SECTION 01311 - CONSTRUCTION SCHEDULE B

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PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide a schedule of major construction activities.

1.02 RELATED REQUIREMENTS

A. Section 01340, *"Submittals"*

1.03 REFERENCE STANDARDS

Not used

1.04 QUALITY ASSURANCE

Not used

1.05 MEASUREMENT AND PAYMENT

Not used

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

3.01 SCHEDULE OF OPERATIONS

The Contractor shall submit to the Engineer a Preliminary Progress Schedule and a Critical Path Method (CPM) Schedule (along with updates) as described below:

A. Preliminary Progress Schedule - The Contractor shall submit to the Engineer, within ten (10) working days after date of the contract award, a Preliminary Progress Schedule covering the Contractor's activities during the first ninety (90) calendar days of the contract. The Preliminary Progress Schedule shall be subject to favorable review by the Engineer, and shall be amended as required by the Engineer.

B. Critical Path Method (CPM) Schedule - The Contractor shall submit an acceptable CPM Schedule to the Engineer within thirty (30) calendar days after the receipt of the Notice to Proceed. Subsequent revisions to said schedule shall be submitted as set forth hereinafter. The requirement for the CPM Schedule is included to assure adequate planning and execution of the work and to assist the Engineer in appraising the reasonableness of the proposed schedule and evaluating progress of the work. The CPM Schedule submitted under this Specification shall utilize a critical path method (CPM) format, either the precedence or arrow diagramming method with schedule showing completion of contract completion date, with neither Contractor nor the City owning "float." No more than one (1) progress payment will be made prior to submission and acceptance of the CPM Schedule.

1. The CPM Schedule system shall consist of diagrams and accompanying mathematical analyses. The diagrams shall show elements of the project in detail and an entire project summary. Diagrams shall show the order and interdependence of activities and sequence in which the work is to be accomplished as planned by the Contractor. The basic concept of a network analysis diagram shall be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of following activities. Detailed network activities shall include, in addition to construction activities, the submittal and approval of samples and equipment, fabrication of special material and equipment and their installation and testing. Cost value of each activity shall be included. All activities of the Owner and the Engineer that affect progress and required contract dates for completion of all or parts of the work shall be shown. The selection and number of activities shall be subject to favorable review by the Engineer. Summary networks shall be time-scaled. Duration shall be in working days and shall not exceed fifteen (15) working days, except for submittal and delivery items. Where the duration of continuous work exceeds fifteen (15) working days, work items in the Construction Schedule shall be subdivided by location, approximate stationing or other sub-element of the work.

   The graphic network diagram shall include for each activity, the description, activity number, the estimated duration in working days, and all activity relationship lines. The network diagram shall be drawn for the early start of all activities. If the precedence technique is utilized, the schedule report shall include a calendar in working days, a network report sorted by early start and a logic table report sorted by preceding work item. If the arrow technique is utilized, the schedule report shall include a calendar in working days, a network report sorted by early start, a network report sorted by I-J numbers, and a network sorted by slack time and I-J numbers.

2. The critical path shall be shown on all reports and on the graphic network diagram. The activities that constitute the critical path shall be identified.

3. The mathematical analysis of the network diagram shall include a tabulation of each activity. The following information shall be furnished as a minimum for each activity:

a. preceding and following event numbers

b. activity description and number

c. estimated duration of activities

d. earliest start date (by calendar date)

e. earliest finish date (by calendar date)

f. actual start date (by calendar date)

g. actual finish date (by calendar date)

h. latest start date (by calendar date)

i. latest finish date (by calendar date)

j. slack or float

k. percentage of activity completed

l. cost value of each activity

4. The program shall be capable of accepting revised completion dates as modified by approved time adjustments and re-computations of all tabulation dates and float accordingly.

5. Submission and review of the system shall be as follows:

   a. The complete network analysis system, consisting of the detailed network mathematical analysis and network diagrams, shall be submitted within thirty (30) calendar days after receipt of Notice to Proceed.

   b. The Contractor shall participate in a review and evaluation of the proposed network diagrams and analysis by the Engineer. Any revisions necessary as a result of this review shall be resubmitted for review by the Engineer within ten (10) calendar days. When completed, the favorably reviewed schedule shall then be the schedule to be used by the Contractor for planning, organizing, and directing the work, and for reporting progress. If the Contractor thereafter desires to make significant changes in his method of operating and scheduling, he shall notify the Engineer in writing stating the reasons for the change.

c. The Contractor shall submit at monthly intervals a report of the actual construction progress. Each monthly report shall cover a period of approximately thirty (30) days ending around the 30th of each month. The monthly reports shall be submitted within ten (10) calendar days of the end of the reporting period.

i. If the project is proceeding on schedule, the monthly update report may consist of a marked-up copy of the graphical network diagram. This submittal shall clearly indicate the status of any minor shifts in sequence or schedule and the estimated completion date or percent complete of all activities currently in progress. The contract completion date shall also be indicated. The Contractor shall submit a narrative report relating to status of construction, the schedule, and factors that may affect the remainder of the schedule. The report shall show the activities or portions of activities completed during the reporting period. The report shall state the percentage of the work actually completed and scheduled as of the report date and the progress along the critical path in terms of days ahead or behind the allowable dates.

ii. If, in the opinion of the Engineer, the project is behind schedule, the monthly report shall include a revised network diagram and/or mathematical analysis showing the Contractor's proposed revised schedule. An analysis of the effect that the delay has on progress along other paths shall also be included in the report. The Contractor shall also submit a narrative report with each updated analysis which shall include but not be limited to a description of current and anticipated problem areas, delaying factors and their impact, and an explanation of corrective actions taken or proposed.

iii. A minimum of eight (8) copies of the periodic reports shall be submitted to the Engineer, who shall return two (2) copies to the Contractor after their approval.

6. To the extent that the favorably reviewed initial Construction Schedule, or revisions thereto, indicate anything not jointly agreed upon, it shall be deemed to be not favorably reviewed by the Engineer. Any omission of work from the detailed schedule, otherwise required for Contract compliance, will not excuse the Contractor from completing such work within any applicable completion date. The CPM Schedule shall be generated by computer methods.

C. Schedule Review - Once each month, on a date mutually agreed upon, but no later than seven (7) working days after the monthly schedule progress report date, a job-site meeting will be held to review the Construction Schedule and job progress. The Contractor shall also attend weekly meetings scheduled by the Engineer to review the progress of the work in the preceding week and in the subsequent work, coordinate the work with public agencies or other contractors as required, and allow the Engineer to plan his activities for testing, inspection, etc.

D. Schedule Revisions - The conditions under which the Engineer will require revisions of the Construction Schedule include the following:

1. When delay in completion of any work item or sequence of work items results in an estimated extension of project completion by either twenty (20) working days or by five percent (5%) of the remaining duration of time to complete the Contract, whichever is less.

2. When delays in submittals or deliveries make re-planning or rescheduling of the work necessary.

3. When the schedule does not represent actual prosecution and progress of the work.

4. When any change to the sequence of activities, the completion date for major portions of the work, or when changes occur which affect the critical path.

5. When Contract modification necessitates schedule revision, the Contractor shall submit a schedule analysis of all change order work with his proposal.

E. Cash Flow Projection - A cash flow projection shall be submitted with the Construction Schedule. This cash flow projection shall be revised and resubmitted when revisions of the Construction Schedule will result in changes to the projected cash flow.

3.02 TIME IMPACT ANALYSIS FOR CHANGES, DELAYS, TIME EXTENSIONS, AND CONTRACTOR REQUESTS

A. When change orders are initiated, delays are experienced or the Contractor, desires to revise the logic, the Contractor shall submit to the Engineer a written Time Impact Analysis illustrating the influence of each change, delay, or Contractor request on the current contract schedule completion date. Each Time Impact Analysis shall include a fragment (fragmentary network analysis) demonstrating how the Contractor proposes to incorporate the change order, delay, or Contractor request into the Detailed Network. The analysis shall demonstrate the time impact based on the date of occurrence of the change, delay, etc., the status of construction at the point in time, and the event time computation of all affected activities. The event times used in the analysis shall be those included in the latest update copy of the Detailed Network or as adjusted by mutual agreement.

B. Activity time delays will not automatically mean that an extension of contract time is warranted or due the Contractor. It is possible that a strike or contract modification will not affect existing critical activities or cause non-critical activities to become critical, i.e., a strike or modification may result in only absorbing a part of the available total float that may exist within an activity chain of the network, thereby not causing any affect on the contract completion date or time. Float or slack is not for the exclusive use of or benefit of the Owner, Engineer, or the Contractor. Extensions of time or performance will be granted only to the extent that the equitable time adjustments for the activity or activities affected exceeds the total float along the activity chain involved at the time the change was ordered or delay occurred.

C. Each Time Impact Analysis shall be submitted in triplicate and within fifteen (15) calendar days after a delay occurs or notice of direction for a change is given to the Contractor. In cases where the Contractor does not submit a Time Impact Analysis for a specific change order delay, or Contractor request within the specified period of time, then it is mutually agreed that particular change order, delay or Contractor request has no time impact on the contract completion date and no time extension is required. Approval or rejection of each Time Impact Analysis is by the Engineer and Owner and shall be made within fifteen (15) calendar days after receipt of each Time Impact Analysis unless subsequent meetings and negotiations are necessary. Upon approval, a copy of the time Impact Analysis signed by the Engineer and Owner will be returned to the Contractor. Upon mutual agreement by both parties, fragmentary network(s) illustrating the influence of change orders, delays, and/or Contractor requests will be incorporated into the detailed Network during the first update after agreement is reached.

End of Section