

SECTION 013216 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 DEFINITIONS

- A. **AS-BUILT SCHEDULE:** As-Built Schedule means a schedule of work as specified by Section 3.1.E, recording each actual Work Activity, the duration of each activity, and all dependencies to other work activities.
- B. **BASELINE SCHEDULE:** Baseline schedule means a detailed subcontract schedule, approved by the University, which conforms to the contract requirements and is used for comparison with the Progress Schedule.
- C. **CHANGE ORDER FRAGNET SCHEDULE:** Change Order Fragnet Schedule means a schedule submitted anytime a request is made by the Subcontractor for adjustment of the Subcontract Time, as specified in Section 3.1.G.
- D. **CONSTRAINED WORK ACTIVITY:** Constrained Work Activity means any Work Activity as specified in Section 1.2.A.6 through 1.2.A.10, including early start or finish date, Milestone date, or other activity that is set, but is not included in the CPM forward or backward pass calculation.
- E. **CRITICAL WORK ACTIVITY:** Critical Work Activity means a Work Activity that, if delayed, will delay the scheduled completion of the Work (i.e., Work Activities that comprise the path of least total float). All other Work Activities are defined as non-critical and considered to have float.
- F. **FLOAT/NEGATIVE FLOAT:** Float means the difference in calendar days between the Late Finish Date and the Early Finish Date, as specified in Section 1.2.A.14. Negative Float means that situation where the Late Finish Date precedes the Early Finish Date.
- G. **LOOK AHEAD SCHEDULE:** Look Ahead Schedule means a schedule based on the Updated Progress Schedule that shows current work activities for a period of at least three weeks before and three weeks after the date of submission of the schedule, or other such requirements as the University may request.
- H. **MILESTONE:** Milestone means an element on the schedule that reflects the planned point in time for the start or finish of one or more Work Activities.
- I. **PRELIMINARY SUBCONTRACT SCHEDULE:** The Preliminary Subcontract Schedule is the interim schedule submitted while the Detailed Baseline Schedule is being developed, as specified in Section 3.1.A, representing the schedule of all work for the Project.
- J. **PROJECT SCHEDULES:** The term "Project Schedules" means Subcontract Schedules, Preliminary Subcontract Schedules, Recovery Schedules, Updated Progress Schedules, Change Order Fragnet Schedules, Look Ahead Schedules, and As-Built Schedule.
- K. **RECOVERY SCHEDULE:** Recovery Schedule means a schedule prepared by the Subcontractor as specified under Section 3.1.F., which is meant to modify the Subcontract Schedule to account for unapproved Critical Work Activity delays.
- L. **SUBCONTRACT SCHEDULE:** The Subcontract Schedule means the schedule of Work submitted by CONTRACTOR and approved by the University, which constitutes the work plan for accomplishing the Construction Work.
- M. **SUBCONTRACT TIME:** For the purposes of this specification only, it will be understood that Subcontract Time represents both the Subcontract Time allowed and may be modified by Subcontract Modification. If the University issues its Notice of Intent, Subcontract Time will have the same meaning as defined in Schedule of Articles.

- N. **UPDATED PROGRESS SCHEDULE:** Updated Progress Schedule means a report of periodic updates to the Subcontract Schedule with every progress payment request, as specified in Section 3.1.C, submitted at least monthly, but under no circumstances less than one per month.
- O. **WORK ACTIVITY:** Work Activity means any individual task of Construction Work shown on a submitted schedule that requires time and resources (manpower, equipment, materials, etc.) to be completed in a continuous operation.

1.2 REQUIREMENTS

A. GENERAL REQUIREMENTS

1. The Subcontractor's personnel that prepare Project Schedules shall be qualified and experienced in Critical Path Method (CPM) scheduling with the software specified in the Products section of this specification, and capable of fulfilling the requirements of this specification. The Subcontractor shall hire a qualified consultant to prepare and maintain all Project Schedules, or if qualified, the Subcontractor may perform these services with its own personnel. Subcontractor shall provide documentation of the qualifications of the persons or entities that Subcontractor intends to perform scheduling for the University approval. Any changes in personnel must be submitted and approved by the University.
2. It is intended that the Preliminary Subcontract Schedule, once received, reviewed and approved by the University, will be the Subcontract Schedule. The Preliminary Subcontract Schedule shall reflect the requirements and information provided in Item 10 and these specifications detailing planned work, operations, and/or procurement activities for the first 45 days after the Notice of Award and summary activities for the balance of work beyond the 45 days. The Preliminary Subcontract Schedule shall define the project critical path
3. The Subcontract Schedule shall be used by the University in reviewing any request by the Subcontractor for modification of the Subcontract Time. Once the Preliminary Subcontract Schedule is reviewed and accepted by the University, it will be deemed the Subcontract Schedule. The Subcontract Schedule may not be modified other than as provided in this section.
4. All requirements of the Subcontract Schedule shall also apply to the Preliminary Subcontract Schedule, any Recovery Schedule, any Updated Progress Schedule, any Change Order Fragnet Schedule, any Look Ahead Schedule, and the As-Built Schedule (Collectively referred to as the "Project Schedules").
5. The Project Schedules issued by Subcontractor for the Construction Work, will reflect all Construction Work activities, all early start and late start dates, early finish and late finish dates, and will reflect all interdependent activities, critical milestones, submittals and submittal review periods, inspection and testing periods, and all other elements affecting the timely completion of the Construction Work.
6. All cost for preparing, printing, mailing of any schedules called for by this section, or the Subcontract Documents shall be part of the Subcontractor Base Fee.
7. All Work Activities will identify all components necessary to monitor and evaluate progress of that Work Activity and any related Work Activity. There will be no Constrained Work Activities on the Subcontract Schedule, except the scheduled start date for Construction Work may be set to reflect the date of the Notice to Proceed.
8. Work Activity descriptions will be sufficiently detailed to clearly identify the scope of work included in the Work Activity, and identify all components necessary to executing, monitoring and evaluating the progress of the Work. Work Activities will identify discrete items of Work that must be accomplished under the Subcontract, and will constitute definable, recognizable entities within the Project.
9. All Work Activities shall have appropriate durations that will allow measurement of their progress. Where progress on a particular Work Activity cannot be measured readily by the University, that

- Work Activity will be segregated at the direction of the University into multiple Work Activities sufficient to monitor actual progress.
10. All Work Activities shall have a defined duration. All durations shall be measured in calendar days. Work Activities shall have duration of 14 calendar days or less. The University may approve use of longer Work Activity durations on non-construction activities, including the procurement and fabrication of materials and equipment, and review period for submittals.
 11. The Work Activities that will be included in Project Schedules shall include all Design Work and Construction Work, including, but not limited to, the following:
 - a. All Submittals, including, but not limited to, Shop Drawings, Product Data and Samples, approval of permit applications (as necessary), working drawings, testing and inspections, safety and security plans, worksite control plans, roadway shutdowns, required shutdown of existing utilities, and applications.
 - b. Materials procurement or equipment potentially impacting the critical path.
 - c. Fabrication of special materials and equipment and their installation and testing.
 - d. Delivery of University-Furnished Government Property.
 - e. Work Activities of the University and any third parties associated with the Work.
 - f. Project submittals must be submitted to the University per Division 01 Section 010000 – General Requirements for review and approval unless otherwise noted as part of the submittal. One re-submittal cycle (revision, review, and approval) should also be included.
 12. Project Schedules shall include Work Activities and Milestones that identify all design and pre-construction activities; specific Milestones for the start and completion for each stage of the Design Work; specific Milestones for when reviews are required; submittal dates; production Milestones; early purchasing; key deliverables; Milestones for each Subcontract Part; mobilization of personnel and equipment when required; sequence of operations; commissioning Work Activities; procurement of materials, equipment and long lead items; and all Subcontract closeout Work Activities such as Punch List and Operation Manuals.
 13. The Critical Work Activities shall be identified, including critical paths for Subcontractor interim and final completion Milestone dates.
 14. All Work Activities shall be coded as called for in the Execution section of this specification.
 15. "Float" for any Work Activity will be calculated as the difference in days between the Late Finish Date and the Early Finish Date. If the difference between these dates is a negative number, i.e., the Late Finish Date precedes the Early Finish Date, the difference in days between the Late Finish Date and its Early Finish Date will be considered "Negative Float." Any Project Schedule showing negative float will be rejected by the University.
 16. Subcontractor may not sequester float through strategies including extending Work Activity duration estimates to consume available float, using preferential logic, using extensive or insufficient crew/resource loading, use of float suppression techniques, special lead/lag logic constraints, unless specifically requested in writing by Subcontractor and approved in writing by the University.
 17. Use of float time disclosed or implied by the use of alternate float suppression techniques shall not be for the exclusive use or benefit of either the University or Subcontractor. It is acknowledged that University-caused or Subcontractor-caused time savings to Work Activities on or near the critical path may increase float. Such increase in float shall not be for the exclusive use or benefit of either the University or the Subcontractor.

PART 2 - PRODUCTS

2.1 SCHEDULING SOFTWARE

- A. All Project Schedules shall be prepared utilizing Oracle's Primavera Project Planner P6 (version compatible with the University's version).

PART 3 - EXECUTION

3.1 SUBMITTALS

A. PRELIMINARY SUBCONTRACT SCHEDULE

1. Submission:
 - a. As soon as practical, but no later than specified in Division 01 Section 010000 – General Requirements, submit a preliminary subcontract schedule.
 - b. Any revisions deemed necessary by the University, as a result of its review, shall be resubmitted to the University for review within six (6) calendar days after the Subcontractor's receipt of the preliminary subcontract schedule from the University.
2. Format:
 - a. Prepare the preliminary subcontract schedule as a time-scaled bar chart showing continuous flow from left to right. Durations and specific calendar dates shall be clearly and legibly shown for the start and finish of each work activity.
 - b. Prepare the preliminary subcontract schedule detailing the first 45 calendar days of the contract. The schedule should show in sufficient summary activities to demonstrate a practical plan to complete the work within the Subcontract time. The University will review the Contractor's submittal to ensure sufficient detail will be provided to support progress payments to be made while the Detailed Subcontract Schedule is being developed.
 - c. The preliminary subcontract schedule shall include but not limited to those elements defined in Division 01 Section 010000 – General Requirements for use in the schedule of values. Include major milestones that are critical to the completion of the work.

B. DETAILED SUBCONTRACT SCHEDULE:

1. Submit to the University for review and approval, a detailed subcontract schedule per Division 01 Section 010000 – General Requirements. The detailed subcontract schedule shall be a computerized detailed task level CPM diagram. Show a clear delineation of work activities on the detailed subcontract schedule. Show clear and single (not multiple) start and finish dates for each activity.
2. The work activities comprising the detailed subcontract schedule shall be of sufficient detail to ensure adequate planning and execution of the work and such that the schedules provide an appropriate basis for monitoring and evaluating the progress of the work. Include activities for materials or equipment purchased or fabricated and stored, but not yet installed.
3. Subcontractor's failure to include any element of the work required for performance of this Subcontract and completion of the project will not excuse Subcontractor from completing all work required within the time for completion, notwithstanding the University acceptance of the detailed subcontract schedule.
4. These schedules shall indicate the sequence and interdependency of work activities. They shall include, but not be limited to, the following items:
 - a. Mobilization;
 - b. Document preparation by Subcontractor and review and approval by the University;

- c. Order, manufacture, fabrication, delivery, installation, and check out of long lead and major construction material and major equipment;
 - d. Design and installation of system(s), structures and components (use Table of Contents of this Specification as general guide);
 - e. All other major design and construction activities;
 - f. All utility interfaces required within the scope of work;
 - g. Performance and acceptance tests.
 - h. Punch-out and acceptance of all facilities and turnover;
 - i. Delivery, installation, and check out of University-furnished equipment and material;
 - j. All Subcontract-stipulated milestone dates, Subcontract performance period, partial acceptance dates, if any are specified, and final completion date;
 - k. Final cleanup;
 - l. Approved change orders shall be plotted as appropriate.
5. Identification of all holidays and non-working days.
 6. Cost load the schedule activities in such a manner to support and equal the schedule of values/cost breakdown of the subcontract. Include items such as long lead procurements in the schedule.
 7. Once approved by the University, Subcontractor's detailed subcontract schedule shall be known as the baseline schedule.
 8. The baseline schedule shall be updated as required for approved changes and shall conform to the contract value and schedule.
 9. A "copy" of the baseline schedule shall be used by Subcontractor for executing the work of the subcontract, including planning, organizing and directing the work, and reporting its progress until subsequently revised. This shall be known as the Progress Schedule which shall also be updated for all approved changes.

C. PROGRESS SCHEDULES

1. The Progress Schedule will be used by the Subcontractor for reporting of all Subcontract requirements, keep the network plans up to date in accordance with the requirements of this section and utilize the Critical Path Method (CPM) in planning, coordinating, performing and reporting the work under this Subcontract, including all activities of subcontractors, equipment vendors, and suppliers. The Progress Schedule will assist the University in monitoring the progress of the work.

D. LOOK AHEAD SCHEDULES

1. Look Ahead Schedules shall be submitted at each progress meeting of the Work as outlined in the Scope of Work or as reasonably requested by the University. The first Look Ahead Schedule will be issued by Subcontractor per Division 01 Section 010000 – General Requirements and shall provide a listing of the planned Work Activities for the first 45 days. The Look Ahead Schedule shall be a bar graph showing the times the Subcontractor intends to commence and complete the various Work Activities.
2. Succeeding Look Ahead Schedules shall be a time scaled bar chart based on the Updated Progress Schedule showing the comparison of planned work and actual work, and indicating the percentage complete for all Work Activities schedule within 3 weeks of both before and after the date of report/meeting.

E. AS-BUILT SCHEDULE

1. Subcontractor will maintain a separate schedule that records the actual Work Activities performed, the duration of each activity, and all dependencies to other work activities. This "As Built" schedule shall be included with any Progress Payment Request. The As-Built schedule shall be submitted with the Monthly Status Report, and shall reflect the information the Subcontractor and University have agreed has occurred as the actual as-built sequence of the Work.

F. RECOVERY SCHEDULE

1. If at any time it is determined by the University that any Critical Work Activity will be completed more than 14 calendar days after indicated on the Subcontract Schedule, the University shall give written notice to Subcontractor requesting a Recovery Schedule. Within 7 calendar days from the date of the University's request for a Recovery Schedule, or such other time specified by the University, the Subcontractor shall prepare and submit a Recovery Schedule. The Recovery Schedule shall address a new work plan to accomplish the Work within the Subcontract Time, and shall include and identify additional concurrent operations, logic and sequence changes, additional manpower, additional shifts, or overtime work. Once reviewed and approved by the University, the approved Recovery Schedule shall become the Subcontract Schedule.

G. CHANGE ORDER FRAGNET SCHEDULE

1. At any time that the Subcontractor requests an extension of the Subcontract Time, in addition to other requirements in the Subcontract Documents, the Subcontractor shall submit a Change Order Fragnet Schedule. No time extension may be granted unless the Subcontractor has timely submitted a Change Order Fragnet schedule pursuant to the requirements of this paragraph.
2. Change Order Fragnet Schedules shall be based on the applicable portion of the Subcontract Schedule that is claimed to be affected, and that Subcontractor believes necessitates an extension of the Subcontract Time. All modifications to the Subcontract Schedule Work Activities, and their associated information (including duration, logic, manpower, etc) shall be clearly identified, but the Subcontract Schedule information shall be left for clear comparison.
3. Change Order Fragnet Schedules shall have starting and ending Work Activities or Milestones from the Subcontract Schedule that are unchanged, (same logic constraints, duration, and resources) and shall clearly identify each such Work Activity or Milestone.
4. All other requirements of Subcontract Schedule shall apply to a Change Order Fragnet Schedule.

H. MONTHLY STATUS REPORT

1. On the 25th day of each month, Subcontractor will submit five copies of an Updated Progress Schedule, a draft Monthly Status Report a Variance Report and a Status Narrative. The Updated Progress Schedule shall show the total cost of the work completed that month.
2. Subcontractor shall review the draft Monthly Status Report with the University upon submittal. The purpose of this joint review is to reach agreement on the job status shown in the draft Monthly Status Report.
3. A Variance Report shall be submitted based on the Updated Progress Schedule. The Variance Report shall include a description of all Work Activities completed during the preceding month, a description of progress made, a list of all Work Activities that have commences but have not reached completion, and identify all Work Activities that are 5 or more working days behind the Subcontract Schedule for that Work Activity. The format of this report shall include:
 - a. Work Activity code and description;
 - b. Scheduled early start/finish dates;
 - c. Current anticipated early start/finish dates;
 - d. Calendar days remaining to complete unfinished Work Activities;
 - e. Percentage complete of started Work Activities;
 - f. Total float for each Work Activity.

4. The Status Narrative Report shall identify the Work actually completed and describe the progress of all Critical Work Activities. The Status Narrative Report shall indicate forecasted progress in relation to interim and/or final completion Milestone dates as specified in the Subcontract Documents, and shall identify the number of calendar days that the Project is ahead or behind the Subcontract Schedule. The Status Narrative Report will specifically identify the following:
 - a. Actual completion dates for Work Activities completed during the report period;
 - b. Actual start dates for Work Activities started during the report period;
 - c. Estimated start dates for Work Activities scheduled to start during the month following the report period;
 - d. Changes in the duration(s) of any Work Activities and/or logic changes to Work Activities, or Work Activities done in a different sequence from the Subcontract Schedule;
 - e. Current critical path(s) to the interim and/or final completion milestones;
 - f. Work Activities proposed to be added to the Subcontract Schedule;
 - g. Any proposed or approved Change Order Fragnet Schedule;
 - h. Any variances or changes in the direct labor hour allocation, the cause, and the Work Activities affected, and shall provide an explanation of proposed corrective action to meet the planned allocation called for in the Subcontract Schedule.
5. Within 5 days of meeting with the University to review the draft Monthly Status Report, the Subcontractor will submit a Monthly Status Report reflecting any agreed modifications. Any revisions agreed to by the University resulting in changes to the Subcontract Schedule shall be incorporated into a revised Updated Progress Schedule, which will be submitted to the University for approval. Upon approval by the University, the Updated Progress Schedule shall be deemed the Subcontract Schedule for the remainder of the Work. Updated Progress Schedules shall track work activities performed to date and current work status of all Construction Work activities measured against the latest approved Subcontract Schedule.

I. SCHEDULE UPDATING

1. Subcontractor shall update and review the Updated Progress Schedule, and As-Built Schedule on a weekly basis.

3.2 SCHEDULE SUBMITTAL PROCEDURES

- A. Submit one reproducible of each required schedule and report, including required revisions thereof and an electronic export file in Primavera P6 "xer" format.
- B. Submit the monthly updated subcontract schedules (hereafter approved baseline schedule) and reports referenced herein concurrently in a single package.

3.3 SCHEDULE REVIEW AND PROGRESS PAYMENTS

- A. Review and approval of the detailed subcontract schedule by the University will be a condition of making of any progress payment for work performed.
- B. The updated start/finish dates on the current schedule shall incorporate only changes mutually agreed upon by Subcontractor and the University during preceding periodic reviews and all changes resulting from approved change orders and subcontract modifications.
- C. Submit applications for payment in accordance with Division 01 Section "Payment Procedures". Monthly updating of the current schedule and reports shall be an integral part, and basic element of the estimate upon which progress payments will be made. Submittal, review and approval by the University of these items will be a condition precedent to the making of progress payments. If, in the judgment of the University, Subcontractor fails or refuses to provide a complete updated schedules or reports as specified, Subcontractor will be deemed to have not provided the required estimate upon which progress payments

may be made, and will not be entitled to such progress payments unless or until Subcontractor has furnished the aforesaid schedules.

3.4 WORK ANALYSIS

- A. Using a computerized critical path scheduling system produce computer generated reports with the following minimum information:
1. Activity identification code keyed to Summary and Detailed Subcontract Schedule activities;
 2. Activity description;
 3. Status date, planned duration, and remaining duration;
 4. Activity percentage complete;
 5. Activity duration;
 6. Early/start/finish and late start/finish;
 7. Total float and line item float (free float);
 8. The predecessor and successor activities for each individual activity;
 9. A comparison between the current schedule update and the baseline schedule;
 10. Designation of the planned work day/work week for each activity;
 11. A critical or near critical item list of activities with ten working days or fewer total float.

3.5 SCHEDULE FORMAT / DATA

A. WORK ACTIVITY CODING

1. The following activity codes and structure sequence shall be applied at a minimum for all Work Activities and Milestones; additional codes may be added/utilized by the Subcontractor for its requirements:
 - a. Work/Bid Package;
 - b. Specification Group;
 - c. Responsibility/Subcontractor (Include University and third parties);
 - d. Building (Utility or Foundry);
 - e. Floor;
 - f. Change Order number;

B. RESOURCE LOADING

1. Resource Loading means that all Work Activities involving labor or major equipment shall be resource loaded indicating what is required to accomplish the Work Activity. Labor shall be defined to show crew type and size, so that total manpower is identified.

C. COST LOADING

1. Subcontractor shall provide unit costs for all resources identified in Resource Loading, and provide material costs for each Work Activity. Any other cost will be added in accordance with the Cost Breakdown on a prorated basis, such that each modified Cost Breakdown category shall remain

proportional to the original Cost Breakdown category as submitted in the Preliminary Subcontract Schedule.

D. SCHEDULE CALENDARS

1. All holidays and non-work periods shall be identified in the Subcontract Schedule's calendar. Two calendars shall be used; a defined work week calendar, and a 24-hour, 7-day per week calendar (for such continuous events such as concrete curing, etc.).

E. REPORT FORMAT/DISTRIBUTION

1. The University shall provide format/distribution requirements for printing the Project Schedules; which the University may revise during the Project.

END OF SECTION 013216