**DRAFT December 2018 Clean Copy**

REVISION OF SECTION 108

PROJECT SCHEDULE

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 108.03 and replace with the following:

**108.03 Project Schedule.**

1. *Definitions.*

Activity ID. A unique, alphanumeric, identification code assigned to an activity and remains constant throughout the project.

Activity. (Task) A portion of the project that requires time and or resources to complete. An activity has a description, start date, finish date, duration, and one or more logic ties. A critical activity is an activity on the critical path.

Baseline Schedule. The original, approved, project schedule before the project begins with no progress.

Calendar. Defined work periods and no work periods that determine when project activities can occur. Multiple calendars may be used.

Constraint. A restriction imposed in a schedule, which fixes a value that would otherwise be calculated within the schedule. Examples of values that can be fixed by a constraint include start date, end date, and completion date.

Critical Path Method Scheduling. (CPM Scheduling) is a logic-based planning technique using activity durations and relationships between activities to calculate a schedule determining the minimum total project duration and the interdependencies of all activities.

Critical Path. The critical path is defined as the longest logical path through the CPM network driven by calendars, constraints, and activity logic and consists of those activities that determine the shortest time for project completion and the sequence of activities such that a delay to any of the activities on the critical path will prolong contractual project milestones, such as project completion.

Data Date. The starting point from which to schedule all remaining work. Can also be considered the ‘cut-off date’ wherein all work before this date has actual starts, actual finishes, or both.

Duration. The estimated amount of time needed to complete an activity.

Free Float. (Free Slack.) The amount of time an activity can be delayed without delaying the Early Start or Early Finish of its successor activity or activities.

Gantt Chart. A time-scaled graphical display of the project’s schedule.

Lag. A time-value assigned to a relationship.

Logic. Relationships between activities defining the sequence of work (See also predecessor activity and successor activity).

Milestone. An activity, with zero duration used to represent an event.

Near Critical Activity. An activity with a total float of five days or fewer or as defined by the Engineer.

Open-Ended Activity. An activity that does not have a predecessor activity and a successor activity or only has a start-to-start as a predecessor or finish-to-finish as a successor.

Planned Completion Date. The date on which the schedule shows work is planned to be completed.

Predecessor Activity. An activity that is defined by schedule logic to precede another activity.

Relationship. The interdependence between activities.

Successor Activity. An activity that is defined by schedule logic to follow another activity.

Time-Scaled Logic Diagram. Gantt chart that illustrates logic links depicting both schedule logic and the time at which activities are performed.

Total Float. (Total Slack) The amount of time between the earliest date an activity can start and the latest date when an activity must start, or the earliest date an activity can finish and latest date when an activity can finish before the activity causes a delay to the time specified in the *Commencement and Completion of the Work* special provision.

1. *Project**Schedule* **-** *General*

The Contractor shall use either Microsoft Project or Primavera Scheduling software to develop and manage a CPM Project Schedule to plan, schedule, and report the progress of the work. Prior to, or at the Preconstruction Conference, the Contractor shall notify the Engineer in writing, which scheduling software the Contractor shall use to manage the project. The Contractor’s selection and use of particular scheduling software cannot be changed after the first schedule submittal. If the Contractor selects Primavera, the Contractor shall calculate the schedule using the Retained Logic scheduling option.

The Contractor shall submit schedules for approval by the Engineer. The Contractor’s schedule shall be an accurate plan to complete the work so that the Department can use the schedule to evaluate progress, schedule CDOT resources, inform the project stakeholders, and evaluate the effect of changes to the schedule. A schedule review meeting shall be held to discuss each schedule submittal.

The Contractor shall submit a monthly update as either a Project Schedule Update or Revised Schedule as determined by the Engineer. When the project has a maintenance or landscape establishment period, the Engineer may waive the monthly update requirement during that period. The Contractor shall submit a final update that shows all work through the final acceptance date.

The Engineer will not issue a monthly progress payment if the Engineer has not received an update. The Engineer may not make monthly progress payments for the months following the update submission until the Engineer either Approves or Approves-as-Noted the Project Schedule Update or Revised Schedule.

The Contractor shall use activity descriptions that ensure the work is easily identifiable. Activity description shall start with an action verb when practicable to clearly communicate what is being performed. The Contractor shall show the no-work days in the schedule calendars. The Contract Completion Date shall be included as an activity.

The Contractor shall use durations for individual construction activities that do not exceed 15 days of work unless approved by the Engineer. The Contractor may group a series of activities with an aggregate duration of five work days or less into a single activity. Non-construction activities may have durations exceeding 15 days of work as approved by the Engineer.

The Contractor may include summary bars in the schedule as long as the detailed activities to complete the work are displayed.

The Contractor shall not use the following in the schedule unless approved by the Engineer:

1. Negative lags.
2. Lags in excess of 10 work days.
3. Start-to-finish relationships.
4. Open-ended activities.
5. Constraints.

The Project Schedule shall show all activities required by all parties to complete the work. The Contractor, its subcontractors, suppliers, and engineers, at any tier, shall perform the work according to the approved Project Schedule. Float within the Baseline Schedule or any other Project Schedule is not for the exclusive use or benefit of either party, but is a project resource available to both parties as needed until it is depleted.

The Engineer’s review of the schedule will not exceed 10 days. The Engineer will provide the Contractor with one of the following responses within 10 days after receipt of the Project Schedule:

* + Approved, no exceptions taken;
	+ Approved-as-Noted; or
	+ Revise and Resubmit within 10 days.

Approval of the Project Schedule does not relieve the Contractor of any contract requirement including the requirement to complete all work within the Contract Time. Contractual requirements do not change by submission or approval of a schedule, unless specifically amended by Change Order.

1. *Schedule Submittals.*

The Contractor shall include a time-scaled logic diagram with all schedule submittals that:

* 1. Is plotted on a horizontal time-scale in accordance with the project calendar.
	2. Uses color to clearly identify the critical path.
	3. Is based on early start and early finish dates of activities.
	4. For Project Schedule Updates and Revised Schedules, shows actual completion dates up to but not including the data date.
	5. Clearly shows the sequence and relationships of all activities necessary to complete the contract work.
	6. Includes an activity block for each activity with the following information:

|  |  |  |
| --- | --- | --- |
| Activity ID | Activity Description | Original Duration |
| Total Float | Early start date  | Early finish date  |
| Late start date \* | Late finish date \* | Actual Start date ^ |
| Actual Finish date ^ | Calendar used on the activity | Activity Responsibility# |
| Remaining Duration ^ | Duration Percent Complete ^ | Gantt chart |
| \* Required with the Preliminary and Baseline Schedule.^Required with the Project Schedule Update and Revised Schedule.#Specify subcontractors, vendors, and all stakeholders. |

* 1. A Job Progress Narrative Report that includes the following:
1. Baseline, Preliminary, and Revised Schedules:
2. A narrative of the critical and near critical work activities. This narrative shall include real or perceived risks and assumptions, including production rates. Particular emphasis shall be made on activities which are the Contractor’s and Department’s responsibilities, third party activities, or long lead procurement items.
3. A narrative, including attachments if appropriate, of all of the project’s calendars. This narrative shall explain work and non-work periods as well as special weather dependent calendars. A list of the calendars used in the schedule, a description of each calendars work and non-work days, a list of the activities using each calendar, and an explanation of how the calendar applies to that work.
4. A narrative of planned work on night shifts or planned work that will require approval from the Department or other agencies.
5. A list of all added and deleted activities along with a brief explanation for the change.
6. All logic and duration changes to any activity along with an explanation for changes to any critical and near critical activities.
7. A description of site mobilization (such as dates of expected material shipments, planned dates for equipment arrivals, office setup, material laboratory arrival and setup, and anticipated portable crusher or batch plant setup).
8. A list of the fabrication and delivery of key and long-lead procurement activities.
9. Project Schedule Update:
10. A description of the work performed since the previous month’s schedule update.
11. A description of changes to any items in subsection (c)(7)(i).
12. A description of problems encountered or anticipated since the previous month’s schedule submission.
13. A description of unusual labor, shift, equipment, or material conditions or restrictions encountered or anticipated.
14. The status of all pending items that could affect the schedule.
15. Explanations for milestones forecasted to occur late.
16. Scheduled completion date status and any change from the previous month’s submission.
17. An explanation for a scheduled completion date forecasted to occur before or after the contract completion date or contract time.
18. Schedule Delays:
19. A description of current and anticipated delays including identification of the delayed activity or activities by Activity ID(s) and description(s).
20. Effect of the delay on other activities, milestones, and completion dates.
21. Identification of the actions needed to avoid a potential or mitigate an actual delay.
22. A description of the critical path impact and effect on the scheduled completion date in the previous month’s schedule update.
23. An explanation of any critical and near critical work that is not progressing as planned.
24. A list of all added and deleted activities along with a brief explanation for the change.
25. Any logic and duration changes to a critical or near critical activity along with an explanation for the change.
26. For working day contracts, a list of planned nonworking days with actual work.
	1. A Predecessor Activity and Successor Activity report that defines all schedule logic and clearly indicates all logical relationships and constraints.
	2. An Early Start report listing all activities, sorted by actual start/early start date.
	3. A Float report listing all activities sorted in ascending order of available float.
	4. A Critical Path report listing all activities not yet complete with the percent complete, sorted by float and then by early start.
	5. A listing of all non-work days.

For all required schedule submittals, the Contractor shall submit two USB flash drives or other media as directed by the Engineer with electronic copies of the schedule submittals. Electronic copies of the CPM schedules shall be submitted both in the native file format and in Portable Document Format (PDF).

Each schedule submittal shall be appropriately labeled as a Preliminary Schedule, Baseline Schedule, Project Schedule Update, or Revised Schedule. The title bar shall include the CDOT project number, subaccount, project name, Contractor name, and schedule data date. If an originally submitted schedule is revised during review, the title bar shall also include a revision number (REV1, REV2, etc.) revision date, and submission date.

1. *Preliminary Schedule.*

Within 14 days of Award of the Contract, the Contractor may submit a Preliminary Schedule showing all planned activities from the Notice to Proceed through the first 60 days of the project. If the Contractor elects not to submit a Preliminary Schedule, then the Contractor shall submit a complete Baseline Schedule within 14 days of award of the Contract, which will be subject to all requirements of a Baseline submittal. The Preliminary Schedule shall be used as the basis for the Baseline Schedule. The Preliminary Schedule shall not show any progress and it will be approved by the Engineer before work can commence. The Preliminary Schedule shall be used as the basis for the Baseline Schedule.

1. *Baseline Schedule.*

If the Contractor elects to submit a Preliminary Schedule, within 45 days of the award of Contract, the Contractor shall submit a Baseline Schedule that includes all work activities completed within Contract Time. The Contractor shall not show progress in the Baseline Schedule. Further partial payments will not be made beyond 60 days after the start of Contract Time unless the Baseline Schedule is approved. When approved, the Baseline Schedule shall become the Project Schedule. The Contractor shall use all information known by the Contractor at the time of bid submittal to develop the Baseline Schedule. If the Contractor elects to submit a Baseline Schedule in lieu of a Preliminary Schedule, the Baseline Schedule shall be approved before work can commence.

1. *Project Schedule Update*.

The Contractor shall submit a monthly update of the Project Schedule updated through the cut-off date for the monthly progress pay estimate, and a projection for completing all remaining activities. A schedule update may show a completion date that is different than the Contract completion date. Approval of this schedule shall not relieve the Contractor of its obligation to complete the work within the Contract Time. When approved, the Project Schedule Update will become the Project Schedule.

1. *Weekly Planning* Schedule.

The Contractor shall submit, in writing, a Weekly Planning Schedule that shows the Contractor’s and all Subcontractor’s planned activities for a minimum of two weeks immediately following the date of submittal and actual days worked versus planned for the week prior to the date of submittal. This schedule shall include the description, duration and sequence of work activities and anticipated lane closures for the upcoming two weeks. The Weekly Planning Schedule shall be based on the Project Schedule and may be a time-scaled logic diagram or other standard format as approved by the Engineer. Subsection 108.03(c) Schedule Submittal requirements for reports do not apply to the Weekly Planning Schedule.

1. *Revised Schedule*.

A Revised Schedule is required in the event of any major change to the work. Examples of major changes are:

* 1. Significant changes in logic or methods of construction or changes to the critical path;
	2. Addition, deletion, or revision of activities required by contract modification order;
	3. Approval of a Contractor submitted Value Engineering Change Proposal;
	4. Delays in milestones or project completion;
	5. Phasing revisions,
	6. When the Engineer determines that the schedule has a fatal flaw; or
	7. When the work cannot be constructed as scheduled.

The Contractor shall provide a Revised Schedule within 10 days of written notification and shall include the diagrams and reports as described in subsection 108.03 (b) Schedule - General and (c) Schedule Submittals. Once approved, the Revised Schedule becomes the Project Schedule.

1. *Payment.*

All costs relating to the requirements of this subsection will not be paid for separately, but shall be included in the work.