and schedule system(s) Start-up in a timely manner so that each component or system can operate for a period of time that is sufficient to evaluate and adjust performance as necessary. All building systems shall be operational and must have been successfully inspected by Owner's representatives, through attendance and concurrence with results of the Prefunctional Checklists or as otherwise approved by Owner, prior to the Contractor proceeding with Functional Performance Tests.
- 3.3.2.4. Contractor shall clearly list outstanding items on initial Start-up and Prefunctional Checklists not completed successfully. Contractor shall obtain from Subcontractor completed forms documenting any outstanding Deficiency within five (5) calendar days of completion of such test procedures.

- 3.3.2.5. Contractor shall review completed Deficiency forms to determine if outstanding items prevent the Functional Performance Tests.
- 3.3.2.6. Owner may backcharge Contractor for any incomplete Prefunctional Checklist or Deficiency that subsequently causes delays during Functional Performance Test.

3.4. FUNCTIONAL PERFORMANCE TESTS

3.4.1. Objective and Scope:

- 3.4.1.1. The objective of a Functional Performance Test is to demonstrate that each system operates according to the Contract Documents.
- 3.4.1.2. Contractor shall operate each system through all modes of operation (occupied, unoccupied, warm-up, cool-down, etc.) for specified system responses. Contractor is required to demonstrate to Owner's satisfaction each operational sequence.

3.4.2. Development of Functional Performance Test Procedures:

- 3.4.2.1. The purpose of a Functional Performance Test is to verify and document compliance with the stated criteria of acceptance. Contractor shall develop specific script-type test procedures and associated test forms to verify and document proper operation of each piece of equipment and system.
- 3.4.2.2. Contractor shall prepare Functional Performance Test Procedure forms as part of the Commissioning Plan.
- 3.4.2.3. Functional Performance Test Procedure forms must include the following.
 - 3.4.2.3.1. System and equipment or component name(s).
 - 3.4.2.3.2. Equipment location and identification number as identified in the Equipment List/Matrix.
 - 3.4.2.3.3. Unique test identification number and reference to unique Prefunctional Checklist and Start-up documentation identification numbers for the equipment.
 - 3.4.2.3.4. Date and time of test.
 - 3.4.2.3.5. Project name.
 - 3.4.2.3.6. Participating parties.
 - 3.4.2.3.7. Specific sequence of operation or other specified parameters, including performance data being verified.
 - 3.4.2.3.8. Instructions for setting up a Functional Performance Test.
 - 3.4.2.3.9. Specific script-type, step-by-step procedures to perform a Functional Performance Test, in a clear, sequential and repeatable format that is customized for the system being tested.
 - 3.4.2.3.10. A Yes/No checkbox (or data entry box as appropriate) for clearly indicating whether or not proper performance of each part of a Functional Performance Test was achieved and space for actual readings.

3.4.2.3.11. Section for comments.

3.4.2.3.12. Signatures and date block for participants and Owner approvals.

3.4.3. Contractor shall operate, or cause to be operated, each system, device, or equipment item, both intermittently and continuously, for a duration period as indicated in the Specification Section(s) for each item and/or in accordance with the manufacturer's written recommendations, the Contract Documents and the Commissioning Plan.

3.4.4. Contractor shall operate each component device and each building system to the full extent of its capability, from minimum to maximum, and under automatic control and manual control.

3.4.5. Contractor and manufacturer's representatives shall supervise and coordinate adjustments and balancing of all devices and systems for proper operation prior to requesting a Functional Performance Test(s).

3.4.5.1. Where final balancing of a system is to be performed by Owner or Owner's consultants, such as final air balancing, Contractor shall provide all services indicated in the applicable Technical Sections and under this Section including the following prior to Owner's final balancing.

3.4.5.1.1. Operational verification of all component devices and the total system, including automatic controls when applicable. Operational verification includes verification that all motors, fans, dampers, and other operable devices are performing in compliance with Specifications throughout their operable range and that all devices are controlled as described in the specified sequence of operation.

3.4.5.1.2. All tabulated data, motor amperage readings, valve tag verifications, and other data required by Technical Specifications.

3.4.5.2. Where final balancing of a system or particular components of a system are not specifically indicated to be performed by Owner or Owner's consultants, Contractor shall provide final balancing and adjustments for operation within specified tolerances prior to Functional Performance Test of such system.

3.4.6. Coordination and Scheduling.

3.4.6.1. Owner may observe Functional Performance Tests of equipment components and systems. Contractor shall provide written notice to Owner at least seven (7) calendar days prior to Functional Performance Tests of equipment components and systems. Contractor shall notify Owner in advance of any changes to the Functional Performance Test schedule. Owner may require Contractor to reschedule Functional Performance Tests to ensure availability of Owner's representative(s).

3.4.6.2. Contractor conducts Functional Performance Tests after system Start-up and Pre-functional Checklists are satisfactorily completed and approved by Owner. Air balancing and water balancing shall be completed before Functional Performance Tests.

3.4.6.3. Contractor conducts Integrated System Tests after Functional Performance Tests are satisfactorily completed and approved by Owner. Owner's representative(s) may observe Integrated System Tests.

3.5. INTEGRATED SYSTEM TESTS

3.5.1. Objective and Scope:

- 3.5.1.1. The objective of an Integrated System Test is to demonstrate that each system operates jointly and independently of other systems according to the Contract Documents.
- 3.5.1.2. Contractor shall operate each system, jointly and independently of other systems, through selected modes of operation (occupied, unoccupied, warm-up, cool-down, etc.) for specified system responses. Contractor is required to demonstrate to Owner's satisfaction each operational sequence.
- 3.5.2. Development of Integrated System Test Procedures:
 - 3.5.2.1. The purpose of an Integrated System Test is to verify and document compliance with the stated criteria of acceptance. Contractor shall develop specific script-type test procedures and associated test forms to verify and document proper operation of each piece of equipment and system, jointly and independently of other systems.
 - 3.5.2.2. Contractor shall prepare Integrated System Test Procedure forms as part of the Commissioning Plan.
 - 3.5.2.3. Integrated System Test Procedure forms must include the following.
 - 3.5.2.3.1. System and equipment or component name(s).
 - 3.5.2.3.2. System and equipment location and identification number as identified in the Equipment List/Matrix.
 - 3.5.2.3.3. Unique test identification number and reference to unique Prefunctional Checklist, Start-up documentation, and Functional Performance Test identification numbers for the system and equipment.
 - 3.5.2.3.4. Date and time of test.
 - 3.5.2.3.5. Project name.
 - 3.5.2.3.6. Participating parties.
 - 3.5.2.3.7. Specific sequence of operation or other specified parameters, including performance data being verified.
 - 3.5.2.3.8. Instructions for setting up an Integrated System Test.
 - 3.5.2.3.9. Specific script-type, step-by-step procedures to perform an Integrated System Test, in a clear, sequential and repeatable format that is customized for the system being tested.
 - 3.5.2.3.10. A Yes/No checkbox (or data entry box as appropriate) for clearly indicating whether or not proper performance of each part of an Integrated System Test was achieved and space for actual readings.
 - 3.5.2.3.11. Section for comments.
 - 3.5.2.3.12. Signatures and date block for participants and Owner approvals.
- 3.5.3. Contractor shall operate, or cause to be operated, each system, device, or equipment item, both intermittently and continuously, for a duration period as indicated in the Specification Section(s) for each item and/or in accordance with the manufacturer's written recommendations, the Contract Documents and the Commissioning Plan.

3.5.4. Coordination and Scheduling.

- 3.5.4.1. Owner may observe Integrated System Tests of equipment components and systems. Contractor shall provide written notice to Owner at least fourteen (14) calendar days prior to Integrated System Tests of equipment components and systems. Contractor shall notify Owner in advance of any changes to the Integrated System Test schedule. Owner may require Contractor to reschedule Integrated System Tests to ensure availability of Owner's representative(s).
- 3.5.4.2. Contractor conducts Integrated System Tests after Functional Performance Tests are satisfactorily completed and approved by Owner. Owner's representative(s) may observe Integrated System Tests.

3.6. DOCUMENTATION AND NON-CONFORMANCE

3.6.1. Documentation:

- 3.6.1.1. Contractor shall witness and document the results of all Functional Performance Tests and Integrated Systems Tests using specific procedural forms developed for that purpose. Prior to testing, Contractor shall submit these forms to the Owner for review and approval. Contractor will include the completed, filled-out forms in the Commissioning and Closeout Manual.

3.6.2. Non-Conformance:

- 3.6.2.1. Contractor shall record results of Functional Performance Tests and Integrated System Tests. Contractor shall report all deficiencies and non-conformance issues to Owner on the Functional Performance Test form and the Integrated Systems Test form and in a Commissioning Deficiency report.
- 3.6.2.2. At the sole discretion of Owner, Owner may permit Contractor to make corrections of minor deficiencies observed during a Functional Performance Test or during an Integrated System Test. However, the Contractor must document the Deficiency and resolution on the appropriate report form.
- 3.6.2.3. Contractor shall make every effort to expedite testing and minimize unnecessary delays, while not compromising the integrity of a Functional Performance Test or an Integrated Systems Test.
- 3.6.2.4. Contractor and Owner will attempt to resolve deficiencies in the following manner.
 - 3.6.2.4.1. When there is no dispute about a Deficiency and Contractor accepts responsibility for correction.
 - 3.6.2.4.1.1. Contractor documents the Deficiency and the corrective actions, and then proceeds to another test or sequence. Contractor submits a Deficiency report to Owner. Contractor corrects the Deficiency, completes the statement of correction form certifying that the equipment or system is ready for retesting, and sends the certification to Owner.
 - 3.6.2.4.1.2. Contractor reschedules test with Owner.
 - 3.6.2.4.2. When there is a dispute about whether or not the test indicates a Deficiency, or the Contractor's responsibility for the correction of the apparent Deficiency.

- 3.6.2.4.2.1. Contractor documents the apparent Deficiency and proceeds to another test or sequence. Contractor submits a Deficiency report to Owner, including the apparent Deficiency.
- 3.6.2.4.2.2. Contractor facilitates resolution of Deficiency and provides recommendations to the Owner. Contractor and Owner may bring other parties into the discussions as needed. Final technical interpretive authority is with the Architect/Engineer. Final acceptance authority is with the Owner.
- 3.6.2.4.2.3. Contractor documents resolution process.
- 3.6.2.4.2.4. If Owner agrees with Contractor's interpretation and proposed resolution, Contractor forwards response to Owner. Contractor reschedules test with Owner. Contractor must repeat this process until satisfactory performance and Owner's approval is obtained.

3.7. DEMONSTRATION AND OWNER TRAINING

- 3.7.1. Contractor shall conduct classroom-style training session followed by on-site demonstrations of system operation. Refer to Technical Specification Sections and Contract Documents for training requirements. When equipment or a system requires both demonstration and training, Contractor may combine the demonstration and training provided that the Contractor obtains the Owner's approval at least ten (10) calendar days prior to the demonstration and training.
- 3.7.2. Contractor shall furnish to the Owner a professional quality video and audio recording of the training. Owner may select portions of the training to be recorded.
- 3.7.3. Contractor shall coordinate, schedule and complete the training related to all equipment specified in the Contract Documents. Contractor may utilize the installing subcontractor and/or manufacturers' representative or others approved in advance by Owner for specific portions of equipment or systems training. Contractor shall conduct multiple training sessions as required to adequately train Owner's staff.
- 3.7.4. Contractor shall submit a written training plan to the Owner and Architect/Engineer for review and approval. Contractor's training plan shall cover the following elements.
 - 3.7.4.1. Equipment included in training.
 - 3.7.4.2. Intended audience.
 - 3.7.4.3. Location of training.
 - 3.7.4.4. Objectives.
 - 3.7.4.5. Subjects covered.
 - 3.7.4.6. Duration of training on each subject.
 - 3.7.4.7. Instructor for each subject.
 - 3.7.4.8. Methods (classroom lecture, video, Site walk-through, actual operational demonstrations, written handouts, etc.).
 - 3.7.4.9. Instructors and qualifications.

- 3.7.5. Contractor shall use Operating and Maintenance Manuals and the Equipment List/Matrix as a basis for instructing Owner's staff regarding system operation. Contractor shall review contents of Operating and Maintenance Manuals and review equipment data and performance verification to Owner as part of Owner training. This instruction and data review should be held in a classroom environment.
- 3.7.6. Contractor shall demonstrate in the field: start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of the system(s) and each component device.
- 3.7.7. Contractor shall demonstrate system performance at each stage of sequence of operation. Contractor shall promptly correct any deficiencies noted during the demonstration and document on a Deficiency report.
- 3.7.8. Contractor shall cooperate with Owner and Owner's Test, Adjust, and Balance Firm for verification testing and final adjustments and balancing as may be indicated in the Contract Documents or as directed by Owner.
- 3.7.9. As a minimum, Contractor shall perform training on all systems including, but not limited to, the following (as applicable to the Project):
 - 3.7.9.1. Heating, Ventilating, and Air Conditioning Airside and Waterside Systems.
 - 3.7.9.2. Building Automation System.
 - 3.7.9.3. Life Safety Systems (including Fire Alarm, Stairwell Pressurization, Fire Protection, and Smoke Containment, Control, and Response System).
 - 3.7.9.4. Elevators/Escalators.
 - 3.7.9.5. Refrigeration Systems.
 - 3.7.9.6. Lighting Control Systems.
 - 3.7.9.7. Communications Systems (including Network, Data, Nurse Call)
 - 3.7.9.8. Emergency Power and Uninterruptible Power Supply (UPS) Systems.
 - 3.7.9.9. Domestic and Process Water Systems.
 - 3.7.9.10. Medical Gas and Vacuum Systems.
 - 3.7.9.11. Laboratory Gas and Vacuum Systems.
 - 3.7.9.12. Any other major system not identified above.

3.8. DEFERRED TESTS

3.8.1. Deferred Tests:

- 3.8.1.1. Contractor shall complete Deferred Tests as part of this Contract during the warranty period. Contractor shall schedule this activity with Owner. Contractor shall perform tests and document and correct deficiencies. Owner may observe the tests and review and approve test documentation and Deficiency corrections.
- 3.8.1.2. Contractor shall incorporate final updates to the Commissioning and Closeout Manual.

- 3.8.1.3. If any check or test cannot be completed prior to Substantial Completion due to the building structure, required occupancy condition, or other condition, performance of such test may be delayed to later in the warranty period, upon approval of the Owner. Contractor shall reschedule and conduct these unforeseen deferred tests in the same manner as Deferred Tests.

3.9. COMMISSIONING DOCUMENTATION

- 3.9.1. Contractor shall compile and organize the Commissioning and Closeout Manual, and deliver the Commissioning and Closeout Manual to Owner. The Commissioning and Closeout Manual must include the following:

- 3.9.1.1. The Commissioning Plan within the Commissioning and Closeout Manual must include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and general description of testing and verification methods. The Commissioning Plan shall address methodology for documentation of equipment and system operational performance in the following areas: 1) Conformance to Contract Documents, 2) Equipment Installation, and 3) Prefunctional Checklist, Functional Performance Tests, and Integrated System Tests.
- 3.9.1.2. Specifically list all outstanding non-compliance items. Recommendations for improvement to equipment or operations, future actions, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific Functional Performance Test or Integrated System Test where the Deficiency is documented.
- 3.9.1.3. Project Commissioning schedules with Commissioning milestone activities and Equipment List/Matrix.
- 3.9.1.4. Request for Start-Up/Functional Performance Test Forms with all attachments.
- 3.9.1.5. Completed Prefunctional Checklists and Prefunctional test results, Functional Performance Tests, Integrated System Tests, and Owner Demonstration test records and results of each.
- 3.9.1.6. Owner training attendance.
- 3.9.1.7. Deficiency reports and solution results.
- 3.9.1.8. Recommendations on continuous Commissioning, best practices, and preventive maintenance.

- 3.9.2. Contractor shall submit the Commissioning and Closeout Manual to Owner on paper and in original electronic file format as described in Section 01 77 00 – Project Closeout Procedures.

ATTACHMENTS:

“A” - Equipment List/Matrix

END OF SECTION 01 91 00

Download an electronic version of this spreadsheet to use as a template for submittal purposes at:
[HTTP://WWW2.MDANDERSON.ORG/DEPTS/CPM/STANDARDS/SUPP.HTML](http://www2.mdanderson.org/depts/cpm/standards/supp.html)

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