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SECTION 01 32 17.00 20

COST-LOADED NETWORK ANALYSIS SCHEDULES (NAS)

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USACE / NAVFAC / AFCEC / NASA	**UFGS-01 32 17.00 20 (May 2018)** **Change 3 - 08/20**

Preparing Activity: NAVFAC	**Superseding** **UFGS-01 32 17.00 20 (February 2015)**

UNIFIED FACILITIES GUIDE SPECIFICATIONS

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SECTION 01 32 17.00 20

COST-LOADED NETWORK ANALYSIS SCHEDULES (NAS)
05/18, CHG 3: 08/20

****

NOTE: This guide specification applies to Design-Bid-Build and Design-Build projects and covers the preparation and use of Cost-Loaded Network Analysis Schedules (NAS) for construction using Primavera P6.

This specification Section applies primarily to MILCON projects and any other similar projects with multiple disciplines working simultaneously. These projects may have known critical completion dates and may involve multiple phases.

Confirm with the Administering FEAD/ROICC that the project schedule should be prepared under the requirements of this section. Further, this section must be reviewed and approved by the administering FEAD/ROICC prior to completion of the Request for Proposal (RFP).

Coordination is required with Section 01 20 00 PRICE AND PAYMENT PROCEDURES with selection of "Earned Value Report" rather than "Schedule of Prices" in that section.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

****

****

NOTE: This section contains tailoring for Design-Build (DB), Design-Bid-Build (DBB), TABS, and Commissioning (CX). Use TABS tailoring when Section

23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC and Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC are included in the contract specifications.
****

PART 1 GENERAL

1.1 DEFINITIONS

The cost-loaded Network Analysis Schedule (NAS) is a tool to manage the project, both for Contractor and Government activities. The NAS is also used to report progress, evaluate time extensions, and provide the basis for progress payments.

For consistency, when scheduling software terminology is used in this section, the terms in Primavera's scheduling programs are used.

1.2 SCHEDULE REQUIREMENTS PRIOR TO THE START OF WORK

1.2.1 Preliminary Scheduling Meeting

Before preparation of the Project Baseline Schedule, and prior to the start of work, meet with the Contracting Officer to discuss the proposed schedule and the requirements of this section. Propose projected data dates for monthly update schedules for the project and incorporate each monthly update submittal into submittal register. Discuss required forms, terminology, and submittal requirements of this section and other requirements related to schedule management for this contract.

1.2.2 Project Baseline Schedule

****
NOTE: This paragraph is tailored for Design-Bid-Build.

For projects in the NAVFAC PAC Area of Operation, in the first sentence, select the default of "30" calendar days as the standard. If warranted, the amount of calendar days for projects requiring more time may be tailored based on project size and technical complexity.
****

Submit the Baseline NAS within [45] [30] [_____] calendar days after contract award. Data date must be set to contract award date and no progress statused for any activity. Only bonds may be paid prior to acceptance of the Baseline NAS. The acceptance of a Baseline NAS is a condition precedent to:

a. The Contractor starting demolition work or construction stage(s) of the contract.

b. Processing Contractor's invoices(s) for any items other than bonds.

c. Review of any schedule updates.

Submittal of the Baseline NAS is the Contractor's certification that the submitted schedule meets the requirements of the Contract Documents and represents the Contractor's plan on how the work will be accomplished.

Provide all items listed in paragraph REQUIRED TABULAR REPORTS AND NATIVE P6 XER FILES with baseline NAS submittal.

1.2.3 Project Baseline Schedule

****
NOTE: This paragraph is tailored for Design-Build.
****

1.2.3.1 Baseline NAS

Submit the Baseline NAS at the Post-Award Kickoff (PAK) Meeting or within [30] [_____] calendar days after contract award whichever occurs first. The Baseline schedule must include detailed design activities and a general approach to construction, including summary activities for required phasing and definable areas. Summary Construction activities must not exceed duration of 60 calendar days, unless approved otherwise by Contracting Officer. Data date must be set to contract award date and no progress statused for any activity.

Only bonds may be paid prior to acceptance of the Baseline NAS. The acceptance of a Baseline NAS is a condition precedent to:

a. The Contractor submitting the first design submittal.

b. Processing Contractor's invoices(s)other than that for the bonds.

c. Review of any schedule updates.

1.2.3.2 Post-Award Kickoff (PAK) Meeting and Baseline NAS

Present the Draft Baseline NAS at the PAK Meeting. Be prepared to discuss the schedule logic emphasizing how the schedule satisfies the design package requirements and incorporates the required government review periods for each design submittal.

1.2.3.3 Construction Baseline

Submit the Construction Baseline NAS prior to the pre-final design submittal. The pre-final design submittal will not be reviewed until a Construction Baseline NAS is submitted.

The acceptance of the Construction Baseline NAS is a condition precedent to:

a. The contractor starting demolition work or construction stage(s) of the contract.

b. Processing Contractor's invoices for demolition or construction activities.

c. Review of any construction phase schedule updates.

Submittal of the Construction Baseline NAS must be the Contractor's certification that the submitted schedule meets the requirements of the Contract Documents, and represents the Contractor's plan on how the work will be accomplished. Provide all items listed in paragraph REQUIRED TABULAR REPORTS AND NATIVE P6 XER FILES with baseline NAS submittal.

1.3 THREE-WEEK LOOK AHEAD SCHEDULE

1.3.1 Weekly CQC Coordination and Production Meeting

Deliver electronic file of 3-Week Look Ahead Schedule to the Contracting Office at least 24 hours prior to the weekly scheduled CQC Coordination and Production Meeting. Contractor is required to provide all attendees at the CQC Coordination and Production Meeting with a hard copy of the 3-Week Look Ahead Schedule.

1.3.2 Look Ahead Schedule Requirements

Prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Project Network Analysis Schedule. Requirements include:

a. For each Look Ahead schedule activity, identify parent NAS activity number(s). The parent NAS activity is the activity in the NAS that would incorporate the Look Ahead schedule activity requirement and or scope of work.

b. Update schedule each week to show the planned work for the current and following two-week period. Also include previous week, as-built work, showing actual start and finish dates.

c. Include upcoming outages, closures, preparatory meetings, and initial meetings, testing and inspections.

d. Clearly identify longest path activities on the Three-Week Look Ahead Schedule. Include a key or legend that distinguishes longest path activities. Include all Longest Path activity NAS start/finish dates exceeded and/or occurring during this period.

e. The detail work plans are to be bar chart type schedules, derived from but maintained separately from the Project NAS on an electronic spreadsheet program and printed on 299 by 432 mm 11 by 17 inch sheets as directed by the Contracting Officer.

f. Activities must not exceed 5 working days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work.

1.4 MONTHLY NETWORK ANALYSIS

Submittal of Monthly NAS is the Contractor's certification that the submitted schedule meets the requirements of the Contract Documents and represents the Contractor's plan on how the work will be accomplished. Provide all items listed in paragraph REQUIRED TABULAR REPORTS AND NATIVE P6 XER FILES with the monthly NAS submittal.

1.4.1 Monthly Network Analysis Updates

a. Regardless of whether an invoice is being submitted monthly, an updated schedule must be submitted monthly to the Government. The Monthly NAS update must be submitted within 10 calendar days of the data date.

b. Provide all items listed in paragraph REQUIRED TABULAR REPORTS AND NATIVE P6 XER FILES, with each monthly NAS update submittal.

c. Meet with Government representative(s) at monthly intervals to review and agree on the information presented in the updated project schedule. The submission of an accepted, updated schedule to the Government is a condition precedent to the processing of the Contractor's invoice.

d. Activity progress must incorporate as-built events as they occurred and correspond to records including but not limited to submittals and daily production and quality control reports. Software Settings: Handle schedule calculations and Out-of-Sequence progress (if applicable) through Retained Logic, not Progress Override. Show all activity durations and float values in days. Show activity progress using Remaining Duration. Set default activity type to "Task Dependent".

e. Update schedule must reflect current Contract Completion Date and contract value in accordance with all conformed contract modifications issued prior to data date of NAS update.

1.4.2 As-Built Schedule

As a condition precedent to the release of retention and making final payment, submit an "As-Built Schedule," as the last schedule update showing all activities at 100 percent completion. This schedule must reflect the exact manner in which the project was actually constructed.

1.5 CORRESPONDENCE AND TEST REPORTS

Reference Schedule activity IDs that are being addressed in each correspondence (e.g., letters, Requests for Information (RFIs), e-mails, meeting minute items, Production and QC Daily Reports, material delivery tickets, photographs) and test report (e.g., concrete, soil compaction, weld, pressure).

1.6 ADDITIONAL SCHEDULING REQUIREMENTS

Other specification sections may include additional scheduling requirements, including systems to be inspected, tested and commissioned, and submittal procedures. Those schedule requirements must be incorporated into the NAS schedule.

1.7 SUBMITTALS

****

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets

following the "G" classification, with a code of up to three characters 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.**

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

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

****

****

NOTE: **For DB, delete 01 33 00, SUBMITTAL PROCEDURES, and replace with 01 33 00.05 20, CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20, DESIGN SUBMITTAL PROCEDURES.**

****

Government approval/acceptance is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

****

NOTE: For projects in the NAVFAC PAC Area of Operation, and for the submittals identified as SD-01 Preconstruction Submittals, select the "G" designation requiring Government approval for Baseline NAS and Construction Baseline NAS. Remove the "G" designation for Designated Project Scheduler.

****

Baseline NAS; G[, [_____]]

Construction Baseline NAS; G[, [_____]]

Designated Project Scheduler; G[, [_____]]

SD-07 Certificates

Three-Week Look Ahead Schedule; G[, [_____]]

Monthly Network Analysis Updates; G[, [_____]]

SD-11 Closeout Submittals

As-Built Schedule; G[, [_____]]

1.8 SOFTWARE

Prepare and maintain project schedules using Primavera P6 software in a version compatible with Government's current version. Importing data into P6 using data conversion techniques or third party software is cause for rejection of the submitted schedule. Schedules with Performing Organizational Breakdown Structure (POBS) data is cause for rejection.

1.9 DESIGNATED PROJECT SCHEDULER

****
NOTE: For projects in the NAVFAC PAC Area of Operation, remove the bracketed portion.
****

Within 30 calendar days of contract award, submit [to the Contracting Officer for approval an individual]who will serve as the Designated Project Scheduler. Include a copy of the candidate's resume with qualifications. The Contracting Officer may remove the Designated Project Scheduler, and require replacement, if the scheduler does not effectively fulfill their duties in accordance with the contract requirements. Payment request will not be processed without an approved Designated Project Scheduler.

1.9.1 Qualifications

The Designated Project Scheduler must have prepared and maintained at least three previous construction schedules, of similar size and complexity to this contract, using Primavera P6.

1.9.2 Duties

****
NOTE: In item f., select one of two options concerning the meeting between the Designated Scheduler, Prime Contractor, and Government Representative. Select the first option for most projects. Only select the second option if specifically requested by the FEAD/ROICC office because requiring job site visits by the scheduler will likely add significant cost to the project.
****

Duties of the Designated Project Scheduler:

a. Prepare Baseline NAS.

b. Prepare monthly schedule updates.

c. Prepare tabular reports.

d. Prepare Time Impact Analysis (TIA) as necessary.

e. Provide certification that NAS and TIA submittals conform to the

contract requirements.

f. Participate with the Prime Contractor and Government Representative in a monthly [teleconference call,][meeting at the job site in-person,] and scheduled with sufficient time to support the Monthly Network Analysis Updates process, to discuss project status, schedule updates, critical activities, potential delays, and contract modifications impacting the schedule. Have a computer with P6 software available during the meeting.

1.10 NETWORK SYSTEM FORMAT

Prepare the schedule in accordance with the following Primavera P6 settings and parameters. Deviation from these settings and parameters, without prior consent of the Contracting Officer, is cause for rejection of schedule submission.

1.10.1 Schedule Activity Properties and Level of Detail

1.10.1.1 Activity Identification and Organization

****

NOTE: Item a. contains tailoring for Design-Build projects, and item e. contains tailoring for sections used in Design-Bid-Build and Design-Build.

****

a. Identify design and construction activities planned for the project and other activities that could impact project completion if delayed in the NAS.

b. Each activity must have a unique name.

c. Identify administrative type activity/milestones, including all pre-construction submittal and permit requirements prior to demolition or construction stage.

d. Include times for procurement, Contractor quality control and construction, acceptance testing and training in the schedule.

e. Include the Government approval time required for the submittals that require Government Approval prior to construction, as indicated in Section 01 33 00 SUBMITTAL PROCEDURES Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

f. Create separate activities for each Phase, Area, Floor Level and Location the activity is occurring.

g. Do not use construction category activity to represent non-work type reference (e.g. Serial Letter, Request for Information) in NAS. Place Non-work reference within the P6 activity details notebook.

Activity categories included in the schedule are specified below.

1.10.1.2 Activity Logic

a. With the exception of the Contract Award and Contract Completion Date (CCD) milestone activities, activity must not be open-ended; each activity must have at least one predecessor and at least one successor.

b. Activities must not have open start or open finish (dangling) logic.

c. Do not use lead or lag logic without Contracting Officer prior approval.

d. Minimize redundant logic ties.

e. Once an activity exists on the schedule it must not be deleted or renamed to change the scope of the activity and must not be removed from the schedule logic without approval from the Contracting Officer.

(1) While an activity cannot be deleted, where said activity is no longer applicable to the schedule, but must remain within the logic stream for historical record, change the activity original and remaining duration to zero and clearly label "(NO LONGER REQUIRED)" after the activity name. Actual finish date for activity that falls behind the data date. Redistribute accordingly any remaining budget associated with that activity, to other remaining appropriate activity.

(2) Document any such change in the activities' "Notebook," including a date and explanation for the change.

(3) The ID number for a "NO LONGER REQUIRED" activity must not be re-used for another activity.

1.10.1.3 Longest Path Activity Baseline Limitation

****

NOTE: Retain 30 percent threshold baseline in the bracketed item for most projects. However, for horizontal construction, and the more linear a project, (for example, sidewalk, roadway, fence) this threshold may be increased accordingly to as much as 80 percent, depending on the type of project. Consult with FEC scheduler if additional guidance is needed.

****

For P6 settings, critical activities are defined as being on the Longest Path. Longest Path (Critical) Activities must not make up more than [30 percent] [_____] of all activity within the Construction Baseline Schedule.

1.10.1.4 Assigned Calendars

All NAS activity must be assigned calendars that reflect required and anticipated non-work days.

1.10.1.5 Activity Categories

1.10.1.5.1 Design Activities

****

NOTE: This paragraph is tailored for Design-Build projects.

****

Design activities must include design decision points and design submittal

packages, including critical path submittals for Fast Tracked Phases. Review times for design development packages must be included in the schedule. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES, for specific requirements.

1.10.1.5.2 Pre-construction Activities

Examples of pre-construction activities include, but are not limited to, bond approval, permits, pre-construction submittals and approvals. Include pre-construction activities that are required to be completed prior to the Contractor starting the demolition or construction stage of work.

1.10.1.5.3 Procurement Activities

Examples of procurement activities include, but are not limited to: Material/equipment submittal preparation, submittal and approval of material/equipment; material/equipment fabrication and delivery, and material/equipment on-site. As a minimum, separate procurement activities must be provided for critical items, long lead items, items requiring Government approval and material/equipment procurement for which payment will be requested in advance of installation. Show each delivery with relationship tie to the Construction Activity specifically for the delivery.

1.10.1.5.4 Government Activities

****

NOTE: The paragraph below includes Design-Build tailoring for Design and Construction Start activities.

****

Government and other agency activities that could impact progress must 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, Design Start, Construction Start (including Design/Construction Start for each Fast-Track Phase, and delivery of Government Furnished Material/Equipment.

1.10.1.5.5 Construction Quality Management (CQM) Activities

The Preparatory and Initial Phase meetings for each Definable Feature of Work identified in the Contractor's Quality Control Plan must be included in the Three-Week Look Ahead Schedule. Preparatory and Initial phase meetings are not required in the NAS, but can be represented by a start milestone linked to successor parent Construction Activity. The Follow-up Phase must be represented by the Construction Activities themselves in the NAS.

1.10.1.5.6 Construction Activities

****

NOTE: The paragraph below includes tailoring for NAVFAC SE.

****

On-site construction activities must not have a duration in excess of 20

working days. Contractor activities must be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days, unless otherwise defined in this contract. Federal Holidays are as defined in 5 USC 6103.

1.10.1.5.7 Turnover and Closeout Activities

Include activities or milestones for items on the NAVFAC Red Zone Checklist/POAM that are applicable to this project. As a minimum, include required Contractor testing, required Government acceptance inspections on equipment, Pre-Final Inspection, Punch List Completion, Final Inspection and Acceptance. Add an unconstrained start milestone for the initial NAVFAC Red Zone - Facility Turnover Planning Meeting at approximately 75 percent construction contract completion or six months prior to Contract Completion Date (CCD), whichever is sooner.

1.10.1.5.8 Testing of HVAC - DALT, TAB, and PVT Activities

****
NOTE: Use this paragraph when Section 23 05 93 TESTING, ADJUSTING AND BALANCING FOR HVAC and Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC are included in the contract specifications; otherwise, delete. This paragraph is tailored for TABS.
****

Include in the baseline schedule, activities and milestones associated with Government acceptance of Duct Air Leakage Test (DALT), Testing, Adjusting, and Balancing (TAB) and Performance Verification Test (PVT) as required and in accordance with Section 23 05 93 TESTING, ADJUSTING AND BALANCING FOR HVAC and Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

a. Identify the general area or location(s) for Government Acceptance Testing of DALT, TAB and PVT.

b. Incorporate into the baseline schedule, time periods required for advance notification of work, and Government submittal review in accordance with Section 23 05 93 TESTING, ADJUSTING AND BALANCING FOR HVAC, paragraph DALT AND TAB SUBMITTAL AND WORK SCHEDULE.

c. Include the following as schedule activities or milestones:

(1) Pre-DALT/TAB/PVT Meeting

(2) TAB Design Review Report, Government review

(3) TAB Pre-Field Engineering Report, Government review

(4) DALT Field Work

(5) DALT Field Acceptance Testing

(6) Certified Final DALT Report, Government review

(7) Control Contractors PVT Plan, Government review

(8) Equipment Suppliers PVT Plan, Government review

(9) Season I TAB Field Work

(10) Season I Certified Final TAB Report, Government review

(11) Endurance Testing, Government review

(12) PVT Field Work

(13) PVT Report, Government review

(14) Season I TAB Field Acceptance Testing

(15) Season II TAB Field Work

(16) Season II Certified Final TAB Report, Government review

(17) Season II TAB Field Acceptance Testing

****
NOTE: Insert the following when required by, and coordinate the post-occupancy endurance testing and post occupancy PVT Field Work with, Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.
****

[(18) Post-Occupancy Endurance Testing Government review

(19) Post-Occupancy PVT Field Work

]1.10.1.5.9 Commissioning Activities

****
NOTE: This paragraph is tailored for Commissioning (CX). Use this paragraph if Section 01 91 00.15 20 (for Navy projects) or 01 91 00.15 10 (for Army and Air Force projects) TOTAL BUILDING COMMISSIONING is included in the contract specifications.
****

Include in the baseline schedule activities and milestones associated with Commissioning.

a. Identify the general area or location(s) of systems for Commissioning Inspection and Testing

b. Incorporate into the baseline schedule time periods for Government submittal review

1.10.1.6 Contract Milestones and Constraints

1.10.1.6.1 Project Start Date Milestones

Include as the first activity on the schedule a start milestone titled, "Contract Award", which must have a Mandatory Start constraint equal to the Contract Award Date.

1.10.1.6.1.1 Design Phase Completion Milestone

****
NOTE: This paragraph is tailored for Design-Build projects.
****

Include an unconstrained finish milestone on the schedule titled, "Design Phase Completion". Design Phase Completion is defined as the point in time when all design requirements are complete and approved. Duration for Government review and approval must be included as predecessor activities to Design Phase Completion.

1.10.1.6.1.2 Post-Award Kickoff (PAK) meeting Milestone

Include an unconstrained finish milestone on the schedule titled, "Post-Award Kickoff Meeting". The Post Award Kickoff Meeting may be a single day, or it may range over several days. The intent is to cover all PAK topics, including Partnering and Concept Design Workshop (if required) in one continuous session.

1.10.1.6.2 Pre-Construction Meeting Milestone

****
NOTE: This paragraph is tailored for Design-Bid-Build projects.
****

Include an unconstrained finish milestone on the schedule titled, "Pre-Construction Meeting". The Pre-Construction meeting may be a single day, or it may range over several days. The intent to cover all the Pre-Con topics, including Partnering and DD1354.

1.10.1.6.3 Preconstruction Submittals Finish Milestone

Include an unconstrained finish milestone on the schedule titled, "Preconstruction Submittals". This milestone is complete when all required preconstruction submittals have been reviewed and approved by the Government.

1.10.1.6.4 Contractor Mobilization Finish Milestone

Include an unconstrained finish milestone on the schedule titled, "Contractor Mobilization".

1.10.1.6.5 NAVFAC Red Zone - Facility Turnover Planning Meeting Milestones

See paragraph TURNOVER AND CLOSEOUT ACTIVITIES above.

1.10.1.6.6 Substantial Completion Milestone

Include an unconstrained finish milestone on the schedule titled "Substantial Completion." Substantial Completion is defined as the point in time the Government would consider the project ready for beneficial occupancy wherein by mutual agreement of the Government and Contractor, Government use of the facility is allowed while construction access continues in order to complete remaining items (e.g. punch list and other close out submittals). Include a separate Substantial Completion Milestone for each phase if the contract requires construction to be

completed in phases.

1.10.1.6.7 DD-1354 Finish Milestone

Add unconstrained finish milestone, titled "DD-1354" and scheduled 30 calendar days prior to Substantial Completion, whenever a Form DD-1354 is required in accordance with Section 01 20 00 PRICE AND PAYMENT PROCEDURES.

1.10.1.6.8 Projected Completion Milestone

****
NOTE: Section 01 45 00.00 20 QUALITY CONTROL is tailored for Design-Bid-Build Section 01 45.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL is tailored for Design-Build in paragraph below.
****

Include an unconstrained finish milestone on the schedule titled "Projected Completion." Projected Completion is defined as the point in time all contract requirements are complete and verified by the Government with a successful Final Inspection in accordance with Section 01 45 00.00 20 QUALITY CONTROL Section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL. This milestone must have the Contract Completion Date (CCD) milestone as its only successor.

1.10.1.6.9 Contract Completion Date (CCD) Milestone

Last schedule entry must be an unconstrained finish milestone titled "Contract Completion (CCD: DD-MM-YY)." DD-MM-YYYY is the current contract completion date at data date, day-month-year corresponding to P6 Must Finish By Date. NAS milestone updates of Project Completion finish date for longest path must reflect calculated float as positive or negative based on CCD. Calculation of schedule updates must be such that if the finish of the "Projected Completion" milestone falls after the contract completion date, then negative float is calculated on the longest path. If the finish of the "Projected Completion" milestone falls before the contract completion date, the float calculation must reflect positive float on the longest path.

1.10.1.6.10 Additional Milestones

Provide up to 5 additional milestones as required by Contracting Officer.

1.10.1.7 Work Breakdown Structure & Activity Code

At a minimum, establish a Work Breakdown Structure (WBS) and provide activity codes identified as follows:

1.10.1.7.1 Work Breakdown Structure (WBS)

Group all activities and milestones within appropriate WBS categories including, at a minimum, the following:

****
NOTE: The following items a.(4) and a.(5) are tailored for Design-Build Contracts.
****

a. Project Milestones:

(1) Management Milestones

(2) Project Administrative Meetings

(3) Permits

(4) Design Phase

(5) Submittals and Reviews

b. Pre-Construction Phase:

(1) Submittals and Reviews

(2) Procurement

(3) Mobilization

c. Construction Phase: Create multiple sub-sections in accordance with project specific categories of work including in WBS descending order as follows:

(1) General Area

(a) Type of Work Item

1. Location

****
NOTE: The following item d. is tailored for Commissioning. Use this paragraph if Section 01 91 00.15 20 (for Navy projects) or 01 91 00.15 10 (for Army and Air Force projects) TOTAL BUILDING COMMISSIONING is included in the contract specifications.
****

d. Commissioning & Testing:

(1) Specific area/locations of commissioning

(2) Final Testing

(3) Training

di. Project Closeout: Include activity items such as, but not limited to, Punchlist, Demobilization, O&M, As-built Drawings, Training, and As-built NAS.

dii. Modifications: Create sub-category of Conformed and Non-Conformed under Modification WBS. Create multiple sub-sections as the project progresses identified by issue and Fragnet placed in Conformed for modifications issued prior data date, or Non-Conformed for issues not modified to contract prior data date.

diii. Removed Activity: Activity is "removed" by remaining within logic sequence, eliminating duration and adding "(NO LONGER REQUIRED)" after Activity Name in Activity Table.

1.10.1.7.2 Responsibility Code

All activities in the project schedule must be identified with the resource for completing the task. Activities must not belong to more than one responsible party.

1.10.1.7.3 Activity Category Code

Provide user defined "CAT" codes for Project Level activity codes. Use the following codes:

****
NOTE: The following item h. is tailored for Design-Build Contracts.
****

a. Assign "PROC" value to Procurement type activity

b. Assign "PRE-CON" value to Pre-construction activity

c. Assign "CONS" value to Construction type activity

d. Assign "TEST" value to dedicated testing type activities

e. Assign "CX" value to dedicated Commissioning type activities

f. Assign "CLOS" value to dedicated Close Out type activity

g. Assign "OTHR" to other activity not otherwise designated

h. Assign "DSGN" value to Design type activity

[1.10.1.7.4 Construction Specification Institute (CSI) Masterformat Code

****
NOTE: Retain either or both of the following two paragraphs where justified by project complexity.
****

Provide up to an additional five activity codes as required by the Contracting Officer.

][1.10.1.7.5 Drawing Code

Identify all activities in the project schedule with its respective Drawing Code. The Drawing Code is the Sheet Number on the primary project drawing which indicates work to be performed. If an activity does not have an applicable Drawing Code (e.g. Mobilize), the code must be "0000".

]1.10.1.8 Adverse Weather Lost Work Days

****
NOTE: Check with the FEC's Scheduling Subject Matter Expert or with the FEAD/ROICC for known site-specific Adverse Weather Delays to determine how to edit this paragraph. If historical data is not available, choose the first paragraph using NOAA historical monthly averages as the basis for

establishing non-workdays. Note that NOAA historical data may not be available for all OCONUS locations.

If the historical adverse weather data is available, use the second paragraph and table and populate the table with the known data. Insert the data for each month in the blank, bracketed item provided. A bracketed choice of 2 days per month is provided only as an option to remind the Designer to insert the actual data.

****

[Use the National Oceanic and Atmospheric Administration's (NOAA) Summary of Monthly Normals report to obtain the historical average number of days each month with precipitation, using a nominal 30-year, greater than 2.5 mm 0.10 inch precipitation amount parameter, as indicated on the Station Report for the NOAA location closest to the project site as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, in addition to Saturdays, Sundays and all Federal Holidays as non-work days.

][Use the following schedule of anticipated monthly non-work days due to adverse weather as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, in addition to Saturdays, Sundays and all Federal Holidays as non-work days.

MONTHLY ANTICIPATED ADVERSE WEATHER LOST WORK DAY											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
[2][_]	[2][_]	[2][_]	[2][_]	[2][_]	[2][_]	[2][_]	[2][_]	[2][_]	[2][_]	[2][_]	[2][_]

] Assign the Weather Calendar to any activity that could be impacted by adverse weather. The Contracting Officer will issue a modification in accordance with the contract clauses, giving the Contractor a time only extension for the difference of days between the anticipated and actual adverse weather delay if the number of actual adverse weather delay days exceeds the number of days anticipated for the month in which the delay occurs and the adverse weather delayed activities are on the longest path to contract completion in the period when delay occurred. A lost workday due to weather conditions is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity. Impacts resulting from adverse weather must be documented in Narrative Report for the month that it occurred.

Make changes to P6 project calendars to reflect as-built conditions where work occurred where originally anticipated as non-work days, and where work did not occur (lost work day).

[1.10.1.9 Anticipated Restricted Delays

****

NOTE: Use this paragraph if base access restrictions are anticipated during the project timeframe; otherwise, delete. Revise number of days and period of time as appropriate for project

specific requirements.
****

Unless otherwise noted or defined in Section 01 14 00 WORK RESTRICTIONS, allow in the schedule one [_____] lost workday for every two months [_____] of project duration for instances where base access is not permitted or where work areas are temporarily not accessible for security reasons which causes a delay in the work. Use Anticipated Restricted Delays as basis for establishing a "Security Calendar" showing the number of anticipated non-workdays for each month due to anticipated restrictions, in addition to anticipated adverse weather, Saturdays, Sundays and all Federal Holidays as non-work days. Assign the Security Calendar to any activity that could be impacted by restriction delays. The Contracting Officer will issue a modification in accordance with the contract clauses, giving the Contractor a time extension for the difference of days between the anticipated and actual lost work days if the number of actual restriction delay days exceeds the number of anticipated for the month in which the delay occurs and the restriction delayed activities are critical to contract completion. A lost workday due to restriction delay is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity.

Impacts resulting from restriction delays must be documented in Narrative Report for the month that it occurred.

Make changes to P6 project calendars to reflect as-built conditions where work occurred where originally anticipated as non-work days, and where work did not occur (lost work day).

]1.10.1.10 Cost Loading

The Project Network Analysis Schedule (NAS) must be cost-loaded and will provide the basis for progress payments. Earned Value Reports must be derived from and correspond to cost loaded NAS. Use the Critical Path Method (CPM) and the Precedence Diagram Method (PDM) to satisfy time and cost applications.

1.10.1.10.1 Cost Loading Activities

****
NOTE: Choose 10 percent in the brackets below, unless FEC or FEAD/ROICC scheduler directs otherwise.
****

Assign material and equipment costs, including their quantities, for which payment will be requested in advance of installation, to their respective procurement activity. Assign labor costs, including their quantities, for material and equipment paid for after installation to their respective construction activities. Include all typical mobilization costs dispersed over early construction activities. Costs for mobilization will not be paid as individual pay items with the exception of batch plant set-up, mobilization of dredging equipment or other similar labor-intensive situations. The value of commissioning, testing and closeout WBS section may not be less than [10] [_____] percent of the total costs for procurement and construction activities. ALL activities assigned Government responsibility will have Zero Cost. No contractor cost should be assigned to an activity designated as a Government responsibility. Do not include field overhead positions as individual pay items. Evenly disperse overhead costs and profit to each activity over the duration of

the project.

1.10.1.10.2 Partial Payment

Breakdown unit of measure and cost must be defined within P6 Activity Detail Expenses for partial payment of any cost loaded activity. Lump sum cost loaded activity will not be partially paid.

1.10.2 Schedule Software Settings and Restrictions

a. Activity Constraints: Date/time constraint(s), other than those required by the contract, are not allowed unless accepted by the Contracting Officer. Identify any constraints proposed and provide an explanation for the purpose of the constraint in the Narrative Report as described in paragraph REQUIRED TABULAR REPORTS.

b. Default Progress Data Disallowed: Actual Start is date work begins on activity with intent to pursue work to substantial completion. Actual Finish is date work is substantially complete to point where successor activity can begin. Actual dates on the CPM schedule must correspond with activity dates reported on the Contractor Quality Control and Production Reports.

c. At a minimum, include the following settings and parameters in P6 Schedule preparation:

(1) General: Define or establish Calendars and Activity Codes at the "Project" level, not the "Global" level.

(2) Admin Drop-Down Menu, Admin Preferences, Time Periods Tab:

(a) Set time periods for P6 to 8.0 Hours/Day, 40.0 Hours/Week, 172.0 Hours/Month and 2000.0 Hours/Year.

(b) Use assigned calendar to specify the number of work hours for each time period: Must be checked.

(3) Admin Drop-Down Menu, Admin Preferences, Earned Value Tab:

(a) Earned Value Calculation: Use "Budgeted values with current dates".

(4) Project Level, Dates Tab:

(a) Set "Must Finish By" date to "Contract Completion Date", and set "Must Finish By" time to 05:00pm.

(5) Project Level, Defaults Tab:

(a) Duration Type: Set to "Fixed Duration & Units".

(b) Percent Complete Type: Set to "Physical".

(c) Activity Type: Set to "Task Dependent".

(d) Calendar: Set to "Standard 5 Day Workweek". Calendar must reflect Saturday, Sunday and all Federal holidays as non-work days. Alternative calendars may be used with Contracting Officer approval.

(6) Project Level, Calculations Tab:

(a) Default Price/Unit for activities without resource or role Price/Units: Set to "$1/h".

(b) Activity percent complete based on activity steps: Must be Checked.

(c) Link Budget and At Completion for not started activities: Must be Checked.

(d) Reset Remaining Duration and Units to Original: Must be Selected.

(e) Subtract Actual from At Completion: Must be Selected.

(f) Recalculate Actual units and Cost when duration percent complete changes: Must be Checked.

(g) Update units when costs change on resource assignments: Must be Unchecked.

(h) Link Actual to Date and Actual This Period Units and Cost: Must be Checked.

(7) Project Level, Settings Tab:

(a) Define Critical Activities: Check "Longest Path".

(8) Work Breakdown Structure Level, Earned Value Tab:

(a) Technique for Computing Performance Percent Complete: "Activity percent complete" is selected.

(b) Technique for Computing Estimate to Complete (ETC): "PF = 1" is selected.

1.10.3 Required Tabular Reports and Native P6 XER Files

Include the following reports with the Baseline, Monthly Update and any other required schedule submittals:

a. Time Scaled Logic Schedule

Provide formatted 11 by 17-inch Time-scaled Logic Schedule in color and landscape-oriented with each schedule submittal. Clearly show activities on the longest path setting Gantt chart longest path activity bars to red. Group activities by WBS and sort by finish date in ascending order. Include the following information in column form for each activity and include accompanying Gantt chart:

(1) Activity ID

(2) Activity Name

(3) Original Duration

(4) Remaining duration

(5) Physical Percent Complete

(6) Start Date

(7) Finish Date

(8) Total Float

b. Previous Monthly Update Comparison Time Scaled Logic Schedule (Submit with all Monthly Update Schedule Submittals.)

Provide formatted 11 by 17-inch Time-scaled Logic Schedule in color and landscape-oriented with each monthly update schedule submittal. Clearly show activities on the current month longest path setting Gantt chart longest path activities bars to red. Show previous month activities as yellow bars and previous month milestones in yellow within Gantt chart. Sort by finish date in ascending order. Filter activities for longest path. Maintain and assign the accepted previous month update or the accepted baseline schedule for the first update submittal as the baseline and primary baseline in P6 before printing the schedule. Include the following information in column form for each activity and include accompanying Gantt chart:

(1) Activity ID

(2) Activity Name

(3) Original Duration

(4) Current Month Remaining Duration

(5) Current Month Start Date

(6) Previous Month Update Start Date (BL Project Start)

(7) Start Date Delta between Current Month and Previous Month (Variance - BL Project Start Date)

(8) Current Month Finish Date

(9) Previous Month Finish Date (BL Project Finish)

(10) Finish Date Delta between Current Month and Previous Month (Variance - BL Project Start Date)

(11) Current Month Total Float

c. P6 native XER file: Include the back-up native .xer program file compatible with the Government version of P6. Each native schedule file must have a unique file name to include project name and data date using (yyyy-mm-dd) convention. Each native schedule must have a unique Project ID and Project Name.

d. Log Report: P6 Scheduling/Leveling Report.

e. Narrative Report: Identify and justify:

(1) Provide Project Summary Data in format below:

(a) Data Date _____

(b) Award Date: _____

(c) Original Project Duration: _____ days post Award Date

(d) Current Project Duration: _____ days post Award Date

(e) Time percent elapsed: _____ percent at data date

(f) Original CCD: _____

(g) Current CCD: _____ (thru MOD _____)

(h) Anticipated CCD: _____ (___ calendar days early/late)

(i) Original Contract Value: $_____

(j) Current Contract Value: $_____

(k) Invoiced Amount: $_____ (____ percent)

(l) Cost Growth: ____ percent

(m) Schedule Growth: ____ percent

(n) There are a total of _____ activities, _____ activities complete (____ percent), ____ activities in progress (____ percent), _____ activities not started (____ percent). Of the in progress and not started activities; ____ (____ percent) are on the longest path. The longest path has duration of _____ calendar days from data-date to anticipated project completion.

(2) Progress made in each area of the project;

(3) Longest Path;

(4) Date/time constraint(s), other than those required by the contract

(5) Listing of all changes made between the previous schedule and current updated schedule include: added or deleted activities, original and remaining durations for activities that have not started, logic (sequence constraint lag/lead), milestones, planned sequence of operations, longest path, calendars or calendar assignments, and cost loading;

(6) Any decrease in previously reported activity Earned Amount;

(7) Pending items and status thereof, including permits, changes orders, and time extensions;

(8) Status of Contract Completion Date and interim milestones;

(9) Status of Projected Completion Milestone and account of difference in calendar days between previous update Projected Completion Milestone

(10) Current and anticipated delays listing Activity Names and IDs for

impacted activities(describe cause of delay and corrective actions(s) and mitigation measures to minimize);

(11) Description of current and potential future schedule problem areas.

(12) Identification of any weather and restricted lost time as compared to anticipated weather for the month and anticipated restricted days for which the update is submitted. Impacts resulting from adverse weather must be documented in tabular form showing the calendar month (or billing period) with the days on which construction activity incurred Lost Work Days due to adverse weather. In narrative form, describe the adverse weather cause such as precipitation measurement, temperature, wind or other influencing factors, and why work was impacted. Describe the construction activity(s) that was (were) scheduled, impacted.

Each entry in the narrative report must cite the respective Activity ID and Activity Name, the date and reason for the change, and description of the change.

f. Earned Value Report: Derive from and correspond to P6 cost loaded schedule. List all activities having a budget amount cost loaded. Compile total earnings on the project from notice to proceed to current progress payment request. Show current budget, previous physical percent complete, to-date physical percent complete, previous earned value, to-date earned value, cost this period and cost to complete on the report for each activity.

g. Schedule Variance Control (SVC) Diagram: With each schedule submission, provide a SVC diagram showing 1) A Cash Flow Curve indicating planned project cost based on each of projected early and projected late activity finish dates and 2) one curve for Earned Value to-date. Revise Cash Flow Curves when the contract is modified, or as directed by the Contracting Officer Include a legend on report clearly indication 3 curves: early finish, late finish, and earned-value to date.

Use the following settings in Activity Usage Profile Options:

(1) In the Data section, under Display, the radio box for Cost must be selected.

(2) In the Data section, under Filter for Bars/Graphs, the checkbox for Total must be checked.

(3) In the Show Bars/Curves section:

(a) Under the By Date column, the checkboxes for Baseline, Actual and Remaining Late must be checked. The checkboxes for Budgeted and Remaining Early must be unchecked.

(b) Under the Cumulative column, the checkboxes for Baseline, Actual and Remaining Late must be checked. The checkboxes for Budgeted and Remaining Early must be unchecked.

(c) Set the color for Baseline to green.

(d) Set the color for Actual to blue.

(e) Set the color for Remaining Late to red.

(4) In the Show Earned Value Curves section, the checkboxes for Planned Value Cost, Earned Value Cost and Estimate at Completion must be unchecked.

h. Logic Diagram showing timescale from data date to 60 days after data date with filter for longest path. Leave Group By selection blank and sort by finish date in ascending order.

i. Baseline or Monthly Update Checklist as applicable completed and certified by Qualified Scheduler. Baseline Project Schedule and Monthly Update Schedule Checklists can be found on the Whole Building Design Guide website at https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-01-32-17-00-20

j. Screen shot PDF of P6 Time Periods Settings referenced in paragraph SCHEDULE SOFTWARE SETTINGS AND RESTRICTIONS, list item d.(2): ADMIN DROP-DOWN MENU, ADMIN PREFERENCES, TIME PERIODS TAB

****
NOTE: Retain the following paragraph where justified by project complexity.
****

[k. Daily Reported Production Activity: Submit on a monthly basis, in electronic spreadsheet (format provided by the Government), summary of daily reported production activity for the reporting month in the update schedule. Use the following columns for reporting:

(1) Date

(2) Activity ID

(3) Work Description

(4) Contractor

(5) Billable Hours

]

****
NOTE: Include the following when required for project. See Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.
****

[l. HVAC/COMMISSIONING KTR Checklist. See Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC for checklist requirements. Complete checklist listing all items with baseline submittal. Complete checklist as required to complete project, submitting complete checklist in intermediately following monthly update submittal.

]1.11 CONTRACT MODIFICATION

1.11.1 Time Impact Analysis (TIA)

Submit a Time Impact Analysis with each cost and time proposal for a proposed change. TIA must illustrate the influence of each change or delay on the Contract Completion Date or milestones. No time extensions will be granted nor delay damages paid unless a delay occurs which consumes all available Project Float, impacts the longest path, and extends the Projected Completion beyond the Contract Completion Date.

a. Each TIA must be in both narrative and schedule form. The narrative must define the scope and conditions of the change; provide start and finish dates of impact, successor and predecessor activity to impact period, responsible party; describe how it originated, and how it impacts the schedule's longest path. The schedule submission must consist of three native XER files:

(1) Fragnet used to define the scope of the changed condition

(2) Most recent accepted schedule update as of the time of the impact start date. Update this schedule to show all activity progress as of the time of the impact start date. The impact start date is identified as the time when an existing activity is impeded for either starting or finishing.

(3) The impacted schedule that has the fragnet inserted in the updated schedule and the schedule "run" so that the new completion date is determined.

b. For claimed as-built project delay, the inserted fragnet TIA method must be modified to account for as-built events known to occur after the data date of schedule update used. Updated schedules for periods following the impact start date will be used to evaluate how the project progressed (as-built) through the finish of impact. Impact to longest path must be determined for each following update period.

c. All TIAs must include any mitigation, and must determine the apportionment of the overall delay assignable to each individual delay. Apportionment must provide identification of delay type and classification of delay by compensable and non-compensable events. The associated narrative must clearly describe analysis methodology used, and the findings in a chronological listing beginning with the earliest delay event.

(1) Identify and classify types of delay defined as follows:

(a) Force majeure delay (e.g. weather delay): Any delay event caused by something or someone other than the Government or the Contractor, or the risk of which has not been assigned solely to the Government or the Contractor. If the force majeure delay is on the longest path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, classified as a non-compensable event.

(b) A Contractor-delay: Any delay event caused by the Contractor, or the risk of which has been assigned solely to the Contractor. If the contractor-delay is on the longest path, in absence of other types of concurrent delays, Contractor is not granted

extension of contract time, and classified as a non-compensable event. Where absent other types of delays, and having impact to project completion, Contractor must provide to Contracting Officer a Corrective Action Plan identifying plan to mitigate delay.

(c) A Government-delay: Any delay event caused by the Government, or the risk of which has been assigned solely to the Government. If the Government-delay is on the longest path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, and classified as a compensable event.

(2) Functional concurrency must be used to analyze concurrent delays, where: separate delay issues delay project completion, do not necessarily occur at same time, rather occur within same monthly schedule update period at minimum, or within same as-built period under review. If a combination of functionally concurrent delay types occurs, it is considered Concurrent Delay, which is defined in the following combinations:

(a) Government-delay concurrent with contractor-delay: excusable time extension, classified non-compensable event.

(b) Government-delay concurrent with force majeure delay: excusable time extension, classified non-compensable event.

(c) Contractor-delay concurrent with force majeure delay: excusable time extension, classified non-compensable event.

(3) Pacing delay reacting to another delay (parent delay) equally or more critical than paced activity must be identified prior to pacing. Contracting Officer will notify Contractor prior to pacing. Contractor must notify Contracting Officer prior to pacing. Notification must include identification of parent delay issue, estimated parent delay time period, paced activity(s) identity, and pacing reason(s). Pacing Concurrency is defined as follows:

(a) Government-delay concurrent with contractor-pacing: excusable time extension, classified compensable event.

(b) Contractor-delay concurrent with Government-pacing: inexcusable time extension, classified non-compensable event

d. Submit electronic file containing the narrative and the source schedule files used in the time impact analysis.

1.12 PROJECT FLOAT

Project Float is the length of time between the Contractor's Projected Completion Milestone and the Contract Completion Date. Project Float available in the schedule will not be for the exclusive use of either the Government or the Contractor.

The use of Resource Leveling or other techniques used for the purpose of artificially adjusting activity durations to consume float and influence longest path is prohibited.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --