1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contract Description.

B. Work by Owner.

C. Owner supplied Products.

D. Contractor use of site **[and premises].**

E. Work Sequence.

F. Owner occupancy.

1.2 CONTRACT DESCRIPTION

A. Contract Type: Stipulated Price as described in the Standard Form Agreement Between Owner and Contractor **[(Construction Management Edition)].**

A. Contract Type: The University of Arizona® Standard Form Agreement Between Owner and CM@Risk on the Basis of a Guaranteed Maximum Price including issued Addenda.

B. The work to be performed includes, but is not limited to the following:

1. **[**insert short outline description**]**

2. All other work shown on the drawings and/or miscellaneous incidental work not shown that may be required to complete the project.

C. Documents Furnished To The Contractor:

1. Owner will furnish the General Contractor **[fifteen (15)] [_____]** sets of drawings and specifications for use in construction of the project. Any additional sets required by the Contractor may be purchased from the Owner.

1.3 WORK BY THE OWNER

A. Other Contractors, Vendors, and/or forces of the Owner will be working at **[Project Name]** during the construction period and during the Contractor's work on punch list items following substantial completion**[s]**. The areas of other work include, but are not limited to **[furniture installation], [art installation], [lab equipment installation].**

1. The sequencing of **[_____]** installation shall be coordinated between the Owner, the Contractor, and the **[Vendor] [Contractor] [UA Forces].**

A. The Owner **[has awarded] [will award] [a contract] [contracts]** for **[supply] [and] [installation]** of **[_____]** which **[commences] [will commence on] [_____].**

B. Work under **[this contract] [these contracts] [will include:] [includes:]**

1. Existing Building Demolition: *The Owner has contracted for demolition of the existing garage structure on site and removal of its foundations. The site will be backfilled at the removed foundations and filled to existing grade elevation. Work will be completed on July 1, 1994.*

2. Elevators: The Owner intends to award a separate contract for elevator work associated with this contract. The proposed elevator contract documents are available for inspection at the office of the Owner.

C. Items noted NIC (Not in Contract), [movable cabinets,] [furnishings,] [minor equipment,] [and] [_____] will be supplied and installed by Owner [beginning] [before] [after] [_____].

D. Owner will remove and retain possession of the following items before start of work:

1. **[_____].**

2. **[_____].**

E. Contractor shall remove and Owner will take possession of **[the following items:] [items indicated.]**

1. **[_____].**

2. **[_____].**

1.4 OWNER SUPPLIED PRODUCTS

A. Owner's Responsibilities:

1. Arrange for and deliver review Shop Drawings, Product Data, and Samples to Contractor.

2. Arrange and pay for Product delivery to site.

3. On delivery, inspect Products jointly with Contractor.

4. Submit claims for transportation damage and replace damaged, defective, or deficient items.

5. Arrange for manufacturers; warranties, inspections, and service.

B. Contractor's Responsibilities:

1. Review Owner furnished Shop Drawings, Product Data, and Samples.

2. Receive and unload Products at site: inspect for completeness or damage jointly with Owner.

3. Handle, store, install, and finish Products.

4. Repair or replace items damaged after receipt.

C. Products supplied to site and installed by Owner.

1. **[_____].**

2. **[_____].**

D. Items supplied by Owner for installation by Contractor.

1. **[_____].**

2. **[_____].**

1.5 CONTRACTOR USE OF SITE **[AND PREMISES].**

A. Limit use of site **[and premises]** to allow:

1. Owner occupancy.

2. **[Work by Others] [and] [Work by Owner}/**

3. Use of site **[and premises]** by **[the public.] [_____.]**

4. In addition to site utilization limitations and requirements shown on drawings, and other contract documents, Contractor shall administer allocation of available space equitably among entities needing access and space, so as to produce the best overall efficiency in performance of total work on project. Contractor shall schedule deliveries as so to minimize space and time requirements for storage of materials and equipment on site. Use of the site, other than as specified in the Contract Documents, shall be requested in writing for the Owner's review and approval.

B. Access to Site: **[Limited to [_____.]] [_____.]**

C. Emergency Building Exits During Construction: **[Limited to [_____]. [_____.]**

D. Construction Operations: **[Limited to [areas noted on Drawings] [_____].] [_____.]**

1. Protect all existing work from damage. All damaged work shall be replaced or repaired a no cost to the Owner and to the satisfaction of the Owner or the Authority having jurisdiction thereover.

E. Time Restrictions for Performing Work:

1. No work shall be performed before **[7:00 a.m.]** and after **[5:00 p.m.]**, Monday through Friday, except with approval of the Owner. Hot weather concrete work and other critical work may require work between **[5:00 p.m.]** and **[7:00 .am.]** in which event the Contractor shall, in advance, coordinate time and obtain the prior written approval of Owner for such work.

2. Night Work:

   a. In general, all work shall be performed during regulated daytime hours. Night work hours shall be defined as 6 p.m. to 6 a.m. Approval for night work must be obtained in writing from the Owner.
   b. If night work is allowed, the Contractor shall furnish, erect and maintain an amount of artificial lighting sufficient for the construction, flagging, inspection, etc., and for the safety of the workmen and the general public. Lighting shall be directed downward towards the construction site and away from the adjacent residential area to the greatest extend possible. Refer to requirements in Section 01510. No night work shall be performed until the Construction Project Manager is satisfied that an adequate amount of artificial light has been furnished and placed properly.
   c. When doing night work, deactivation of the vehicle back-up devices will be required. When vehicle back-up alarm devices are deactivated, the Contractor shall provide flag personnel to direct traffic at all times in order to comply with OSHA requirements.
   d. Every effort shall be made to minimize noise and disruptions during all night work activities.

3. In addition to the above provision, Contractor must restrict work activities during certain critical periods of Owner's operations. These time periods and application restrictions are as follows:

[incorporate UA schedule with desired restrictions**]**

4. On any project located adjacent to (within 150 feet) non-University residential areas, all applicable City of Tucson ordinances concerning nuisance abatement shall be observed by the Contractor. These ordinances shall apply to all work under this Contract whether or not they are applicable to said work as enacted. Where there are variations between the Owner's regulations and applicable City ordinances, the more restrictive shall be observed.

5. In addition to all the above provisions, Owner reserves the right to restrict Contractor's work activity as may be necessary proper and uninterrupted

operation of Owner's facilities. Owner will attempt to coordinate Contractor's schedule with Owner's schedule of activities so as to minimize any unscheduled restrictions of Contractor's work.

F. Utilities Outages and Shutdowns

1. The Contractor shall perform the work under this Contract with a minimum of outage time for all utilities. Coordinate all interruptions with the Owner. Interruption shall be by approved section of the utility. In some cases, the Contractor may be required to perform the work while the existing utility is in service. When it is necessary to interrupt the existing utilities, the Contractor shall notify the Architect and the Owner in writing at least two weeks in advance of the time the existing service is to be interrupted. Depending upon the activities at the facility which require continuous service from the existing utility, an interruption may not be subject to schedule at the time desired by the Contractor. In such cases the interruption may have to be scheduled at a time of minimum requirement of demand from the utility. The amount of time requested by the Contractor for interruption of existing utility services shall be as approved by the Owner. Service interruptions may occur outside regular working hours without any additional expense to the Owner.

G. Hot Work Permit;

1. Hot work is defined as cutting, welding, soldering, sweating, brazing, and other similar activities conducted with portable gas or arc equipment.

2. Hot work permits are required for demolition, structural, mechanical, and general hot work activities, in new and existing buildings (including utility tunnels and vaults).

3. Hot work permits must be obtained by each individual entity performing hot work on a project. More than one permit may be required for each project. A separate permit is required for each building where hot work is being conducted when a particular project includes multiple buildings.

4. Secure permits prior to the commencement of any on-site hot work from U of A Environmental Health & Safety, 621-1790. Detailed procedures for obtaining and complying with the hot work permit (including validity periods and renewal requirements) will be issued with the actual permit.

5. All permits must be turned in to Owner upon expiration.

H. Safety

1. The Contractor shall comply with the Williams-Steiger Occupational Safety and Heath Act of 1970 and shall submit a written statement to Architect that he will do so.

2. Contractor shall maintain adequate emergency exiting at all times for construction area and areas adjacent to the construction area while work is being completed.

1.6 WORK SEQUENCE

A. Construction Work in **[phase] [to accommodate Owner's occupancy requirements] [_____]** during the construction period, coordinate construction schedule and operations with **[Owner:] [Architecture/Engineer:]**

1. **[Phase] 1: [_____].**

2. **[Phase] 2: [_____].**

3. **[Phase] 3: [_____].**

1.7 OWNER OCCUPANCY

A. The Owner intends to occupy the **[_____]** portion of the Project by **[_____].**

A. The Owner will occupy the **[site] [premises] [_____]** during **[the entire period of construction.] [[Stage] [Phase] of construction.] [for the conduct of normal operations.] [for installation of [_____].]**

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Allowances.

B. Schedule of Values.

C. Application for payment.

D. Change procedures.

E. Defect Assessment.

F. Measurement and payment – unit prices.

G. Optional Prices.

1.2 RELATED SECTIONS

A. Section 01027 – Application For Payment.

B. Section 01028 – Modification Requirements.

C. Section 01030 – Optional Prices.

D. Section 01600 – Material and Equipment: Product substitutions.

1.3 ALLOWANCES

A. Costs Included in Allowances: Cost of Product to Contractor or Subcontractor, less applicable trade discounts; **[delivery to site] [and] [applicable taxes] [_____].** Subcontractor, less applicable trade discounts; **[delivery to site] [and] [applicable taxes] [_____]**.

B. Costs Not Included in Allowances but Included in the Contract Sum: Product **[delivery to site and] handling at site, including unloading, uncrating, and storage; [protection of Products from elements and from damage;] [and] [labor for installation and finishing;] [_____]**.

C. **[Architect/Engineer] [Construction Manager]** Responsibilities:

1. Consult with Contractor for consideration and selection of Products, **[suppliers] [and] [installers]**.

2. Select Products in consultation with Owner and transmit decision to Contractor.

3. Prepare Change Order.

D. Contractor Responsibilities:

1. Assist **[Architect/Engineer] [and Construction Manager]** in selection of Products, suppliers **[and installers]**.

2. Obtain proposals from suppliers **[and installers].** and offer recommendations.

3. On notification of selection by **[Architect/Engineer] [Construction Manager] [Owner]** execute purchase agreement with designated supplier **[and installer]**.

4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.

5. Promptly inspect Products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Change Order.

F. Allowances Schedule:

1. Section **[_____]:** Include the stipulated sum of **$[_____]** for purchase and delivery of **[_____].**

2. Section **[_____]:** Include the stipulated sum of **$[_____]** for installation of **[_____].**

3. Section **[_____]:** Include the stipulated sum of **$[_____]** for purchase, delivery, and installation of **[_____].**

4. Section **[_____]:** Include the unit price of **$[_____]** per **[_____]** for purchase, delivery, and installation of **[_____].**

5. Section 01312 – Cost Loaded Construction Progress Schedules (Third Party Scheduler): Included the stipulated sum of $[_____] for Contractor's share of the cost of the Third Party Scheduler.

1.4 SCHEDULE OF VALUES

A. Submit a printed schedule on AIA Form G702 and G703 – Application and Certification for Payment Continuation Sheet. Contractor's electronic media printout of this form will also be considered.

B. Submit Schedule of Values in duplicate within **[15] [20] [_____]** days after date established in Notice to Proceed.

C. Format: **[Utilize the Table of Contents of this Project Manual. Identify each line with number and title of the major specification Section.] [Identify [site mobilization,] [bonds and insurance.] [_____].]**

**** OR ****

D. Submit a Schedule of Values for review by the Owner's Representative. The Schedule of Values shall be based on the breakdown of the computer listing of activities. The Schedule of Values produced for the Cost-Loaded Construction Progress Schedule specified in Section **[01311] [01312]** shall allocate a dollar Value (cost), an estimate of manpower, and crew size for each activity of the Construction CPM Network. Activity costs, summed by responsibility, shall equal the actual subcontract price, or cost to the Contractor for work it is to perform. Bonds and insurance for which payment is made in full at the commencement of the project shall be a separate line item. The cost breakdown shall also indicate preparation and delivery of operations and maintenance manuals, record documents, and punch lists as separate line items. The sum of all activity costs shall equal the total Contract Sum. Each activity cost shall be coded with a cost code corresponding to the subcontractor responsible for performing the work so that subtotals for each division of the work can be prepared.

E. Include as separate line items, the amount of each Allowance specified in this section. **[For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.]**

****OR****

F. Within **[seven (7)] [_____]**calendar days following receipt of the final cost-loaded schedule, Contractor shall participate in a conference with the Owner's Representative, **[Architect] [and the Third Party Scheduler]** to review and evaluate the Schedule of Values. The accepted Schedule of Values shall, in the best judgment of the Contractor, Owner's Representative, **[Architect] [and the Third Party Scheduler],** represent a fair, reasonable, and equitable dollar cost and manpower allocation for each activity in the cost-loaded construction schedule.

G. **[Include within each line item a direct proportional amount of Contractor's overhead and profit.] [_____]**.

H. Submit revised schedule listing approved Change Orders with each Application For Payment.

1.5 APPLICATIONS FOR PAYMENT

A. Submit **[three] [_____]** copies of each application on **Application and Certificate for Payment and AIA G703 – Continuation Sheet.] [AIA G722 – Project Application and Project Certificate for Payment and AIA G723 – Project Application Summary.]** Contractor's electronic media printout of this form will also be considered.

B. Content and Format: Utilize current approved Schedule of Values for listing items in Application for Payment.

C. Payment Period: **[Monthly]**.

D. Waiver of **[Claims]**.

E. Include Vendor Claim Forms and other forms required by Owner.

F. Include an updated construction progress schedule.

G. Payment for stored materials and equipment will be restricted by Owner to custom fabricated materials identified with mark numbers on shop or erection drawings, and to equipment specified with tag numbers in the Contract Documents.

H. Payment for bulk materials which are normally stocked by suppliers will be made by Owner only when such materials have been physically incorporated into the Work.

I. Materials Stored Offsite: Submit all requests for off-site storage to the Owner for consideration and approval. Options and requirements for off-site storage include, but may not be limited to:

1. Possibility of off-site Owner property on which adequately secured storage can be made available during the contract period, at rental rates as set by the Owner; or the availability of an Owner approved bonded warehouse or secured bonded site.

2. Provision by the Contractor, at no cost to the Owner, of off-site storage on non-University property with insurance (naming the Owner as additional insured) and bonding to hold the Owner free of all risks, including delay attributed to loss, damage or destruction of stored materials off job site.

   (a) Bonding shall protect the Owner's exclusive right of possession, and indemnify the Owner against any loss of use or possession of materials paid for by the Owner and not stored on University property.

3. Contractor shall provide suitable security fence/materials enclosure for locked containment of materials submitted for payment.

4. Contract shall bear all costs for inspection of quantities at time of storage, and monthly thereafter if the list of materials changes.

5. Contractor shall bear all costs for security monitoring of the storage site as deemed required by the Owner.

6. All Payment Applications for stored materials billed must be accompanied by a Bill of Sale, indicating transfer of ownership of such materials to the Owner.

Submit all requests for off-site storage to Owner for consideration. Materials stored off-site on non-University property must be bonded and insured, adequately secured. Owner must be named as additional insured for all stored materials. Any and all costs of inspection of quantities

at time of storage and/or for security monitoring of the storage site (if required) shall be borne by the Contractor.

1.6 CHANGE PROCEDURES

A. The **[Architect/Engineer]** will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time by issuing a written order.

B. The **[Architect/Engineer] [Construction Manager] [Owner]** may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a request for any change in Contract Time for executing the change **[and] [the period of time during which the requested price will be considered valid]**. Contractor shall prepare and submit an estimate within the number of days stated in the Proposal Request.

C. The Contractor may propose changes by submitting a request for change to the **[Architect/Engineer], [Construction Manager], [Owner],** describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation **[and a statement describing the effect on Work by separate or other Contractors]. [Document any requested substitutions in accordance with Section [01600.] [_____.]**

D. Stipulated Sum Change Order: Based on **[Proposal Request] [Notice of Change]** and Contractor's **[fixed] [estimated] [maximum]** price quotation **[or Contractor's request for a Change Order as approved by [Architect/Engineer] [Construction Manager] [Owner].**

E. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Work Directive issued by **[Owner] [Architect] [Engineer] [Construction Manager]** and changes in the Contract Sum will be computed in accordance with **[Section 28] [Section 10]** of the General Conditions.

F. **[Architect/Engineer] [Construction Manager] [Owner]** may issue a written directive, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum or Contract Time. Promptly execute the change.

G. Cost Basis Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. **[Architect/Engineer] [Construction Manager] [Owner]** will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents.

H. Maintain detailed records of work done on cost basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

I. Change Order Forms: **[AIA G701] [AIA G701/CM]** Change Order.

J. Execution of Change Orders: **[Architect/Engineer] [Construction Manager] [Owner]** will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.7 DEFECT ASSESSMENT

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

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

1.8 MEASUREMENT AND PAYMENT – UNIT PRICES

A. Authority: Measurement methods are delineated in the individual specification sections.

B. Take measurements and compute quantities. The **[Architect/Engineer] [Construction Manager] [Owner] [_____]** will verify measurements and quantities.

****OR****

B. The **[Architect/Engineer] [Construction Manager] [Owner]** will take measurements and compute quantities accordingly. Provide and assist in the taking of measurements.

C. Unit Quantities: Quantities and measurements indicated in the **[Bid Form] [_____]** are for contract purposes only. **[Quantities and measurements supplied or placed in the Work shall determine payment.] [Actual quantities provided shall determine payment.]**

D. Payment Includes: Full Compensation for required labor, Products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

E. Unit Price Schedule:

1. **[Item: [_____]; Section [_____].]**

2. **[Item: [_____]; Section [_____].]**

3. **[Item; [_____]; Section [_____].]**

1.9 OPTIONAL PRICES

A. Accepted Options will be identified in Owner-Contractor Agreement.

B. Coordinate related work and modify surrounding work as required.

C. Schedule of Optional Prices:

1. Optional Price No. 1: ***[Foundation Wall Construction:***

Based Bid Item: Sections 03100, 03200, and 03300 (Cast-In-Place Concrete including pre-molded control joints) and Drawing numbers A-3 and S-2 including referenced details.

Optional Price No. 1: Sections 04100 and 04310 (mortar and masonry including integral reinforcement) and Drawing numbers A-3-a and S-2-a including referenced details.]

2. Optional Price No. 2 **[Title]:**

Base Bid item: Section [_____] and Drawing number {_____] including [_____].

Optional Price No. 2: Section [_____] and Drawing number [_____] including {_____.]

3. Optional Price No. 3: **[Title]:**

Base Bid Item: Section [_____] and Drawing number [_____] including [_____].

Optional Price No. 3: Section [_____] and Drawing number [_____] including [_____].

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Format

B. Preparation of Applications

C. Submittal Procedures

D. Substantiating Data

E. Materials Stored Offsite

1.2 RELATED SECTIONS

A. Section 01019 – Contract Considerations.

B. Section 01028 – Modification Requirements**.**

C. Section 01019 – Contract Considerations.

D. Section 01300 – Submittals.

E. Section 01700 – Contract Closeout.

1.3 FORMAT

A. **[AIA G702 – Application and Certificate for Payment and AIA G703 – Continuation Sheet] [AIA G722 – Project Application and Project Certificate for Payment and AIA G723 – Project Application Summary] [Contractor's electronic media driven form] [_____]** including continuation when required.

B. For each item, provide a column for listing each of the following:

1. Item Number.

2. Description of work.

3. Scheduled Values.

4. Previous Applications.

5. Work in Place **[and Stored Materials]** under this Application.

6. Authorized Change Orders.

7. Total Completed **[and Stored]** to Date of Application.

8. Percentage of Completion.

9. Balance to Finish.

10. Retainage.

1.4 PREPARATION OF APPLICATIONS

A. General: Unless otherwise indicated, sequence of progress payments shall be regular, and each must be consistent with previous applications and payments. Certain applications will involve extra requirements, including initial application, application at time of substantial completion, and final payment application which is addressed in Section 01700.

B. Present required information **[in typewritten form.] [or] [on electronic media printout.]**

C. Execute certification by notarized signature of authorized officer.

D. Use data from current approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed **[and for stored Products].**

E. Applications for payment of allowance items shall include invoices and/or receipts for documentation of payment amount.

F. List each authorized Change Order as an extension on AIA G703 – Continuation Sheet, listing Change Order number and dollar amount(s) for each item of Work.

G. The following submittals must precede submittal of first payment application:
1. Listing of subcontractors and material vendors **[submitted with the bid].**

2. Schedule of Values.

3. Construction Schedule – See Section **[01300] [01310] [01311]** for specific requirements.

4. Proposed Products List and Submittal Schedule.

5. Copies of any required authorizations from governing authorities for current performance of the work.

6. Performance and Payment Bonds and Certificate(s) of Insurance (submitted to the Owner prior to contract award).

7. Copies of executed contracts for all subcontractors.

8. Copies of Performance Bond from required subcontractors.

H. Following issuance of the final Certificate of Substantial Completion, a "special" payment application may be prepared and submitted. The principal actions and submittals which must precede such special Application for Payment include the following:

1. Any required approvals or certifications by governing authorities and/or franchised services, assuring Owner's full access and use of completed Work.

2. Warranties, guaranties, maintenance agreements, and similar provisions of Contract Documents.

3. Test/adjust/balance records, Operation and maintenance instructions, meter readings, start-up performance reports, and similar information for Owner's use.

4. Consent of Surety for any requested reduction of retainage.

5. Final progress photographs, when required.

6. Change-over of door locks and other access to Owner's property.

7. Complete start-up and testing of systems and instructions for Owner's operating/maintenance personnel. Discontinue or change over and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.

8. Complete final cleaning requirements.

9. Touch-up and otherwise repair and restore marred exposed finishes.

I. Prepare Application for Final Payment as specified in Section 01700.

1.5 SUBMITTAL PROCEDURES

A. Submit **[three] [_____]** copies of each Application for Payment.

B. Submit an updated **[_____]** construction schedule with each Application for Payment.

C. Payment Period: **[Submit at intervals stipulated in the Agreement.] [_____.]**

D. Submit with transmittal letter as specified for Submittals in Section **[01300.]**

E. Submit **[_____]** waivers.

1.6 SUBSTANTIATING DATA

A. When **[Architect/Engineer] [Construction Manager]** or Owner requires substantiating information, submit data justifying dollar amounts in question.

B. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

C. Include the following with the application:

1. Current construction photographs specified in Section 01300**.**

2. Partial release of liens from major subcontractors and vendors.

3. Record documents as specified in Section 01700, for review by the Owner which will be returned to the Contractor.

4. Affidavits and other specified documents attesting to off-site stored products.

5. Construction progress schedules, revised and current as specified in Section **[01300] [01310] [01311] [01312].**

1.7 MATERIALS STORED OFFSITE

1 Materials Stored Offsite:

Submit all requests for off-site storage to the Owner for consideration and approval. Options and requirements for off-site storage include, but may not be limited to:

A. Possibility of off-site Owner property on which adequately secured storage can be made available during the contract period, at rental rates as set by the Owner; or the availability of an Owner approved bonded warehouse or secured bonded site.

B. Provision by the Contractor, at no cost to the Owner, of off-site storage on non-University property with insurance naming the Owner as additional insured and bonding to hold the Owner free of all risks, including delay attributed to loss, damage or destruction of stored materials off jobsite.

1. Bonding shall protect the Owner’s exclusive right of possession and indemnify the Owner against any loss of use or possession of materials paid for by the Owner and not stored on University property.

C. Contractor shall provide suitable security fence/materials enclosure for locked containment of materials submitted for payment.

D. Contractor shall bear all costs for inspection of quantities at time of storage, and monthly thereafter if the list of materials changes.

E. Contractor shall bear all costs for security monitoring of the storage site as deemed required by the Owner.

F. All Payment Applications for stored materials billed must be accompanied by a Bill of Sale, indicating transfer of ownership of such materials to the Owner.

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittals.

B. Documentation of change in Contract Sum and Contract Time.

C. Change procedures.

D. Owner Order.

E. Stipulated Sum change order.

F. Unit price change order.

G. Cost Basis change order.

H. Execution of change orders.

I. Correlation of Contractor submittals.

1.2 RELATED SECTIONS

A. Document **[00500 - Agreement]** **[_____]**

B. Document **[00700 – General Conditions]** **[_____]**

C. Section 01019 – Contract Considerations.

D. Section **[_____ -- _____]:** Scope of unit prices.

E. Section 01027 – Applications for Payment:

F. Section 01300 – Submittals:

G. Section 01310 – Construction Progress Schedules:

H. Section 01311 – Cost Loaded Construction Progress Schedules:

I. Section 01312 – Third Party Scheduler:

J. Section 01600 – Material and Equipment: Product options and substitutions.

K. Section 01700 – Contract Closeout: Project record documents.

1.3 SUBMITTALS

A. Submit name of the individual authorized to receive change documents and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. Change Order Forms: **[AIA G701]** **[AIA G701/CM]** Change Order.

1.4 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

A. Maintain detailed records of work done on a cost basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

C. Provide data to support computations: (For computation of items 2 and 3, refer to example of Change Order Pricing included at the end of this section).

1. Quantities of products, labor and equipment.

2. Taxes, Insurance, and bonds.

3. Overhead and profit.

4. Justification for any change in Contract Time.

5. Credit for deletions from Contract, similarly documented.

D. Support each claim for additional costs, and for work done on a cost basis, with additional information.

1. Origin and date of claim.

2. Dates and times work was performed, and by whom.

3. Time records and wage rates paid.

4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.5 CHANGE PROCEDURES

A. The Architect/Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by AIA A201, by issuing supplemental instructions on **[AIA Form G710.]** **[_____.]**

B. The **[Architect/Engineer]** **[Construction Manager]** **[Owner]** may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, **[a change in Contract Time**

for executing the change] [with a stipulation of any overtime work required] [and] [the period of time during which the requested price will be considered valid.].

C. The Contractor may propose a change by submitting a request for change to the **[Architect/Engineer] [Construction Manager] [Owner]** describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation **[and a statement describing the effect on Work by separate or other contractors]. [Document any requested substitutions in accordance with Section [01600.] [_____.]]**

1.6 OWNER DIRECTIVE

A. The **[Architect/Engineer] [Construction Manager]** may issue a written order, signed by the Owner, instructing the Contractor to proceed with a change in the Work, in accordance with Section **[28.4] [10.2 CM@R]** of the General Conditions, for subsequent inclusion in a Change Order.

B. The document will describe changes in the Work, and will designate the method of determining any change in Contract Sum or Contract Time.

C. Promptly execute the change in Work.

1.7 STIPULATED SUM CHANGE ORDER

A. Based on a **[Proposal Request]** and the Contractor's **[fixed] [estimated] [maximum]** price quotation **[or Contractor's request for a Change Order as approved by the [Architect/Engineer] [Construction Manager] [and Owner].**

1.8 UNIT PRICE CHANGE ORDER

A. For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis.

B. For unit costs or quantities of units of work which are not pre-determined, execute Work under a written order from Owner.

C. Changes in Contract Sum or Contract Time will be computed as specified for a Cost Basis Change Order.

1.9 COST BASIS CHANGE ORDER

A. Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

B. The **[Architect/Engineer] [Construction Manager] [Owner]** will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents.

C. Maintain detailed records of work done on cost basis.

D. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

1.10 EXECUTION OF CHANGE ORDERS

A. Execution of Change Orders: The **[Architect/Engineer] [Construction Manager] [Owner]** will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.11 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line items and adjust the Contract Sum.

B. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

C. Promptly enter changes in Project Record Documents.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submission requirements.

B. Schedule of Options.

1.2 RELATED SECTIONS

A. Document **[00500] [00500CM Agreement:]** Incorporating monetary value of accepted Options.

B. Document 00100 – **[Instruction to Bidders.] [Instructions to CM@Risk.]**

C. Section 01019 – Contract Considerations.

D. Section 01300 – Submittals.

E. Section 01600 – Material and Equipment: Product options and substitutions.

1.3 SUBMISSION REQUIREMENTS

A. As set forth in the Instructions to **[Bidders] [CM@Risk]** the amount quoted for each Optional *Price* is to include the *furnishing of all materials, plant, equipment, tools and all other facilities called for in the Contract Documents, and the performance of all labor and services necessary and proper for the completion of the* Option(s) except such as may be otherwise expressly provided in the Contract Documents.

B. Options quoted **[on Bid Forms] [in the GMP]** will be reviewed and accepted or rejected at the Owner's option. Accepted options will be identified in the Owner-Contractor Agreement.

C. Coordinate related work and modify surrounding work to integrate the Work of each Option.

1.4 SCHEDULE OF OPTIONS

A. Optional Price No. 1 – ***[****Provide a fire sprinkler system.*

*1. *This Optional Price is for providing a complete automatic fire sprinkler system installation for the areas shown on the drawings and as described in the Specifications.****]***

B. Optional Price No. 2 – ***[****Provide an acid neutralization system.*

1. **This Optional Price includes installing new concrete curbs and a new drain line connecting the new installation to an existing sewer. Also included is the relocation of two tanks, three steel cover plates, one trap, one sensor, one sink, one eye wash and shower, and one controller from an existing location shown on the drawings. These items to be relocated must be installed as a complete system at the new location as indicated.**]***

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used

END OF SECTION

1 PART 1 GENERAL

1.1 SECTIONS INCLUDES

A. Coordination and Project Conditions.

B. Coordination Drawings.

C. Staff Names.

D. Field Engineering.

E. Preconstruction Meeting.

F. Progress Meetings.

G. Preinstallation Meetings.

1.2 RELATED SECTIONS

A. Section 01045 – Cutting and Patching.

B. Section 01050 – Field Engineering.

C. Section 01120 – Alteration Project Procedures.

1.3 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, **[with provisions for accommodating items installed later.]**

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. The Installer or Subcontractor of each element of the work must examine the conditions of the substrate to receive the work, dimensions and spaces adjacent, tolerances, interfacing with other elements and services, and the conditions under which the work will be performed, and must notify the Contractor in writing of conditions detrimental to the proper or timely completion of the work. If work proceeds the substrate will be deemed acceptable by Installer or Subcontractor. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

D. Coordinate space requirements, supports, and installation of mechanical and electrical Work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas **[except as otherwise indicated]**, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion **[and for portions of Work designated for Owner's [partial] occupancy].**

G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.4 COORDINATION DRAWINGS

A. For locations where several elements of equipment mechanical, electrical or other work must be sequenced and positioned with precision in order to fit into the available space, prepared coordination drawings showing the actual physical dimensions at accurate scale required for the installation. Prepare and submit coordination drawings prior to purchase/fabrication/installation of any of the elements involved in the coordination.

B. Lay out the work in conformity with the Contract Drawings, coordination drawings and other shop drawings, product data and similar requirements, so that the entire installation will perform as a properly interfaced and integrated system.

C. Comply with submittal requirements, Section 01300.

D. The submittal by the Contractor of suitable coordination drawings meeting the above requirements shall be a condition precedent to the Owner making monthly progress payments.

1.5 STAFF NAMES

A. Within 5 days of Notice of Intent to Award, submit a list of the Contractor's principle staff assignments, including the Project Manager, Superintendent, and other coordinating, administrative and supervisory personnel in attendance at the site. Contractor shall provide relevant work experience data for all assigned personnel to the Owner for review and approval, including authority assignment, addresses, and phone numbers.

1.6 FIELD ENGINEERING

A. Employ a Land Surveyor registered in the State of Arizona and acceptable to Architect/Engineer.

B. Contractor confirms and protects survey control and reference points.

C. Verify set-backs and easements, confirm drawing dimensions and elevations. Prior to commencing work, carefully check existing conditions and compare all drawings that in any way affect the location or elevation of the Work, and immediately report any discrepancy to Architect for verification and adjustments. Any duplication of work made necessary by failure or neglect to comply with this requirement shall be done at Contractor's sole expense.

D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices. Working from existing or Owner established reference points, establish and maintain bench marks and other dependable markers, and set lines and levels for the work at each story of construction and elsewhere on site as needed to properly locate each element of entire project. Calculate and measure required dimensions as shown within recognized tolerances. Do not scale drawings to determine dimensions. Advise tradesmen performing the work of the marked lines and levels provided for their use in layout of work.

E. Submit a copy of **[site drawing] [and] certificate]** signed by the Land Surveyor certifying that the elevation and locations of the Work are in conformance with the Contract Documents.

1.7 PRECONSTRUCTION MEETING

A. Owner will schedule a meeting after Notice of Intent to Award has been issued.

B. Attendance Required: Owner, **[Architect/Engineer,] [Construction Manager] [_____]** and Contractor.

C. Agenda:

1. Receipt of Construction Agreement Between Owner and Contractor signature (if applicable).

2. Submission of executed bonds and insurance certificates (if applicable).

3. Distribution of Contract Documents (if applicable).

4. Submission of complete **[list of Subcontractors,]** list of Products, schedule of values, and progress schedule.

5. Designation of personnel representing the parties in Contract, **[_____,]** and the Architect/Engineer.

6. Procedures and processing of field decisions, submittals, **[substitutions]**, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

7. Scheduling.

8. Scheduling activities of a(n) **[Geotechnical Engineer,] [Special Inspector] [_____.]**

9. Site Mobilization

    a. Use of premises by Owner and Contractor.

    b. Owner's requirements **[and [partial] occupancy].**

    c. Construction facilities and controls provided by Owner.

    d. Temporary utilities.

    e. Survey and layout.

    f. Security and housekeeping procedures.

10. **[Owner] [Architect] [Construction Manager]** will record minutes and distribute copies.

1.8 PROGRESS MEETINGS

A. **[Architect] [Construction Manager]** will schedule and administer meetings throughout progress of the Work at weekly intervals.

B. **[Architect/Engineer,] [Construction Manager]** will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, **[Architect/Engineer,] [Construction Manager,]** as appropriate to agenda topics for each meeting.

D. Agenda:

1. Progress noted.

2. Schedule Status/Look Ahead.

3. Contractual and Administrative Items.

4. Job Safety/Cleanliness.

5. Old Business.

6. New Business.

7. Clarifications.

E. **[Architect/Engineer]** **[Construction Manager]** will record minutes and distribute copies of meeting minutes.

1.9 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at **[the site]** **[_____]** prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect/Engineer, Owner, **[Construction Manager]** **[one week]** **[_____]** days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of installation, preparation and installation procedures.

2. Review coordination with related work.

E. **[Architect/Engineer]** **[Construction Manager]** will record minutes and distribute copies of minutes.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

4 Not Used

END OF SECTION

1 PART 1 GENERAL

1.0 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specifications Sections, apply to this section.

1.1 SUMMARY

A. Section includes:

1. Owner's intention for partnering.

2. Goals and concepts of partnering.

3. Team building workshop.

1.2 INTENTION

A. The Owner expects a cohesive team-orientated relationship between the successful contractor, its suppliers and subcontractors, the Architect/Engineer, **[Construction Manager]** and the Owner to accomplish the Work under this Contract.

B. This relationship will be structured to draw on the strengths of each organization to identify and achieve such mutual beneficial goals as a quality project done right the first time, within the contract prices at all levels and on schedule.

C. The terms of Partnering arrangement will be negotiated and agreed upon by all concerned.

1.3 GOALS AND CONCEPTS

A. Other supplemental information is outlined below to assist the contractor in understanding the intended goals and concepts.

B. The concept of Partnering involves developing a cooperative management team consisting of the key players from the organizations involved in the construction project. The team focuses on common goals and benefits to be achieved during project execution and develops processes to keep the team working toward those goals. The idea is best summarized as an environment that nurtures team building cooperation. Successful Partnering depends upon both commitment and communication. All team members need to participate in the identification of goals and objectives for the project, and also in the decisions as to how these goals and objectives can best be achieved.

C. The Partnering relationship will be multilateral. To implement this partnering initiative, it is anticipated that, within 30 calendar days of a Notice to Proceed, the project managers and key management representatives of all the team members will

attend an initial partnering (team-building) workshop. Follow-up workshops will be held periodically throughout the duration of the Contract as agreed to by the team members.

D. An integral aspect of partnering is the resolution of problems or disputes in a timely, professional and non-adversarial manner. A project dispute resolution process will be developed to assist in promoting and maintaining an amicable working relationship. This process is intended to be a non-binding procedure available for use by the parties to this Contract to resolve any dispute that may arise during performance of the Work.

E. Good working relationships need to be developed between team members. These relationships form a basis for trust and understanding between team members and thus foster more open communications between them.

1.4 TEAM BUILDING WORKSHOP

A. Certain topics and agenda items for a typical team building workshop include, but are not limited to, those listed below:

1. The Work.

2. The Challenge.

3. The Players—the Champions.

4. Team Goals (derived by team members: Contractor, Owner, Architect/Engineer, **[Construction Manager,]** Subcontractor/Supplier)

5. Action Plans for:

a. Accident prevention.
b. Achieving the desired quality product.
c. Continuing the partnering commitment.
d. Project dispute resolutions (informal procedures)

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements and limitations for cutting and patching of Work.

1.2 RELATED SECTIONS

A. Section 01010 – Summary of Work for Work by Owner or by separate contractors.

B. Section 01300 – Submittals.

C. Section 01500 – Construction Facilities and Temporary Controls for cleaning requirements.

D. Section 01600 – Material and Equipment.

E. Section **[_____]** – Selective Demolition for demolition of selected portions of the building for alterations.

F. Section **[_____]** – Firestopping.

G. Individual Product Specification Sections.

1. Cutting and patching incidental to work of the section.

2. Coordination of required openings.

3. Limitations on cutting structural members.

4. Division 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 SUBMITTALS

A. Submit written request in advance of cutting or alteration which affect:

1. Structural integrity of any element of Project, including its load-carrying capacity or load/deflection ratio.

2. Integrity of weather exposed or moisture resistant element.

3. Efficiency, maintenance, or safety of any operational element.

4. Visual qualities of sight exposed elements.

5. Work of Owner or separate contractor.

B. Include in request:

1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and Products to be used.
5. Firms or entities that will perform work.
6. Alternatives to cutting and patching.
7. Effect on work of Owner or separate contractor.
8. Written permission of affected separate contractor.
9. Date and time the Work will be executed.
10. Utilities that will be disturbed or affected. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
11. Details and engineering calculations for any required structural reinforcement and how reinforcement is integrated with the original structure.

1.4 QUALITY ASSURANCE

A. Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:

    a. Structural Concrete.
    b. Structural Steel.
    c. Structural Decking.
    d. Stair Systems.
    e. Miscellaneous structural metals.
    f. Equipment supports.
    g. Piping, ductwork, vessels, and equipment.

B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:

    a. Primary operational systems and equipment.
    b. Air or smoke barriers.
    c. Water, moisture, or vapor barriers.
    d. Membranes and flashings.
    e. Fire protection systems.
    f. Noise and vibration control elements and systems.
    g. Control systems.
    h. Communication systems.
    i. Electrical wiring systems.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually satisfactory manner.

D. Warranty:

1. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

2 PART 2 PRODUCTS

2.1 MATERIALS

A. Primary Products: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are not available or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

B. Meet at the project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve conflicts before proceeding.

C. After uncovering existing Work, assess conditions affecting performance of work.

D. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Coordinate work of alterations and renovations to expedite completion and to accommodate Owner occupancy.

B. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

C. Provide protection from elements for areas, which may be exposed by uncovering work.

D. Maintain excavations free of water.

E. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

F. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to by pass them.

3.3 INSTALLATION

A. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring products and finishes to **[original] [specified]** conditions.

B. In addition to specified replacement of **[equipment] [and] [fixtures]** restore existing **[plumbing,] [heating,] [ventilation,] [air conditioning,] [electrical,] [and] [_____]** systems to full operational condition.

C. Re-cover and refinish Work that exposes mechanical and electrical work exposed accidentally during the work.

3.4 CUTTING

A. Execute cutting and fitting to complete the Work.

B. Remove and replace defective or non-conforming work.

C. Remove samples of installed work for testing when requested.

D. Provide openings in the Work for penetration of mechanical and electrical work.

E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

3.5 PATCHING

A. Execute patching to complement adjacent Work.

B. Fit products together to integrate with other Work.

C. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

D. Employ approved installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.

E. Restore work with new products in accordance with requirements of Contract Documents.

F. Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with **[fire rated] [fire resistant] [_____]** material **[in accordance with Section [07270] [_____]],** to full thickness of the penetrated element.

H. Patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections.

I. Repair substrate prior to patching finish.

J. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

1. Where Work abuts or aligns with existing, perform a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

2. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect/Engineer.

3. Where removal of partitions or walls result in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

4. Where a change of plane of **[1/4] [_____] inch [[6] [_____]mm]]** or more occurs, request instructions from **[Architect/Engineer] [Construction Manager] [Owner].**

5. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance.

B. Submittals for review.

C. Project Record Documents.

D. Examination.

E. Survey reference points.

F. Survey requirements.

1.2 RELATED SECTIONS

A. Document 00200 – Information Available to **[Bidders.] [CM@Risk.]**

B. Document **[00700 – General Conditions]. [00700CM – General Conditions (CM Edition)].**

C. Section 01700 – Contract Closeout.

1.3 QUALITY ASSURANCE

A. Employ an individual acceptable to Architect/Engineer to perform survey work of this section.

B. Submit evidence of satisfactory completion of a number of similar projects within last 5 years.

C. Employ a Professional Engineer of the discipline required for specific service on Project, licensed in the State of Arizona.

1.4 SUBMITTALS FOR REVIEW

A. Submit name, address, and telephone number of proposed individual before starting survey work.

B. On request, submit documentation verifying accuracy of survey work.

C. Submit a copy of site drawing signed by the responsible individual, certifying that the elevations and locations of the Work are in conformance with Contract Documents.

1.5 PROJECT RECORD DOCUMENTS

A. Maintain a complete and accurate log of control and survey work as it progresses.

B. On completion of foundation walls, major site improvements, and underground utilities, prepare and submit a survey showing as-built locations.

C. Maintain and submit Record Documents under provisions of Section 01700.

1.6 EXAMINATION

A. Verify locations of survey control points prior to starting work.

B. Prior to commencing work, carefully check existing conditions and compare all drawings that in any way affect the location or elevation of the Work, and immediately report any discrepancy to Architect for verification and adjustments. Any duplication of work made necessary by failure or neglect to comply with this requirement shall be done at Contractor's sole expense.

C. Promptly notify **[Architect/Engineer]** **[Construction Manager]** of any discrepancies discovered.

1.7 SURVEY REFERENCE POINTS

A. Contractor confirm and protect survey control and reference points.

B. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

C. Promptly report to **[Architect/Engineer]** **[Construction Manager]** **[Owner]** the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

D. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to **[Architect/Engineer]** **[Construction Manager]** **[Owner]**.

1.8 SURVEY REQUIREMENTS

A. Provide field engineering services. Utilize recognized engineering survey practices. Working from existing or Owner established reference points, establish and maintain bench marks and other dependable markers, and set lines and levels for the work at each story of construction and elsewhere on site as needed to properly locate each element of entire project. Calculate and measure required dimensions as shown within recognized tolerances. Do not scale drawings to determine dimensions. Advise tradesmen performing the work of the marked lines and levels provided for their use in layout of work.

B. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.

C. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; **[and] [_____].**

2. Grid or axis for structures.

3. Building foundation, column locations, ground floor elevations, **[and] [_____].**

D. Periodically verify layouts by same means.

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

A. Conform to reference standard by date of issue on date of Contract Documents except where a specific date is established by code or in individual specification section.

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

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

1.1 SECTIONS INCLUDE

A. Quality assurance.

B. Applicable Codes.

C. Applicable Standards.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control

B. Section 01600 - Materials and Equipment

1.3 QUALITY ASSURANCE

A. Throughout the Contract Documents, reference is made to Codes and Standards which establish qualities and types of workmanship and materials and which establish methods for testing and reporting on the pertinent characteristics.

B. Work Included: Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named Code or Standard, it is the Contractor’s responsibility to provide materials and workmanship which meet or exceed the specifically named Code or Standard.

C. Related Work: Specific naming of the Codes or Standards occurs on the Drawings and in other Sections of these Specifications.

D. Quality Control: It is the Contractor’s responsibility to verify the requirements of the specifically named Codes and Standards to verify that the items produced for this work meet or exceed the specified requirements.

E. The Architect/Engineer reserves the right to reject items incorporated in the work which fail to meet the specified minimum requirements or accept non-complying

items subject to an adjustment in the Contract amount approved by the Architect and the Owner.

1.4 APPLICABLE CODES

When reference is made in the Drawings and/or Specifications to "this code", it shall mean all the codes listed below:

1. 2018 International Fire Code, as amended by the University of Arizona
2. 2018 International Building Code, as amended by the University of Arizona
3. 2018 International Existing Building Code, as amended by the University of Arizona
4. 2018 International Mechanical Code, as amended by the University of Arizona
5. 2018 International Plumbing Code, as amended by the University of Arizona
6. 2018 International Fuel Gas Code, as amended by the University of Arizona
7. 2018 International Residential Code, as amended by the University of Arizona
8. 2017 National Electrical Code (NFPA 70), as amended by the University of Arizona
9. Code Amendments: Refer to the Manual of Design and Specifications Standards (DSS) on the PDC Website for links to the actual text of the following amendments:
   2018 - IFC - UA
   2018 - IBC - UA
   2018 - IEBC - UA
   2018 - IMC - UA
   2018 - IPC - UA
   2018 - IFGC - UA
   2018 - IRC - UA
   2017 - NEC - UA
10. Accessibility Guidelines: In addition to any requirements in the codes enumerated above, incorporate the guidelines listed below:
    Governing Regulation: Department of Justice Regulations for Title II (28 CFR 35) and Title III (28 CFR 36) of the Americans with Disabilities Act of 1990, and the Americans with Disabilities Act Amendments of 2008
    Governing Regulation: Arizona Civil Rights Act, ARS Title 41, Article 41-1401 *et. seq.*
    Americans with Disabilities Act Standards for Accessible Design (ADASAD), dated September 15, 2010
    If a conflict arises between these code and regulation references, Owner will make a determination in consultation with the Project Team
11. Occupational Safety Guidelines: In addition to any requirements in the codes enumerated above, incorporate the guidelines listed below:
    Occupational Safety and Health Administration (OSHA) Regulations 29 CFR 1910 (General Industry Regulations) and 29 CFR 1926 (Construction Regulations)

1.5 APPLICABLE STANDARDS

Applicable standards referenced in the Drawings and/or Specifications may include, but are not limited to:

AAMA	Architectural Aluminum Manufacturing Association

	35 East Wacker Drive Chicago, IL 60601
ACI	American Concrete Institute Box 10150, Redford Station Detroit, MI 48219
ADA	Americans with Disabilities Act, Public Law 101-336 Office of the Americans with Disabilities Act Civil Rights Division U.S. Department of Justice Washington, D.C. 20530
AISC	American Institute of Steel Construction Inc. 122 Avenue of the Americas New York, NY 10020
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute (successor to USASI & ASA) 1430 Broadway New York, NY 10018
APA	American Plywood Association P.O. Box 11700 Tacoma, WA 98411
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWI	Architectural Woodwork Institute 2310 South Walter Reed Drive Arlington, VA 22206
AWS	American Welding Society, Inc. 2501 N.W. 7th Street Miami, FL 33125
AWWA	American Water Works Association, Inc. 6666 West Quincy Avenue Denver, CO 80235
CRSI	Concrete Reinforcing Steel Institute 228 North LaSalle Street Chicago, IL 60610

CS — Commercial Standard of NBS
U.S. Department of Commerce
Government Printing Office
Washington, D.C. 20402

FED SPEC & FED STANDARDS
Specifications Sales (3FRI) Bldg. 197
Washington Navy Yard
General Services Administration
Washington, D.C. 20407

FGMA — Flat Glass Marketing Association
3310 Harrison
Topeka, KS 66611

International Building Code Council
Los Angeles District Office
5360 South Workman Mill Road
Whittier, CA 90601

- IFC — International Fire Code
- IBC — International Building Code
- IEBC — International Existing Building Code
- IMC — International Mechanical Code
- IPC — International Plumbing Code
- IFGC — International Fuel Gas Code
- IRC — International Residential Code

NAAMM — The National Association of Architectural Metal Manufacturers
1033 South Boulevard
Oak Park, IL 60302

NEC — National Electrical Code (NFPA 70)

NEMA — National Electrical Manufacturer’s Association
155 East 44 Street
New York, NY 10017

NFPA — National Fire Protection Association
470 Atlantic Avenue
Boston, MA 02210

NRCA — National Roofing Contractors Association
8600 Bryn Mawr Avenue
Chicago, IL 60631-3502

OSHA — Occupational Safety Health Administration
Government Printing Office
Washington, D.C. 20402

SAMA	Scientific Apparatus Makers Association 1101 16th Street Washington, D.C. 20036
SDI	Steel Door Institute 712 Lakewood Center N. Cleveland, OH 44107
SDI	Steel Deck Institute 135 Addison Avenue Elmhurst, IL 60125
SSPC	Steel Structures Painting Council 4400 5th Avenue Pittsburg, PA 15213
SMACNA	Sheet Metal & Air Conditioning Contractors National Association 8224 Old Courthouse Road Vienna, VA 22180
TCA	Tile Council of America, Inc. P.O. Box 326 Princeton, NJ 08540
UL	Underwriter's Laboratories, Inc. 207 East Ohio Street Chicago, IL 60611

2 PART 2 PRODUCTS

Not Used

3 EXECUTION

Not Used

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products and installation for patching and extending work.

B. Transition and adjustments.

C. Repair of damaged surfaces, finishes, and cleaning.

1.2 RELATED SECTIONS

A. Section 01039 – Coordination and Meetings: **[Work sequence,] [Owner occupancy,] [maintenance of utility services,] [and] [_____].**

B. Section **[01039 – Coordination and Meetings:] [01045 – Cutting and Patching:] [Cutting and patching.][_____.]**

C. Section **[_____-_____]:** Special procedures for historic restorations.

D. Section 01500 – Construction Facilities and Temporary Controls: **[Temporary enclosures,] [protection of installed work,] [and] [cleaning during construction].**

2 PART 2 PRODUCTS

2.1 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New Materials: As specified in product sections; match existing Products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that demolition is complete and areas are ready for installation of new Work.

B. Beginning of restoration Work means acceptance of existing conditions.

C. The Installer or Subcontractor of each element of work must examine the conditions of the substrate to receive the work, dimensions and spaces adjacent, tolerances, interfacing with other elements and services, and the conditions under which the work will be performed, and must notify the Contractor in writing of conditions detrimental to the proper or timely completion of the work. If work proceeds the substrate will be deemed accepted by Installer or Subcontractor. Do not proceed

with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 PREPARATION

A. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

C. Remove debris and abandoned items from area and from concealed spaces.

D. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.

E. Close openings in exterior surfaces to protect existing work **[and salvage items]** from weather and extremes of temperature and humidity. Insulate duct work and piping to prevent condensation in exposed areas.

3.3 INSTALLATION

A. Coordinate work of alterations and renovations to expedite completion **[sequentially] [and] [to accommodate Owner occupancy].**

B. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to **[original] [specified]** condition **[in accordance with Section [01039] [01045]]**.

C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes **[in accordance with Section [01039] [01045]]**.

D. **[Project,] [Designated areas,] [Rooms and spaces,] [and] [Finishes]**: Complete **[including operational mechanical and electrical work] [and] [_____].**

E. In addition to specified replacement of **[equipment] [and] [fixtures]** restore existing **[plumbing,] [heating,] [ventilation,] [air conditioning,] [electrical,] [and] [_____]** systems to full operational condition.

F. Re-cover and refinish Work that exposes mechanical and electrical work exposed accidentally during the work.

G. Install Products as specified in individual sections.

3.4 TRANSITIONS

A. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

B. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along with straight line at a natural line of division and make recommendation to Architect/Engineer.

3.5 ADJUSTMENTS

A. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

B. Where a change of plane of **[1/4] [_____] inch ([6] [_____] mm)** or more occurs, **[submit recommendation for providing a smooth transition for Architect/Engineer [Construction Manager] [Owner] review.] [request instructions from Architect/Engineer.] [Construction Manager] [Owner] [_____.]**

C. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

D. Work at penetrations of surfaces as specified in Section **[01045.] [_____.]**

3.6 REPAIR OF DAMAGED SURFACES

A. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

B. Repair substrate prior to patching finish.

3.7 FINISHES

A. Finish surfaces as specified in individual Product sections.

B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.8 CLEANING

A. In addition to cleaning specified in Section **[01500] [_____],** clean Owner occupied areas of work.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal Procedures.

B. Submittal Log.

C. Construction Progress Schedules.

D. Proposed Products List.

E. Product Data.

F. Shop Drawings.

G. Samples.

H. Design Data.

I. Electronic Files.

J. Test reports.

K. Certificates.

L. Manufacturer’s Instructions.

M. Manufacturer’s Field Reports.

N. Erection Drawings.

O. Construction Photographs.

1.2 RELATED SECTIONS

A. Section 01027 – Applications for Payment.

B. Section 01400 – Quality Control.

C. Section 01700 – Contract Closeout.

1.3 REFERENCES

A. AGC (Associated General Contractors of America) publication “Construction Planning and Scheduling”, June 1997.

1.4 SUBMITTAL PROCEDURES

A. Transmit each submittal with **[Architect/Engineer] [Construction Manager] [Owner]** accepted form.

B. Sequentially number submittals in the following format:

Section number. submittal number. submission number.
Example: 15300.1.1 First shop drawing submittal. First submission.
15300.2.1 Second shop drawing submittal. First submission

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

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to **[Architect/Engineer] [Construction Manager] [Owner] [_____]** at **[location]** Coordinate submission of related items.

F. For each submittal for review, allow **[20] [_____]** days excluding delivery time to and from the Contractor.

G. Identify variations from Contact Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor **[Construction Manager]** and Architect/Engineer review stamps.

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

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

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

1.5 SUBMITTAL LOG

A. Submittal Log: Within 14 days of Notice to Proceed the Contractor shall submit a Submittal log and Submittal schedule for review and approval by the Architect. The log shall include a list of all Shop Drawings, Materials List and Literature and Samples specified to be submitted and organized by specification section.

1.6 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within **[10] [20] [_____]** days after date **[of Owner-Contractor Agreement.] [established in Notice to Proceed.]** No payment requests from Contractor will be paid after **[10] [20] [_____]** calendar days after Notice to Proceed unless the initial project schedule has been submitted and agreed to in principle.

B. Revise and resubmit as required.

C. Submit revised schedules with **[each] [_____]** Application for Payment, identifying changes since previous version.

D. Submit a computer generated **[or hand-drawn]** comprehensive horizontal bar chart with separate line for each major portion of Work or operation to be performed at the Project Site, identifying first work day of each week and showing completion of the Work by the date established for Substantial Completion.

******* [OR] *******

D. Submit computer generated network analysis diagram using the critical **path** method, as outlined in AGC – "Construction Planning and Scheduling", June 1997, showing completion of the Work by the date established for Substantial Completion.

E. The schedule shall incorporate all schedule constraints (phasing or sequence of construction, delivery windows for Owner furnished items, interim milestone dates, etc.) specified in the Contract Documents.

F. The schedule shall show separate procurement activities for all specially fabricated or custom produced items of material or equipment including order, design, submittals, fabrication and delivery.

G. The schedule shall include separate activities for both submittal and review of all required submittals. The minimum time allocated for review and return of submittals and all resubmittals shall be **[__ days]** as stated in Subsection 1.4 above for each submittal or resubmittal. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.

H. Secure critical time commitments for performing major elements of the Work by meeting with subcontractors and material suppliers to ascertain crew size, anticipated production, and lead times for materials and equipment to be incorporated into the Work. The schedule shall demonstrate fulfillment of all Contract requirements so that it can be utilized for scheduling, coordinating, and monitoring work under this Contract.

I. Submit schedule for initial approval and then update and resubmit monthly or more often as required in order to demonstrate contract compliance and facilitate evaluation of monthly payment requests and requests for time extension. All monthly updates shall show schedule revisions and actual progress **[by use of additional parallel time bars for each activity, while retaining the original approved schedule time bars.]**

J. At the preconstruction conference, Contractor shall submit a preliminary **[major milestone type]** project schedule **[and a 90-day "look ahead" schedule for the work to be done during the first 90 days of the Contract Time.]** No onsite construction work will be permitted and no progress payments will be made by Owner until the **[preliminary 90-day] [preliminary] [project]** schedule has been submitted **[and approved.]**

K. Show the sequence and interdependence of activities required for complete performance of all items of work under this Contract or portion thereof. Show complete and proper sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. **[Indicate the early and late start, early and late finish, float dates, and duration.]** Preparing the schedule:

1. Exercise sufficient care to produce a clear, legible, and accurate schedule. Activities related to specific physical areas of the project shall be grouped on the schedule for ease of understanding and simplification.

2. In addition to the performance of work in place, show special activities such as:

    a. Interruption of utilities, delivery of Owner furnishings and equipment, special inspections, or other project phasing requirements.
    b. Testing and balancing of mechanical equipment, special testing, equipment start-up, Owner training, etc.
    c. Final cleaning, punch list inspections, final inspection, demobilization.

3. Break up the Work into activities of a duration no longer than 20 work days each, except as to non-construction activities (such as procurement of materials, delivery of equipment and concrete curing) and any other activities for which the Owner may approve the showing of longer duration.

4. Show time periods for the start-up and shakedown operation of the following systems:

    a. HVAC
    b. Life Safety Systems
    c. Elevators
    d. **(Other special systems as applicable)**

L. Submit the following supporting data with the schedule:

    a. The proposed number of working days per week.
    b. The holidays to be observed during the life of the Contract (by day, month, and year).
    c. The planned number of shifts per day.

M. Unless otherwise agreed upon, the schedule format shall be 11" x 17" minimum.

N. All changes to the Work resulting in a time change shall be reflected in the schedule. Minor changes may be omitted from the schedule provided that there is no change in time and that the Owner is in agreement with the procedure.

O. Following initial submittal and response by Owner, print and distribute Construction schedule to Owner **(_____ copies)**, Architect **(_____ copies)**, **[Construction Manager (_____ copies)]** subcontractors, suppliers, fabricators, and other with schedule-compliance requirements. Post copies in Project meeting rooms and field office. When revisions are made, distribute updated issues to same entities. Those who are no longer involved in performance of scheduled work may be deleted from distribution list.

P. The submittal of monthly schedule updates by the Contractor shall be a condition precedent to the making of monthly progress payments by the Owner.

Q. Owner may request expediting of material and equipment deliveries without assuming the responsibility for said deliveries. Upon request, furnish to the Owner copies of equipment and material purchase orders complete with scheduled shipping and receiving dates.

R. When the monthly update of the schedule indicates that any critical activity directly affecting completion of the Project will not be completed as scheduled, Contractor shall take some or all of the following actions at no additional cost to the Owner unless the late completion of the activity is due to an excusable delay:

   a. Increase construction manpower in quantities needed to eliminate the backlog of work and put the Project back on schedule.
   b. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment or any combination of the foregoing which will eliminate backlog of work and put the Project back on schedule.
   c. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities and put the Project back on schedule.

S. Ownership and Use of Float: Float is defined as the amount of time between the early and late completion dates of a scheduled activity. Float time on this Project is a project resource jointly owned by the Owner and Contractor. This resource expires as the Project progresses, and it is to be available to and consumed by the joint owners on a first-come first-served basis. If Contractor's schedule indicates a completion date for the project prior to the contractual completion date, then the time period between the two dates shall be considered as project float and shall be owned and used in accordance with this paragraph.

1.7 PROPOSED PRODUCTS LIST

A. Within **[15] [_____]** days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

C. Overstock Materials Log: Within 15 days of Notice to Proceed, the Contractor will submit a list of all materials and quantities specified as extra stock.

1.8 PRODUCT DATA

A. Product Data For Review:

1. Submitted to Architect/Engineer, **[Construction Manager]** for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for the record documents purposes described in Section 01700 – CONTRACT CLOSEOUT.

B. Product Data For Information:

1. Submitted for the **[Architect/Engineer's] [Construction Manager's]** knowledge as contract administrator or for the Owner.

C. Product Data For Project Close-out:

1. Submitted for the Owner's benefit during and after project completion.

D. Submit the number of copies which the Contractor requires, plus **[three] [_____]** copies which will be retained by the Architect/Engineer.

E. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

F. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

G. After review, distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 – CONTRACT CLOSEOUT.

1.9 SHOP DRAWINGS

A. Shop Drawings For Review:

1. Submitted to Architect/Engineer **[Construction Manager]** for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 – CONTRACT CLOSEOUT.

B. Shop Drawings For Information:

1. Submitted for the **[Architect/Engineer's] [Construction Manager's]** knowledge as contract administrator or for the Owner.

C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Submit in the form of one reproducible transparency **[and] [4_____]** opaque reproductions.

1.10 SAMPLES

A. Samples For Review:

1. Submitted to Architect/Engineer **[Construction Manager]** for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 – CONTRACT CLOSEOUT.

B. Samples For Information:

1. Submitted for the **[Architect/Engineer's] [Construction Manager's]** knowledge as contract administrator for the Owner.

C. Samples For Selection:

1. Submitted to Architect/Engineer for aesthetic, color, or finish selection.

2. Submit samples of finishes, textures, and patterns for Architect/Engineer selection, as specified in individual specification sections.

3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 – CONTRACT CLOSEOUT.

D. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

E. Include identification on each sample, with full Project information.

F. Submit the number of samples specified in individual specification sections; **[one] [_____]** of which will be retained by Architect/Engineer.

G. Reviewed samples which may be used in the Work are indicated in individual specification sections.

H. Samples will not be used for testing purposes unless specifically stated in the specification section.

1.11 DESIGN DATA

A. Submit for the Architect/Engineer's **[Construction Manager's]** knowledge as contract administrator or for the Owner.

B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.12 TEST REPORTS

A. Submit for the **[Architect/Engineer's] [Construction Manager's]** knowledge as contract administrator or for the Owner.

B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.13 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to **[Architect/Engineer] [Construction Manager]**, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.14 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, **[start-up]** adjusting, and finishing, to **[Architect/Engineer] [Construction Manager]** for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Refer to Section 01400 – Quality Control, Manufacturers' Field Service article.

1.15 MANUFACTURER'S FIELD REPORT

A. Submit reports for the Architect/Engineer's **[Construction Manger's]** benefit as contract administrator or for the Owner.

B. Submit report **[in duplicate]** within **[30] [_____]** days of observation to **[Architect/Engineer] [Construction Manager]** for information.

C. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.16 ERECTION DRAWINGS

A. Submit drawings for the **[Architect/Engineer's] [Construction Manager's]** benefit as contract administrator or for the Owner.

B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by the **[Architect/Engineer's] [Construction Manager]** or Owner.

1.17 CONSTRUCTION PHOTOGRAPHS

A. **[Twice monthly] [Each month] [On alternating months]** submit photographs **[with Application for Payment] [_____.]**

B. Photographs: **[One print] [[two] [_____] prints]; [color] [black and white], [glossy] [matte]; [8 x 10] [_____] inch ([200 x 250] [_____]**mm) size; mounted on **[8-1/2 x 11] [_____**] **inch** (**[216 x 280] [_____]** mm) soft card stock, with left edge binding margin for **[three hole punch.] [_____.]**

C. Take **[two] [_____]** site photographs from differing directions and **[five] [_____]** interior photographs of **[_____]** indicating the relative progress of the Work, **[_____]** days maximum prior to submitting.

D. Identify photographs with date, time, orientation, and project identification.

2 PART 2 PRODUCTS

Not Used

3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Requirements.

B. Format.

C. Content.

D. Updating of Schedules.

E. Revisions to Schedules.

F. Submittals.

G. Distribution.

1.2 RELATED SECTIONS

A. Section **[01010 – Summary of Work:] [Work sequence.] [Owner occupancy.] [_____.]**

B. Section 01019 – Contract Considerations.

C. Section **[01019 – Contract Considerations] [01027 – Application for Payment.]**

D. Section 01039 – Coordination & Meetings.

E. Section 01300 – Submittals.

1.3 REFERENCES

A. AGC (Associated General Contractors of America) publication “Construction Planning and Scheduling”, June 1997.

1.4 GENERAL REQUIREMENTS

A. General: Prepare and maintain a progress schedule consisting of a computer generated network analysis system generally known as the Critical Path Method (CPM) Schedule. Proceed with the preparation immediately following first notification of Contract Award. Submit schedule and pursue the necessary steps of development and analysis as specified below. Establish regular procedures for monitoring, updating and reporting, coordinated with progress meeting dates and payment request dates.

The Construction Progress Schedule shall establish a baseline from which actual project progress will be measured, utilizing more than one level of schedule detail. All levels of the schedule shall roll-up into one or more summaries.

B. The principles and definitions of the terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication, "Construction Planning and Scheduling", copyright 1997, but the provisions of this section shall govern.

C. Program: Utilize computer hardware/software systems as approved by Owner. System shall be intended for building construction progress schedule management. The scheduling program must be capable of calculating and presenting negative float.

D. Preliminary Schedule: At the preconstruction conference the Contractor shall submit for the Owner's review a preliminary bar chart progress schedule covering the first 30 calendar days of the Project. This schedule shall include both procurement and construction activities. The Notice to Proceed will not be issued by the Owner until this preliminary schedule has been submitted and agreed to in principle.

E. Interim Diagram: Within 20 calendar days after issue date of Notice to Proceed, the Contractor shall submit for the Owner's review an Interim Diagram covering the first 90 calendar days of the Project in detail. The Interim Diagram shall include construction and shop drawing submission and approval activities occurring during the 90 calendar day period. Format shall be as identified in the section, except manpower shall not be required for the interim schedule. No interim progress payments will be made by Owner until the 90-day schedule has been approved.

F. Final Network Diagram: Within **[60]** calendar days after issue dare of Notice to Proceed, the Contractor shall submit for the Owner's review the complete CPM system. The submittal shall include computer-produced time-scaled network diagram(s) and tabular management reports showing the information required by this Section. The complete working diagram shall reflect the Contractor's approach to scheduling the complete project, taking into account the accuracy of the logic and the experience gained from the interim diagram. No payment requests from Contractor will be paid after **[60]** calendar days after start dare contained in Notice to Proceed unless the Final CPM Diagram has been submitted and agreed to in principle.

G. Subcontractor Participation: The Contractor shall consult with its subcontractors and suppliers relating to the preparation and updating of its construction plan and construction schedule. Subcontractors shall receive copies of those portions of the Contractor's CPM which relate to their work. They, in turn, shall supply comments on activity definitions, scope, and durations, as needed, for each activity. The Contractor shall continually advise subcontractors and suppliers of any updates or revisions to the Construction Schedule as the work progresses, and obtain their concurrence with the changes affecting their portions of the Work.

H. The CPM schedule shall be utilized for scheduling, coordinating, and monitoring work under this Contract. The CPM Schedule shall be submitted for initial approval and then be updated and resubmitted monthly or more often as required in order to

demonstrate contract compliance and facilitate evaluation of monthly payment requests and requests for time extension.

I. The CPM Schedule shall consist of a time scaled Network Analysis Diagram (logic diagram), a time scaled bar chart, a cost loaded schedule (computer data printout) and any other standard tabular reports as requested by Owner, all of which shall be submitted together in triplicate.

J. Computer-Produced Schedule: The computer produced schedule shall meet all contractual requirements, such as contract duration, phasing, and phasing restraints, and cover all procurement activities, including submittals, submittals status, fabrication and delivery times, and reflect all key long lead or critical procurement activities.

K. Ownership and Use of Float: Float is defined as the amount of time between the early and late completion dates of a scheduled activity. Float time on this Project is a project resource jointly owned by the Owner and Contractor. This resource expires as the Project progresses, and it is to be available to and consumed by the joint owners on a first-come first-serve basis. If Contractor's schedule indicates a completion date for the project prior to the contractual completion date, then the time period between the two dates shall be considered as project float and shall be owned and used in accordance with this paragraph.

1.5 FORMAT

A. Prepare computer generated network analysis system using the critical path method, as outlined in AGC – The Use of CPM in Construction.

B. Network Analysis Diagram: The logic diagram shall show the sequence and interdependence of activities required for complete performance of all items of work under this Contract in the time frame allowed. The diagram shall be drafted or plotted to show a continuous flow of work, from start to finish for the entire project, reading from left to right with all activities and subnets interfaced and matchlined to allow assembly as one total project schedule.

C. Exercise sufficient care to produce a clear, legible, and accurate diagram. Activities related to specific physical areas of the project shall be grouped on the diagram for ease of understanding and simplification. Critical path activities must be clearly identified in red. The critical path shall be plotted generally along the center of the sheet with channels with increasing floats placed towards the top or bottom.

D. Uniquely number each activity with event numbers ranging up to 9999 only. The diagram should be generally numbered in sequence; left to right, and top to bottom. Activity number to be prefixed or suffixed with corresponding specification division. Number activities in the general progressive order that they will be completed in. Allow for inserting of additional activities should further breakdown of the work be required.

E. The Network Analysis Diagram must clearly show the Critical Path for the Project at all times.

F. Sequence of Listings: **[The Table of Contents of this Project Manual.] [The chronological order of the start of each item of Work.] [_____.]**

G. Scale and Spacing: To provide space for notations and revisions.

H. Sheet Size: **[_____x____]** inches.

1.6 CONTENT

A. Activities: Before attempting to produce the CPM schedule, prepare a listing of activities involved. Include every activity having a possible bearing on the time required to complete the project. This listing of activities and levels of detail to be presented to Owner for approval.

Show the following on each work activity in alphanumeric form:

1. Work activity number (unique number identifying the work activity).

2. Concise description of the work activity. Activity descriptions shall be unique to an activity and understandable at the working level.

3. Duration (in work days).

4. Total float.

5. Early start, early finish, late start, late finish.

B. In addition to the performance of work in place, show special activities such as:

1. Interruption of utilities, delivery of Owner furnishings and equipment, special inspections, or other project phasing requirements.

2. Testing and balancing of mechanical equipment, special testing, equipment start-up, Owner training, etc.

3. Final cleaning, punch list inspections, final inspection, demobilization.

4. Punchlist: Show two separate activities totaling a minimum of **[30]** work days for completion of punch list items and final cleanup.

5. Weather Delays: Total weather delays for this project are anticipated to be **[_____]** work days. A **[_____]** work day "Planned Weather Delay" activity shall be inserted between the Contract Directed Completion Date and the Scheduled Completion Date. The planned weather delays duration will be reduced by the number of actual critical path weather delays experienced at each monthly update until the activity duration reaches 0 days. Thereafter weather delays will be an excusable delay (see General Conditions, **[Article 8] [Article 9].**

C. Show not only the activities for actual construction work for each trade category of the project, but also include trade restrictions to indicate the movement of trades from one area, floor, etc., to another area, floor, etc., for trades who are performing major portions of the work under this contract.

D. Break up the work into activities of a duration no longer than 20 work days each, except as to nonconstruction activities (such as procurement of materials, delivery of equipment and concrete curing) and any other activities for which the Owner may approve the showing of longer duration. The duration for Architect's approval of any required submittal, shop drawing, etc., shall be as stated in Section 01300. The construction time as determined by the Construction Progress Schedule from early start to late finish for any sub-phase, phase, or the entire project shall not exceed the Contract times indicated in Contact Documents.

E. Describe work activities such that the work is readily identifiable for assessment of completion. Activities labeled "start", "continue", or "completion' will not be allowed. All constraints will be start finish relationships. Lead and lag time activities will be acceptable only if the description accurately identifies such a restraint and that such restraints are realistic with respect to the schedule of the project. Partial dependencies of activities will not be permitted without approval of the Owner.

F. The schedules shall include separate activities for both submittal and review of all required submittals. The minimum time allocated for review and return of submittals and all resubmittals shall be as stated in Section 01300 for each submittal or resubmittal.

G. The schedule shall incorporate all schedule constraints (phasing or sequence of construction, delivery windows for Owner furnished items, interim milestone dates, etc.) specified in the Contract Documents.

H. The schedule shall show separate procurement activities for all specially fabricated or custom produced items of material or equipment including order, design, submittals, fabrication and delivery.

I. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

J. Identify work of **[separate stages]** **[separate floors]** and other logically grouped activities.

K. Provide sub-schedules for each stage of Work identified in Section **[01010]**.

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

M. Include conferences and meetings in schedule.

N. Provide separate schedule of submittal dates for shop drawings, product data, and samples, including **[Owner furnished products}** **[and]** **[Products identified under**

Allowances], and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.

O. Indicate delivery dates for **[Owner furnished products] [and] [Products identified under Allowances.]**

P. Coordinate content with schedule of values specified in **[Section 01019] [General Conditions CM@Risk]**.

Q. The schedule shall show the following minimum time periods for the start-up and shakedown operation of the following systems:

1. HVAC

2. Life Safety Systems **(list)**

3. Elevators

4. **(Other special systems as applicable)**
[list times]

1.7 UPDATING OF SCHEDULES

A. The CPM Schedule shall be updated monthly, or more often if required, to indicate the actual progress of the Project. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the **[first] [_____]** day of each month.

B. The computer-produced report shall categorize areas of work behind schedule by use of thirty, sixty, and ninety day “look ahead” projections. Along with this data, the Contractor shall submit a narrative report as a part of this monthly review and update, in a form agreed upon by the Contractor and the Owner. The narrative report shall include the current status, a description of problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates, and an explanation of corrective action taken or proposed.

C. The submittal of monthly schedule updates by the Contractor shall be a condition precedent to the making of monthly progress payments by the Owner.

D. When the monthly update of the schedule shows negative float on any activity, the Contractor shall take some or all of the following actions at no additional cost to the Owner, unless the negative float is the result of an excusable delay:

1. Increase construction manpower in quantities needed to eliminate the backlog of work and put the Project back on schedule.

2. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment or any combination of the foregoing which will eliminate backlog of work and put the Project back on schedule.

3. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities and put the Project back on schedule.

E. If the monthly update of the schedule shows completion of the Project prior to the current contractual completion date, the time between such an early completion date and the current contractual completion date shall be identified and used as project float in accordance with Subsection 1.4.K this Section 01310.

1.8 REVISIONS TO SCHEDULES

A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.

B. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

C. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect **[including the effect of changes on schedules of separate Contractors].**

D. Changes to the Work: With each change proposal containing a request for a time extension, Contractor shall furnish a detailed subnet and other backup information as required to support and enable ready quantitative evaluation of the request. This backup shall indicate, by event number, the activities affected, activities added, or activities deleted. The time effect shall be indicated for each activity. In the event the Contractor does not furnish the required information or an agreement cannot be reached, the Owner may direct the Contractor as to the specific logic changes and/or time adjustment which shall be entered into the schedule. All changes in the work shall be reflected in the computer produced schedule and listed in a specific fashion so as to be summarized by trade sort and incorporated into the schedule of values by change order number. Major changes shall be reflected in the Network Analysis Diagram. Minor changes may be omitted from the Network Analysis Diagram provided there is no change in time and that the Owner and Contractor are in agreement with the procedure.

1. All changes to the Contract must be approved by the Owner prior to inclusion into the Network Analysis System. Requests for time extension as related to changes in the scope of work will be reviewed in conjunction with the revised NAS, but will not be granted or rejected on that basis alone.

2. All costs related to the production and/or revision of the Network Analysis System including but not limited to changes in the work schedule (for whatever reason), updating requirements, reproduction, and distribution shall be borne by the Contractor. These costs shall be considered to be indirect costs only,

recoverable as being included in the Contractor's mark-up referenced in Conditions of the Contract.

1.9 SUBMITTALS

A. Immediately upon receipt of Notice of Intent to Award, submit a statement to the Owner **[Construction Manager]** describing Contractor's computerized scheduling capability for review and approval. This statement shall include the following as a minimum:

1. Identification, qualifications, and experience of the members of the Contractor's scheduling staff or any consultant's staff.

2. References of not less than two previous projects on which the Contractor or Consultant has utilized computerized CPM scheduling, which were of not less than one-half of the value of the present Contract. Owner references shall be included. Actual working examples from previous projects may be requested by Owner.

3. The name and description of the project management software and computer hardware to be utilized on this Contract.

B. At the preconstruction conference, Contractor shall submit the preliminary schedule.

C. Submit Interim and Final Network Diagrams in accordance with this Subsection 1.4 of this Section 01310.

D. The Contractor shall also submit the following logic diagram supporting data:

1. The proposed number of working days per week.

2. The holidays to be observed during the life of the Contract (by day, month, and year).

3. The planned number of shifts per day.

4. The number of hours per shift.

5. The major construction equipment to be used on the site.

E. Submit updated Progress Schedules with each Application for Payment.

F. Submit one reproducible transparency.

1.10 DISTRIBUTION

A. Following initial submittal and response by Owner, print and distribute Construction Schedule to Owner **( ) copies. [Construction Manager] ( ) copies]**, Architect **( ) copies**, subcontractors, suppliers, fabricators, and others with schedule-compliance

requirements. Post copies in Project meeting rooms and field office. When revisions are made distribute updated issues to same entities. Those who are no longer involved in performance of scheduled Work may be deleted from distribution list. Revised Schedule shall be reissued with report of Progress Meeting.

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

2 PRODUCTS

Not Used.

3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Requirements.

B. Format.

C. Content.

D. Updating of Schedule.

E. Revisions to Schedules.

F. Submittals.

G. Distribution.

1.2 RELATED SECTIONS

A. Section **[01010 – Summary of Work:** **[Work sequence.]** **[Owner occupancy,]** **[_____.]**

B. Section 01019 – Contract Considerations.

C. Section **[01019 – Contract Considerations:]** **[01027 – Applications for Payment:]**

D. Section **[01019 – Contract Considerations:]** **[01028 – Modifications Requirements:]**

E. Section 01300 – Submittals.

F. Section 01039 – Coordination and Meetings.

1.3 REFERENCES

A. AGC (Associated General Contractors of America) publication “Construction Planning and Scheduling”, June 1997.

1.4 GENERAL REQUIREMENTS

A. General: Prepare and maintain a progress schedule consisting of a computer generated network analysis system generally known as the Critical Path Method (CPM) Schedule. Proceed with the preparation immediately following first notification of Contract Award. Submit schedule and pursue the necessary steps of development and analysis as specified below. Establish regular procedures for monitoring, updating and reporting, coordinated with progress meeting dates and payment request dates.

The Construction Progress Schedule shall establish a baseline from which actual project progress will be measured, utilizing more than one level of schedule detail. All levels of the schedule shall roll-up into one or more summaries.

B. The principles and definitions of the terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication, "Construction Planning and Scheduling", copyright 1997, but the provisions of this section shall govern.

C. Program: Utilize Computer hardware/software systems as approved by Owner. System shall be intended for building construction progress schedule management. The scheduling program must be capable of calculating and presenting negative float.

D. Preliminary Schedule: At the preconstruction conference the Contractor shall submit for the Owner's review a preliminary bar chart progress schedule covering the first 30 calendar days of the Project. This schedule shall include both procurement and construction activities. The Notice to Proceed will not be issued by the Owner until this preliminary schedule has been submitted and agreed to in principle.

E. Interim Diagram: Within **[___] [_____]** calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Owner's review an Interim Diagram covering the first 90 calendar days of the Project in detail. The Interim Diagram shall include construction and shop drawing submission and approval activities occurring during the 90 calendar day period. Format shall be as identified in this section, except manpower shall not be required for the interim schedule. The interim schedule will be used for progress payments until final CPM system is completed.

F. Final Network Diagram: Within **[60] [_____]** calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Owner's review the complete CPM system. The submittal shall include computer-produced time-scaled network diagram(s) and tabular management reports showing the information required by this Section. The complete working diagram shall reflect the Contractor's approach to scheduling the complete project, taking into account the accuracy of the logic and the experience gained from the interim diagram. No payment requests from Contractor will be paid after **[60] [_____]** calendar days after Notice to Proceed unless the Final CPM Diagram has been submitted and agreed to in principle.

G. Subcontractor Participation: The Contractor shall consult with its subcontractors and suppliers relating to the preparation and updating of its construction plan and construction schedule. Subcontractors shall receive copies of those portions of the Contractor's CPM which relate to their work. They, in turn, shall supply comments on activity definitions, scope, and durations, as needed, and provide the dollar value, man hours, and crew size to execute each activity. The Contractor shall continually advise subcontractors and suppliers of any updates or revisions to the Construction Schedule as the work progresses, and obtain their concurrence with the changes affecting their portions of the Work.

H. The CPM schedule shall be utilized for scheduling, coordinating, and monitoring work under this Contract. The CPM Schedule shall be submitted for initial approval and then be updated and resubmitted monthly or more often as required in order to demonstrate contract compliance and facilitate evaluation of monthly payment requests and requests for time extension.

I. The CPM Schedule shall consist of time scaled Network Analysis Diagram (logic diagram), a time scaled bar chart, a cost loaded schedule (computer data printout) and any other standard tabular reports as requested by Owner, all of which shall be submitted together in triplicate.

J. Computer-Produced Schedule: The computer produced schedule shall meet all contractual requirements, such as contract duration, phasing, and phasing restraints, and cover all procurement activities, including submittals, submittals status, fabrication and delivery times, and reflect all key long lead or critical procurement activities.

K. No on-site construction work will be permitted and no progress payments will be made by Owner until the **[preliminary 90-day] [preliminary] [project]** schedule has been submitted **[and approved]**.

L. Ownership and Use of Float: Float is defined as the amount of time between the early and late completion dates of a scheduled activity. Float time on this Project is a project resource jointly owned by the Owner and Contractor. This resource expires as the Project progresses, and it is to be available to and consumed by the joint owners on a first-come first-served basis. If Contractor's schedule indicates a completion date for the project prior to the contractual completion date, then the time period between the two dates shall be considered as project float and shall be owned and used in accordance with this paragraph.

1.5 FORMAT

A. Prepare computer generated network analysis system using the critical path method, as outlined in AGC – Construction Planning and Scheduling.

B. Network Analysis Diagram: The logic diagram shall show the sequence and interdependence of activities required for complete performance of all items of work under this Contract in the time frame allowed. The diagram shall be drafted or plotted to show a continuous flow of work, from start to finish for the entire project, reading from left to right with all activities and subnets interfaced and matchlined to allow assembly as one total project schedule.

C. Exercise sufficient care to produce a clear, legible, and accurate diagram. Activities related to specific physical areas of the project shall be grouped on the diagram for ease of understanding and simplification. Critical path activities must be clearly identified in red. The critical path shall be plotted generally along the center of the sheet with channels with increasing floats placed towards the top or bottom.

D. Uniquely number each activity with event numbers ranging up to 9999 only. The diagram should be generally numbered in sequence; left to right, top to bottom. Activity number to be prefixed or suffixed with corresponding AIA division. Number activities in the general progressive order that they will be completed in. Allow for inserting of additional activities should further breakdown of the work be required.

E. The Network Analysis Diagram must clearly show the Critical Path for the Project at all times.

F. Sequence of Listings: **[The Table of Contents of this Project Manual.] [The chronological order of the start of each item of Work.] [_____.]**

G. Scale and Spacing: To provide space for notations and revisions.

H. Sheet Size: **[Minimum [22 x 17][24 x 36] [36 x 42] [___x___]** inches **[[560 x 432] [___x___] mm.] [Multiples of 8 1/2 x 11 inches (216 x 280 mm).] [_____.]**

1.6 CONTENT

A. Activities: Before attempting to produce the CPM schedule, prepare a listing of activities involved. Include every activity having a possible bearing on the time required to complete the project. Submit this listing of activities and levels of detail to Owner for approval.

Show the following on each work activity in alphanumeric form:

1. Work activity number (unique number identifying the work activity).

2. Concise description of the work activity. Activity descriptions shall be unique to an activity and understandable at the working level.

3. Performance responsibility or trade code.

4. Duration (in work days).

5. Work location, descriptive of the area involved.

6. Total float.

7. Early start, early finish, late start, late finish.

B. In addition to the performance of work in place, show special activities such as:

1. Interruption of utilities, delivery of Owner furnishings and equipment, special inspections, or other project phasing requirements.

2. Testing and balancing of mechanical equipment, special testing, equipment start-up, Owner training, etc.

3. Final cleaning, punch list inspections, final inspections, demobilization.

4. Punchlist: Show two separate activities totaling a minimum of **[_____]** work days for completion of punch list items and final cleanup.

5. Weather Delays: Total weather delays for this project are **[per the General Conditions, Construction Manager at Risk]**. A **[_____]** work day "Planned Weather Delay" activity shall be inserted between the Contract Directed Completion Date and Scheduled Completion Date. The planned weather delays duration will be reduced by the number of actual critical path weather delays experienced at each monthly update until the activity duration reaches 0 days. Thereafter weather delays will be an excusable delay (see General Conditions, **[Article 8] [Article 9]**).

C. Show not only the activities for actual construction work for each trade. Category of the project, but also include trade restrictions to indicate the movement of trades from one area, floor, etc. to another area, floor, etc., for trades who are performing major portions of the work under this contract.

D. Break up the work into activities of a duration no longer than **[20] [_____]** work days each, except as to nonconstruction activities (such as procurement of materials, delivery of equipment and concrete curing) and any other activities for which the Owner may approve the showing of longer duration. The duration for Architect's approval of any required submittal, shop drawing, etc., shall not be more than **20** work days. The construction time as determined by the Construction Progress Schedule from early start to late finish for any sub-phase, phase, or the entire project shall not exceed the Contract times indicated in Contract Documents.

E. Describe work activities such that the work is readily identifiable for assessment of completion. Activities labeled "start", "continue", or "completion" will not be allowed. All constraints will be start-finish relationships. Lead and lag tie activities will be acceptable only if the description accurately identifies such a restraint and that such restraints are realistic with respect to the schedule of the project. Partial dependencies of activities will not be permitted without approval of the Owner.

F. The schedule shall include separate activities for both submittal and review of all required submittals. The minimum time allocated for review and return of submittals and all resubmittals shall be **[___ days] [as stated in Section] [01300]** for each submittal or resubmittal.

G. The schedule shall incorporate all schedule constraints (phasing or sequence of construction, delivery windows for Owner furnished items, interim milestone dates, etc.) specified in the Contract Documents.

H. The schedule shall show separate procurement activities for all specially fabricated or custom produced items of material or equipment including order, design, submittals, fabrication and delivery.

I. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

J. Identify work of **[separate stages]** **[separate floors]** and other logically grouped activities.

K. Provide sub-schedules for each stage of Work identified in Section **[01010.]** **[01011.]**

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

M. Include conferences and meetings in schedule.

N. Provide separate schedule of submittal dates for shop drawings, product data, and samples, including **[Owner furnished products]** **[and]** **[Products identified under Allowances]**, and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.

O. Indicate delivery dates for **[Owner furnished products]** **[and]** **[Products identified under Allowances.]**

P. The schedule shall allow the following minimum time periods for the startup and shakedown operation of the following systems:

a. HVAC.
b. Life Safety systems **(list).**
c. Elevators.
d. **(Other special systems as applicable).**

[List times]

Q. Cost load all work activities to a singular resource and take special care to separate the costs for labor and materials where the placement of major equipment is involved. In special cases actual invoices or back-up may be required to verify costs.

R. The cumulative amount of all cost loaded work activities shall equal the total Contract price. Overhead and profit shall be pro-rated on all activities for the entire project length. Generate from this information cash flow curves indicting graphically the total percentage of activity dollar value scheduled to be in place for early finish, late finish, and 50% float dates. These cash flow curves will be used by the Owner to assist in determining approval or disapproval of the cost loading. In the event of disapproval, resubmit, within 10 calendar days, a corrected or adjusted cost load report in accordance with any agreements reached during the previous notification.

S. The computer program shall summarize the value of work completed each month by way of a responsibility (trade) sort. This sort shall summarize all work by type or trade rather than by time or sequential fashion, which sort is also required. A summary of all trade work and other work by the General Contractor will, in terms of information, constitute the schedule of values to be utilized on the monthly pay request form.

T. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:

1. Preceding and following event numbers.
2. Activity description.
3. Estimated duration of activity, in maximum **[15] [_____]** day intervals.
4. Earliest start date.
5. Earliest finish date.
6. Actual start date.
7. Actual finish date.
8. Latest start date.
9. Latest finish date.
10. Total and free float; float time shall accrue to the Owner and to the Owner's benefit.
11. Monetary value of activity, keyed to Schedule of Values.
12. Percentage of activity completed.
13. Responsibility.

U. Required Sorts: List activities in sorts or groups:

1. By preceding work item or event number from lowest to highest.
2. By amount of float, then in order of early start.
3. By responsibility in order of earliest possible start date.
4. In order of latest allowable start dates.
5. In order of latest allowable finish dates.
6. Contractor's periodic payment request sorted by **[Schedule of Values listings] [specifications sections]**.
7. Listing of basic input data which generates the report.
8. Listing of activities on the critical path.

V. Coordinate content with schedule of values specified in Section **[01019.] [_____.]**

1.7 UPDATING OF SCHEDULES

A. The CPM Schedule shall be updated monthly, or more often if required, to indicate the actual progress of the Project. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the **[first] [_____]** day of each month.

B. The computer-produced report shall categorize areas of work behind schedule by use of thirty, sixty, and ninety day “look ahead” projections. Along with this data, the Contractor shall submit a narrative report as a part of this monthly review and update, in a form agreed upon by the Contractor and the Owner. The narrative report shall include the current status, a description of problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates, and an explanation of corrective action taken or proposed.

C. The submittal of monthly schedule updates by the Contractor shall be a condition precedent to the making of monthly progress payments by the Owner.

D. When the monthly update of the schedule shows negative float on any activity, the Contractor shall take some or all of the following actions at no additional cost to the Owner, unless the negative float is the result of an excusable delay:

   a. Increase construction manpower in quantities needed to eliminate the backlog of work and put the Project back on schedule.

   b. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment or any combination of the foregoing which will eliminate backlog of work and put the Project back on schedule.

   c. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities and put the Project back on schedule.

E. If the monthly update of the schedule shows completion of the Project prior to the current contractual completion date, the time between such an early completion date and the current contractual completion date shall be identified and used as project float in accordance with Subsection 1.4L of this Section 10311.

1.8 REVISIONS TO SCHEDULES

A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.

B. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

C. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect **[including the effect of changes on schedules of separate Contractors].**

D. Change to the Work: With each change proposal containing a request for a time extension, Contractor shall furnish a detailed subnet and other backup information as required to support and enable ready quantitative evaluation of the request. This backup shall indicate, by event number the activities affected, activities added, or activities deleted. Both the time and money effect shall be indicated for each activity. In the event the Contractor does not furnish the required information or an agreement cannot be reached, the Owner may direct the Contractor as to the specific logic changes and/or time adjustment which shall be entered into the schedule. All changes in the work shall be reflected in the computer produced schedule and listed in a specific fashion so as to be summarized by trade sort and incorporated into the schedule of values by change order number. Major changes shall be reflected in the Network Analysis Diagram. Minor changes may be omitted from the Network Analysis Diagram provided that there is no change in time and that the Owner and Contractor are in agreement with the procedure.

1. All changes to the Contract must be approved by the Owner prior to inclusion into the Network Analysis System. Requests for time extension as related to changes to the scope of work will be reviewed in conjunction with the revised NAS, but will not be granted or rejected on that basis alone.

2. All costs related to the production and/or revision of the Network Analysis System including but not limited to changes in the work schedule (for whatever reason), updating requirements, reproduction, and distribution shall be borne by the Contractor. These costs shall be considered to be indirect costs only, recoverable as being included in the Contractor's mark-up referenced in Conditions of the Contract.

1.9 SUBMITTALS

A. Immediately upon receipt of Notice of Intent to Award, submit a statement to the Owner **[Construction Manager]** describing Contractor's computerized scheduling capability for review and approval. This statement shall include the following as a minimum:

1. Identification, qualifications, and experience of the members of the Contractor's scheduling staff or any consultant's staff.

2. References of not less than two previous projects on which the Contractor or Consultant has utilized computerized CMP scheduling, which were of not less than one-half of the value of the present Contract. Owner references shall be included. Actual working examples from previous projects may be requested by Owner. Contractor's project management and supervisory personnel shall have **[years] [projects]** minimum experience in using and monitoring cost-loaded CPM schedules on comparable projects.

3. The name and description of the project management software and computer hardware to be utilized on this Contract.

B. At the preconstruction conference, Contractor shall submit the preliminary progress schedule.

C. Submit Interim and Final Network Diagrams in accordance with Subsection 1.4 of this Section 01311.

D. Participate in review of Interim and Final network diagrams jointly with Architect **[Construction Manager]** and Owner.

E. Within **[20] [_____]** days after joint review of Interim network diagram, submit draft of proposed Final network diagram for review. Include written certification that **[major] [mechanical and electrical]** Subcontractors have reviewed and accepted proposed schedule.

F. Within **[10] [_____]** days after joint review of proposed Final network submit complete analysis consisting of network diagrams and mathematical analysis.

G. The Contractor shall also submit the following logic diagram supporting data:

1. The proposed number of working days per week.

2. The holidays to be observed during the life of the Contract (by day, month, and year).

3. The planned number of shifts per day.

4. The number of hours per shift.

5. The major construction equipment to be used on the site.

H. Submit updated Progress Schedules with **[each] [every second] [_____]** Application for Payment.

I. Submit the number of opaque reproductions which Contractor requires, plus **[two] [_____]** copies which will be retained by **[Architect/Engineer.] [Construction Manager] [Owner] [_____.]**

*******[OR]*******

I. Submit **[one] [_____]** opaque reproduction and one reproducible transparency.

J. Owner may request expediting of material and equipment deliveries without assuming the responsibility for said deliveries. Upon request, furnish to the Owner copies of the equipment and material purchase orders complete with scheduled shipping and receiving dates.

1.10 DISTRIBUTION

A. Following initial submittal to and response by Owner, print and distribute Construction Schedule to **[Construction Manager (_____copies)],** Owner, **(_____copies),** Architect **(_____copies)**, subcontractors, suppliers, fabricators, and others with schedule-compliance requirements. Post copies in Project meeting rooms and field office. When revisions are made, distribute updated issues to same entities. Those who are no longer involved in performance of scheduled Work may be deleted from distribution list. Revised Schedule shall be reissued with report of Progress Meeting.

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

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance – control of installation

B. Tolerances

C. Testing Services

D. Inspection Services

E. Manufacturers' field services

F. Workmanship

1.2 RELATED SECTIONS

A. Section 01090 – Reference Standards.

B. Section 01300 – Submittals.

C. Section 01600 – Material and Equipment.

D. Section 01650 – Starting of Systems.

1.3 QUALITY ASSURANCE – CONTROL OF INSTALLATION

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

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

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

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

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

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

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

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

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

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

1.5 TESTING SERVICES

A. Owner will appoint, employ, and pay for specified services of an independent firm to perform testing. Employment of testing agency or laboratory in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

B. The independent firm will perform tests and other services specified in individual specification sections and as required by the Architect/Engineer or Authority Having Jurisdiction.

C. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Architect/Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Architect/Engineer, Owner and Contractor, in duplicate indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.

2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for re-testing will be charged to the Contractor by deducting testing charges form the Contractor's Payment Application.

G. Limits of testing authority are as follows:

1. Independent firm may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Independent firm may not approve or accept any portion of the Work.

3. Independent firm may not assume any duties of Contractor.

4. Independent firm has no authority to stop the Work.

H. Testing requirements are specified in the individual specification section for the Work requiring tests.

1.6 INSPECTION SERVICES

A. Owner will perform its inspection services utilizing either its own employees or independent firms, or both.

B. The independent firm(s) will perform inspections and other services as specified in individual specification sections or required by the Owner.

C. Inspection may occur on or off the project site. Off-site inspection will be performed as required by the Architect/Engineer or the Owner.

D. Reports will be submitted to the Architect/Engineer, Owner, and Contractor, in duplicate, indicating inspection observations and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with inspectors; furnish safe access and assistance by incidental labor as request. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.

F. Inspection of Work in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

G. Re-inspection required because of non-conformance to specified requirements shall be performed by the same inspector(s). Payment for re-inspection will be charged to the Contractor by deducting re-inspection charges from the Contractor's Payment Application.

H. Limits of inspection authority are as follows:

1. Inspections may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Inspectors may not approve or accept any portion of the Work.

3. Inspectors may not assume any duties of Contractor.

4. Inspectors have no authority to stop the Work.

I. Inspection requirements are specified in the individual specification section for the Work requiring inspection.

1.7 MANUFACTURERS' FIELD SERVICES

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

B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations.

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

D. Refer to Section 01300 – SUBMITTALS, MANUFACTURERS' FIELD REPORTS article.

1.8 WORKMANSHIP

A. Owner will observe Contractors performance relating to workmanship and shall have authority to direct Contractor to instigate and maintain procedures to ensure that persons performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality in completed work. Contractor shall remove and replace persons and work which does not comply with workmanship standards specified and as recognized in the construction industry for applications indicated and shall remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

2 PRODUCTS

Not Used.

3 EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verity that utility services are available, of the correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: **[Electricity,] [lighting,] [heat,] [cooling,] [ventilation,] [communication services,] [water,] [and] [sanitary facilities].**

B. Temporary Controls: **[Barriers,] [enclosures and fencing,] [protection of the Work,] [surface water control,] [dust control,] [erosion and sediment control,] [and] [noise control].**

C. Construction Facilities: **[Access roads,] [parking,] [progress cleaning,] [and] [temporary buildings].**

1.2 RELATED SECTIONS

A. Section 01540 – Security.

B. Section 01561 – Construction Cleaning.

C. Section 01580 – Project Identification and Signs.

D. Section 01590 – Field Offices and Sheds.

E. Section 01700 – Contract Closeout: Final cleaning.

1.3 TEMPORARY ELECTRICITY

A. Cost: By Contractor; provide and pay for power service required from **Tucson Electric Power Company**. Source shall be **[location of pole.]**

*****[OR]*****

B. Cost: By Owner; connection to Owner's existing power service. Do not disrupt Owner's need for continuous service. **[Owner will pay cost of energy used. Exercise measures to conserve energy.]**

*****[OR]*****

C. Cost: By Contractor; connect to Owner's existing power service. Do not disrupt Owner's need for continuous service.

1. Provide temporary electric feeder from **[existing building]** electrical service at **[location as directed]**. Provide an electric utility meter at this location. Owner will read the meter on a monthly basis and directly invoice the contractor for reimbursement. Do not disrupt Owner's need for continuous service.

D. **[Power]** **[Feeder]** Service Characteristics: **[_____]** volt, **[_____]** ampere, **[three]** **[_____]** phase, **[four]** **[_____]** wire.Com.

*****[OR]*****

D. Complement existing power service capacity and characteristics as required.

E. Provide power outlets for construction operations, with branch wiring and distribution boxes located **[at each floor.]** **[as required.]** **[_____.]** Provide flexible power cords as required.

F. Provide **[main service disconnect and over-current protection at convenient location.]** **[feeder switch at source distribution equipment.]**

G. Permanent convenience receptacles may **[not]** be utilized during construction.

H. Remove the temporary installation and connections of systems when no longer required. Restore the services sources and supply to proper operating condition.

I. Provide protection for each power supply source complete with disconnect switches and other required electrical devices.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of **[2] [_____] watt/sq. ft.**

B. Provide and maintain **[1] [_____] watt/sq. ft** lighting to exterior staging and storage areas after dark for security purposes.

C. Provide and maintain **[0.25] [_____] watt/sq. ft** H.I.D. lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

*****[OR]*****

D. Maintain lighting and provide routine repairs.

E. Permanent building lighting may **[not]** be utilized during construction.

1.5 TEMPORARY HEATING

A. Provide heating devices and heat as needed to maintain specified conditions for construction operations.

B. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in

place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.

1.6 TEMPORARY COOLING

A. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.

B. Prior to operation of permanent equipment for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.7 TEMPORARY VENTILATION

A. Ventilation enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases. Comply with IAQ Guidelines for Occupied Buildings Under Construction.

B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.8 COMMUNICATION SERVICES

A. Arrange for all of the following services through Owner's Communications (CCIT) Department.

B. TELEPHONE SERVICE

1. Provide, maintain, and pay for telephone service to field office **[and Architect/Engineer's field office]** at time of project mobilization.

2. Architect/Engineer will pay for own service.

C. FACSIMILE SERVICE

1. Provide, maintain and pay for facsimile service **[and a dedicated telephone]** to field office **[and Architect/Engineer's field office]** at time of project mobilization.

2. Architect/Engineer will pay for own service.

D. DATA (COMPUTER) SERVICE

1. Provide, maintain and pay for data service **[and a dedicated telephone]** to field office **[and Architect/Engineer's field office]** at time of project mobilization.

2. Architect/Engineer will pay for own service.

3. Provide scanning capability up to 11" x 17" size minimum.

1.9 TEMPORARY WATER SERVICE

A. **[Provide, maintain and pay for suitable quality water service required] [Connect to existing water source]** for construction operations at time of project mobilization.

B. **[Owner will pay cost of water used. Exercise measures to conserve water.]**

C. Extend branch piping with outlets located so water is available by hoses with threaded connections. **[Provide temporary pipe insulation to prevent freezing.]**

1.10 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. **[Existing facility use is not permitted.]** Provide at time of project mobilization.

*****[OR]*****

B. **[Existing] [Permanent] [Designated]** facilities **[located at [_____]]** may be used during construction operations. Maintain daily in clean and sanitary condition equivalent to Owner's maintenance.

C. At end of construction, return facilities to same or better condition as originally found.

1.11 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades and covered walkways required by governing authorities for public right-of-ways **[and for public access to existing building].**

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

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.12 FENCING

A. Exterior work and storage areas exposed to adjacent pedestrian traffic or which present an attractive nuisance shall at all times be satisfactorily fenced and secured with chain link fence panels.

B. Construction: **[Commercial grade chain link fence.]** Associated support posts are to be driven or anchored into the ground, concrete or asphalt. T-posts are to be avoided.

C. Provide 6 foot high fence around construction site; equip with vehicular **[and pedestrian]** gates with locks.

D. When the hazard/nuisance to pedestrian traffic is minimal and subject to the approval of the Architect and Owner, temporary, short term fencing needs may be accomplished with plastic roll fencing and flagging.

1.13 SURFACE WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. **[Provide water barriers as required to protect site from [soil erosion] [_____].]**

C. Provide temporary measures such as berms, dikes and drainage ways to prevent water flow from damaging the Work or adjacent property.

1.14 EXTERIOR ENCLOSURES

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

B. If exterior work on or above new roof level is not complete by the time of dry-in for start of interior work, provide temporary roofing as specified in Section **[_____].**

1.15 INTERIOR ENCLOSURES

A. Provide temporary partitions **[and ceilings]** as indicated to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and **[reinforced polyethylene] [plywood] [gypsum board]** sheet materials with closed joints and sealed edges at intersections with existing surfaces.

1. Insulated to R **[_____]** (RS) **[_____].**

2. STC rating of **[35] [_____]** in accordance with ASTM E90.

3. Maximum flame spread rating of **[75] [25]** in accordance with ASTM E84.

C. Paint surfaces exposed to view from Owner occupied areas.

1.16 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.17 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. When dust-generated work is performed in the vicinity of active fire alarm devices, temporary fire alarm bypasses will be required.

1.18 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation. Provide soil and erosion control plan as required by Pima County Department of Environmental Quality.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.19 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise from **[_____]** and noise produced by construction operations.
B. The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances, which apply to any work performed pursuant to the contract including excavation, hauling and dumping.

C. Haul trucks and equipment shall be maintained and operated in such a manner so as to minimize the generation of noise. The Owner reserves the right to review the operation of this equipment throughout the haul route to insure that no unnecessary noise is generated. The Contractor will be required to remedy any unsatisfactory conditions. In no case will the use of engine compression brakes be permitted.

1.20 ACCESS ROADS

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. **[Designated]** existing on-site roads **[may] [shall not]** be used for construction traffic.

1.21 PARKING

A. Parking of Contractor's vehicles and vehicles of the Contractor's employees, shall be only at locations designated by the Owner. The available space for Contractor parking will be verified at the Pre-Construction Conference. The location will be as close to the construction site as possible.

B. Vehicle spaces will be limited in number, and the vehicles must have permits properly displayed. The Contractor may apply to the parking Service Field Coordinator at 621-3756 for permits to park on campus.

C. If granted, the costs for these permits will be borne by the Contractor. The permits are transferable and are valid for one year with the unused portion being refundable. Verify costs and all conditions with the Owner.

D. If a vehicle is permitted and parked in unauthorized space, a citation will be issued. If vehicle does not display permit, a citation will be issued.

1.22 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site **[weekly] [_____]** and dispose off-site.

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

1.23 FIELD OFFICES AND SHEDS

A. Office: Weather tight, with lighting, electrical outlets, heating, cooling, **[and] [ventilating]** equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 12 persons.

C. Provide separate private office, similarly equipped and furnished, for use of **[Architect/Engineer] [Owner].**

D. Locate offices and sheds as directed.

1.24 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Final Acceptance inspection.

B. Remove underground installations. **[Grade site as indicated.]**

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

D. Restore existing **[and permanent]** facilities used during construction to original condition. **[Restore permanent facilities used during construction to specified condition.]**

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: **[Electricity,] [Lighting,] [Heat,] [Ventilation,], Telephone service,] [Water,] [and] [Sanitary facilities]**

1.2 RELATED SECTIONS

A. Section 01555 – Construction Facilities

B. Section 01560 – Temporary Controls

C. Section 01570 – Traffic Regulation

D. Section 01580 – Project Identification and Signs

E. Section 01590 – Field Offices and Sheds.

F. Section 01700 – Contract Closeout: Final cleaning

1.3 TEMPORARY ELECTRICITY

A. Cost: By Contractor; provide and pay for power service required from **Tucson Electric Power Company**. Source shall be **[location of pole.]**

*****[OR]*****

B. Cost: By Owner; connection to Owner's existing power service. Do not disrupt Owner's need for continuous service. **[Owner will pay cost of energy used. Exercise measures to conserve energy.]**

*****[OR]*****

C. Cost: By Contractor; connect to Owner's existing power service. Do not disrupt Owner's need for continuous service.

1. Provide temporary electric feeder from **[existing building]** electrical service at **[location as direct]**. Provide an electric utility meter at this location. Owner will read the meter on a monthly basis and directly invoice the contractor for reimbursement. Do not disrupt Owner's need for continuous service.

D. **[Power] [Feeder]** Service Characteristics: **[_____]** volt, **[_____]** ampere, **[three] [_____]** phase**, [four] [____]** wire.Com

*****[OR]*****

G. Complement existing power service capacity and characteristics as required.

H. Provide power outlets for construction operations, with branch wiring and distribution boxes located **[at each floor.] [as required.] [_____.]** Provide flexible power cords as required.

I. Provide **[main service disconnect and over-current protection at convenient location.] [feeder switch at source distribution equipment.]**

J. Permanent convenience receptacles may **[not]** be utilized during construction.

K. Remove the temporary installation and connections of systems when no longer required. Restore the services sources and supply to proper operating condition.

L. Provide protection for each power supply source complete with disconnect switches and other required electrical devices.

M. Submit sealed electrical diagram and one-line drawing of temporary service for Owner approval.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain **[incandescent]** lighting for construction operations **[to achieve a minimum lighting level of [2] [____] watt/sq ft].**

B Provide and maintain **[1]** watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

C. Provide and maintain **[0.25]** watt/sq ft H.I.D. lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

E. Maintain lighting and provide routine repairs.

F. Permanent building lighting may **[not]** be utilized during construction.

G. Exterior fixtures over 50 watts shall be fully shielded per City of Tucson Lighting Ordinance.

H. Exterior lamp sources over 50 watts shall not be metal halide.

I. All HID fixtures shall be totally enclosed with safety chains and tempered glass lenses.

1.5 TEMPORARY HEATING

A. Existing facilities shall not be used.

*****[OR]*****

B. Provide **[and pay for]** heating devices and heat as needed to maintain specified conditions for construction operations.

*****[OR]*****

C. Utilize Owner's **[existing] [new]** heat plant, extend and supplement with temporary heat devices as needed to maintain specified conditions for construction operations.

D. [Owner will pay cost of energy used. Exercise measures to conserve energy.] [Provide separate metering and reimburse Owner for cost of energy used.]

E. [Enclose building prior to activating temporary heat in accordance with the Exterior Enclosures article in this section.]

F. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

G. Maintain maximum ambient temperature of **[50]]** degrees F**([10]] degrees C)** in areas where construction is in progress, unless indicated otherwise in specifications.

H. When it has been determined by mutual agreement between the Contractor and the Architect, in writing, that the temporary heating is not longer required, remove all temporary piping, temporary heating units and other equipment.

1.6 TEMPORARY COOLING

A. Existing facilities shall not be used.

*****[OR]*****

B. Provide **[and pay for]** cooling devices and cooling as needed to maintain specified conditions for construction operations.

*****[OR]*****

C. Utilize Owner's **[existing] [new]** cooling plant, extend and supplement with temporary cooling devices as needed to maintain specified conditions for construction operations.

D. [Owner will pay cost of energy used. Exercise measures to conserve energy.] [Provide separate metering and reimburse Owner for cost of

energy used.] [Enclose building prior to activating temporary cooling in accordance with the Exterior Enclosures article in this section.]

E. Prior to operation of permanent equipment for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

F. Maintain maximum ambient temperature of **[80] [___]** degrees F **([26] [___] degrees C)** in areas where construction is in progress, unless indicated otherwise in specifications.

1.7 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.8 TELEPHONE AND DATA SERVICE

A. Provide, maintain, and pay for telephone service to field office **[and Architect/Engineer's field office]** at any time of project mobilization.

B. [Architect/Engineer will pay for own service]

1.9 FACSIMLE SERVICE

A. Provide, maintain and pay for facsimile service **[and a dedicated telephone line]** to field office **[and Architect/Engineer's field office]** at time of project mobilization

A. Provide, maintain, and pay for dedicated connection to University's data service from Field Office at time of project. Coordinate installation requirements with University CCIT Department.

B. **[Provide for telephone/and data outlet at Owner and Architect/Engineer plan table. Refer to Section 01590.]**

1.10 TEMPORARY WATER SERVICE

A. **[Provide, maintain and pay for suitable quality water service required] [Connect to existing water source]** for construction operations at time of project mobilization

B. **[Owner will pay cost of water used. Exercise measures to conserve water.] [Provide separate metering and reimburse Owner for cost of water used.]**

C. Extend branch piping with outlets located so water is available by hoses with threaded connections. **[Provide temporary pipe insulation to prevent freezing.]**

1.11 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. **[Existing facility use is not permitted.]** Provide at time of project mobilization.

*****[OR]*****

A. **[Existing] [Permanent] [designated] facilities [located at [ ]]** may be used during construction operations. Maintain daily in clean and sanitary condition.

B. At end of construction, return facilities to same or better condition as originally found.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Security program

B. Entry control.

C. Building Access.

1.2 RELATED SECTIONS

A. Section **[01010 – Summary of Work:] [Contractor use of premises.] [Owner occupancy].**

B. Section 01500 – Construction Facilities and Temporary Controls.

1.3 SECURITY PROGRAM

A. Protect Work **[existing premises] [and] [Owner's operations]** from theft, vandalism, and unauthorized entry.

B. Initiate program **[in coordination with Owner's existing security system]** at project mobilization.

C. Maintain program throughout construction period until **[Owner occupancy.] [Owner acceptance precludes the need for Contractor security.] [directed by Architect/Engineer.]**

1.4 ENTRY CONTROL

A. Restrict entrance of persons and vehicles into Project site **[and existing facilities].**

B. Allow entrance only to authorized persons with proper identification.

C. Maintain log of workers and visitors, make available to Owner on request

D. **[Owner will] [Contractor shall]** control entrance of persons and vehicles related to Owner's operations.

*****[OR]*****

E. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.5 BUILDING ACCESS

A. If in order to execute the work it becomes necessary to issue keys to the Contractor, a deposit of $50.00 will be required for each key so issued. Deposits will be returned to the Contractor upon the return of the keys to the University.

B. In the event that a key is lost and is not returned to the University, thereby breaching the security of the building(s), the deposit shall be forfeited, and in addition, the Contractor shall be held liable for the cost of re-keying of the building(s) by the Owner.

C. Where keyless access systems are in place, Contractor and subcontractors will be authorized to purchase Owner's "Cat cards" at a cost of $15 each for building access in lieu of keys.

2 PRODUCTS

Not Used.

3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Access roads.

B. Maintenance.

C. Removal, repair.

D. Mud from site vehicles.

E. Haul Routes

F. Hauling Restrictions/Load Requirements

1.2 RELATED SECTIONS

A. Section 01010 – Summary of Work.

B. Section 01039 – Coordination and Meetings.

C. Section 01555 – Construction Facilities

D. Section 01560 - Temporary Controls.

E. Section 01570 – Traffic Regulation.

F. Section 02200– Earthwork.

2 PART 2 PRODUCTS

2.1 MATERIALS

A. Temporary Construction: Contractor’s option.

B. Earthwork, Paving Base, and Topping which will all become part of permanent construction as specified in product specification sections.

3 PART 3 EXECUTION

3.1 PREPARATION

A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.2 ACCESS ROADS

A. Construct and maintain temporary access roads from public thoroughfares to serve construction area, of a width and load bearing capacity to provide unimpeded traffic for construction purposes.

B. Extend and relocate as Work progress requires, provide detours as necessary for unimpeded traffic flow.

C. Provide unimpeded access for emergency vehicles. Maintain 20 foot width driveways with turning space between and around combustible materials.

D. Provide and maintain access to fire hydrants and control valves free of obstructions.

3.3 MAINTENANCE

A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, Products, mud, snow, and ice.

B. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.4 REMOVAL, REPAIR

A. Remove temporary materials and construction before Substantial Completion.

B. Remove underground work and compacted materials to a depth of 2 feet, fill and grade site as specified.

C. Repair permanent facilities damaged by use, to specified condition.

3.5 MUD FROM SITE VEHICLES

A. Provide means of removing mud from vehicle wheels before entering streets.

3.6 HAUL ROUTES

A. The Contractor is to coordinate with the Owner and secure approval from the City of Tucson; Traffic Engineering regarding haul routes and schedules on public roads.

B. **[Supplemental traffic control by an off-duty Traffic Control Officer will be required during night work. The Traffic Control Officer will control the signal at [_____] and [_____] during times when that access is used.]**

C. Traffic control plans and schedules shall be submitted to the Owner and reviewed and approved by the City of Tucson; Traffic Engineering.

D. Residential streets are not to be used. Any public street damages by the Contractor's vehicles or operation shall be repaired by the Contractor at no expense to the Owner.

3.7 HAULING RESTRICTIONS/LOAD REQUIREMENTS

A. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads. A pamphlet, Sizes and Weights of Vehicles and Loads upon Highways, which has been extracted from Title 28, Chapter 6, Arizona Revised Statutes, is available from the Motor Vehicle Division, Arizona Department of Transportation. A special permit shall not relieve the Contractor of liability for damage, which may result from hauling of material or moving of equipment.

B. The operation of equipment of such weight or so loaded as to cause damage to structures or the roadway or to any other type of construction shall not be permitted. The Contractor shall be responsible for all damage done by the Contractor's hauling equipment. In no case shall legal load limits be exceeded unless permitted, in writing, by the City of Tucson Traffic Engineer.

C. Hauling of materials over the subgrade or the base course or surface course under construction shall be limited as directed by the Architect. No loads shall be permitted on a portland cement concrete pavement, base or structure before the expiration of the curing period.

D. City of Tucson Requirements:

1. The applicant must furnish to the City of Tucson Traffic Engineering proof that the University was notified prior to any approval of haul route.

2. The applicant and its subcontractors are responsible for traffic control. It is their responsibility to periodically examine barricades, traffic control devices, and warning signs to insure they meet all federal and city requirements.

3. The applicant is responsible for continually cleaning the entrance, egress, and roadway of the haul route of excess dirt and debris.

4. The University is responsible for notifying businesses and residences affected by the egress and entrance of haul routes.

5. The normal days and hours of haul route operations are Monday through Friday, 7:00 p.m. to 6:00 a.m. Weekend operation requires a variance from Traffic Engineering. Traffic Engineering may grant a variance if the applicant makes a request 24 hours in advance with written proof that the University was previously notified.

6. Off-duty police officers or Traffic Control Officers shall be employed and utilized during all hauling operations.

7. All work site personnel in or along the roadway are required to wear a clean reflective vest that meets federal and city standards.

8. The applicant shall meet all special conditions that may be set by Traffic Engineering during the course of haul route operation.

9. In addition, the applicant shall meet all necessary federal, state, county, and city requirements that apply to haul route operation.

10. The City of Tucson Traffic Engineering reserves the right to alter any requirement or specify additional requirement(s) during the course of the haul route operation.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Construction Facilities: progress cleaning and removal of utilities, facilities, and controls

1.2 RELATED SECTIONS

A. Section 01510 – Temporary Utilities.

B. Section 01550 – Access Roads

C. Section 01560 – Temporary Controls.

D. Section 01570 – Traffic Regulation.

E. Section 01590 – Field Offices and Sheds.

F. Section 01700 – Contract Closeout: Final cleaning.

1.3 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

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

1.4 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

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

B. Remove underground installations to minimum depth of 2 feet (600 mm). Grade site as indicated.

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

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Barriers

B. Fencing

C. Surface water control

D. Interior Enclosures

E. Protection of Installed Work

F. Security

G. Erosion and Sediment Control,

H. Noise Control

1.2 RELATED SECTIONS

A. Section 01010 – Summary of Work

B. Section 01039 – Coordination and Meetings

C. Section 01555 – Construction Facilities

D. Section -01561 – Construction Cleaning: Pollution and Dust Control

E. Section 02900 – Plant Protection

1.3 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas but to allow for Owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing buildings.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.4 FENCING

A. Exterior work and storage areas exposed to adjacent pedestrian traffic or which present an attractive nuisance shall at all times be satisfactorily fenced and secured.

B. Construction: Commercial grade chain link fence

C. Provide 6 foot high fence around construction site; equip with vehicular gates with locks.

D. When the hazard/nuisance to pedestrian traffic is minimal and subject to the approval of the Architect and the Owner, temporary short term fencing needs may be accomplished with plastic roll fencing and flagging.

1.5 SURFACE WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion and flooding.

1.6 INTERIOR ENCLOSURES

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

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

STC rating of 35 in accordance with ASTM E90.
Maximum flame spread rating of 75 in accordance with ASTME84.

C. Paint surfaces exposed to view from Owner occupied areas.

1.7 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.8 SECURITY

A. Provide security and facilities to protect Work, and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

C. Building Access:

1. If, in order to execute the work, it becomes necessary to issue keys to the Contractor, a deposit of $200.00 will be required for each key so issued. Deposits will be returned to the Contractor upon the return of the keys to the University.

2. In the event that a key is lost and is not returned to the University, thereby breaching the security of the building(s), the deposit shall be forfeited, and in addition, the Contractor shall be held liable for the cost of re-keying of the building(s) by the Owner.

3. Where keyless access systems are in place, Contractor and subcontractors will be authorized to purchase Owner's "Cat cards" at a cost of $15 each for building access in lieu of keys.

1.9 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation to comply with the University of Arizona Storm Water Management Plan dated March 10, 2003.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.10 NOISE CONTROL

A. Provide methods, means and facilities to minimize noise produced by construction operations.

B. The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances, which apply to any work performed pursuant to the contract including excavation, hauling and dumping.

C. Haul trucks and equipment shall be maintained and operated in such a manner so as to minimize the generation of noise. The Owner reserves the right to review the

operation of this equipment throughout the haul route to insure that no unnecessary noise is generated. The Contractor will be required to remedy any unsatisfactory conditions. In no case will the use of engine compression brakes be permitted.

D. Haul trucks shall not be hired on a piecework basis.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES:

A. General Requirements

B. Cleaning Materials

C. Waste Disposal

D. Clean up

1.2 RELATED SECTIONS

A. Section 01700 – Contract Closeout

1.3 GENERAL REQUIREMENTS

A General: Contractor and each Subcontractor and Installer is responsible for specific cleaning operations of his work.

B. Safety and insurance standards: State Industrial Commission (of Arizona) OSHA.

C. Fire Protection: Store volatile waste in covered metal containers, and remove from the premises daily.

D. Pollution Control: Conduct clean-up and disposal operations to comply with applicable anti-pollution laws and local ordinances. Burning or burying of waste materials on the site is not permitted. Disposal of volatile fluids and wastes in storm or sanitary sewers, or into streams or waterways is not permitted.

E. Dust Control: Provide a plan acceptable to the Owner for preventing generation of dust due to construction operations on site, along haul routes, in equipment parking areas, and in waste areas. This plan may consist of water sprinkling or an equivalent service in compliance with State and Pima County Control Rules and Regulations.

F. Dust Control: The work under this section shall consist of applying all water required for the control of dust as considered necessary for the safety and convenience of the public, for the reduction of the dust nuisance to adjacent buildings and property, and for the allaying of dust on roads used to haul materials, all in accordance with the requirements of the Pima County Air Pollution Control District Ordinance. This project is located at the **[_____]** of the University campus adjacent to **[research**], **[teaching]** and **[residential facilities]** and dust control is a serious concern.

1. Water utilized for dust control purposes shall be that quantity required to assure conformance with the Pima County Air Pollution Control Ordinance as administered by the Pima County Health Department.

2. The Contractor shall also comply with the applicable requirements of Title 49 – Public Health and Safety, Chapter 3 Air Quality, of the Arizona Revised Statutes, and with the Arizona Administrative Code, Title 18 – Environmental Quality, Chapter 2 Air Pollution Control, Arizona Department of Environmental Quality pursuant to the authority granted by the Statutes.

3. All loads are to be satisfactorily covered and secured prior to hauling off site.

G. When dust-generating work is performed in the vicinity of active fire alarm devices, temporary fire alarm bypasses will be required.

2 PART 2 PRODUCTS

2.1 CLEANING MATERIALS

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

3 PART 3 EXECUTION

3.1 WASTE DISPOSAL

A. Collection and Disposal of Wastes:

1. Establish and enforce a daily system for collection and disposing of waste materials from construction areas and elsewhere at the project site. Provide suitable trash containers at a central collection point on the site. Provide chutes or other suitable means for removing trash safely and cleanly from elevated portions of the work.

2. Comply with NFPA 241 for removal of combustible waste material and debris.

3. Maintain project in accordance with State Industrial Commission (of Arizona) OSHA.

4. Contractor and each Subcontractor and Installer is responsible for cleaning and removal of his trash and debris to this collection point.

5. Do not hold collected materials at the site for periods of more than seven days. Handle hazardous, dangerous, or unsanitary wastes separately from other waste materials, by containerizing properly. Dispose of each category of waste material in a lawful manner. Do not bury or burn waste materials on the Owner's property.

6. Enforce strict prohibition against the washing of waste materials down sewers or into waterways.

7. Waste concrete and masonry shall be removed from the site and legally disposed of by masonry and concrete installers.

3.2 CLEAN UP

A. Cleaning and Protection of Work:

1. At the time each unit of work or element of the construction is completed.

2. Where subsequent construction activities could result in damage to other work in place, provide appropriate protective covering or other provisions.

3. Repeat cleaning and protection operations during remainder of construction period, wherever work might otherwise be damaged by sustained soiling or exposure.

B. During Construction:

1. Oversee cleaning and ensure that building, grounds, and public properties are maintained free from accumulation of waste materials and rubbish.

2. Take measures to prevent spread of trash, debris, cartons, packaging, or other waste materials on or off the Project Site by wind.

3. Sprinkle dusty debris with water.

4. At reasonable intervals during progress of work or as directed by the Owner, clean up site and access and dispose of waste materials, rubbish, and debris.

5 Remove snow and ice from public sidewalks adjacent to site and from access ways to the building and construction.

6. Clean adjacent and nearby streets of dirt occasioned by construction operations; frequency and methods as required by governing authority.

7. Vacuum clean interior building areas when ready to receive finish painting.

C. Contaminated Earth:

1. Remove earth contaminated by construction operations and dispose of off site. Replace with clean soils, as approved, in accordance with Section [02200] using materials appropriate to the location on the site and methods specified for fills and backfills.

2. Contaminated earth includes, but is not limited to, waste concrete and mortar; debris and waste materials, areas used for cleaning tools, washing mixers, and concrete trucks; and areas containing oils, solvents, paints, and similar liquids or other residues.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Construction parking controls.

B. Flag persons.

C. Flares and lights.

D. Haul routes.

E. Traffic signs and signals.

F. Removal.

1.2 RELATED SECTIONS

A. Section 01010 – Summary of Work.

B. Section 01039 – Coordination and Meetings.

C. Section 01555 – Construction Facilities

D. Section 01560 - Temporary Controls.

2 PART 2 PRODUCTS

2.1 SIGNS, SIGNALS, AND DEVICES

A. Post Mounted and Wall Mounted Traffic Control and Informational Signs: Specified in Section 01580.

B. Traffic cones and Drums, Flares and Lights: As approved by local jurisdictions.

C. Flag-person Equipment: As required by local jurisdictions.

3 PART 3 EXECUTION

3.1 CONSTRUCTION PARKING CONTROL.

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner’s operations.

B. Parking of Contractor's vehicles and vehicles of the Contractor's employees shall be only at locations designated by the Owner. The exact quantity and location for Contractor parking will be verified at the Pre-Construction Conference. The location will be as close to the construction site as possible. Vehicle spaces will be limited in number, and the vehicles must have permits properly displayed. The Contractor may apply to the parking Services Field Coordinator at 621-3756 for permits to park on campus. If granted, the costs for these permits will be borne by the Contractor. The permits are transferable and are valid for one year with the unused portion being refundable. Verify costs and all conditions with the Owner. Apply for permits sufficiently in advance.

C. If a vehicle is permitted and parked in an unauthorized space, a citation will be issued. If vehicle does not display permit, a citation will be issued.

D. Contractor can request additional permits at his expense if Owner's Parking and Transportation Department approves the request.

3.2 FLAG PERSONS

A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.3 FLARES AND LIGHTS

A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.4 HAUL ROUTES

A. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.

*****[OR]*****

B. Drawings indicate haul routes designated by authorities for use of construction traffic.

C. Confine construction traffic to designated haul routes.

D. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.5 TRAFFIC SIGNS AND SIGNALS

A. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

B. Relocate as Work progresses, to maintain effective traffic control.

3.6 REMOVAL

A. Removal equipment and devices when no longer required.

B. Repair damage caused by installation.

C. Remove post settings in their entirety.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Project identification sign.

B. Project informational signs.

C. Maintenance.

D. Removal.

1.2 RELATED SECTIONS

A. Section 01010 – Summary of Work.

B. Section 01555 – Construction Facilities

C. Section 01560 - Temporary Controls.

D. Section 01570 – Traffic Regulation.

1.3 QUALITY ASSURANCE

A. Design sign and structure to withstand 60 miles/hr wind velocity.

B. Sign Painter: Experienced as a professional sign painter for minimum three years.

C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.4 SUBMITTALS

A. Section 01300 – Submittals: Shop drawings.

B. Show content, layout, lettering, color, and sizes.

2 PART 2 PRODUCTS

2.1 SIGN MATERIALS

A. Structure and Framing: New wood, structurally adequate, 4x4 minimum post size.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, standard large sizes to minimize joints.

C. Rough Hardware: Galvanized.

D. Paint and Primers: Exterior quality, two coats; sign background of color as selected.

E. Lettering: Exterior quality paint, as selected.

2.2 PROJECT IDENTIFICATION SIGN

A. One painted sign of construction, design, and content shown on sample Project Sign Details at end of section.

B. Actual Names for this Project Are:

Project Name:

Architect:

Construction Manger @ Risk:

Project Management:

C. Content: As Indicated on Project Sign Details.

D. Graphic Design, Colors, Style of Lettering: As Indicated on Project Sign Details.

E. The University may elect to place a decal of a rendering or perspective view of the project in the upper left hand corner of the sign.

F. Obtain information on required University of Arizona word marks from Owner. Only use the electronic file of the indicated wordmark provided by the Owner for incorporation into the project sign. The wordmark idicated in the Project Sign Detail is “UA Horizontal 200-281-no tag” and is the only wordmark approved for use on the Project Identification Sign.

2.3 PROJECT INFORMATIONAL SIGNS

A. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering to provide legibility at 100 foot distance.

B. Provide directional signs at each field office, storage shed(s) and site entries as required to direct traffic into and within site. Relocate as Work progress requires.

2.4 OTHER SIGNS

A. No other promotional signage for consultants, contractors, subcontractors, etc. will be allowed on the construction fence or as free standing signs anywhere on the site.

3 PART 3 EXECUTION

3.1 INSTALLATION

A Install free standing project identification sign within 15 days after start date specified in Notice to Proceed.

B. Erect at designated location.

C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.

D. Install sign surface plumb and level, with butt joints. Anchor securely. Bottom edge of sign shall be a minimum of 4’-0” above adjacent grade.

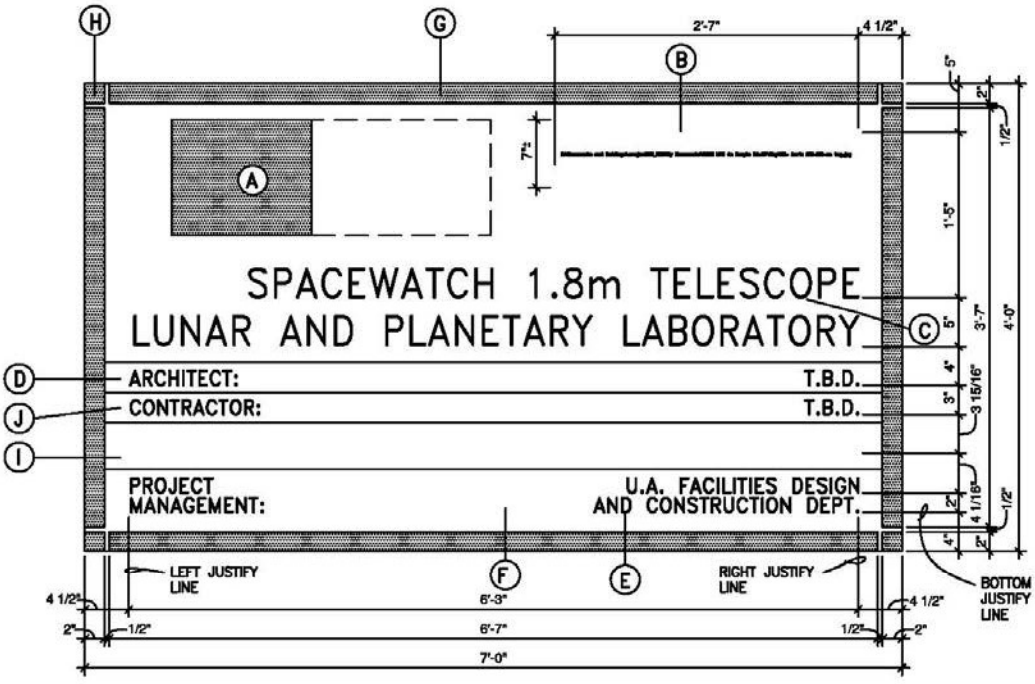
E. Paint exposed surfaces of sign, supports, and framing.

3.2 MAINTENANCE

A. Maintain signs and supports clean, repair deterioration and damage.

3.3 REMOVAL

A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.



JOB SIGN ELEVATION

12 9 6 3 0 1'

PAINTING AND LETTERING SCHEDULE

MARK	LETTERING STYLE	SIZE	PAINTING COLOR	REMARKS
A	PROJECT GRAPHIC IMAGE	AS SHOWN	———	PROJECT GRAPHIC–ELECTRONIC FILE PROVIDED BY FDC
B	UA WORDMARK HORZ. RED & BLUE	AS SHOWN	BRIGHT RED–PMS 200 BRILLIANT BLUE–PMS 281	PER UA TRADEMARK. .EPS FILE WILL BE PROVIDED
C	HELVETICA–MEDIUM	3"	BLACK	HOLD TO ONE LINE CAN BE TWO IF NECESSARY
D	HELVETICA–MEDIUM	1 1/2"	BLACK	FIRM IDENTIFICATION
E	HELVETICA–REGULAR	1 1/2"	BLACK	FIRM NAME
F	———	——	POLAR WHITE	BACKGROUND
G	———	——	BRILLIANT BLUE (CHROMATIC L156)	INTERMEDIATE BORDER
H	———	——	BRIGHT RED (CHROMATIC L104)	BORDER CORNER
I	———	——	———	BLANK FOR DISCRETIONARY USE
J	———	——	———	CONSTRUCTION MANAGER @ RISK FOR CM@R PROJECT DELIVERIES

NOTE:
CONTRUCTED OF 3/4" EXT GRADE PLYWOOD, BOTTOM EDGE OF SIGN SHALL BE 4'–0" ABOVE ADJACENT GRADE MINIMUM, BRACING AND SUPPORT TO BE RESPONSIBILITY OF CONTRACTOR.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Use of Existing Facilities

B. Use of Permanent Facilities

C. Materials, Equipment, Furnishings

D. Construction

E. Environmental Control

F. Contractor Office and Facilities

G. Storage Areas and Sheds

H. Preparation

I. Installation

J. Maintenance and Cleaning

K. Removal

1.2 RELATED SECTIONS

A. Section 01010 – Summary of Work.

B. Section 01555 – Construction Facilities

C. Section 01560 - Temporary Controls.

D. Section 01550 – Access Roads.

E. Section 01580 – Project Identification and Signs.

F. Section 01600 – Material and Equipment.

1.3 USE OF EXISTING FACILITIES

A. Existing facilities shall not be used for field offices or for storage.

1.4 USE OF PERMANENT FACILITIES

A. When permanent facilities are enclosed with operable utilities, relocate offices and storage into building, with written agreement of Owner, and remove temporary buildings.

2 PART 2 PRODUCTS

2.1 MATERIALS, EQUIPMENT, FURNISHINGS

A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.2 CONSTRUCTION

A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.

B. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove when no longer needed.

C. Temperature Transmission Resistance of Floors, Walls, and Ceilings; Compatible with occupancy and storage requirements.

D. Exterior Materials: Weather resistant, finished color acceptable to Owner.

E. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.

G. Lighting for Offices: 50 ft-C at desk top height, exterior lighting at entrance doors.

H. Fire Extinguishers: Appropriate type fire extinguisher at each office and each storage area.

I. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

2.3 ENVIRONMENTAL CONTROL

A. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfortable conditions.

B. Storage Spaces: Heating and ventilation as needed to maintain Products in accordance with Contract Documents; adequate lighting for maintenance and inspection of Products.

2.4 CONTRACTOR OFFICE AND FACILITIES

A. Size: For Contractor’s needs and to provide space for project meetings.

B. Telephone/Data: As specified in Section 01510.

C. Fax: As specified in Section 01510.

D. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.

E. Furnishings for Owner and Architect/Engineer: Separate plan table and chair for sole use of Owner and Architect/Engineer.

F. Other Furnishings: Contractor's option.

G. Equipment: Six adjustable band protective helmets for visitors, one 10 inch outdoor weather thermometer.

2.5 STORAGE AREAS AND SHEDS

A. Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01600.

3 PART 3 EXECUTION

3.1 PREPARATION

A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.2 INSTALLATION

A. Install office spaces ready for occupancy 15 days after date fixed in the Notice to Proceed.

B. Employee Residential Occupancy: Not allowed on Owner's property.

3.3 MAINTENACE AND CLEANING

A. Weekly janitorial services for offices; periodic cleaning and maintenance for office and storage areas.

B. Maintain approach walks free of debris, mud, water, and snow.

3.4 REMOVAL

A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. “Or Equal” Products.

E. Substitutions.

1.2 RELATED SECTIONS

A. Document 00100 – Instructions to **[CM @ Risk] [Bidders]**: Product options and substitution procedures.

B. Section 01027 – Applications for Payment.

C. Section 01400 – Quality Control.

1.3 PRODUCTS

A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

B. Provide interchangeable components of the same manufacture for components being replaced.

C. Only unmanufactured materials produced in the United States of America and only products manufactured in the United States of America, chiefly from materials produced in the United States of America, shall be used under this Contract in construction of the project, unless prior approval is obtained from the Owner.TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer’s instructions.

B. Deliver all manufactured materials in the original packages, containers, or bundles with seals unbroken bearing the name or identification mark of the manufacturer.

C. Deliver fabrications in as large assemblies as practicable and where specified to be shop-primed or shop finished, they shall be packaged or crated as required to preserve such priming or finish intact and free from abrasion.

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

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

1.5 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.

D. Store all materials in such manner as necessary to properly protect same from damage. Materials or equipment damaged by handling, weather, dirt, or from any other cause will not be acceptable.

E. Store material so as to cause no obstructions, stored off sidewalks, roadways, and underground services. The Contractor shall be responsible for protecting all material and equipment furnished under the Contract.

F. When any room in the project is used as a shop or store room, the Contractor shall be responsible for any repairs, patching or cleaning necessary due to such use. Location of such storage space shall be subject to approval of the Architect **[Construction Manager]** **[Owner]**.

G. For exterior storage of fabricated Products, place on sloped supports above ground.

H. Provide suitable off-site storage and protection when site does not permit on-site storage or protection.

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

J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

K. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

L. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.6 "OR EQUAL' PRODUCTS

A. During the **[Guaranteed Maximum Price (GMP)] [Bid]** period, requests for approval of "or equal" products shall follow the process specified in the **[Instructions to CM@R.] [Instruction to Bidders.]**

1.7 SUBSTITUTION

A. Instructions to **[CM@R]** **[Bidders]** specify procedures for submitting requests for prior approval of equal products during the**[GMP]** **[Bid]** period.

B. Award of the contract in accordance with Contract Documents requires that the specified manufacturers, trade names or materials and equipment shall be furnished and installed.

C. Substitutions will not be allowed unless specifically submitted and approved in accordance with the following provisions.

D. Owner will not approve a substitution of materials or equipment on the basis of lower price after **[GMP is accepted]** **[bids are opened]**. The conditions under which a request for substitution will be considered are:

1. The request for substitution is a result of changes in scope, materials or equipment made by Owner during post-bid cost reduction negotiations as allowed by Subsection 3-803.B.7 of the University Procurement Code.

2. Owner actions, such as selection of Optional Price(s) or optional work, makes a suppliers bid non-responsive or significantly non-competitive.

3. Written admission by the manufacturer of its inability to furnish the product required by the Contract Documents in a timely manner.

4. A written refusal by the supplier to furnish the product for the price included in its bid on bid day.

5. The manufacturer becomes insolvent or bankrupt, ceases its business operations, or otherwise becomes unable to furnish the specified product.

6. Persistent or repeated failure or refusal by the manufacturer to furnish its product as reasonably expected by the General Contractor to enable the General Contractor to meet its contractual commitment to the University.

E. A request constitutes a representation that the Contractor:

1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

2. Will provide the same warranty for the Substitution as for the specified Product.

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extensions which may subsequently become apparent.

5. Will reimburse Owner and/or Architect/Engineer for review or redesign services associated with re-approval by authorities.

F. Substitution shall not be offered unless a thorough check is made of all related items and interferences, all approved or pending changes in the Work, and any changes in the order of performance of the Work or the construction progress schedule that are or may be necessary to accommodate the proposed substitution. Prepare drawings of revised equipment and piping arrangements caused by substitutions.

Such drawings shall be at least equal in quality and detail to Contract Drawings. The cost of supplying drawings shall be included by the Contractor in his estimate of proposed substituted materials.

G By offering a substitution Contractor shall accept responsibility for its effect on the work of all trades, including any possible delays in completion time of Project. All costs of changes in the work of other trades and As-Built Drawings, etc., affected by inclusion of Contractor requested substitutions shall be paid by the Contractor.

H. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, with separate written request, or when acceptance will require revision to the Contract Documents.

I Substitution Submittal Procedure:

1. Requests for approval of substitute manufacturer, trade name or materials shall be submitted on the Substitution Request Form, Section 01601. Submit three **[_____]** copies of request for Substitution for consideration. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer. Submittals shall contain sufficient information, samples or other data as necessary to provide direction comparison to the specified products. Each submittal shall be well marked and identified as to the type and kind of items being submitted for approval. Lack of proper information will be sufficient cause for rejection. References to catalogs that the Architect may or may not have will not be accepted.

3. The Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

J. Unless specifically submitted and approved in accordance with the above, substitutions will not be allowed.

2 PART 2 PRODUCTS

3 PART 3 EXECUTION

Not Used.

END OF SECTION

SUBSTITUTION REQUEST FORM

UA Project Name:

UA Project No.:

We hereby submit for your consideration the following material/product in lieu of the specified item for the above referenced product.

Section No.: Page: Paragraph / Line: Item:

_____ _____ _____ _____

Proposed Substitution: _____
_____
_____
_____

Attach complete product descriptions, drawings, specifications, and any other information or data to fully describe the proposed item.

A. The proposed item meets or exceeds specification requirements?

Yes: ☐ No : ☐

B. Will any changes be required to building design in order to properly install the proposed item?

Yes: ☐ No: ☐

If yes, please explain:

_____
_____
_____

C. Supplier is responsible for all changes to the building design, including engineering and drawings costs, caused by requested approval/substitution?

Yes: ☐ No: ☐

UA Project Name:

UA Project No.:

D. List all differences between proposed substitution and specified item.

SPECIFIED ITEM	PROPOSED ITEM

E. Does substitution affect drawing dimensions?

Yes: ☐ No: ☐

If yes, please explain:

_____

F. What affect does the substitution have on other trades?

G. Proposed product is subject to all requirements of specifications, including warranties?

Yes: ☐ No: ☐

H. Will proposed substitution affect progress schedule?

Yes: ☐ No: ☐

If yes, please explain:

I. Will maintenance and service parts be locally available for proposed substitution?

Yes: ☐ No: ☐

J. Will proposed substitution require more license fees or royalties than specified product?

Yes: ☐ No: ☐

K. Will proposed product meet all requirements of reviewing agencies (health, life, safety, fire, etc.)?

Yes: ☐ No: ☐

If no, please explain:

DIVISION 1 **UA NO.**

SECTION 01601 **SUBSTITUTION REQUEST FORM**

UA Project Name:

UA Project No.:

Please quantify or explain benefits to Owner:

Submitted By:

Representative:

Company:

Address:

Phone:

Representative's Signature:

Date:

For Architect's Use Only:

Accepted: Accepted As Noted:

Rejected: Received Too Late:

By: Date:

Remarks:

_____

_____

_____

_____

_____

_____

_____

_____

END OF SECTION

Issued January 26, 2004

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting, and balancing.

D. Commissioning.

1.2 RELATED SECTIONS

A. Section 01400 – Quality Control.

B. Section 01700 – Contract Closeout.

1.3 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect/Engineer and Owner seven days to prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative or Contractors' personnel in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01300 that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of final inspection.

B. Demonstrate Project equipment instructed by a qualified manufacturers' representative who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each of equipment at scheduled time at designated location.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

G The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

1.5 TESTING, ADJUSTING, AND BALANCING

A. Owner will appoint, employ, and pay for services of an independent firm to perform testing, adjusting, and balancing.

B. The independent firm shall perform services specified in Section 15990.

C. Reports shall be submitted by the independent firm to the Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.

1.6 COMMISSIONING

A. Commissioning is primarily the responsibility of the Owner's Independent Commissioning Agent, with support for start-up, testing, and commissioning the responsibility of the Contractor. The commissioning process does not relieve the Contractor from participation in the process or diminish the role and obligations to complete all portions of work in a satisfactory and fully operational manner.

B. Refer to appropriate sections in Divisions 15 and 16 for scope of work.

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Substantial Completion.

B. Final Acceptance.

C. Final Cleaning.

D. Adjusting.

E. Project Record Documents.

F. Operation and Maintenance Data.

G. Spare Parts and Maintenance Products.

H. Warranties

I. Maintenance Service.

1.2 RELATED SECTIONS

A. Section 01500 – Construction Facilities and Temporary Controls.

B. Section 01555 – Construction Facilities.

C. Section 01560 – Temporary Controls.

D. Section 01650 – Starting of Systems.

E. Section **[_____ - Project Commissioning.]**

F. Section 01730 – Operation and Maintenance Data.

G. Section 01740 – Warranties.

1.3 SUBSTANTIAL COMPLETION (See General Conditions)

A. GENERAL: The following conditions must exist for the Work **[or any designated portion thereof]** to be considered as substantially complete in accordance with Section 31 of the General Conditions:

1. All Life Safety systems are operating and are approved by the authorities having jurisdiction.

2. All building systems (mechanical, plumbing, electrical and other special systems) are operating as specified except for minor adjustments such as final balancing of flows, final programming of controls, etc.

3. All of the Contractor's remaining work may be performed without major interruption or disruption of the Owner's operations, should Owner occupy the facility.

4. All test and balance work on the building systems has been found by the Architect to be substantially complete, based upon review of submitted reports.

5. All preliminary operating and maintenance information required by Section **[01700]** **[01730]** of the Specifications has been submitted and approved.

6. See the General Conditions for the definition of the term "Substantial Completion".

B. Preliminary Procedures:

1. Contractor shall give notice to Owner **[and Construction Manager]** of the claim of Substantial Completion of the Project or portion thereof in accordance with the General Conditions.

2. In the Application for Payment that coincides with, or first allows, the date Substantial Completion is claimed, show 100% completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in the Contract Documents. If 100% completion cannot be shown, include list of incomplete items, the value of incomplete construction, and reasons for the Work being incomplete. This list of remaining incomplete work termed an "Initial Punch List" should be prepared in close cooperation and agreement with the **[Architect]** **[Construction Manager].**

3. Advise Owner, Architect, **[and Construction Manager]** of pending insurance changeover requirements.

4. Submit specific warranties, final certifications, and similar documents.

5. Obtain and submit releases enabling Owner unrestricted use of the Work and access to services and utilities, including occupancy permits, operating certificates, and similar releases.

6. Submit test and balance reports, preliminary operating and maintenance information.

7. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.

8. Make final change-over of permanent locks, transmit keys to Owner, and advise Owner's personnel of change-over in security provisions.

9. Complete start-up and testing of systems and instructions for Owner's operating/maintenance personnel. Discontinue or change over and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.

10. Complete final cleaning requirements.

11. Touch-up and otherwise repair and restore marred exposed finishes.

C. Inspection and Certification Procedure:

1. In order to verify Substantial Completion, the **[Construction Manager]** Architect and his Engineers, as appropriate, within **[10] [_____]** days of written receipt of request for inspection, will inspect the Project, provided specified prerequisites listed above are met. If they find it substantially complete, Owner will prepare the Certificate of Substantial Completion, AIA Document G704, and advise the Contractor by means of a "Punch List" inspection report prepared by the Architect of items required for completion and acceptance.

   If Work is not substantially complete, Contractor will be advised of general reasons for this judgment or specific areas of non-compliance with the Contract Documents requiring correction or completion for the Work to be considered substantially complete.

   a. The "Substantial Completion" inspection will not be made until test and balance reports, and preliminary operating and maintenance information have been delivered to the Architect and found by him to be substantially complete.

   b. The combined total number of "Punch List" items identified by the Contractor, **[Construction Manager]** Architect, and Owner shall not be excessive in number and scope. If the volume or nature of the deficiencies identified are deemed to be excessive, the inspection will be canceled and the Contractor shall assume responsibility for payment of the costs for additional inspections. The costs for such additional inspections will be deducted from any funds due the Contractor.

2. Proceed immediately to complete all items and transmit to the **[Construction Manager and]** Architect a weekly report of the progress on or completion of each item on the "Punch List" **[and the Contractor's list.]** Any non-conforming or incomplete work brought to the Architect's attention during this period will be added to the list.

3. Should the Architect **[and Construction Manager]** determine that the work is not substantially complete, they will notify the Contractor, in writing, stating reasons. After the Contractor completes work, he shall resubmit certification and request for final inspection.

1.4 FINAL ACCEPTANCE

A. Preliminary Procedures:

1. Before requesting final inspection for certification of final acceptance and final payment, complete the following. List known exceptions in the request.

2. Submit any special warranties.

3. Submit Project Record Documents.

4. Submit final payment request with final releases and supporting documentation not previously submitted and accepted.

5. Submit certified copy of Architect's final Punch List of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by Architect.

6. Submit Contractor's Subcontracting Report to Owner's Small Business Program Coordinator.

7. Submit consent of surety to final payment, AIA G707, and Contractor's Affidavit of Payment of Debts and Claims, AIA G706.

8. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

9. Remove all temporary facilities, services, surplus materials, rubbish, and similar materials.

10. When applicable, submit final meter readings for utilities and similar data as of the date of Substantial Completion or when Owner took possession of and responsibility for corresponding elements of the work.

11. Submit certification letter and backup testing information certifying that facility is mold free at the time of final acceptance.

B. Final Inspection:

1. Contractor shall submit written certification that:

   a. Contract Documents have been reviewed.

   b. Project has been inspected for compliance with Contract Documents.

   c. Work has been completed in accordance with Contract Documents.

   d. Equipment and systems have been tested in the presence of Owner's Representative and are operational.

2. The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list times from earlier inspections, has been completed,

except items whose completion has been delayed because of circumstances acceptable to the **[Construction Manager and]** Architect. If additional inspections are required, the costs of such additional inspections will be deducted from any funds due the Contractor.

3. Upon completion of this inspection, the Architect will prepare a Certificate of Final Acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.'

4. If necessary, inspection will be repeated. The Contractor shall assume responsibility for payment of the costs for additional inspections. These costs will be deducted from any funds due the Contractor.

1.5 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean interior and exterior glass, surface exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, **[vacuum carpeted and soft surfaces.]**

C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and materials being cleaned.

D. **[Clean]** **[Replace]** filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.6 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.7 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. As-Built Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and modifications.

F. As-Built Drawings **[and Shop Drawings]:** Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension and detail.

5. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer **[Construction Manager] [Owner] [with claim for final Application for Payment.] [_____.]**

1.8 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, binders with durable covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on white bond paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, **[Construction Manager]**, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

   a. Significant design criteria.

   b. List of equipment.

   c. Parts list for each component.

   d. Operating instructions.

   e. Maintenance instructions for equipment and systems.

   f. Maintenance instructions for **[special]** finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

   a. Shop drawings and product data.

   b. Air and water balance reports.

   c. Certificates.

   d. Originals of warranties and bonds.

E. Submit 1 draft copy of completed volumes **[15] [_____]** days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect/Engineer **[and Construction Manager]** comments. Revise content of all documents sets as required prior to final submission.

F. Submit three sets of revised final volumes, within 10 days after receipt of final comments.

1.9 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to location designated by Owner; obtain receipt prior to final payment.

1.10 WARRANTIES

A. The Contractor shall provide the Owner all product Warranties.

B. The Contractor shall deliver to the Architect upon completion of all work under the Contract, his written warranty made out to the Owner on the Contractor's Letterhead, in the form included as specification Section 01741. This warranty shall be made to cover the minimum period specified in **[Section 24] [Article 2.7]** of the General Conditions of the Construction Agreement.

C. Warranties from Contractor shall be supported by individual warranties from each trade or subcontractor and manufacturer or supplier covering work. Where specific sections of the specifications call for longer warranties, those specification sections shall be referenced in the second paragraph of the warranty.

D. Provide notarized copies.

E. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

F. Provide Table of Contents and assemble in binder with durable cover.

G. Submit prior to final Application for Payment.

H. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within **[10] [____]** days after acceptance, listing date of acceptance as start of warranty period.

1.11 MAINTENANCE SERVICE

A. Furnish service and maintenance of components where indicated in specification sections for **[_____] year from date of Substantial Completion.] [during the warranty period.] [_____.]**

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Format and content of manuals.

B. Instruction of Owner's personnel.

C. Submittals.

1.2 RELATED SECTIONS

A. Section 01300 – Submittals.

B. Section 01400 – Quality Control: Manufacturer's instructions.

C. Section 01600 – Material and Equipment.

D. Section 01700 – Contract Closeout.

E. Section 01740 – Warranties.

F. Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.4 FORMAT

A. Prepare data in the form of an instructional manual.

B. Binders: Commercial quality, 8 ½ x 11 ring binders with durable covers. When multiple binders are used, correlate data into related consistent groupings.

C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

D. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

E. Text: Manufacturer' printed data, or typewritten data on bond paper.

F. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

G. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, **[Construction Manager]**, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by **[specification section] [_____].** For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following"

a. Significant design criteria.
b. List of equipment.
c. Parts list for each component.
d. Operating instructions.
e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for **[special]** finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

a. Shop drawings and product data.
b. Air and water balance reports.
c. Certificates.
d. Photocopies of original warranties.

1.5 CONTENTS, EACH VOLUME

A. Table of Contents: Provide title of Project; names, address, and telephone numbers of Architect/Engineer, **[Construction Manager]** Subconsultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. **[Do not use Project Record Documents as maintenance documents.]**

E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions as specified.

F. Warranties: Originals as specified in Section 01740.

1.6 MANUAL FOR MATERIALS AND FINISHES

A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.

B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional Requirements: As specified in individual Product specification sections.

E. Provide a listing of Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.7 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications.

C. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and re-assembly. Instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual Product specification sections.

P. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.8 INSTRUCTIONS OF OWNER PERSONNEL

A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within **[six] [_____]** months.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.9 SUBMITTALS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit 1 copy of completed volumes **15** days prior to final inspection. This copy will be reviewed and returned **[after final inspection]**, with Architect/Engineer **[Construction Manager]** comments. Revise content of all document sets as required prior to final submission.

D. Submit these sets of revised final volumes in final form within **10** days after final review comments are received.

2 PRODUCTS

Not Used.

3 EXECUTION

Not Used.

END OF SECTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Form of Submittals.

B. Preparation and Submittal of Warranties.

C. Time of Submittals.

1.2 RELATED SECTIONS

A. **[Documents 00700 – General Conditions -- [00700CM – General Conditions -] [Construction Manager @ Risk form (CM@Risk) – General Conditions]**

B. Section 01700 – Contract Closeout.

C. Section 01730 – Operation and Maintenance Data.

D. Individual Specifications Sections: Warranties required for specific Products or Work.

1.3 FORM OF SUBMITTALS

A. The Contractor shall provide the Owner all product Warranties and Guarantees.

B. The Contactor shall deliver to the Architect upon completion of all work under the Contract, his written guarantee made out to the Owner on the Contractor's Letterhead, in the form included at the end of this section. This guarantee shall be made to cover the minimum period specified in **[Section 24] [Article 2]** of the General Conditions of the Construction Agreement.

C. Guarantees from Contractor shall be supported by individual guarantees from each trade or subcontractor and manufacturer or supplier covering work. Where specific sections of the specifications call for longer guarantees, those specification sections shall be referenced in the second paragraph of the guarantee.

D. Bind in commercial quality 8 ½ x 11 inch 3-ring binders with durable covers.

E. Cover: Identify each binder with typed or printed title WARRANTIES AND GUARANTEES with title of Project; name, address and telephone number of Contractor and equipment supplier and name of responsible company principal.

F. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.

G. Separate each warranty or guarantee with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractors, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.4 PREPARATION OF SUBMITTALS

A. Obtain warranties and guarantees executed in triplicate by responsible Subcontractors, suppliers, and manufacturers, within time frame specified in Section 01700. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittal when required.

D. Retain warranties and guarantees until time specified for submittal.

1.5 TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after final acceptance.

B. Make other submittals within time frame specified in Section 01700.

C. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within days after acceptance, listing the date of acceptance as the beginning of the warranty period.

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

Not Used.

END OF SECTION

WRITTEN WARRANTY FOR_____
(Entire Work, in the case of the Contractor, or Specific Specification SECTION (S) in the case of a Subcontractor or Supplier)

Name and address of Owner Date: _____
Re: (Title of Project)

Gentlemen:

The undersigned firm(s), herby warrant(s) that the (description of work covered) _____which it/they have provided for the (Owner's project title and number) _____has been completed in accordance with the requirements of the Contract Documents.

The undersigned firm(s) hereby warrantee the Owner that it/they will be responsible for defective materials, equipment, and workmanship, and further agree to repair or replace any or all of the referenced Work, as may be required to make it conform to the Contract Documents, together with any other adjacent work displaced or damaged by so doing, which may prove to be defective in its workmanship or materials in accordance with the provisions of **[Section(s)_____and_____of the Specifications and] [Section 24] [Article 2.7]** of the General Conditions of the Construction Agreement, ordinary wear and tear and unusual abuse or neglect excepted.

The undersigned firm(s) also agree(s) to repair any and all damages resulting from such defective work.

In the event of failure by the undersigned firm(s) to comply with the above-mentioned conditions within a reasonable time, not to exceed 14 calendar days, after being notified in writing by the Owner, the firm(s) collectively and separately, do hereby authorize the Owner to have said defective Work and damages repaired or replaced and made good at its/their expense, and will honor and pay the costs and charges therefore upon demand.

SIGNED_____

(Contractor's name, address, license number, and date of signing)

Attest: _____

or

SIGNED_____

(Subcontractor's name, address, license number, and date of signing)

Attest: _____

NOTE: All Signatures must be Notarized

Section 01810 GENERAL COMMISSIONING REQUIREMENTS

GENERAL

1.1 REFERENCE

A. The Work under this Section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 1 General Requirements.

1.2 DESCRIPTION

A. This Section will delineate the requirements of the Contractor and Installation Contractors in the execution of the commissioning process.

B. Commissioning (Cx) is the process of ensuring that all building systems are installed and perform interactively according to the design intent, meet the Owner's operational needs, the installation is adequately documented and the building system Operations and Maintenance staff are adequately trained. It establishes testing and communication protocols to advance the building systems from installation to full dynamic operation and optimization.

C. The Contractor verifies installation, provides scheduling and coordination of commissioning activities with sub-contractors, performs training, starts up equipment, conducts functional performance testing, corrects deficiencies, performs retests, and provides documentation of the effort. Contractor is expected to verify the functional readiness of systems to be tested prior to scheduling and demonstrating the functional operational performance in the presence of the Commissioning Agent (CA).

D. The CA works with the Contractors and the A/E to direct and oversee the Cx process and witness functional performance testing.

E. A Commissioning Plan will be developed by the CA outlining the Commissioning Process as detailed in the project specifications. The plan also identifies the roles and responsibilities of the other project team members. The plan will be updated regularly and redistributed to the commissioning team for review and comment. The intent of this plan is to evoke questions, expose issues, and resolve them with input from the entire commissioning team early in construction.

1.3 RELATED SECTIONS

A. Division 7 – Thermal and Moisture Protection

B. Division 15 – Mechanical Systems

C. Division 16 – Electrical Systems

1.4 SYSTEMS IN COMMISSIONING PROGRAM

A. Building Envelope including roof system

B. HVAC Mechanical Equipment including air handling units, fan coil units, and zone temperature control

C. Chilled Water System

D. Steam and Condensate System

E. General and Laboratory Exhaust Systems

F. Building Automation System

G. Potable Water and Waste Systems

H. High Purity Water System

I. Laboratory Process Systems including vacuum, compressed air, industrial water and process cooling water

J. Electrical Distribution Primary Switchgear and Unit Substations

K. Emergency Power and Lighting Systems including emergency generator

L. Automatic Fire Suppression System including fire pump

1.5 COORDINATION

A. Commissioning Team:
   1. Members of the Commissioning Team (CT) will consist of:
      a. Commissioning Agent (CA)
      b. Owner's Representative(s) (OR)
      c. Contractor
      d. Design Professional (A/E)
      e. Mechanical Contractor (MC)
      f. Electrical Contractor (EC)
      g. Test and Balance Contractor (TAB)
      h. Controls Contractor (CC)
      i. Equipment Suppliers and Vendors

B. A majority of the Contractor's effort supporting the Commissioning Program are activities that are typically required for a project that does not include formal commissioning. There are several specific tasks included in the Commissioning Program that do require an increased level of effort:

1. Installation verification and start-up documentation. The Contractor is responsible for installation in accordance with applicable code, plans, specifications and industry standards and practices. The documentation of installation and start-up is part of the Project Quality Assurance Program
2. Functional Performance Testing. Provided the installation verification and start-up documentation was properly completed, the involvement of installation contractors during the functional performance testing is minimal except as noted herein. The primary contractors involved in the functional performance testing is the Controls Contractor and the Test, Adjust and Balance Contractor. The anticipated level of involvement for these two contractors are defined in Division 15. The involvement of the Plumbing Contractor for systems included in the Commissioning Program will also be defined in Division 15. The involvement of the Electrical Contractor for systems included in the Commissioning Program will be defined in Division 16.
3. Training. As specified in the technical sections of this specification, Contractors are responsible for providing training to the building operators. The CA will work with the Owner's Facility Management Department to define the areas of focus for the training and then it will be the Contractors responsibility to develop the training lesson plans and execute the training.
4. Participate in regularly scheduled commissioning meetings. In order to coordinate the commissioning activities, the CA will conduct regular commissioning meetings. These would typically follow a project progress meeting.

C. The CA will witness start-up and functional testing activities as specified in this Section. The OR may elect to also witness activities on a case-by-case basis.

D. Contractor will provide written timely notice to OR of any changes in date, time, location or anticipated duration of start-up and test activities. For the purpose of this paragraph written notice shall be received by Owner's Representative a minimum of 72 hours in advance to be considered timely.

E. Contractor shall reimburse Owner for actual costs incurred by the Owner as the result of failure to provide timely notice, per preceding paragraph, of changes in date, time, location, or anticipated duration of start-up and test activities.

F. Management:
   1. The Owner will provide the services of the CA. The CA directs and coordinates commissioning activities and reports to OR. All members of the Commissioning Team work together to fulfill contracted responsibilities and objectives of the Contract Documents.

G. Commissioning Meetings:
   1. Within 90 days following the start of construction and concurrent with pre-installation meetings with the contractors, the CA will plan, schedule, and conduct a commissioning kickoff meeting. Responsibilities of the commissioning team will be clarified at this meeting. The CA will distribute meeting minutes to all parties.

2. Commissioning meetings will be held on a monthly basis as a minimum. The frequency of these meetings will increase as construction and acceptance activities require. Contractors are to designate a primary commissioning representative who will be responsible for attending the meetings, as required. Commissioning meetings will typically be scheduled following the weekly project meetings. Prior to the meeting, the CA will notify which commissioning representatives are required to participate in the meeting.

H. Scheduling:

1. In cooperation with the CA, the Contractor will integrate commissioning activities into the master construction schedule. This integration of commissioning activities, in general terms, will be developed early in the project and then refined as the project progresses.
2. Scheduling issues will be resolved at monthly commissioning meetings.
3. The CA will provide an initial schedule of primary commissioning events at the commissioning kick-off meeting. As construction progresses, more specific activities and milestones will be incorporated into the master construction schedule.

1.6 DEFINITIONS

A. Acceptance Phase: Phase of construction after startup and initial checkout when Functional Performance Testing, O&M documentation review, and facility and user training occurs.

B. Basis of Design: Documentation of design criteria and decisions made to meet design intent. Describes systems, components, conditions, and methods chosen to define the intent of the Owner.

C. Commissioning Agent (CA): The consultant who directs and coordinates day-to-day commissioning activities. The CA reports directly to the Owner.

D. Commissioning Plan: Overall plan that provides structure means of scheduling and coordination for the commissioning process

E. Commissioning Team: Owner, Commissioning Agent, Contractor and Division Contractors.

F. Construction Manager (CM): Owner's representative for management and coordination of construction activities.

G. Deferred Functional Test: Functional test performed after substantial completion due to conditions that preclude test from being performed in normal sequential order of project delivery.

H. Deficiency: Condition of a component, piece of equipment, or system that is not in compliance with Contract Documents (That is, does not perform properly or does not comply with design intent.)

I. Design Professional (A/E) : The design team, generally the Architect, HVAC Mechanical Engineer and Electrical Engineer.

J. Factory Testing: Testing of equipment at factory by the Manufacturer.

K. Functional Performance Test (FPT): Test of dynamic function and operation of equipment and systems. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. Systems are run through all specified sequences of operation. Components are verified to be responding in accordance with contract documents. CA develops Functional Performance Test procedures in sequential written form, coordinates, oversees and documents actual testing, which is usually performed by installing contractor or vendor. Functional Performance Tests are executed after installation checklists and startups are complete. FPT's are conducted only after the completed IV documentation has been submitted to the CA.

L. Functional Performance Test Procedures: Protocols and instructions described in the Commissioning Plan and specifications that describe process required to document the demonstration of functional operational performance.

M. Indirect Indicator: Indicator of a response or condition by a secondary intangible method, such as a reading from a control system graphical interface reporting some device to be in some state.

N. Installation Contractor: Contractor responsible for coordinating the installation and start-up of equipment, components and systems. May include sub-contractors from other trades to complete the installation.

O. Installation Verification and Start-Up Checklist (IV): List of items to inspect and elementary component tests that verify proper installation of equipment. The checklists are primarily static inspections and procedures to prepare equipment or system for initial operation (e.g., belt tension, oil levels, labels affixed, gages in place, sensors calibrated, etc.) The IV document that will eventually be submitted to the Owner, the A/E and the CA will be a coordinated document representing the efforts of all subcontractors and the Contractor. Since this documentation is part of the Project Quality Assurance Program, the Contractor shall be responsible for compiling this information.

P. Monitoring: Recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or trending capabilities of control systems.

Q. Non-Compliance: See Deficiency.

R. Non-Conformance: See Deficiency.

S. Over-written Value: "Writing" over a sensor value in control system to verify proper response of a system (e.g., changing outside air temperature value from 50°F to 75°F to verify economizer operation). See also "Simulated Signal".

T. Over-ridden Value: "Writing over" of a set point or constant operating parameter during functional testing to instigate a mode or reaction in a system to prove operation.

U. Phased Commissioning: Commissioning completed in phases due to size of structure, construction phasing, availability of systems, etc.

V. Seasonal Performance Test: Functional Performance Test executed at the time of year such that system(s) experience conditions closer to design conditions.

W. Simulated Condition: Condition created for testing component or system (e.g., applying heat to space temperature sensor to monitor response of VAV box).

X. Simulated Signal: Disconnecting sensor and using signal generator to send amperage, resistance, or pressure to transducer and/or DDC system to simulate sensor value.

Y. Specifications: Construction specifications of Contract Documents.

Z. Startup: Initial start or activation of dynamic equipment, including executing Installation Verification and Start-up Checklists.

AA. Sub-contractor: Contractors under contract to installation contractors who provide and/or install building components and systems.

BB. Trending: Monitoring controls points of systems as a function of time using building control system.

CC. Vendor: Supplier of equipment.

1.7 SUBMITTALS

A. General: Submit the following in accordance with Conditions of the Contract and Division 01 Specification Sections.

B. Start-Up Plan: For each piece of equipment or system submit a start-up plan to the OR for review by the A/E and the CA. Obtain approval of the plan prior to beginning activities. The plan should include, but not be limited to, the following:

1. Start-up schedule
2. Names of firms/individuals required to participate

C. Start-up procedures: As part of the project quality assurance plan, the Contractor shall utilize installation verification and start-up checklists and data forms, developed by the CA, to document the installation and start-up of the various system components and equipment Contractors shall review these documents and submit manufacturer, start-up documentation, as appropriate, for inclusion in the forms required for installation verification and start-up.

D. Preliminary Systems Operations and Maintenance (O&M) Data: Once the contractor's equipment and system component submittals are reviewed and approved by the A/E, but no later than six months prior to substantial completion, the contractor shall submit preliminary Systems O&M data to the CM, in the format specified in Section 01815. The installation contractors shall be required to provide the O&M documentation to the Contractor in sufficient time for the Contractor to compile and submit the manuals to the CA for review and comment. The documentation provided to the CA shall be used to develop the training requirements for the equipment.

E. The CA will review submittals for criteria as related to commissioning. Review is primarily intended to aid in development of functional testing procedures and secondarily to verify compliance with equipment specifications. The CA notifies Contractor, OR, and A/E of missing items or where issues may exist.

1.8 SEQUENCING AND SCHEDULING

A. In order to expedite the close out of the facility, various systems can be in various stages of the commissioning process. CA and Contractor shall cooperate to schedule the Cx tasks to minimize the duration of the Cx activities.

B. Cx Scheduling: Contractor shall incorporate the commissioning process into the project schedule. Start-Up, TAB, and Functional Performance Testing shall be itemized as applicable for each system/area. CA will dictate duration for the tasks.

C. The satisfactory completion of the functional performance testing of the building systems in the Commissioning Program is a requirement for Substantial Completion of the work. For planning purposes, it is anticipated that the functional performance testing period will occur during the last six weeks prior to Substantial Completion. All building systems included in the commissioning program shall be ready for functional performance testing including the completion of all prerequisite requirements for testing as stated in the specifications.

D. Approximately six months prior to the start-up activities, a working session will be held to review construction and commissioning milestones with the contractors to ensure that all critical path items are identified and monitored.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. Division contractors will provide all specialized tools, test equipment, and instruments required to execute startup, checkout, and functional performance testing of equipment under their contract.

B. Test equipment will be of sufficient quality and accuracy to test and/or measure system performance according to specified tolerances. Test equipment is to have calibrated within the previous 12 months. Calibration will be NIST traceable. Equipment will be re-calibrated according to manufacturer's recommended intervals and when dropped or damaged. Calibration tags will be affixed or certificates be readily available. The accuracy of the test equipment used to verify calibration shall be equal or greater than the specified sensor/device accuracy.

PART 3 - EXECUTION

3.1 COMMISSIONING PROCEDURE

A. Sequence of testing: Commissioning shall proceed from lower to higher levels of complexity. For each discrete subsystem or system, testing at the lower level shall be completed prior to starting the next higher level of tests. In general, the order of testing, from lowest to highest is as follows:

1. Static tests (e.g. duct leakage tests, meggar tests). Typically, the Owner's Representative, CA and Contractor will witness the initial static tests to establish the standard for testing and the acceptance criteria. The sub-contractors shall then be responsible for conducting future tests in accordance with this standard. Periodically, the Owner's Representative and/or the CA may observe future tests.
2. Component installation verification (i.e. motors, actuators and sensors) and start-up
3. System Balancing
4. System functional performance tests
5. Intersystem functional performance tests

B. Retesting: Repeat, at no additional cost to the Owner, the complete functional test procedure for each test in which acceptable results are not achieved and the failed test is due to the contractor's action or non-conformance to contract requirements. Repeat tests until acceptable results are achieved. Compensate the Owner for direct costs incurred as the result of tests repeated to achieve acceptable results, if the requirement for retesting is a direct result of the contractor's action or non-conformance to contract requirements.

C. Correction of deficiencies
1. Correct functional performance test deficiencies promptly and schedule retest.
2. Corrections during functional performance tests are generally prohibited to avoid consuming the time of personnel waiting for the test, but not involved in making the correction. Exceptions will be allowed if the cause of the failure is obvious and corrective action can be completed in a timeframe acceptable to the CA. If corrections are made under this exception, the failure shall be noted on the functional performance test data form. A new functional performance test data form, marked "retest," shall be initiated after the correction has been made. The entire functional performance test procedure shall be repeated.

3.2 PARTICIPATION IN COMMISSIONING

A. Provide skilled technicians, and manufacturer representatives as appropriate, to start up systems.
1. These same sub-contractor technicians shall be made available to assist the CA in completing the commissioning program as it relates to each system and their technical specialty.
2. Work schedules, time required for testing, etc., will be coordinated by the Contractor to ensure that all work is completed and ready for functional performance testing six weeks prior to substantial completion.
3. Contractor will ensure that qualified technician(s) are available and present during the agreed-upon schedules and for sufficient duration to complete the necessary tests, adjustment, and problem resolutions.
4. System problems and discrepancies may require additional technician time which shall be made available for the subsequent commissioning periods until required system performance is obtained.

3.3 The CA reserves the right to judge the appropriateness and qualifications of the technicians relative to each item of equipment or system. Such qualifications include expert knowledge relative to the specific equipment involved, adequate documentation and tools to service/commission the equipment, and an attitude/willingness to work with the CA to get the job done.

3.4 INSTALLATION VERIFICATION

A. Before system start-up begins, conduct a final installation verification audit. The Contractor shall be responsible for completion of all work, including change orders and punch list items, to the satisfaction of the Owner's Representative.

B. If any work is found to be incomplete, inaccessible, incorrect, or non-functional, make note of deficiencies, and correct deficiencies before system start-up work proceeds.

3.5 SYSTEM START-UP

A. Develop a start-up plan. The start-up plan shall be developed by the Contractor in coordination with the sub-contractors, taking into consideration the construction and commissioning milestones that have to be met in order to reach substantial completion. Commence with system start-up after approval has been given to the start-up plan and the pre-start-up inspection has been completed. The Contractor shall document the start-up activities on the approved start-up forms and list all system and equipment deficiencies noted during start-up. The Contractor shall take corrective action on all system deficiencies noted and demonstrate to the CA, if requested, suitable system operation. Notify CA and A/E of start-up activities' schedule at least 72 hours in advance. CA may physically witness selected start-up procedures. Should the CA witness a start-up procedure, the Contractor shall obtain signature of the CA indicating successful start-up.

3.6 START-UP DEFICIENCY LISTS

A. Prepare Start-up Deficiency List forms to report deficiencies discovered in conjunction with system start-up. Start-up deficiency forms shall indicate the system being started-up, the location and identification of the deficient equipment/material, date of observation; initials of the observer; observed deficiency; date of correction; initials of person making the correction; and corrective action taken. The Contractor will be responsible for incorporating the start-up deficiencies identified by the responsible sub-contractor into a Master Start-up Deficiency Log that will be tracked utilizing the ProLog system.

B. Issue weekly Start-up Deficiency Report updates to the Contractor indicating corrective action and follow-up activities. The Contractor shall advise the CA when all start-up deficiency list items have been corrected on a specific piece of equipment or system component.

3.7 FUNCTIONAL PERFORMANCE TESTING

A. Participation: CA will coordinate and witness functional performance tests after successful start up, documentation of systems and equipment installation, and testing and balancing is complete. The CA will coordinate with the Contractor to ensure that commissioning milestones do not impact construction milestones and to ensure that the commissioning activities are completed prior to Substantial Completion. The Contractor will generally execute test by manipulation of systems or

equipment, provision of supporting equipment or materials (lifts, ladders, specialty test equipment, etc.), and on spot remediation of minor identified deficiencies.

B. Detailed Test Forms: CA will prepare detailed functional performance test (FPT) protocols for functionally testing systems. These will be developed during the construction phase and completed during the acceptance phase. The protocols will be reviewed with the involved parties (e.g. installation contractor, controls contractor, test and balance contractor, etc.) at least four weeks prior to the scheduled testing to ensure the involved parties clearly understand the procedures, level of involvement and scope of testing prior to the actual system operational demonstration.

C. Completeness: All systems must be completed and ready for FPT.

D. Test Documentation: CA will witness functional testing of systems. CA will record test results on the forms developed for the testing. CA will Pass or Fail the testing and record the date and time of the test. Deficiencies shall clearly be indicated when the test is failed. When all related testing is completed successfully, CA shall recommend acceptance of the system or component.

E. Deficiencies and Re-testing: When deficiencies are identified during testing, depending on their extent or magnitude, they can be corrected during the test and the testing can continue to successful completion without significant delay. More significant deficiencies will require failure of the test and re-testing. Deficiencies of this magnitude will result in an action item on the Action List. The Contractor will then subsequently track the resolution of the deficiency via the Action List. All tests shall be repeated until successful completion.

F. Sampling: Some types of identical equipment (such as terminal devices) will be tested using a sampling strategy.

G. Failure Limit on Sample Tests: An acceptable failure limit will be established for each type of equipment where sampling is used. This limit indicates the maximum percentage of tested devices that may have any test that fails before an entirely new sample must be tested. This is based on the concept that if many failures occur, it is a result of inadequate start-up. When the maximum number of failures is reached, testing on that sample will be terminated and re-testing will be scheduled.

1. Where sample tests involve multiple systems, the maximum failure limit will apply per system.
2. All work necessitated by sample failures shall be at no cost to the Owner
3. For laboratory spaces, if a sampling strategy is conducted, the acceptance criteria shall be a zero failure rate. For support spaces, offices and educational classrooms (other than laboratories), if a sampling strategy is conducted, the acceptance criteria shall be a maximum of ten percent failure rate for total parameters that are sampled.

H. Opposite Season Testing: Testing procedures shall be repeated and/or conducted as necessary during appropriate seasons. "Opposite season" testing is primarily for environmental systems and will be required where scheduling prohibits thorough testing in all modes of operation. Air Handler and Central heating system testing for heating related modes of operation and control loops shall

be tested during outside air temperatures below 40°F. The CA will schedule the opposite season testing during the warranty period to coincide with a design day condition when possible.

I. Acceptance Criteria: Acceptance criteria for construction installation tests (e.g. duct leakage tests, pipe pressure tests, pipe cleaning, electrical acceptance testing, etc.) is very important. The acceptance criteria where applicable will be specified in the individual sections. Documentation of the testing is to be provided to the CA prior to FPT.

J. Additional information regarding functional performance testing is found in Division 7, 15 and 16.

3.8 TRAINING

A. Prepare and submit for approval a training plan. Training plan shall include for each training session the following:
   1. Dates, start and finish times, and locations
   2. Outline of the information to be presented
   3. Names and qualifications of the presenters
   4. List of texts and other materials required to support training

B. Contractors, Subcontractor, Vendors, etc. shall prepare and conduct training sessions on the installed systems and equipment they are responsible for. Generally the CA and A/E shall conduct systems overview, design intent, and design criteria training. The Contractors and Vendors shall perform all other training as previously described. The training agenda, content and number of training sessions will be incorporated into a training plan prepared by the Contractor.

C. Contractor shall compile training plans of contractors, subs, and vendors and present a comprehensive training plan.

D. Training sessions should typically start and end in a classroom setting. Field demonstrations will also typically be conducted to demonstrate the hands-on aspects of the required tasks.

E. Appropriate contractor or vendor shall instruct the Owner's designated representative(s) on the safe and proper operation, maintenance, diagnosis, and repair of each piece of specific equipment. Submitted operation and maintenance information shall be used during training. Sessions shall include as a minimum:
   1. Conceptual overview of how the equipment works.
   2. Names, addresses, numbers etc. of sources for information, tools, spare parts, etc. for the equipment.
   3. Details of the warranty or guarantee.
   4. Intended sequences of operation in all modes of operation.
   5. Sources of utility support.
   6. Routine operator tasks involving monitoring and operation covering all modes of operation and mode switching as applicable.
   7. Relevant health and safety practices/concerns.

8. Common problems and their diagnosis and repair.
9. Proper maintenance schedules, tasks and procedures with demonstrations.
10. Emergency response, documentation and recovery procedures.

F. Minimum Training
   1. A three tiered training approach will be employed as follows:
      a. Tier 1 System Overview (by A/E) – To describe overall system concepts and design intent.
      b. Tier 2 Component Training (by installing contractor) – To describe detailed component.
      c. Tier 3 Specific Equipment Training (by installing contractor and manufacturer) – To describe detailed specifics of individual pieces of equipment (such as VFD's).
      d. Specific training requirements are found in the appropriate Division 15 and 16 sections.

G. Training is to be expense of the contractor and/or the manufacturer.

H. In addition to the verbal instructions outlined above, the Contractor and the manufacturer's representatives and subcontractors shall furnish written basic instructions indicating the proper operation of each system and associated equipment. Each manufacturer shall also submit maintenance guidelines, in a format defined by the Owner and the Commissioning Agent, on the equipment including instructions on operation, lubrication, recommended spare parts and instruction on preventive, routine and corrective maintenance and equipment troubleshooting.

I. The written instructions and manufacturer's equipment maintenance guidelines that will be used as handouts for the training session shall be bound and ten (10) copies of the training documentation provided for the training. In addition, three(3) copies of the Systems Operations and Maintenance Manuals will be available during the training session.

J. Training shall include both classroom and on-site hands-on system instruction. Training in the classroom setting will utilize the operations and maintenance manuals and appropriate schematics, handouts, and audio/visual training aids.

K. The Owner has the right to videotape training sessions for use in staff orientation training in the future.

3.9 TEMPORARY CONDITIONS AND PHASED CONSTRUCTION

A. As the construction progresses it may be necessary to utilize building systems for temporary environmental control within the building. Should systems be used for temporary environmental control, this activity shall be sequenced into the system delivery process and involve temporary start-up and functional operations testing. Temporary conditions will not be fully functionally tested to the extent that a duplication of effort must occur for final delivery to the Owner, once the system is fully operational and balanced. Temporary conditions must, at a minimum, meet the intent of the documentation regarding functionality, fluid flow rates and space pressurization. The sub-contractor shall utilize the installation verification and start-up forms for documenting the readiness of the system to be temporarily operated. The contractor will be responsible to verify that all temporary conditions meet the requirements of the design documents.

B. Should the temporary operation of the system include a Sequence of Operations that does not conform fully to the contract requirements, this temporary Sequence of Operations shall be submitted for review and approval prior to energizing and operating the system in the temporary mode.

C. A formal verification process for temporary systems will be at the discretion of the Owner and the A/E in the event the need becomes apparent. A formal process is defined as the responsible contractor demonstrating comprehensive functionality to a representative of the Owner, CA or A/E. The Owner will not bear additional cost for this demonstration and the demonstration will occur at the request of the Owner or A/E.

D. The above applies to systems that serve areas of phased construction. Testing will occur piecewise as determined prudent by the project team for conditions of a system considered to be permanent. The intent is to not repeat the formal functional testing process on a system except as deemed prudent for effective delivery by the Owner and A/E.

E. These stipulations do not apply to the TAB process. The systems and spaces will meet the intent and requirements of the design documents for each subsequent phase or temporary condition as defined in the design documents.

3.10 RESPONSIBILITIES

A. Responsibilities of contractors are provided as follows (see the project Commissioning Plan for a comprehensive list of responsibilities of all project parties):

1. Contractor:
    a. Include requirements for commissioning in each purchase order or subcontract written.
    b. Attend commissioning kick-off meeting and other commissioning team meetings.
    c. Perform required review of Contractor submittals.
    d. Submit copy of approved submittals with startup, operating and maintenance criteria to CA.
    e. Facilitate coordination of commissioning activities as directed by CA.
    f. Incorporate commissioning activities including functional performance testing into master construction schedule. Contractor shall be responsible for maintaining schedule document such that it is an accurate representation of construction progress through the completion of functional performance testing and resolution of all punch list issues.
    g. Incorporate milestone durations into construction schedule to review system installation progress with appropriate contractor. (Progress is documented to PC and reflected in project schedule.)
    h. Incorporate durations into construction schedule per each system completion to administer Functional Performance Testing.
    i. Review Commissioning Plan and Functional Performance Test procedures developed by CA.
    j. Incorporate durations into construction schedule per each system to administer system training.

k. Take active role in coordinating completion and documentation of Installation Verification and Start-Up Checklist.

l. Coordinate this activity with knowledgeable staff of contractors and submit single comprehensive document to CA.

m. Submit detailed training plan to CA for approval.

n. Provide CA with required documentation from commissioning activities and submittal request.

o. Manage the submission and review of Installation Verification and Start-Up Checklists as outlined in this specification.

p. Forward completed Installation Verification and Start-Up Checklist to CA at least 5 workdays prior to scheduled FPT.

q. Schedule, coordinate and assist CA in seasonal or deferred testing and deficiency corrections required by specifications.

r. Maintain and keep current all information sharing (e.g. deficiency lists, field observation punchlists, etc.) and project scheduling and documentation in the ProLog Construction Manager software.

2. Installation Contractors and Sub-Contractors:

a. Attend commissioning kick-off meeting and other commissioning team meetings scheduled by CA. Assign a primary commissioning representative who will be responsible for participating in commissioning meetings and other commissioning related activities as appropriate.

b. Assist Contractor and CA with developing a comprehensive commissioning schedule during regularly scheduled commissioning meetings.

c. Complete commissioning activities as scheduled in master construction schedule.

d. Provide certified and calibrated instrumentation required to take measurements of system and equipment performance during Functional Performance Testing.

e. Ensure installation work is complete, is in compliance with Contract Documents, and ready for Functional Performance Testing.

f. Execute inspections, tests, and Functional Performance Tests as described in contract documents and Commissioning Plan. Operate systems and equipment to demonstrate proper sequences of operation.

g. Complete Installation Verification and Start-Up Checklist in cooperation with Contractor and submit with supporting documentation.

h. Review Commissioning Plan and Functional Performance Test procedures.

i. Provide required training for Owner personnel as detailed in Part 3.7 of this Section and as specified in other technical specification sections.

j. Provide documentation according to contract documents.

k. Execute seasonal or deferred Functional Performance Testing.

3. Controls Contractor:
   a. Completely install and thoroughly inspect, startup, test, adjust, calibrate, and document systems and equipment under Building Automation/Controls Contract
   b. Assist CA during Functional Performance Testing. Assistance will generally include the following:
      1) Attend Cx progress and coordination meetings
      2) Prepare and submit required draft forms and systems information.
      3) Provide trend logs of system operation at discretion of CA.
      4) Demonstrate system operation to the CA.
      5) Provide instrumentation necessary for verification and Functional Performance Testing.
      6) Manipulate control systems to facilitate verification and Functional Performance Testing.
      7) Train Owner's Representatives in system operation and control equipment use, operation, maintenance, and repair as detailed in Part 3.7 of this Section and as specified in other technical specification sections.
   c. Provide onsite programmer to correct deficiencies in control sequences during the commissioning period.
4. Test Adjust Balance (TAB) Contractor:
   a. Attend Commissioning meetings.
   b. Submit Balancing Plan and forms describing the methodology for execution of the project.
   c. Coordinate TAB work with EMCS contractor.
   d. Rebalance deficient areas identified during commissioning.

3.11 COMMISSIONING TEAM MEETINGS

A. Commissioning Team Meetings will be held periodically as determined by CA with frequency increasing as construction advances and systems become operational. Attendance of commissioning representative, as appropriate and as requested by the CA, is mandatory. CA will record minutes and attendance. CA will chair Commissioning Team Meetings.

B. Discussions held in Commissioning Team Meetings will include but not be limited to system / equipment start-up, progress, scheduling, testing, documentation, training, deficiencies, and problem resolution.

3.12 INSTALLATION VERIFICATION (IV) AND START-UP CHECKLISTS

A. Completion of IV checklists and startup procedures are directed by the Contractor in accordance with the Project Quality Assurance Program and executed by Sub-contractor. When checking off IV checklists, signatures are required by individuals of subcontractors or manufacturer's representatives with specific knowledge of completion of work.

B. The IV checklists will be amended by the contractor to include start-up and static test documentation required by the manufacturer for a piece of equipment.

C. The division contractor will maintain a "living" copy of an IV checklist for each piece of equipment. The master copy of the IV checklist will be attached to the specific piece of equipment to allow all trades to "sign off" on tasks for which they are responsible. The division contractor shall notify the other trades when the equipment/component is ready for sign off. These forms will be reviewed by the Owner's Representative, A/E and CA, as appropriate, during scheduled site visits.

D. At appropriate milestones, the Contractor will review the IV of each division contractor and record progress to the project IV checklist that will eventually be submitted to the Owner and CA.

E. The IV review will be completed by field survey of each piece of equipment by the Contractor representative and the installing contractor. Contractor will document proper installation of equipment to IV checklist in the field with installing division contractor.

F. The installing contractor will provide the individual with specific knowledge of the installation of respective equipment for this review.

G. The Owner, A/E and Cx Team receive completed IV Checklist. CA performs random verification of checklist items and makes recommendation to Owner to proceed with FPT.

H. CA reserves the right to witness any startup and preliminary equipment testing.

I. Sub-contractor will execute startup and provide CA with signed and dated copy of completed start-up and IV checklists. Only individuals having direct knowledge a task was actually performed will initial or check respective item.

J. Sub-contractor will clearly list outstanding items of initial start-up and installation items not completed successfully on IV Checklists.

K. CA reviews report to determine if outstanding items prevent scheduling of Functional Performance Testing.

L. Sub-Contractor will re-submit an updated IV Checklist with date of completion noted for completed items.

3.13 FUNCTIONAL PERFORMANCE TESTING

A. Objectives and Scope:

1. The objective of Functional Performance Testing is to demonstrate each system is operating according to documented Basis of Design intent and Contract Documents. Functional Performance Testing facilitates bringing systems from a state of substantial completion to full dynamic operation. Additionally, during Functional Performance Testing, areas of deficient

performance are identified and corrected the improving operation and functionality of systems.

2. Each system shall be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load, etc.) where there is a specified system response. Verifying each sequence in the specified sequence of operation is required including responses to conditions such as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc.
3. The contractor that is responsible for the dynamic operation of a system will demonstrate comprehensive functionality of that system. All contractors that have contributed to the installation of the same system will not be required to directly participate in the functional testing activity but will be required to be immediately available for reconciliation of issues that fall within their scope and responsibility during testing.

B. Development of Test Procedures:

1. The purpose of a test is to verify and document compliance with specified criteria and to meet the design intent of the project. The contents of a functional test will not be the limiting factor for acceptance of a system. The Cx team or source vendor will develop specific test procedures and forms to verify and document proper operation of each system. The contractor responsible for associated system or component will provide assistance to CA in finalizing test procedures (answering questions about equipment, operation, sequences, etc.).
2. Test forms for many systems are included in the bid documents and will be used as a basis for proving that systems meet the project requirements as defined in the design documents and the project intent documents. Other systems may require the vendor to provide test documentation at the time of product submittals for review by the A/E. See specifications for specific requirements for each system. The vendor is encouraged to utilize the test format provided at the project website for ease of review and subsequent approval by the A/E.
3. Test procedure forms will include, but not be limited to, the following information:
   a. Project name
   b. Date
   c. System name
   d. Equipment tags that make up systems
   e. Participating parties
   f. Required pre-test field measurements
   g. Instructions for setting up test
   h. Specific step-by-step procedures to execute test, in a clear, sequential, and repeatable format
   i. Acceptance criteria of proper performance with a Yes / No check box to allow for clearly marking whether or not proper performance of each part of test was achieved
   j. Section for comments
   k. Signature and date block for participants
4. Coordination and Scheduling:

a. Functional and installation issues will be posted to the A/E's punch list and correction will follow protocol as described in the general conditions.

5. When the contractor completes a system prior to the completion date as shown on the project schedule, the contractor may submit PC documentation and request review and initiation of FPT. Coordination and final scheduling confirmation of Functional Performance Testing will occur during regularly scheduled commissioning meetings. All commissioning activities will be fully integrated into the construction activity schedule. This includes milestone deadlines for completion of installation of major system components and the durations for functional testing of a system.
6. CM will provide sufficient notice to CA regarding changes to the coordinated completion schedule for systems testing.
7. CA will witness and document Functional Performance Testing of systems. Designated sub-contractor or vendor responsible for dynamic operation of a system or device will demonstrate system functionality to CA.
8. Functional Performance Testing is conducted following completion of IV and Start-Up Checklists and associated start-up procedures as required by the manufacturer and design documents.

C. Test Strategy

1. The responsible contractor will test all systems comprehensively.
2. Systems that contain many repeated identical devices may be selected and demonstrated to the project team based on a sampling strategy.
   a. The sample population for any group of identical devices that will undergo functional testing will be determined by the Owner and CA.

3.14 COMPLETION OF DOCUMENTATION

A. Documentation:

1. CA will witness and document results of FPT using procedural forms developed for that purpose. CA will include FPT documentation in final Commissioning report as an appendix to the final report.

B. Non-Conformance:

1. CA will document results of Functional Performance Test to FPT forms. Deficiency or non-conformance issues will be noted and reported to commissioning team as a punch list item with specific responsibility indicated. The Functional Performance Test Discrepancy Report will be provided to the Contractor by the CA. The Contractor will be responsible for incorporating these discrepancy report items into ProLog and tracking completion.
2. Corrections of minor deficiencies identified may be made during testing at discretion of CA. In such case, deficiency and resolution will be documented on procedure form and to punch list as a resolved issue.
3. Every effort will be made to expedite testing and minimize unnecessary delays, while not compromising integrity of procedures.

4. Deficiencies are handled in the following manner:
   a. When there is no dispute on deficiency and Sub-contractor accepts responsibility for remedial action:
      1) CA documents deficiency and Sub-contractor's response and intention. CA posts issue to action list. Sub-contractor corrects deficiency and resubmits to commissioning team. Contractor addresses all issues noted on action list by correcting deficiencies or by posting date for completion of resolution of deficiency.
      2) Contractor reschedules test with CA, Sub-contractor. New test time is posted to project schedule.
   b. When there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
      1) CA documents deficiency and Contractors response and testing proceeds on subsequent test or sequence. CA post issue to punch list and distributes to team.
      2) Contractor facilitates resolution of deficiency. Other parties are brought into discussions as needed. Final interpretive authority is with A/E. Final acceptance authority is with the Owner.
      3) CA documents resolution process.
      4) Once interpretation and resolution has been decided, appropriate party corrects deficiency, and CA is given notice to proceed for retest. Contractor and CA reschedule test. New test time is posted to project schedule.

C. Cost of Retesting:
   1. If the cause for retesting is construction related, the cost for sub-contractor to recheck IV checklist or re execute FPT will be borne by the sub-contractor.
   2. If the cause of retesting in not construction related (e.g. Design Issue) cost recovery for the sub-contractor for re-visitation will be negotiated with Contractor.
   3. Time for CA and Contractor to direct any retesting required because a specific IV checklist or start-up test item reported to have been successfully completed, but determined during Functional Performance Testing to be faulty, may be backcharged to Sub-contractor.
   4. Contractors and subcontractors may be held responsible for expenses incurred by owner for retesting due to their state of reported readiness or lack thereof as represented on the IV checklists. Expenses could include, but not be limited to, retesting labor costs, travel expenses, and remobilization for owner and consulting teams.Approval:
   5. CA notes each satisfactorily demonstrated function on test form. CA, Contractor, and Owner provide formal approval of FPT after review.

3.15 COMMISSIONING RECORD AND COMMISSIONING BINDER

A. CA is responsible to compile, organize, and index commissioning data by equipment and deliver it to the Owner in Commissioning Binders. Some of the documentation compiled by the CA requires information from the sub-contractor. The Contractor shall be responsible for collecting the sub-

contractor information and providing this information to the CA. Commissioning Data to include the following:

1. Commissioning Plan
2. Final Commissioning Report
3. Startup plan and report, approvals, corrections, blank IV and Start-up Checklists
4. Completed Functional Performance Test documentation
5. Completed training plan with attendee record
6. Deficiency Log
7. Construction photo archive

3.16 FINAL REPORT DETAILS

A. Final commissioning report will include an executive summary, list of participants and roles, brief building description, overview of commissioning process and general description of test and verification methods. Some of the documentation compiled by the CA requires information from the sub-contractor. The Contractor shall be responsible for collecting the sub-contractor information and providing this information to the CA. For each piece of commissioned equipment, the report will contain disposition of commissioning agent regarding adequacy of equipment, documentation and training meeting contract documents in the following areas:

1. Equipment meeting equipment specifications
2. Equipment installation
3. Functional performance and efficiency
4. Equipment documentation and design intent, and
5. Operator training.

B. All outstanding non-compliance items will be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. will also be listed. Each non-compliance issue will be referenced to specific functional test, inspection, trend log, etc. where deficiency is documented. Functional performance and efficiency section for each piece of equipment will include brief description of verification method used (manual testing, BAS trend logs, data loggers, etc.) and includes observations and conclusions from testing.

3.17 DEFERRED TESTING

A. Unforeseen Deferred Tests:

1. Any check or test not completed due to building structure, required occupancy condition, or other deficiency, may be delayed upon approval of Owner. These tests will be conducted as soon as possible. Contractor shall provide support, as appropriate and requested by the CA, to satisfactorily complete the testing.

B. Seasonal Testing:

1. During warranty period, seasonal testing (tests delayed until weather conditions are closer to system's design) on the environmental systems (e.g. air handling units, chilled water system,

etc.) will involve the installation contractor's for these systems. This contract. CA will coordinate this activity. Tests will be executed, documented and deficiencies corrected by appropriate contractor(s), with facilities staff and CA witnessing. CA will incorporate final updates to O&M manuals as necessary.

END OF SECTION