

01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION (SCHEDULING)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 - 1. Uniform General Conditions for Construction Contracts, State of Texas, 2010 (UGC).
 - 2. The University of Houston's Supplemental General Conditions and Special Conditions for Construction.

1.2 SUMMARY

- A. A CPM schedule is a mutually-agreed construction plan which demonstrates to the Owner that the contractor has thought through all elements of the construction process, has conformed to the requirements of the contract, and can and will execute the activities within the contractual time frames. The CPM schedule also may be used as a tool for communication, re-examination of methodology, and settlement of disputes.
- B. Section includes administrative and procedural requirements for CPM project scheduling.
- C. Related Requirements:
 - 1. Section 01 31 00 "Project Management and Coordination" for general coordination procedures

1.3 DEFINITIONS

- A. Owner's Designated Representative (ODR): As defined in the UGC. This term is used interchangeably with "Owner."
- B. Architect/Engineer: As defined in the UGC.
- C. Contractor: As defined in the UGC. The Contractor is generally the responsible party for maintaining the Schedule as defined in this document and in the contract agreement.
- D. Scheduling Specialist: An internal or third party entity contracted to the Owner providing scheduling advice (if applicable).

1.4 ORGANIZATIONAL BREAKDOWN STRUCTURE (OBS)

- A. The OBS defines the scheduling team members and provides a hierarchy based on each team members role. The organizational breakdown follows the structure as follows:
 - 1. Owner's Designated Representative (ODR)
 - a. Architect/Engineer (A/E)
 - b. Contractor
 - c. Scheduling Specialist (SS)

PART 2 - PRODUCTS

2.1 SOFTWARE

- A. Microsoft Project 2010 or higher and Oracle Primavera (P6) are the only acceptable methods for providing scheduling data to the ODR.
- B. Certain terms are used in the scheduling sections that will only apply to a specific scheduling software and which are clearly identified.

PART 3 - PROJECT SCHEDULE DETAILED REQUIREMENTS

3.1 OVERVIEW

- A. Schedule shall be developed utilizing the Critical Path Method
- B. The work for each phase or area must be represented by at least one summary activity that cumulatively indicates the entire Construction Schedule.
- C. Milestone dates must be adhered to and shall be clearly identified on the schedule
- D. Milestone dates may not be changed without the written consent of the ODR
- E. Constraints will not be allowed unless specifically allowed in this specification. Any use of constraints that are unavoidable will be submitted in writing for the ODR's approval.
- F. Schedule shall clearly identify the activities illustrating accomplishment of the time(s) for completion of the Project and set forth in the Contract. If the schedule indicates earlier completion time(s) than that set forth in the Contract, the difference between the schedule and Contract dates shall be considered part of the total float available. This float is a resource available to both the ODR and Contractor or as defined in the applicable agreement.
- G. 10% float shall be incorporated into the schedule as a single activity at the end of all construction activities and just preceding substantial completion. A written request must be submitted to the ODR for approval prior to use of float time.
- H. The Schedule Maintainer shall be responsible for assuring the applicable work activities, as well as those of consultants and trade contractors at all sub-tiers, are included in the schedule.
- I. The schedule shall show the sequence and interdependence of activities required for complete performance of the work. The Schedule Maintainer shall be responsible for assuring all work sequences are logical and the schedule shows a logical plan of work and critical path.
- J. Normal weather conditions shall be considered and included in the planning and scheduling of all work influenced by high or low ambient temperatures, wind and/or precipitation to ensure completion of all work within the contract time. Normal weather conditions have been determined by an assessment of average historical climatic conditions based on locality by the National Oceanic and Atmospheric Administration (NOAA) for the William P. Hobby Airport and should be used as the bases for determining the number of weather days permitted.
- K. Proposed durations assigned to each activity shall be the best estimate of time required to complete the activity considering the scope and resources planned for the activity.

- L. If using P6, each activity shall be defined with as many activity codes as are applicable. The global activity codes will be preset and will not be modified unless the scheduling group agrees to those changes.
 - M. If requested by the ODR, the appropriate party shall furnish a written narrative of the determination of durations for critical activities. Such explanation shall include the number of crews, crew composition, number of shifts per day, number of hours in a shift and the number of workdays per week. A list of the major construction equipment intended for use during operations including types, number of units, unit capacities and proposed time each piece of equipment will be on the job keyed to the activities to which the equipment will be used shall also be provided.
- 3.2 LEVEL OF DETAIL REQUIRED. The level of detail shall be a function of the complexity of the work involved. The total number of activities shall be subject to approval by the ODR.
- A. Activity durations:
 - 1. The smallest increment of time allowed will be one (1) full day or will be represented as a milestone with a (0) day duration activity
 - 2. Construction activities shall represent the continuous work of a definable crew in a defined work area or location and have a duration not longer than ten workdays, unless deviation is approved by the Owner. Non-construction activities (such as design, procurement, fabrication, etc.) may have durations in excess of ten workdays
 - B. Procurement Activities
 - 1. The schedule must include activities associated with the submittal, approval, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.
 - C. Mandatory Detail
 - 1. Overall Milestones: Every project should have at least the following activities listed at the top of the schedule:
 - Contract Dates – Activity to be linked to Contract Start and Completion milestone
 - Contract Start Date – A constrained milestone
 - Contract Duration Base Bid & Alternates
 - Contract Completion Date – Substantial Completion, a constrained milestone
 - Contract Delay Claimed by Contractor
 - Contract Delay Awarded by Owner
 - Current Contract Completion Date by Owner – Linked to Contract Completion Date and Contract Delay Awarded by Owner
 - Current Project Completion Date by Contractor – Linked to Contractor’s actual progress schedule
 - 2. Owner’s Milestones:
 - Design Review Meetings
 - Design Approvals
 - UH Fire Marshal Inspection
 - UH Fire Marshal Approval
 - Substantial Completion Inspections
 - FFE installation
 - Move-In
 - Artwork installation

3. Design Milestones: The Design Schedule shall include at a minimum the following milestones.

Schematic Design:

Start of Schematic Design Phase
90% SD Submission
Owner Approval of 90% SD Package

Design Development:

Start of Design Development Phase
50% DD Submission
90% DD Submission
Owner Approval of 90% DD Package

Construction Documentation:

Start of Construction Documentation Phase
50% CD Submission
90% CD Submission
Owner Approval of 90% CD Package
Issuance of Construction Package

4. Construction Milestones: The Construction Schedule(s) shall include at a minimum the following Milestones:

GMP:

GMP Submittal
Approval of GMP

Trade Contractor Procurement:

100% CDs (Finish Milestone)
Bid Day

Submittal/Material Procurement:

Submittals Complete
Doors, Frames, Hardware Approved
Door Frame Delivery
Windows Approved
Curtain Wall Approved
Steel Approved
AHUs Approved

Structure:

1st Pier Pour
1st Slab Pour
Concrete Structure Top Out
Tower Crane Up
Tower Crane Down
Man/Material Hoist Up
Man/Material Hoist Down
Structural Steel Top Out

Dry-In:

Exterior Wall Start
Window Start
Curtain Wall Start
Roof Start
Temporary Dry In
Dry In

Interior Construction:

MEP Overhead Start
Interior Studs Start
Permanent Power
Conditioned Air On
1st In Wall Inspection
1st Wall Cover-Up Approval
1st Overhead Inspection
1st Overhead Cover Up Approval
Elevator Temporary Use Start

Completion

1st Contractor Punch List
1st A/E Punch List
Start TAB
Commissioning Start
Substantial Completion
Owner Move-In
Final Completion

3.3 LINKAGE REQUIREMENTS:

- A. The following requirements are meant to eliminate any duplication of data and possible inconsistencies, while maintaining data integrity and responsibility.
- B. Links within an Individual Schedule File: Predecessor and successor links within an individual schedule will be created and updated by the Schedule Maintainer. These links will be subject to review by the any of the OBS parties as outlined in the structure above. No activity will have less than one predecessor and one successor, unless it is the first or last activity in the entire schedule.
- C. Use of Lag: Start-to-Finish relationships shall not be used.
- D. Use of Negative Float: Negative Float in the baseline schedule will not be permitted.

3.4 STATUSING SCHEDULES

- A. Schedules will be submitted as to their current status by updating the latest data as often as the responsible OBS party feels necessary to maintain accurate records and presentations, but no less frequently than the timeline and requirements below.
- B. Design Schedule: Design schedule will be updated by the last Friday of the month. The data date to be used will be at least the first of the month, if not more current. The A/E performs the update.

C. Baseline Schedule:

It refers to a set of data about your project that represents its state before the work actually began. In Project, a baseline is a copy of the Start, Finish, Work, and Cost for all the Resources and Assignments, plus Duration for all the Tasks in your project.

D. Preconstruction Schedule: Preconstruction schedule will be updated by the last Friday of the month. The data date to be used will be at least the first of the month, if not more current. The Schedule Maintainer performs the update.

E. Construction Schedule: Construction Schedule will be updated by the last Friday of the month. The data date to be used will be at least the first of the month, if not more current. The Schedule Maintainer performs the update.

1. Updated schedule should be accompanied by a narrative describing the changes from the previous month's version
2. Should the schedule fall behind, an appropriate recovery plan shall be submitted, by the Contractor in addition to the requirements above.

F. Current Schedule: Once a month, the scheduling team will meet to update the schedule. All schedules will be opened and updated. This process will not change the data date of the individual files, but will incorporate all changes from all schedules and propagate.

1. The purpose of these meetings will be to analyze the overall changes to the schedule and determine the cause of the variances.
2. Should the schedule fall behind, an appropriate recovery plan shall be submitted by the Schedule Maintainer.

G. GMP Milestone Schedule: The GMP Milestone Schedule shall cover major project activities and significant project milestones.

3.5 CALENDARS

A. Three calendars may be contemplated for use, however the contractor shall designate which calendar is used when submitting the baseline schedule. Additional calendars may be added as the need arises, but will be subject to the approval of the ODR.

B. Working Calendar: A 5-day/work week calendar, including all holidays. This will be used for all activities not impacted by inclement weather. All design and owner activities will follow this schedule. Generally, all construction activities taking place within the confines of enclosed building will use this schedule.

C. Weather Calendar: A 5-day/work week calendar, including all holidays and weather days. This will be used for all activities that could be impacted by inclement weather. This schedule is reserved exclusively for the use of the construction team. Activities using this schedule will be subject to review by the OBS parties responsible for the construction team.

D. Contractual Calendar: A 7-day/week calendar. This will be used for all activities whose durations are defined by the language of the contract.

3.6 APPROVALS

A. Schedules will need to be reviewed and approved as part of the project development. This section describes those approvals, based on the type of schedule. Schedules will not be considered approved unless a letter has been given to the contractor or design professionals from the ODR. Upon the approval, the schedule will be established as the baseline and cannot be altered without written approval from the

ODR. All submissions will require submittal of the following reports both electronically and (2) hardcopies.

1. Predecessor/Successor Report
2. Total Float Report
3. Complete Schedule with Critical Path Outline

B. Design Schedule Approval: A detailed design schedule will be submitted to the ODR within 10 calendar days of the Notice to Proceed for design work.

C. Construction Schedule Approvals: All construction schedules will be presented to the ODR for review prior to approval of the first payment application at the appropriate corresponding phase of the project. Schedules required for submission are:

1. Preconstruction/Design Schedule
2. GMP Milestone Schedule(s)
3. Detailed Baseline Construction Schedule

3.7 SCHEDULING SUBMITTALS

A. Design Schedule: The A/E shall submit for the ODR's review and approval an updated, detailed design schedule.

1. The detailed design schedule shall include
 - a. Design Milestones (as outlined in the contract documents)
 - b. Document submission for review and approval to the Owner
 - c. Document submissions to the Contractor for bidding and construction
 - d. Critical deadlines for Owner's approvals
 - e. Scheduled interactions with Owner
 - f. Anticipated Design Review Session activities
2. If the schedule has the potential to impact the substantial completion of the project, the team will have to determine possible mitigation strategies including fast tracking and multiple bid packages.

B. Preconstruction Schedules: The A/E or Contractor, as applicable, shall submit a Preconstruction Schedule for the Owner's review and approval. The Preconstruction Schedule shall be updated monthly, consistent with Section 3.3.

1. The Preconstruction Schedule shall cover the following phases and activities:
 - a. Proposed Preconstruction activities prior to issuing the GMP
 - 1) Activities including budgeting, GMP Pricing and approvals, and subcontractor procurement shall be detailed in a format sufficient to directly relate to the current Design Schedule
 - 2) At each successive design milestone (90% SD, 50% DD, 90% DD, 50% CD and 90%CD), the preconstruction activities are to be update to coincide with the current direction on the design package.
 - b. Proposed Procurement activities to be accomplished during the first ninety (90) calendar days after the GMP
 - 1) Activities including mobilization, key shop drawing, sample submittals, fabrication and delivery of long-lead elements. Dates should reflect realistic durations.
 - 2) Procurement activities shall later be incorporated into the GMP Schedule including all requested revisions.
 - c. Construction Summary activities to be accomplished during the construction phase(s)
 - 1) Activities necessary to properly indicate the approach to scheduling the work areas or phases of the work.
 - 2) The approximate duration for each summary activity shall be shown
2. The Preconstruction Schedule shall be used for the preliminary review of time extension request(s) while the GMP Schedule is being developed.
3. Within fourteen (14) calendar days after receipt by the ODR, the ODR shall notify the appropriate party of its acceptance or concerns. A response to the concerns shall be provided, to the satisfaction of the ODR, before submittal of the GMP Milestone Schedule.

- C. GMP Milestone Schedule: With each submission of a GMP (whether standalone or part of multiple GMPs) the Contractor shall submit for the ODR's review and approval, a GMP Schedule.
- D. Detailed Baseline Construction Schedule: Within seven (7) calendar days following the NTP for construction, the Contractor shall submit to the ODR a detailed Baseline Construction Schedule in precedence format (as described in Section 5) for the construction work scope.
 - 1. Schedule shall conform to the requirements outlined in the technical requirements as outlined in Part 3.
 - 2. The Construction Schedule shall be reviewed in the following manner:
 - a. Within fourteen (14) calendar days after receipt by the ODR, the ODR shall notify the Contractor of any comments/concerns
 - b. Within seven (7) calendar days after receipt of the ODR's request of revision to, with adequate justification, activities, durations, manpower or cost loading, the Contractor shall submit a revised schedule, to the satisfaction of the ODR.
 - c. ODR will have final review and acceptance of the schedule.
 - d. Upon the acceptance of the Contractor's Construction Schedule, the ODR shall issue a baseline schedule acceptance letter.
 - 1) This letter will outline acceptance of the construction schedule for use as the baseline for evaluation of all work to be performed.
 - 2) No accepted activity shall be deleted from the construction schedule. In the event that an activity is no longer appropriate, either by change order or otherwise, it shall be stautused with zero (0) duration as the date such determination is made.
 - 3. The Contractor shall submit an electronic copy of the schedule to the ODR each time presented. In addition, the Contractor shall submit accompany schedule report and graphics as specified in Section 4 – Required Reports.

3.8 REQUIRED REPORTS

- A. As part of the Detailed Construction Schedule submittals, as well as for each schedule update, the Contractor shall submit the following reports and graphics as indicated (unless otherwise requested by the ODR):
- B. Graphics:
 - 1. Detailed CPM Schedule with critical path highlighted (Initial Submittal and Revisions)
 - 2. Executive Summary bar chart (Initial Submittal and Monthly Updates)
 - 3. Short-Interval bar chart including 1 week look back and 3 week look ahead (Weekly)
- C. Schedule Reports:
 - 1. Activity listing report showing all schedule activities, sorted by activity number (Initial Submittal)
 - 2. Milestone Summary Report including both Contract Milestones and Interim Milestones (Initial Submittal)
 - 3. Precedence Report including activity predecessors and successors, sorted by activity number (Initial Submittal and Revisions)
 - 4. Total Float Report sorted by total float (Initial Submittal and Monthly Updates)
 - 5. Early Start Report grouped and sorted by early start date. (Monthly Updates)
 - 6. Variance Report comparing current dates to baseline dates. (Monthly Updates)
- D. Narrative Schedule Report:
 - 1. Description of the actual work accomplished during the reporting period (Monthly Updates)
 - 2. Description of any problem areas (Initial Submittal and Monthly Updates)
 - 3. Description of current and anticipated delays with recommended corrective actions to mitigate delays. (Monthly Updates)
 - 4. Digger Report (only applies to P6 scheduling) including a list of explanations of proposed modifications, addition, deletions and changes in logic to the approved construction schedule. If modifications are proposed, a revised schedule demonstrating the effects of such modifications is to be submitted (Monthly Updates)

3.9 SCHEDULE MEETINGS

- A. Monthly Schedule Meetings: Once monthly, on a day mutually agreed to by the Owner, Architect and Contractor, a meeting will be held to assess the progress achieved during the previous month. The Contractor shall submit a progress schedule listing all the activities completed and in progress for the previous month and activities schedule for the succeeding 3 weeks. A bar chart directly derived from the Detailed Construction Schedule shall be used to generate the three week window. All activities shown in this short interval schedule will be identified by the same activity numbers and descriptions as shown in the Construction Schedule. The Contractor may add further details to monitor this Short Interval Schedule
- B. Project Schedule Review Meetings: Each project schedule will be reviewed in depth as part of the specific project's periodic (weekly or biweekly, depending on the project) Owner/Architect/Construction Manger meetings. Schedule issues left unresolved during those meeting will be elevated to discussion at the Monthly Scheduling Meetings.

3.10 SCHEDULE MODIFICATIONS

- A. If the Construction Schedule no longer represents the actual execution and progress of the work, the Owner may require the Contractor to submit a revision to the Construction Schedule.
- B. The Contractor may also request revisions to the Construction Schedule in the event the planning for the work is revised. If revisions to the Construction Schedule are required, the Contractor shall submit fragnets of the proposed changes along with a written narrative of the proposed changes. Such revisions to the Schedule shall not alter any of the Project Milestone dates. If accepted by the Owner these fragnets will be incorporated into the Construction Schedule.
- C. Schedule revisions shall be submitted utilizing a copy of the updated Construction Schedule as modified with proposed changes and a narrative explanation of the change(s).
- D. Upon acceptance of a revision, the revised Construction Schedule shall be the basis for evaluating future status, impact and/or changes. This acceptance will be transmitted in a formal letter from the ODR.
- E. Updating the Construction Schedule to reflect actual progress shall not be considered a revision to the Construction Schedule.

3.11 SCHEDULE IMPACTS, DELAYS AND TIME EXTENSIONS

- A. During the course of the Project, it may be appropriate to revise the schedule to incorporate impacts or delay issues into the Project Schedule. If the Contractor feels they have encountered a schedule impact that warrants a time extension, the Contractor shall notify and present an Impacted Schedule to the Owner supporting the claim within forty-eight (48) hours of the occurrence causing the change.
- B. The procedure for incorporating impacts into the schedule is as follows:
 - 1. Create a schedule activity (or activities) that represent the scope of the change or delay
 - 2. Assign durations to the new activities
 - 3. Determine appropriate logic ties for activities. Assign predecessors and successors to tie into the existing schedule activities. Every effort to mitigate the potential delay by either isolating the impact of the delay or planning "work-around" approaches to the work shall be considered and incorporated where effective.
 - 4. These activities should be loaded into a copy of the updated schedule that immediately preceded the impact issue's time frame. For instance, if an impact issue occurs during mid-April, the new activities should be input into the March 31 (status date) update.
 - 5. After the Schedule is recalculated with these impact activities, the effect on the Project Milestones will be reviewed to determine if the time extension is merited.

- C. The impacted Schedule, along with the narrative describing the new schedule activities and logic ties, which comprise the impact/delay issues, will be submitted to the ODR for review and approval. If approved, these impact/delay issues will become a permanent part of the Project Schedule.
- D. The Contractor shall not unilaterally make changes to the Project Schedule to justify schedule impacts without the approval of the ODR.
- E. Activity delays shall not automatically mean that an extension of the Contract Time is warranted or due to the Contractor. It is possible that an impact/delay will not affect the critical activities or cause non-critical activities to become critical. An impact or delay may result in absorbing a part of the available total float.
- F. Float is not for the exclusive use of the Contractor. Contract time extensions will be granted only to the extent that equitable time adjustments to the activity (activities) affected by the impact/delay exceeds the total float along the critical path of activities at the time of the delay. Use of float must be requested in writing and approved by the ODR in accordance with the Contract Documents.
- G. Weather Days not used in previous months may be allocated for the purpose of mitigating the schedule. The Contractor shall use Saturday as a make-up for approved rain day impacts.

3.12 SCHEDULE LOGS

- A. A schedule log shall be maintained by the Schedule Maintainer that outlines the following:
 - 1. Identifies conflicts and deviation for the Baseline Project Schedule for the selected package.
 - 2. Provides justification for deviation from the Baseline Project Schedule for the selected package.
 - 3. Aids in the creation of a mitigation plan for recovery of Baseline Project Schedule.
- B. The schedule log shall be updated and reviewed by the A/E and Contractor on a monthly basis.