

## **SECTION 01 32 00 – CPM SCHEDULING REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements for CPM scheduling.

#### **1.2 GENERAL REQUIREMENTS**

- A. The Work under this Contract will be planned, scheduled, executed and reported using the Critical Path Method (CPM).
- B. The Contractor shall develop the CPM schedule using Primavera schedule software (P6). No other scheduling software will be permitted.
- C. The Contractor shall provide all information and input required for development of the schedule for the Work according to the requirements of this Section. The purpose of the project schedule shall be to:
  - 1. Assure adequate planning, scheduling and reporting during execution of the contract;
  - 2. Assure coordination of the Work of the Contractor and Subcontractors;
  - 3. Assist the Contractor and the Construction Manager in monitoring the progress of the Work and evaluating the time and cost impact, if any, of proposed changes to the Contract and the project schedule;
  - 4. Assist the Contractor and Construction Manager in the preparation and evaluation of the Contractor's monthly progress payments.
- D. The Contractor shall involve all applicable Subcontractors in the schedule development, updating, and revisions, as required.
- E. The Contractor understands and agrees that the schedule is intended to accurately reflect at all times the status of the Work. The Contractor also understands and agrees that changes or revisions to the schedule are key components of this requirement and will make every reasonable effort so that the schedule accurately reflects current conditions.
- F. The Contractor shall maintain staff onsite that is knowledgeable in preparing input information for the schedule, monitoring progress, updating and revising schedules when necessary. The Contractor shall identify the individual(s) on its staff who will be responsible for scheduling efforts.
- G. If the Contractor does not possess on-staff scheduling capabilities sufficient to comply with the requirements of this Section, the Contractor shall identify the firm and individual within the firm who will be retained to provide the required expertise.
- H. Failure to furnish any required submittal or information specified herein shall constitute a cause for withholding any progress payment.

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### 1.3 SCHEDULE REQUIREMENTS

- A. Within 30 calendar days of the Notice to Proceed, the Contractor shall submit to the Construction Manager for review and acceptance, a CPM schedule utilizing precedence diagramming method for procurement and construction work scope. The CPM schedule shall provide a complete and detailed sequence of operations of the Work within the time limits in the Contract.
- B. The CPM schedule shall include:
  - 1. All activities necessary to account for the full scope of work.
  - 2. The order and interdependencies of the Contractor's activities and the interface or interrelation with the activities of others. The following criteria shall form the basis for assembly of the logic relationships:
    - a. What activity must be completed before a subsequent activity can be started?
    - b. What activities can be done concurrently? This includes activities with Start-To-Start and Finish-To-Finish relationships with or without leads and lags.
  - 3. A single critical path that runs through the entire CPM schedule beginning with the first activity, e.g., Notice to Proceed, and ending with the last activity, e.g., Project Complete.
  - 4. Conformance with and identification of the specific milestone or completion dates specified in the Contract Documents.
  - 5. Off-site activities: The Contractor shall include in the CPM schedule all procurement activities which lead to the delivery of materials to the site and logically tie the material delivery to the related construction activity. The off-site activities shall include the following:
    - a. Ordering, submittals, manufacturing or fabricating, and delivery of equipment and materials. Long lead items requiring more than one month between ordering and delivery to the site shall be clearly noted.
    - b. All significant Contractor activities during the fabrication and erection/installation in a Contractor's plant or on a job site, including materials/equipment purchasing, and delivery.
    - c. Contractor's drawings and submittals to be prepared and submitted to the Architect.
    - d. Approval of Contractor submittals by the Architect, which shall be a maximum of (21) calendar days.
  - 6. Delivery of Owner furnished material and equipment.
  - 7. Testing and commissioning of equipment, systems and materials.
  - 8. Required state inspections.
  - 9. Project closeout activities.
- C. The identity, duration, and logic of activities comprising the CPM schedule shall meet the following criteria:
  - 1. Activity boundaries shall be easily measurable and descriptions shall be clear and concise. Do not preface activity descriptions with "Begin" or "Complete." The beginning and end of each

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activity shall be readily verifiable, and progress should be quantifiable. Do not reference percentage completion within the activity description.

2. Activity codes necessary to better organize the schedule, including but not limited to, a responsibility code for each activity that shall identify an activity with a single performing organization.
  3. The calendar shall account for all holidays, shutdown periods for weather sensitive work, etc.
  4. Seasonal weather conditions, utility coordination, no-work periods, expected job learning curves, and other foreseeable delays to activities shall be considered and included within the developed duration for each activity affected.
  5. “Start To Start” and “Finish-To- Finish” activity relationships shall be minimized. The preferred relationship type is “Finish-To-Start” with zero lag. Do not use “Start-To-Finish” relationship types. The use of negative lag is also prohibited. The use of “Finish-To-Finish” relationships, only, is prohibited. Where “Start-To-Start” relationships are used between activities, “Finish-To-Finish” relationships must also be used between those same activities. There should be no activities where the finish of one activity is not tied to another activity.
  6. Imposed completion dates for events other than the specified milestones or completion dates will not be permitted.
- D. The level of detail of the CPM schedule shall be such that no activity duration shall be over (30) calendar days, except for non-construction activities such as shop drawing and sample submittals, fabrication and delivery of materials and equipment, and delivery of equipment.
- E. The CPM schedule shall not show an early completion date for the project later than the project’s required completion date.
- F. The Owner does not guarantee that the Contractor can start work activities on the “Early Start” or “Late Start” dates or complete work activities on the “Early Finish” or “Late Finish” date shown in the initial schedule submission, or in an updated or revised schedule; nor does the Owner or Construction Manager guarantee that the Contractor can always proceed in the sequence established by said schedule. If Contractor’s schedule shows that the Owner or a separate contractor is to complete an activity by a specific date, or within a certain duration, the Owner or any separate contractor under contract with the Owner shall not be bound to said date or duration unless the Owner expressly and specifically agrees in writing to same; the Owner’s, the Construction Manager’s and/or Architect’s review and acceptance of the schedule does not constitute an agreement to the specific dates, durations, or sequences for activities of the Owner or any separate contractor.
- G. The submittal of the contract scheduling documents for the baseline and subsequent updates shall include:
1. Electronic copy in Primavera .XER format
  2. Written narrative of construction progress to include, as a minimum, activities completed, activities started, and activities ongoing. Narrative to also include any impacts to construction progress and methods to eliminate said impacts.

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3. 11 x 17 Gantt Chart report in color to include, as a minimum, activity ID's, activity descriptions, early and late start and finish dates, percent complete, and total float. The reports shall be sorted by:
  - a. Activity ID
  - b. Early Start, Early Finish
  - c. Total Float

### 1.4 APPROVAL PROCESS

- A. The Construction Manager will review the Contractor's schedule, including logic diagrams and computer generated analysis for compliance with the provisions of this Section as well as the requirements of the Contract as a whole. The Construction Manager shall have (14) calendar days to review and comment on (or accept) in writing the Contractor's schedule submission.
- B. The Contractor shall revise and resubmit the schedule within (7) calendar days. The Construction Manager will have (7) calendar days to review and comment on (or accept) in writing the Contractor's revised schedule.
- C. Within (3) calendar days following final acceptance of the schedule, the Contractor shall provide copies of the CPM schedule to the Construction Manager in accordance with this Section.
- D. Upon final acceptance, the schedule will become the official project schedule and will be used to monitor progress of the Work, subject to such revisions made to the schedule as provided for herein or in the Contract Documents, and to support requests for payment.
- E. Acceptance by the Construction Manager of the Contractor's CPM schedule shall not relieve the Contractor of the responsibility for accomplishing the Work within every contract required milestone and completion date. The Owner and Construction Manager disclaim any obligation or liability due to acceptance of the CPM schedule.

### 1.5 SCHEDULE UPDATES

- A. Schedule updates shall be prepared each month with progress reported through the 24<sup>th</sup> day of the month and submitted with the payment applications for review by the Construction Manager on the 25<sup>th</sup> of each month. Upon review and acceptance by the Construction Manager, the final schedule update shall be submitted with the final payment application on the first weekday of the next month.
- B. The progress report submitted by the Contractor will indicate, as a minimum, those activities, or portions of activities, which were completed during the reporting period, the actual start and finish dates for those activities, remaining duration and/or estimated percent complete for activities currently in progress.

Starting (30) calendar days after the start of construction, and throughout the progress of the Work, the Contractor shall prepare and maintain a two week look-ahead schedule reflecting schedule of work activities (from the CPM schedule) actually accomplished for the previous week and the work scheduled for the forthcoming two weeks. This look-ahead schedule shall be prepared on a weekly basis and issued to the Construction Manager.

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### 1.6 SCHEDULE REVISIONS

- A. Should the Contractor, after acceptance of the initial CPM schedule, want to change its plan of construction, the Contractor shall submit the requested revisions to the Construction Manager including a written description of the reason for rescheduling the Work, and methods of maintaining adherence to milestone and specific dates. The Construction Manager will have (7) calendar days to review and either accept or reject the reason for the revised schedule in writing to the Contractor. If the Contractor's requested schedule revision is accepted by the Construction Manager, the changes will be incorporated by the Contractor into the CPM schedule in the next schedule update and will become the new project schedule.
- B. The Contractor shall revise the schedule to include the effect of changes or other conditions or events that have affected the CPM schedule. The Construction Manager will have (7) calendar days to review and either accept or reject the reason for the revised schedule in writing to the Contractor. If the Contractor's requested schedule revision is accepted by the Construction Manager, the changes will be incorporated by the Contractor into the CPM schedule in the next schedule update and will become the new project schedule.
- C. When the Construction Manager directs changes by Change Order that have the potential to impact the Contract milestones or completion dates, a schedule fragnet shall be prepared by the Contractor and provided to the Construction Manager as part of the Change Order Proposal. If the Contractor has prepared a scheduled fragnet that results in a time extension request, the Contractor must identify to the Construction Manager as part of the Change Order Proposal the cost to buy back time to allow the Owner the option of granting a time extension or buying back the time. If the Construction Manager accepts the schedule fragnet, it will be incorporated into the CPM schedule by the Contractor during the next schedule update.
- D. Should any of the conditions exist, such that certain activities shown on the Contractor's CPM schedule fall behind schedule to the extent that any of the specific milestone or completion dates are in jeopardy, the Contractor may be required when directed, to prepare and submit to the Construction Manager, a recovery schedule and written narrative explaining how the Contractor intends to reschedule the Work to regain compliance with the accepted CPM schedule. The preparation of a recovery schedule shall not be grounds for a Change Order or a time extension unless the Contractor can conclusively establish that the Owner is responsible for the schedule slippage. In no event shall Contractor refuse or fail to revise the schedule based on claimed Owner delays or lack of information. In such cases, Contractor shall apply its best efforts and apply reasonable assumptions when information is alleged to be lacking.
- E. The Contractor shall do the following, after determination of the requirement for a recovery schedule:
  - 1. Within (5) calendar days of being directed to provide a recovery schedule, the Contractor shall submit the recovery schedule, and written narrative of how the Contractor intends to recover the time, for acceptance to the Construction Manager. The recovery schedule shall be prepared to similar level of detail as the accepted CPM schedule and shall address how the Contractor intends to recover the time. The Construction Manager will have (5) calendar days to review and comment on the recovery schedule.
  - 2. Any revisions necessary because of this review shall be resubmitted by the Contractor for acceptance within (3) calendar days. The accepted recovery schedule shall then be the schedule that the Contractor shall use in planning, organizing, directing, coordinating, performing and

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executing the Work (including all activities of subcontractors) to regain compliance with the CPM schedule.

3. Typical methods of revising the schedule to recover time include, but are not limited to:
  - a. Reducing the durations of activities not yet started.
  - b. Changing schedule logic, e.g. changing “Finish-To-Start” relationships to “Start-To-Start” relationships, using negative lags, etc.
  - c. Changing the method of schedule calculation from retained logic to progress override.
4. If at any time during the construction, it appears to the Construction Manager that the Contractor’s schedule no longer represents the actual prosecution and progress of the Work, the Construction Manager will request in writing a revision to the schedule. Any “out of sequence progress” problems will be considered evidence that the schedule needs revising. The Contractor then has (5) calendar days to respond to that written request.

**- END OF SECTION 01 32 00 -**