
USACE / NAVFAC / AFCEA / NASA UFGS-01321N (August 2004)

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UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 23 June 2005

Revised throughout - changes not indicated by CHG tags

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SECTION 01321N

[DESIGN-BUILD] NETWORK ANALYSIS SCHEDULES (NAS)
08/04

NOTE: This guide specification covers the preparation and use of Design-Build Network Analysis Schedules and Design-Bid-Build Network Analysis Schedules and as such must be edited for the acquisition method used. As prescribed in FAR 36.515, the Contracting Officer may insert the clause "Schedules for Construction Contracts" (FAR 52.236-15) in solicitations and contracts when a fixed-price construction contract is contemplated, the contract amount is expected to exceed the simplified acquisition threshold, and the period of actual work performance exceeds 60 days. This clause may be inserted in such contracts when work performance is expected to last less than 60 days and an unusual situation exists that warrants impositions of the requirements. This clause should not be used in the same contract with clauses covering other management approaches for ensuring that a contractor makes adequate progress. Coordination is required with other Division 1 specifications when Network Analysis Schedules is not specified.

Coordinate selection of the scheduling specification (either 01320 or 01321) with the administrating ROICC Office.

Comments and suggestion on this specification are welcome and should be directed to the technical proponent of the specification. A listing of the technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

NOTE: This guide specification requires project costs to be loaded into the schedule and assigned to activities. When using this section, delete the requirement for "Schedule of Prices" in Section 01200 "Price and Payment Procedures".

PART 1 GENERAL

1.1 DESCRIPTION

NOTE: Edit the following paragraph as applicable for Design-Build or Design-Bid-Build contracts.

The network analysis system shall consist of the network analysis schedule (diagram) and associated reports. The scheduling of all[design,] procurement and construction shall be the responsibility of the Contractor. [All design and construction][Construction] increments will be interrelated on a single schedule that represents the entire project duration from Contract Award to the Contract Completion Date. Schedule updates will build upon each other and will include [design and]construction increments as they are detailed, submitted and accepted. Submission of progress and revision data will be used to measure work progress, aid in the evaluation for requests for time extensions, and to provide the basis of all progress payments. The Critical Path Method (CPM) of network calculation shall be used to generate the project schedule and will utilize the Precedence Diagram Method (PDM) to satisfy both time and cost applications. All progress payment amounts will be derived from and tied to the cost-loaded schedule activities.

For consistency, when scheduling software terminology is used in this specification, the terms in Primavera's scheduling programs are used. Primavera Project Planner, P3, Primavera Project Manager, SureTrak and PrimeContract are registered trademarks or service marks of Primavera Systems, Inc. Adobe and Acrobat are registered trademarks of Adobe Systems Incorporated.

1.2 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the

submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualifications; G

Standard Activity ID Dictionary; G

[Design Network Analysis Schedule; G]

Construction Network Analysis Schedule; G

Baseline Network Analysis Schedule; G

SD-07 Certificates

Monthly Network Analysis Updates; G

[Summary Network; G]

SD-11 Closeout Submittals

As-Built Schedule; G

1.3 SCHEDULE ACCEPTANCE

Review comments made by the Government on the Contractor's schedule(s) will not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for scheduling, sequencing, and prosecuting the Work to comply with the requirements of the Contract Documents. Government acceptance extends only to the activities of the Contractor's schedule that the Government has been assigned responsibility and agrees it is responsible. The Government will also

review for contract imposed schedule constraints and conformance, and cost loading of the CPM activities. Comments offered on other parts of the schedule, which the Contractor is assigned responsibility, are offered as a courtesy and are not conditions of Government acceptance; but are for the general conformance with established industry schedule concepts.

1.3.1 Schedule Acceptance Prior to Start of Work

[Unless stipulated otherwise as part of the Contract Award, design work may not be started prior to submittal and acceptance of the Design Network Analysis Schedule by the Government. Acceptance of the Design NAS will be a condition precedent to processing any pay requests submitted by the Contractor.]The Baseline Network Analysis Schedule described in the paragraph entitled "Baseline Network Analysis Schedule" must be submitted and accepted by the Government before the Contractor will be allowed to start work on the construction stage(s) of the contract. Examples of construction stages are, but not limited to; demolition, site work, temporary work for construction, etc.

1.3.2 Acceptance

- a. [When the Design Network Analysis Schedule is submitted and accepted by the Contracting Officer it will be considered the "Baseline Network Analysis Schedule for Design". The Design Network Analysis Schedule shall be updated at least monthly or submitted as part of the design submittals, whichever occurs first.]When the Construction Network Analysis Schedule is submitted and accepted by the Contracting Officer, it will then be considered the "Baseline Network Analysis Schedule". The Baseline Network Analysis Schedule will then be used by the Contractor for planning, organizing, and directing the work; reporting progress; and requesting payment for work accomplished. The schedule will be updated monthly by the Contractor and submitted monthly with the progress pay request to reflect the current status of the work. Submittal and acceptance of the [Baseline Network Analysis Schedule for Design and]Baseline Network Analysis Schedule and accurate updated schedules accompanying the pay requests are both conditions precedent to processing pay requests. Only bonds will be paid prior to acceptance of the Baseline Schedule(s).
- b. Submittal of the Baseline Network, and subsequent schedule updates, will be understood to be the Contractor's certification that the submitted schedule meets all of the requirements of the Contract Documents, represents the Contractor's plan on how the work will be accomplished, and accurately reflects the work that has been accomplished and how it was sequenced (as-built logic).

1.4 SOFTWARE

**NOTE: Contact the Administering ROICC Office to
determine which software will be used on the
project.**

The scheduling software that will be utilized by the Government on this project is [SureTrak by Primavera Systems, Inc.][Primavera Project Planner (P3) by Primavera Systems, Inc.]. Notwithstanding any other provision in the contract, schedules submitted for this project must be prepared using

either Primavera P3 or Primavera SureTrak (files saved in Concentric P3 format). The Contractor shall provide electronic files saved in a format that is compatible with the Contracting Officer's current software version.

Submission of data from another software system where data conversion techniques or software is used to import into Primavera's scheduling software is not acceptable and will be cause for rejection of the submitted schedule.

1.5 QUALIFICATIONS

NOTE: The requirement for a full time scheduler will be used very infrequently and only on projects that are large and complex enough to warrant the additional expense. A part time scheduler can be specified (and part time defined) when complexity and size does not warrant a full time scheduler and the ROICC does not want emphasis of the duty left to the discretion of the Contractor. Lastly, the office may choose to not designate full or part time and leave the emphasis of the duty to the Contractor. Before editing the following paragraph, coordinate with the ROICC Office.

The Contractor shall designate a [full time][part time] Scheduler that will be responsible for the development, preparation, and maintenance of an accurate, computerized Network Analysis Schedule. [Full time is defined as the scheduler being on-site during normal work hours to perform on-site coordination, attending project meetings, and updates. The Scheduler shall have no other duties than scheduling for this contract.] [Part time is defined as the Scheduler performing [on-site] coordination, attending project meetings, and updates for [____] hours per work week.]The Scheduler shall have previously developed, created and maintained at least [2][____] previous computerized schedules of similar size and complexity of this contract. A resume outlining the qualifications of the Scheduler and their SureTrak or P3 training certificate from an authorized Primavera trainer shall be submitted for acceptance to the Contracting Officer. If at a later date, the Contracting Officer considers the Contractor's Scheduler to be incompetent or objectionable, the Contractor will propose a new Scheduler, meeting the qualification requirements. Payments will not be processed until an acceptable Scheduler is provided.

1.6 NETWORK SYSTEM FORMAT

The system shall consist of time scaled logic diagrams and specified reports.

1.6.1 Diagrams

Show the order and interdependence of activities and the sequence in which the work is planned to be accomplished. The basic concept of the network analysis diagram will be followed to show how the start of a given activity is dependent on the completion of preceding activities and how its completion restricts or restrains the start of following activities. Activity durations shall not be resource-driven, activities shall start according to network logic and finish when its duration has elapsed. Diagrams shall be [organized by [Work Phase][Area Code],] sorted by Early Start Date and will show a continuous flow from left to right with no logic

(relationship lines) from right to left. With the exception of the Contract Award, Start Project and End Project milestone activities, no activities will be open-ended; each activity will have predecessor and successor ties. The diagram shall clearly show the activities of the critical path and must be red in color. Once an activity exists on the schedule it may not be deleted or renamed, and must remain in the logic. No more than [20][____] percent of the activities may be critical or near critical. Critical will be defined as having zero days of Total Float. "Near critical" will be defined as having Total Float in the range of [1 to 14][[____] to [____]] days. Show the following information on the diagrams for each activity:

- a. Activity ID
- b. Activity Description
- c. Original Duration in Work Days
- d. Remaining duration
- e. Actual Duration in Work Days
- f. Early Start Date
- g. Early Finish Date
- h. Total Float

Provide network diagrams on [tabloid (11X17)][ANSI D][ANSI E] sheets. Updated diagrams shall show the date of the latest revision.

1.6.2 Schedule Activity Properties and Level of Detail

NOTE: A good knowledge of construction and scheduling are required when determining the number of activities for a network analysis schedule. Factors such as the nature of the work, geographical location, completion time, complexity (the complexity of a project is related to the number of specification sections, the number of buildings, special phasing requirements and special quality control requirements), cost of maintaining each activity throughout the life of the contract and level of use by field management personnel must be considered. Contact the administrating ROICC Office when determining the number of construction activities.

***Important-**When selecting the number of activities, please keep in mind the cost added to the contract. A schedule needs to be maintained throughout the life of the contract and the use of too many activities will unnecessarily increase the total contract cost.

Use your best judgment for selecting number of activities. (Ex: A contract to stripe a 500-mile stretch of highway may have a project cost of

\$6,000,000 but it should not require between 1000 to 2000 activities).

Numbering shall be assigned so that, in general, predecessor activity numbers are smaller numerically than the successor activity numbers. Skip numbering shall be used on the network to allow insertion of additional activities for contract modifications and logic changes. The minimum number of construction activities in the final network diagram shall be [____]. Activity categories included in the schedule are specified below.

1.6.2.1 Activity Categories

NOTE: Include the following paragraph in Design Build projects. Remove the first bracketed phrase if Fast-Tracking will not be used on this project.

- [a. Design Activities: Requirements for the activities related to design shall be included as separate activities in the project schedule. Design activities shall include, but are not limited to; the Design Notice to Proceed, Contractor's various stages of design, application for and receipt of permits required, Contractor's constructibility reviews, submittal of design packages to Government, Government's design review periods, specified design meetings, transition periods prior to Construction Notice to Proceed, [(including Notices to Proceed for each Fast-Track Phase as indicated in other sections of this specification and as directed by the Contracting Officer)]etc. The Government review period shall be from the time the design is received by the Government to the time it is sent back to the Contractor; mail time will not be included in the Government review period. Design activities will be linked to their associated Procurement and/or Construction Activities.

If the Government's action on any submittal is "Disapproved" or "Revise and Resubmit", a new series of Design Activities will be inserted into the schedule. Predecessor for the new design preparation activity will be the original approval activity and the successor of the new approval activity will be the next design step (in-progress or final) activity.]

- b. Procurement Activities: Tasks related to the procurement of material or equipment shall be included as separate activities in the project schedule. Examples of procurement activities include, but are not limited to; Material/equipment submittal preparation, submittal and approval of material/equipment; delivery of O&M manuals; material/equipment fabrication and delivery, delivery of extra parts, extra stock, special tools, notification of Government Furnished Material/Equipment delivery requirement, etc. As a minimum, separate procurement activities will be provided for every specification section. If the Contractor intends on using Just-In-Time (JIT) delivery methods, the schedule will show each JIT delivery with relationship tie to the Construction Activity specifically for the JIT delivery. Material and equipment for which payment will be requested in advance of installation shall be cost-loaded with the procurement costs (e.g.; the delivery milestone(s)). All activities within a

procurement process/cycle will have a unique identifier in the activity code to show their relationships and will extend to the related construction activities (i.e., CSI Code).

If the Government's action on any submittal is "Disapproved" or "Revise and Resubmit", a new series of Procurement Activities will be inserted into the schedule. Predecessor for the new submittal preparation activity will be the original approval activity and the successor of the new approval activity will be the fabrication/deliver activity for the equipment or material.

**NOTE: Remove the bracketed phrase if Fast-Tracking
will not be used in the project.**

- c. Government Activities: Government and other agency activities that could impact progress shall be clearly identified. Government activities include, but are not limited to; Government approved submittal reviews, Government conducted inspections/tests, environmental permit approvals by State regulators, utility outages, Notice(s) to Proceed [(including Notices to Proceed for each Fast-Track Phase as indicated in other sections of this specification and as directed by the Contracting Officer)]and delivery of Government Furnished Material/Equipment. Show activities indicating Government furnished materials and equipment utilizing delivery dates indicated in "FAR 52.245-2, Government Property (Fixed-Price Contracts)." Government activities will be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.
- d. Construction Quality Management (CQM) Activities: CQM Activities will identify the Preparatory Phase and Initial Phase for each Definable Feature of Work identified in the Contractor's Quality Control Plan. These activities will be added to each 3-Week Look Ahead Schedule referenced in the paragraph entitled "THREE-WEEK LOOK AHEAD SCHEDULE" and will also be included in each monthly update referenced in the paragraph entitled "Monthly Network Analysis Updates". The Follow-up Phase will be represented by the Construction Activities in the Baseline Schedule and in the schedule updates.
- e. Construction Activities: Construction activities shall include, but are not limited to: Tasks related to mobilization or demobilization; the installation of temporary or permanent work by tradesman; testing and inspections of installed work by technicians, inspectors or engineers; start-up and testing of equipment; commissioning of building and related systems; scheduling of specified manufacture's representatives; Punch Out Inspection; Pre-Final Inspection, Final Acceptance Inspection; final clean-up; training to be provided; and administrative tasks necessary to start, proceed with, accomplish or finalize the contract. No onsite construction activity shall have a duration in excess of 20 working days. Contractor activities will be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

NOTE: Include Hammock Activities if Summary

Networks will be requested or if repetitive groups of activities will be used in a project (e.g. similar housing units being built several times over). Also include if Summaries will assist in keeping Customer or Management appraised of progress.

- [f. Hammock (Summary) Activities: The Contractor shall include special activities that are a summary of a chain of activities. The start of the activity will be the start date of the first activity in the chain and the finish date will be the finish date of the last activity in the chain. Generalized work sequences, Area Codes and Phase Codes will be summarized.]

1.6.2.2 Project Milestones

Dates shall be shown on the diagram for the start of the project, any contract required interim start and completion dates, contract completion date and other significant milestones.

- a. Project Start Date Milestones: The schedule shall start no earlier than the Contract Award Date and the project duration (Day 1) will start on the Notice-to-Proceed (NTP) date. The Contractor shall include as the first milestone in the schedule, an activity named "Contract Award". Another milestone shall be included that will be named "Start Project". [Additional milestones shall be included for Design NTP for each design increment and Construction NTP for each construction increment.] The Contract Award and Project Start milestones shall have mandatory start constraint dates equal to the Contract Award and NTP dates, respectively.
- b. Constraint of Last Activity Milestone: The Contractor shall include as the last activity in the project schedule, an activity named "End Project". The "End Project" activity shall have a mandatory finish constraint equal to the contract completion date for the project. Calculation of project updates shall be such that if the finish of the last activity falls after the contract completion date, then the float calculation shall reflect negative float on the critical path and if the finish of the last activity falls before the contract completion date, the float calculation shall reflect positive float on the critical path. The only predecessor activity to this activity will be either the "Contractor Early Completion" or the "Substantial Completion" milestone, whichever is used by the Contractor.
- c. Early Project Completion: In the event the Contractor's project schedule shows completion of the project prior to the contract completion date, the Contractor shall include an activity named "Contractor Early Completion". The activity shall be a milestone with an unconstrained date representing the Contractor's Early Completion date. The only successor activity to this activity will be the "End Project" milestone.
- d. Substantial Completion: If the Contractor elects to include an activity for Substantial Completion, then it is agreed that Substantial Completion will be the point in time that the Government considers the project is complete and ready for its intended use. The activity will be named "Substantial Completion". The activity shall be a milestone with an

unconstrained date representing the Contractor's Substantial Completion date. The only successor activity to this activity will be the "End Project" milestone.

NOTE: Include the following three paragraphs when the project includes the requirement for Phased Construction.

- [e. Phase Start Milestone: The Contractor shall include as the first activity for a project phase, an activity named "Start Phase X", where "X" identifies the phase of work. The "Start Phase X" activity shall have an unconstrained start date equal to the date of the Phase NTP. This unconstrained start date is not a release from contractually required start dates, but is left unconstrained to allow the schedule logic to calculate without hindrance.
- f. End Phase Milestone: The Contractor shall include as the last activity in a project phase, an activity named "End Phase X" where "X" identifies the phase of work. The "End Phase X" activity shall have an unconstrained late finish date equal to the contract phase completion date. This unconstrained completion date is not a release from contractually required finish dates, but is left unconstrained to allow the schedule logic to calculate without hindrance.
- g. Early Phase Completion: If the Contractor expects to finish prior to the contract phase completion date, the milestone will show an early finish date equal to the Contractor's early finish date. The name of the activity will be "Early Phase Completion" and will have an unconstrained date representing the Contractor's early phase completion date.]

1.6.2.3 Activity Identification (ID) and Description

- a. Standard Activity ID Dictionary: The Contractor shall submit the alphanumeric coding scheme for Schedule Activity Numbers that shall be used throughout the project. The coding scheme submitted shall list the values for each activity code and translate those values into project specific designations. Code length shall not exceed [10][_____] characters. Once accepted, the coding scheme will be used for the duration of the project.
- b. Activity Description: Each activity shall have a narrative description consisting of a Verb or work function (e.g.; form, pour, excavate), an Object (e.g.; slab, footing, under floor plumbing), and Area (e.g.; 3rd floor, northeast quadrant, basement).

1.6.2.4 Activity Code Dictionary and Values

The Contractor shall establish the activity codes identified in this specification. The codes will have values assigned that will allow the scheduling program to sort, select, group and organize the activities in the schedule. Activity codes include, but are not limited to, the following codes:

NOTE: Include the following paragraph when the project includes the requirement for Phased Construction.

- [a. Phase Code: If phasing is specified in the contract, all activities shall be identified in the project schedule by the Phase Code in which the activity occurs. Activities shall not be contained in more than one Phase.]

NOTE: Use the following paragraph only when Fast-Tracking is required or is an option.

- [b. Fast-Track Code: All Activities shall be identified in the project schedule according to the design phase and its corresponding construction increment. An example of activities that would have a common Fast-Track Code is the foundation design activities and the corresponding foundation construction activities. Individual activities shall not be contained in more than one fast-track code.]
- c. Area Code: All activities shall be identified in the project schedule by the Area Code in which the activity occurs. Activities shall not be contained in more than one Area Code. Area is defined as distinct separations in construction, such as a story of construction, separate structure, usage or function difference, utility distribution systems, etc.
- d. Responsibility Code: All activities in the project schedule shall be identified with the party responsible to perform the task. Responsibility includes, but is not limited to; the Prime Contractor, subcontracting firm, or Government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by a responsibility code. For example, a responsibility code value, "ELEC", may be used to identify the "Electrical Subcontractor".
- e. CSI Code: All activities in the project schedule shall be identified with its respective 5-digit Specification Section number. Activities shall not belong to more than one Section number. If an activity does not have an applicable CSI Code, (such as "Mobilize"), the code will be "00000".
- f. Drawing Code: All activities in the project schedule shall be identified with its respective project Drawing Code. The Drawing Code is the Sheet Number on the primary project drawing, which indicates the work to be performed. Activities shall not belong to more than one Drawing Code. Examples of Drawing Codes are "C-10", "C.10" or "C10". The code system will allow organizing all activities by Drawing Code in alpha and numeric order. If an activity does not have an applicable Drawing Code, (such as "Mobilize"), the code will be "00000".
- g. Modification Code: The Modification Code shall identify activities that are modified or added by contract modification. Activities shall not belong to more than one Modification Code.

The Government will assign the modification number, which will be shown on the Standard Form 30. Use a shortened version of the modification number for the code (e.g.; A00010 = 010).

- h. Request for Equitable Adjustment (REA) or Claim Code: Activities that are modified or added, as a result of a Contractor's REA or Claim shall be identified by a code generated by the Contractor. Activities shall not belong to more than one REA or Claim Code.

1.6.2.5 Cost and Resource Loading

- a. Cost Loading Activities: Costs for incremental design preparation will be assigned to the respective design phase submittal milestone(s). Equipment costs will be assigned to their respective Procurement Activities (i.e., the delivery milestone activity). Costs for installation of the material/equipment (labor, construction equipment, and temporary materials) will be assigned to their respective Construction Activities. The value of inspection/testing activities will not be less than [10] [_____] percent of the total costs for Procurement and Construction Activities. Evenly disperse overhead and profit to each activity over the duration of the project. The total of all cost loaded activities; including costs for material and equipment delivered for installation on the project, and labor and construction equipment loaded construction activities, shall total to 100 percent of the value of the contract.
- b. Quantities and Units of Measure: Each cost loaded activity will have a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, etc. These entries are informational only and are non-calculating. Quantities shall be entered as Log Text 1 (in SureTrak) or Log 1 (in P3) for each activity, column heading will be "Quantities". Units of Measure shall be entered as Log Text 2 (in SureTrak) or Log 2 (in P3) for each activity, column heading will be "Units of Measure".

NOTE: The information required by the following paragraphs is optional. Tracking of actual resources is typically not needed for routine work. Labor and equipment loaded schedules are of primary importance to the Contractor in deciding the most efficient use of personnel resources and optimizing equipment usage and is the basis of activity duration estimates. Since these decisions are the responsibility of the Contractor's management process, the information value to the Contracting Officer is in assuring that the planned labor and equipment are being supplied throughout the course of the project.

- [c. Labor Resource Loading: As part of the Baseline Schedule development each construction activity shall have an estimate of the number of workers per day by trade, hours per day by trade and total expected hours used by trade during the execution of the activity. If no workers are required for an activity, then the activity shall be identified as using zero workers per day. All

labor resources loaded into the schedule shall be non-driving and will not be used to calculate activity cost or duration. Resource leveling shall not be used.[Actual labor resource expended on an activity will be recorded in the monthly updated schedules and will coincide with entries made in the Daily Reports.]

- d. Equipment Resource loading: As part of the Baseline Schedule development each construction activity shall have an estimate of the equipment used per day, number of units per day and total expected hours for each piece of equipment used during the duration of the activity. Include a description of the major items of construction equipment planned for each construction activity on the project. The description shall include the year, make, model, and capacity. If no equipment is required for an activity, then the activity shall be identified as using zero equipment per day. All equipment resources loaded into the schedule shall be non-driving and will not be used to calculate activity cost or duration. Resource leveling shall not be used.[Actual equipment resource expended on an activity will be recorded in the monthly updated schedules and will coincide with entries made in the Daily Reports.]]

1.6.2.6 Anticipated Weather Delays

Schedule activity duration(s) shall be formulated with allowance for normal adverse weather conditions. Any activity duration, which could be impacted by normally anticipated adverse weather (precipitation, high or low temperature, wind, etc.), due to the time period that the Contractor has scheduled the work, shall include an adjustment to include the anticipated weather delay. The Contractor shall anticipate delay by comparing the contractually imposed environmental restrictions in the Contract Documents to the National Oceanic and Atmospheric Association's (NOAA) historical monthly averages for the NOAA location [at (Enter NOAA Station here)][closest to the project site]. The number of anticipated adverse weather delays allocated to an activity will be reflected in the activity's calendar. A lost workday, due to weather conditions, is defined as a day in which the Contractor's workforce cannot work 50 percent or more of the day on the impacted activity(s). The Contractor shall immediately notify the Contracting Officer when a lost day has occurred due to weather, will record on the Daily Reports the occurrence of adverse weather and resultant impact to the normally scheduled work. If the number of actual adverse weather delay days exceeds the number of days anticipated, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days and issue a modification in accordance with the contract clauses.

1.6.2.7 Schedule Software Settings and Restrictions

- a. Activity Constraints: Date/time constraint(s), other than those required by the contract, will not be allowed unless accepted by the Contracting Officer. Contractor will identify any constraints proposed and provide an explanation for the purpose of the constraint in the Narrative Report.
- b. Lags: Lags will not be used when the creation of an activity will perform the same function (e.g., concrete cure time). Lag durations contained in the project schedule shall not have a negative value. Contractor will identify any lag proposed and provide an explanation for the purpose of the lag in the Narrative

Report.

- c. Default Progress Data Disallowed: Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software system. Actual Start and Actual Finish dates on the CPM schedule shall match the dates provided from Contractor Quality Control and Production Reports. These reports will be the sole basis for updating the schedule. Work activities will be updated by actual work progression rather than being cash flow driven. Actual labor and equipment hours used on activities will be derived from the Daily Reports.
- d. Software Settings: If the contractor chooses to use Primavera's SureTrak software, the Autocost Rules shall be set to:
 - 1) Uncheck - Link Remaining Duration and Schedule Percent Complete;
 - 2) Check - Use Updated Percent Complete Against Budget to Estimate Actual to Date;
 - 3) Check - Freeze Resource Units per Hour When Quantities Change;
 - 4) Check - Update Cost and Revenue Information; and,
 - 5) Set Resource Data to "Two decimal places".

If the contractor chooses to use Primavera's P3 software, the AutoCost rules shall be set as shown below, all others shall be deactivated (i.e.; check boxes and radio buttons not filled in):

- 1) Use the update percent complete against budget to estimate: Actual cost to date.
- 2) Link budget and EAC for non-progressed activities: Budget-EAC.
- 3) Perform these calculations during each schedule computation: Apply these rules when moving from one Resource to another.

Schedule calculations and Out-of-Sequence progress (if applicable) shall be handled through Retained Logic, not Progress Override. All activity durations and float values will be shown in days, time will not be shown in the duration display. Activity progress will be shown using Remaining Duration. Date format will be DDMMYY (i.e., 11DEC02). Default activity type will be set to "Task".

1.6.3 Required Tabular Reports

**NOTE: Consult with the ROICC Office to identify
which of the following reports will be needed.
Always include Earned Value Report and Log Report.**

The following reports will be based on the information in the paragraph entitled "Diagrams" and included with the schedule submittals and in each updated schedule submission provided on disk by the Contractor:

- a. Earned Value Report: Listing all activities having a budget amount and cost. A compilation of total earnings on the project from the notice to proceed to the most recent monthly progress payment request and the difference between the previous request amount and the current payment request amount. Sort report first by resource and then by activity.

- b. Log Report: With each updated schedule submission, provide a computer generated Log Report using a recognized schedule comparison software listing all changes made between the previous schedule and current updated schedule. Identify the name of the previous schedule and name of the current schedule being compared. This report will as a minimum show changes for: Added & Deleted Activities, Original Durations, Remaining Durations, Activity Percent Complete, Total Float, Free Float, Calendars, Descriptions, Constraints (added, deleted or changed), Actual Starts/Finishes, Added/Deleted Resources, Resource Quantities, Costs, Resource Percents, Added/Deleted Relations, Changed Relation Lags, Changed Driving Relations, and Changed Critical Status.
- [c. Activity ID Report: By activity number in ascending order showing the current status of all activities.]
- [d. Total Float Report: List of all activities by total float in ascending order and then in order of [activity number] [early start date].]
- [e. Early Start Report: By earliest allowable start dates and then in order of activity number.]
- [f. 30-Day Look Ahead: Activities in progress or scheduled to start or finish within the next 30 calendar days of the project Data Date or is continuing through the 30 day period.]
- [g. Predecessor/Successor Report: By activity number from lowest to highest, showing preceding and succeeding activity numbers for each activity and showing the current status of each activity.]

NOTE: Include the following two paragraphs if resource loading is specified in the paragraph entitled "Cost and Resource Loading". If resource loading is required, determine if only the Baseline Network Analysis Schedule will be loaded or if actual resource allocation is tracked in each update. Tracking actual resources will increase the cost of project scheduling and the information should be available from the Daily Reports.

- [h. Labor Staffing Report and Histogram: With each Baseline Network Analysis Schedule submittal[and each updated schedule], a planned early and planned late[versus actual] labor resource report and histogram will be provided.[The report and histogram shall be based upon and shall be in agreement with, the number of shifts and crew sizes by craft, in the Baseline Network Analysis Schedule (planned) and the Monthly Network Update (actual). Included in the report will be a tabular listing of each trade that worked on the activities during the construction period.]
- i. Equipment Usage Report and Histogram: With each Baseline Network Analysis Schedule submittal[and each updated schedule], a planned early and planned late[versus actual] equipment resource report and histogram will be provided.[The report and histogram shall be based upon and shall be in agreement with the equipment

allocation in the Baseline Network Analysis Schedule (planned) and the Monthly Network Update (actual). Included in the report will be a tabular listing of equipment (by year, make and model) that worked on the activities during the construction period.]]

1.7 SUBMISSION AND ACCEPTANCE

1.7.1 Preliminary Meeting

Prior to the preparation of the Construction Network Analysis Schedule for acceptance; the Contracting Officer, Contractor and the scheduler shall participate in a preliminary meeting to discuss the proposed schedule and requirements of this section prior to submission of the network. Discussions shall include: 1) Which construction activities may have delivered material costs included (e.g., concrete placement, etc.), 2) Which procurement activities will have material/equipment costs separated from their respective construction activity costs (e.g., any stored equipment, etc.) and, 3) Which procurement and construction activities will have separate testing/inspection costs; per the paragraph entitled "Cost Loading Activities".

[1.7.2 Design Network Analysis Schedule

**NOTE: When Design-Build is being used in a project,
use this paragraph. When the Fast-Tracking is
required or an option for the project, include the
first bracketed sentence of this paragraph.**

**NOTE: When WebCM is a requirement on this project,
use the second set of bracketed sentences and delete
the third bracketed sentence of this paragraph.**

Submit the Design Network Analysis Schedule defining the planned operations during the design phase(s) of the contract. The general (summarized) approach for the construction phase(s) of the project shall be indicated. Include any administrative submittals and review periods that will be required prior to start of construction (e.g., QC Plan, EP Plan, AP Plan, Construction Schedule, Demo Plan, etc.) Cost of activities expected to be completed or partially completed before submission of the Baseline Network Analysis Schedule shall be included.[When the project is being Fast-Track, the Design Network Analysis Schedule shall include all fast-tracked design phases, including the required or proposed design submittals within each phase that will occur during the duration of the project.] Submit three copies of both the design network diagrams and reports listed in paragraph entitled "Required Tabular Reports." In accordance with paragraph entitled "Monthly Network Analysis Updates" the design network may be used for requesting progress payments for a period not to exceed the design phase(s) of the contract. Submittal and acceptance of the Design Network Analysis Schedule is condition precedent to the processing of the Contractor's pay requests on this schedule. The activities and relationships of the design schedule shall coincide and mesh with the activities of the Baseline Network Analysis Schedule. As part of this submittal, provide the Project Name format (and Project Group Name if used) that will be used by the Contractor to identify initial schedule submittals, updates, fragnets, changes, etc. [Backed-up native files (.prx

or .stx) for the schedule submittal will be posted to the NAVFAC WebCM internet site, as directed by the Contracting Officer. The project schedule will also be posted in the format specified as an Adobe PDF file with no relationship lines displayed in the graphic.][Include [1 copy][____ copies] of the Design Network Analysis Schedule on electronic media that is acceptable to the Contracting Officer.]]

1.7.3 Construction Network Analysis Schedule

NOTE: Include the first set of brackets if the project is Design Build, the second set of brackets will be used for Design-Bid-Build. When Fast-Tracking is required or an option for the project, include the third set of brackets.

NOTE: When WebCM is a requirement on this project, use the fourth set of bracketed sentences and delete the fifth bracketed sentence of this paragraph.

[If design must be completed and accepted prior to construction, submit][Submit] the complete network analysis schedule and obtain acceptance prior to starting construction work.[If the project will be Fast-Tracked, each construction stage will be built upon the previous Fast-Tracked Baseline Schedule (including any interim updates thereto) and accepted prior to starting that stage of the construction work.][So as to capture performance to date, this schedule shall be built upon as an extension of the most current accepted update of the Design schedule.] Submit [three][____] copies of the diagrams described in the paragraph entitled "Diagrams" and the reports listed in the paragraph entitled "Required Tabular Reports". As part of this submittal, provide the Project Name format (and Project Group Name if used) that will be used by the Contractor to identify initial schedule submittals, updates, fragnets, changes, etc. [Backed-up native files (.prx or .stx) for the schedule submittal will be posted to the NAVFAC WebCM internet site, as directed by the Contracting Officer. The project schedule will also be posted in the format specified as an Adobe PDF file with no relationship lines displayed in the graphic.][Include [1 copy][____ copies] of the Construction Network Analysis Schedule on electronic media that is acceptable to the Contracting Officer.]

1.7.4 Review and Evaluation

After the Government's review(s) of the [Design Network Analysis Schedule and]Construction Network Analysis Schedule, the Contractor shall meet with the Contracting Officer to discuss the review and evaluation of the NAS submittal. Revisions necessary as a result of this review shall be resubmitted for acceptance within 10 calendar days after the meeting.

1.7.5 Baseline Network Analysis Schedule

Once review comments are resolved and the Contracting Officer has accepted the [Design Network Analysis Schedule and]Construction Network Analysis Schedule, the Contractor shall within 5 calendar days furnish:

- a. [Two][____] copies of the network diagrams.

- b. [Two][_____] copies of the reports listed in paragraph entitled "Required Tabular Reports".
- [c. [Two][_____] copies of the Cash Flow S-Curve indicating the cash flow based upon both the projected early and late finish dates.]

**NOTE: When WebCM is a requirement on this project,
use the third set of bracketed sentences and delete
the fourth bracketed sentence of this paragraph.**

- d. [Two][_____] sets of data disks containing the project schedule shall be provided for the each Baseline submission and every periodic project update. [Backed-up native files (.prx or .stx) for the schedule submittal will be posted to the NAVFAC WebCM internet site, as directed by the Contracting Officer. The project schedule will also be posted in the format specified as an Adobe PDF file with no relationship lines displayed in the graphic.]Data shall be submitted on electronic media that is acceptable to the Contracting Officer. A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule ([Design NAS,]Construction NAS, Baseline, Update, Recovery, Time Impact Analysis (PC#), etc.), full contract number, Project Name used to identify project in scheduling software, contract name & location, data status date, diskette number with total number of diskettes in set, software name and version used to run the schedule, and the name and telephone number of person responsible for the schedule.

For major revisions, updates or changes to the network diagrams, once accepted by the Contracting Officer, the Contractor shall submit these same diagrams and reports.

1.7.6 Monthly Network Analysis Updates

At monthly intervals the Contractor and Government representatives will meet to jointly update the project schedule and agree on percentage of payment for each activity progressed during the update period. The purpose of the meeting is to determine progress payment amounts for each activity, allow all parties to evaluate project status at the data date, provide a complete and accurate update of [design,]procurement and construction progress, create an historical record of the project and establish prediction of completion date(s) based upon current status. The Contractor is responsible to gather all supporting documentation, present the update data for the schedule and record the meeting minutes. All progress payment amounts will be derived from and tied to the cost-loaded schedule activities. Submit at monthly intervals a report of the actual [design and]construction progress by updating the required reports and the time scaled logic diagram. Meeting to update the schedule and the submission of an error free, acceptable updated schedule to the Government is a condition precedent to the processing of the Contractor's pay request. As a minimum, the following actions will be accomplished during the meeting:

- a. Identify activities started and completed during the previous period and enter the Actual Start and Actual Finish dates. It will be understood that Actual Start is defined as the date that work begins on an activity with the intent to pursue the work

represented by the activity to substantial completion, and Actual Finish is defined as the date that the activity's work is substantially complete to the point that its successor activity(s) may begin.

- b. Show estimated duration (in workdays) to complete each activity started but not completed (remaining duration).
- c. Indicate percentage of cost payable and percent of work complete as separate and independent entries for each activity. The assignment of an Actual Finish date to an activity does not imply that the activity's percent of payment will be statused to 100%.
- d. Reflect changes in the network diagram. All changes (i.e., remaining duration changes, logic changes, new logic, conformed change orders, new activities, changes due to Conformed Modifications, changes in work sequence, entry of as-built relationship logic, etc.) shall be recorded and a note added to the activity log field. The log shall include as a minimum, the date and reason for the change, and description of the change.
- e. Submit [two][_____] copies of a Narrative Report describing: 1) Progress made in each area of the project; 2) Changes in the following; activities, original durations, logic interdependencies, milestones, planned sequence of operations, critical path, and resource and loading; 3) Pending items and status thereof, including permits, change orders, and time extensions; 4) Status of Contract Completion Date and interim milestones; 5) Current and anticipated delays (describe cause of the delay and corrective action(s)); and 6) Description of current and future schedule problem areas. Each entry in the narrative report will cite the respective Activity ID and Activity Description.
- f. Submit [two][_____] copies of the reports listed in paragraph entitled "Required Tabular Reports".
- g. [Two][_____] hard copies of the network diagrams and [two][_____] sets of data disks.
- h. Submit [two][_____] copies of the Update Meeting minutes.

[1.7.7 Summary Network

NOTE: Before specifying Summary Networks, verify with the ROICC Office that the Summary will be useful on the project being designed. Choose type of summary to be provided. Area Code will be the typical sequence to choose unless the project is Phased, at which time either (but not both) may be chosen.

A summary network shall have the same network format as the Baseline Network Analysis Schedule. The summary network will contain a minimal number of activities that represent the general approach of work sequence. The Summary will be a time-scaled logical sequence of [Phase Code][Area Code]. The Contractor shall submit a summary network diagram along with

the Baseline Network Analysis Schedule. A summary network update shall be submitted every [6][_____] months during the contract duration and immediately following acceptance of each major schedule change. Submit the following:

- a. [Two][_____] copies of the summary network diagram.
- b. [Two][_____] copies of the Activity ID Report.
- c. [Two][_____] copies of the Total Float Report.
- d. [Two][_____] copies of the Earned Value Report indicating the actual cash flow for the current updated (not summary) network based upon both the early and late start schedules.

]1.7.8 As-Built Schedule

NOTE: Before specifying As-Built Schedules, verify with the ROICC Office that the schedule will be required.

As a condition precedent to the release of retention and making final payment, the Contractor shall submit an "As-Built Schedule", which is the last schedule update. The As-Built Schedule shall reflect the exact manner in which the project was actually constructed (including actual start and finish dates, activities, sequences, and logic) and shall be certified by the Contractor's Project Manager and Construction Scheduler as being a true reflection of the way the project was actually constructed. If more than one person filled the position(s) during the course of the project, each person will provide certification for the period of time they were responsible.

1.8 CONTRACT MODIFICATION

When a contract modification to the work is required, submit proposed revisions to the network with a fragnet and a cost proposal for each proposed change. All modifications shall be incorporated into the network analysis system as separate identifiable activities broken down and inserted appropriately on the first update following issuance of a directive to proceed with the change. Submit [two][_____] copies of the Total Float Report, Log Report and a copy of the proposed Time Impact Analysis on disk, with the cost proposal. Unless the Contracting Officer requests otherwise, only conformed contract modification fragnets will be added into the subsequent monthly updates. All revisions to the current baseline schedule activities that are necessary to further refine the schedule so that the changed work activities can be logically tied to the schedule shall be made. Financial data shall not be incorporated into the schedule until the Contracting Officer signs the contract modification.

1.8.1 Time Impact Analysis:

The Time Impact Analysis method shall be used by the Contracting Officer and Contractor in determining if a time extension or reduction to the contract milestone date(s) is justified. The Contractor shall provide a Time Impact Analysis to the Contracting Officer for any proposed contract change or as support for a Value Engineering Proposal, Variance Request, Claim or Request for Equitable Adjustment by the Contractor. Submit the

Time Impact Analysis schedule, reports, etc. on disk and as a printed/plotted hardcopy.

- a. The Contractor shall submit a Time Impact Analysis (TIA) illustrating the influence of each change or delay on the Contract Completion Date or milestones. Unless the Contracting Officer requests an interim update to the schedule, the current monthly updated schedule accepted by the Government shall be used to display the impacts of the change. Unless requested by the Contracting Officer, no other non-conformed changes will be incorporated into the schedule being used to justify the change impact.
- b. Each TIA shall include a Fragmentary Network (fragnet) demonstrating how the Contractor proposes to incorporate the impact into the project schedule. A fragnet is defined as the sequence of new activities and/or activity revisions, logic relationships and resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. The Contractor shall provide a hardcopy printout of the fragnet activities and relationships being added and also insert the fragnet into the most current, accepted Monthly Network Analysis Update, run the schedule calculations and submit the impacted schedule with the proposal, claim, etc. Include a narrative report describing the effects of new activities and relationships to interim and contract completion dates, with each TIA. Submit time extension requests with a Time Impact Analysis and three hardcopies of the fragnet (in a graphic format), impacted schedule (with fragnet loaded), Total Float Report, Narrative Report and Log Report.
- c. Following the Contractor's receipt of a contract modification on a Standard Form 30 signed by the Government; all changes in the fragnet used to determine impacts, shall be incorporated into the schedule. Changes to the schedule will occur during the next monthly schedule update meeting.

1.8.2 No Reservation-Of-Rights

All direct costs, indirect costs, and time extensions will be negotiated and made full, equitable and final at the time of modification issuance.

1.9 CHANGES TO THE NETWORK ANALYSIS SCHEDULE

If changes in the method of operating and scheduling are desired, the Contracting Officer shall be notified in writing stating the reasons for the change. If the Contracting Officer considers these changes to be of a major nature, the Contractor may be required to revise and submit for acceptance, without additional cost to the Government, the network diagrams and required reports. A change may be considered of a major nature if the estimated time required or actually used for an activity or the network logic has varied from the original plan to a degree that there is a reasonable doubt as to the effect on the contract completion date(s) [or phase completion dates]. Changes that affect activities with adequate float time shall be considered a major change when their cumulative effect could extend the contract completion date.

1.10 FLOAT

Use of float suppression techniques, such as; preferential sequencing (arranging critical path through activities more susceptible to Government caused delay), lag logic restraints, zero total or free float constraints, extended activity times, or imposing constraint dates other than as required by the contract, shall be cause for rejection of the project schedule or its updates. The use of Resource Leveling (or similar software features) used for the purpose of artificially adjusting activity durations to consume float and influence the critical path is expressly prohibited.

1.10.1 Definitions of Float

Free Float is the length of time the start of an activity can be delayed without delaying the start of a successor activity. Total Float is the length of time along a given network path that the actual start and finish of activity(s) can be delayed without delaying the project completion date.

Project Float is the length of time between the Contractor's Early Completion (or Substantial Completion or similar activity) and the Contract Completion Date.

1.10.2 Ownership of Float

Float available in the schedule, at any time shall not be considered for the exclusive use of either the Government or the Contractor. During the course of contract execution, any float generated due to the efficiencies of either party is not for the sole use of the party generating the float; rather it is a shared commodity to be reasonably used by either party. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated weather is less than expected, will also contribute to the reserve of float. A schedule showing work completing in less time than the Contract time, and accepted by the Government, will be considered to have Project Float. Project Float will be a resource available to both the Government and the Contractor. No time extensions will be granted nor delay damages paid unless a delay occurs which impacts the Project's critical path, consumes all available float or contingency time, and extends the work beyond the Contract Completion Date.

1.10.3 Negative Float

Negative float will not be a basis for requesting time extensions. Any extension of time will be addressed in accordance with the paragraphs entitled "CONTRACT MODIFICATION". Scheduled completion date(s) that extend beyond the contract[or phase] completion date(s) (evidenced by negative float) may be used in computations for assessment of payment withholdings. The use of this computation is not to be construed as a means of acceleration.

1.11 THREE-WEEK LOOK AHEAD SCHEDULE

NOTE: Consult with the local ROICC Office if the
bracketed phrase will be used.

To provide a more detailed day-to-day planning of upcoming construction work, the Contractor shall prepare and issue detailed work plans that coordinate with and supplement the above defined network analysis. The

work plans shall be keyed to the CPM activity numbers and shall be submitted each week and shall show the project activities that will occur during the current and following two-week interval. Additionally, the critical path activities are to be identified on the 3-Week Look Ahead Schedule. The schedule will be a bar chart type schedule prepared by the Contractor in sufficient detail to define the work to be accomplished, the crews, construction tools and equipment to be used during the current and next two-week interval. The bar charts shall be formatted to allow reproduction on 8 1/2 by 11 sheets. Three copies of the bar chart schedules shall be delivered to the Contracting Officer[not less than 3 work hours prior to the start of the weekly coordination meeting].

[1.12 WEEKLY COORDINATION MEETING

**NOTE: Consult with the local ROICC Office on
whether to use this paragraph.**

In conjunction with the receipt of the 3-Week Look Ahead Schedule, a coordination meeting will be held each week [on-site][in the Contracting Officer's conference room] to discuss the work schedule. The Contractor shall make a presentation of the previously submitted and current 3-Week Look Ahead Schedule to the Contracting Officer so as to provide an overview of the project's schedule and provide an opportunity to discuss items of coordination. Consideration of materials, crews, and equipment shall be addressed to ascertain their respective availability. The meeting shall identify actions necessary to provide adherence to the 3-Week Look Ahead Schedule and the overall network for the project defined above. The Contractor will take meeting minutes. All meeting minute entries will be keyed to the schedule activity number(s) being addressed. Within one day of the meeting, the Contractor will provide a draft copy of the meeting minutes to the Contracting Officer for review and comment. Final copies of the minutes containing the comments provided by the Contracting Officer will be issued within 3 days of the meeting.

]1.13 CORRESPONDENCE AND TEST REPORTS

All correspondence (e.g., letters, Requests for Information (RFIs), e-mails, meeting minute items, Production and QC Daily Reports, material delivery tickets, photographs, etc.) shall reference the Schedule Activity Number(s) that are being addressed. All test reports (e.g., concrete, soil compaction, weld, pressure, etc.) shall reference the Schedule Activity Number(s) that are being addressed.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --