

PART 1 - GENERAL**1.1 RELATED REQUIREMENTS**

- .1 Not Used.

1.2 OBJECTIVES

- .1 The Contractor must provide a Project Schedule in order to meet the following needs:
 - .1 Know the dates that the facility must provide certain equipment or services;
 - .2 Know the dates that the Professionals must respect for work within their expertise. (Approval of drawings and samples, etc.);
 - .3 Ensure that phasing required in Contract Documents is respected;
 - .4 Ensure that the deadlines mentioned in the Contract Documents are respected;
 - .5 Ensure continuous monitoring of the project so that if delays occur during the course of the project, there will be quick a response and intervention;
 - .6 Reasonably establish time frames caused by unpredictable construction conditions or Change Orders;
 - .7 Ensure proper follow-up when a request for information (RFI's) is made by Contractor to Professionals;
 - .8 Ensure follow-up and tracking for Change Order approval process.

1.3 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
 - .2 Non-critical Activity: activity with a low total float margin.
 - .3 Critical Activity: activity with a total float margin equal to zero
 - .4 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.
 - .5 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
 - .6 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
 - .7 Project Schedule Baseline: accepted by Contractor and Owner as the project schedule to be followed to carry out project. This schedule can be modified along the way after agreement between the contractor and the owner.
 - .8 Updated Project Schedule: Reference execution schedule on which the actual start and end dates, the planned start and end dates and the updated percentages progress have been entered.
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- .9 Modified Project Schedule: Work execution schedule that changes the list of activities or relationships contained in the reference execution schedule. When approved, it becomes the new Project Schedule Baseline.
- .10 Project Planning: Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.
- .11 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .12 Construction Work week: five (5) day week work week, Monday to Friday, defining scheduled calendar working days shown in the Bar (GANTT) Chart submission.
- .13 Quantified Days Duration: number of work periods (discounting statutory holidays or other nonworking periods) required to complete activity or other project task. Usually expressed as workdays or workweeks.
- .14 Stakeholder: Company or individual responsible for carrying out a task (activity).
- .15 Milestone: significant event in project, usually corresponding to the completion of an important (deliverable) product. In MS Project software, the milestone is represented by an activity that has a duration of zero days.
- .16 Completion Milestone: event corresponding to the end of the project (issuance certificate of substantial completion).
- .17 Elapsed Day: name given to a calendar day in the MS Project software.
- .18 Critical Path: the longest path between the start and the end of the project. On this path, all activities have a total float margin equal to 0.
- .19 Constraints: restrictions or limits having repercussions on the realization of the project. Its restrictions are normally beyond the control of the contractor. Anything that affects the timing of an activity.
- .20 Control: comparison between the actual execution and planned execution, deviation analysis, possible solution evaluation, and implementation of appropriate corrective measures.
- .21 Start Date: point in time associated with activity's start, usually qualified by one of following: actual, planned, estimated, scheduled, early, late, baseline, target or current date.
- .22 Late Start Date: latest possible point in time when uncompleted portions of a schedule activity can start based on schedule network logic without delaying project, and schedule constraints if applicable.
- .23 Early Start Date: contains the earliest date that a task could possibly begin, based on schedule network logic without modifying project, and schedule constraints if applicable.
- .24 Expected Start Date: contains the date at which the task is expected to start. In the Baseline Project Schedule, it is the earliest start date.
- .25 Actual Start Date: shows the date and time that a task or an assignment actually began.
- .26 Finish Date: point in time associated with a schedule activity's completion. Usually qualified by one of following: actual, planned, estimated, scheduled, early, late, baseline, target, or current.
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- .27 Late Finish Date: latest possible point in time when uncompleted portions of a schedule activity can finish based on schedule network logic, and schedule constraints if applicable.
- .28 Early Finish Date: contains the earliest date that a task (project) could possibly finish, based on schedule network logic, and schedule constraints if applicable.
- .29 Expected Finish Date: contains the date at which the task is expected to be finished. In the Baseline Project Schedule, corresponds to the earliest finish date.
- .30 Actual Finish Date: shows the date and time when a task or assignment was actually completed.
- .31 Update Work: date on or until which information on the actual status of the project, provided by the reporting system, applies or is valid.
- .32 Status Date: is almost never the current date, so you need to set it in MS Project.
- .33 Free Float (Slack) Margin: amount of time that a task can be delayed without delaying any successor tasks. If the task has no successors, Free Float is the amount of time that a task can be delayed without delaying the entire project's finish date. The Float Margin is calculated arithmetically and may change depending on the progress of the project and changes to the project plan.
- .34 Total Float (Slack) Margin: contains the amount of time a task's finish date can be delayed without delaying the project's finish date. The float margin is calculated arithmetically and may change depending on project progress and changes to the project plan.
- .35 Project Schedule Network Diagram: graphical representation of logical relationships among project schedule activities. Always drawn from left to right to reflect Project chronology.
- .36 Follow up (Progress Analysis): information gathering about the status of a project activity, analysis, usually in comparison with performance baselines; report production.

1.4 TOOLS TO BE USED

- .1 The Contractor is to provide the Owner with a Project Schedule built in accordance with precedence model rules (CPM with activities on the knots). This Project Schedule shall be prepared using the MS Project software (version 2017). All Project Schedule versions requested by Owner or submitted to Owner must be accompanied by an MPP format file (created by MS Project) that will have been used to prepare these Project Schedules.

1.5 REQUIREMENTS

- .1 Ensure that Master Plan and Detail Schedules are practical and remain within specified Contract duration.
 - .2 Plan to complete Work in accordance with specified milestones and time frame.
 - .3 Limit activity durations to a maximum of approximately 10 working days, to allow for progress reports.
 - .4 Ensure that it is understood that Award of Contract or start date, work progress, provisional certificate and final certificate are definite project steps and are of essence of this contract.
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- .5 The Contractor will assign an employee responsible for planning and controlling construction projects to carry out and track the Project Schedule. This employee must have enough knowledge to efficiently use the MS Project software.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative, within 15 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan. The Departmental Representative must advise the Contractor of the work schedule compliance within 5 working days following submission.
- .4 If submitted project schedule meets all criteria listed below, the Departmental Representative will issue a compliance notice, if not the Departmental Representative will provide Contractor with a list of corrections to make project schedule compliant.
- .5 **Construction Work will not be authorized to begin unless Contractor has submitted project schedule.**
- .6 If the Project Schedule is deemed incompliant, the Contractor will have 5 working days to correct the Project Schedule, in accordance with Departmental Representative's requirements and provide a revised copy. The Departmental Representative will have 5 working days to assess compliance of revised Project Schedule.
- .7 If, during review, the timetable schedule is deemed incompliant by Departmental Representative because corrections have not been made, the Departmental Representative shall correct the schedule and the corrected schedule will become the standard project reference and Contractor must comply to the updated schedule as if he/she himself/herself had prepared and submitted it.
- .8 **If submission deadlines for the previously listed project schedule are not respected by Contractor, the first payment request will be withheld until project schedule is received and approved.**
- .9 The accepted revised schedule will become the master plan, which will serve as a benchmark for updates.
- .10 Approval of Project Schedule reference :
 - .1 The initial Project Schedule submitted by the Contractor will be reviewed by the Owner for compliance with Contract document requirements.
 - .2 The Project Schedule will be refused and returned to Contractor if it does not fully comply with the following rules:
 - .1 Generalities
 - .1 It must be designed as a precedence type network (CPM with activities on the knots) and all Start dates at the earliest, End dates at the earliest, Start dates at the latest, and End dates at the latest, total and free margins must be calculated using the mathematical model corresponding to this type of Project Schedule.
 - .2 It must be prepared with the MS Project software or any other software that can generate an MPP format file and that can be directly used by the MS Project software (version 2017).

- .3 It must be electronically delivered to the Owner and accessible as an MPP format file, compatible with MS Project (version 2017).
- .2 Activity List
 - .1 Each activity must be performed by a single stakeholder and be able to be continuously performed without carrying out other activities.
 - .2 All activities must have at least one predecessor and at least one End-to-Start or End-to-End successor.
 - .3 All Start and End dates must be calculated using the mathematical model. No Start or End date should be imposed on an activity.
 - .4 Milestones must always have predecessors or successors.
 - .5 The dates imposed on the milestones, if any, must not create negative margins.
 - .6 All procurement activities must appear on the Project Schedule.
 - .7 Activities must be grouped in accordance with Article 1.8 requirements.
- .3 Length of activities
 - .1 The length of activities shall be indicated as working days or calendar days.
- .4 Scheduling
 - .1 Procurement activities must be interconnected as requested in Article 1.9.
- .5 Schedule
 - .1 The Project Schedule must include all legal holidays.
- .6 Stakeholders
 - .1 All activities must have at least one affected resource to identify responsible stakeholder for the activity.

1.7 PROJECT MILESTONES

- .1 The project must begin with a milestone entitled « Award of Contract » which has no predecessors and whose Start date is that of the Award of Contract at the earliest.
- .2 The Construction Work is preceded by a milestone entitled « Authorization to begin Work » which has as a predecessor the activity « Award of Contract » and whose Start date is the earliest one at which Work can begin on-site.
- .3 The project ends with a milestone entitled « Project Delivery » which has no successors and whose End date at the earliest is calculated using the mathematical model of the precedence network. It is the earliest End date of this milestone that determines the project's completion date according to the Project Schedule.
- .4 If the contractual documents stipulate that the facility must provide equipment or services at specific dates or at specific project phases, the Project Schedule must provide milestones for each of these requirements with suitable constraints.
- .5 If the contractual documents stipulate that the project must be delivered in stages, the Project Schedule should provide milestones for each stage. Each step will be subject to partial Provisional Acceptance.
- .6 The Project Schedule must include all activities necessary for delivery of each project stage: Final Cleaning, Inspection, Tests, Deficiency correction.

1.8 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.

- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Project management including at least the following subgroups:
 - .1 Project start (mobilization, obtaining permit, relocation, etc.);
 - .2 Delivery of project (Mechanical, elevator and ventilation testing, inspections, deficiency corrections etc.)
 - .2 Project procurement divided into the following sub-groups :
 - .1 Award of sub-contracts.
 - .2 Shop drawing and sample preparation (shop drawing and sample list must correspond to the list provided by the Professionals).
 - .3 Approval of shop drawings and samples by the Professionals.
 - .4 Approval of drawings and samples, if necessary, by the establishment.
 - .5 Manufacturing and delivery.
 - .6 Materials provided with a long delivery time.
 - .7 Delivery dates requested for equipment provide by the Engineer.
 - .3 Construction
 - .1 Excavation.
 - .2 Backfill.
 - .3 Building footings.
 - .4 Slab on grade.
 - .5 Structural Steel.
 - .6 Siding and Roofing.
 - .7 Interior Architecture (Walls, Floors and Ceilings).
 - .8 Plumbing.
 - .9 Lighting.
 - .10 Electrical.
 - .11 Piping.
 - .12 Controls.
 - .13 Heating, Ventilating, and Air Conditioning.
 - .14 Millwork.
 - .15 Fire Systems.
- .3 Each activity must be carried out by a single stakeholder (ex.: formwork sub-contractor, plumbing sub-contractor, General Contractor, Departmental Representative) and this activity must be able to be carried out on an ongoing basis by the same stakeholder without having to wait for other activities to begin or end. However, there are two exceptions to this rule. The first is where installation is performed by one stakeholder and supply of materials by another. The second is where the work must be carried out by several stakeholders at the same time and in close collaboration for a very short period of time (ex. pouring of concrete).
- .4 Activity description should be easily understood by all. It must clearly identify the activity even if is isolated from its structure. (ex. 1st floor Drywall Installation).
- .5 Activity numbering must be independent of its position on the Project Schedule and must be permanent for the length of the entire project (use the field « Unique ID » in MS Project or the static WBS numbering).

1.9 SEQUENCING

- .1 All activities must have at least one predecessor and one successor such as End-to-Start or End-to-End.
- .2 The milestones must be linked to at least one task by a predecessor or a successor, depending on the case.

- .3 Procurement activities must respect the following principle: Award of sub-contract, follow-up of shop drawing preparation necessary for sub-contract realization, follow-up of shop drawing approval, follow-up of fabrication or delivery for all components/elements appearing on shop drawing, and follow-up of construction activity for these components. .
- .4 The Contractor is responsible for scheduling activities. The Departmental Representative will be able to report to Contractor any links which may seem faulty, missing or unnecessary. The decision, however, without appeal, will be the Contractor's.

1.10 DURATION OF ACTIVITIES

- .1 The duration of activities are set by the Contractor.
- .2 The duration of activities to be carried out by the Owner or by the Owner's Representative's must respect the durations indicated in the contractual documents. (Drawing approval time frame, etc.).
- .3 The Departmental Representative will be able to report to the Contractor activity durations that appear to be faulty. The decision without appeal, however will belong to the Contractor.

1.11 STAKEHOLDERS

- .1 The Contractor must assign at least one resource to each activity defining the stakeholder's specialty allowing stakeholder to carry out this activity.

1.12 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

1.13 WORK PROGRESS REPORT

- .1 Update Project Schedule twice a month before site meetings, to reflect changes in activities, completion of activities and ongoing activities.
 - .2 Attach a narrative report to the Project Schedule indicating work progress, comparing progress against reference schedule and presents current projections, expected delays, impacts of these elements and possible mitigation measures.
 - .3 Completed dates:
 - .1 For all activities that began before the stated date, the Contractor will enter the date on which the activity began in the field « Actual Start » and progress percentage in the « % completed » field.
 - .2 If the activity is expected to last longer than planned, the Contractor will correct the activity duration to reflect new duration. The Contractor will indicate this change in the « Comment » field of the activity.
 - .3 For all activities that ended before the stated date, enter the date on which the activity ended in the « Actual End » field.
 - .4 For updating purposes, the Contractor must not modify links, add or remove activities except for requests for Information and for follow-up activities of change notices.
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- .4 Predictable dates:
 - .1 If the Contractor anticipates that certain activities will begin on a different date than on the Project Schedule, the date can be modified by entering the new date in the « Start » field and indicating this change in the « Comment » field.
 - .2 During the update, the Contractor should not change the links that unite the activities.
 - .3 Request for Information :
 - .1 If the Contractor issues requests for information, they will have to be added as new activities in the schedule.
 - .2 The Contractor will place under the same group entitled « Request for Information » all requests for information.
 - .3 During updates, the Contractor will track these activities in the same way as construction activities are tracked.
 - .4 Change Orders (CO)
 - .1 The CO's that may affect project duration or various phase delivery or actions to be carried out by the facility, will have to be included in the Project Schedule. If the Contractor decides not to include a CO in the Progress Schedule, the Departmental Representative will interpret that the CO has no repercussions to the Project Schedule timeline.
 - .2 The Contractor must enter all changes in a group entitled « CO follow-up ».
 - .3 Each CO must include the following activities:
 - .1 CO Issuance.
 - .2 Contractor's quote.
 - .3 Proposal evaluation by the Professionals.
 - .4 CO Approval.
 - .5 Modification execution.
 - .4 Following OC approval, the Contractor must replace « Modification execution » activity with one or more activities required by the change. In some cases, only the duration of certain existing activities may occur.
 - .5 When updating the Project Schedule, the Contractor will track these activities in the same way as for construction activities.

1.14 MODIFICATION OF WORK SCHEDULE REFERENCE

- .1 Definition:
 - .1 Unlike the update, the changes in the Project Schedule are intended to modify the Project Schedule reference model. If the Project Schedule reference cannot be respected or must be changed because of unpredictable site conditions, or changes requested by Owner or for any other reason, the Contractor may change the Project Schedule reference with the Owner's consent.
- .2 Content:
 - .1 To do this, the Contractor will first need to update by setting the stated date to the date on which he/she wishes to make the changes.
 - .2 The Contractor will then make all the required modifications.
 - .3 The Contractor submits the revised Project Schedule to the Owner with a document explaining all changes to the Project Schedule. The Departmental Representative establishes compliance of the modified Project Schedule, by applying the same criteria as for the Project Schedule reference.
 - .4 Once the modified Project Schedule is accepted by the Departmental Representative, it becomes the Project Schedule reference.

2021-01-19

Page 9

.3 Frequency:

.1 The schedule must be changed whenever events beyond the Contractor's control prevent the Contractor from respecting the sequence of activities planned in the Work schedule reference.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION
